

# **Chapter 27**

## **Synthesis of the Environmental Impact Statement**

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## 27 Synthesis

This chapter provides a synthesis of the findings of the Environmental Impact Statement.

### 27.1 Overview of the project

#### 27.1.1 Key features

The project involves the construction and operation of a metro railway line around 23 kilometres in length between St Marys in the north and the Aerotropolis Core precinct in the south (see Figure 27-1). Station locations for the project would comprise:

- a new metro station connecting to, and providing an interchange with, the existing Sydney Trains suburban rail network at St Marys, north of Western Sydney International
- two new metro stations between the existing Sydney Trains suburban rail network and Western Sydney International; one at Orchard Hills and one at Luddenham within the Northern Gateway Precinct
- two new metro stations within the Western Sydney International site; one at the Airport Terminal and one at the Airport Business Park
- a new metro station within the Aerotropolis Core precinct, south of Western Sydney International.

The alignment of the new metro railway line would:

- include a combination of tunnel, surface and viaduct sections
- interface with key roads including the Great Western Highway, M4 Western Motorway, Luddenham Road, the future M12 Motorway, Elizabeth Drive and Badgerys Creek Road, as well as key utilities such as the Warragamba to Prospect Water Supply Pipelines
- include waterway crossings of Blaxland Creek and Cosgroves Creek.

The project includes works required to support its construction and operation, including all operational systems and infrastructure.

A stabling and maintenance facility and operational control centre would be required to support operation of the project. The facility is proposed to be located in Orchard Hills, to the south of Blaxland Creek and east of the proposed metro line.

Services facilities are proposed at Claremont Meadows and Bringelly for the St Marys to Orchard Hills tunnel and Western Sydney International to Bringelly tunnel, respectively. The need for the Claremont Meadows services facility is subject to further investigation.

The project is described in more detail in Chapter 7 (Project description – operation) and Chapter 8 (Project description – construction).

#### Key features of the project on-airport

The project comprises components that are located within Western Sydney International (on-airport).

The project would enter Western Sydney International as a surface rail alignment from the north. The rail line would then progress through Airport Business Park Station, before transitioning into a tunnel, through Airport Terminal Station and exiting Western Sydney International beneath Badgerys Creek to the south.

As shown in Figure 27-2, the project would be located both within and outside the Western Sydney International Stage 1 Construction Impact Zone. There is also an Environmental Conservation Zone (ECZ) located along the southeast boundary of the airport site (which generally corresponds to the riparian corridor for Badgerys Creek). No works are proposed within the ECZ and the project would be located in tunnel beneath Badgerys Creek.

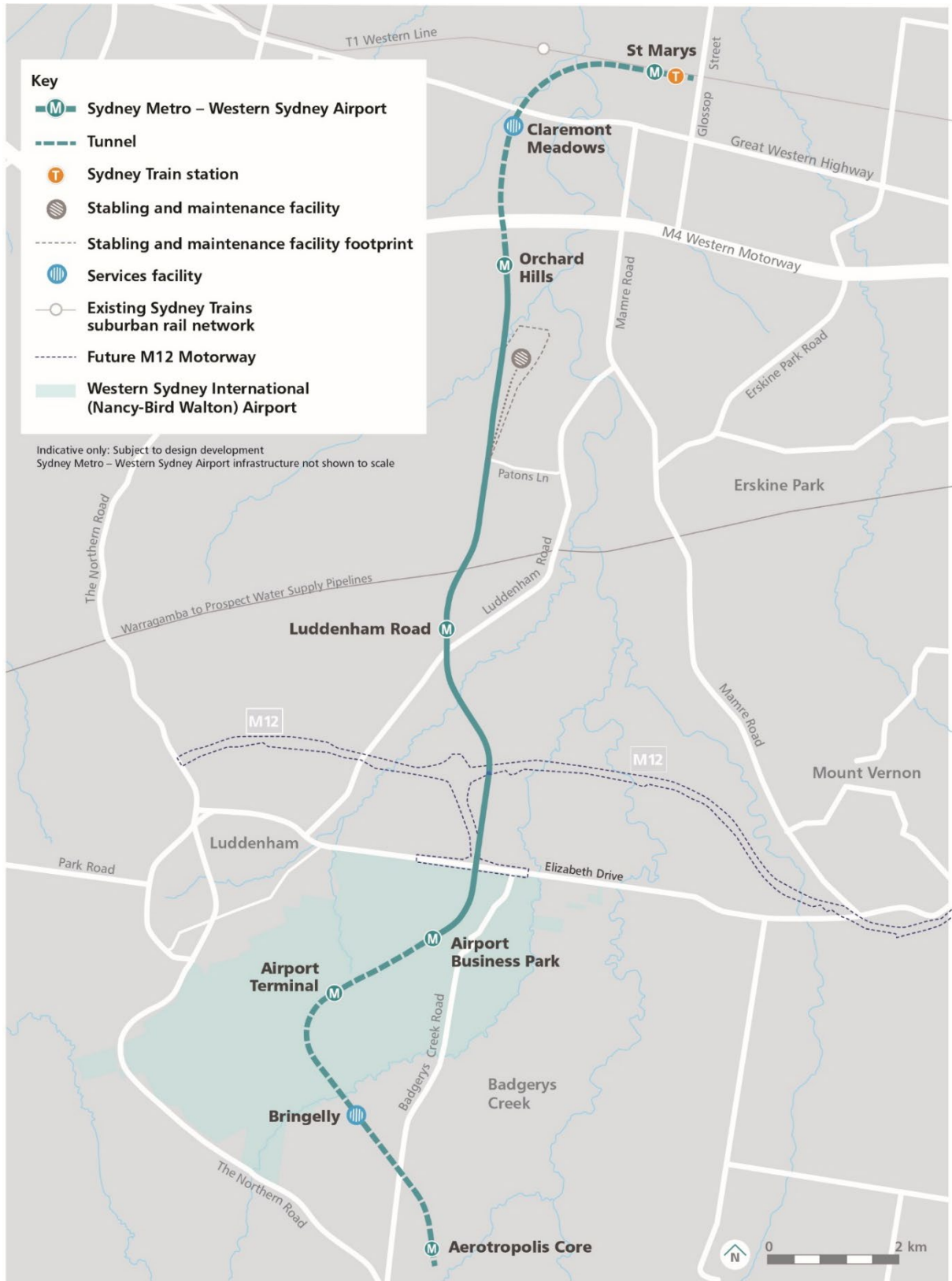
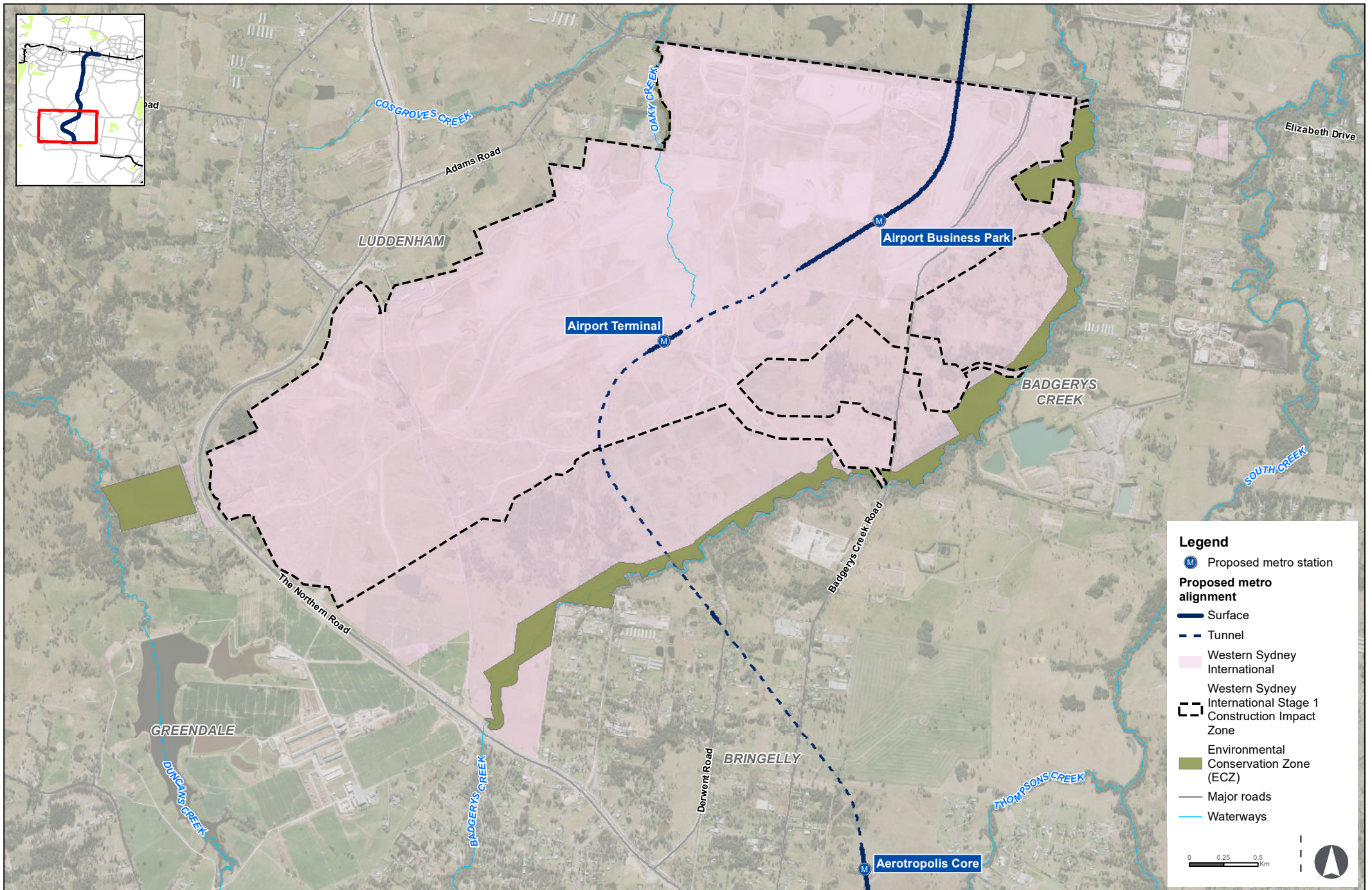


Figure 27-1 Overview of the project





### 27.1.2 Key operational aspects of the project

The following summary is provided for the purposes of the assessment of the project. Further details are provided in Chapter 7 (Project description – operation).

#### Network interface, servicing and capacity

The project would operate as a separate rail line that would connect to the existing T1 Western Line at St Marys via a new St Marys metro station integrated with the existing Sydney Trains suburban train station. It will provide a 'turn up and go' service to Western Sydney International.

It is anticipated that the project would initially operate up to three carriages per train with a service frequency of up to 12 trains per hour in the peak. The ultimate operational capacity of the project is expected to be 20 trains per hour in each direction – a train every three minutes each way. The ultimate number of train movements may further increase should future extensions to the north (to Schofields/Tallawong in Rouse Hill) and south (to Macarthur) become operational.

#### Hours of operation

The project has the ability to operate as a 24-hour service. The operation of the project combined with alternative services such as local and rapid bus services in the evening and early morning where required, would ensure there is a 24-hour transport service to respond to the operational requirements of Western Sydney International.

The final operating hours would be determined as part of the development of the services schedules for the project taking into account customer and maintenance access requirements. The stabling and maintenance facility would operate 24 hours a day, seven days a week.

When the project is not operating (for example, outside of operating hours, during maintenance activities or in the event of an emergency) alternative services such as local and rapid bus services would be provided.

#### Train types

All trains would be new, single-deck metro trains. They would deliver a fast, safe and reliable journey for customers with high performance standards and good customer amenities.

#### Other operational features

Other key operational features of the project would include:

- pedestrian links and connections to other modes of transport and surrounding land uses
- operation of services facilities at Claremont Meadows and Bringelly for fresh air ventilation inlets and emergency evacuation
- traction substations to provide traction power supply. These would generally be co-located at the stabling and maintenance facility and stations where possible
- operation of a stabling and maintenance facility.

### 27.1.3 Key aspects of construction

#### Construction sites and associated activities

Table 27-1 identifies the indicative works at proposed construction sites.



