Sydney Metro – Western Sydney Airport

State Significant Infrastructure Assessment (SSI-10051)

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Title: Sydney Metro Western Sydney Airport State Significant Infrastructure Assessment (SSI-10051)

Cover image: Sydney Metro

Glossary

Abbreviation	Definition
BC Act	*Biodiversity Conservation Act 2017*
BDAR	Biodiversity Development Assessment Report
CEEC	Critically endangered ecological community
CNVS	Construction Noise and Vibration Standard
Council	Liverpool City Council or Penrith City Council
CTMF	Construction Traffic Management Framework
DAP	Design Advisory Panel
DAWE	Department of Agriculture, Water and the Environment
Department	Department of Planning, Industry and Environment (DPIE)
DNVIS	Detailed Noise and Vibration Impact Statements
DPI Fisheries	Department of Primary Industries - Fisheries
DPIE ESS	Environment, Energy and Science Group of Department of Planning, Industry and Environment
DPIE Water	The Water Group of Department of Planning, Industry and Environment
DRP	Design Review Panel
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESD	Ecologically Sustainable Development
Heritage Council	Heritage Council of NSW
Heritage NSW	Heritage NSW, Department of Premier and Cabinet (Aboriginal Cultural Heritage Regulation Branch)
HNA	Highly noise affected
ICNG	*Interim Construction Noise Guideline* (EPA 2009)

Infrastructure SEPP	State Environmental Planning Policy (Infrastructure) 2007
KFH	Key fish habitat
LoS	Level of Service
Minister	Minister for Planning and Public Spaces
PCT	Plant community type
Planning Secretary	Secretary of the Department of Planning, Industry and Environment
Proponent	Sydney Metro
RING	*Rail Infrastructure Noise Guideline* (EPA 2013)
Road Authority	Council or Transport for NSW as defined in the *Roads Act 1993*
SSI	State significant infrastructure
TEC	Threatened ecological community
TSC Act	*Threatened Species Conservation Act 1995*
PUDCLP	Place, Urban Design and Corridor Landscape Plan

Executive Summary

The Sydney Metro Western Sydney Airport project involves the construction and operation of a new 23 kilometre metro rail line between St Marys and the Western Sydney Aerotropolis. New metro stations will be built at St Marys, Orchard Hills, Luddenham Road, Airport Business Park, Airport Terminal and Aerotropolis, with operational ancillary facilities at Orchard Hills, Claremont Meadows and Bringelly. The project includes tunnels between St Marys and Orchard Hills, and between Western Sydney International Airport and Aerotropolis Core, and surface and viaduct rail between Orchard Hills and Western Sydney International Airport.

The project will provide a direct, reliable and frequent connection between St Marys and the new Western Sydney Aerotropolis and is crucial to the success of the airport and Western Sydney Aerotropolis.

The project complies with the objects of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and is consistent with the Government's key priorities and transport planning framework. The project is Critical State significant infrastructure under section 5.13 of the EP&A Act. The Minister for Planning and Public Spaces is the approval authority.

The Department considers the environmental impacts of construction and operation acceptable, subject to implementation of appropriate mitigation and management measures and compliance with the Department's recommended conditions of approval. The Department considers that the project is in the public interest.

Community engagement

The EIS was on exhibition from Wednesday 21 October 2020 until Wednesday 2 December 2020 (a total of 43 days) on the Department's Major Projects website. 32 submissions and eight NSW Government agencies' comments were received during the exhibition period. Of the 32 submissions, three were from local councils, nine were from special interest groups and 20 were from community members. Eight submissions were in support of the project, six submissions objected and 18 submissions provided comments only. No council or government agencies objected to the project.

The key issues raised by the community and considered in this report include traffic impacts during construction and operation; noise impacts during construction and operation; land fragmentation and acquisition; visual impacts; and cumulative impacts from construction of the Western Sydney International Airport, the Northern Road Upgrade and the proposed Sydney Metro Western Sydney Airport (this project).

Key assessment issues

Socioeconomic, land use and property

61 properties, encompassing 416 hectares of land, will be acquired for the project and 11 properties will be leased during construction. The Department acknowledges property acquisition would result in a range of social and economic impacts, particularly for the owners of those properties, but accepts that acquisitions are necessary for large-scale infrastructure projects. Acquisitions will be managed in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* and through the

Proponent's commitment to appoint Acquisition Managers and Personal Managers to support landowners, in accordance with Government practice for property acquisition.

The Department recognises that substantial land use change would occur as the surrounding area is transformed. The project has been identified as a key transport connection in regional and metropolitan land use planning and the Department considers the project as key enabling infrastructure for the growth of the Western Sydney Aerotropolis.

The project would deliver broad economic benefits but will impact on economic activity in St Marys in the short term. Businesses will be supported through a Small Business Owners Engagement Plan to minimise impacts.

Place, urban design and landscape

The project includes a comprehensive urban design framework to facilitate good design along the rail corridor and station precincts, improve active transport connectivity with existing land uses, and respond to existing and emerging contexts. The design of stations, bridges and viaducts and the project's landscaping will be refined prior to construction. The NSW Government Architect will convene a Design Review Panel to provide independent expert advice to this design process, in consultation with councils and landowners.

The project has minor to moderate visual impacts on current residents that will be mitigated or will be more substantially influenced through the development of the Western Sydney Aerotropolis.

Noise and vibration

Above ground construction activities will generally be subject to standard construction hours. The greatest noise impacts to adjoining residents and business would be station box excavation activities at St Marys and Orchard Hills, which would result in 50 residences experiencing construction noise above the highly affected noise level under standard construction activities. The Department recommends that the Proponent identify and implement specific mitigation measures so that construction noise impacts at residences and other sensitive receivers are reduced. These mitigation measures apply in addition to typical mitigation measures, such as quiet work practices, enclosing noisy equipment, use of respite periods and ongoing community and business consultation.

Underground tunnelling activities and ancillary surface support activities would be carried out 24 hours per day, seven days per week. The Department notes it is not expected to cause noise impacts to any given receiver over extended time periods. However, the Department considers the Orchard Hills tunnelling site to be sensitive given the proximity to residences, and recommends a condition prohibiting heavy vehicle movements at Orchard Hills between 10:00pm and 7:00am to protect residential amenity.

The project is predicted to comply with operational noise and vibration criteria, with the exception of noise generated at the stabling and maintenance facility at Orchard Hills (north of Patons Lane). To ensure appropriate measures are applied to mitigate these impacts, the Department recommends a condition requiring the Proponent to undertake an Operational Noise and Vibration Review during detailed design. This is a standard approach to undertake further noise modelling as the project's design is further developed and then determine the final suite of noise mitigation measures. Within the first 12 months of the project's operation, a validation exercise will be undertaken to determine

whether the actual operational noise and vibration impacts comply with the predicted detailed design modelling, and if not, whether additional mitigation measures are required.

Traffic and Transport

The project would have limited impact on traffic during construction and operation. Some intersection performance will see minor declines due to construction. The Department considers the Proponent's construction traffic framework is appropriate to manage these impacts. Impacts attributable to the project during operation are also minor, although the Department notes a steady decline in traffic performance due to background traffic growth. The project would cause capacity constraints at three intersections in St Marys. The Department recommends a condition requiring the Proponent to work with the road authority (Councils or TfNSW) to alleviate these constraints.

The Department notes concerns raised in submissions about parking impacts during construction in St Marys. While St Marys is well-serviced by off-street parking, construction workers will cause competition for this parking. The Department is satisfied that the Proponent's construction worker parking strategy will adequately manage impacts on parking availability.

Biodiversity

The project will have direct and indirect impacts to 28.42 hectares of threatened ecological communities and 42.96 hectares of threatened flora and fauna species habitat listed under the *Biodiversity Conservation Act 2017* (BC Act). The Proponent has committed to implementing mitigation measures to reduce impacts, including managing vegetation clearing processes, weed management and provision of nest boxes as alternative fauna habitat.

Impacts to biodiversity values will be offset under the Biodiversity Offsets Scheme, including purchasing and retirement of ecological and species credits, or payment into the Biodiversity Conservation Fund. The Department recommends conditions which specify the ecosystem and species credits required, and preparation and implementation of a Flora and Fauna Management Subplan to manage impacts on biodiversity during construction.

The Department also acknowledges that vegetation clearing necessary for the project will impact on the area's tree canopy cover and recommends a condition requiring that the Proponent replace cleared trees not subject to biodiversity offsets at a ratio of 2:1.

Flooding, hydrology and groundwater

Flooding will generally meet flooding criteria, with localised minor exceedances unlikely to significantly affect the natural or built environment. Surface and groundwater quality is poor, due to historic agricultural land uses in the area and would not be worsened by the project. Ground and surface water will be treated and discharged to meet relevant water quality criteria.

Station excavation and tunnelling will be to a depth of six to 25 metres below ground level. These works would intercept groundwater and will cause limited localised groundwater table drawdown around stations during construction. Stations and tunnels will be sealed from groundwater intrusion during operation, which would minimise ongoing impacts to groundwater. Settlement impacts around station excavations are generally considered to be minor but will be subject to monitoring and independent property review.

Contents

1. Introduction

1.1 Sydney Metro program

Sydney Metro is an independent metro railway system and Australia's biggest public transport program. Sydney Metro's program of works are shown in **Figure 1** and include:

- Sydney Metro North West, between Tallawong and Chatswood, which commenced services in May 2019
- Sydney Metro City & Southwest, between Chatswood and Bankstown via the Sydney CBD, which is currently under construction and is due to commence services in 2024
- Sydney Metro West, between Westmead and the Sydney CBD, determined in March 2021 and construction expected to commence in 2021.
- Sydney Metro Western Sydney Airport (this project).

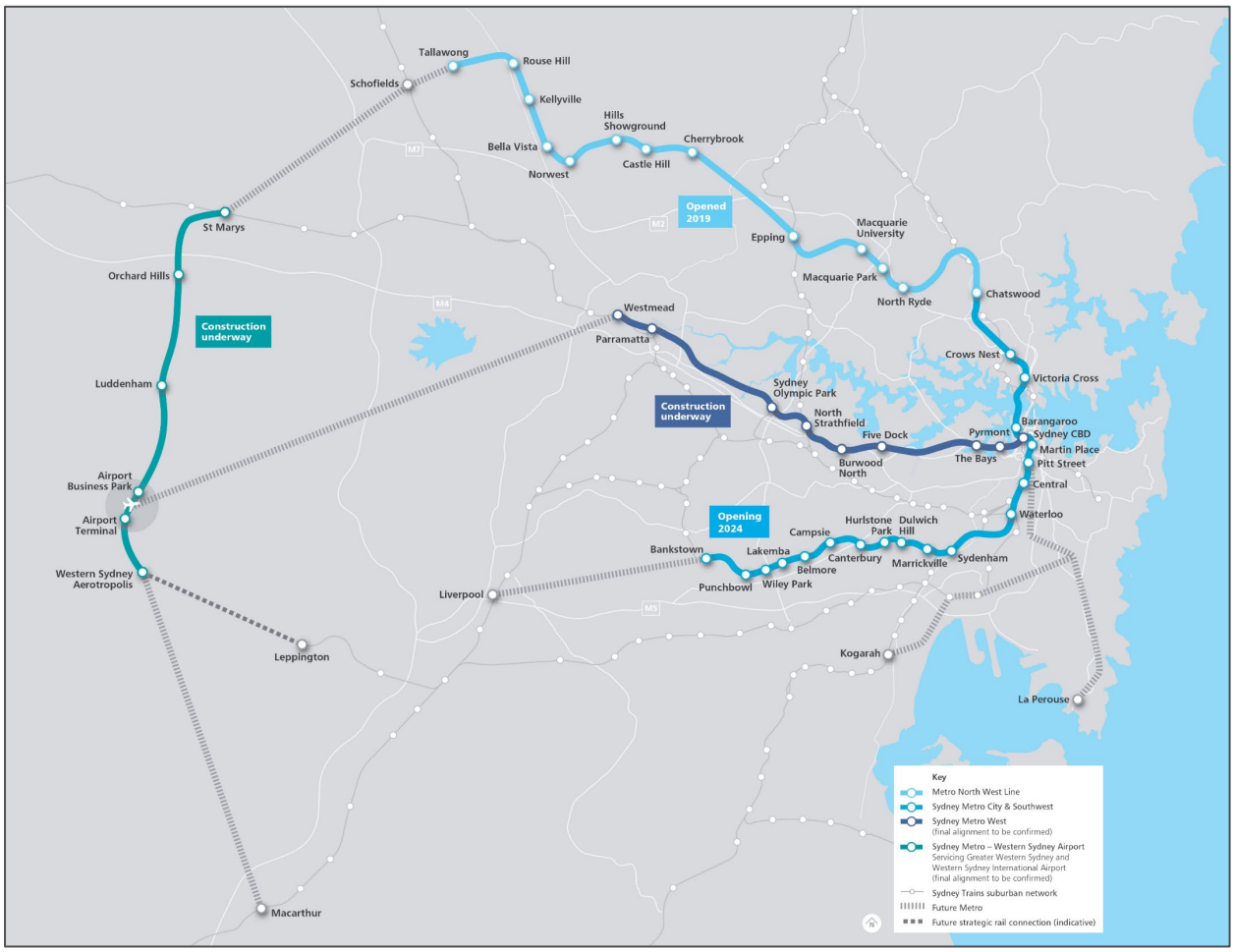

Figure 1 | Sydney Metro network map (Source: Submissions Report)

1.2 Sydney Metro Western Sydney Airport

The Sydney Metro Western Sydney Airport project (the project) is located in the suburbs of St Marys, Orchard Hills, Luddenham, Badgerys Creek and Bringelly in the Penrith and Liverpool local government areas. 5.3 kilometres of the project (two kilometres of surface rail, 2.3 kilometres of tunnel and two underground stations) is on Commonwealth-owned land leased to Western Sydney Airport. The project requires approval under the *Environmental Planning and Assessment Act 1979* (EP&A Act), *Environment Protection and Biodiversity Conservation Act 1999* (Cth) and *Airports Act 1996* (Cth). This report addresses the requirements of the EP&A Act.

The project is a committed initiative identified in the *Greater Sydney Region Plan: A Metropolis of Three Cities – connecting people* (Greater Sydney Commission, 2018), *Building Momentum: NSW State Infrastructure Strategy 2018-2038* (Infrastructure NSW, 2018) and *Future Transport Strategy 2056* (TfNSW, 2018).

The project will provide a direct, fast, reliable and frequent connection between St Marys and the new Western Sydney Aerotropolis in the south. The project would have the capacity to run a metro train every three minutes in each direction. The project is crucial to the success of both the airport and the Western Parkland City.

2. The Project

2.1 Project description

The Sydney Metro Western Sydney Airport project involves the construction and operation of a new 23 kilometre metro rail line between St Marys and the Western Sydney Aerotropolis Core, within the Penrith and Liverpool local government areas. New metro stations would be built at St Marys, Orchard Hills, Luddenham Road, Airport Business Park, Airport Terminal and the Aerotropolis. The proposed alignment, stations and operational ancillary facilities at Orchard Hills, Claremont Meadows and Bringelly are shown in **Figure 2**.

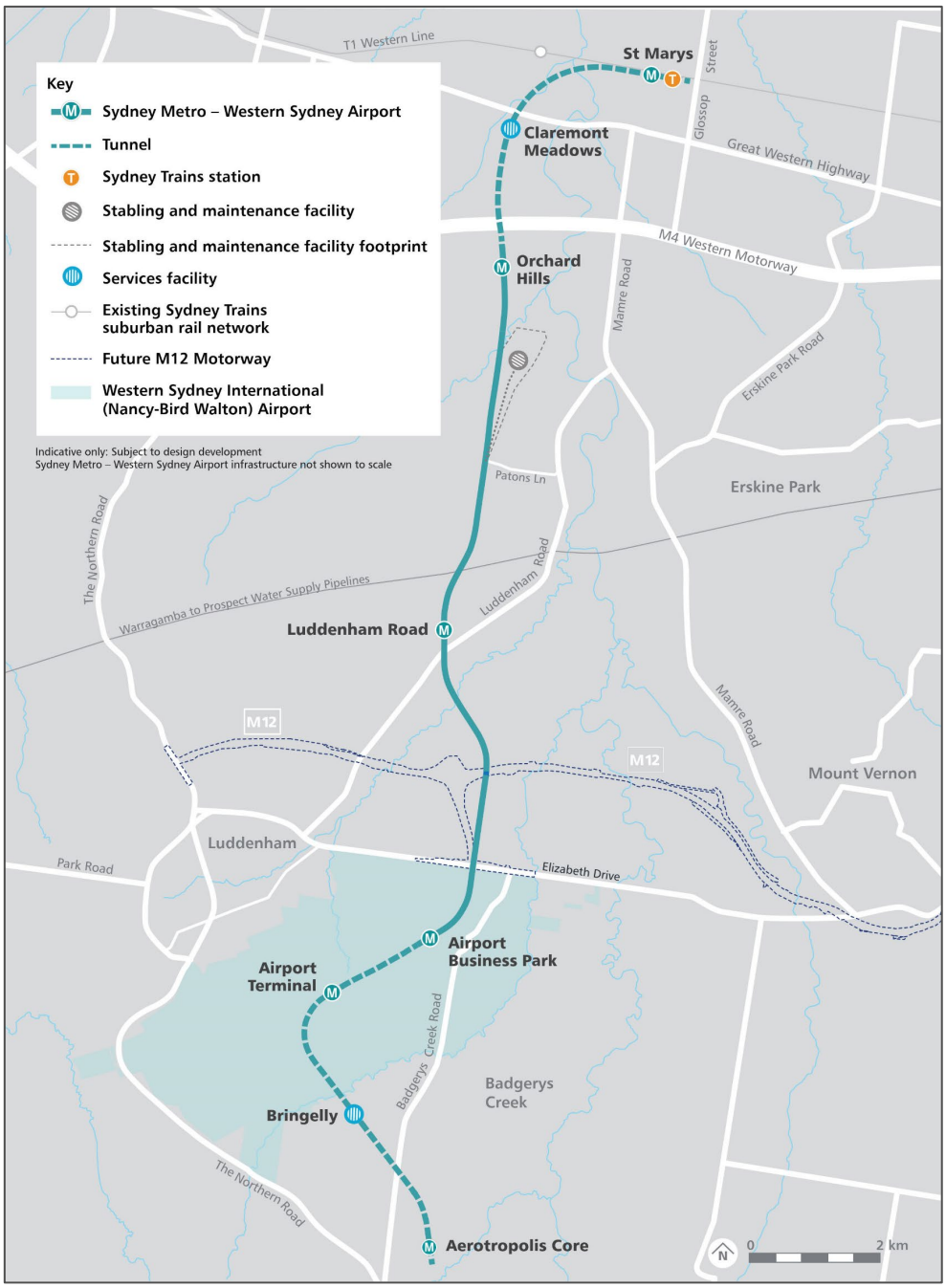

Figure 2 | Project alignment (Source: Submissions Report)

Key components and features of the project are in **Table 1**.

Table 1 | Main components of the project (Source: Submissions Report)

Aspect	Description
Track and corridor alignment	• 4.3 kilometres of twin rail tunnels between St Marys and Orchard Hills • a cut-and-cover tunnel approximately 350 metres long, transitioning to an in-cutting rail alignment south of the M4 Western Motorway at Orchard Hills • 10 kilometres of rail alignment between Orchard Hills and Western Sydney International Airport (a combination of a viaduct and surface rail alignment) • two kilometres of surface rail alignment within Western Sydney International Airport • 3.3 kilometres of twin rail tunnels (including tunnel portal) within Western Sydney International Airport • 3 kilometres of twin rail tunnels between Western Sydney International Airport and Aerotropolis Core.
Metro stations	• new metro stations at St Marys (connected to the existing railway station), Orchard Hills, Luddenham Road, Airport Business Park, Airport Terminal and the Aerotropolis • modifications to the existing Sydney Trains station and rail infrastructure at St Marys to support interchange between the new metro station and existing Sydney Trains suburban rail network • pedestrian links and connections to other modes of transport and surrounding land uses • services within each metro station, including mechanical and fresh air ventilation equipment and electrical power substations to supply power for operation.
Ancillary infrastructure	• a stabling and maintenance facility and operational control centre at Orchard Hills, south of Blaxland Creek and east of the proposed metro track • service facilities at Claremont Meadows and Bringelly for fresh air ventilation and emergency evacuation. • tunnel ventilation systems at the Orchard Hills tunnel portal and Western Sydney International Airport tunnel portal • turnback track arrangements at St Marys and Aerotropolis Core to allow trains to turn back and run in the opposite direction • additional track stubs to the east of St Marys Station and south of Aerotropolis Core Station to allow potential future extension of the line without impacting future metro operations • associated rail infrastructure (including overhead wiring, signalling, access tracks/paths and rail corridor fencing) • traction power supply through dedicated traction substations.
Station sites	• new pedestrian, cycle, park-and-ride and kiss-and-ride facilities, public transport interchange infrastructure, road infrastructure and landscaping as part of station precincts • subdivision of station sites to support integrated station and precinct development and ancillary facilities.

The metro would be a fully automated high-demand, turn-up-and-go service with driverless single deck trains that will interchange with the Sydney Trains network at St Marys. It will operate with three-carriage trains at a service frequency of every five minutes in peak hour. Trains and stations will be fully accessible. Automated station platform screen doors along the length of the platform would open in conjunction with the train doors, increasing passenger safety.

2.2 Construction works

The key construction works are summarised in **Table 2**.

Table 2 | Main construction components of the project (Source: Submissions Report)

Aspect	Description
Site establishment and enabling works	• site investigations and subsequent remediation or clearance works • demolition • transport network adjustments • utility works including protection, adjustment and augmentation • temporary hoarding and fencing • works within and around the T1 Western Line rail corridor • vegetation clearance.
Tunnelling and associated works	• tunnel excavation from St Marys to Orchard Hills and Western Sydney International Airport to Bringelly tunnel with tunnel boring machines retrieved at St Marys and the Aerotropolis Core construction site • tunnel stubs at St Marys and Aerotropolis Core to support potential future extensions.
Station construction	• station excavation and fitout • station precinct and transport integration works.
Ancillary facilities	• temporary shaft excavation • associated building construction • rail and tunnel systems fitout • spoil handling, storage, and transport.
Stabling and maintenance facility	• earthworks and structural work including buildings and internal roads • construction of stabling and maintenance facility rail entry/exit.
Dive structure and tunnel portal construction	• piling along the edge of the dive structure • excavation • placement of precast and cast in-situ concrete for the tunnel portal.
Tunnel rail systems fitout	• ventilation • track slab and rail fastening • rail track installation • electrical cable and equipment installation • overhead power supply installation.
Finishing works	• site stabilisation and rehabilitation • landscaping.

Construction is proposed to be generally undertaken between 7:00 am and 6:00 pm weekdays and 8:00 am to 1:00 pm on Saturdays. However, some works need to be undertaken outside of these hours for safety and operational reasons, including utility works, tunnelling works, tunnel fit-out and associated works, construction during road and rail possessions and spoil haulage. The Department's assessment of construction hours is in **Section 6.3**.

2.3 Timing

Construction will take approximately five years to complete, with the project opening anticipated to align with the opening of the Western Sydney International Airport to passenger services. The indicative timing of the main work phases as set out in the EIS is shown in **Figure 3**. The construction program will be updated and confirmed by the construction contractor once the tender for construction is awarded.

