

28. Synthesis of the Environmental Impact Statement

This chapter provides a synthesis of the findings of the Environmental Impact Statement. It addresses the Secretary's environmental assessment requirements listed in Table 28.1.

Table 28.1 Secretary's environmental assessment requirements – synthesis

Ref	Secretary's environmental assessment requirements - synthesis	Where addressed
2.1	(q) a chapter that synthesises the environmental impact assessment and provides: <ul style="list-style-type: none"> a succinct but full description of the project for which approval is sought; 	Section 28.1
	<ul style="list-style-type: none"> a description of uncertainties that still exist around design, construction methodologies and/or operational methodologies and how these will be resolved in the next stages of the project; 	Section 28.2 and Table 28.2
	<ul style="list-style-type: none"> a compilation of the impacts of the project that have not been avoided; 	Section 28.3
	<ul style="list-style-type: none"> a compilation of the proposed measures associated with each impact to avoid or minimise (through design refinements or ongoing management during construction and operation) or offset these impacts; 	Sections 28.4 and 28.5
	<ul style="list-style-type: none"> a compilation of the outcome(s) the proponent will achieve; and 	Section 28.6
	<ul style="list-style-type: none"> the reasons justifying carrying out the project as proposed, having regard to the biophysical, economic and social considerations, including ecologically sustainable development and cumulative impacts. 	Section 28.7

28.1 Description of the project for which approval is sought

This Environmental Impact Statement considers the potential impacts of constructing the Sydenham to Bankstown upgrade, and operating it as part of Sydney Metro City & Southwest. It has been prepared to support Transport for NSW's application for approval of the project as critical State significant infrastructure, in accordance with the requirements of Part 5.1 of the EP&A Act. The Environmental Impact Statement addresses the environmental assessment requirements of the Secretary of the Department of Planning and Environment, dated 23 March 2017.

28.1.1 Project features

The project involves upgrading 10 existing stations west of Sydenham (Marrickville to Bankstown inclusive), and a 13 kilometre long section of the Sydney Trains T3 Bankstown Line, between west of Sydenham Station and west of Bankstown Station, to improve accessibility for customers and meet the standards required for metro operations. The project would enable Sydney Metro to operate beyond Sydenham, to Bankstown.

A key element of the project is upgrading stations along the corridor from Marrickville to Bankstown, to allow better access for more people, by providing new concourses, level platforms, and lifts at all stations. These upgrades aim to provide a better, more convenient and safer experience for public transport customers by delivering:

- stations that are accessible to people with a disability or limited mobility, the elderly, people with prams, and people travelling with luggage

- upgraded station buildings and facilities for all transport modes that meet the needs of a growing population
- interchanges that support an integrated transport network and allow seamless transfers between different modes for all customers.

The key features of the project are listed below.

Works to upgrade access at stations

The project includes upgrading the 10 stations between Marrickville and Bankstown as required, to meet legislative requirements for accessible public transport, including the requirements of the *Disability Discrimination Act 1992* and the *Disability Standard for Accessible Public Transport 2002*. The proposed works include:

- works to platforms to address accessibility issues, including levelling and straightening platforms
- new station concourse and station entrance locations, including:
 - new stairs and ramps
 - new or relocated lifts
- provision of additional station facilities as required, including signage and canopies.

Works would also be undertaken in the areas around the stations to better integrate with other modes of transport, improve travel paths, and meet statutory accessibility requirements. This would include provision of pedestrian, cyclist, and other transport interchange facilities; as well as works to the public domain, including landscaping.

Works to convert stations and the rail line to metro standards

Station works

In addition to the station upgrades to improve accessibility, works to meet the standards required for metro services would be carried out, including:

- installation of platform screen doors
- provision of operational facilities, such as station services buildings.

Track and rail system facility works

Upgrading the track and rail systems to enable operation of metro services would include:

- track works where required along the rail corridor, including upgrading tracks and adjusting alignments, between west of Sydenham Station and west of Bankstown Station
- new turn back facilities and track crossovers
- installing Sydney Metro rail systems and adjusting existing Sydney Trains rail systems
- overhead wiring adjustments.

Other works

Other works proposed to support Sydney Metro operations include:

- upgrading existing bridges and underpasses across the rail corridor
- installation of security measures, including fencing
- installation of noise barriers where required
- modifications to corridor access gates and tracks

- augmenting the existing power supply, including new traction substations and provision of new feeder cables
- utility and rail system protection and relocation works
- drainage works to reduce flooding and manage stormwater.

Active transport corridor and future rail corridor development

The project would also provide for:

- sections of an active transport corridor located around the station areas, to facilitate walking and cycling connections to each station and between Marrickville and Bankstown
- enabling works to support future development at Campsie Station (future development would be subject to separate approvals).