Table 27-1 Indicative works at proposed construction sites

Location	Enabling works	TBM launch	TBM support	TBM retrieval	Spoil handling and removal	Roadheader launch/support	Ancillary facility construction	Stabling and maintenance facility construction	Major earthworks	Bridge and viaduct construction	General civil works	Concrete batch plant	Equipment and material laydown	Rail system fitout	Site offices and worker amenities	Water treatment plant	Potential acoustic shed	Vehicle parking
<b>Off-airport</b>																		
St Marys	✓			✓	✓	✓	✓		✓		✓		✓	✓	✓	✓	✓	✓
Claremont Meadows services facility	✓				✓	✓	✓		✓		✓		✓	✓	✓	✓	✓	✓
Orchard Hills	✓	✓	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Off-airport construction corridor	✓				✓		✓		✓	✓	✓		✓	✓	✓			✓
Stabling and maintenance facility	✓				✓		✓	✓	✓		✓		✓	✓	✓			✓
Luddenham Road	✓				✓		✓			✓	✓		✓	✓	✓			✓
Bringelly services facility	✓				✓	✓	✓		✓		✓		✓	✓	✓	✓	✓	✓
Aerotropolis Core	✓			✓	✓	✓	✓		✓		✓		✓	✓	✓	✓	✓	✓
<b>On-airport</b>																		
On-airport construction corridor	✓				✓		✓		✓	✓	✓		✓	✓	✓			✓
Airport Business Park	✓				✓		✓		✓		✓		✓	✓	✓			✓
Western Sydney International tunnel portal	✓	✓	✓		✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓
Airport Terminal	✓		✓		✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓
Airport construction support site	✓				✓				✓		✓	✓	✓	✓	✓			✓

## Construction methods

Table 27-2 provides an overview of the indicative construction methods for the project.

**Table 27-2 Construction methods**

Construction activity	Construction methods
Enabling works	<p>Enabling works for the project are required to establish key construction sites and facilitate construction activities. Enabling works would include:</p> <ul style="list-style-type: none"> <li>• detailed site investigations and subsequent remediation or heritage clearance works</li> <li>• demolition of buildings and other structures where required</li> <li>• transport network adjustments</li> <li>• relocating, adjusting and protecting utilities and services affected by the project</li> <li>• supplying water, power and other utilities to construction sites and other areas within the construction footprint</li> <li>• works within and around the T1 Western Line rail corridor</li> <li>• vegetation clearance (as required).</li> </ul>
Tunnels	<p>Tunnel excavation methodologies for the project would include:</p> <ul style="list-style-type: none"> <li>• bored tunnels for the St Marys to Orchard Hills tunnel and the Western Sydney International to Aerotropolis tunnel</li> <li>• other techniques including the use of roadheaders or excavators to excavate non-standard sections of tunnels including cross-passages and tunnel stubs.</li> </ul>
Station construction	<p>The construction method for the stations include cut and cover, viaduct and surface construction. Station construction would generally be carried out in the following sequence:</p> <ul style="list-style-type: none"> <li>• excavation and structural works for station construction</li> <li>• station fitout, precinct and transport integration works.</li> </ul>
Services facilities	<p>Construction works for the services facilities would involve:</p> <ul style="list-style-type: none"> <li>• excavation of a vertical shaft to the tunnels below</li> <li>• temporary lining and reinforcement of the shaft.</li> </ul>
Stabling and maintenance facility	<p>Construction works for the stabling and maintenance facility would involve:</p> <ul style="list-style-type: none"> <li>• earthworks to achieve required ground surface levels and introduce stormwater detention and water quality basins</li> <li>• construction and installation of maintenance buildings</li> <li>• laying of track and stabling roads to accommodate the stabling of trains.</li> </ul>
Rail systems fitout	<p>Tunnel fitout and rail systems works would include installation of:</p> <ul style="list-style-type: none"> <li>• track slab and rail track</li> <li>• cable and equipment</li> <li>• overhead wiring.</li> </ul>

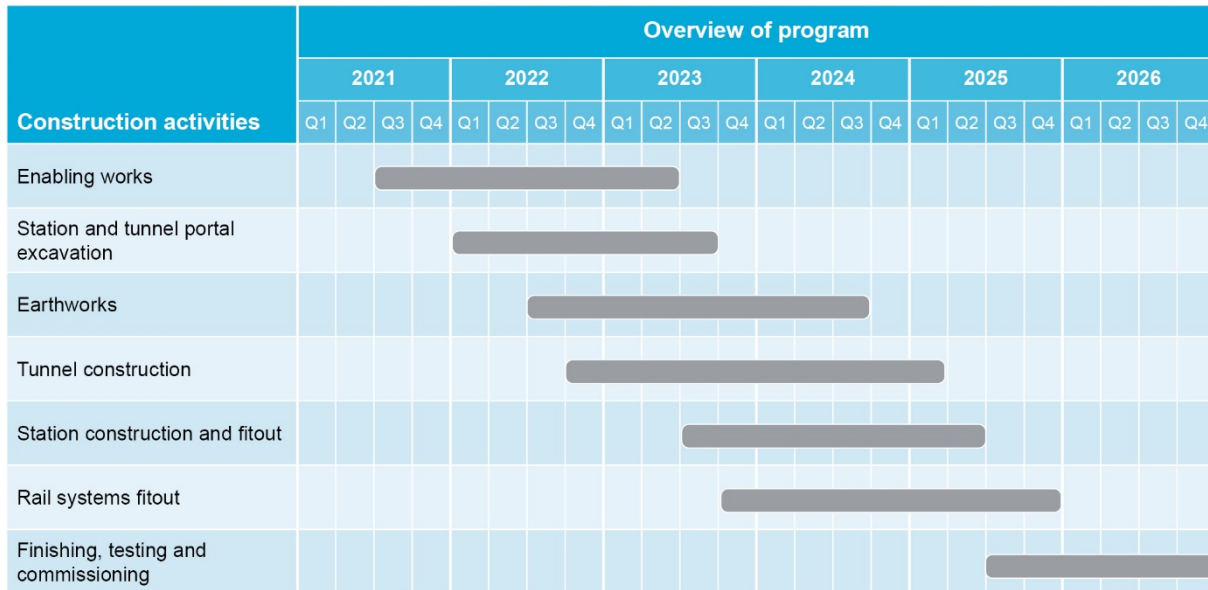
## Construction program

Early works including site investigations would be undertaken in 2020, however these works would be subject to separate approval outside the scope of this Environmental Impact Statement.

The indicative timeframe for the project is for main construction to commence in 2021 and take about five years to complete, subject to planning approval, with project opening intended to align with when Western Sydney International opens for passenger services.

An indicative construction program is shown in Figure 27-3. The final construction methodology and program would be developed by the construction contractor(s) when appointed.





**Figure 27-3 Indicative construction program**

#### 27.1.4 Placemaking

The delivery of Sydney Metro – Western Sydney Airport offers the opportunity to support the creation of new places focused around the locations of the proposed stations, such as at the Aerotropolis Core precinct, or to reinforce or enhance existing places, such as St Marys.

The approach to placemaking at each station precinct would be contextual, taking into consideration their surrounding environment or ‘place’ in which they are located by supporting planned or future land use development or renewal. Sydney Metro considers placemaking opportunities at different scales, starting from the station itself, extending to the interchange area, and to the broader precinct in which the station and interchange are located (see Figure 27-4).

Sydney Metro’s role in delivery changes as the scale increases. Sydney Metro’s scope to deliver and influence place outcomes is highest within the station and interchange area. The physical extent of this area differs from station to station depending on context, but generally includes station plazas and interchange infrastructure in the immediate surrounds of the station. In some locations this may include areas for future development, placemaking or transport integration purposes.

Sydney Metro’s scope to deliver place outcomes would relate to the physical infrastructure to be delivered as part of the project and future potential integrated and precinct developments (subject to separate approval). Together, these scope elements would include the development of rail infrastructure and precinct infrastructure such as bike storage and buses and point-to-point interchanges. These are the elements where public domain and transport can be delivered as part of an integrated solution that can respond to complementary land uses within a wider precinct.

There are a range of different stakeholders who would have a role in delivering place outcomes across the project corridor and at station precincts. At all off-airport stations, Sydney Metro would deliver public domain elements and work with other parts of Transport for NSW and other key stakeholders to deliver transport integration elements. At the on-airport stations, Sydney Metro would work with Western Sydney Airport to ensure the required transport integration elements are effectively delivered to support the project.

This would ensure stations and interchanges are attractive, safe, functional and allow for the gathering and movement of people, whilst also being consistent with the aspirations of the places surrounding them. Within station and interchange areas, Sydney Metro would also explore opportunities for activation, retail and other specialised spaces for the customer and community. The fit out and use of these spaces would be delivered subject to separate planning approvals as appropriate.

The final approach and design to placemaking for the project would be undertaken with consideration to current best practices for urban design and placemaking including consideration of the Government Architect NSW's *Better Placed – an integrated design policy for the built environment of New South Wales* (Government Architect of NSW, 2017a) and the principles of *Designing with Country* (Government Architect of NSW, 2020). These frameworks and principles are aimed at creating a clear approach to the design of architecture, public places and environments for the future as well as promoting incorporation of Aboriginal leadership and advice in the design of projects.

These frameworks and principles would be considered as part of the ongoing design development of the project and have been considered as part of the development of the urban design guidelines for the project (Appendix E).

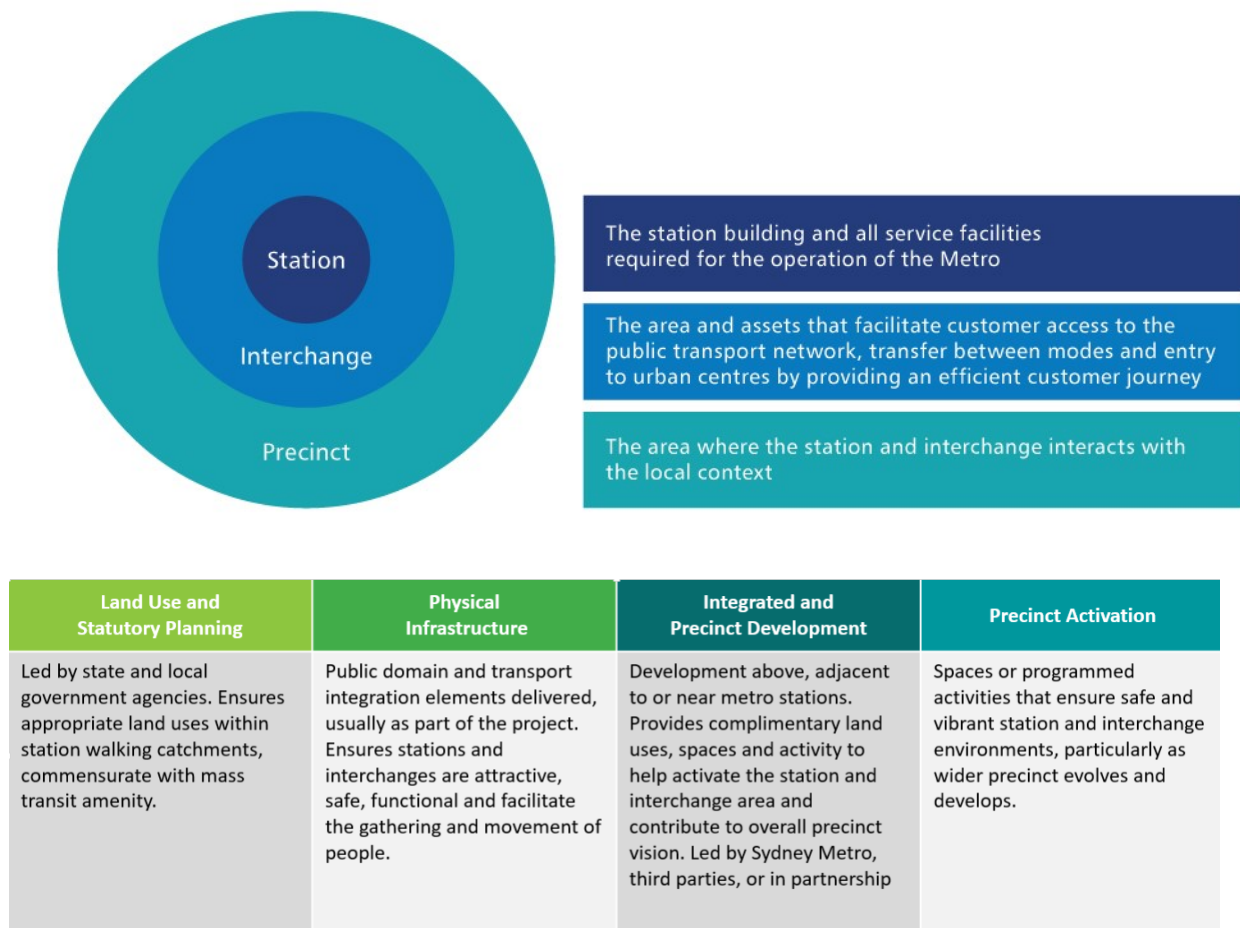


Figure 27-4 Placemaking at different scales for the project

## 27.2 Uncertainties and resolution

The construction footprints for the stations, rail corridor, services facilities and the stabling and maintenance facility have been developed taking into account expected future requirements, as well as considering the key construction requirements.