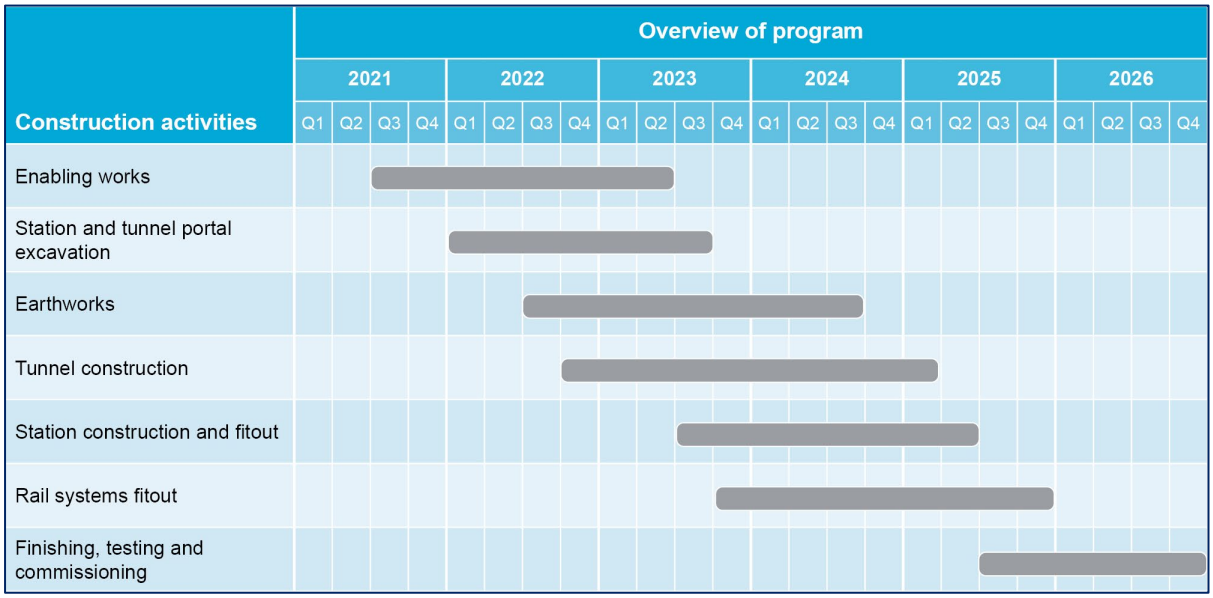

Figure 3 | Indicative construction program (Source: EIS)

2.4 Related development

The NSW and Australian Governments are making significant investments in Western Sydney with the development of Western Sydney International Airport at Badgerys Creek, proposed to be operational by the mid-2020s.

The NSW and Australian Governments are also making significant investment in the transport network to support the future growth and provide reliable access to Western Sydney International Airport and the Western Sydney Aerotropolis. Sydney Metro Western Sydney Airport is one of several transport projects, including the Northern Road Upgrade and M12 Motorway, that form the primary north-south and east-west road access to the airport and Aerotropolis.

The Northern Road Upgrade will provide a minimum four-lane divided road, and up to an eight-lane divided road with dedicated bus lanes between Narellan and South Penrith. The Northern Road Upgrade is being delivered in six stages, with the full upgrade expected to open to traffic in 2022.

The M12 Motorway, a 16-kilometre new four-lane motorway connecting the M7 Motorway with the Western Sydney International Airport and The Northern Road, will also provide direct access between the Western Sydney Airport at Badgerys Creek and Sydney's motorway network. The M12 project was approved by the Minister for Planning and Public Spaces on 23 April 2021, and it is anticipated that construction will commence in 2022 and be completed in 2025.

3. Strategic context

3.1 Strategic justification

The Sydney Metro Western Sydney Airport project will form the mass transit 'spine' that is integral to achieving the strategic vision for the Western Parkland City and economic growth planned for the Western Sydney Aerotropolis.

The *Greater Sydney Region Plan: A Metropolis of Three Cities – connecting people* (Greater Sydney Commission, 2018) established a strategic vision that by 2056, Sydney would transform into a metropolis of three cities where people will live within 30 minutes of their jobs, education, health facilities and services. The Plan identifies a third city, the Western Parkland City, centred around the new Western Sydney International Airport and Aerotropolis.

The population of the Western Parkland City is projected to grow from 740,000 people in 2016 to 1.1 million people by 2036, and to more than 1.5 million people by 2056. The project is essential to integrate transport and land-use planning for the Western Parkland City in a way that responds to forecast population growth. As part of the Sydney Metro program of works, the project is a key piece of infrastructure to support the success of the emerging Western Parkland City and is critical to realising the '30-minute city' vision.

As outlined in the *Greater Sydney Region Plan, Western City District Plan* and *Western Sydney Aerotropolis Plan,* the Western Parkland City is centred around the Western Sydney International Airport and Aerotropolis. The project will safeguard the long-term success of the three cities vision.

An important aspect of *Future Transport Strategy 2056* (TfNSW, 2018), a plan to create and maintain a world-class, safe, efficient, and reliable transport system, is the transition to a three-tier transport system which includes Sydney Metro. *Future Transport 2056* and *Building Momentum: State Infrastructure Strategy 2018-2038* (Infrastructure NSW, 2018) identified the need for a north-south mass transit connection for the Western Parkland City. The project is a committed Government initiative connecting the Aerotropolis and Western Sydney International Airport in the 0-10 year horizon under *Future Transport Strategy 2056*.

The project is also consistent with other NSW and Australian Government strategic planning policies and frameworks including the *2020 Infrastructure Priority List* (Infrastructure Australia, 2020).

3.2 Project justification

The key project benefits are detailed in **Table 3.**

Table 3 | Key project benefits (Source: EIS)

Aspect	Description
Transport benefits	• increased transport network capacity in metropolitan Sydney's passenger rail network • provision of a spinal transport network to service the Western Parkland City, offering reliable and efficient public transport for existing and future residents, customers, and employees in Western Sydney

	• improved accessibility to key centres which are forecast to have significant employment and housing growth including St Marys, the Aerotropolis and Western Sydney International Airport • increased public transport network reach and use, linking precincts along the project corridor that are not serviced by passenger rail • meet forecast demand for passenger rail transport.
Customer benefits	• provide direct, fast and reliable connections to Western Sydney precincts • improved travel times, particularly from St Marys to Western Sydney Aerotropolis • deliver enhanced customer experience to commuters including safety, comfort, and accessibility.
Operational benefits	• increase in operational reliability, efficiency and flexibility in the passenger rail network, including improved resilience to incidents on the rail network • opportunities to optimise the bus network and improve road network traffic conditions for road users • travel time savings for passengers in Western Sydney.
Modal shift benefits	• increase in public transport market share • reduced reliance on private vehicles and associated traffic congestion and pollution.
Other benefits	• support the successful development of Western Sydney International Airport as a nationally significant economic driver • act as a catalyst for economic development, employment generation, planned growth and urban renewal along the mass transit corridor and at stations • enhance social equity with improved access to jobs and housing • supporting the '30-minute city' model.

During construction, the project is expected to support around 14,000 jobs.

3.3 Project development and alternatives

The merits of the project were considered in the context of several alternative options, including:

- improvements to other parts of the public transport network
- improvements to the existing road network
- do nothing/do minimum.

These are summarised in **Table 4**.

Table 4 | Project alternatives

Aspect	Description
Alternative 1 – public transport improvements	The Proponent considered options for investments in active transport, buses, light rail, and heavy rail. These alternative public transport modes do not offer the combination of capacity, reliability and frequency to serve the growth planned for the Western Parkland City and Western Sydney International Airport. The Department is satisfied that metro rail best meets the objectives of providing a frequent and reliable connection to Western Sydney International Airport and the Aerotropolis.

	Construction and operation of the project does not preclude the development and implementation of other transport improvements. *State Environmental Planning Policy (Major Infrastructure Corridors) 2020* has reserved a corridor for a potential future extension of the South West Rail Link to the Aerotropolis. The NSW Government is also in early stages of planning for a rapid bus network to complement the project and serve key centres within the Western Parkland City which would provide feeder services to the future mass transit spine.
Alternative 2 – improvements to the existing road network	The Department notes the recent program of road upgrades, including Northern Road Upgrade and future M12 Motorway. These would improve some congestion issues in the area and increase connectivity to the Western Parkland City but would not alone be able to address future demand or fully cater for improved access to and from Western Sydney International Airport.
Alternative 3 – do nothing/do minimum	There is currently no mass public transport/rail access to the Western Sydney International Airport. The success of the Western Parkland City and Western Sydney International Airport requires a high-capacity and frequency transport solution. A "do nothing" approach compromises the sustainable and successful growth of the Western Parkland City and targets for population and employment growth may not be met. It would also compromise the success of the Airport.

A guiding principle for the alignment of the rail corridor and metro station locations was to provide an efficient alignment that avoids natural constraints and supports future land use changes. The proposed corridor alignment responds to environmental constraints, physical interfaces, and the requirement to connect Western Sydney International Airport and the Aerotropolis Core precinct.

Station location options considered and shortlisted but ultimately removed from further consideration included Werrington, Western Sydney University Precinct, Caddens, St Marys South and North Elizabeth Drive. The Proponent's assessment identified that a direct tunnel route between St Marys and Orchard Hills would provide cost benefits in the delivery of the project and travel time savings for customers. In particular, the Proponent identified that a station at Western Sydney University's Werrington precinct would have considerable risks to construction, program and interface impacts, and require a fundamentally different construction strategy. This would outweigh the benefits of a station in this location.

As a result of natural constraints, existing or planned infrastructure and property constraints, the project alignment includes a mixture of tunnel, in-cutting, elevated/viaduct, and surface infrastructure.

4. Statutory Context

4.1 Critical State significant infrastructure

The project is critical State significant infrastructure (CSSI) under section 5.13 *Environmental Planning and Assessment Act 1979* (EP&A Act). The Minister for Planning and Public Spaces is the approval authority.

The project is for the purpose of a rail infrastructure facility and is characterised as development permitted without consent, in accordance with clause 79 *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP).

4.2 Other approvals

State approvals and legislation

In accordance with section 5.22(2) EP&A Act, the only NSW environmental planning instruments that apply to the project are the Infrastructure SEPP (as it relates to the declaration of development that does not require consent) and *State Environmental Planning Policy (State and Regional Development) 2011* (as it pertains to the declaration of infrastructure as State significant infrastructure (SSI)). The *State Environmental Planning Policy (Major Infrastructure Corridors) 2020* protects corridors for major infrastructure in western Sydney. While this project does not require any approval under that SEPP, the Department notes that the project corridor is generally consistent with the corridor identified in the SEPP.

The construction of the project is likely to require an environmental protection licence issued under the *Protection of the Environmental Operations Act 1997.*

Other legislation that applies to the project includes *Land Acquisition (Just Terms Compensation) Act 1991* and the *Contaminated Land Management Act 1997.*

Commonwealth approvals and legislation

Airports Act 1996 and *Airports (Protection of Airspace) Regulations 1996*

Authorisation under the Airport Plan for the Western Sydney International (Nancy-Bird Walton) Airport (the Airport) will be required for the sections of the Sydney Metro - Western Sydney Airport rail line on the Airport site. This will be done through a variation to the Airport Plan to be approved by the responsible Federal Minister under the *Airports Act 1996* (Cth). The Airport Plan, which was prepared in 2016 in accordance with the requirements under the *Airports Act 1996* (Cth), may set out the details of any development to be carried out on the Airport site.

Environment Protection and Biodiversity Conservation Act 1999

Section 160(1) *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* (EPBC Act) requires that before a Commonwealth agency or employee of the Commonwealth gives an authorisation of an action (including major airport development), they must obtain and consider advice from the Australian Minister for the Environment. The Commonwealth Department of Infrastructure,

Transport, Regional Development and Communications will seek advice from the Australian Minister for Environment on behalf of the Minister for Infrastructure, Transport and Regional Development.

For parts of the project located south of Western Sydney International Airport (off-airport land), impacts on matters of national environmental significance and Commonwealth land protected by the EPBC Act have been assessed and approved on 28 February 2012 under the *Sydney Growth Centres Strategic Assessment Program Report*. As such, no further approval under the EPBC Act is required for the project south of Elizabeth Drive and outside the airport site.

On 14 July 2020, the Commonwealth Department of Agriculture, Water and the Environment (DAWE) determined the project to be a controlled action under sections 18 and 18A and sections 26 and 27A EPBC Act, as it was considered likely the project could have a significant impact on listed threatened species and ecological communities as well as impact Commonwealth (Defence) owned land. As such, for works on State land to the north of Western Sydney International Airport (off-airport land), assessment and approval is required under Part 8 and 9 of the EPBC Act to address impacts on listed threatened species and communities, and Commonwealth land. Though the project is also a controlled action under the EPBC Act, the NSW Assessment Bilateral agreement has not been applied for Commonwealth matters as DAWE undertook a parallel assessment to assess impacts under the EPBC Act. The Commonwealth Minister for the Environment issued the EPBC Act approval on 15 June 2021.

4.3 Mandatory Matters for Consideration

Objects of the *Environmental Planning and Assessment Act 1979*

The determination must have regard to the objects of the EP&A Act. The Department has considered the objects of the EP&A Act including:

- ecologically sustainable development (ESD) (see **Section 4.5.1** and **6**)
- social and economic welfare (see **Section 6**)
- protection of the environment, including in relation to biodiversity, traffic, noise and vibration, air quality, surface and groundwater hydrology, urban design, amenity and socioeconomic issues (see **Section 6**)
- sustainable management of built and cultural heritage, including Aboriginal cultural heritage (see **Section 6**)
- good design and amenity of the built environment (see **Section 6**)
- promote the sharing of the responsibility for environmental planning and assessment between the different levels of government (see **Section 5**)
- community participation in the assessment of the project (see **Section 5**).

Ecologically Sustainable Development (ESD)

The EP&A Act adopts the definition of ESD found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental consideration in decision-making process and that ESD be achieved through the implementation of:

- the precautionary principle
- inter-generational equity
- conservation of biological diversity and ecological integrity
- improved valuation, pricing and incentive mechanisms.

Project objectives which guide the delivery and operation of the project will contribute to the project's sustainability and meeting of ESD principles. In addition to these objectives, the Proponent has addressed the above principles directly in both the EIS and Submissions Report and identified a broad range of mitigation measures to manage impacts associated with ESD.

The Department recommends conditions of approval requiring that:

- the project achieves an Infrastructure Sustainability Council of Australia (ISCA) (Version 1.2) Infrastructure Sustainability rating of +75 (or equivalent) or a 5-Star Green Star rating, and
- a water reuse strategy be prepared and implemented that is based on best practice.

The precautionary principle is applied throughout the EIS and the Department considers the assessment and range of mitigation measures adequately adopt the principle. The Department is also satisfied that the valuation and pricing of the environmental resources associated with the project have been adequately undertaken and internalised through the project design and the mitigation measures.

4.4 Biodiversity Development Assessment Report

The project south of the airport is located on land that was biodiversity certified (on 11 December 2007) under the *Threatened Species Conservation Act 1995* (TSC Act) and is subject to the transitional provisions of the *Biodiversity Conservation Act 2016* (BC Act). Therefore, a Biodiversity Development Assessment Report (BDAR) is not required for the project in this area.

However, a BDAR was prepared in accordance with the biodiversity assessment method and the requirements of the BC Act for the area north of the airport. Due to limited access to private residential properties for field surveys, the BDAR proposed a staged assessment process. The BDAR was updated following additional field surveys and a revised BDAR was submitted with the Proponent's Response to Submissions Report.

The assessment considered construction and operational impacts on native vegetation, including terrestrial and aquatic threatened species and communities. The project has been designed to avoid biodiversity impacts where possible, by providing bridges and viaducts over key riparian and vegetated areas. The project has potential to impact approximately 32 hectares of native vegetation off-airport. Up to 848 ecosystem credits and 1,113 species credits may be required to offset impacts to threatened fauna, flora and ecological communities.

The Proponent has committed to implementing management measures during construction and operation to minimise impacts to vegetation and fauna. The Proponent will prepare a Flora and Fauna Management Plan to minimise and manage the clearing of native vegetation. The Department recommends conditions of approval which require the Proponent to offset impacts to threatened species and ecological communities, and to design the project to minimise vegetation impacts and maximise fauna connectivity. Biodiversity matters are assessed further in **Section 6.7**.

5. Engagement

5.1 Department's engagement

The Planning Secretary is required to make the EIS publicly available in accordance with section 5.28(1)(c) of the EP&A Act. The Department placed the EIS and accompanying documents on exhibition from 21 October 2020 until 2 December 2020 (43 days) electronically on the Department's Major Projects website.

Notification of the public exhibition was advertised in the Sydney Morning Herald, The Daily Telegraph, Penrith Western Weekender and Liverpool City Champion on Wednesday 21 October 2020. The Department notified relevant State and local government authorities of the exhibition.

Due to the timing of the exhibition period and assessment during the COVID-19 pandemic, standard exhibition procedures such as displaying physical copies of the EIS for public exhibition at local libraries and council offices, and community information sessions, were unable to proceed in compliance with NSW Government Public Health Orders.

The Department undertook a site visit on 12 February 2021 of the proposed alignment, to obtain a comprehensive understanding of the surrounding environment, its sensitivities and issues raised in submissions.

The Department held a range of discussions with various State agencies during its assessment of the project. The Secretary's Environmental Assessment Requirements were prepared in consultation with regulatory agencies and councils, the Department hosted a Planning Focus Meeting in June 2020 and met with State agencies and Penrith and Liverpool Council to discuss their submissions.

5.2 Summary of submissions and advice

During the exhibition period, the Department received a total of 32 submissions and advice from eight NSW Government agencies. Three submissions were from local council, nine from special interest groups and 20 were from community members. Eight submissions were in support of the project, six submissions objected to the project, and 18 submissions provided comments. A summary of the submissions is provided in **Table 5** and **Table 6**, and a link to the full copy of submissions is in **Appendix C**.

Table 5 | Summary of State and local government submissions and advice

Submitter	Position
Government Agencies	
Department of Primary Industries (DPI) Fisheries	Advice
Environment, Energy and Science Group of DPIE (DPIE EES) Group	Advice
Environment Protection Authority (EPA)	Advice
Heritage Council of NSW	Advice
Heritage NSW - Department of Premier and Cabinet (Aboriginal Cultural Heritage Regulation Branch)	Advice
Water Group of DPIE (DPIE Water)	Advice
WaterNSW	Advice
Sydney Water	Advice
Local Councils	
Blacktown City Council	Comments
Penrith City Council	Support
Liverpool City Council	Comments

Table 6 | Summary of interest groups and private organisation submissions

Submitter	Position
Action for Public Transport Inc (NSW)	Support
Blacktown & District Environment Group	Object
Celestino	Comment
Luddenham Landowners Consortium	Support
The University of Sydney	Comment
TransGrid	Comment
Urban Development Institute of Australia NSW (UDIA)	Comment
Urbis on behalf of Roy Medich Properties Pty Ltd and CSPA Properties Pty Ltd	Comment
Western Sydney University	Comment

5.3 Key issues raised – government agencies

Department of Primary Industries Fisheries (DPI Fisheries) noted that both the off-airport and on-airport environment contains Key Fish Habitat and recommended conditions to avoid impacts on these habitats. These included the installation and maintenance of best practice sediment and erosion controls, ensuring final designs and waterway crossings allow for suitable fish passage and any stream realignments be constructed to ensure habitat values are included.

Environment, Energy and Science Group of DPIE (DPIE EES) provided comments on flooding and biodiversity (including impacts to native vegetation and microbats) and made recommendations regarding the preparation of a Vegetation Management Plan, a Dewatering Plan, a Landscape Plan and tree replacement including the use of trees to mitigate the urban heat island effect.

Environment Protection Authority (EPA) commented on noise and vibration, water quality, contaminated land and groundwater impacts. Issues raised included noise mitigation, construction, wastewater and leachate management, construction on contaminated land and groundwater monitoring.

Heritage NSW – Heritage Council of NSW (Heritage Council) commented on the works affecting St Marys Railway Station Group including the relocation of the jib crane and detailed design of the proposed station. Heritage NSW requested concept drawings of the proposed station development and adequate documentation and supervision during the dismantling and reassembly of the jib crane. Heritage Council also suggested the impacts from excavation of underground tunnels to Kelvin Park Group and Warragamba Supply Scheme be assessed.

Heritage NSW – Department of Premier and Cabinet (Aboriginal Cultural Heritage Regulation Branch) (Heritage NSW) commented that the Aboriginal cultural heritage assessment was incomplete for a thorough review and submission. Heritage NSW emphasised the importance of continued Aboriginal consultation on investigation results for Aboriginal cultural heritage assessment.

Sydney Water Corporation noted that endorsement and/or approval will be required from Sydney Water for any discharges to its assets to ensure the project does not adversely impact its water, wastewater and stormwater infrastructure. Sydney Water also commented on soils and contamination, groundwater, biodiversity, flooding, land use and property, and piling adjacent to Sydney Water assets.

WaterNSW commented on vibration impacts on WaterNSW assets, surface water flows, utility protection measures, the protection of heritage and archaeological potential, WaterNSW access and security, erosion and sediment control and notification of incidents.

Water Group of DPIE (DPIE Water) requested correct stream ordering for watercourses that will be intersected by the development. DPIE Water recommended additional groundwater studies and monitoring if the project is approved as well as consultation during the preparation of the Erosion and Sediment Control Plan.

5.4 Key issues raised – council

Penrith City Council indicated general support for the project and provided the following comments:

Project design

- concerns regarding the lack of a station at The Quarter
- requested a business case to understand the shortlisted station precincts
- requested to progress and lead future station precinct development in partnership with Government
- seeks representation on the Design Panel for the project
- seeks underground rather than above ground pedestrian connection at St Marys Station and upgrade of existing overpass to cater for cyclists.

Transport and access

- location of the temporary bus interchange at St Marys
- construction and operational parking impacts at St Marys
- operational road network impacts including deterioration of level of service
- requested widening of Luddenham Road
- consider opportunities to extend station catchments through network integration, supplementary transport services and a potential interchange hub
- requested west facing access ramps at Kent Road/M4 interchange
- protection of car parking surrounding construction sites.

Biodiversity

- protection of existing vegetation and establishment of landscape buffers at the stabling and maintenance facility.

Other

- support for local workers and suppliers
- requested inclusion of acoustic sheds as a standard mitigation measure.

Liverpool City Council provided the following comments:

Transport and access

- requested further consideration of the rail extension from Leppington to the Airport
- development of an integrated Land-use and Transport Plan
- establishment of a Project Working Group to discuss the impacts of major transport projects
- design drawings for station access, service roads and the signalised intersection at Badgerys Creek
- station design that is accessible, prioritises pedestrian/cyclist connections and provides end of trip facilities
- linkages from stations to employment precincts, particularly the Agribusiness Precinct in the Aerotropolis
- development of a Construction Traffic Management Plan.

Biodiversity

- further details regarding spoil placement, potential impacts to Badgerys Creek Environment Conservation Zone and proposed mitigation measures
- tree planting including of Cumberland Plain woodland species
- consideration of impacts to native vegetation and fauna habitat as a result of dam dewatering
- preparation of Soil and Water Management Plan
- inclusion of Kemps Creek construction power route in biodiversity reports.

Flooding

- incorporation of water sensitive urban design principles into project design
- design to minimise flow diversion.

Heritage

- investigation of areas of high sensitivity for Aboriginal objects
- recommended consultation with the Heritage Council and adoption of a Construction Heritage Management Plan before works within the curtilage of the State Heritage listed Kelvin Park Group
- development of a Heritage Interpretation Plan.

Noise and vibration

- requested detailed acoustic assessments
- preparation a Construction Noise and Vibration Management Plan.

Urban design and public domain

- incorporation of placemaking initiatives and public art into station design
- preparation an Urban Design and Public Domain Plan.

Other

- establishment of Community Liaison Committee to resolve community concerns
- support local workers and embed local training initiatives
- establishment of an Interface Agreement with Council.

Blacktown City Council's submission provided no comments or recommendations.

5.5 Key issues raised – community, special interest groups and organisations

The following key issues were raised by the community, special interest groups and private organisations / corporations. Key environmental issues raised in submissions include:

Project justification

- project justification and station location selection are not adequate
- planning and cost benefit analysis does not justify the project
- metro rail is not the right format or technological solution for the project.