Temporary works during construction

During construction, the project would involve:

- provision of temporary facilities to support construction, including construction compounds and work sites
- implementation of alternative transport arrangements for rail customers during possession periods and/or station closures, guided by the Temporary Transport Strategy.

Further information on the design features of the project is provided in Chapter 8.

28.1.2 Location

The project is located mainly within the existing rail corridor, from about 800 metres west of Sydenham Station in Marrickville, to about one kilometre west of Bankstown Station in Bankstown.

The location of the project is shown in Figure 1.3.

28.1.3 Construction

Construction of the project would commence once all necessary approvals are obtained (anticipated to be in 2018). Upgraded stations would be progressively delivered from 2019 until 2024, with the main station upgrade works estimated to take about two years for each station. During this period, works to upgrade other infrastructure, such as tracks, bridges, embankments and drainage, would also be undertaken.

The T3 Bankstown Line and freight tracks operated by ARTC (between Marrickville and west of Campsie) would remain operational for the majority of the construction period. However, to ensure the station and infrastructure upgrade works are completed as efficiently and safely as possible, and to accommodate works that cannot be undertaken when trains are operating, it would be necessary to undertake some work during rail possession periods, when trains are not operating. It is anticipated that these rail possession periods would comprise the routine weekend maintenance possessions scheduled by Sydney Trains (and ARTC), together with some longer possession periods during periods of reduced patronage such as school holidays.

A final, longer possession of about three to six months would also be required. This would involve full closure of the line to enable it to be converted to metro operations. This final possession period is to enable works that can only be completed once Sydney Trains services are not operating. It would include works such as the installation of new signalling, communication systems, and platform screen doors.

During each possession period, a temporary transport management plan would be implemented to provide alternative transport arrangements and ensure that customers can continue to reach their destinations.

Further information on how the project would be constructed is provided in Chapter 9.

28.1.4 Operation

The project would connect with the Chatswood to Sydenham project within the existing rail corridor, about 800 metres to the west of Sydenham Station.

The project would operate in conjunction with Sydney Metro Northwest and the Sydney Metro City & Southwest Chatswood to Sydenham project, which, subject to the modification described in Section 1.1, is proposed to extend from Chatswood Station to Sydenham Station.

Sydney Metro Northwest will be operational between Cudgegong Road and Chatswood stations by 2019. Sydney Metro City & Southwest would be fully operational by 2024, with the opportunity of operation commencing in two phases. Initially, Sydney Metro Northwest services would be extended by the City & Southwest project, and would operate from Chatswood Station to Sydenham Station. Some months later, metro operations would extend from Sydenham Station to Bankstown Station, with both phases planned to be completed before the end of 2024. The opportunity for phased opening of the project would enable metro trains to operate from Cudgegong Road Station to Sydenham Station prior to the final conversion of the T3 Bankstown Line to metro operations.

Once the project is operational, Sydney Trains services would no longer operate between Sydenham and Bankstown stations. Metro trains would run between Sydenham and Bankstown stations in each direction, at least every four minutes in peak periods, with at least 15 trains per hour. Customers would be able to interchange with Sydney Trains services at Sydenham and Bankstown stations. Sydney Trains services to Liverpool and Lidcombe stations from Bankstown Station would also not be affected.

Further information on how the project would operate is provided in Section 8.3.

28.1.5 Project objectives

The primary objectives of the project are to:

- improve the quality of the transport experience
- provide a system that is able to satisfy long-term demand
- improve the resilience of the transport network

Secondary objectives are to:

- grow public transport patronage and mode share
- support the productivity of the Global Economic Corridor
- serve and stimulate urban development
- improve the efficiency and cost effectiveness of the public transport system
- implement a feasible solution recognising impacts, constraints and delivery risks.

The project also aims to

- deliver accessible, modern, secure and integrated transport infrastructure
- contribute to the accessibility and connectivity of existing and future communities.

28.2 Project uncertainties and approach to design refinements

28.2.1 Project uncertainties

Given the complexity of delivering the project, the design presented in this Environmental Impact Statement is indicative. The design serves to:

- confirm that the proposed performance and technical requirements can be achieved
- validates the feasibility and methodology of the required construction
- identifies key risks/constraints and environmental assessment issues.

There remain some uncertainties relating to technical requirements and how the project would be constructed. These would be resolved as the design progresses. A summary of the uncertainties that have the potential to impact on the environment, and how these would be resolved, is provided in Table 28.2.