The construction methodology for the project has been developed to a level where potential impacts can be appropriately identified. Aspects of the construction methodology that may be subject to further refinement (but which would be unlikely to substantially alter the predicted potential impacts) include:

- location of and layout within construction sites (including the design and siting of acoustic sheds or other acoustic measures if required)

- alternative haulage routes, construction site access and/or traffic management arrangements at St Marys, Orchard Hills, Luddenham and Aerotropolis Core to provide improved traffic safety and reduce potential impacts in these locations
- construction interface and arrangements within Western Sydney International
- location of permanent and construction power supply routes
- sequence of construction activities
- temporary road diversions.

The final construction methodology and program would be developed by the construction contractor(s) when appointed.

## 27.3 Summary of potential impacts

### 27.3.1 Outline of strategies to avoid potential impacts

Many potential impacts have been avoided through the project development process which included input from key stakeholders and the community. In particular, locating the project south of Western Sydney International almost completely underground would substantially reduce most major environmental impacts, including:

- noise
- traffic
- property and land use (as well as facilitating future land use)
- social impacts
- Aboriginal and non-Aboriginal heritage
- biodiversity.

Potential impacts have also been minimised through the specific design and the construction methods chosen, such as the use of tunnel boring machines for tunnelling and a spoil management strategy to minimise haulage and movement of a large amount of surplus material. Design development and refinements would continue to further minimise any potential impacts.

Despite this, it is not unexpected that a project of this scale and nature would still have potential impacts that require mitigation.

### 27.3.2 Potential impacts requiring mitigation

Chapters 9 to 24 provide an assessment of the potential impacts of the project. The key potential impacts requiring mitigation and management are summarised in Table 27-3. These potential impacts would be mitigated by implementing the environmental management approach, including the project-specific performance outcomes and mitigation measures, described in Section 27.4.

**Table 27-3 Summary of potential impacts requiring mitigation**

Issue	Potential impact
Transport	<ul style="list-style-type: none"> <li>• potential temporary increase in construction traffic on the local and regional road network, resulting in potentially temporary increased congestion and delays</li> <li>• potential temporary local traffic disruptions and short-term access restrictions and detours for road users. Directional signage and line marking would be used to direct and guide drivers and pedestrians past construction sites and on the surrounding network</li> <li>• potential temporary decrease in road network performance resulting in delays and increased queue lengths at some intersections in St Marys</li> </ul>

Issue	Potential impact
	<ul style="list-style-type: none"> <li>• potential temporary access restrictions for pedestrians and cyclists within and surrounding the construction sites. Access to existing properties and buildings would be maintained in consultation with property owners</li> <li>• potential temporary impacts to the public transport network, particularly in St Marys, associated with the temporary relocation of the bus interchange, bus stops and changes to bus routes resulting in minor impacts to commuters</li> <li>• several on and off-street parking spaces would be temporarily unavailable to the general public for the duration of construction, with the main potential impacts at St Marys. Commuter parking spaces removed by the project during construction would be accommodated nearby in conjunction with the extension of the multi-deck commuter car park (subject to separate approval).</li> </ul>
Noise and vibration	<ul style="list-style-type: none"> <li>• potential temporary airborne noise impacts at some sensitive receivers during worst-case construction activities such as the use of hydraulic hammers and concrete saws. It is predicted that up to 49 receivers at St Marys may be highly noise affected for a short duration throughout the construction period</li> <li>• potential temporary ground-borne noise impacts at some sensitive receivers during worst-case tunnel construction works along the two tunnel alignments. It is predicted that up to 38 receivers along the St Marys to Orchard Hills tunnel and up to four receivers along the Western Sydney International to Bringelly tunnel may experience noise levels that exceed the residential night management level</li> <li>• some vibration sensitive receivers would be located within the vibration (surface works) minimum safe working distance from the construction footprint including the St Marys Railway Station, McGarvie-Smith Farm and the Warragamba to Prospect Water Supply Pipelines in Luddenham</li> <li>• potential temporary ground-borne vibration from tunnelling works is predicted to exceed the human comfort criteria at 16 residential receivers above the two tunnel alignments</li> <li>• potential temporary road traffic noise levels exceedances at the closest residential receivers on Kent Road, Orchard Hills (south of the M4 Western Motorway) and Badgerys Creek Road, Bringelly (north of The Northern Road)</li> <li>• potential operational noise levels at the nearest residences (in the vicinity of Bordeaux Place and Traminer Grove, Orchard Hills) to the west of the stabling and maintenance facility could exceed the project noise trigger levels if appropriate mitigation is not implemented.</li> </ul>
Biodiversity	<ul style="list-style-type: none"> <li>• potential impact upon around 33 hectares of native vegetation off-airport and 27 hectares of native vegetation on-airport outside the Western Sydney International Stage 1 Construction Impact Zone</li> <li>• clearing of Threatened Ecological Communities (TECs), including around 16 hectares of Cumberland Plain Woodland</li> <li>• potential removal of threatened species and/or their habitat</li> <li>• potential indirect impacts to threatened species and/or their habitat such as reduced viability of adjacent habitat due to edge effects, noise, dust or light spill</li> <li>• potential impacts on groundwater dependent ecosystems resulting from changes to groundwater level or flow</li> <li>• potential reduced viability of adjacent habitat due to noise and light impacts from the project</li> <li>• potential impacts on aquatic ecology arising from changes in hydrology and water quality.</li> </ul>



Issue	Potential impact
Non-Aboriginal heritage	<ul style="list-style-type: none"> <li>• moderate impact to the State heritage listed St Marys Railway Station Group and the locally listed McGarvie Smith Farm, primarily as a result of changes to their visual setting</li> <li>• potential temporary impacts due to construction vibration would be limited, with potential negligible to minor impacts identified, including at St Marys Railway Station Group and the Warragamba Supply Scheme.</li> </ul>
Aboriginal heritage	<ul style="list-style-type: none"> <li>• disturbance of a recorded Aboriginal site located within the Aerotropolis Core construction site and the potential to disturb areas of archaeological sensitivity. Archaeological test excavation (and salvage where required) would be carried out where intact natural profiles with the potential to contain significant archaeological deposits are encountered.</li> </ul>
Flooding, hydrology and water quality	<ul style="list-style-type: none"> <li>• potential temporary changes during construction to the local flooding regime which would potentially affect nearby properties due to temporary blockage of flow paths, increased flow rates due to vegetation clearing and hardstand area and modification of downstream flow paths due to works in dams and waterways</li> <li>• potential temporary flooding at construction sites by flood events</li> <li>• potential temporary changes to waterways and overland flow paths during construction including flow channel shape, increased sedimentation due to clearing, loss of riparian vegetation increasing risk of erosion and removal of levee banks, flood control works and farm dams</li> <li>• potential temporary increases of pollutants in waterways during construction which would further degrade water quality due to the release of nutrients from agricultural activities, increased sediment from clearing activities, release of construction related contaminants including from water treatment plants</li> <li>• potential increases to peak flood levels during operation are isolated to a few locations around Blaxland Creek and the stabling and maintenance facility</li> <li>• potential local overland flow impacts during operation at St Marys and Aerotropolis Core stations</li> <li>• removal of several farm dams has the potential to change frequency of low flow events</li> <li>• potential for further water quality degradation during operation due to pollutants from increased runoff from impervious surfaces.</li> </ul>
Groundwater and geology	<ul style="list-style-type: none"> <li>• potential minor impacts associated with localised ground movement and/or settlement due to excavation or groundwater drawdown causing damage to infrastructure</li> <li>• potential migration of groundwater towards, and into, station excavations</li> <li>• potential increase in groundwater levels upgradient of any structure and a lowering downgradient due to the undrained structures which would present a barrier to the natural groundwater flow.</li> </ul>

Issue	Potential impact
Soils and contamination	<ul style="list-style-type: none"> <li>• potential for interaction with areas of known salinity within the off-airport environment lie in the riparian zone and unnamed creek just south of Patons Lane and Badgerys Creek at Bringelly, with high salinity potential in the areas around all watercourses which could cause adverse impacts to receiving environments from runoff if not managed appropriately</li> <li>• potential spills of oils, fuels or chemicals from plant and equipment within the construction footprint</li> <li>• accumulation of potentially contaminated sediments in sedimentation and water quality basins</li> <li>• potential impact upon existing areas of contamination within the construction footprint that could have an adverse impact on human or ecological health if disturbed during construction or remain during operation of the project</li> <li>• potentially contaminated stormwater and groundwater ingress into the tunnel portal that may contain slightly elevated concentrations of chemical contaminants during operation</li> <li>• stormwater runoff from tracks which may contain slightly elevated concentrations of heavy metals and oils from train operations.</li> </ul>
Sustainability, climate change and greenhouse gas	<ul style="list-style-type: none"> <li>• potential climate change risks associated with extreme heat and extreme rainfall and flooding events Increase in greenhouse gas emissions through the consumption of electricity.</li> </ul>
Resource management	<ul style="list-style-type: none"> <li>• potential generation of unusable spoil during tunnelling due to contamination or acid sulfate soils.</li> </ul>
Land use and property	<ul style="list-style-type: none"> <li>• temporary and permanent acquisition of private and publicly owned land for construction and operation of the project</li> <li>• farming operations may potentially be temporarily affected by changes to access and farm infrastructure such as fencing.</li> </ul>
Landscape and visual	<ul style="list-style-type: none"> <li>• temporary moderate adverse landscape and visual impacts during construction due to the presence of construction activity</li> <li>• potential moderate adverse to minor beneficial landscape and visual impacts during operation of the project given a large section of the project would be in tunnel and the stations would be designed to be compatible with their context.</li> </ul>
Social and economic	<ul style="list-style-type: none"> <li>• temporary changes to the road network, including temporary parking loss has the potential to affect deliveries and convenience for business employees and customers.</li> </ul>
Air quality	<ul style="list-style-type: none"> <li>• potential temporary nuisance impacts during construction from dust and emissions from vehicles and construction plant.</li> </ul>
Hazard and risk	<ul style="list-style-type: none"> <li>• potential temporary impacts associated with the storage, use and transport of dangerous goods and hazardous substances</li> <li>• potential damage to major transport, water and power infrastructure traversed by the project off-airport, particularly Warragamba to Prospect Water Supply Pipelines poses a significant potential risk given the critical role of the pipelines in Sydney's water supply</li> <li>• potential exposure to hazardous materials (particularly asbestos) and contaminated soils (containing hydrocarbons, heavy metals) during demolition and construction works</li> <li>• the project would continue to consider and respond to requirements relating to airport operations outlined in the <i>National Airports Safeguarding Framework</i>.</li> </ul>

### 27.3.3 Cumulative impacts

Potential temporary cumulative impacts during construction have been an important consideration given the potential concurrent construction with a number of large infrastructure projects. Potential temporary cumulative impacts have been identified in relation to the following projects:

- future M12 Motorway
- Western Sydney International
- St Marys Intermodal
- The Northern Road.

Key potential cumulative construction impacts could include:

- potential temporary local traffic and access impacts
- potential temporary noise and vibration impacts
- potential temporary visual and amenity impacts of construction compounds and associated sites and activities
- construction fatigue as a result of concurrent or consecutive construction projects
- potential temporary localised flooding, hydrology and water quality impacts
- direct and indirect impacts on biodiversity
- direct and indirect impacts on non-Aboriginal heritage
- direct and indirect impacts on Aboriginal heritage.

These impacts would be managed in accordance with the environmental management framework, performance outcomes and mitigation measures as outlined in Section 27.4. Coordination and engagement with other projects has been undertaken and would continue throughout construction to further manage construction fatigue and cumulative impacts where possible.

Any potential cumulative adverse impacts would be offset by the benefits of the project.

## 27.4 Environmental management and mitigation

### 27.4.1 Overall approach to environmental management

The proposed approach to environmental management is to prepare an overarching, integrated environmental management strategy for the whole of the project that addresses both the on-airport and off-airport environmental management regimes. The proposed environmental approach is described in Chapter 25 (Environmental management and mitigation) and shown in Figure 27-5.

The overarching approach to construction environmental management is guided by the following:

- Planning approval documentation including:
  - Construction Environmental Management Framework (CEMF) (Appendix F)
  - Construction Traffic Management Framework (CTMF) (Appendix G)
  - Construction Noise and Vibration Standard (CNVS) (Appendix H)
  - Overarching Community Communications Strategy (OCCS) (Appendix C)
  - performance outcomes
  - mitigation measures
- Construction (Rail) Plan/Staging Report
- Construction Environmental Management Plans (CEMPs) and sub-plans, including CEMPs for on-airport rail works consistent with the existing Western Sydney Airport CEMPs
- Sustainability Management Plans (SMPs)

- performance and compliance reporting.

In addition to the environmental management framework document, a consolidated list of project-specific performance outcomes and mitigation measures for the project are provided in Section 27.4.2 and Section 27.4.3 respectively.