Project design

- location of additional stations particularly at Western Sydney University, Orchard Hills, North Elizabeth Drive and Badgerys Creek North
- consideration of alternative route options
- provision of additional connections including to Parramatta, Blacktown, Oran Park, Macarthur, Bankstown, North West Metro, South West Rail Line and future connections to Canberra and Melbourne
- timing of potential extension to Tallawong
- comments on station access, configuration and integration with other active and public transport networks including enclosed/underground pedestrian connections and the provision of cross platform interchanges with existing and future rail lines
- provision of detailed design information, including tunnelling depths, actual levels of the surface rail line and cross-corridor access.

Traffic, transport and access

- concern with traffic and heavy vehicles using local streets during construction
- concerns traffic modelling and land use forecast assumptions are out of date
- cumulative impacts from construction traffic of major infrastructure projects in the Aerotropolis
- clarifications regarding bicycle parking and pedestrian and cyclist access arrangements at stations and bus routes
- resolution of the number and optimal location of road connections, spatial/layout requirements and intersection designs at Luddenham Road.

Parking

- construction worker parking on local streets causing congestion and a loss of street parking
- inadequate provision of car parking close to metro stations
- review of commuter carpark to a more appropriate location for customers.

Noise and vibration

- construction noise and vibration impacts on residences, including structural damage
- concerns regarding operational noise and vibration.

Socio-economic, land use and property

- additional information regarding property acquisition and compensation
- project's role in facilitating urban sprawl at Orchard Hills Station
- general loss of amenity during construction
- land fragmentation, access loss and sterilisation of land
- noise, dust, property access, traffic and health issues as a result of proximity of construction to residences
- concerns regarding impacts on the community during the acquisition process
- potential impacts on an approved land subdivision
- uncertainties regarding tunnel depths delaying development applications.

Biodiversity

- inadequate assessment of some biodiversity impacts

- extension of northern tunnel alignment to reduce biodiversity impacts
- provision of areas for fauna to move freely under the rail line for foraging and existence.

Flooding, hydrology and water quality

- flooding impacts on flood-prone areas in south St Marys during construction and operation
- flooding impacts on rail tunnels during heavy rainfall events
- flooding management measures.

Other comments

- waste and sustainability concerns
- requests for ongoing consultation and direct engagement
- provision of specific details regarding location, size and justification for proposed on-site detention basins and water quality basins
- air quality impacts, including dust and pollution, on private properties
- concerns around ground movement impacts to foundations and structural integrity of homes in St Marys as well as Bringelly tunnel
- clash of planning/urban design outcomes between current Penrith LEP controls, proposed designs in Metro EIS and Western Sydney Draft Aerotropolis Precinct Plan for Northern Gateway.

5.6 Response to submissions

The Department provided the Proponent with all submissions following the public exhibition of the EIS and requested the Proponent prepare a response to submissions. The Proponent's Submissions Report (**Appendix D**) was made publicly available on the Department's Major Projects website on 19 April 2021 and forwarded to relevant agencies and councils for comment.

During the exhibition of the EIS, the Proponent made three design refinements to the project which were addressed in the Submissions Report and are set out in **Table 7**.

Table 7 | Changes in response to Submissions Report

Change	Justification
Relocation of the temporary bus interchange to the Station Street carpark site instead of Nariel Street	Consultation with Penrith City Council confirmed that relocating the temporary bus interchange to the Station Street carpark would minimise potential parking impacts on Nariel Street, provide a more direct connection to the station for commuters and limit changes to bus routes.
Reduction in the construction footprint in the area to the south of Patons Lane	Design development has reduced the amount of land required for the construction footprint in the area to the south of Patons Lane. This will result in a reduction of one partial property acquisition and a slight reduction of native vegetation clearing.
Revised Aerotropolis Core construction site footprint and minor changes to operational footprint	Ongoing consultation between the Proponent and the Western Parkland City Authority has revealed these changes would help facilitate the movement of materials and equipment during construction as well as minimise conflicts between delivery programs of broader Aerotropolis precinct works and the project.

The Submissions Report was forwarded to government agencies and councils. Issues included:

- **EPA** reiterated its comments on the EIS
- **DPIE EES** advised that the majority of its concerns are still outstanding and recommended conditions to address its concerns / comments
- **Heritage Council** noted the clarification provided regarding the projects impacts to the jib crane at St Marys Railway Station, tunnel locations in respect of Kelvin Park Group and that no tunnels are proposed in the vicinity of the Warragamba Supply Scheme. The Heritage Council concurred with the Archaeological Research Design and Archaeological Method Statements prepared for St Marys Station Group. The Heritage Council recommended Drawings identifying significant elements/fabric at St Marys Station in relation to the proposed development should be provided to enable thorough assessment of the proposal
- **Heritage NSW** noted the finalised and revised documents relating to Aboriginal Cultural heritage assessment and management plan. Heritage NSW identified that some survey locations are incomplete and recommended conditions to address these outstanding matters
- **WaterNSW** reviewed the Submissions Report and supporting documents and supports the mitigation measures and commitments made within the EIS and Submissions Report to safeguard WaterNSW assets from impact. WaterNSW recommended that all incidents that affect or could affect the Warragamba Pipeline must be reported to WaterNSW
- **Penrith City Council** advised is it satisfied that some of its EIS comments resulted in revised or new mitigation measures particularly parking impacts and the relocation of the temporary bus interchange. However, Council acknowledges that some of its recommendations could not be addressed within the scope of the project and that transport network integration of the project would be subject to further consultation with Council
- **Liverpool City Council** noted that several concerns and requests have been acknowledged and addressed through the Submissions Report and draft conditions provided. Nonetheless, a few outstanding concerns remain regarding the establishment of a Traffic and Transport Liaison Group, development of an interface agreement to outline ownership and responsibilities for maintenance of access roads and public transport facilities at the proposed stations, replacement trees must be planted, Councils role and involvement within a Design Review Panel and contamination identification and management.

6. Assessment

The Department has considered the Proponent's EIS, Response to Submissions report and community submissions received on the project as part of its assessment. Based on this consideration, the Department has identified the key issues for the assessment are:

- socio-economic, land use and property (**Section 6.1**), noting the impacts of property acquisition
- place, urban design and landscape (**Section 6.2**), as the project will contribute to establishing the design quality of the Aerotropolis
- noise and vibration (**Section 6.3**), as noise is a key community concern
- traffic and transport (**Section 6.4**), to ensure the project does not cause unacceptable traffic impacts
- flooding, hydrology and groundwater (**Section 6.5**), to ensure the project responds to existing flooding risks within the Wianamatta-South Creek catchment and
- biodiversity (**Section 6.6**), to balance infrastructure growth with biodiversity conservation.

Other issues are discussed in **Section 6.7**.

6.1 Socio-economic, land use and property

As with many major transport infrastructure projects, significant acquisition of property is necessary along the corridor for construction and operational purposes, with approximately 416 hectares of land impacted.

Property acquisitions result in a range of social and economic impacts. Acquisition will be carried out in accordance with the requirements of the *Land Acquisition (Just Terms Compensation) Act 1991* and impacts managed through the Proponent's commitment to appoint Acquisition and Personal Managers to support landowners.

The project would deliver broader economic benefits but will impact economic activity in St Marys in the short term. Businesses will be supported through a Small Business Owners Engagement Plan to minimise impacts.

The Department recognises that substantial land use change will occur as the surrounding area is transformed with future land use planning and the long-term growth of the Western Parkland City. The project's direct social impacts are primarily associated with construction as long-term social change will occur from land use changes brought about by the area's wider planning initiatives.

Issue

The project will acquire property supporting a range of land uses

The construction footprint will directly impact approximately 416 hectares of land. Five hectares is in the St Marys town centre and the remainder is predominantly rural and semi-rural residential land.

The project will directly impact 63 properties either by partial or full acquisition and 11 temporary leases. The land to be acquired includes:

- **St Marys:** full acquisition of the Station Plaza shopping centre, open space and at-grade car parks
- **Orchard Hills:** full acquisition of semi-rural properties on Kent Road and Lansdowne Road at the Orchard Hills Station site and tunnel portal, partial acquisition of larger rural properties along the project alignment
- **Luddenham:** partial acquisition of larger rural properties along the rail alignment
- **Badgerys Creek:** full acquisition of one semi-rural property at the Bringelly services facility.

The Proponent has commenced the acquisition process to transfer identified properties to Sydney Metro and appointed Acquisition and Personal Managers to assist and support residents and small businesses throughout the acquisition process. Construction of the project also has the potential to divide areas of land at Orchard Hills to Elizabeth Drive (i.e. the aboveground section of the project), through the establishment of site fencing and hoardings.

The project will require the acquisition of land below the surface of properties for the construction and operation of tunnels. The subsurface layer acquisition of the envelope around the tunnels is not expected to impact existing and future residential uses at the surface. The project has been designed to minimise fragmentation and severance of properties through the use of tunnels, viaducts and bridge sections.

Construction activities will impact access to businesses and recreational land which are important for the community

An important feature of community life is access to and use of infrastructure and services, their surroundings, and personal and property rights.

Construction activities will impact businesses adjoining the construction footprint at St Marys Town Centre. Changes to retail and employment services through site acquisition and demolition of St Marys Station Plaza (including the Coles supermarket) would impact existing shopping convenience and access. Access will generally be maintained for local vehicles, pedestrians and cyclists, however temporary diversions may be required.

Construction activities in St Marys are also expected to impact businesses due to loss of passing trade. Businesses such as cafes and restaurants are dependent on passing trade and changes to amenity have the potential to reduce foot traffic in this area. The Proponent has indicated that construction activities could cause a reduction in revenue, financial hardship and potentially a loss of around 430 jobs, depending on whether a business could relocate. Access to most businesses and employment services would be maintained where possible and the impacts will be limited to the construction phase of the project.

Submissions and advice

Community and special interest groups

Key issues raised in submissions from the community and organisations include:

- all existing access to properties and assets be maintained and unaffected during construction and operation of the project

- property acquisition and compensation and concerns that excess land is being acquired for the project and the project will create inaccessible fragmented pockets of land
- future subsurface developments could be impacted by tunnelling
- the project will be the catalyst for urban sprawl particularly at Orchard Hills Station
- project impacts on development potential of approved land subdivision adjacent to the stabling facility
- concerns regarding impacts on the community during the acquisition process.

Council

Liverpool City Council acknowledges the project would generate significant construction jobs and suggests the project should investigate local training initiatives to target local apprentices, construction workers and the Aboriginal community.

Department's consideration

The project is consistent with future land use planning and would contribute to the long-term growth of the Western Parkland City

Strategic plans for the Western Parkland City, including the Aerotropolis, identified the wider project area for urban growth and development. Future regional economic employment lands would benefit from the project through increased trade catchments and connections to employment opportunities.

The Department acknowledges that the project is a key piece of transport infrastructure that will serve the Western Sydney Aerotropolis and the Western Parkland City. The project has been considered as a central component of the transport and access framework for Aerotropolis planning, and future land uses at the Aerotropolis have been planned around the project, with more intense mixed-use development around stations. The Department is satisfied that the project is consistent with future land use planning and would deliver long-term land use and economic benefits.

Property acquisitions will result in a range of social and economic impacts. These will be managed under the Land Acquisition (Just Terms Compensation) Act 1991 and Proponent's commitment to appoint Acquisition and Personal Managers to support landowners

The Department acknowledges the concerns raised by landowners regarding loss of properties, property access and land fragmentation. The different types of acquisition would have different impacts on landowners and occupiers, and in some cases will result a loss of people's homes and/or businesses. The Proponent's Socio-economic Impact Assessment accompanying the EIS identifies this as a high risk of significant socio-economic impacts. The Department agrees with this assessment.

The Proponent has commenced consultation with potentially affected property owners regarding property acquisition and potential adjustments required for the project, and has committed to several land use and property measures, including carrying out all partial and full acquisitions and associated property adjustments in accordance with the requirements of the *Land Acquisition (Just Terms Compensation) Act 1991* in consultation with landowners.

The Proponent has also committed to working with property owners on their adjustment plans and access arrangements during detailed design. This includes the engagement of an Acquisition

Manager and Personal Manager to assist landowners. These managers will provide ongoing support for relocated persons, including dispute resolution and counselling, and provision of contact information for relevant services. In its Submissions Report, the Proponent included an additional mitigation measure to provide alternative access to fragmented properties in consultation with landowners throughout the duration of construction. The Department supports these measures.

The Department acknowledges that land acquisition will have a social impact on owners and occupiers, even after the implementation of the Proponent's mitigation measures. However, the Department accepts that land acquisition is required for the construction of major infrastructure projects and considers the Proponent's mitigation measures to assist landowners through the acquisition process to be appropriate.

The Department notes that a landowner raised concerns about the project's potential impact on a development site in St Marys. If sub-stratum acquisition is required for that property, which will be determined during detailed design, it would occur in accordance with relevant legislation. The Department also notes that a landowner raised concerns about potential impacts on an approved but not completed land subdivision adjacent to the stabling and maintenance facility. The Place, Urban Design and Corridor Landscape Plan discussed in **Section 6.2** will consider the design of this facility and measures to mitigate visual and lighting impacts. Similarly, the Operational Noise and Vibration Review discussed in **Section 6.3** will consider measures to reduce noise impacts from the facility.

The project is unlikely to detrimentally impact on future land uses of non-acquired sites within the Aerotropolis and Western Parkland City, given that land uses are expected to change over the medium to long term due to both the project and other infrastructure project delivery in the area. The project would not directly affect the ability to develop non-acquired sites and once operational, may have benefits for these development sites by providing improved access and connectivity.

The project would deliver broader economic benefits but will impact on economic activity in St Marys; businesses will be supported through a Small Business Owners Engagement Plan

The project is expected to provide economic benefits through the creation of direct employment opportunities, including jobs in construction, professional and administrative services, and technical and trade services such as plant and machinery operators, transport, and skilled labour. The Department notes that the construction phase of the project would provide benefits to more diverse and inclusive groups such as youth and Aboriginal people and provide training opportunities and apprenticeships for people to gain skills in the construction industry.

The project would support around 14,000 jobs during construction, which would contribute to economic recovery and would result in an increase of passing trade during the construction period for local businesses (such as retail and convenience services).

The project is expected to increase amenity and opportunities for the community through new station precincts, associated facilities, potential retail and other station activation opportunities. The project will cater for future transport needs by providing better access to infrastructure across greater Sydney and future infrastructure such as the West Sydney International Airport and the Aerotropolis.

The closure of the St Marys Station Plaza will cause the loss of approximately 430 jobs within that shopping centre, including closure of the Coles supermarket. This would affect economic activity in St Marys, as the Socio-economic Impact Assessment identifies an existing shortfall in supermarket floor space in St Marys, which Coles' closure would exacerbate. While there would be a reduction in

overall supermarket floor space, the Department notes there are two other supermarkets in St Marys (Woolworths and Aldi) that are likely to be appropriate substitutes for most customers of the Station Plaza.

The closure of the Station Plaza would also impact on the operators and customers of smaller retailers within the centre. Small retailers elsewhere in the St Marys town centre would also be affected by construction activity, which would affect their attractiveness to customers. In most instances, these impacts are temporary, and there are alternate shopping locations for the community to use outside of the construction area. The Proponent has committed to maintaining access to existing local shops and cafes where possible and managing impacts by implementing wayfinding signage, maintaining drop off areas and working to provide alternate parking arrangements to assist the community.

The Department acknowledges the project will have economic impacts as well as benefits, particularly due to loss of employment and retail services at St Marys. While these are unavoidable impacts of construction and acquisition, the Department has expanded upon the Proponent's mitigation measures by recommending a condition requiring Small Business Owners Engagement Plan(s) to be implemented. The plan(s) will ensure impacts on small businesses adjacent to major construction sites during construction are minimised.

The project's social impacts are primarily associated with construction, as long-term social change would occur from land use changes brought about by the areas wider planning initiatives

The Department notes that the project would create social impacts during construction. These impacts will affect the community (and different groups within the community) in terms of way of life, community, access and use of infrastructure and services, culture, health and wellbeing, surroundings, and personal and property rights. Most amenity-related impacts from construction activities, such as noise, vibration, dust and traffic and light spill from night-time construction work, will be managed through the Proponent's mitigation measures and the Department's recommended conditions of approval. However, impacts related to the loss of properties and access to services from property acquisition, and changes to surroundings from the demolition of buildings and construction activities in semi-rural areas, would have continued impact after mitigation. The Department acknowledges these construction impacts but considers they are unavoidable.

The project would also have social impacts during operation. Some of these will be positive, such as improvements to rail access, stations and public domain. Other impacts will be negative for some receivers, such as the presence of rail infrastructure in a semi-rural environment. The introduction of this new built form within the rural and semi-rural areas at Orchard Hills and Luddenham would contrast within the existing landscapes.

The Department acknowledges that significant social change and impact would occur along the semi-rural sections of the project's alignment in future years as the construction of Western Sydney International Airport and land use planning for the Western Sydney Aerotropolis, and associated land use change, transition the area to an urban and employment area.

6.2 Place, urban design and landscape

The project includes a comprehensive urban design framework to facilitate good design along the rail corridor and station precincts, improve active transport connectivity with existing land uses, and

respond to existing and emerging contexts. The design will be further refined through design review by a Design Review Panel chaired by the NSW Government Architect and community and other stakeholder engagement.

Issue

The project will have varying visual impacts during construction and operation with the most significant impacts at St Marys and Orchard Hills

The construction of the project at and above ground between Orchard Hills and Western Sydney International Airport would be visually prominent. The project will change the landscape between Orchard Hills and the Western Sydney International Airport by constructing a new rail corridor and station precincts. The above ground structures will introduce a strong horizontal element into the landscape, which would contrast in scale and form with the adjacent low lying, undulating rural landscape.

The Proponent carried out a landscape character and visual impact assessment that considered existing land uses, built forms and landforms, and considered how the project will relate to the future Western Parkland City and Western Sydney Aerotropolis. The assessment concluded the impacts on existing landscape to be moderate within the six landscape character zones in the study area. Five of the landscape character zones are located outside of the Western Sydney International Airport site. The visual impact assessment considered 28 viewpoints, with eight of these having a moderate visual impact, with this being the highest impact. The key receptors likely to be impacted include views to the:

- south of Orchard Hills from the residential area to the west (see **Figure 4**); and
- viaduct from Luddenham Road (see **Figure 5**).

Figure 4 | Photomontage of view to viaduct from Traminer Grove, Orchard Hills (Source: EIS)

Figure 5 | Photomontage of view to viaduct at Luddenham Road (Source: EIS)

Impacts of the project's construction include changes to pedestrian and vehicle access, demolition of existing buildings, clearing of vegetation, and the erection of construction equipment at the St Marys station and plaza site. Impacts are most concentrated at St Marys where the visibility of construction activities and the removal of large trees would impact the level of comfort and amenity for station users during construction. However, the design quality of the new station works, including an updated station forecourt plaza, would provide a long-term positive visual impact at St Marys. A concept artist impression of St Marys is shown in **Figure 6**.

Impacts will also be significant at the Orchard Hills station tunnel portal, as this site is close to surrounding rural-residential properties. The viaduct construction at Luddenham will introduce new built infrastructure into an area that is predominantly of a rural landscape. The removal of vegetation and the large scale of works will reduce visual amenity and be visible when viewed northeast along Luddenham Road.

Figure 6 | Artist impression of St Marys Station (Source: EIS)

Some evening and night works will be required at the St Marys town centre, St Marys urban fringe, Orchard Hills, Luddenham and Bringelly, mainly for haulage and deliveries. Some underground works for tunnelling create potential for associated lighting impacts if not appropriately managed.

The project's design development will be delivered through a design quality framework, including the formation and implementation of design advisory and review panels

The delivery of the project's place, design and landscape outcomes require involvement from several stakeholders including the Proponent, Councils and the Western Sydney Planning Partnership. The Proponent will deliver the rail line, stations, public domain works in the immediate vicinity of stations, and corridor landscaping, while ensuring high design quality by implementing the project's design guidelines and review process by a Design Review Panel (DRP).

The Submissions Report (**Appendix D**) includes design guidelines that set urban design objectives and principles for the project. These design guidelines relate to internal station design and function, design of external station areas and interfaces with the public domain, and corridor design such as earthworks, engineering structures and landscaping. Key considerations include:

- **Station design**: legible wayfinding, amenity and safety, placemaking through station and line-wide design identity, incorporation of high-quality finishes, incorporation of public art and design that relates to the Aboriginal and multicultural identity of Western Sydney
- **Public interfaces**: placemaking through public spaces extending from stations, design of public squares for a range of formal and informal activities, high-quality landscaping, lighting and water features
- **Corridor design**: use of hard landscaping that considers local government public domain guidelines, vegetated embankments, consistent, simple and elegant bridge and viaduct form, and landscaping that reflects Cumberland Plain Woodland communities.

A Design Advisory Panel (DAP) was established by the Proponent to provide independent design review of the project throughout the project's design through the EIS and Submission Report processes. The role of the DAP has been to provide advice on the design and guide the strategic and master planning outcomes prior to the project's determination. DAP meetings have included Council participation regarding local issues and design outcomes as they relate to the local context.

Once the project is approved, the Proponent will establish a DRP to provide independent design review during the detailed design and construction of the rail corridor, stations and interchange areas. The DRP will be chaired by the NSW Government Architect or delegate and comprise members of the State Design Review Panel with relevant expertise and can request further specialist advice.

Submissions and advice

Community and special interest groups

While organisations and the community did not raise concerns regarding design and landscape, submitters requested additional access points to station precincts and reconsideration of the station designs at St Marys and Aerotropolis to assist passenger interchange.

Council

Liverpool City Council recommended that a detailed landscape plan be prepared for the entire project area, and for engagement with a public art consultant to explore opportunities to integrate public art along the metro line.

Penrith City Council requested involvement in both the Design Advisory and Design Review Panel and for St Marys station to include an underground pedestrian connection between the metro and train station. Council also requested the stabling and maintenance facility be designed to protect and include existing vegetation within the site.

Government agencies

Heritage Council requested exact design details of the proposed station at St Marys and provided advice and recommendations on its detailed design s.

Department's consideration

The Proponent's design guidelines provide a comprehensive basis for the project's design and will inform the preparation of a Place Design and Corridor Landscape Plan

The landscape within the Aerotropolis is undergoing significant changes in the medium to long-term as the area transitions from a semi-rural to an urban landscape. The design of the project, including the stations and the corridor infrastructure, will be significant landscape and built form features in this emerging urban environment. The Department considers the quality of the project's design and its consistency with the existing and desired future landscape are key considerations for assessment.

The Department has assessed the project's design guidelines and considers they form an appropriate basis for further design of the project. The guidelines present clear objectives and principles for the project's design and include guidelines about station design, interface with public spaces, and design of the natural and built environment features of the project. Station-based objectives and guidelines provide for a dialogue between stations on the line, intuitive movement and wayfinding within and around stations, and for high-quality station finishes and public art.

As the stations are likely to serve as focal points in the urban development of the area, the Department considers the stations' integration with surrounding public spaces is important. The Department supports the Proponent's commitment to well-designed and multi-purpose public squares in station precincts as these provide public space for activity around stations.

The Department supports the corridor design and landscaping guidelines. The proposal to provide a natural slope treatment and vegetation for embankment sections of the project, design viaducts and bridges as elegant and non-obtrusive landscape features, and prioritise Cumberland Plain Woodland communities in project landscaping, minimises visual impacts and responds to the blue-green corridor initiatives of the Western Sydney Aerotropolis precinct planning.

To ensure that the projects place and design guidelines translate into detailed design, the Department recommends a condition that requires the development of a Place, Urban Design and Corridor Landscape Plan (PUDCLP). The plan must be prepared with stakeholders including Council, and be consistent with the Proponent's design guidelines including the land use, urban design, open space and landscaping provisions of local and State planning provisions that apply to the area, including Aerotropolis planning.