Table 28.2 Project uncertainties

Category of impact	Key uncertainty	How uncertainties will be resolved
Transport, traffic and access	Possession strategy	A number of possession options are being considered for use for construction. The preferred option will be identified taking into consideration the final design, and construction planning undertaken by the construction contractor.
	Temporary transport arrangements - rail replacement services during construction, including: <ul style="list-style-type: none"> • final service provision and arrangements • services west of Bankstown • infrastructure required • rail network changes for Circle Line stations and other network changes 	Transport for NSW will work to ensure disruptions to customers are minimised. In accordance with the Temporary Transport Strategy, temporary transport management plans will be implemented during possessions to cater for displaced train passengers between Sydenham and Bankstown, and stations west of Bankstown where services are impacted. Development of the plans have commenced and will continue during detailed design. Further information is provided in Appendix G.
	Program for bridge closures	Transport for NSW will work to ensure disruptions to road operations and users are minimised. Detailed design and construction planning will determine a program for the road network configurations required to undertake bridge works. This will include consideration of interfaces with the Temporary Transport Strategy and other construction traffic movements.
Noise	Final noise mitigation requirements	Further noise modelling will be undertaken during detailed design to confirm the receivers that are eligible for mitigation. Feasible and reasonable mitigation measures will be considered for each of the receivers during detailed design.
Hydrology and flooding	Flood management	Additional flood modelling will be undertaken for the area west of Marrickville Station during detailed design. This will include modifications to the design where required and practicable, to confirm and where possible reduce identified issues.
Across a number of potential impact areas	Compounds and work sites – location, layout and facilities	The final location and layout of compounds and work sites will be confirmed based on the detailed design and final construction methodology, taking into account the criteria and requirements provided in Section 9.8.

Category of impact	Key uncertainty	How uncertainties will be resolved
	Utilities – impacts to utilities to be defined in detail	Utility investigations are ongoing and will be completed during detailed design, to validate current assessments, and confirm relocation/protection requirements. To minimise potential impacts to utilities and the community, utilities would be managed in accordance with the Utilities Management Framework, provided in Appendix I.

28.2.2 Approach to design refinements

The design as described in the Environmental Impact Statement would be subject to ongoing refinements during the detailed design phase. Refinements may be made to:

- avoid services that present significant construction difficulties in terms of logistics, time and/or cost
- reduce the construction timeframe
- avoid areas of environmental sensitivity identified following approval
- reduce impacts on the community
- improve operation without increasing the potential environmental impacts.

Such refinements may include, for example:

- minor changes to the location of compounds, work sites, and construction site accesses
- minor changes to the location of key infrastructure, refinement or reorientation of site boundaries
- minor changes the features of key project components
- utility relocations outside the existing project area
- additional infrastructure to support the implementation of the Temporary Transport Strategy.

For design refinements, a screening assessment would be undertaken to consider whether the refinement would:

- result in any of the conditions of approval not being met
- be consistent with the objectives and operation of the project as described in the Environmental Impact Statement
- result in a significant change to the approved project
- result in any potential environmental or social impacts of a greater scale or impact on previously unaffected receivers than that considered by the Environmental Impact Statement.

A refinement that does not meet these criteria would be considered a design modification. Approval would be sought from the Minister for Planning for any such modifications in accordance with the requirements of Part 5.1 of the EP&A Act.

28.3 Compilation of impacts

28.3.1 Impacts that have not been avoided

Part C of the Environmental Impact Statement provides an assessment of the potential impacts during construction and operation. The key potential adverse impacts requiring mitigation and

management are summarised in Table 28.3 and Table 28.4. Further information on these impacts is provided in Chapters 10 to 27. The operational benefits are summarised in Section 28.7.2.

Impacts would be mitigated by implementing the environmental management procedures and plans described in Section 28.4, and the mitigation measures compiled in Table 28.5.