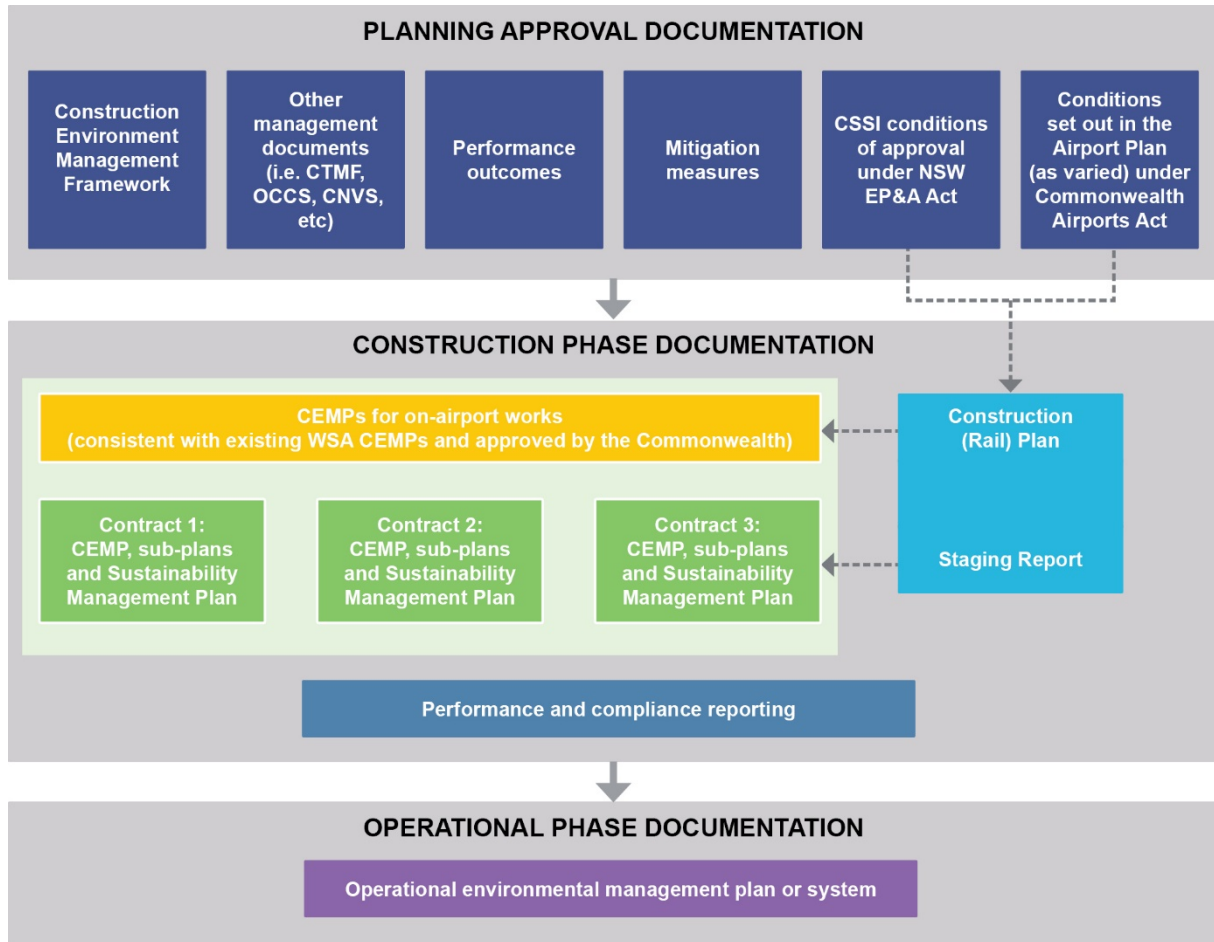


Figure 27-5 Environmental management approach

#### 27.4.2 Performance outcomes

Performance outcomes have been developed consistent with the requirements of the Planning Secretary's Environmental Assessment Requirements (SEARs) for the project. The performance outcomes for the project are identified in Table 27-4 and identify measurable, performance-based standards for environmental management. Mitigation measures, including measures necessary to achieve the performance outcomes, are identified in Table 27-5.



Table 27-4 Consolidated list of performance outcomes

SEARS desired performance outcome	Project performance outcome	Timing
<b>Design, place and movement</b>		
Supporting the provision of successful places - the project is integrated with and enhances the environment where it is located, including improved accessibility and connectivity for communities	The Sydney Metro – Western Sydney Airport Design Guidelines and Design Quality Framework are implemented to deliver a rail corridor, stations and ancillary facilities that achieve the project vision and design objectives	Operation
	Design excellence is exhibited in the project to complement the anticipated character of the precincts in which the project is located	Operation
	Accessibility and connectivity between future communities is supported by the project through opportunities to integrate with key project components such as stations	Operation
	Within Western Sydney International, the project is integrated with and supports the outcomes and design objectives set out in the Airport Plan, future master plans for Western Sydney International and design guidelines for Western Sydney International	Operation
The project contributes to greener places through supporting the enhancement and provision of green infrastructure	The number of trees within the project area is increased using a range of local species to enhance canopy coverage, subject to the constraints on tree planting associated with safe airport operations	Operation
<b>Transport</b>		
Network connectivity, safety and efficiency of the transport system in the vicinity of the project are managed to minimise impacts. The safety of transport system customers is maintained. Impacts on network capacity and the level of service are effectively managed.	Safe and efficient routes are provided for pedestrians, cyclists and road users at/near construction sites	Construction
	Access to the existing St Marys Station is maintained while train services are operating	Construction
	Safe access to properties and businesses is maintained during construction, unless alternatives are agreed with property owners and businesses	Construction
	Heavy vehicles access the arterial network as soon as practicable on route to, and immediately after leaving, a construction site	Construction
	The local community and relevant authorities are informed of transport, access and parking changes/impacts to minimise inconvenience to the public	Construction
	Safe and efficient interchanges are provided between transport modes	Operation
	Transport interchange facilities provided at station precincts are designed in accordance with the modal access hierarchy	Operation
	Each station and station plaza is provided with sufficient customer capacity to achieve a minimum Fruin's Level of Service C (for 2056 demand)	Operation
	Stations and interchanges are fully accessible and compliant with the <i>Disability Discrimination Act 1992</i> (Cth) and the <i>Disability Standards for Accessible Public Transport</i> (Australian Government, 2002)	Operation

SEARS desired performance outcome	Project performance outcome	Timing
Works are compatible with existing infrastructure and future transport corridors	The project is designed to be compatible with existing infrastructure and future transport corridors	Operation
<b>Noise and vibration</b>		
Construction noise and vibration (including airborne noise, ground-borne noise and blasting) is effectively managed to minimise adverse impacts on acoustic amenity	Construction noise and vibration impacts on local communities (including airborne noise and ground-borne noise and vibration) are managed in accordance with the Sydney Metro Construction Noise and Vibration Standard, the Interim Construction Noise Guideline, and the Airports (Environment Protection) Regulations 1997	Construction
Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise adverse impacts on the structural integrity of buildings and items including Aboriginal places and environmental heritage	Structural damage to buildings, heritage items and public utilities and infrastructure, including the Warragamba to Prospect Water Supply Pipelines, from construction vibration to be avoided	
Increases in noise emissions and vibration affecting nearby properties and other sensitive receivers during operation of the project are effectively managed to protect the amenity and well-being of the community	Operational noise and vibration levels from rail operations are managed in accordance with the Rail Infrastructure Noise Guidelines and Airports (Environment Protection) Regulations 1997. Operational noise levels for the stabling and maintenance facility, stations and other fixed infrastructure are managed in accordance with the <i>Noise Policy for Industry 2017</i>	Operation

SEARS desired performance outcome	Project performance outcome	Timing
<b>Biodiversity</b>		
The project design considers all feasible measures to avoid and minimise impacts on terrestrial and aquatic biodiversity	Minimise or where possible avoid impacts on threatened flora and fauna species, and ecological communities listed under the <i>Biodiversity Conservation Act 2016</i> (NSW) and <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth)	Construction
	Manage groundwater drawdown at Orchard Hills to avoid or minimise impacts on groundwater dependent ecosystems	Construction
	No removal of any vegetation within the Thompsons Creek riparian zone or any adjacent areas that are non-certified under the South West Growth Area	Construction
	Culverts and bridges would be appropriately sized to maintain fauna habitat connectivity	Operation
	Maintain integrity and functionality of rail corridor fencing to minimise wildlife-train collision	Operation
	Re-establish native vegetation in accordance with the National Airports Safeguarding Framework Principles and Guidelines including Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports (Australian Government, 2014)	Operation
Offsets and/or supplementary measures are assured which are equivalent to any residual impacts of project construction and operation	Impacts on threatened ecological communities and threatened species are offset in accordance with the requirements of the <i>NSW Biodiversity Assessment Method</i> (OEH, 2018)	Construction
<b>Non-Aboriginal heritage</b>		
The design, construction and operation of the project facilitates, to the greatest extent possible, the long term protection, conservation and management of the heritage significance of items of environmental heritage The design, construction and operation of the project avoids or minimises impacts, to the greatest extent possible, on the heritage significance of environmental heritage	Impacts on the State heritage significant St Marys Railway Station Group are avoided or minimised so that the overall heritage value of the item is maintained	Construction
	Impacts on non-Aboriginal heritage items and archaeology are minimised or where possible avoided	Construction
	The design of St Marys Station is sympathetic to retained and adjacent heritage items	Operation
	An appropriately qualified and suitably experienced heritage architect and relevant stakeholders are consulted during design development	Operation
	The design of the project incorporates non-Aboriginal heritage interpretation	Operation

SEARS desired performance outcome	Project performance outcome	Timing
<b>Aboriginal heritage</b>		
The design, construction and operation of the project facilitates, to the greatest extent possible, the long term protection, conservation and management of the heritage significance of items of Aboriginal objects and places The design, construction and operation of the project avoids or minimises impacts, to the greatest extent possible, on the heritage significance of Aboriginal objects and places	The heritage significance of Aboriginal objects and places are protected, conserved and/or managed in order to ensure the project does not diminish the story and cultural understanding of Aboriginal people in New South Wales	Construction
	Impacts on areas of archaeological potential and significance are avoided or minimised, where practical	Construction
	The design of the project incorporates Aboriginal heritage interpretation and Aboriginal cultural design principles in consultation with Aboriginal stakeholders	Operation
<b>Flooding, hydrology and water quality</b>		
The project minimises adverse impacts on flooding characteristics Construction and operation of the project avoids or minimises the risk of, and adverse impacts from, infrastructure flooding, flooding hazards, or dam failure Long term impacts on surface water and groundwater hydrology (including drawdown, flow	Land and property beyond the construction footprint would not be impacted by construction for the 0.5 Exceedances per Year (EY) storm event	Construction
	No aspect of construction to materially adversely affect existing water quality in receiving waters to a minimum 0.5 EY storm event, or in line with the 'Blue Book' (Managing Urban Stormwater: Soils & Construction Volume 1 (Landcom, 2004))	Construction
	No material change to channel shape within the construction footprint for the 0.5 EY storm event for streams classified first order and higher	Construction



SEARS desired performance outcome	Project performance outcome	Timing
<p>rates and volumes) are minimised</p> <p>The environmental values of nearby, connected and affected water sources, groundwater and dependent ecological systems including estuarine and marine water (if applicable) are maintained (where values are achieved) or improved and maintained (where values are not achieved)</p> <p>Sustainable use of water resources</p> <p>The project is designed, constructed and operated to protect the NSW Water Quality Objectives where they are currently being achieved, and contribute towards achievement of the Water Quality Objectives over time where they are currently not being achieved, including downstream of the project to the extent of the project impact including estuarine and marine waters (if applicable)</p>	<p>Water discharged from the project, including runoff from hardstand areas, surface and ground water storages would:</p> <ul style="list-style-type: none"> <li>contribute towards achieving ANZECC guideline water quality trigger values for physical and chemical stressors for slightly disturbed ecosystems in lowland rivers in southeast NSW, or</li> <li>meet any water quality criteria determined in consultation with the NSW Environment Protection Authority (off-airport) where an EPL is required or in consultation with Western Sydney Airport in accordance with the Airports (Environmental Protection) Regulations 1997 (on-airport)</li> </ul>	Construction and operation
	<p>Drainage from the project (including the stabling and maintenance facility, service facilities and stations) designed in accordance with local council requirements for managing urban stormwater quality and quantity</p>	Operation
	<p>For all land currently flooded up to the one per cent annual exceedance probability event, no change to peak flood levels up to the following limits, unless otherwise agreed with the affected property owner:</p> <ul style="list-style-type: none"> <li>residential, commercial, critical infrastructure – no new above floor flooding, maximum change of 10 millimetres for existing flooded buildings and maximum of 50 millimetres for properties where flooding is below floor level.</li> <li>roads – maximum change of 50 millimetres</li> <li>Crown land open space, farming, grazing and cropping land – maximum change of 200 millimetres</li> </ul>	Operation
	<p>Where flood water velocities are currently below one metre per second (m/s), the project is designed and operated to ensure they remain below one metre per second. Where velocities are above one m/s, an increase of no more than 20 per cent is permitted.</p>	Operation
	<p>No change to flood hazard vulnerability classification limits for residential and commercial buildings or roads</p>	Operation
	<p>No change to flood hazard vulnerability classification limits for all land types as a result of the placement of the permanent spoil stockpile site at Western Sydney International</p>	Operation
	<p>No change to the one per cent annual exceedance probability duration of inundation up to the following limits:</p> <ul style="list-style-type: none"> <li>residential, commercial, critical infrastructure – no increase for above floor flooding</li> <li>roads – maximum change of 10 per cent increase in duration</li> <li>agricultural land for cropping – dependant on cropping type</li> </ul>	Operation
	<p>For moderate and high fragility watercourses impacted by the project (as defined by the NSW River Styles mapping (NSW, Department of Planning, Industry and Environment 2019)), maintain existing flow regimes and velocities as best as possible to preserve and minimise changes to the watercourses</p>	Operation
	<p>Critical infrastructure (including stations entries and tunnel portals) to have immunity against the probable maximum flood event</p>	Operation