The PUDCLP will apply to the entire project corridor and station precincts and include detailed design plans for the rail corridor and other built elements, retaining walls, embankments and viaduct sections, as well as final landscaping arrangements and maintenance regimes. The PUDCLP requirements expand upon the design guidelines to require further details of native and local landscaping, maintaining and enhancing fauna connectivity across the alignment, watercourse crossings to minimise impacts on aquatic ecosystems, and to protect airport operations from bird strike.

Submissions from Penrith City Council and landowners made suggestions regarding the design of and access to the station precincts, including, in Council's case, specific requests for an underground interchange and enhanced crossing of the existing rail corridor at St Marys station. The project has proposed an above ground interchange rather than an underground interchange as shown in **Figure 7**. The Department considers that an above ground interchange can provide an acceptable urban design and functionality outcome, subject to design development and review.

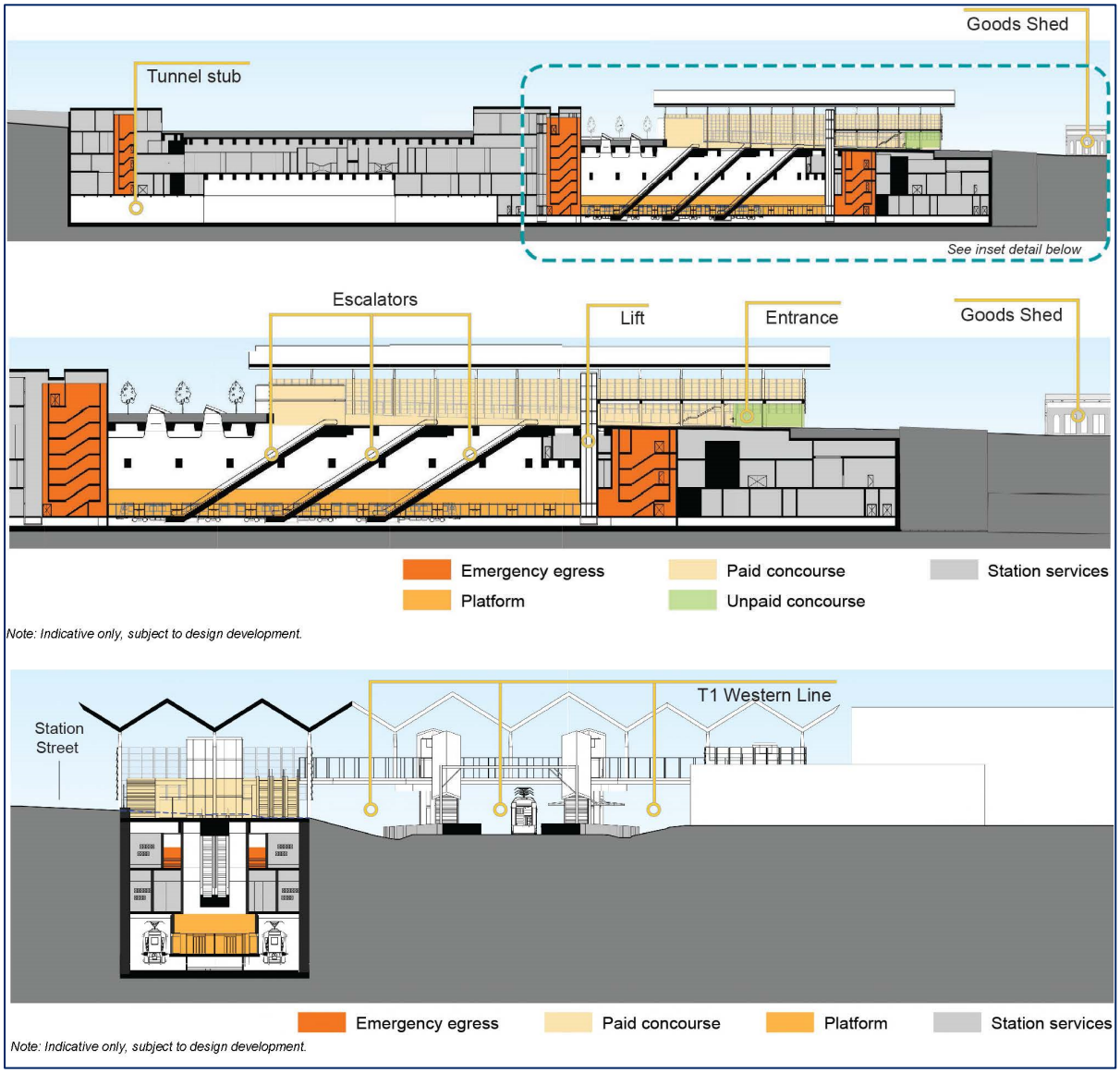

Figure 7 | St Marys station– indicative cross-sections (Source: Submissions Report)

To ensure that the station precincts are designed to respond to their existing and future character, and to respond to submissions regarding station design and access, the PUDCLP must include detailed design plans for the station precincts, servicing facilities and other built, public art and

landscaping elements included at each station. The PUDCLP must also include active transport facilities and connections to surrounding active transport networks.

The project's design will be subject to DRP and independent design advice

The Proponent has committed to establishing a DRP comprising independent experts, and to provide independent design review of the project as the design is finalised. The Department supports this and considers that independent expert review is necessary to ensure the project's detailed design reflects the quality of the indicative design provided in the EIS and the design guidelines.

To ensure design excellence, and independent review and guidance is undertaken during the detailed design of the project, the Department recommends conditions establishing the governance of the DRP, including that the DRP be chaired by the NSW Government Architect and operate throughout design development and construction. The DRP will provide advice and recommendations on the detailed design and architecture, heritage, urban and landscape design and artistic aspects of the project and will nominate an independent expert to review the PUDCLP.

The design has considered Connection to Country and will continue to be informed by the Aboriginal community

The Proponent has prepared a preliminary Designing with Country report that includes Aboriginal Cultural Design Principles to inform the design, public art and heritage interpretations of the project. The report includes a list of opportunities and recommendations to integrate Aboriginal culture in the design of the project.

The Department notes that Government Architect NSW's *Connecting with Country* framework was published after the Proponent's preliminary Designing with Country report. The Department recommends that the PUDCLP considers this draft framework to inform the integration of Aboriginal culture into the design of the project. This would ensure the project incorporates Aboriginal design into the project, and ensure continued engagement with local Aboriginal communities, elders and knowledge holders to develop appropriate themes or narratives for use in design, heritage interpretation or public art components of the project.

Project landscaping and lighting will consider airport operations

The Department has consulted with Western Sydney Airport (the entity constructing the airport) about the landscaping and urban design components of the project to ensure that they do not affect airport operations and aircraft safety through lighting and bird strike (i.e. aircraft colliding with large birds). The PUDCLP conditions include requirements for lighting and landscape design to consider impacts on airport operations and to be consistent with the *National Airports Safeguarding Framework* guidelines.

The visual impacts of the project on current residents are acceptable with the recommended design review process facilitating high quality built form and landscape design

The Department has considered the visual impacts of the project during construction and operation on existing and future residents. While much of the project alignment (such as the Aerotropolis) would experience significant land use and landscape change in the medium to long-term, St Marys has an established urban form, and impacts on the visual and landscape amenity for residents of the urban and semi-rural parts of the alignment must be minimised.

Visual impacts are expected and inevitable during the construction of a large linear infrastructure project. Construction activities will cause temporary visual amenity impacts for surrounding land uses and motorists traveling on nearby roads from vegetation clearing, earthworks and construction compounds. Construction of viaducts and bridge sections will be visible and light spill from construction sites may also affect the visual amenity of adjacent land uses at night. The Proponent has committed to ensuring all construction-related temporary structures are coloured to reduce visual impacts during construction. This commitment is reinforced through a condition requiring the Proponent to further reduce visual impacts during construction by providing temporary landscaping and vegetative screening and minimising light spill.

The visual impacts of the project during operation will vary depending on the location of the rail line, the stations and ancillary facilities, and the views to and from them. Proposed viaduct and bridge structures for the above ground section of the rail line and associated station facilities may impact motorists travelling along adjacent roads as well as surrounding residents, although this impact is reduced in most semi-rural areas by the project's distance to most receivers.

Impacts in the semi-rural areas of the alignment would be greatest between Orchard Hills and Western Sydney International Airport, where the project is at grade or on a viaduct. The project contrasts with the surrounding semi-rural landscape. Orchard Hills Station would mainly be visible from houses on surrounding local roads including Kent Road and Lansdowne Road, and the stabling and maintenance facility would be seen from large lot residential properties to the west and north. The elevated station and alignment at grade and on viaduct at Luddenham will be visible and would contrast with the surrounding rural residential landscape. The structures will be visible primarily from Luddenham Road, rural properties to the west and north of the station, some residences within the Twin Creeks estate and rural areas surrounding the alignment between Cosgroves and Badgerys Creek.

At Orchard Hills and Luddenham, the Proponent has assessed the level of impact to generally be minor, as the existing landscape is evolving into an urbanised area over the medium to long-term. Proposed major developments in the area such as the Sydney Science Park and Northern Gateway precinct at Luddenham will include employment and other urban land uses. Though the new built forms of stations and rail viaducts may seem intrusive and out of character at present, these built form elements are consistent with the transitioning character of the Western Sydney Aerotropolis. While the project would have visual impacts at Orchard Hills Station and nearby residents on Kent Road and Lansdowne Road, recommended conditions for design review and development will mitigate impacts on these existing residents through providing high-quality built form, and landscape design that reflects local vegetation communities.

Place impacts at St Marys station are expected to be minor or positive as the new built form and landscaping would be contemporary and well-designed and would include an upgraded transport interchange. The station's increased proximity to residential properties on Station and Chesham Streets is expected to have night-time amenity impacts due to lighting and vegetation removal, which will remove existing screening. The Proponent has committed to planting new trees in this area which would filter views from the adjacent residential properties along Chesham Street over time. The Department has strengthened this commitment by recommending a condition to ensure that St Marys station is designed to mitigate visual impacts and minimise light spill on residences in St Marys through appropriate landscaping and building design.

6.3 Noise and vibration

The greatest noise impacts to adjoining residents and business will be station box excavation activities at St Marys and Orchard Hills. The Proponent must consider mitigation measures to reduce noise impacts, provide appropriate respite, offer at-property treatment and continue ongoing community and business consultation.

Underground activities such as tunnel boring, tunnel fit out and ancillary surface support activities such as logistics support and material delivery, spoil handling, and grout batching would occur during tunnelling works, 24 hours a day, seven days a week. Heavy vehicle movements at Orchard Hills would be restricted between the hours of 10:00pm and 7:00am to protect residential amenity.

The project is predicted to comply with most operational noise and vibration criteria. To provide certainty of potential mitigation measures, the Proponent has committed to undertaking an Operational Noise and Vibration Review during detailed design to further consider measures to mitigate these impacts. This approach is standard practice to determine the final suite of noise attenuation measures as additional noise modelling. An Operational Noise and Vibration Validation Report will also be undertaken within the first 12 months of the project's operation to verify noise predictions and determine if further mitigation is required. The validation process will determine whether the actual operational noise and vibration impacts comply with the predicted detailed design modelling and whether additional mitigation measures are required.

Issue

Construction hours include activities within standard daytime hours, work outside standards hours and 24 hours a day, seven days a week tunnelling

The project's construction would generate varying noise and vibration impacts, depending on the activities being carried out and proximity to residences and other sensitive receivers. The construction of rail infrastructure projects often involves the use of large plant and machinery, sometimes moving along the alignment (clearing and bulk earthworks) and sometimes working in fixed locations (bridge construction, compound sites, station box excavation or station construction). The project will require a tunnel boring machine (TBM) to construct the tunnel sections. Tunnelling and associated ancillary support activities are proposed to be undertaken 24 hours a day, seven days a week.

Proposed construction hours for construction activities are shown in **Table 8**. These are generally consistent with those applied to the Sydney Metro City and Southwest - Chatswood to Sydenham metro project (tunnelling activities) and Coffs Harbour Bypass (surface activities).

Construction noise impacts will exceed relevant criteria and must be mitigated

The Proponent's noise assessment identified the greatest impact to adjoining residents, business and other sensitive receivers is associated with the following activities:

- excavation of station boxes at St Marys and Aerotropolis Core
- excavation of the tunnel portal at Orchard Hills and excavation of the cutting for the proposed station
- excavation of the shaft for the services facility at Claremont Meadows.

These locations are the highest impacted areas because there are a larger number of residents located near these construction zones compared to the remaining construction corridor. 127 sensitive receivers during the worst-case scenario and 50 sensitive receivers during the typical construction scenario are predicted to exceed the highly noise affected (HNA) noise levels (75dBA as defined in the *Interim Construction Noise Guideline* (EPA 2009) (ICNG)). However, these exceedances are based on unmitigated construction works. The worst-case scenario refers to all noisy activities occurring simultaneously and is unlikely to occur for extended periods of time. The typical scenario reflects the expected regular impacts during construction.

Figure 8 and **Figure 9** identify the sensitive receivers that are predicted to exceed the HNA criteria. Most of the activities within these locations would be carried out during standard construction hours as shown in **Table 8**.

The remaining areas across the project corridor (south of Orchard Hills to Elizabeth Drive) would experience exceedances of noise management levels (NMLs). Because these areas are further from sensitive receivers, the noise assessment does not predict any exceedances of the HNA criteria.

To address the noise impacts associated with excavation works, the Proponent has committed to managing construction noise impacts in accordance with its Construction Noise and Vibration Standard (CNVS), supplementary project specific mitigation measures determined through the preparation of Detailed Noise and Vibration Impact Statements (DNVIS), and consideration of acoustic sheds.

Table 8 | Proponent proposed construction hours (Source: Submissions Report)

Construction hours	Activities
Above ground activities	
24 hours a day, seven days a week / outside standard construction hours	long term activities to support tunnelling • TBM launch, support and extraction • mucking out and spoil handling • tunnelling support activities (including tunnel section segment manufacture and storage, material handling and grout batching) • activities at the tunnel and viaduct segment production and storage facility within the airport construction support site, including transport of material to support segment production and segment deliveries • construction traffic for material supply to and spoil removal from tunnelling and underground excavation short term duration work • utility works (short term work).
7.00 am to 6.00 pm Monday to Friday 8.00 am to 1.00 pm Saturday No work on Sunday and public holidays	enabling works • demolition of buildings, relocating, adjusting and protecting utilities and services affected by the project • establishing construction compounds and work sites, including fencing and hoarding • supplying power, water and other utilities to construction compounds excavation activities

Construction hours	Activities
	• cut-and-cover • station box excavation • Claremont Meadows and Bringelly service facilities corridor surface works • bridge and viaduct structures (including pier or column construction) • earthworks (including ground stabilisation, cut and fill to design levels) • rail systems fitout (fit-out of mechanical and electrical ventilation, track slab and rail fastening, rail track installation, fixing and welding) • construction of stabling and maintenance and other ancillary facilities above ground structural works at all stations • support columns and foundations for vertical transport structures and the station buildings and platform structure.
Underground construction activities	
24 hours a day, seven days a week / outside standard construction hours	• tunnel boring between St Marys and Orchard Hills, and Western Sydney International Airport and Aerotropolis Core • tunnelling work • TBM build • tunnel lining / fitout • TBM extraction • TBM demobilisation • rock breaking (in the tunnel and cross passages).
Other construction activities	
Work carried out when required up to 24 hours a day, seven days a week	• work determined to comply with the relevant noise management level at the nearest sensitive receiver • work required to be carried out during rail possessions • delivery of materials outside approved hours as required by the NSW Police or other authorities for safety reasons • emergency situations where it is required to avoid the loss of lives and property and/or prevent environmental harm • situations where agreement is reached with affected receivers.

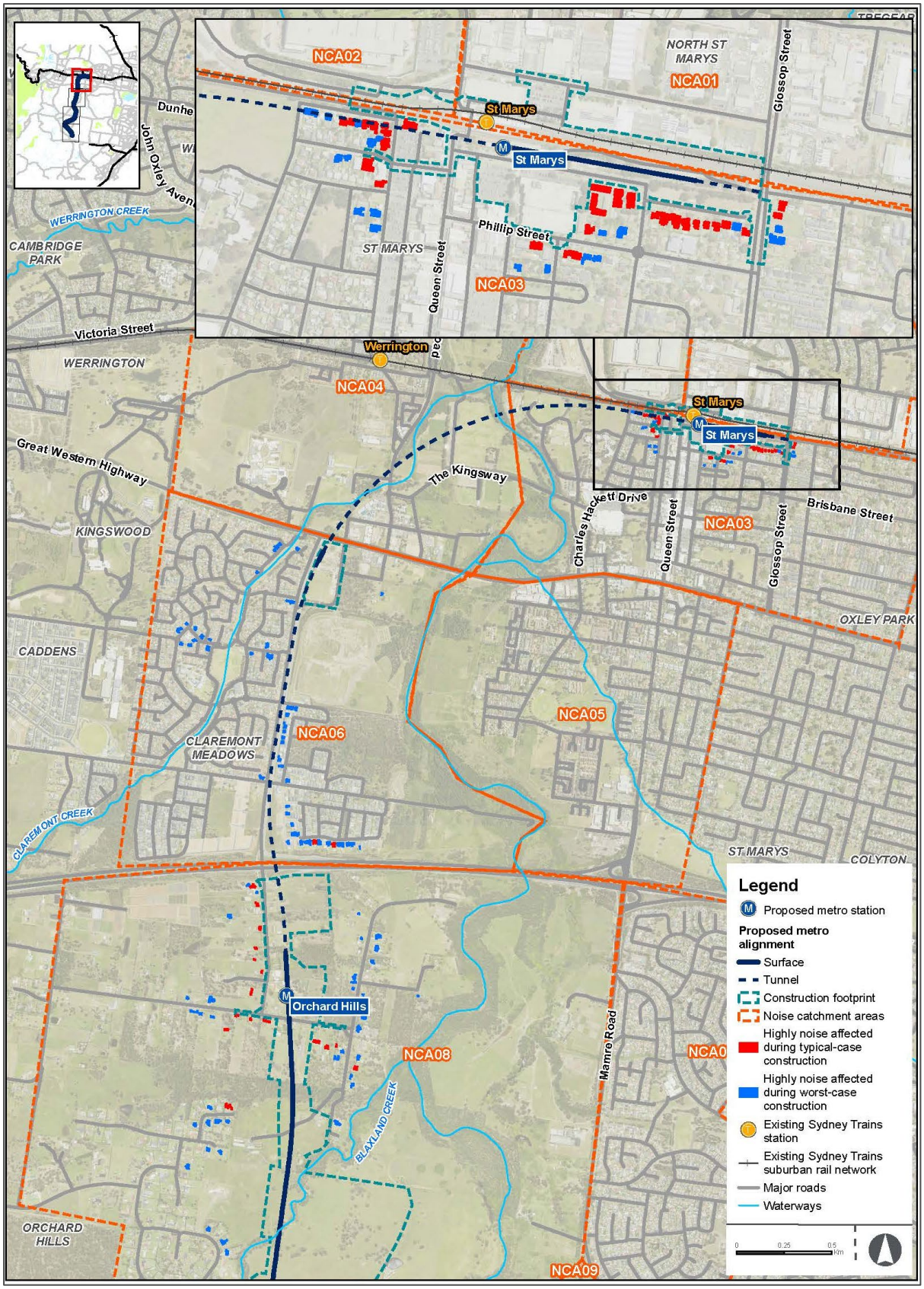

Figure 8 | Indicative location of highly noise affected receivers during construction activities – St Marys and Orchard Hills (Source: Sydney Metro)

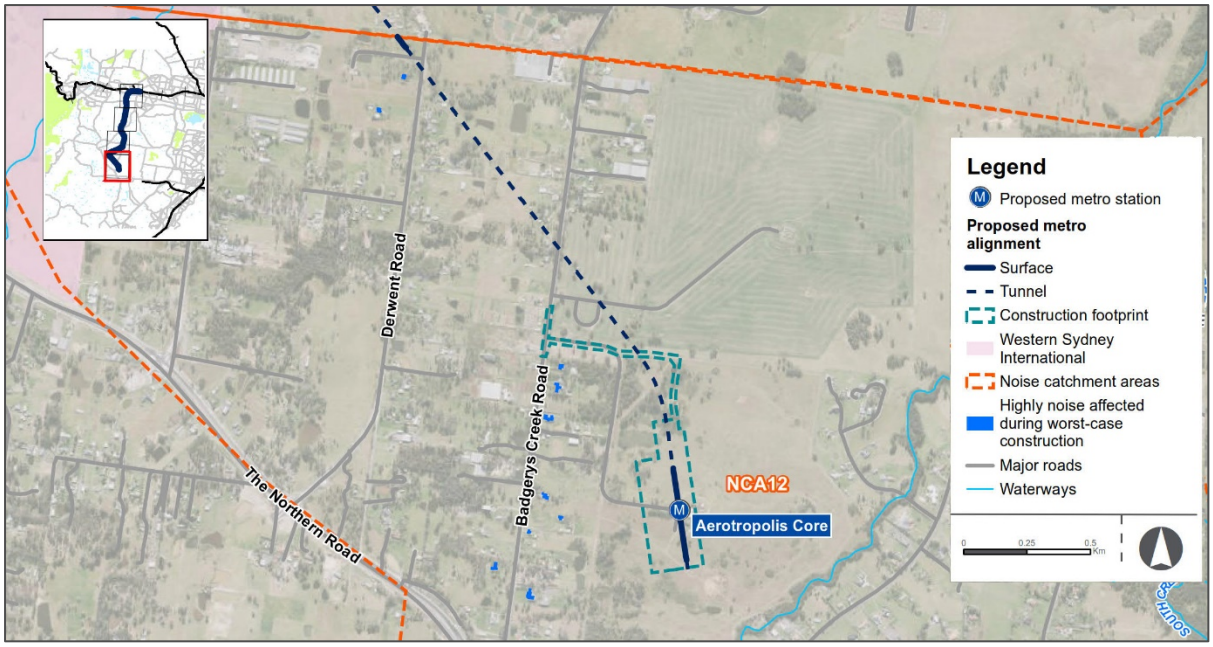

Figure 9 | Indicative location of highly noise affected receivers during construction activities – Aerotropolis Core (Source: EIS)

DNVISs include specific mitigation measures identified through consultation with affected sensitive receivers. Supplementary to DNVISs, industry best practice construction methods must be implemented where reasonably practicable. A similar requirement was imposed on the Sydney Metro City and Southwest project, which lead to innovative construction methods being implemented to reduce noise impacts such as use of alternative quieter equipment, only using hydraulic hammers in areas of hard rock / concrete, bored piling, substitution of materials (e.g., plastic for metal), minimising the number of noisy machines running at any one time, substitution of processes (change from impact action e.g. hammering a metal bar to progressive pressure action e.g. bending metal bar with pliers), undertaking trials of construction activities in consultation with the community using alternative methods.

The operational noise and vibration impacts of the project generally meet operational criteria

The operational noise assessment is based on four different scenarios that include:

- airborne noise impacts generated by railways
- ground-borne noise and vibration impacts generated by railways
- operational noise from stabling and maintenance facilities
- operational traffic impacts.

The assessment found that noise and vibration generated by the project would meet trigger levels identified in the Rail Infrastructure Noise Guideline (EPA, 2013) (RING) and Noise Policy for Industry (EPA, 2017) (NPfI) for most operational scenarios and locations except for:

- twelve (12) residential receivers near St Marys Station, which are predicted to exceed ground borne noise trigger levels. With the use of high attenuation track form adjacent to St Marys Station, the ground-borne noise levels are not predicted to exceed noise trigger levels

- potentially affected receivers near the Orchard Hills stabling and maintenance facility are predicted to exceed the applicable NPfI trigger levels for all scenarios by up to 6 and 8 dBA for day and night time scenarios
- noise levels for fixed facilities at off-airport stations are predicted to comply with relevant noise criteria at the nearest receivers to all stations except St Marys. Minor exceedance of 2dBA are predicted at the nearest receivers to St Marys underground ventilation shafts.