Table 28.3 Summary of key potential construction impacts

Issue	Key potential construction impacts
Traffic, transport and access	<ul style="list-style-type: none"> • Increase in vehicle movements on the local and regional road network due to construction traffic, resulting in increased congestion and delays. • Local traffic disruptions and short-term access restrictions and detours for road users during station and bridge works. • Access restrictions for pedestrians and cyclists within and surrounding the stations during station works. • A number of on and off-street (including commuter) parking spaces would be unavailable to the general public for the duration of construction at each station, with the main potential impacts at Hurlstone Park, Belmore, Lakemba, Punchbowl, and Bankstown stations. • Additional temporary impacts to on and off-street parking are also predicted during possession periods, with the main potential for impacts during these periods at Dulwich Hill, Canterbury, Campsie, Belmore, Lakemba, and Punchbowl stations. • The establishment of temporary bus layovers and bus stops near stations for the operation of rail replacement buses would impact some on-street and off-street parking spaces, with the main potential impacts at Campsie, Lakemba, Wiley Park, and Bankstown stations. As a result of the operation of rail replacement buses, some impacts to parking may also be experienced at other stations, including Sydenham, Birrong, Sefton, and Lidcombe stations. • Implementation of rail replacement buses during possessions, guided by the Temporary Transport Strategy, would add to road traffic and congestion, and change the amenity of public transport trips, with corresponding changes to travel times and mode choice. • Impacts to rail customers, as a result of changes to rail timetables on the T3 Bankstown Line and on the connecting lines during possession periods.
Noise and vibration	<ul style="list-style-type: none"> • Construction noise levels were predicted to exceed the relevant criteria at most sites for the majority of construction scenarios modelled, with a number of exceedances at residential receivers being greater than 20 decibels above the relevant criteria during the day and night. These predictions identify noise levels at the most exposed receiver, which may not be reached, or only infrequently reached, during the construction period. • There is also the potential for sleep disturbance impacts during the night. • Construction traffic movements, including both heavy vehicles and rail replacement buses, may result in road traffic noise levels above the relevant criteria. • In the event that large hydraulic rock breakers are used at the edge of the work site closest to the receiver, a large number of buildings adjacent to the project area would be located within the recommended offset distance for potential amenity and cosmetic damage resulting from vibration. • In practice, this may not be necessary and vibration impacts would be intermittent over the duration of construction. • Given the proximity of construction to a number of heritage items, particularly at stations, there is the potential for vibration impacts if appropriate mitigation measures are not implemented.
Non-Aboriginal heritage	<ul style="list-style-type: none"> • The project would result in the removal of one or more heritage elements at each station, which would directly impact on heritage listed items as follows:

Issue	Key potential construction impacts
	<ul style="list-style-type: none"> – a major impact to the State Heritage Register listed Marrickville Railway Station Group, mainly as a result of upgrading the Illawarra Road overbridge – moderate impacts to the State Heritage Register listed Canterbury and Belmore railway station groups – major impacts to four locally listed items (Dulwich Hill, Hurlstone Park, Wiley Park, and Punchbowl railway station groups) – moderate impacts to three locally listed heritage items (Campsie, Lakemba and Bankstown railway station groups) – a moderate impact to the locally listed Canterbury (Cooks River) Underbridge, as a result of the proposed removal and replacement of the parapets during bridge works. • Major visual impact to one item listed on the State heritage Register (Marrickville Station). • Moderate visual impacts to two items listed on the State Heritage Register (the Canterbury and Belmore railway station groups). • Major visual impacts to four items with a local heritage listing (the Dulwich Hill, Hurlstone Park, Wiley Park, and Punchbowl railway station groups). • Potential for impacts to significant archaeological remains at Marrickville, Canterbury, Lakemba, and Belmore stations. • Two locally listed items (Wiley Park and Punchbowl railway station groups) would no longer meet the threshold for local significance and would likely be de-listed.
Aboriginal heritage	<ul style="list-style-type: none"> • Construction may disturb a potential Aboriginal archaeological deposit of moderate significance and low to moderate potential for intact archaeological deposits (S2B PAD 02), located adjacent to Punchbowl Station.
Land use and property	<ul style="list-style-type: none"> • Acquisition of three privately owned lots under one ownership near Marrickville Station. • Partial acquisition of land from three publicly owned lots near Marrickville and Punchbowl stations, including a small area within Warren Reserve, adjacent to Punchbowl Station. • Some areas of land would need to be temporarily leased or occupied to locate some of the proposed compounds and work sites. • During construction, the use of land within the project area would change from its existing use (mainly transport) to use as a partial and temporary construction site. • Recreation use of the area of McNeilly Park in Marrickville where the underground detention basin is proposed would be temporarily restricted during construction of the basin.
Socio-economics	<ul style="list-style-type: none"> • Changes in existing access arrangements and connectivity across and within the station areas. • Possessions and/or station closures, and the associated alternative public transport arrangements, have the potential to impact the community, including as a result of travel time delays, and a reduced likelihood to use public transport. • Impacts on the amenity of the local community, including as a result of an increase in noise levels, traffic movements and congestion, dust, and changes in visual outlook. • Impacts on community infrastructure located near the project area, mainly as a result of changes to amenity and access arrangements.
Business	<ul style="list-style-type: none"> • Cessation of a total of 37 existing commercial leases at seven stations, including one lease at each of Dulwich Hill, Belmore, Lakemba, Wiley Park, Canterbury, and Punchbowl stations, and 31 leases at buildings surrounding Campsie Station. • Slight temporary potential for impacts to property values and rental return.