SEARS desired performance outcome	Project performance outcome	Timing
<b>Groundwater and geology</b>		
Long term impacts on surface water and groundwater hydrology (including drawdown, flow rates and volumes) are minimised	Groundwater availability and quality for water supply and environmental benefit (e.g. groundwater dependent ecosystems) is not affected beyond the requirements outlined in the NSW Aquifer Interference Policy	Construction and operation
	Structural damage to buildings, heritage items and public utilities and infrastructure, including the Warragamba to Prospect Water Supply Pipelines, from ground movement to be avoided	Construction
<b>Soils and contamination</b>		
The environmental values of land, including soils, subsoils and landforms, are protected Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to acid sulfate soils and site contamination	Contamination risks to human health and ecological receivers are minimised through effective management of existing contaminated land	Construction
	Contaminated land and soil within the footprint of the project is remediated where required, to ensure the land is suitable for the intended future land use	Operation
<b>Sustainability, climate change and greenhouse gas</b>		
The project reduces the NSW Government's operating costs and ensures the effective and efficient use of resources Conservation of natural resources is maximised	The project achieves a minimum 'Design' and 'As built' rating score of 65 to 75, using the Infrastructure Sustainability Council of Australia infrastructure rating tool or equivalent	Operation
	Sustainability initiatives are incorporated into the planning, design and construction of the project	Construction and operation
	100 per cent of the greenhouse gas emissions associated with consumption of electricity during operation are offset	Operation
	25 per cent of the greenhouse gas emissions associated with consumption of electricity during construction are offset	Construction

SEARS desired performance outcome	Project performance outcome	Timing
The project is designed, constructed and operated to be resilient to the future impacts of climate change	The project is designed to be resilient to the long-term consequences of climate change	Construction and operation
<b>Resource management</b>		
Conservation of natural resources is maximised	100 per cent of useable spoil is reused in accordance with the spoil reuse hierarchy	Construction
	A minimum 95 per cent recycling target is achieved for construction and demolition waste	Construction
	Products made from recycled content are prioritised	Construction
	The use of potable water for non-potable purposes is avoided if non-potable water is available	Construction and operation
	The reuse of water is maximised, either on-site or off-site	Construction and operation
<b>Cumulative impacts</b>		
	Cumulative impacts are managed through coordination of construction activities and communication processes with nearby major projects (Western Sydney International, M12 Motorway, The Northern Road, St Marys Intermodal)	Construction

#### 27.4.3 Environmental management measures

Mitigation measures have been developed to mitigate and manage the potential impacts of the project and achieve the performance outcomes outlined in Table 27-4.

A range of measures for the management of potential impacts from construction are included in the CEMF, OCCS, CNVS and CTMF. Additional mitigation measures have been identified throughout this Environmental Impact Statement to manage project-specific impacts and these measures are compiled in Table 27-5.

The measures have been identified to manage both construction and operational impacts and some measures have been identified to manage impacts in a site-specific location. The location/s applicable to each mitigation measure are identified in the table.

These mitigation measures may be revised in response to submissions received during public exhibition and/or any design changes made following exhibition. The revised list of mitigation measures would be provided in the Response to Submissions and project Amendment Report (if required). On-airport measures detailed in Appendix J (EPBC Act Draft Environmental Impact Assessment of on-airport proposed action (EPBC 2019/8541)) and off-airport measures in Appendix K (EPBC Act Draft Environmental Impact Assessment of off-airport proposed action (EPBC 2020/8687)) would be subject to similar revisions following exhibition, along with any revisions resulting from design changes made following exhibition. A revised list of on-airport measures would be presented in the final version of environmental impact assessment of on-airport works prior to the variation to the Airport Plan being made.

Table 27-5 Consolidated list of mitigation measures

Ref	Mitigation measures	Applicable location(s)
<b>Transport - construction</b>		
T1	Construction Traffic Management Plans would be prepared in accordance with the Construction Traffic Management Framework	All
T2	The Construction Traffic Management Plan for St Marys would be developed to ensure existing transport interchange infrastructure continues to operate effectively within the St Marys station precinct would be developed in consultation with the Traffic and Transport Liaison Group.	St Marys construction site
T3	Coordination with Western Sydney Airport and Transport for NSW would be undertaken through the Traffic and Transport Liaison Group to manage potential cumulative construction traffic impacts with M12 Motorway and Elizabeth Drive	All
T4	Road Safety Audits would be carried out to address vehicular access and egress, and pedestrian, cyclist and public transport safety. Road Safety Audits would be carried out as per the guidelines outlined in Section 10 of the Construction Traffic Management Framework	All
T5	Maintain access for pedestrians and cyclists around construction sites as per the guidelines outlined in the Construction Traffic Management Framework. Appropriate signage and line marking would be provided to guide pedestrians and cyclists past construction sites and on the surrounding network to allow access to be maintained	All
T6	Access for construction vehicles to be planned as per the guidelines outlined in the Construction Traffic Management Framework. Construction site traffic would be managed to minimise movements during peak periods. Vehicle access to and from construction sites would be managed to maintain pedestrian, cyclist and motorist safety	All
T7	Temporary relocation of bus stops and bus layovers at St Marys relocations would be subject to further design development, including consideration of the use of the Station St carpark. Bus stop relocations would be implemented prior to impacts on existing bus facilities. Temporary relocation of bus stops and bus layover at St Marys would be carried out in consultation with the Traffic and Transport Liaison Group Transport for NSW, Penrith City Council and bus operators. Wayfinding and customer information would guide customers to temporary bus stop locations	St Marys construction site
T8	Transport for NSW would be consulted to discuss opportunities for their delivery of intersection upgrades at Mamre Road/M4 Western Motorway on and off ramps prior to the peak year of construction	Luddenham Road construction site
<b>Transport - operation</b>		
T9	Interchange access plans would be prepared, in consultation with the Traffic and Transport Liaison Group, to ensure adequate pedestrian and cycle facilities and other transport interchange infrastructure is provided at each station precinct, in consultation with relevant authorities including Western Parkland City Authority	All
T10	The project would be designed such that access to properties and existing infrastructure neighbouring the proposed stations would be maintained	All



Ref	Mitigation measures	Applicable location(s)
T11	Consultation and coordination would be undertaken with Transport for NSW through the Traffic and Transport Liaison Group to align proposed road and intersection upgrades with the year of opening, to enable safe and efficient interchanges between transport modes	All
<b>Noise and vibration - construction</b>		
NV1	Where acoustic sheds are installed, the internal lining and type of material used in the construction of the sheds would be considered during design development and construction planning to ensure appropriate attenuation is provided	St Marys construction site Claremont Meadows services facility construction site Orchard Hills construction site Western Sydney International tunnel portal construction site Airport Terminal construction site Bringelly services facility construction site Aerotropolis Core construction site
NV2	To avoid potential vibration impacts to the Warragamba to Prospect Water Supply Pipelines, a detailed construction vibration assessment would be undertaken in accordance with the Guidelines for Development Adjacent to the Upper Canal and Warragamba Pipelines (WaterNSW, 2020) and would consider the following requirements: <ul style="list-style-type: none"> <li>confirm velocity limits for construction activities and the impact the works will have on WaterNSW assets</li> <li>excavation methods would be undertaken in accordance with German Standard DIN 4150-3:2016 (2.5 mm/s PPV)</li> <li>vibration monitoring would be undertaken prior to and during construction for high risk construction activities</li> <li>vibration monitoring reports would be provided to WaterNSW</li> </ul>	Off-airport construction corridor
<b>Noise and vibration – operation</b>		
NV3	An Operational Noise and Vibration Review would be prepared during design development to confirm the mitigation measures required to manage: <ul style="list-style-type: none"> <li>airborne and ground-borne noise impacts from rail operations</li> <li>airborne noise impacts from the stabling and maintenance facility</li> <li>airborne noise impacts from fixed industrial sources, including stations and services facilities</li> </ul>	All

Ref	Mitigation measures	Applicable location(s)
<b>Biodiversity – construction</b>		
FF1	<p>The Biodiversity Construction Environmental Management Plan (on-airport)/Flora and Fauna Management Plan (off-airport) would minimise and manage the clearing of native vegetation and habitat by:</p> <ul style="list-style-type: none"> <li>• seeking to locate site offices, site compounds and ancillary facilities in areas where there are limited biodiversity values (e.g. cleared land)</li> <li>• delaying the removal of vegetation until absolutely necessary</li> <li>• avoiding the removal of hollow-bearing trees, where possible</li> <li>• using a qualified surveyor and suitably qualified ecologist to mark out exclusion zones and clearing/project boundaries prior to construction</li> <li>• providing contractors with regularly updated sensitive area maps (showing clearing boundaries and exclusion zones)</li> </ul>	<p>Orchard Hills construction site</p> <p>Off-airport construction corridor</p> <p>Stabling and maintenance facility construction site</p> <p>Luddenham Road construction site</p> <p>Airport construction support site</p> <p>Bringelly services facility construction site</p> <p>Aerotropolis Core construction site</p>
FF2	<p>A Nest Box Strategy would be prepared to minimise habitat loss to hollow-dependent fauna in accordance with the Flora and Fauna Management Plan and would include the following requirements:</p> <ul style="list-style-type: none"> <li>• hollow-bearing trees would be marked/tagged and mapped prior to their removal. The size, type, number and location of nest boxes required would be based on the results of the pre-clearing survey</li> <li>• about 70 per cent of nest boxes would be installed about one month prior to any vegetation removal to provide alternate habitat for hollow-dependent fauna displaced during clearing</li> </ul>	<p>Claremont Meadows services facility construction site</p> <p>Off-airport construction corridor</p> <p>Airport construction support site</p>
FF3	<p>Works on-airport would be undertaken in accordance with the nest box strategy included in the Western Sydney Airport Habitat Management subplan and in consultation with Western Sydney Airport</p>	On-airport
FF4	<p>A targeted microbat survey (Eastern Coastal Free-tailed Bat or Eastern False Pipistrelle) of dwellings and structures proposed for demolition, removal or modification would be undertaken in accordance with 'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method (OEH, 2018) prior to disturbance</p> <p>Human-made structures such as culverts and other under-road structures within the construction footprint would be surveyed for threatened microbats (e.g. particularly the Southern Myotis) in accordance with the Biodiversity Assessment Method (OEH, 2018). If threatened microbats are detected, a Microbat Management Plan would be developed as part of the Biodiversity Construction Management Plan and implemented by a suitably qualified bat specialist</p>	<p>Claremont Meadows services facility construction site</p> <p>Off-airport construction corridor</p> <p>Airport construction support site</p>

Ref	Mitigation measures	Applicable location(s)
FF5	Works on-airport would be managed in accordance with the Western Sydney Airport Microbat Management Plan and in consultation with Western Sydney Airport	On-airport
FF6	During construction, shading and artificial light impacts would be minimised in areas adjoining remnant bushland in intact condition	Claremont Meadows services facility construction site Orchard Hills construction site Off-airport construction corridor
FF7	Fish passage and fish habitat associated with Cosgrove Creek and Blaxland Creek would be protected in accordance with the <i>Policy and Guidelines for Fish Habitat Conservation and Management</i> (DPI (Fisheries NSW), 2013)	Off-airport construction corridor
<b>Biodiversity – operation</b>		
FF8	Wildlife connectivity would be maintained (where possible) through the installation of viaduct/bridge structures designed in accordance with the following: <ul style="list-style-type: none"> <li>height and width of the area under a bridge to be maximised for all species, noting a minimum height of approximately 3 metres of dry passage will provide connectivity for most terrestrial species</li> <li>bridges wide enough to encompass water flow, stream bank and riparian vegetation, preferably on both sides of the water course</li> <li>for small and medium sized mammals, provide fauna furniture as shelter (e.g. vegetation, logs, rocks, leaf-litter, refuge pipes, escape poles, roofing tiles, and roofing iron)</li> <li>height and carriageway separation designed to allow sufficient light and moisture to enhance growth of vegetation under the structure</li> <li>if used for multiple purposes (e.g. pathways or access roads) aim to provide the 3 metre of natural passage for fauna</li> <li>relocation or adjustment of the stream bed avoided where possible</li> <li>the structure to tie in with the natural hydrology of the surrounding habitat such that the width, depth and gradient of the watercourse are maintained in the structure</li> <li>consistent with the <i>Policy and Guidelines for Fish Friendly Waterway Crossings</i> (DPI (Fisheries NSW), 2013)</li> </ul>	Off-airport
<b>Non-Aboriginal heritage – construction</b>		
NAH1	Potential moveable heritage items would be identified and assessed and a significant fabric salvage schedule would be prepared by an appropriately qualified and experienced heritage specialist for St Marys Railway Station, Bringelly RAAF Base, McGarvie-Smith Farm, McMasters Farm and Kennett's Airfield. Significant fabric would only be salvaged if it can be salvaged in such a way that it can be reused and is likely to be able to be reused	St Marys construction site Off-airport construction corridor Aerotropolis Core construction site