Existing and future land uses south of the M4 Motorway to the Aerotropolis Core station will change, resulting in changes to background noise levels and applicable operational noise triggers for adjoining development

The existing noise environment surrounding the project can be grouped into two separate noise environments that reflect the urban and suburban environment north of the M4 Western Motorway and the current semi-rural environment south of the motorway. Land uses between the Warragamba to Prospect Water Supply Pipeline to the Aerotropolis Core station would change with development of the Aerotropolis, and likely result in higher background noise levels. The future context of these lands will be further developed and refined through strategic planning initiatives discussed in **Section 3.** **Section 6.1** also considers current and future land uses.

Submissions and advice

Community and special interest groups

The following comments were raised:

- the assessment did not adequately assess impacts on St Marys residents
- concerns about vibration impacts during tunnelling works and station box excavations
- concerns about vibration impacts during operation along Camira Street in St Marys.

Council

Penrith City Council recommends acoustic sheds be used as a standard mitigation measure.

Liverpool City Council noted the environmental assessment process is highly fragmented and it is difficult to determine the extent of noise and vibration impacts. Council requested:

- spatial data to identify land in or adjacent to the rail corridor likely to be adversely affected by rail noise or vibration
- construction works occur within standard construction hours unless otherwise approved by Council
- a Construction Noise and Vibration Management Plan and Operational Environmental Management Plan be prepared.

Government agencies

EPA requested:

- clarification of what sleep disturbance assessment criteria have been adopted for the noise and vibration assessment

- additional information to explain the anticipated duration of impacts associated with the construction scenarios and clarify ambient noise monitoring results
- the EIS identifies activities / scenarios that may occur outside standard construction hours, and further justification is required as to why certain activities should occur outside standard construction hours
- an operational noise and vibration review be undertaken to ensure the operation of the project meets the relevant operational noise and vibration objectives of relevant policies/guidelines, including the identification of appropriate noise attenuation measures.

EPA's advice on the Submissions Report added comments about the categorisation of background noise levels and identification of individual receivers in the EIS and Submissions Report.

WaterNSW raised potential construction and operational vibration impacts to the Warragamba to Prospect Reservoir pipeline.

Department's consideration

Areas surrounding the St Marys and Orchard Hills stations will have the greatest construction noise and vibration impacts that must be managed through provision of noise attenuation measures

The project will result in approximately 50 residences being subject to noise above the HNA levels in the typical construction in St Marys and Orchard Hills. These noise levels are primarily associated with station box excavation works, the most noise-intensive of which (excavation using hydraulic hammers) are expected to last for eight months. Affected receivers are expected to experience noise levels above the HNA criteria throughout this period and excavation and earthworks.

The Department notes that the Proponent has not committed to providing acoustic sheds for this project. Instead, the Proponent proposes to mitigate these noise impacts through application of its CNVS and DNVIS to determine appropriate mitigation measures prior to commencement of construction. The Department does not consider this provides sufficient certainty that the impacts will be satisfactorily managed given their extent and duration. The Department recommends a condition requiring the Proponent to implement mitigation measures so that noise impacts at residences and other sensitive receivers are reduced to below HNA levels during typical case construction. Mitigation measures may include at source measures such as quieter working methods, path barrier controls such as acoustic sheds and/or noise walls, at-property treatment (secondary glazing such as acrylic/magnetic or glass secondary glazing, shutters, or acoustic blinds/curtains), or a combination of source, path and at-property treatment.

In addition, given station box excavation activities' impacts would have the greatest noise impact in the project's construction, these activities would be restricted to standard construction hours. The Proponent must provide respite to residents due to the continuous nature of these activities.

Impacts of above ground works along the remaining corridor will be acceptable subject to appropriate management and mitigation measures

Apart from station box excavation and tunnelling, the construction process would have other unavoidable noise impacts to residents neighbouring the project footprint. Proposed activities located in this corridor will be earthworks (shaping and forming the corridor), constructing pylons for bridges and viaducts, laying of rail track and associated operational infrastructure. Due to the linear nature of the project, construction stages will vary from several weeks to months, and generally move along the

rail corridor as construction progresses. For the remaining corridor between Blaxland Creek and Elizabeth Drive, the noise assessment predicated no exceedances of the HNA noise level criteria. Though the HNA criteria won't be exceeded, many residents along this section of the corridor will experience noise exceedances during construction. Exceedance of NMLs is attributed to the low existing noise background levels experienced along the remainder of the corridor.

Similarly, residents near the Aerotropolis Core will experience exceedances of NMLs with approximately nine sensitive receivers expected to exceed the HNA noise level criteria (worst case scenarios) during station box excavation activities. As noted above, these activities can only be undertaken during standard construction hours.

While the Department acknowledges construction activities will cause noise impacts above NMLs, these are not as significant as the impacts of works at St Marys and Orchard Hills. The Department considers the Proponent's CNVS and DNVIS, and conditions requiring the use of all reasonable and feasible mitigation measures, will appropriately manage these noise impacts.

Tunnelling activities can be undertaken 24/7 with limited impact, subject to meeting strict noise criteria and restricted heavy vehicle spoil haulage movements

The Department accepts that tunnelling and related activities will occur 24 hours per day, seven days per week (24/7). Tunnel Boring Machines (TBMs) operate continuously once commissioned, and associated ancillary surface support activities such logistics support and material delivery (such as precast concrete segments used for tunnel lining), spoil handling, grout batching plant, and fresh air ventilation also need to occur continually to support these tunnelling works.

Tunnel boring will generate ground borne noise and vibration exceedances. The predicted exceedances are shown in **Table 9**. The assessment predicted no exceedances of the building structural damage criteria at any location due to TBM and rock-breaker activities from tunnelling.

Table 9 | Tunnel boring exceedances – ground borne noise and vibration (Source: EIS)

Number of exceedances	Sensitive receiver type	Location of exceedances	Duration of impact (worst case)
Ground borne vibration exceedances of preferred and maximum vibration values			
10	Residential	above the St Marys to Orchard Hills tunnel (at chainages between 17800 metres and 18200 metres)	0-1 night (3-4 nights)
6	Residential	above Western Sydney International Airport to Bringelly tunnel	0-1 night (3-4 nights)
Ground borne noise – ICNG night-time NMLs			
38	Educational, residential and business and industrial	St Marys to Orchard Hills tunnel	0-1 night (3-4 nights)

4	Residential	above Western Sydney International Airport to Bringelly tunnel	0-1 night (3-4 nights)

While there are some exceedances of ground-borne noise and vibration criteria for human comfort and ground-borne regenerative noise, worst-case exceedances are predicted to be four nights at any one receiver as the TBM passes beneath. The Department notes that these exceedances are short-lived and acceptable subject to the Proponent's identified safeguards to manage vibration impacts, including undertaking activities to comply with applicable construction vibration criteria.

The Department recommends conditions to monitor and manage potential vibration impacts:

- preparation of a land use survey before work, to identify additional uses that are sensitive to construction vibration
- pre- and post- construction dilapidation surveys of buildings likely of being at risk of damage before commencement of any work, and rectification of damage caused by project construction
- establishment of an Independent Property Impact Assessment Panel for the resolution of property damage disputes
- measures and procedures to minimise construction vibration impacts including alternative construction methods and equipment
- real time vibration monitoring and adaptive management measures to ensure limits are not exceeded.

The Department acknowledges the potential impact of the 24/7 use of the Orchard Hills site to support tunnelling. This site includes ancillary activities such as logistics support and material delivery (such as precast concrete segments used for tunnel lining), spoil handling, grout batching, and fresh air ventilation. The Department recommends conditions allowing 24/7 works at Orchard Hills, but only to directly support tunnelling activities. The requirement for mitigation measures discussed above limits impacts from 24/7 works at this site.

In addition, to ensure that adjoining residents' night-time amenity is maintained, the Department has limited spoil haulage movements during this time to prevent frequent late night and early morning spoil haulage through surrounding streets. The Proponent has committed to maximising night-time onsite spoil storage in its CNVS. As the Proponent has not made a clear commitment not to haul spoil from the Orchard Hills site at night, the Department recommends a condition prohibiting spoil haulage to and from the Orchard Hills site between 10.00pm and 7.00am. These restricted hours will maintain night-time amenity for residents.

The Western Sydney International Airport site will have similar activities to the Orchard Hills site as the location of the other TBM launch site. In addition, this site will manufacture the precast concrete segments from a dedicated concrete batching plant located at the airport construction support site. The manufacture of segments at the airport construction support site would be undertaken 24 hours a day, seven days a week due to the process of manufacture, which requires that 'forming' the segments, concrete pour and concrete curing activities occur in a continuous cycle, with transport of the cured segments out of the facility to storage. The segments would be transported by trucks within the Western Sydney International Airport site and to Orchard Hills. As this site is located on

Commonwealth Airport land, noise impacts would be managed under the Commonwealth's approval(s) and Environmental Management Plans / Procedures.

Operational rail noise and vibration, including noise associated with the operation of the stabling facility, will be acceptable subject to design review and monitoring

The project's operation will introduce a new noise and vibration source associated with train movements, platform announcements, horns and whistles, ground vibration and industrial noise elements from the stabling and maintenance facility. Areas in the Aerotropolis are also subject to substantial land use changes that will create higher background noise levels that correspond to future development. The future context is further discussed in **Section 3** and **6.1** of this report.

Though the operation of the project is not expected to exceed surface airborne noise limits under the RING, the project is predicted to exceed ground borne noise levels by 2dB at up to 12 residential receivers adjacent to St Marys Station. The Department considers these noise impacts can be designed out using highly attenuated rail fixings. These would be installed along sections of rail track adjacent to sensitive receivers, to reduce ground borne noise levels. This approach is industry standard to address ground borne noise level exceedances.

Figure 10 presents the locations of the residences predicted to experience noise levels above the NPfI at the Orchard Hills stabling facility for the most stringent night time period. To mitigate exceedances of the NPfI at the Orchard Hills stabling facility, the Proponent has committed to three measures:

1) provision of a noise barrier to the west of the facility; and/or
2) reconfiguration of the stabling yard layout to utilise on site buildings to provide screening; and/or
3) provision of at property treatment to residents.

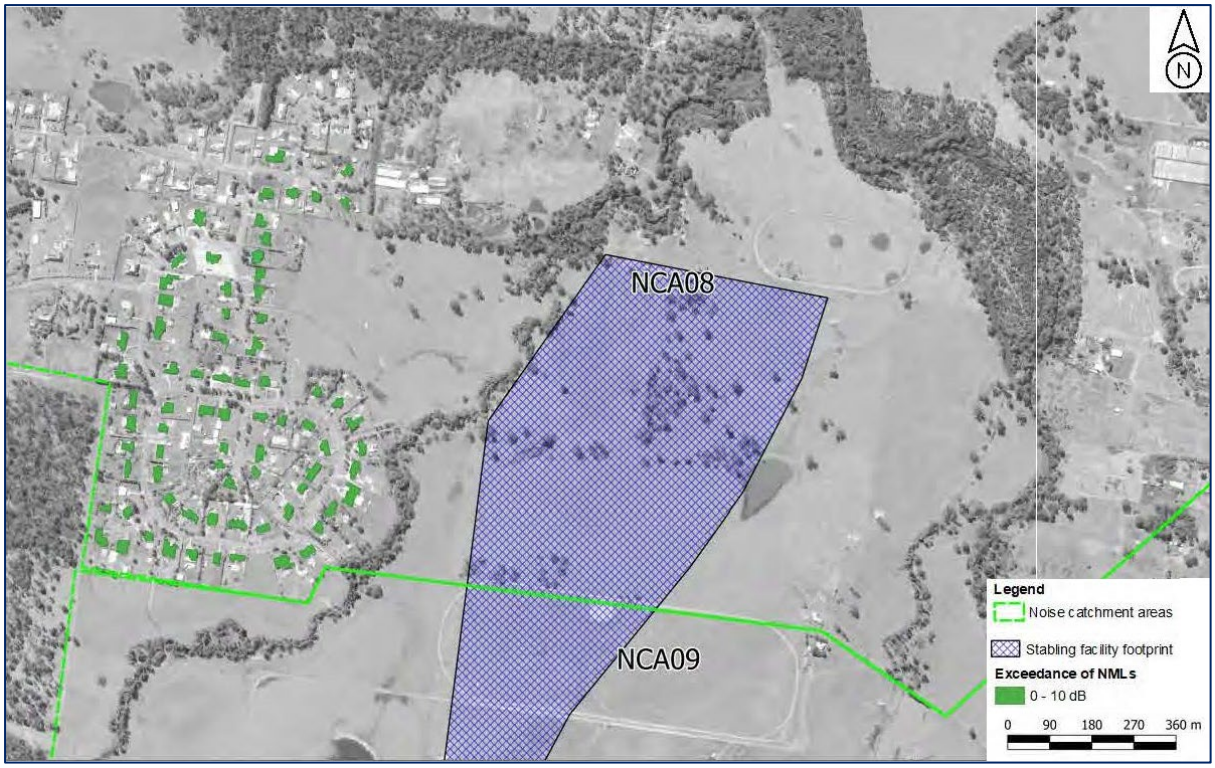

Figure 10 | Exceedances of NPfI at the Orchard Hills stabling facility during the night time period (Source: EIS)

The Proponent has committed to investigating all measures during detailed design, through further noise and vibration modelling and undertaking an Operational Noise and Vibration Review to determine the final measures. The Department considers that the level of noise exceedances (up to 10 dB) can be managed with the suggested measures and that these measures will respond to the existing noise environment. This approach is standard practice to determine the final suite of noise attenuation measures as additional noise modelling and project design would be undertaken.

To ensure this process is robust and appropriate noise attenuation measures are developed and installed, the Department requires the Proponent to undertake detailed noise validation of the project following 12 months of operation. This compliance review will identify the actual noise and vibration levels generated by the project and determine whether the mitigation measures provided are sufficient or whether addition measures will be required to meet the RING and NPfI operational noise levels and vibration goals for human exposure for existing sensitive receivers, as presented in *Assessing Vibration: a Technical Guideline (Department of Environment and Conservation, 2006).*

Future land use change and development along the rail corridor will be required to the noise environment that exists at the time of development

Western Sydney is a fast-growing area due to heavy economic investment. The area is being transformed into the Western Parkland City, and as a result the existing noise environment will substantially change. The future noise environment would include commercial, industrial and residential development, operation of transport infrastructure (road and rail), and aircraft noise during the day, evening and night. Land use planning in the Aerotropolis is being undertaken with knowledge of this project, and therefore has the opportunity to make land use decisions accordingly.

Any future development adjacent to the project will need to meet the requirements of *State Environmental Planning Policy (Infrastructure) 2007* (the Infrastructure SEPP) to meet the required internal noise amenity criteria. This may include future developments being acoustically designed and treated to ensure that rail noise meets specified criteria in habitable rooms.

The approach of future development designing out rail noise consistent with the Infrastructure SEPP would address future operational noise concerns and ensure that the amenity of future residents is maintained.

6.4 Traffic and transport

The project is not expected to cause significant traffic and transport impacts during construction and the Proponent's construction traffic framework is appropriate to manage these impacts.

Impacts attributable to the project during operation are minor, although the Department notes a steady decline in traffic performance due to background growth. The Department recommends a condition requiring the Proponent to work with the roads authority on alleviating capacity constraints where the project may cause intersections to perform unsatisfactorily.

The Department also notes concerns raised in submissions about parking impacts in St Marys. While St Marys will continue to be well-served by off-street parking, construction workers will cause competition for this parking. The Department is satisfied that the Proponent's construction worker parking strategy will adequately manage impacts on parking availability including encouraging workers' use of car sharing and public transport.

Issue

During construction there will be minimal reductions to levels of service on affected roads

Construction of the project will require up to 58 heavy vehicle movements and 280 light vehicle movements per hour during peak construction across the off-airport construction corridor, and between 12 and 40 heavy vehicle movements and 30 and 280 light vehicle movements at each of the construction sites. The traffic modelling for 'with project' and 'without project' scenarios assessed the construction traffic impacts of the project. The construction traffic modelling used a worst-case approach that included the cumulative impacts of this project, the M12 Motorway and Western Sydney International Airport projects. The assessment predicts that most roads and intersections in the study area would experience a moderate decline in the level of service (LoS) (see **Table 10**) by 2024 compared with the base year (2019).

Table 10 | Peak construction 2024 level of service impacts (Source: EIS)

Intersection	Intersection LOS without construction 2024	Intersection LOS with construction 2024
Glossop Street/Forrester Road	C	D
Glossop Street/Harris Street	A	A
Glossop Street/Phillip Street	A	B
Queen Street/Charles Hackett Drive	B	B
Glossop Street/Great Western Highway	C	D
Queen Street/Great Western Highway/Mamre Road	E	E
Charles Hackett Drive/Great Western Highway/ Pages Road	C	D
Mamre Road/M4 Western Motorway Eastbound Ramp	F	F
Mamre Road/M4 Western Motorway Westbound Ramp	E	E
Great Western Highway/Gipps Street	C	D
Gipps Street/Sunflower Drive	B	B
Kent Road/Caddens Road	B	B
Kent Road/M4 Western Motorway On-ramp	A	A
Kent Road/M4 Western Motorway Off-ramp	B	B

Intersection	Intersection LOS without construction 2024	Intersection LOS with construction 2024
Kent Road/Lansdowne Road	B	B
Mamre Road/Luddenham Road	F	F
Luddenham Road/Patons Lane	B	D
Luddenham Road/Elizabeth Drive	A	B
Elizabeth Drive/Adams Road	B	C
Elizabeth Drive/Badgerys Creek Road	A	B
Badgerys Creek Road/The Northern Road	C	D
The Northern Road/Derwent Road	A	A

Spoil haulage from tunnelling sites will focus activity towards the Western Sydney International Airport site

Approximately 885,000 cubic metres of surplus spoil will be generated from off-airport land and 1,055,000 cubic metres of surplus spoil from on-airport land from tunnelling activities and station box excavations. Tunnelling from St Marys to Orchard Hills will have spoil removed at the Orchard Hills construction site. Tunnelling from Western Sydney International Airport to Bringelly will have spoil removed from the Western Sydney International Airport tunnel portal and Airport Terminal construction sites.

The Proponent proposes spoil haulage would occur on a 24-hour, seven day basis, but will prioritise movements during standard hours and stockpiling spoil out of hours where possible.

Roads proposed for haulage are:

- Mamre Road
- Luddenham Road
- Badgerys Creek Road
- Elizabeth Drive
- Glossop Street
- The Northern Road.

All the above roads, except for Luddenham Road, currently permit haulage-sized trucks and the Proponent has committed to obtaining the required approvals to use this road.

Where spoil meets certain quality criteria, it would be transported to the Western Sydney Airport site to be used for earthworks or placed at the permanent spoil site to south of the airport terminal. This approach reduces heavy vehicle movements across the wider road network, compared to the construction traffic modelling which assumed spoil would be transported to disposal locations across Sydney. Overall handing and transportation of spoil would be detailed in a Spoil Management Plan.

Removal of the existing Station Street car park at St Marys to accommodate relocation of the bus interchange will affect parking availability

The project will impact on existing road access and parking availability surrounding St Marys station and construction site. Works include road closures, access restrictions and adjustments to street layouts to allow bus access. Heavy vehicle construction traffic movements in St Marys would access the site via a new access road adjacent to the rail corridor connecting to Glossop Street, which aims to avoid heavy construction traffic in the town centre.

The project will require the removal of approximately 390 parking spaces in St Marys during construction (see **Figure 11**):

- Station Street car park: approximately 160 spaces removed for a temporary bus interchange. Sydney Metro will consult with Penrith City Council about the use of the site following completion of the project.
- Harris Street car park: approximately 130 spaces removed for construction site. This car park will be closed following completion of additions to the adjacent multi-storey car park, which will provide 250 spaces (a net increase of 90 spaces). The addition was approved by Transport for NSW in May 2021 and is expected to be completed in 2022.
- On street parking: approximately 60 spaces removed temporarily, and 40 spaces removed permanently for construction site access and the new station's kiss and ride facility.

The Proponent's parking availability survey found there are approximately 4,500 public on-street and off-street parking spaces in St Marys. The survey found that while parking close to the station is fully used on a typical weekday, and that there could be a permanent net loss of approximately 170 parking spaces (depending upon the reinstatement of the Station Street car park), there is spare capacity in the surrounding area. This relatively minor loss should be viewed within the context of improved place outcomes, public transport infrastructure and services provided by the project.

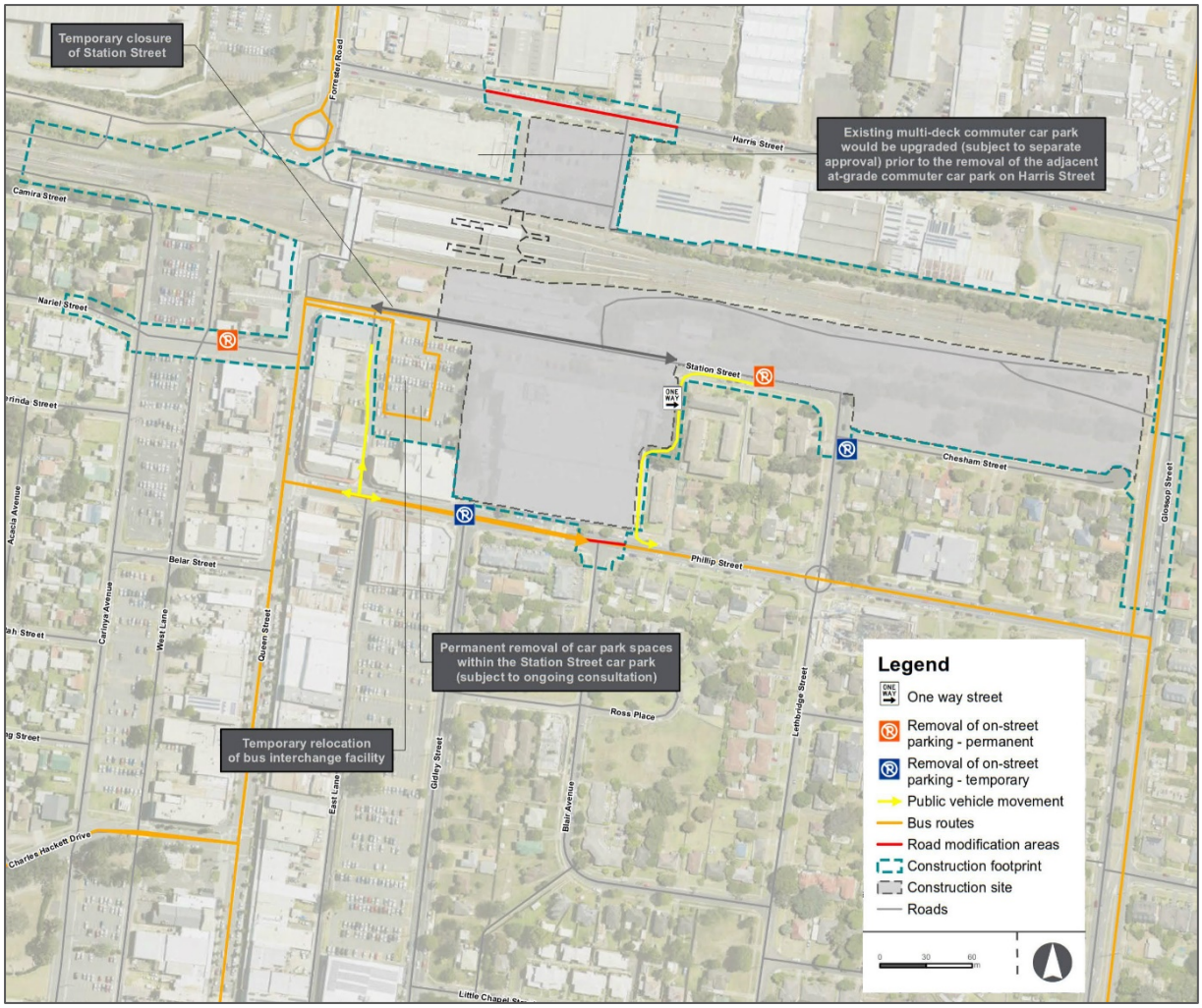

Figure 11 | Temporary construction on-street parking and road access changes at St Marys (Source: Submissions Report)

Once the project is operating it will generate small amounts of traffic during am and pm peaks

The operational traffic modelling predicts gradual deterioration at several intersections (see **Table 11**), most notably in St Marys, at M4 and Mamre Road east and west ramps, and intersections connecting to the Great Western Highway. By 2036, intersections for key roads including Luddenham Road, Mamre Road, Elizabeth Drive, The Northern Road and Badgerys Creek Road will operate between LoS E and F. Similarly, by 2036 the Mamre Road/M4 east and westbound ramps will operate at LoS E-F both with and without the project. The main traffic generation from the project would occur during AM and PM peak times when travellers park at or drop off at the stations.