Issue	Key potential construction impacts
	<ul style="list-style-type: none"> Station and track closures would have the potential to affect businesses, mainly those located close to the stations that have a higher reliance on passing trade, particularly during longer duration possessions. Temporary changes to the road network could result in inefficiencies, potentially reducing revenue and providing a disincentive for visiting some local centres near stations. Changes to parking arrangements and the temporary removal of some existing parking spaces has the potential to affect deliveries and convenience for business employees and customers, particularly for areas where parking is already in short supply, businesses close to stations, and/or retail or service-oriented businesses that require quick and efficient access for customers. Impacts on amenity for businesses, including as a result of an increase in noise levels, traffic movements and congestion, dust, and changes in visual outlook.
Landscape character and visual impact	<ul style="list-style-type: none"> Visual impacts during construction as a result of the presence of construction works, plant, and disturbance. Loss of mature street trees providing screening and amenity, particularly in the vicinity of stations.
Hydrology, flooding and water quality	<ul style="list-style-type: none"> Potential for inundation of construction areas during flood events particularly in areas where flooding is currently problematic (such as high flood risk areas at Marrickville Station, Canterbury, and Campsie). Changes in surface water flows as a result of construction activities. Impacts on downstream water quality if management measures are not implemented, monitored, and maintained.
Biodiversity	<ul style="list-style-type: none"> It was assumed for the purpose of the biodiversity assessment that construction would require removal of all vegetation located along the rail corridor in the project area. This would involve removal of about 29.8 hectares of vegetation, the majority of which comprises exotic plants (about 21.5 hectares) or planted, often non-indigenous, native species on fill material (about 7.3 hectares). Removing all vegetation in the rail corridor would impact about one hectare of native vegetation, including about 0.6 hectares of threatened ecological communities listed under the TSC Act. Removing all vegetation in the rail corridor would also impact some nesting and foraging habitat, including about 7.9 hectares of foraging habitat for the threatened Grey-headed Flying-fox, Eastern Bentwing Bat, and other threatened fauna species with known or potential habitat in the study area.

Table 28.4 Summary of key potential operation impacts

Issue	Key potential operation impacts
Traffic, transport and access	<ul style="list-style-type: none"> Kerbside parking arrangements around some station areas would be reconfigured to support access to the stations. This would include reallocation of kerbside space, mainly to provide/upgrade accessible parking, and areas for kiss and ride, and taxis. This reallocation would result in a loss of some on-street parking spaces in the immediate vicinity all stations. Creation of new station forecourts and active transport facilities would impact off-street parking areas adjacent to some stations, including a loss of about 58 off-street spaces at Belmore and Bankstown stations, and about 20 spaces at Campsie. All these spaces are adjacent to the stations and/or rail corridor, and are not designated commuter parking.
Noise and vibration	<ul style="list-style-type: none"> Noise levels at a number of residential receivers adjacent to the rail corridor have the potential exceed the <i>Rail Infrastructure Noise Guideline</i> criteria, and are therefore eligible for further consideration of noise mitigation (i.e. noise barriers).

Issue	Key potential operation impacts
Land use and property	<ul style="list-style-type: none"> The use of the portion of Warren Reserve to be acquired near Punchbowl Station (about 15 per cent of the overall reserve, located adjacent the existing rail corridor) would change from recreation to rail infrastructure. The use of NSW Government (RailCorp) owned land at Charles Street, Canterbury would change from parking to rail infrastructure.
Business	<ul style="list-style-type: none"> Loss of parking described above may impact the availability of parking for some customers of local businesses in the vicinity of stations.
Landscape character and visual amenity	<ul style="list-style-type: none"> Introduction of new structures in the visual landscape, including upgraded stations (with elevated station concourses and buildings).

28.4 Approach to environmental management

28.4.1 Environmental management during construction

The approach to environmental management during construction is shown on Figure 28.1 and involves:

- Project design – measures incorporated in the design and construction planning to avoid and minimise impacts. Further information is provided in Chapters 7 (Design development and place making) and 9 (Project description – construction).
- Mitigation measures – identified as an outcome of the environment impact assessment detailed in Chapters 10 to 27, and consolidated in Table 28.5.
- Environmental performance outcomes – future construction planning would be considered against the environmental performance outcomes provided in Section 28.6.
- Implementation of the following project specific construction environmental management frameworks/strategies (described below):
 - Construction Environmental Management Framework
 - Construction Noise and Vibration Strategy
 - Temporary Transport Strategy
 - Utilities Management Framework.

Construction Environmental Management Framework

The Construction Environmental Management Framework, provided in Appendix D, details the approach to environmental management and monitoring during construction. The framework is a linking document between the planning approval documentation and the construction environmental management documentation (including the Construction Environmental Management Plan), which would be developed by the construction contractors.