Ref	Mitigation measures	Applicable location(s)
NAH2	Heritage advice would be sought to develop solutions to manage potential ground movement impacts to the St Marys Goods Shed	St Marys construction site
NAH3	Archival recording of heritage items which would be impacted or that would have their setting altered, would be carried out in accordance with the NSW Heritage Office's <i>Photographic Recording of Heritage Items Using Film or Digital Capture</i> (2006). The following items would be archivally recorded: <ul style="list-style-type: none"> <li>• St Marys Railway Station</li> <li>• Kennett's Airfield</li> <li>• Luddenham Road Alignment</li> <li>• McMaster Farm</li> <li>• McGarvie-Smith Farm</li> <li>• Kelvin Park Group</li> <li>• Bringelly RAAF Base</li> </ul>	St Marys construction site Off-airport construction corridor Luddenham Road construction site Aerotropolis Core construction site
NAH4	Kennett's Airfield will be physically investigated during later investigation phases of the project to confirm heritage significance through an assessment of significance. Appropriate management and mitigation measures would then be determined	Off-airport construction corridor
NAH5	Archaeological investigation would be conducted for archaeological sites which would be impacted by the project. A non-Aboriginal Archaeological Research Design would be prepared for the project which would outline further archaeological investigation required for the project	St Marys construction site
NAH6	The following heritage items would be monitored for potential vibration impacts during works: <ul style="list-style-type: none"> <li>• St Marys Railway Station Group</li> <li>• Queen Street Post-War Commercial Building</li> <li>• St Marys Munitions Workers Housing</li> <li>• McGarvie Smith Farm</li> <li>• McMaster Farm</li> </ul>	St Marys construction site Off-airport construction corridor
NAH7	The St Marys Station jib crane would be temporarily relocated prior to construction commencing in the vicinity of this item, safely stored and appropriately maintained and reinstated. A detailed methodology for the removal and reinstatement of the jib crane would be prepared in consultation with an appropriately qualified heritage advisor	St Marys construction site
NAH8	A dilapidation survey of the Warragamba to Prospect Water Supply Pipelines would be undertaken prior to construction commencing in the vicinity of this item	Off-airport construction corridor
NAH9	If suspected human remains or unexpected items of potential heritage significance are discovered within the on-airport area, all activity would cease and the unexpected/chance finds requirements specified in the Western Sydney Airport European and Other Heritage Construction Environmental Management Plan would be followed	On-airport
<b>Non-Aboriginal heritage – operation</b>		
NAH10	Design development for the project would endeavour to minimise adverse impacts to heritage buildings, elements, fabric, and heritage significant settings and view lines that contribute to the overall heritage significance of heritage items	Off-airport

Ref	Mitigation measures	Applicable location(s)
NAH11	The architectural design for the project would take account local heritage context and be sympathetic to local heritage character. This would include using sympathetic building materials, colours and finishes Design should aim to minimise visual impacts by ensuring that significant elements are not obstructed or overshadowed Design should adhere to the Sydney Metro – Western Sydney Airport Design Guidelines The Design Review Panel and Heritage Working Group would be consulted in regard to the design, form and material of new built structures that may impact heritage items	Off-airport
NAH12	Consultation with the Heritage Council would occur for the design of works that have the potential to impact State significant items including for St Marys Railway Station and Kelvin/Kelvin Park Group	St Marys Station Aerotropolis Core Station
NAH13	A heritage interpretation strategy would be prepared for the project identifying key stories and interpretive opportunities related to non-Aboriginal heritage. The strategy would address historic and contemporary heritage and community values and would identify innovative and engaging opportunities for interpretation	Off-airport
NAH14	A conservation management plan would be prepared for St Marys Railway Station, in accordance with NSW Heritage Council guidelines. The plan would address any changes to the station, including updated assessment of significance of elements and recommendations on curtilage changes. It would also provide site specific exemptions and management policies	St Marys Station
NAH15	Heritage inventory registers for heritage items modified by the project would be updated to document their change in condition following the completion of construction works for the project	All
<b>Aboriginal heritage – construction</b>		
AH1	Aboriginal stakeholder consultation would continue to be carried out in accordance with the <i>Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010</i> (NSW Office of Environment and Heritage, 2010). Registered Aboriginal Parties would participate in future site inspections and test excavations. Measures to manage and protect the identified cultural values would be developed collaboratively through this consultation process to inform design development and heritage interpretation	Off-airport
AH2	Survey would be undertaken, with Registered Aboriginal Parties, in the areas of archaeological sensitivity where field investigations have not already been completed or where ground surface visibility limited the effectiveness of past inspections. The surface areas above the tunnel alignment would also be ground-truthed to ensure there are no site types directly above the tunnel that would be damaged by subsidence, with site-specific mitigation measures to be developed where any are found to be present	Off-airport
AH3	Test excavation would be undertaken in ground-truthed areas of confirmed archaeological sensitivity, to determine the presence or absence of subsurface archaeological deposits, where project impacts are anticipated	Off-airport



Ref	Mitigation measures	Applicable location(s)
AH4	Following the test excavation program, an Aboriginal Cultural Heritage Management Plan would be prepared. The Aboriginal Cultural Heritage Management Plan would identify management actions including conservation, protection and mitigation, and would authorise harm where appropriate and provide further detail in relation to salvage excavation program if required	Off-airport
AH5	The temporary repository of any retrieved artefacts would be appropriately secured and under the care of the archaeological consultant If retrieved, further consultation with Registered Aboriginal Parties would be required to determine the preferred long-term care and management of any retrieved Aboriginal artefacts	Off-airport
AH6	Aboriginal Heritage Information Management System site cards would be produced for newly identified sites and submitted to the Aboriginal Heritage Information Management System Registrar as soon as practicable	Off-airport
AH7	Aboriginal Site Impact Recording forms would be submitted to the Aboriginal Heritage Information Management System register for all Aboriginal Heritage Information Management System registered Aboriginal sites that are impacted by the project	Off-airport
AH8	If any suspected human remains or unexpected Aboriginal cultural heritage objects are discovered within the on-airport area, all activity would cease and the unexpected finds protocol and discovery of human remains protocol specified in the Western Sydney Airport Aboriginal Cultural Heritage Construction Environmental Management Plan would be followed	On-airport
<b>Flooding, hydrology and water quality – construction</b>		
HYD1	Construction planning would consider flood related mitigation, including: <ul style="list-style-type: none"> <li>staging construction works to reduce the duration of works within the floodplain</li> <li>daily and continuous monitoring of weather forecasts and storm events, rainfall levels and water levels in key watercourses to identify potential flooding events and related flood emergency response</li> <li>consultation with NSW State Emergency Services and relevant local councils to ensure consistent approaches to the management of flood events (off-airport only)</li> <li>provide flood-proofing to excavations at risk of flooding during construction, where reasonable and feasible, such as raised entry into shafts and/or pump-out facilities to minimise ingress of floodwaters into shafts and the dive structure</li> <li>review of site layout and staging of construction works to avoid or minimise obstruction of overland flow paths and limit the extent of flow diversion required</li> </ul>	Orchard Hills construction site Off-airport construction corridor On-airport construction corridor
HYD2	Minimise works in the main creek channels (at Blaxland Creek, unnamed watercourse south of Patons Lane and Cosgroves Creek) where possible and avoid works in the channel during rainfall events	Off-airport construction corridor

Ref	Mitigation measures	Applicable location(s)
WQ1	<p>A surface water quality monitoring program would be implemented to monitor water quality during construction. The program would be developed in consultation with (as relevant) Western Sydney Airport, NSW Environment Protection Authority, relevant sections of Department of Planning, Industry and Environment and relevant local councils. The program would consider monitoring being undertaken as part of other infrastructure projects such as the M12 Motorway and Western Sydney International</p> <p>On-airport, the water quality monitoring program would ensure that works meet the requirements under Schedule 2 of the Airports (Environment Protection) Regulations 1997.</p> <p>The program would monitor all construction discharge locations including South Creek at St Marys, South Creek at the M4 Western Motorway, South Creek at Longleys Road, Cosgroves Creek at Twin Creeks Drive, Thompsons Creek and Badgerys Creek at Elizabeth Drive</p>	<p>Claremont Meadows services facility construction site</p> <p>Orchard Hills construction site</p> <p>Off-airport construction corridor</p> <p>Airport construction support site</p> <p>Airport Terminal construction site</p> <p>On-airport construction corridor</p> <p>Bringelly services facility construction site</p>
<b>Flooding, hydrology and water quality - operation</b>		
HYD3	The flood model for the project would be updated with regard to flood modelling undertaken for the South Creek Sector Review (anticipated to be released in 2020). The updated flood modelling would be used to inform design development	All
HYD4	Develop localised stormwater management plans at St Marys Station and Aerotropolis Core Station to ensure these stations are protected from localised flooding	St Marys Station Aerotropolis Core Station
HYD5	Flood compatible design would need to be demonstrated for the permanent spoil placement area to ensure compliance with applicable land use criteria	On-airport
WQ2	Design batter slope gradients and surface treatments to minimise erosion risk	All
WQ3	Drainage and water treatment design to be undertaken in accordance with Water Sensitive Urban Design requirements specified in local council, Transport for NSW and on-airport standards	All
WQ4	Suitably designed scour and erosion controls should be included at drainage and sedimentation basin outlet discharge points	All
WQ5	Detailed design of viaducts across waterways would aim to minimise infrastructure within the bed and banks of existing waterways and minimise changes to flood behaviour across the floodplain	All
WQ6	Where feasible, on-site detention of stormwater would be introduced where stormwater runoff rates are increased. Where there is insufficient space for the provision of on-site detention, the upgrade of downstream infrastructure would be implemented where feasible and reasonable	All

Ref	Mitigation measures	Applicable location(s)
WQ7	At all locations where stormwater is discharged, water quality measures such as gross pollutant traps, bio-retention swales and Water Sensitive Urban Design features would be investigated and implemented where feasible and reasonable	All
WQ8	Water quality monitoring of all discharges from water quality treatment plants to be undertaken to contribute towards achievement of the ANZECC guideline water quality trigger values	St Marys Station Bringelly services facility
<b>Groundwater and geology - construction</b>		
GW1	Further assessment would be undertaken during design development, and prior to construction commencing, to ensure that damage to buildings and structures at risk of ground movement impacts around St Marys, Claremont Meadows, Orchard Hills and Bringelly are avoided or managed Where building damage risk is rated as slight, moderate or high (as per Rankin 1988), a structural assessment of the affected buildings/structures would be carried out and specific measures implemented to address the risk of damage	St Marys construction site Claremont Meadows services facility construction site Orchard Hills construction site Bringelly services facility construction site
GW2	Further assessment of road and rail infrastructure and utility assets (including the Warragamba to Prospect Water Supply Pipelines) considered to be at risk from ground movement would be undertaken during design development. Consultation would be undertaken with the infrastructure and asset owners in each case to determine appropriate ground movement criteria for the assessment and, if required, to agree management measures to manage potential impacts	St Marys construction site Claremont Meadows services facility construction site Orchard Hills construction site Off-airport construction corridor Bringelly services facility construction site