Submissions and advice

Community and special interest groups

Community submissions raised concerns regarding:

- active transport links and access from Airport Terminal Station should be provided to adjoining future developments
- construction worker parking impacts at St Marys

- land owners requested involvement in finalising road and public space design and locations at Luddenham Road Station
- concern with traffic and heavy vehicles using local streets during construction
- cumulative impacts from construction traffic of major infrastructure projects in the Aerotropolis
- clarifications regarding bicycle parking and pedestrian and cyclist access arrangements at stations and bus routes
- consider the provision of additional parking at St Marys.

Council

Penrith City Council raised the following:

- it does not support the removal of car parking at St Marys Station
- a parking strategy be developed for the precinct to minimise impacts to parking
- recommended a relocated park and ride location at Orchard Hills Station to minimise traffic in the future town centre
- requested road upgrades to the broader area including west-facing ramps at the M4 Motorway Kent Road interchange, widening of Luddenham Road be widened by the project, and Great Western Highway intersection upgrades at St Marys.

Following the receipt of the Submissions Report, Council advised it supports the relocation of the temporary bus interchange and the Proponent's commitment to prepare an operational car parking strategy for St Marys.

Liverpool City Council raised the following issues:

- requested a traffic and transport working group be developed comprising Liverpool Council, Penrith Council and TfNSW to co-ordinate the cumulative impacts of multiple projects in the area
- a Construction Transport Management Plan be implemented to provide management of heavy vehicles and ensure safety protocols are applied
- installation of active transport links across the project.

Table 11 | Modelling of intersection performance in 2026 and 2036 (Source: EIS)

Intersection	2019 (Base year)		2026 AM		2026 PM		2036 AM		2036 PM	
	AM	PM	Without project	With project	Without project	With project	Without project	With project	Without project	With project
Glossop Street/Forrester Road	C	D	C	C	C	C	D	D	D	E
Glossop Street/Harris Street	A	A	A	A	A	A	A	A	B	B
Glossop Street/Phillip Street	A	B	A	A	B	B	B	B	F	F
Queen Street/Charles Hackett Drive	B	B	B	B	B	B	B	B	B	B
Glossop Street/Great Western Highway	D	E	C	D	D	D	E	F	D	E
Queen Street/Great Western Highway/ Mamre Road	D	D	D	F	E	F	F	F	F	F
Charles Hackett Drive/Great Western Highway/Pages Road	D	D	C	C	D	D	F	F	F	F
Mamre Road/M4 Western Motorway Eastbound Ramp	C	B	B	B	F	F	F	F	F	F
Mamre Road/M4 Western Motorway Westbound Ramp	B	B	F	F	F	F	E	E	F	F
Kent Road/Caddens Road	B	B	B	B	B	B	B	B	B	B
Kent Road/M4 Western Motorway On-ramp	A	A	A	A	A	A	A	A	A	A
Kent Road M4 Western Motorway Off-ramp	B	B	B	B	B	B	B	B	B	B
Kent Road/Lansdowne Road	A	A	A	C	A	C	A	D	B	C
Mamre Road/Luddenham Road	A	B	F	F	F	F	E	F	F	F
Elizabeth Drive/Adams Road	B	B	C	C	D	D	C	C	D	D
Badgerys Creek Road/The Northern Road	A	A	F	F	B	B	F	F	C	C

Department's Consideration

There would be moderate and manageable impacts to the local road network and traffic during construction

The Department is satisfied that construction vehicle movements (including spoil haulage) and temporary road changes would not significantly affect the operation of the road network. The project will introduce relatively low numbers of heavy and light vehicle movements to the surrounding road network, spread across multiple construction sites. The main increase in traffic will occur during peak construction from spoil haulage at tunnelling sites towards the Western Sydney Airport site and during station box excavations for St Marys and Orchard Hills. Changes to the layout of roads surrounding St Marys station would be minimal and are required to accommodate the relocation of bus services and changes to public parking.

Table 10 shows that the construction traffic is not predicted to significantly impact on road performance. Construction vehicles will cause some declines to intersections, but intersections for which the project will cause performance declines will still operate at a LoS that maintains sufficient intersection capacity. Construction traffic does not cause any intersection to decline to a LoS F (where a road operates above its capacity), noting that some assessed intersections perform at a LoS of F in the 'with' and 'without' project scenarios.

Construction traffic and road safety impacts would be temporary and modest. They will be mitigated through measures outlined in the Proponent's Construction Traffic Management Framework (CTMF). These include configuring work sites to minimise traffic and road safety impacts, centralising and controlling vehicle routes, employing appropriate traffic controls, and communicating road access changes. As part of the CTMF, the Proponent's contractors will consult with Councils and proponents of other nearby construction projects. The CTMF also requires construction stage and site-specific Construction Traffic Management Plans that detail traffic movements and controls at each site. The Department is satisfied that this approach will adequately manage traffic impacts around construction sites and the broader road network and has recommended a condition to require the Proponent to prepare and implement a Construction Traffic Management Plan for the project.

The Department acknowledges the project's construction coincides with the Western Sydney Airport and M12 Motorway projects and supports the Proponent's establishment of a Traffic and Transport Liaison Group to manage cumulative traffic impacts.

Construction worker parking at St Marys can be accommodated within the surrounding area and through management

St Marys is well served by off-street parking, including public car parks parallel to Queen Street between the railway and Great Western Highway. The proposal would remove approximately 390 spaces. At least 170 of these would be removed permanently, and the Department notes that the post-project status of the Station Street car park is currently unclear and will be resolved between the Proponent and Penrith City Council. The loss of these parking spaces will be partially offset by the 250 space addition to the existing commuter car park, which would reduce the net loss during construction to 140 spaces.

The Department considers that this loss of parking spaces would have a minor impact on overall parking availability in St Marys, as approximately 4,000 on and off-street parking spaces will continue to be available.

At peak construction, the St Marys Station workforce will reach approximately 350 personnel. To address residual parking impacts, the Proponent has committed to developing a construction worker car parking strategy for St Marys. This will be developed in consultation with Penrith City Council and include measures to reduce worker parking demand such as using shuttle buses and encouraging public transport. The Department is satisfied that this is a suitable measure to manage impacts of construction worker parking.

While construction worker parking will impact on parking availability, the Department considers that this is unlikely to significantly affect parking availability for other road users. The Department also notes that the addition to the existing commuter car park would provide additional parking capacity over the longer term.

The project will have modest impacts on traffic levels during operation, changes to which are primarily related to background traffic growth

Table 11 shows that traffic levels will deteriorate between the assessment's base year of 2019 and the future operational years of 2026 and 2036. LoS generally declines over time in both "without project" and "with project" scenarios. The Department considers that this demonstrates most impacts over time are due to background traffic growth rather than the project.

The Department considers that the appropriate comparison to determine the project's impacts are between the "without project" and "with project" scenarios in 2026 and 2036, as this shows the impact of the project, rather than changes to background traffic growth. Modelled intersections generally show no change to levels of service between the without and with project scenarios. The Department is satisfied that the project would operate without significant impacts on the wider road network.

The project will cause some localised LoS deterioration at some intersections, particularly at St Marys where intersections impacted by the project's operation decline by one or two categories. This is a modest decline, indicating that the project would exacerbate existing capacity constraints at these intersections without being the sole cause of constraints. Regardless, the Department considers that the project contributes to congestion at these intersections and has recommended a condition requiring the Proponent to work with the roads authority to mitigate impacts at these intersections.

The Department considers that other intersection declines attributable to the project are minor or will be resolved separately to this project. While the Kent Road and Lansdowne Road intersection declines due to the project, the resultant LoS of C and D are still acceptable intersection wait times. Early planning is underway for a signalised upgrade to the Mamre Road and Luddenham Road intersection as part of wider upgrades to Mamre Road by Transport for NSW.

Station access and transport connections will be considered holistically as part of the project's design development

The Department acknowledges the submissions from Council and landowners along the project's alignment that suggest design treatments for access to and through the stations at St Marys, Orchard Hills, Luddenham Road and the Airport Terminal. The PUDCLP (discussed in **Section 6.2**) will include the design of station precincts and transport connections. The Department agrees that stakeholder consultation throughout the design process is an important part of designing station access and transport connections and has recommended a condition requiring consultation with Councils and surrounding landowners during the preparation of the PUDCLP.

The project will provide active transport facilities at the stations, the design of which will be subject to the PUDCLP. Active transport connections in the wider area are outside the scope of the project. In areas expected to undergo significant land use change, such as the Aerotropolis, active transport connections are considered as part of that land use planning.

The Department acknowledges that land use changes surrounding the project, such as the Western Sydney Aerotropolis, include changes to road networks to support that growth. This project's road connections must integrate with those future road network changes. The Department has recommended a condition that any permanent road works included in the project must be designed, constructed and operated to integrate with existing and proposed road networks, and minimise adverse changes to the safety, efficiency, and accessibility of the network.

6.5 Flooding, hydrology and groundwater

The project is in the Wianamatta-South Creek catchment and crosses several waterways. It crosses 3.6 km of flood liable land which may lead to flooding, hydrology and water quality impacts. 1.5 km of this land is within the main Wianamatta-South Creek floodplain at the north of the alignment, and the remainder is within the floodplain of Badgerys Creek and smaller creeks. The project is in tunnel at the South Creek and Badgerys Creek crossings and crosses other flood liable land at grade or on viaducts.

Predicted flooding impacts will generally meet flooding criteria, with local minor exceedances, and is unlikely to significantly affect the natural or built environment. Surface and groundwater quality is poor, due to historic agricultural land uses in the area, and would not be worsened by the project. Ground and surface water will be treated and discharged to meet relevant water quality criteria.

Station excavation and tunnelling will be to a depth of six to 25 metres below ground level. These works would intercept groundwater and will cause limited and localised groundwater table drawdown around stations during construction. Stations and tunnels will be sealed from groundwater intrusion during operation to minimise ongoing impacts to groundwater. Settlement impacts around station excavations are generally considered to be minor but will be subject to monitoring and independent property review.

Issue

Flood modelling shows project impacts can meet flooding criteria

The flood impact criteria adopted by the Proponent are consistent with those used for other linear infrastructure projects and are provided in **Table 12**.

Table 12 | Flood impact criteria applicable to the project (Source: EIS)

Parameter	Location	Criteria
Afflux (increased flood height)	Residential, commercial buildings and critical infrastructure	Maximum 10 mm increase to buildings that are flood prone in existing conditions
		No new above floor flooding
		50 mm increase where flooding is below floor level
	Roads	50 mm

	Crown land, open space, farming, grazing and cropping land	200 mm
Velocity (speed of floodwater)	All areas	Velocities are to remain below 1 metre per second. Where existing velocities exceed 1 metre per second, increase by less than 20 per cent
Flood hazard	Residential and commercial buildings	No change in flood vulnerability classification limits
	Roads	No change in flood vulnerability classification limits
Flood duration	Residential and commercial buildings	No increase to duration of above floor flooding
	Roads	No more than 10 per cent increase
	Farm cropping	Dependent on the crop.

Flood modelling shows that 53 properties affected by the proposal are within the 1% AEP flood event under existing conditions. The project meets the adopted flood impact criteria at all locations up to and including the 1% AEP flood event, and therefore does not worsen flooding impacts beyond the criteria at these already affected properties.

Water quality impacts will be managed

The Proponent relied on sampling carried out for the M12 Motorway and Western Sydney International Airport EISs within the same catchments as the project to assess water quality impacts. This showed that surrounding waterways exceed the Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines / project trigger levels for dissolved oxygen, electrical conductivity, pH and nitrogen. Trace metals, organic hydrocarbons and pesticides were also found in groundwater with background concentrations of copper, lead, nickel and zinc that exceed ANZECC guidelines.

Water quality performance outcomes were adopted so that no aspect of construction adversely affects existing water quality, and water discharged from the project contributes to achieving ANZECC guideline water quality triggers. In response to the EPA's advice on the water quality parameters, more rigorous criteria were set consistent with the 95 per cent species protection and 99 per cent toxicant level in the Australian and New Zealand guidelines (ANZG). These outcomes will be met through implementation of a Soil and Water Management Plan, including the use of erosion and sediment controls, constructing temporary stormwater treatment basins along the alignment during construction, and permanent water treatment plants at St Marys and Bringelly to treat groundwater.

Excavation will cause localised groundwater drawdown around stations

Excavation will intercept the groundwater table and can cause groundwater drawdown (lowering groundwater levels) as groundwater seeps into excavated sites, which can cause ground movement from changes to stress in rock formations and from ground consolidation. Tunnelling is not expected to cause groundwater drawdown or ground movement during construction as the tunnel walls would be sealed as part of the tunnelling process, significantly limiting groundwater intrusion and therefore drawdown.

Excavation for St Marys, Orchard Hills, and Aerotropolis Core stations and the Bringelly services facility will cause localised groundwater drawdown during construction. The excavations will function as sinks for surrounding groundwater, and groundwater levels will drop during construction. Drawdown of up to one metre will extend up to 440 metres from these sites, with larger drawdowns closer to each site. Drawdown around these sites may cause minor ground movement, which may in turn affect building stability. The stations and services facility will be sealed at the completion of construction to prevent ongoing groundwater drawdown.

The project is unlikely to affect other groundwater users. Poor groundwater quality, low yields, and high salinity result in existing groundwater not being widely used for agriculture or other purposes. There are 13 registered groundwater users along the alignment. The project's average groundwater take of 240 kilolitres per day during construction and 24 kilolitres during operation is unlikely to affect access by surrounding groundwater users, and complies with applicable rules under the Water Sharing Plan for the Greater Metropolitan Groundwater Sources 2011.

Submissions and advice

Community and special interest groups

One public submission raised concerns about existing flooding on Wianamatta-South Creek at St Marys, noting historic flooding and raised concerns about additional flooding impacts caused by the project.

Government agencies

DPIE EES requested further information and refined modelling to understand the project's impacts in more detail.

EPA advised on water quality:

- standard erosion and sediment controls may not be adequate for contaminated soil and the Proponent should implement enhanced controls in contaminated areas
- requested further detail about the surface bioretention and on-site detention basins
- noted a lack of information about specific sediment controls in the Proponent's assessment.

EPA recommended conditions of approval requiring a:

- Trigger Action Response Plan to set water quality limits and adaptive responses if they are not met; and
- water pollution impact assessment to inform any required licensing of construction stormwater discharges.

Department's consideration

The project does not worsen current flooding and hydrological performance

Flooding and hydrological impacts have been minimised through the project's design. The project is in tunnel when it crosses Wianamatta-South Creek at the northern end of the alignment and Badgerys Creek at the southern end of the alignment, and therefore does not cause any changes to hydrology at these crossings. Other creek crossings are by bridge or viaduct, and the project is on bridges or

viaduct when crossing areas currently flooded in the 1% AEP flood event. The design would ensure that, in general, the project will have little change to existing flood behaviour.

The Proponent has developed hydrological and hydraulic flood models based on Penrith City Council's *Updated South Creek Flood Study* (WP, 2015). The Proponent's flood models build on the earlier model by incorporating rainfall patterns from *Australian Rainfall and Runoff 2019* (ARR 2019), and the Proponent has committed to updating its model with the results of the South Creek Sector Review, which is the NSW Government strategy to manage land use and water cycle management in the Wianamatta-South Creek catchment. The Proponent also provided further details about the model's validation following EESG's request for further information about the calibration and validation of the updated model.

The project meets the Proponent's afflux criteria at all locations up to and including the 1% AEP flood event. It also meets these criteria in the 1% AEP event with climate change scenario except for an area of Blaxland Creek at Orchard Hills adjacent to the proposed stabling and maintenance. This occurs over a small area approximately 200 metres long to a maximum afflux of 238 mm. The Proponent has committed to refining its design to reduce afflux at this location.

The project is expected to cause additional afflux at the Probable Maximum Flood (PMF) in other areas of the alignment. Afflux is generally limited to non-urban areas already predicted to be flooded in the PMF in the vicinity of culverts. The exception to this is expected afflux of up to 20 mm in residential areas of St Clair as a result of raising the stabling and maintenance facility above the PMF. While the Department acknowledges this impact on those residents, it occurs in the context of a very large flood (the PMF) that is not required to be mitigated for linear infrastructure projects. The Proponent has committed to mitigating this impact through the design of its earthworks.

No station sites will be flooded during the PMF.

The Department is satisfied the Proponent has managed afflux impacts in accordance with impact criteria to meet current and anticipated future rainfall patterns.

The project meets flood duration criteria up to the 1% AEP flood. At the 1% AEP and larger floods, flood duration resulting from the project increases by more than 10% in small areas within waterways adjacent to the alignment. The Department accepts the Proponent's justification that these minor exceedances are acceptable because they would not extend periods where roads are blocked or properties isolated.

The Proponent has designed the project so that it is generally consistent with the velocity criteria. Velocity is expected to increase by more than 10% for short stretches of waterways adjacent to culverts at the 1% AEP event. The Department is satisfied the project design has minimised changes to existing velocities, as the project is not expected to significantly change waterway flow volumes. The localised exceedances of the velocity criteria are unlikely to significantly impact hydrology and stream morphology.

The Proponent's adopted flood impact criteria differ from those of the recently approved M12 Motorway, which intersects this project. The differences are afflux (200mm in environmental, recreational and rural lands compared to 100mm in the M12) and duration (a maximum 10 per cent increase rather than a flat one-hour increase). To ensure that the project maintains consistency with the M12's conditions, the Department recommends flooding criteria for the project's detailed design that match the M12, except for limited areas where the Proponent's assessment indicates larger

impacts (e.g. afflux between 100mm and 200mm). The Department understands that exceedances of the M12's criteria are over small areas in or adjacent to creeks that are not developed or planned for future development and would not materially affect the use of that land for environmental or recreational purposes.

The Department notes detailed design of the project is an iterative process, which will continue after project approval. This process will determine the project's exact flood performance. The flooding assessment demonstrates the project can be designed and constructed to meet the flood design criteria and have minimal changes/impacts on the affected flood regime. The Department also notes the Proponent's commitment to revise the flood model to include the results of the South Creek Sector Review flood model and has reinforced this commitment with a recommended condition.

The project will not worsen water quality

Surface and groundwater quality is poor due to historic agricultural land uses in the area. Construction could reduce water quality through runoff of sediment and chemicals and fuels, and mobilisation of contaminated soils, as well as exposure of contaminated groundwater, if appropriate management measures are not implemented. The water quality management objectives include contributing to improving water quality to meet the 95 per cent species protection and 99 per cent toxicant level in the ANZG 2018 guidelines. To achieve this, the Proponent will prepare and implement a Soil and Water Management Plan during construction that would include appropriate sediment control measures, and construction of temporary sediment basins and permanent water treatment plants to treat water prior to discharge.

In response to advice from EPA, the Department recommends conditions specifying water quality targets consistent with the ANZG 2018 guidelines that will apply unless an Environmental Protection Licence specifies different targets. The Department will also require monitoring programs to monitor performance and inform corrective measures if targets are not met. These conditions are commonly applied to linear infrastructure projects. Subject to the Proponent's mitigation measures and compliance with recommended conditions of approval, the Department is satisfied the project can be constructed and operated to not worsen water quality.

Groundwater drawdown and settlement is expected to be minimal and limited to areas around station sites and services facilities

Potential groundwater drawdown impacts during construction are not considered significant due to the local geology structure of Wianamatta Shale overlaid with clay-based surface soils. This geology is associated with low groundwater conductivity (i.e. flow) and yield (i.e. volumes). The relatively low volumes of groundwater are expected to limit groundwater drawdown during construction.

Ground settlement of up to 50mm could be expected around stations and service facility excavations, while settlement along tunnels is expected to be 5-10mm. The Proponent assessed potential impacts to existing buildings and structures from ground settlement using an industry-standard screening criterion. This specifies maximum settlement of the building and maximum slope of the ground and is rated between 1 and 4. Buildings and structures predominantly fall within a risk level of 1, which would have negligible impacts on buildings.

A small number of buildings could experience a slight to moderate potential for superficial damage, with some structural damage possible for category 3. Many of the category 3 buildings are within the construction footprint and will be acquired and demolished for the project.

The Department recommends the project's groundwater model is further developed to confirm drawdown impacts and develop adaptive management measures to be applied. This is consistent with other Sydney Metro projects. The Proponent has proposed the establishment of an Independent Property Impact Assessment Panel and the Department recommends a condition detailing the Panel's membership, responsibilities to independently review pre- and post-construction condition survey reports, and the resolution of potential property damage disputes.

6.6 Biodiversity

The project will have direct and indirect impacts to threatened ecological communities and threatened species listed under the *Biodiversity Conservation Act 2017* (BC Act). These can be reduced during detailed design as the construction footprint is refined. In addition, the Proponent has committed to implementing mitigation measures to reduce impacts, including managing vegetation clearing processes, weed management and provision of nest boxes as alternative fauna habitat.

Impacts to biodiversity values will be offset under the Biodiversity Offsets Scheme, including purchasing and retirement of ecological and species credits, or payment into the Biodiversity Conservation Fund. The Department recommends conditions which specify the ecosystem and species credits required, and preparation and implementation of a Flora and Fauna Management Subplan to manage impacts on biodiversity during construction.

Issue

The project is located within the Cumberland sub-region of the Sydney Basin Interim Biogeographic Regionalisation for Australia (IBRA) bioregion. The Cumberland sub-region is situated between the Blue Mountains and the east coast, stretching to Kurrajong in the north and Bargo to the south. The study area is mostly cleared and includes non-native pasture and exotic weeds, interspersed with areas of remnant native vegetation generally along creek lines and low-lying areas.

Biodiversity assessment focuses on impacts on land to the north of the airport as the areas south of the airport are located on land that was biodiversity certified

This assessment focuses on biodiversity matters on land to the north of the airport under the BC Act (**Figure 12**). The project to the south of the airport is located on land that was biodiversity certified under the *Threatened Species Conservation Act 1995* (TSC Act) and is subject to the transitional provisions of the BC Act. Biodiversity matters on airport land were assessed under the *Airports Act*. No further biodiversity assessment of these areas is required. As discussed in **Section 4.2**, the project is also a controlled action under the EPBC Act, however the NSW Assessment Bilateral agreement has not been applied for Commonwealth matters and the DAWE is conducting a parallel assessment to assess impacts under the EPBC Act.