The framework details the environmental, stakeholder, and community management systems and processes that would be applied during construction. Specifically, it details the requirements in relation to the Construction Environmental Management Plan, sub-plans, and other supporting documentation for each specific environmental aspect.

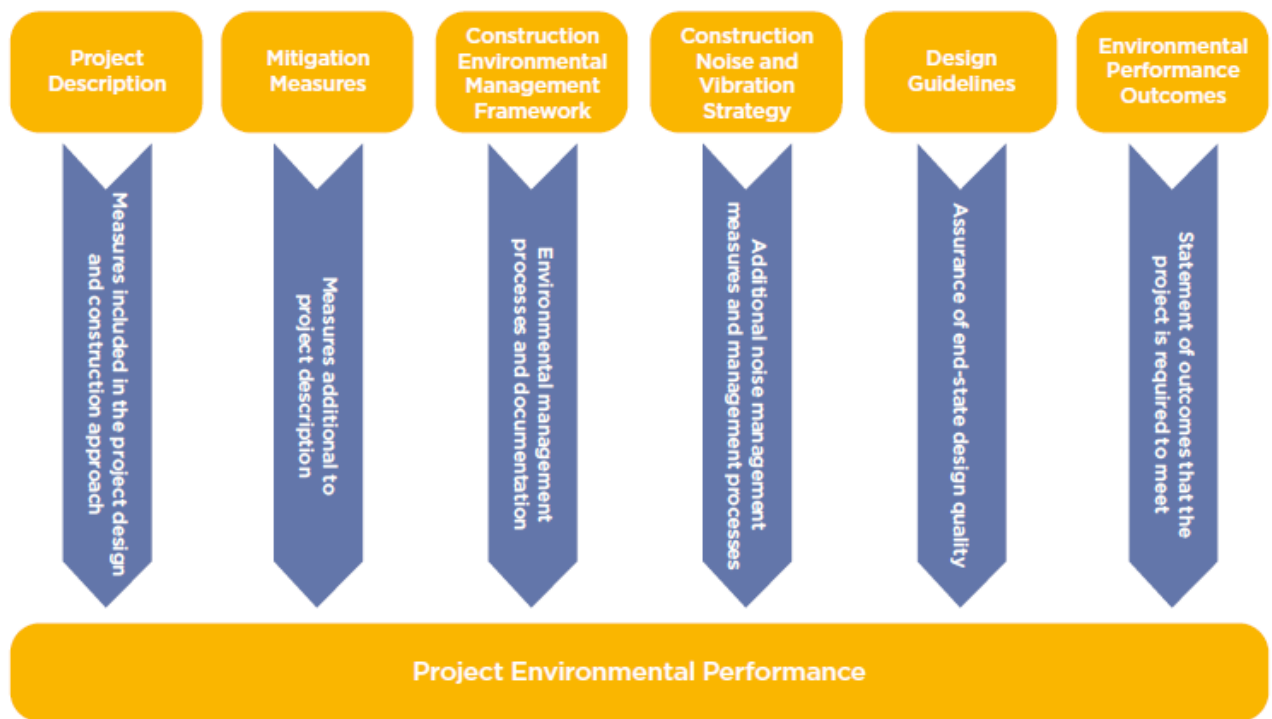


Figure 28.1 Approach to environmental mitigation and management during construction

Construction Noise and Vibration Strategy

The Construction Noise and Vibration Strategy (provided in Appendix E) defines how construction noise and vibration will be managed for the Sydney Metro City & Southwest project as a whole. The strategy provides guidance for managing construction noise and vibration impacts in accordance with the *Rail Infrastructure Noise Guideline*, to provide a consistent approach to management and mitigation across all Sydney Metro projects.

The strategy identifies the requirements and methodology to develop construction noise impact statements. These would be prepared prior to specific construction activities, based on a more detailed understanding of construction methods, including the size and type of construction equipment.

Temporary Transport Strategy

A Temporary Transport Strategy (provided in Appendix G) has been prepared to provide a guide to managing alternative public transport arrangements during construction, to minimise impacts to customers during station closures and possession periods. The strategy identifies:

- objectives for customers and bus services
- customer markets to be served by temporary transport management plans
- the process for developing temporary transport management plans to guide alternative transport arrangements, including stakeholder and community consultation
- options to maintain public transport connections to and from all affected rail stations
- impacts associated with temporary transport options and the level of assessment to be provided in temporary transport management plans
- temporary transport facilities and measures required to support the implementation of temporary transport management plans, ensuring provision of accessible services
- performance outcomes for temporary transport management plans.

Guided by the strategy, temporary transport management plans would be developed to manage, during station closures and possessions, the movement of customers who would usually use the T3 Bankstown Line. The plans would focus on what needs to happen during closures and possession periods to ensure customers have an acceptable means to travel by public transport.