Ref	Mitigation measures	Applicable location(s)
GW3	<p>Further assessment of potential ground movement impacts on the Goods Shed building at St Marys Station, including a building condition survey, would be carried out during design development and prior to the commencement of construction. The assessment would be carried out in consultation with a suitably qualified heritage architect and would identify acceptable ground movement criteria and, if required, feasible measures to reduce or mitigate the effects of ground movement on this structure</p> <p>Ground movement in the vicinity of the Goods Shed and the condition of the Goods Shed building would be monitored during construction</p> <p>A dilapidation survey of the Goods Shed would be carried out prior to work commencing in the vicinity of the building. At the completion of construction, should there be any damage to the building which is determined to be as a result of the project construction works, the building would be repaired in consultation with a suitably qualified heritage architect</p>	St Marys construction site
GW4	<p>Consultation with Western Sydney Airport will be on-going in respect to the construction programs for both projects to understand the potential for ground movement impacts to proposed buildings and structures</p>	On-airport
GW5	<p>Detailed hydrogeological and geotechnical models for the project would be developed and progressively updated during design and construction</p> <p>These models would:</p> <ul style="list-style-type: none"> <li>• be informed by the results of groundwater monitoring undertaken before and during construction</li> <li>• identify predicted changes to groundwater levels, including at nearby water supply works and at groundwater dependent ecosystems or other sensitive groundwater receptors</li> </ul> <p>Where changes to groundwater levels are predicted at nearby water supply works, groundwater dependent ecosystems or other sensitive groundwater receivers, an appropriate groundwater monitoring program would be developed and implemented</p> <p>Where changes to groundwater level are close to the ground surface, dryland salinity monitoring would be implemented to allow for management of any identified impacts</p> <p>The groundwater monitoring program would aim to confirm no adverse impacts on the receiver during construction or to effectively manage any impacts with the implementation of appropriate mitigation measures. Monitoring at any specific location would be subject to the status of the water supply work and agreement with the landowner</p>	All

Ref	Mitigation measures	Applicable location(s)
GW6	<p>A Groundwater Management Plan would be prepared and implemented. The plan must include the following trigger-action-response measures in relation to groundwater levels in areas identified as subject to potential drawdown (at groundwater dependent ecosystems or other sensitive receivers) but outside the construction footprint and Western Sydney International Stage 1 Construction Impact Zone:</p> <ol style="list-style-type: none"> <li>target criteria, set with reference to relevant standards and site specific parameters;</li> <li>trigger values and corresponding corrective actions to prevent recurring or long-term exceedance of the target criteria described in (a); and</li> <li>corrective actions to compensate for any recurring or long-term exceedance of the target criteria described in (a)</li> </ol> <p>Response measures may include:</p> <ul style="list-style-type: none"> <li>targeted ground improvement and grouting to limit groundwater inflows into station excavations, tunnels and cross-passage to reduce groundwater drawdown</li> <li>design of undrained temporary retention systems to minimise groundwater inflow into station excavations and reduce groundwater drawdown</li> <li>supplementing groundwater supply at affected groundwater dependent ecosystems or watercourses</li> <li>make good provisions for groundwater supply wells impacted by changes in groundwater level or quality</li> </ul>	All
<b>Groundwater and geology – operation</b>		
GW7	Ongoing groundwater inflows from drained project elements (or incidental flows) would be treated and tested before discharge to comply with any relevant Environmental Protection Licence or agreed discharge criteria	St Marys Station Bringelly services facility
<b>Soils and contamination - construction</b>		
SC1	<p>The Soil and Water Management Plan would incorporate the following measures:</p> <ul style="list-style-type: none"> <li>for low risk areas of environmental concern, worker health and safety measures, waste management and tracking for contamination would be outlined.</li> <li>for medium and high risk areas of environmental concern, detailed site inspections and review of further available information would be undertaken prior to the start of construction</li> </ul>	All



Ref	Mitigation measures	Applicable location(s)
SC2	<p>Based on outcomes of SC1:</p> <ul style="list-style-type: none"> <li>if a medium or high risk area of environmental concern is reassessed as low, the site would be managed in accordance with the Soil and Water Management Plan. This would typically occur where there is minor, isolated contamination that can be readily remediated through standard construction practices such as excavation and off-site disposal</li> <li>for medium risk areas of environmental concern, if the risk for the areas of environmental concern remains medium, visual inspections and monitoring would be performed during earthworks. If suspected contamination is encountered, the materials would be subject to sampling and analysis to assess management requirements in accordance with NSW Environment Protection Authority statutory guidelines</li> <li>for areas of environmental concern that remain or change to high risk, a Sampling, Analysis and Quality Plan would be prepared for Detailed Site Investigations or data gap investigations. The results from the site investigations would be assessed against criteria contained within the <i>National Environment Protection (Assessment of Site Contamination) Measure</i> (2013) and other applicable NSW statutory guidelines to assess whether remediation is required. Remediation works would be performed in accordance with the hierarchy of preferred strategies in the <i>Guidelines for the NSW Site Auditor Scheme</i> (NSW Environment Protection Authority, 2017). Where practical, remediation works would be integrated with excavation and development works performed during construction</li> </ul>	Off-airport
SC3	<p>Where information gathered from investigations for medium and high risk areas of environmental concern (as per mitigation measure SC1) is insufficient to determine the risk of contamination, a detailed site investigation would be carried out in accordance with the <i>National Environment Protection Measure</i> (2013) and other guidelines made or endorsed by the NSW Environment Protection Authority</p> <p>Where data from the additional data review (mitigation measure SC1) or the detailed site investigation (mitigation measure SC2) confirms that contamination would require remediation, a Remediation Action Plan would be developed for the area of the construction footprint</p> <p>If a Remediation Action Plan is required, it would be developed in accordance with NSW Environment Protection Authority statutory guidelines and a Site Auditor would be engaged. Remediation methodologies would be undertaken in accordance with Australian Standards and other relevant government guidelines and codes of practice</p> <p>Remediation would be performed as an integrated component of construction and to a standard commensurate with the proposed end use of the land</p>	Off-airport
SC4	<p>If a duty to report to the NSW Environment Protection Authority under Section 60 of the <i>Contaminated Lands Management Act 1997</i> is triggered, or where a medium to high risk of contamination is identified, an accredited Site Auditor would review and approve the Remediation Action Plan, and would develop a Site Audit Statement and Site Audit Report upon completion of remediation</p>	Off-airport

Ref	Mitigation measures	Applicable location(s)
SC5	<p>An unexpected finds procedure would be developed and implemented as part of the project Soil and Water Management Plan, outlining a set of potential contamination issues which could be encountered, and detailing the corrective actions to be implemented. The unexpected finds procedure would include a process for chemical and asbestos contamination and would generally include:</p> <ul style="list-style-type: none"> <li>• cessation of works within the affected area until inspection of the suspected contamination by a qualified contaminated lands consultant (verification by a certified contaminated land practitioner)</li> <li>• collection of soil samples for chemical or asbestos analysis based on observations</li> <li>• assessment of results against applicable land use or waste classification criteria in accordance with NSW Environment Protection Authority statutory guidelines</li> <li>• management of the contamination in accordance with NSW Environment Protection Authority statutory guidelines</li> <li>• the unexpected finds procedure for on-airport construction would be consistent with the Western Sydney Airport unexpected finds procedure detailed in the Soil and Water Construction Environmental Management Plan (Western Sydney Airport, 2019)</li> </ul>	All
SC6	<p>Post construction, an inspection of construction, stockpiling and laydown sites and soil validation of redundant sedimentation/water quality basins would be undertaken to assess if further investigation and remediation is required. Investigation and remediation (if required) would be undertaken in accordance with the Soil and Water Management Plan (off-airport) and a project specific Remediation Action Plan that would be consistent with the Western Sydney Airport Remediation Action Plan (2019) (on-airport). All inspections, investigations and remediation would be undertaken by a qualified contaminated lands consultant (verified by a certified contaminated land practitioner)</p>	All
SC7	<p>Prior to ground disturbance in areas of potential acid sulfate soil occurrence, testing would be carried out to determine the actual presence of acid sulfate soils. If acid sulfate soils are encountered, they would be managed in accordance with the <i>Acid Sulfate Soil Manual</i> (Acid Sulfate Soil Management Advisory Committee, 1998)</p>	All
SC8	<p>Prior to ground disturbance in high probability salinity areas testing would be carried out to determine the presence of saline soils. If salinity is encountered, excavated soils would not be reused or would be managed in accordance with <i>Book 4 Dryland Salinity: Productive Use of Saline Land and Water</i> (NSW DECC 2008). Erosion controls would be implemented in accordance with the <i>Managing Urban Stormwater: Soils and Construction Volume 1</i> (Landcom, 2004)</p>	All
SC9	<p>Targeted groundwater investigations would be undertaken prior to construction to identify high salinity areas at risk from rising groundwater. Where high saline areas (&gt;1000 µS/cm) are identified, measures such as planting, regenerating and maintaining native vegetation and good ground cover in recharge, transmission and discharge zones would be implemented where possible</p>	All

Ref	Mitigation measures	Applicable location(s)
SC10	Where the construction footprint is not used as part of the operational footprint (residual land), a site suitability assessment for the proposed land use would be undertaken in accordance with NSW Environment Protection Authority statutory guidelines	Off-airport
SC11	For works within Western Sydney International: <ul style="list-style-type: none"> <li>a review of further available information from Western Sydney Airport would be undertaken prior to the commencement of construction, which may include review of investigations, the Western Sydney Airport Remediation Action Plan and validation reports</li> <li>any remediation works (for contamination encountered by Sydney Metro that has not been remediated by Western Sydney Airport) would be undertaken in accordance with the Sydney Metro Remediation Action Plan, developed in a manner consistent with the Western Sydney Airport Remediation Action Plan (Department of Infrastructure and Regional Development, 2019) to the extent practicable</li> </ul>	On-airport
<b>Sustainability, climate change and greenhouse gas - construction</b>		
SUS1	A Sustainability Plan would be developed to be consistent with the Western Sydney Airport Sustainability Plan, and would be implemented during construction of the project. It would inform the preparation of Sustainability Management Plans	All
SUS2	Protect sensitive construction equipment from the effects of extreme weather and climate, such as direct exposure to the sun on extreme heat days and flooding	All
SUS3	Address climate change impacts in emergency management procedures for the construction of the project, such as consideration of impacts of flash flooding on evacuation procedures	All
GHG1	Carry out an iterative process of greenhouse gas assessments and design refinement prior to construction to identify opportunities to minimise greenhouse gas emissions Performance would be measured in terms of a percentage reduction in greenhouse gas emissions, and assessed against a baseline inventory calculated at the design development and construction planning stage	All
<b>Sustainability, climate change and greenhouse gas - operation</b>		
SUS4	A Sustainability Plan would be developed to be consistent with the Western Sydney Airport Sustainability Plan, and implemented during operation of the project	All
SUS5	Climate change risk treatments would be confirmed and incorporated during further design development	All
GHG2	Carry out an iterative process of greenhouse gas assessments and design refinement during detailed design to identify opportunities to minimise greenhouse gas emissions Performance would be measured in terms of a percentage reduction in greenhouse gas emissions, and assessed against a baseline inventory calculated at the design development stage	All
<b>Resource management - construction</b>		
WR1	Construction waste would be minimised by accurately calculating materials brought to the site and limiting materials packaging	All

Ref	Mitigation measures	Applicable location(s)
WR2	Waste streams would be segregated to avoid cross-contamination of materials and maximise reuse and recycling opportunities	All
WR3	A materials tracking system would be implemented for material transferred between construction sites	All
<b>Resource management - operation</b>		
WR4	<p>Generation of waste would be minimised and reused where possible in line with the waste hierarchy and the sustainability objectives outlined in a Sustainability Plan. In addition:</p> <ul style="list-style-type: none"> <li>bins would be provided for general waste and recyclables and collection would be undertaken by an authorised contractor for off-site recycling or disposal at a licenced waste facility</li> <li>waste from maintenance activities would be stored in designated areas for collection by an authorised contractor for off-site disposal</li> <li>containers holding grease and lubricants for maintenance would be washed prior to disposal or stored separately for disposal as hazardous waste</li> <li>waste oil and oil filters would be stored in recycling bins and collected by an authorised contractor, and recycled off-site, where feasible</li> <li>wastewater, sewage and grey water would be disposed to stormwater, sewer, recycled wastewater system or transported to an appropriately licenced liquid waste treatment facility (if water quality does not meet requirements for discharge to the stormwater/sewer system)</li> </ul>	All
<b>Land use and property - construction</b>		
LU1	Areas of land leased for the purposes of construction would be reinstated at the end of the lease to at least equivalent standard in consultation with the landowner	All
LU2	Where required property adjustments have the potential to impact farm infrastructure (such as fencing or dams) or local access to properties. Consultation with affected property owners would be carried out prior to these works occurring, in order to determine reasonable, feasible and acceptable solutions with affected property owners	All
<b>Landscape and visual - construction</b>		
LV1	Opportunities for the retention and protection of existing street trees and trees within the construction sites would be identified during detailed construction planning	Off-airport
LV2	Existing trees to be retained would be protected prior to the commencement of construction in the vicinity of these trees in accordance with AS4970-2009 Protection of Trees on Development Sites	All
LV3	All structures (including potential acoustic sheds, site offices, workshop sheds and site hoarding) would be finished in a colour which aims to minimise their visual impact where appropriate. This finish is to be applied to all visible fixtures and fittings (such as exposed downpipes)	All