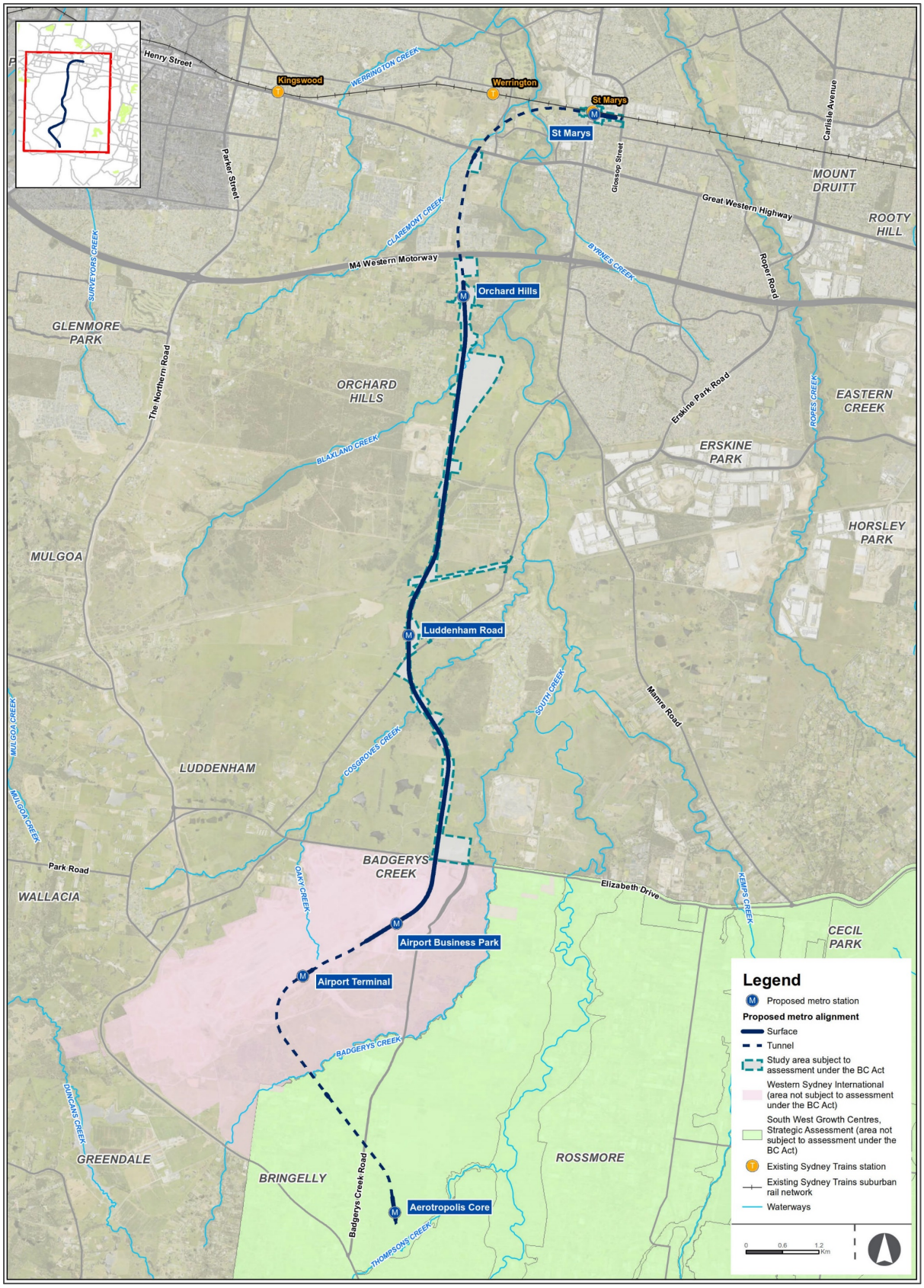

Figure 12 | Area subject to this assessment (Source: Submissions Report)

Ecosystem credits will be provided for direct impacts to threatened ecological communities

The project will directly impact approximately 31.67 hectares of native vegetation (29.86 hectares of direct impact and 1.81 hectares of indirect impact) which requires assessment under the *Biodiversity Assessment Method* (Office of Environment and Heritage, 2017). This includes four Plant Community Types (PCT) and 11 vegetation zones which directly correlate with four threatened ecological communities (TEC) listed under the BC Act. **Table 13** details the impacted PCTs, their general condition, conservation status and area impacted.

Table 13 | Direct impacts to native vegetation (Source: Submissions Report)

Plant Community Type (PCT)	Condition	TEC under the BC Act	Area (ha)
724: Broad-leaved Ironbark – Grey Box – Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion	Intact Thinned Scattered Trees	Yes, Shale Gravel Transition Forest in the Sydney Basin Bioregion (Endangered)	10.42
835: Forest Red Gum – Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	Intact Thinned Scattered Trees	Yes, River-flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (Endangered)	6.23
849: Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion	Thinned Scattered Trees Low	Yes, Cumberland Plain Woodland in the Sydney Basin Bioregion (Critically Endangered)	9.64
1800: Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley	Intact Thinned	Yes, Swamp Oak Floodplain Forest of the New South Wales Coast, Sydney Basin and South East Corner Bioregions (Endangered)	5.38

Construction would remove habitat (grasslands, riparian forest, woodlands and watercourses) for locally occurring threatened fauna species. This includes the loss of potential breeding (hollow bearing trees) and foraging habitat.

The Proponent has committed to providing ecosystem credits for direct impacts to 28.42 hectares of TECs in accordance with the Biodiversity Offsets Scheme.

Threatened flora species will be impacted by construction

Two threatened flora species were found during surveys:

- *Grevillea juniperina* subsp. *juniperina* – 1,225 individuals recorded (Vulnerable under BC Act)
- *Dillwynia tenuifolia* – approximately 100 individuals recorded (Vulnerable under BC Act).

These species, and an additional 10 threatened flora species, were assumed present based on associated habitat in areas that could not be accessed for survey as these properties are private land holdings. The Proponent's assessment assumed that the project would impact these species and ecosystem species credits have been assigned.

Species credits are required for Cumberland Plain Land Snail and Southern Myotis

Two threatened fauna species (Cumberland Plain Land Snail and Southern Myotis) were recorded or are assumed present within the study area. Species credits are required for these two species in accordance with the Biodiversity Offset Scheme.

Following survey and assessment, eighteen fauna species were assigned ecosystem credit species calculations for offsetting purposes. The provision of ecosystem credits addresses the loss of potential foraging, breeding and roosting habitat for other threatened fauna species assumed present in the study area. Hollows removed by clearing hollow-bearing trees would be replaced with nest boxes, re-use of salvaged hollows, and replacement of woody debris.

Construction would result in minor impacts to aquatic habitat and threatened species

No waterways within the construction footprint contain mapped habitat for threatened fish listed under the *Fisheries Management Act 1994* (FM Act). Impacts to threatened species under the FM Act were considered unlikely and do not require offsets.

Six of the waterways are mapped as 'key fish habitat' (KFH) by DPI Fisheries and/or meet the definition of KFH under the *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI, 2013). Impacts to KFH require offset by compensatory works to ensure no net loss (DPI, 2013). The project crosses six waterways (Claremont Creek, Blaxland Creek, Cosgroves Creek, South Creek and unnamed tributaries of South Creek and Badgerys Creek) that meet the definition of KFH. The Proponent has designed the project to minimise impacts to these waterways by proposing tunnelling under some waterways, and construction of bridges and viaducts across others.

Groundwater drawdown near Orchard Hills Station could affect Shale Gravel Transition Forest

There are four TECs in the study area which are potential groundwater dependent ecosystems:

- Cumberland Plain Woodland in the Sydney Basin Bioregion
- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
- Shale Gravel Transition Forest in the Sydney Basin Bioregion
- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.

The proposed cutting south of Orchard Hills station could cause groundwater inflow, lowering of the adjacent groundwater levels and progressive ingress of water. A maximum drawdown, between 1-4 metres within approximately 100 metres of the station, could impact 1.81 ha of Shale Gravel Transition Forest. Impacts would be minimised through the undrained station design and by offsetting residual impacts in accordance with the Biodiversity Offsets Scheme.

Biosecurity risks from weeds, pests and pathogens will need to be managed

Invasive exotic plant species are widespread throughout the study area including sixteen priority weeds for the Greater Sydney region under the *Biosecurity Act 2015*. Nineteen additional exotic species recorded are considered to be high threat weeds.

There is also risk of dispersal of Phytophthora (*Phytophthora cinnamomic*), Myrtle rust (*Uredo rangelii*) and Chytrid fungus (*Batrachochytrium dendrobatidis*) through earthworks and the movement

of construction vehicles and plant across the project alignment. These pathogens threaten native vegetation or fauna.

Submissions and advice

Community and special interest groups

The Blacktown and District Environment Group raised the following:

- suggested that undergrounding the project would minimise impacts around the Defence Establishment Orchard Hills (DEOH) site and Blaxland Creek
- questioned the findings of the BDAR and recommended preservation of the old growth trees south of Blaxland Creek and east of the DEOH site
- requested provision of areas for fauna to move freely under the rail line for foraging.

Councils

Penrith City Council recommended vegetation and landscape buffers to protect vegetation within the proposed maintenance facility site before construction.

Liverpool City Council recommended that a dewatering plan be prepared as part of the Construction Environmental Management Framework to minimise harm to fauna.

Government agencies

DPI Fisheries noted that construction footprint includes areas of key fish habitat and recommended conditions to ensure application of best practice sediment and erosion controls and that waterway crossings allow for suitable fish passage.

DPIE EES provided the following comments on biodiversity:

- supports preparation of a Microbat Management Plan
- notes that is unclear whether the stabling facility would impact the east-west corridor connecting vegetation at the Orchard Hills Defence Establishment site to South Creek and further east to Ropes Creek at Eastern Creek
- prefer fencing that allows movement of larger terrestrial species at the Defence Establishment Orchard Hills site
- recommends that the Proponent prepare a Vegetation Management Plan for rehabilitation of riparian land and vegetation following construction, and recommends replacing invasive species with local provenance species
- recommended design parameters for viaducts/bridges and culvert crossings to minimise clearing/disturbance of native vegetation, maintain or improve riparian/terrestrial connectivity and maximise light and moisture penetration under structures to support native plant growth.
- concern for possible aquatic or riparian impacts of directional drilling at watercourse crossings for underground power supply routes
- dewatering plan should be required for removal of farm dams
- Proponent should consult with relevant organisations about rescuing or translocating native plants or reuse of removed trees and hollows

- require pre-clearance fauna surveys before vegetation clearing
- install nest boxes before removing hollow-bearing trees and/or release of captured hollow dependent fauna.

Department's consideration

Impacts to threatened ecological communities would be largely confined to fragmented and thinned patches with low conservation value and offset

The Proponent has minimised impacts to TECs around the Orchard Hills station by avoiding larger areas of intact vegetation with important fauna habitat and movement. This included designing the project to avoid areas with higher biodiversity value. The project has further reduced its impacts to intact areas by locating the Claremont Meadows service facility on a site that is largely cleared with limited remnant vegetation.

However, the project would still impact 9.64 hectares of Cumberland Plain Woodland in the Sydney Basin Bioregion (PCTs 849), a critically endangered ecological community (CEEC) under the BC Act along the remaining project corridor. Approximately half (4.66 hectares) of the TEC was assessed as thinned, with a native open canopy and continuous ground layer of native grasses and herbs. The project is unlikely to isolate a significant area of the TEC and impacts would predominantly be restricted to small patches, although some impacts to larger areas near Patons Lane, Orchard Hills would occur. **Figure 13** shows the location of the project in context with the regional east west link fauna corridor.

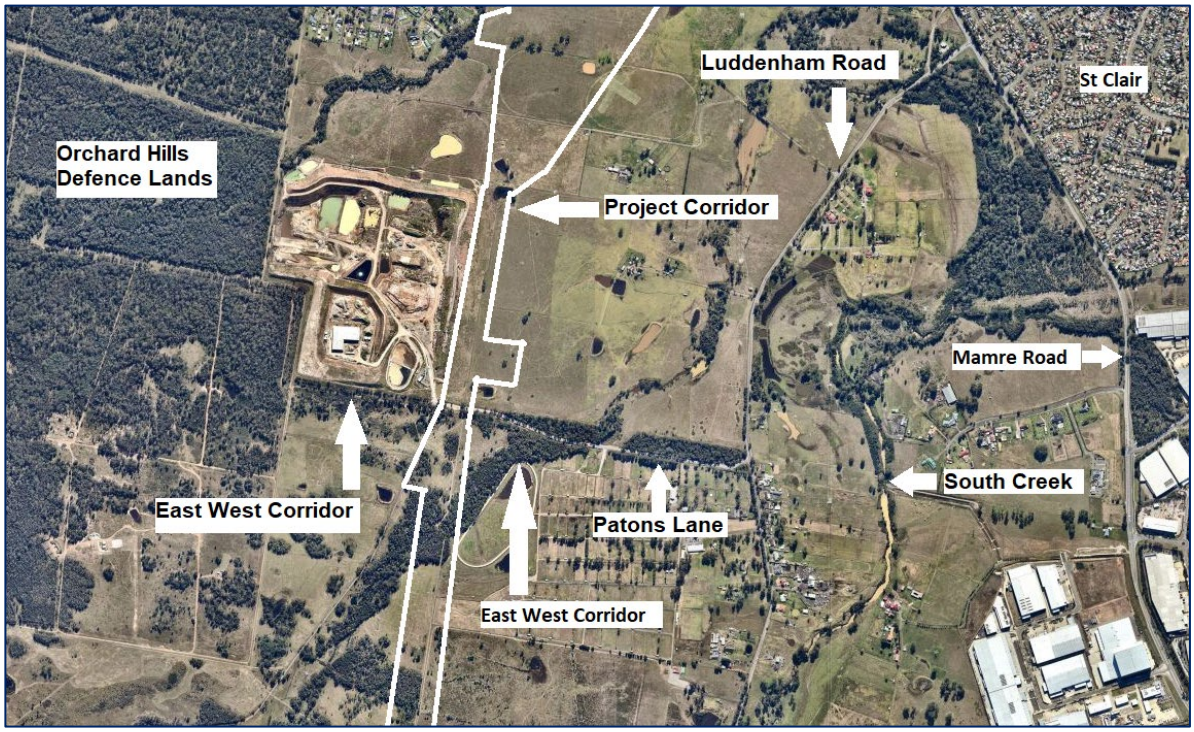

Figure 13 | Location of the regional east west link fauna corridor (Source: Nearmap 5 June 2021)

The Proponent has committed to offsetting direct and indirect impacts in accordance with the Biodiversity Offsets Scheme, providing for conservation of an alternative area of Cumberland Plain Woodland. The Department accepts that impacts to the CEEC are unavoidable and that much of the impact would occur to fragmented patches in thinned or low condition.

The Department recommends reinforcing the Proponent's commitment to manage construction impacts on threatened ecological communities and species through conditions of approval requiring:

- measures to undertake pre-clearing/demolition inspections for native fauna and procedures to relocate them
- measures to minimise impacts to threatened species, including protocols for incidental finds during construction
- re-use of native trees and vegetation in habitat enhancement and rehabilitation work
- development and implementation of a Flora and Fauna Management Sub-plan, to manage construction impacts on biodiversity values.

Impacts on threatened flora and fauna species that cannot be avoided will be offset

Construction will impact 5.31 hectares of Cumberland Plain Land Snail habitat and 10.68 hectares of Southern Myotis breeding habitat. These impacts will be offset by acquiring and retiring species credits. Impacts to twelve threatened flora species are anticipated based on associated habitat. While these species will also be offset by acquiring and retiring species credits, impacts have been minimised by locating the alignment to avoid intact vegetation around Orchard Hills and the location of the service facility at Claremont Meadows.

Impacts to eighteen fauna species will be offset as ecosystem credit species, addressing the loss of potential foraging, breeding, and roosting habitat for these threatened fauna species.

Threatened communities and species impacts will be offset by retiring ecosystem and species credits

The direct impacts to threatened communities and threatened species habitats will require offsetting, through securing ecosystem credits to address impacts to plant community types and species credits for impacts to threatened species. The biodiversity credits required to offset expected impacts are shown in **Table 14** and **Table 15**.

A Biodiversity Offset Strategy has been prepared as part of the BDAR and provides information on the residual biodiversity impacts which must be offset, in this case by the retirement of biodiversity credits.

Table 14 | Ecosystem credits (Source: Submissions Report)

Plant Community Type (PCT) ID and name	Area (hectares)	Number of Credits
724: Broad-leaved Ironbark – Grey Box – Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion	10.42 ha	246
835: Forest Red Gum – Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	6.23 ha	217
849: Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion	6.39 ha	204
1800: Swamp Oak open forest on riverflats of Cumberland Plain and Hunter Valley	5.38 ha	181

Plant Community Type (PCT) ID and name	Area (hectares)	Number of Credits
TOTAL ECOSYSTEM CREDITS		**848**

Table 15 | Species credits required (Source: Submissions Report)

Species	Loss of habitat or individuals	Number of Credits
Acacia bynoeana (Bynoe's Wattle)	1.25 ha	31
Acacia pubescens (Downy Wattle)	2.24 ha	54
Allocasuarina glareicola	1.25 ha	47
Cynanchum elegans (White-flowered Wax Plant)	0.57 ha	18
Dillwynia tenuifolia	3.05 ha	72
Grevillea juniperina subsp. *juniperina* (Juniper-leaved Grevillea)	6.38 ha	153
Grevillea parviflora subsp. *parviflora* (Small-flower Grevillea)	1.27 ha	32
Marsdenia viridiflora subsp. *viridiflora* (Endangered population *Marsdenia viridiflora* R. Br. subsp *viridiflora*	4.23 ha	137
Micromyrtus minutiflora	1.25 ha	47
Pimlea curvilora var. *curviflora*	0.57 ha	18
Pimlea spicata (Spiked Rice-flower)	3.66 ha	22
Pultenaea parviflora	1.25 ha	31
Meridolum corneovirens Cumberland Plain Land Snail	5.31 ha	159
Myotis macropus (Southern Myotis)	10.68 ha	292
TOTAL SPECIES CREDITS		**1,113**

The Proponent's Biodiversity Offset Strategy identifies options available under the Biodiversity Offsets Scheme to address its biodiversity offset obligations. The options include:

- purchase and retirement of existing biodiversity credits currently available on the biodiversity credit register, or
- making a payment into the Biodiversity Conservation Fund.

The Department is satisfied the Biodiversity Offset Strategy sets out a suitable process to retire the required biodiversity credits.

The project will not have significant impacts on riparian vegetation and aquatic fauna

Bridge and viaduct piers will be designed to avoid creeks and waterways. Measures to manage impacts to aquatic communities and species would be outlined in the Flora and Fauna Management Sub-plan. Appropriately designed fish friendly crossing structures and the implementation of standard construction mitigation measures, such as erosion and sediment control, would minimise the potential for adverse impacts to watercourses and aquatic species. The Department recommends that the Proponent consult with DPIE EES and DPI Fisheries during detailed design of viaduct, bridge, and culvert crossings to minimise impacts to habitat connectivity, riparian vegetation, waterways, and aquatic fauna.

KFH may be impacted by the construction works. The Department recommends conditions requiring offset of residual impacts to KFH by the provision of a 2:1 habitat offset requirement, in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI, 2013 update). The design of bridge crossings and provision of offsets for impacts to KFH will be undertaken in consultation with DPI Fisheries during detailed design.

Biosecurity risks need to be managed

Weeds must be managed in accordance with the *Biosecurity Act 2015* both during construction and operation. Diseases, pathogens, and weeds present a risk to biodiversity during construction through the movement of construction personnel, machinery, and vehicles. The Proponent has committed to developing protocols and implementing measures to manage the risks. The Proponent must also manage weeds in accordance with the *Biosecurity Act 2015* both during construction and operation.

6.7 Other issues

The Proponent assessed the potential impacts of the project in relation to heritage, air quality, contamination and soils, hazards and risk, spoil management, sustainability and climate change, and waste management. The Department considers that the Proponent has adequately assessed these issues and they can be managed through the Proponent's environmental management measures and recommended conditions of approval. **Table 16** summarises the Department's consideration and any recommended conditions of approval.

Table 16 | Department's consideration of other issues

Issue	Findings	Recommendations
Aboriginal heritage	The project will directly impact on 12 Aboriginal archaeological sites in the off-airport construction footprint, including isolated artefacts, artefact scatters and potential archaeological deposits (PADs). Of these, two sites will be partially harmed, and ten sites will be totally harmed by the construction of the project. Four sites have been identified as having moderate significance. Surface sites would be managed through surface collection and subsurface sites of moderate significance would be managed through salvage excavation. Sites within 100m of the	Recommended conditions include: • further test excavation and salvage excavation in areas not previously surveyed • preparation of an Unexpected Heritage Finds and Human Remains Procedure to ensure impacts to archaeology are minimised • to take all reasonable steps to not harm, modify or otherwise impact Aboriginal objects

Issue	Findings	Recommendations
	construction footprint would be managed through protective fencing. Registered Aboriginal Parties did not raise any objections and supported the Proponent's archaeological methodology. There is potential for Aboriginal archaeological deposits to be present in areas that have not yet been surveyed or had test excavation done, due to landholder access limitations. The Proponent has committed to undertaking archaeological survey and test excavation prior to construction in these areas. The Department is satisfied that the updated Aboriginal Cultural Heritage Assessment Report and Aboriginal Cultural Heritage Management Plan, submitted with the Submissions Report, provides an adequate framework for the management of Aboriginal cultural heritage expected during site excavations. The cultural significance of the broader landscape would be captured in the Proponent's Heritage Interpretation Strategy which would identify opportunities to recognise the heritage significance in station development including signage, artwork and the appropriate use of Aboriginal language.	• preparation of Aboriginal Cultural Heritage Excavation Report(s) following the completion of the Aboriginal archaeological excavations • the Place, Urban Design and Corridor Landscape Plan to include details of Aboriginal heritage interpretation and designing with Country • The DRP chaired by the NSW Government Architect must seek appropriate expertise to ensure Aboriginal cultural heritage and cultural values inform the design review process.
Non-Aboriginal heritage	The project will impact two items of State significance: • St Marys Railway Station Group would be subject to moderate impacts from modifications to heritage significant elements to construct the new station and aerial concourse. The heritage significant jib crane would potentially need to be relocated • Kelvin Park Group would be subject to minor impacts due to alteration to the heritage setting. The Proponent has committed to ongoing consultation with Heritage NSW on design works with the potential to impact on State heritage items. This includes heritage input into the project's DRP to ensure additions and alterations to St Marys Railway Station are sympathetic to its heritage significance. The values and significance of heritage items will be more broadly captured through heritage interpretation in the design of the project. The project is also likely to result in moderate impacts to significant archaeological remains within the St Marys construction site. The Proponent will establish an exclusion zone, using protective fencing, around potentially locally significant archaeological remains. Ground-disturbing works would be managed according to the Proponent's Archaeological Method Statement. It is unlikely that any archaeological remains of significance would be found outside of this location. The project will impact one item of local significance:	Recommended conditions include: • preparation and implementation of a Construction Heritage Management Plan • preparation of a Heritage report which documents all archival recordings • if relocation of the jib crane at St Marys Station is required, preparation of a Dismantling and Reassembly Methodology for the recording, tagging, dismantling, storage, and reassembly of the jib crane • the DRP must call upon suitable heritage advice to inform its detailed design review of the project.