Further information on the proposed approach to alternative transport arrangements, including the Temporary Transport Strategy and plans is provided in Section 9.11.

Utilities Management Framework

A Utilities Management Framework (provided in Appendix I) has been prepared, adopting a risk-based approach to avoiding and/or minimising impacts associated with the relocation and/or adjustment of public utilities affected by the project. The framework provides a consistent approach to the assessment and management of public utilities relocation/adjustment across all project activities.

28.4.2 Environmental management during operation

The approach to environmental management during operation involves:

- Project design – measures inherent in the design to avoid and minimise impacts. Further information on how the project design has been developed to minimise the potential for operational impacts is provided in Chapter 7.
- Mitigation measures – identified through the environment impact assessment in Chapters 10 to 27, and consolidated in Table 28.5.
- Environmental performance outcomes – future design development and any design changes would be considered against the environmental performance outcomes provided in Section 28.6.
- Sydenham to Bankstown Design guidelines (described below).
- Operational environmental management – the approach to environmental management during operation would be defined in the Operational Environmental Management Plan.

Sydenham to Bankstown Design Guidelines

The Sydenham to Bankstown Design Guidelines (provided in Appendix C) describes how Transport for NSW proposes to achieve a quality design for the project, which is integrated with the surrounding environment and town centres. The guidelines:

- guide the design development process
- support the development of healthy, cohesive and inclusive communities
- respond to the strategic directions and urban design strategies of the local councils
- establish the design standards, by guiding the design of the interface between stations and their surrounding locality, including:
 - stations
 - transport interchange facilities (bicycle facilities, bus stops, kiss and ride, taxi ranks and connections to existing rail and light rail infrastructure)
 - landscaping and other public domain elements
 - rail corridor works.

Operational Environmental Management Plan

Environmental performance during operation would be managed by the implementation of an Operational Environmental Management Plan. The plan would detail how the mitigation measures and performance outcomes would be implemented and achieved during operation, and specify the environmental management practices and procedures to be followed during operation. The plan would be prepared in consultation with relevant agencies and in accordance with the *Guideline for the Preparation of Environmental Management Plans* (Department of Infrastructure, Planning and Natural Resources, 2004). The plan would include, but not be limited to, the following:

- a description of activities to be undertaken during operation
- statutory and other obligations, including approvals, consultations and agreements required from authorities and other stakeholders
- overall environmental policies, guidelines and principles to be applied to operation
- a description of the roles and responsibilities, including relevant training and induction to ensure that employees are aware of their environmental and compliance obligations
- an environmental risk analysis to identify the key environmental performance issues associated with the operation phase
- details of how environmental performance would be managed and monitored.

28.5 Compilation of mitigation measures

Table 28.5 provides a compilation of the measures proposed to mitigate and manage the potential impacts of the project, as provided in the chapters in Part C of the Environmental Impact Statement. The measures described in the chapters and compiled in this table were developed based on the recommended measures in the technical papers, adapted as required to take into account the findings of all the assessments undertaken for the Environmental Impact Statement. The mitigation measures provided in the chapters and compiled in Table 28.5 also include additional measures, consistent with the commitments made by Transport for NSW for other Sydney Metro projects, including the Sydney Metro City & Southwest Chatswood to Sydenham project.

The mitigation measures compiled in Table 28.5, together with the approach to environmental management described in Section 28.4, provide Transport for NSW's commitments for the project. The mitigation measures may be revised in response to submissions raised during public exhibition and/or any design changes made following exhibition. The final list of mitigation measures would be provided in the submissions/preferred infrastructure report. If the project is approved, the conditions of approval, which would include reference to the final mitigation measures, would guide subsequent phases of the project. The project would be undertaken in accordance with the conditions of approval and the final list of mitigation measures.

The measures are broadly grouped according to the main stage of implementation. However, it is noted that the implementation of some measures may occur across a number of stages.

The location/s applicable to each mitigation measure are identified by using a unique identifier as follows:

- | | |
|-----------------------------|---------------------------|
| • All – Project as a whole | • CP – Campsie Station |
| • BW – Bridge works | • BE – Belmore Station |
| • AS – All stations | • LA – Lakemba Station |
| • MA – Marrickville Station | • WP – Wiley Park Station |
| • DU - Dulwich Hill Station | • PB – Punchbowl Station. |

- HP – Hurlstone Park Station
- CB – Canterbury Station
- BA – Bankstown Station
- SS – Substations.