Ref	Mitigation measures	Applicable location(s)
<b>Landscape and visual - operation</b>		
LV4	The landscape design for the project would include consideration of appropriate species lists to minimise opportunities to attract wildlife at levels likely to present a hazard to aviation operations. The landscape design would have regard to relevant requirements and species lists under Western Sydney Airport's Wildlife Management Plan and other relevant guidelines, including the <i>National Airports Safeguarding Framework (Guideline C)</i> and <i>Recommended Practices No. 1 – Standards for Aerodrome Bird/Wildlife Control</i> (International Birdstrike Committee 2006)	All
LV5	Lighting at stations would be designed and operated in accordance with AS4282- 2019 Control of the obtrusive effects of outdoor lighting and the National Airports Safeguarding Framework Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports (where relevant)	All
LV6	Opportunities to provide vegetation screening of the stabling and maintenance facility (from sensitive receivers such as Luddenham Road and the surrounding rural areas within the viewshed) would be investigated during design development	Stabling and maintenance facility
LV7	Landscape screening would be provided along the corridor including restoring vegetation along the creeks to contain local views, in accordance with the Sydney Metro – Western Sydney Airport Design Guidelines, to minimise adverse visual impacts where feasible	All
LV8	Corridor services, including the combined services route would be designed to reduce visual clutter and minimise visual impact ensuring these structures have a low profile and do not obstruct views across the corridor	All
LV9	Proposed engineering batters and water management measures would be designed to integrate with the existing landforms and natural features	All
<b>Social and economic - construction</b>		
SE1	Consultation with the local community and project stakeholders would be undertaken to: <ul style="list-style-type: none"> <li>identify and deliver opportunities for facilitating local creative and cultural activities in appropriate project locations</li> <li>identify and deliver initiatives and opportunities to provide a positive contribution to the potentially affected community and affected locations such as temporary public art and targeted community events and programs</li> </ul>	Off-airport
SE2	Consultation with Penrith City Council and Transport for NSW would be undertaken to identify opportunities for alternative commuter car parking around St Marys if the planned expansion of the multi-level commuter car park does not proceed	St Marys construction site
SE3	Where partial property acquisition has been identified, undertake property liaison and consultation activities to minimise disruption to property owners and activities on impacted sites	Off-airport



Ref	Mitigation measures	Applicable location(s)
<b>Air quality - construction</b>		
AQ1	<p>The Air Quality Management Plan for the project would incorporate the following best-practice odour management measures would be implemented during relevant construction works:</p> <ul style="list-style-type: none"> <li>the extent of opened and disturbed contaminated soil at any given time would be minimised</li> <li>temporary coverings or odour suppressing agents would be applied to excavated areas where appropriate</li> <li>regular odour monitoring would be conducted during excavation to verify that no offensive odours are being generated</li> </ul>	All
AQ2	Where acoustic sheds are proposed these would be designed and managed to prevent/minimise the escape of dust emissions	All
AQ3	Air quality monitoring, consistent with the Western Sydney Airport, Air Quality Construction Environmental Management Plan would be carried out during construction to ensure that works meet the requirements under Schedule 1 of the Airports (Environment Protection) Regulations 1997	On-airport
<b>Hazard and risk - construction</b>		
HR1	All hazardous substances that may be required for construction would be stored and managed in accordance with the <i>Storage and Handling of Dangerous Goods Code of Practice</i> (WorkCover NSW, 2005), the <i>Hazardous and Offensive Development Application Guidelines: Applying SEPP 33</i> (Department of Planning, Industry and Environment, 2011) the <i>Work Health and Safety Act 2011</i> (Commonwealth and NSW) and the requirements of the <i>Environmentally Hazardous Chemicals Act 1985</i> (NSW)	All
HR2	A Bushfire Management Plan would be prepared and implemented to manage current bushfire risk and identify response actions during construction of the project. The Plan would be prepared in consultation with the NSW Rural Fire Service and Western Sydney Airport. For project areas within Western Sydney International the Plan would be prepared having regard to the existing <i>Western Sydney Airport Site at Badgerys Creek Bushfire Risk Management Plan</i> (Western Sydney Airport Corporation, 2019)	All
HR3	A hazardous materials analysis would be carried out prior to stripping and demolition of structures and buildings which are suspected of containing hazardous materials (particularly asbestos). Hazardous materials and special waste (such as asbestos) would be removed and disposed of in accordance with the relevant legislation, codes of practice and Australian Standards (including the <i>Work Health and Safety and Regulation 2011</i> (NSW))	All
HR4	Construction planning and approaches to minimise risks of damage or rupture of the Warragamba to Prospect Water Supply Pipelines would be developed in consultation with WaterNSW, and in accordance with the <i>Guidelines for Development Adjacent to the Upper Canal and Warragamba Pipelines</i>	Off-airport

Ref	Mitigation measures	Applicable location(s)
<b>Hazard and risk - operation</b>		
HR5	All hazardous substances that may be required for operation would be stored and managed in accordance with the <i>Storage and Handling of Dangerous Goods Code of Practice</i> (WorkCover NSW, 2005), the <i>Hazardous and Offensive Development Application Guidelines: Applying SEPP 33</i> (Department of Planning, Industry and Environment, 2011), the <i>Work Health and Safety Act 2011</i> (Commonwealth and NSW) and the requirements of the <i>Environmentally Hazardous Chemicals Act 1985</i> (NSW)	All
HR6	A Bushfire Management Plan would be prepared and implemented to manage current bushfire risk and identify response actions during operation of the project. The Plan would be prepared in consultation with the NSW Rural Fire Service and Western Sydney Airport. For project areas within Western Sydney International the Plan would be prepared having regard to the existing <i>Western Sydney Airport Site at Badgerys Creek Bushfire Risk Management Plan</i> (Western Sydney Airport Corporation, 2019)	All
HR7	The design of the project would aim to minimise risks of damage or rupture of the Warragamba to Prospect Water Supply Pipelines in consultation with WaterNSW, and in accordance with the <i>Guidelines for Development Adjacent to the Upper Canal and Warragamba Pipelines</i>	Off-airport
HR8	The project would be designed to avoid pilot distraction and minimise the risk of headlight glare from metro trains where on surface rail alignment. This would include providing glare screens in those locations where the project creates an unacceptable risk of pilot distraction	All
<b>Cumulative impacts - construction</b>		
CL1	<p>A Cumulative Construction Impacts Management Plan would be developed and would detail co-ordination and consultation requirements with the following stakeholders (as relevant) to manage the interface of projects under construction at the same time:</p> <ul style="list-style-type: none"> <li>• Western Sydney Airport</li> <li>• Transport for NSW</li> <li>• Western Parkland City Authority</li> <li>• Sydney Water</li> <li>• Emergency service providers</li> <li>• Utility providers</li> </ul> <p>Co-ordination and consultation requirements with these stakeholders would be detailed in the plan to include:</p> <ul style="list-style-type: none"> <li>• provision of regular updates to the detailed construction program, construction sites and haul routes</li> <li>• identification of key interfaces with other construction projects</li> <li>• development of mitigation strategies to manage cumulative impacts associated with these interfaces</li> </ul>	All

## 27.5 Summary of impacts that have not been avoided

Chapter 26 (Environmental risk analysis) considers the environmental risks and impacts of the project, including the residual risk that remains following consideration of the project-specific performance outcomes and mitigation measures. The following impacts have been identified as having a high residual risk:

- temporary impacts to roads, parking, pedestrian and cycling access or worsening of traffic performance network due to construction vehicles, road closures or lane closures
- temporary localised airborne noise impacts to sensitive receivers from construction works during and outside of standard construction hours
- impacts (including clearing) on endangered populations, threatened species and threatened ecological communities including riparian and aquatic habitats during construction
- land use and property impacts associated with acquisition or temporary leasing of properties
- social and economic impacts associated with property acquisition
- cumulative impacts from the construction of multiple projects (including the construction of Western Sydney International and future M12 Motorway), including construction fatigue.

It is expected that these impacts would be subject to further investigation to identify additional mitigation measures or further on-site management during construction and operation.

## 27.6 Project justification

### 27.6.1 Addressing the need

Sydney Metro – Western Sydney Airport would be a city-shaping mass transit investment that would unlock and accelerate delivery of the vision for a new Western Parkland City, centred on the economic anchors of the Aerotropolis and Western Sydney International. It would provide an essential transport link to the existing Sydney Trains suburban rail network, and support high-amenity centres, precincts and recreation areas. These factors all work as major attractors for housing and jobs growth across the Western Parkland City.

The project is a significant initiative outlined in various State, regional and local policies and plans such as the Western Sydney City Deal and Western Sydney Aerotropolis Plan. It would provide a mass transit link to connect a range of identified initiatives and opportunities, including delivering on the shared objective of connecting rail to the Aerotropolis and Western Sydney International when the airport opens for passenger services. The project is needed to:

- service a growing population in the Western Parkland City
- provide rail access to Western Sydney International and the Aerotropolis
- connect with the existing Sydney Trains suburban rail network at St Marys, providing a link to the Central River and Eastern Harbour cities
- open access to jobs and increased potential for jobs growth in the Western Economic Corridor (including the Aerotropolis and Western Sydney International) and in the Greater Penrith to Eastern Creek Growth Investigation Area
- facilitate the movement of workers and airline passengers westwards, helping to rebalance demand and supply across Greater Sydney
- support and shape the sustainable growth of the Western Parkland City by optimising land use around station precincts
- create opportunities for precinct planning that would improve liveability in and around station precincts
- support access to urban renewal and new land release areas including the Greater Penrith to Eastern Creek Growth Investigation Area and the Western Sydney Aerotropolis precincts.

### 27.6.2 Biophysical, economic and social considerations

Comprehensive investigations have been carried out in the preparation of this Environmental Impact Statement to assess the biophysical, economic and social impacts. The key potential impacts that cannot be avoided are summarised in Section 27.3.2. As described in Section 27.4 and Chapter 25 (Environmental mitigation and management), the project would incorporate environmental management, performance outcomes and design features so that any unavoidable potential impacts are managed and mitigated as far as feasible and reasonable and to an acceptable level.

Biophysical, economic and social considerations have also been assessed in the context of the principles of ecologically sustainable development. The EP&A Act adopts the definition of ecologically sustainable development contained in the *Protection of the Environment Administration Act 1991* (NSW). An assessment of the biophysical, economic and social impacts of the project in the context of the principles of ecologically sustainable development is provided in Section 27.6.3.

### 27.6.3 Principles of ecologically sustainable development

#### Precautionary principle

The environmental risk analysis documented in Chapter 26 (Environmental risk analysis) addresses the potential impacts of the project. That analysis, together with the detailed assessment carried out in preparing this Environmental Impact Statement indicates that there would be no threat of serious or irreversible damage to the environment.

In addition, the lack of full scientific certainty has not been used as a reason for postponing measures to prevent environmental degradation. As detailed in each impact assessment chapter, mitigation measures have been proposed to manage identified risks/threats of environmental damage.

The assessments carried out are consistent with accepted scientific and assessment methodologies and have considered relevant statutory and agency requirements. The assessments have applied a conservative approach with regard to proposed construction and operational arrangements, and the modelling used has been carried out in collaboration with key stakeholders and relevant statutory and agency requirements.

#### Intergenerational equity

The objectives of the project are essentially around connecting the Western Parkland City and ensuring an efficient and reliable public transport network to connect to Western Sydney International. This would benefit current and future generations. Once operational, the project would leave a positive legacy for future generations. It would provide long term benefits by providing a new transport linkage to the Western Parkland City and connection to Western Sydney International.

In addition to the broader Sydney transport operational benefits, the 'door-to-door' experience provided by the project could also result in long-term health benefits with the creation of safer and more appealing conditions for pedestrians, cyclists and other transit users. These benefits would also flow through to future generations.

The project would result in a greater demand on electricity however operational electricity use would be fully offset. Significant changes to carbon and energy policy (and legislation) are currently occurring in Australia which aim to shift electricity generation from coal fired to renewable sources. As more electricity is generated from renewable sources, the climate change benefits of using electric rail would be improved. A range of measures to mitigate greenhouse gas emissions have been developed and would be implemented.

#### Conservation of biological diversity and ecological integrity

Conservation of biological diversity and ecological integrity has been considered throughout the project development and design stages. The construction footprint has been developed to avoid or minimise impact to areas of high ecological value. Detailed assessments have been carried out to identify flora and fauna impacts and a range of mitigation measures identified for implementation. Impacts on biological diversity and ecological integrity have been assessed as moderate.

### **Improved valuation and pricing of environmental resources**

Economic appraisal of the project draws on a number of established methodologies which provide for the valuation of externalities, including environmental externalities, and their inclusion in the appraisal process. Environmental parameters which can be valued include air pollution, greenhouse gas emissions, noise pollution, water run-off, nature and landscape and urban separation. Valuations typically adopt broad average values.

The value placed on the environment was inherent in the development of the design. In addition, the costs associated with the planning and design of measures to avoid/minimise adverse environmental impacts and the costs to implement them have been built into the overall project costs. Ongoing design development together with specific issue-based management plans would represent further commitment to the recognition of the value of protecting environmental resources.