Issue	Findings	Recommendations
	• McGarvie-Smith Farm would be subject to a major impact due to extensive landscape modifications and demolition of buildings, which are of moderate value to the item's overall heritage significance. Two unlisted heritage items of potential local heritage significance would also be directly impacted by the project: • Bringelly RAAF Base – major impact as the construction for the Aerotropolis Core Station would require the demolition of several buildings within the site and little significance would remain • McMaster Farm – moderate impact as the site would be partially demolished, removing a small number of significant elements. The rural farming landscape, of heritage significance, would be altered by the project's construction and alignment. To ensure that the identified heritage values are appropriately recorded, the Proponent has committed to archival and photographic recording and salvage as well as the preparation of a Heritage Interpretation Strategy. The Department accepts that heritage impacts are unavoidable as they are in the project footprint and it is not practicable to change the project alignment to avoid them. The Proponent's mitigation measures, and the Department's recommended conditions, will appropriately mitigate these impacts.	
Air quality	During construction, particulate matter would be generated by demolition and excavation works, materials handling, transport and storage, and operation of on-site machinery. Dust generation from these activities is common in large linear infrastructure projects and can be managed through standard mitigation measures such as the use of water suppression, covering truck loads and vehicle maintenance. With the implementation of standard dust control measures and vehicle maintenance, the project would have a minor impact on local air quality during construction, and the effects on human health across the community would be minor and acceptable. During operation, electric metro trains would generate very low concentrations of emissions, and potential impacts to nearby sensitive receptors are expected to be negligible. Emissions are anticipated to quickly disperse into the ambient environment from tunnel and station ventilation points. Although the project would generate commuter traffic to metro stations, this would result in a negligible increase in associated vehicle emissions due to relatively the low numbers of trips generated relative to background traffic movements.	Recommended conditions include: • requiring all reasonably practicable measures be implemented to minimise the emission of dust and other air pollutants during construction.

Issue	Findings	Recommendations
Contamination and soils	Areas of medium and high contamination risk were identified within the construction footprint. This risk was determined through testing for contaminants based on their previous land uses. During construction, there may be instances of soil, groundwater, vapour and gas contamination, with medium to high contamination risk in areas of the construction footprint. Additional data reviews would be undertaken to confirm the potential contamination risk at sites of a moderate to high risk of contamination. Where these reviews are not conclusive, detailed site investigations would be undertaken. If the risk of contamination at a site is confirmed to be of moderate to very high risk, a Remediation Action Plan (RAP) would be developed and a site auditor would be engaged to verify remediation. An EPA-accredited site auditor would be required to review and approve the RAP and develop a Site Audit Statement and Site Audit Report. Site Audit Statement(s) stating the land is suitable for its intended purpose, must be submitted to the Planning Secretary and relevant Council before the commencement of operation. The Department notes EPA advice that a site auditor should be engaged for the entirety of works and detailed site investigations should be carried out before any works on potentially contaminated sites. The Proponent's assessment identified the risk of contamination and proposed to proactively undertake detailed site investigations for sites at moderate to high risk of contamination. This approach would focus further investigation and, if necessary, remediation on the identified higher risk sites, while also providing for further investigation and remediation if contaminated sites are unexpectedly found. This approach is consistent with the approach taken for the Sydney Metro West project. A variety of soil types are present along the alignment. Construction of the project could result in the excavation or erosion of highly saline soils, and acid sulfate soils may be encountered at Orchard Hills and Luddenham off-airport construction corridor and the Orchard Hills stabling and maintenance facility. High salinity soil can have detrimental impacts on vegetation, concrete and steel. If acid sulfate soils are encountered, they would be managed in accordance with the *Acid Sulfate Soil Manual* (Acid Sulfate Soil Management Advisory Committee, 1998). Testing would be undertaken in high soil salinity areas and, if found, would be managed in accordance with *Book 4 Dryland Salinity: Productive Use of Saline Land and Water* (NSW DECC 2008).	Recommended conditions include: • undertaking of Detailed Site Investigations at moderate to high-risk contaminated sites • preparation of a Remedial Action Plan and accompanying Section B Site Audit Statement(s) • requiring section A1 or A2 Site Audit Statement(s) and accompanying Site Audit Report(s) confirming the land is suitable for the intended land use • preparation of an Unexpected Finds Procedure for Contamination.
Hazards and risk	The project's alignment will have an elevated rail viaduct crossing a portion of the Warragamba to	Recommended conditions include:

Issue	Findings	Recommendations
	Prospect Water Supply Pipeline. The pipeline is important to Sydney's water supply. The railway viaduct will need to provide sufficient clearance to the pipeline to minimise risk of damage or rupture and to provide maintenance access. Infrastructure developed surrounding the pipeline must be completed in accordance with the *Water NSW Guidelines for Development Adjacent to the Upper Canal and Warragamba Pipelines 2020*. Across the wider alignment, there are potential hazards and risks from the storage, handling and transportation of hazardous and dangerous goods, damage to or disruption of underground utilities and services, and potential ground movement, settlement, or geotechnical uncertainty. The identified hazards and risks can be managed by adhering to relevant regulations, policies, standards and legislation, and the implementation of emergency management plans as relevant. Consultation with utility providers would continue during detailed construction design to mitigate the risk of unplanned and unexpected disturbance of utilities.	• the Proponent consult WaterNSW regarding design and construction • construction must be in accordance with the *Water NSW Guidelines for Development Adjacent to the Upper Canal and Warragamba Pipelines 2020* • access to the pipeline must be maintained for WaterNSW.
Spoil and waste management	Waste generated during construction is predominantly tunnelling spoil; other waste will be generated from station excavations, cuttings and demolition of buildings. The project estimates generating a surplus of 885,000 cubic metres of spoil off-airport and 1,055,000 cubic metres on-airport. Spoil stockpiles would be stored at each construction site and would be managed to reduce dust and runoff impacts. Spoil from both on- and off-airport works would be transported to the Western Sydney International Airport project site, either to be utilised for construction works or placed at the permanent spoil area. All spoil transported will undergo a contamination assessment to meet the Airports Regulations and avoid pollution impacts. Should the spoil not be required at the airport site, spoil will be lawfully disposed of. All waste produced by the project would be managed in accordance with the *Protection of the Environment Operations Act 1997*. The Proponent has committed to preparing a Waste Management Plan and a Spoil Management Plan. The Department considers these plans will adequately manage the movement and disposal of waste and spoil.	Recommended conditions include: • handling, reuse, disposal and tracking of waste.
Sustainability and climate change	The Proponent has a performance outcome to achieve a minimum 'Design' and 'As built' rating score of Leading +75 under the Infrastructure Sustainability Council of Australia's Infrastructure Sustainability Rating Scheme Version 1.2 or equivalent. The Proponent also has a performance outcome to design the project to withstand known impacts associated with climate change to the year 2100. The Department has reinforced these commitments through recommended conditions of approval.	Recommended conditions include: • the project must achieve a minimum Infrastructure Sustainability Council of Australia Infrastructure Sustainability rating of 75 (Version 1.2) (or equivalent level of performance using a demonstrated equivalent rating tool) or a 5-Star Green Star rating (or equivalent level of

Issue	Findings	Recommendations
	The Proponent has also committed to preparing a Sustainability Plan, to ensure sustainability considerations are embedded across the project through sustainability policy and objectives and key activities implemented during construction and operation. The Sustainability Plan would inform the preparation of Sustainability Management Plans. The Proponent would fully offset the greenhouse gas emissions associated with the consumption of electricity during operation of the project.	performance using a demonstrated equivalent rating tool).

7. Evaluation

The Department considers the project is in the public interest and should be approved, subject to conditions.

The Department's assessment considered all relevant matters and objects of the *Environmental Planning and Assessment Act 1979*, the principles of ecological sustainable development, advice from NSW Government agencies, Liverpool City Council and Penrith City Council, and strategic government policies and plans.

The project will provide a reliable and efficient metro rail line to service Western Sydney International Airport and support urban and employment land development within the Western Sydney Aerotropolis.

The project is consistent with key government policies and strategies including:

- *2020 Infrastructure Priority List* (Infrastructure Australia, 2020)
- *Building Momentum: NSW State Infrastructure Strategy 2018-2038* (Infrastructure NSW, 2018)
- *Future Transport Strategy 2056* (Transport for NSW, 2018)
- *A Metropolis of Three Cities – the Greater Sydney Region Plan* (Greater Sydney Commission, 2018)
- *Western City District Plan* (Greater Sydney Commission, 2018)
- *Western Sydney Aerotropolis Plan* (NSW Government, 2020)
- *Western Sydney City Deal* (Commonwealth of Australia, 2018).

The key benefits provided by the project include:

- the provision of a spinal transport network to service the Western Parkland City, offering reliable and efficient public transport to existing and future residents
- supporting the successful development of Western Sydney International Airport as a nationally significant economic driver
- acting as a catalyst for economic development, employment generation, planned growth and urban renewal along the mass transit corridor and at stations
- improved travel times, particularly between St Marys and the Western Sydney Aerotropolis
- improved accessibility to key centres which are forecast to have significant employment and housing growth
- meeting forecast demand for passenger rail transport
- the provision of direct, fast, and reliable connections to key precincts
- expanding the concept of the '30-minute cities' by reducing travel time.

In its assessment, the Department reviewed the Environmental Impact Statement, Response to Submissions, and assessed the key issues arising from the construction and operation of the project.

This was undertaken with advice provided by the Proponent, public agencies and councils, and in consideration of key strategic government policies and plans.

Key issues associated with the project are:

- land use and property
- urban design and visual impacts
- noise and vibration
- traffic and transport
- flooding, water quality and groundwater and
- biodiversity.

The Proponent identified a range of environmental mitigation measures which it has committed to applying to the project. Based on its assessment, the Department recommends conditions of approval to reinforce these commitments and address outstanding or residual impacts.

The Department is satisfied that issues raised in submissions have been appropriately considered and responded to by both the Proponent and the Department. Residual impacts can be mitigated, managed and offset through the implementation of the Proponent's commitments, or through recommended conditions to reinforce these commitments and address outstanding or residual impacts.

8. Recommendation

It is recommended that the Minister for Planning and Public Spaces:

- **considers** the findings and recommendations of this report
- **accepts and adopts** all findings and recommendations in this report as the reasons for making the decision to approve the application
- **agrees** with the key reasons for approval listed in the notice of decision
- **grants approval** for the application in respect of SSI-10051, subject to the conditions in the attached project approval
- **signs** the attached project approval and recommended conditions of approval (see attachment).

Prepared by:

Daniel Gorgioski
Senior Planner
Transport Assessments

Recommended by:

Alexander Scott
Team Leader
Transport Assessments

Recommended by:

Glenn Snow
Director
Transport Assessments

9. Determination

The recommendation is **Adopted / ~~Not adopted~~** by:

The Hon. Rob Stokes MP
Minister for Planning and Public Spaces

Appendices

Appendix A – List of referenced documents

1. *2020 Infrastructure Priority List* (Infrastructure Australia, 2020)
2. *Building Momentum: NSW State Infrastructure Strategy 2018-2038* (Infrastructure NSW, 2018)
3. *Future Transport Strategy 2056* (Transport for NSW, 2018)
4. *A Metropolis of Three Cities – the Greater Sydney Region Plan* (Greater Sydney Commission, 2018)
5. *Western City District Plan* (Greater Sydney Commission, 2018)
6. *Western Sydney Aerotropolis Plan* (NSW Government, 2020)
7. *Western Sydney City Deal* (Commonwealth of Australia, 2018)
8. *Sydney Metro – Western Sydney Airport Environmental Impact Statement* dated 21 October 2020
9. *Sydney Metro – Western Sydney Airport Submissions Report* submitted April 2021.

Appendix B – Environmental Impact Statement

https://www.planningportal.nsw.gov.au/major-projects/project/35016

Appendix C – Submissions

https://www.planningportal.nsw.gov.au/major-projects/project/35016

Appendix D – Submissions Report

https://www.planningportal.nsw.gov.au/major-projects/project/35016

Appendix E – Community Views for Draft Notice of Decision

Issue	Consideration
Socio-economic, land use and property *Construction* • Property acquisition and compensation • Amenity loss - noise, dust, property access, traffic, and health issues near residences • Concerns regarding the health and economic impacts on the community during the acquisition process. *Operation* • Precinct planning and master planning at stations • The project will be the catalyst for urban sprawl particularly at Orchard Hills Station • Land fragmentation and sterilisation • Impacts of tunnel location on property values • Uncertainties regarding tunnel depths holding up development applications • Potential impacts on approved subdivision adjacent to stabling facility site.	*Assessment* • The Department acknowledges the impact of property acquisition but considers that the project's social-economic, land use and property impacts are acceptable. • The project is key transport infrastructure that will serve the Western Sydney Aerotropolis and the Western Parkland City. The project has been considered as a central component of the transport and access framework for Aerotropolis planning, and future land uses at the Aerotropolis have been planned around the project, including more intense mixed-use development around stations. • Land acquisition is an unavoidable outcome of large linear transport projects. This impact has been greatly reduced with parts of project being below ground. • Property will be acquired on just terms in accordance with legislation. • Despite its operational benefits, local communities may lose access to a limited range of businesses and services during construction. However, there are other businesses in the surrounding area that can provide these services to effectively meet the demand. • Affected businesses and services would be appropriately compensated for the loss of their premises and could be relocated within the surrounding areas. *Recommended Conditions / Response* • The Department acknowledges that significant social change and impact will occur along the semi-rural sections of the project's alignment in future years as the construction of Western Sydney International Airport and land use planning for the Western Sydney Aerotropolis and other land use changes transition the area to an urban and industrial area. • The Project is expected to increase amenity and opportunities for the community through new station precincts, associated facilities, potential retail and other station activation opportunities. The project would cater for future transport needs by providing better access to infrastructure across greater Sydney and future infrastructure such as the Western Sydney International Airport and the Aerotropolis. • The Proponent will carry out all required partial and full acquisitions, including any required sub-stratum acquisition, and associated property adjustments in accordance with the requirements of the *Land Acquisition (Just Terms Compensation) Act 1991* in consultation with landowners. • A Small Business Owners Engagement Plan will be implemented to minimise construction impacts on small businesses. • The Proponent will implement a Construction Environmental Management Plan that provides measures to manage amenity impacts during construction. The

	Proponent's environmental performance will be independently audited during construction. • The Place, Urban Design and Corridor Landscape Plan and Operational Noise Verification Report will consider measures to mitigate impacts of the stabling and maintenance facility.
<u>Project design</u> • Detailed design information including tunnelling depths, levels of surface rail line and cross-corridor access • Comments on station access, configuration and integration with other public transport services	*Assessment* • The project's design to date has considered design excellence and integration with current and future built form and landscapes. • The Department considers the project's design guidelines and Design Review Panel review would ensure a high quality and functional design. *Recommended Conditions / Response* • A Place, Urban Design and Corridor Landscape Plan will be developed for the project corridor and station precincts and will include detailed design plans for stations and the rail corridor as well as final landscaping arrangements and maintenance regimes. The Plan must also identify active transport facilities and connections to surrounding active transport networks. • The Plan must be developed in consultation with relevant stakeholders, including landowners.
<u>Noise and vibration</u> • Construction noise and vibration impacts on residences, including structural damage • Concern with operational noise and vibration impacts.	*Assessment* • The Department acknowledges that the project would cause noise impacts during construction. These impacts are unavoidable but will be managed. • The above ground elements / construction activities would be subject to standard construction hours. • The greatest noise impacts to adjoining residents and business would be station box excavation activities at St Marys and Orchard Hills. The Proponent will be required to implement mitigation measures to reduce noise impacts, providing appropriate respite and undertaking in ongoing community and business consultation. • Tunnel Boring Machines (TBM) will operate 24 hours per day, 7 days per week. They are expected to progress at a rate of between 20 to 50 metres per day. This means the worst-case ground-borne noise impacts from tunnelling at a receiver would likely only be apparent for a few days for each TBM as the tunnelling work passes underneath. • The project is predicted to comply with most operational noise and vibration criteria. To provide certainty of potential mitigation measures the Proponent has committed to undertaking an Operational Noise and Vibration Review during detailed design to consider measures to mitigate these impacts. *Recommended Conditions / Response* • Active and ongoing consultation, flexibility in construction techniques, at source and at property mitigation, and coordinating and scheduling work to provide respite. • Station box excavations (unless undertaken within acoustic sheds with acceptable noise levels) must be

	limited to daytime construction hours to provide respite to adjoining residents. • Heavy vehicle movements must be limited to ensure night time respite for residents around Orchard Hills. • Out of hours work must be approved and regulated through an Environment Protection Licence or an Out of Hours Works Protocol. • Pre-construction and post-construction condition surveys must be undertaken on buildings, structures and infrastructure that may potentially be affected by construction. Any damage would require rectification or compensation to the relevant property owner. • The establishment of an Independent Property Impact Assessment Panel before works commence to review pre- and post-construction building condition survey reports and resolve disputes relating to property damage. • Operational noise mitigation measures will be subject to review and compliance monitoring. • Future development adjacent to the project will need to meet the requirements of *State Environmental Planning Policy (Infrastructure) 2007* to meet the required internal noise amenity criteria. This may include future developments being acoustically designed and treated to ensure that rail noise meets specified criteria in habitable rooms.
Traffic, transport and access *Construction* • Traffic and heavy vehicles using local streets during construction • Out of date traffic modelling and land use forecast assumptions • Cumulative impacts from construction with other projects • Impacts to pedestrian and cyclist access • Construction worker parking on local streets causing congestion and loss of street parking. *Operation* • Clarifications regarding bicycle parking and pedestrian access arrangements at stations and bus routes • Resolution of number and optimal location of road connections, spatial/layout requirements, and intersection designs at Luddenham Road • Inadequate provision of car parking at St Marys.	*Assessment* • The Department considers the traffic and transport impacts of the project to be modest and manageable. • The project will introduce relatively low numbers of heavy and light vehicle movements to the surrounding road network which would be spread across multiple construction sites. • The main increase in traffic will occur during peak construction from spoil haulage at tunnelling sites towards the Western Sydney Airport site and during station box excavations for St Marys and Orchard Hills. • Construction traffic and road safety impacts will be temporary and modest. They will be mitigated through measures outlined in the Proponent's Construction Traffic Management Framework. • The Department acknowledges that the land use assumptions that informed the traffic model have subsequently been updated but accepts the Proponent's advice that the revisions show lower traffic numbers and the EIS assessment is conservative. • To address residual parking impacts, the Proponent has committed to developing a construction worker car parking strategy and operational parking strategy for St Marys. These strategies will be developed in consultation with Penrith City Council and will include measures to reduce worker parking demand such as using shuttle buses and encouraging public transport.

	• The project will provide active transport facilities at the stations, the design of which will be subject to the Place, Urban Design and Corridor Landscape Plan. Active transport connections in the wider area are outside the scope of the project. In areas expected to undergo significant land use change, such as the Aerotropolis, active transport connections would be considered as part of that land use planning. • The Department considers the key operational traffic impacts of the project are the intersections at St Marys. Intersections impacted by the project's operation decline by one or two categories in level of service. *Recommended Conditions / Response* • The Department recommends a condition that permanent road works be designed, constructed, and operated to integrate with existing and proposed road and related transport networks and to minimise adverse changes to the safety, efficiency and accessibility of the network. • The Department acknowledges the project's construction will coincide with the Western Sydney Airport and M12 Motorway projects and supports the Proponent's establishment of a Traffic and Transport Liaison Group to manage cumulative traffic impacts. • The Department considers that the project should contribute to resolving congestion at intersections around St Marys once the project is operational and recommends a condition requiring the Proponent to work with the roads authority towards mitigating impacts at these intersections. • The locations of all heavy vehicles used for spoil haulage must be monitored in real time and the records of monitoring be made available electronically to the Planning Secretary and the EPA upon request.
<u>Flooding, hydrology and water quality</u> • Flooding impacts on flood-prone areas in south St Marys during construction and operation • Concerns around ground movement impacts to foundations and structural integrity of homes in St Marys as well as Bringelly tunnel	*Assessment* • The Department has assessed flooding and groundwater impacts and finds the project would have minor and acceptable impacts. • Flooding impacts are generally limited to areas within existing floodplains south of the M4 Motorway. These impacts are within the project's flood impact criteria. • The project will cross Wianamatta-South Creek in tunnel and will not materially affect current flooding in south St Marys. The flooding assessment has found the project will have a neutral flooding impact at south St Marys. • Ground movement is limited to areas surrounding station excavations and is not expected to cause building damage. *Recommended Conditions / Response* • The Department has set stringent flooding limits for the final design of the project to meet. • Pre-construction and post-construction condition surveys must be undertaken on buildings, structures and

	infrastructure that may potentially be affected by settlement. Any damage would require rectification or compensation to the relevant property owner. • The establishment of an Independent Property Impact Assessment Panel before works commence, which must comprise geotechnical and engineering experts independent of the design and construction team, to review pre and post-construction building condition survey reports and resolve disputes relating to property damage.
Biodiversity and trees • Inadequate assessment of some biodiversity impacts • Extension of northern tunnel alignment to reduce biodiversity impacts • Provision of areas for fauna to move freely under the rail line.	*Assessment* • The Department has assessed the biodiversity impacts of the project in consultation with the Environment, Energy and Science Group of the Department and considers the residual impacts are acceptable subject to offsetting. • The project has been designed to avoid significant disturbances to the natural environment by locating the rail corridor and construction zone away from Cumberland Plain Woodland around Orchard Hills. • The direct impacts to threatened communities and threatened species habitats will require offsetting, through securing of ecosystem credits. • The Proponent has committed to offsetting direct and indirect impacts in accordance with the Biodiversity Offsets Scheme, and providing for conservation of an alternative area of Cumberland Plain Woodland. • The Department accepts that impacts to the critically endangered ecological community are unavoidable and that most of the impacts would occur to fragmented patches in thinned or low condition. • Bridge and viaduct piers will be designed to avoid creeks and waterways, while maintaining and enhancing terrestrial fauna connectivity under structures. Measures to manage impacts to aquatic communities and species would be outlined in the Flora and Fauna Management Sub-plan. *Recommended Conditions / Response* • Design the watercourse crossings and the east-west regional corridor (Patons Lane) crossing to retain and minimise clearing/disturbance of native vegetation and maximise native plant growth under the structures, and design of culverts and other crossings to provide for movement of aquatic and terrestrial fauna. • The Department recommends conditions requiring offset of residual impacts to key fish habitat by the provision of a 2:1 habitat offset requirement, in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management (DPI, 2013 update).* • An offset is required for the impacts to plant community types and threatened (species credit) species. • A fauna and flora CEMP Sub-plan must be prepared to implement construction management measures such as pre-survey clearing and protecting retained vegetation.

	• An increase in tree canopy coverage and an increase in number of mature trees at a ratio of 2:1 is required.
Route alignment • Location of additional metro stations, particularly at Western Sydney University, Orchard Hills, North Elizabeth Drive and Badgerys Creek North • Consideration of alternative route options • Provision of additional connections including to Parramatta, Blacktown, Oran Park, Macarthur, Bankstown, other rail lines and future connections to Canberra and Melbourne • Timing of potential extension to Tallawong.	*Assessment* • The project is consistent with strategic land use and transport documents. • This project has been endorsed by the NSW Government as a key component of strategic infrastructure and planning documents including *Future Transport 2056* and the *Greater Sydney Region Plan - A Metropolis of Three Cities.* *Recommended Conditions / Response* • The Department is satisfied the project has been subject to a robust route selection process. • The South West Rail Link extension from Leppington to North Bringelly is identified as a separate project in *Future Transport 2056*. • The project has been designed to safeguard for future northern and southern extensions, and a connection to the South West Rail Link at Leppington. The Aerotropolis Core Station has been designed to allow for future development of the South West Rail Link extension. • The Proponent's assessment identified that a station at Western Sydney University's Werrington precinct would have considerable construction, program and interface impacts and risk, and require a fundamentally different construction strategy. This would outweigh the benefits of a station in this location. • No conditions are needed in relation to this matter.
Other • Concerns about 24 hour operation of Western Sydney International Airport • Justification for Western Sydney International Airport.	*Response* • While the Department acknowledges the concerns raised in these submissions, matters related to the Western Sydney International Airport are outside the scope of this assessment.

Appendix F – Recommended Instrument of Approval

https://www.planningportal.nsw.gov.au/major-projects/project/35016