Table 28.5 Compilation of project specific mitigation measures

ID	Impact	Mitigation measures	Relevant location(s)
Traffic, transport and access			
Design/pre-construction			
TC1	<i>Temporary transport arrangements</i>	<p>Guided by the Temporary Transport Strategy, detailed temporary transport management plan/s would be developed prior to construction to manage the movement of people along the T3 Bankstown Line during possession periods. The plans would be developed in consultation with key stakeholders (including the Sydney Coordination Office, Roads and Maritime Services, Sydney Trains, local councils, emergency services, and bus operators), and would address the requirements specified by the Temporary Transport Strategy. The development of each plan would consider, as a minimum:</p> <ul style="list-style-type: none"> • a review of the road network constraints along any proposed rail replacement bus route • further traffic analysis of key intersections used by rail replacement buses • potential impacts to local road networks affected by rail passengers diverting to cars to reach their destinations • the design of temporary facilities at bus stop locations in consultation with the relevant road authority • expected changes to parking demand at other stations, displacement of existing parking, and any upgrades that may be required. 	AS
TC2		Transport for NSW would consult with Roads and Maritime Services, the State Transit Authority, and bus operators, to identify opportunities to minimise impacts to bus layovers and existing bus stops during operation of rail replacement buses.	AS
TC3	<i>Impacts of bridge works</i>	<p>Detailed analysis of the network impacts of proposed bridge work would be undertaken, and management measures would be developed, in consultation with Roads and Maritime Services and the Sydney Coordination Office. Measures would include restricting work to some bridges during off peak and/or holiday periods, where practicable, including the following bridges as a minimum:</p> <ul style="list-style-type: none"> • Charlotte Avenue underbridge • Illawarra Road overbridge • Burwood Road overbridge • Haldon Street overbridge • King Georges Road overbridge • Stacey Street overbridge. 	BW

ID	Impact	Mitigation measures	Relevant location(s)
TC4		<p>The impacts on the surrounding road network of road diversions and lane closures resulting from bridge works across the rail corridor would be assessed in detail, to identify the suite of management measures to be implemented for each diversion/closure required. This would be undertaken in consultation with Roads and Maritime Services, the Sydney Coordination Office, the Inner West and Canterbury-Bankstown councils, emergency services, and relevant bus operators.</p> <p>Planning for partial or full bridge closures would consider bus rerouting and timetabling, with the intention of minimising impacts to bus customers and bus operators.</p>	BW
TC5	<i>Pedestrian access</i>	Work affecting the pedestrian underpass providing access to and from the Belmore Sports Ground would be timed, in consultation with the facility manager and owners, to ensure that suitable access is provided. This would include (if necessary) avoiding disruptions to access during events, such as game days at Belmore Oval. Local diversions would be put in place during periods of closure.	BE
TC6	<i>Parking impacts during construction</i>	Opportunities to reduce the loss of existing on and off street car parking (including the amount of spaces reduced and the time associated with this reduction) would be reviewed during detailed design and construction planning.	AS
TC7		Where parking spaces are lost or access is impeded, particularly for extended periods, alternative parking would be provided wherever feasible and reasonable. This would include consideration of other privately owned (or vacant) land within close proximity to affected stations.	AS
TO1	<i>Parking impacts during operation</i>	Further consideration of car parking management at stations would be undertaken in consultation with Roads and Maritime Services, the Sydney Coordination Office, and the Inner West and Canterbury-Bankstown councils, to minimise adverse impacts of operation on parking and other kerbside use in local streets.	AS
TC8	<i>Impacts of intersection performance</i>	<p>Further consideration of the need for intersection modifications would be undertaken, to improve intersection performance at locations most affected by the addition of construction heavy vehicles, rail replacement buses, and diverted traffic. This would be undertaken in consultation with Roads and Maritime Services, the Sydney Coordination Office, and the relevant road authority. The improvements considered would include:</p> <ul style="list-style-type: none"> • modification to the existing traffic signal phasing • lane priority changes • changing lane designations (line markings and signage) • kerbside changes (such as removing on street parking or implementing no standing zones at peak times to increase lane capacity) • physical geometric changes (such as minor kerb cut-backs to enable large vehicles to safely move through intersections) • restricting turning movements where traffic demand is low. 	All
TC9	<i>Changes to cyclist facilities during construction</i>	Where existing cycle facilities (e.g. bike parking) would be temporarily unavailable at a station, suitable replacement facilities would be provided while the facility is unavailable.	AS

ID	Impact	Mitigation measures	Relevant location(s)
Construction			
TC10	<i>Management of traffic, transport and access</i>	<p>A construction traffic management plan would be prepared and implemented prior to construction. The plan would be prepared in accordance with the Construction Environmental Management Framework, and would detail, as a minimum:</p> <ul style="list-style-type: none"> • how traffic would be managed when construction works are being carried out • the activities proposed and their impact on the road network and on road users • how these impacts would be addressed. <p>The plan would be prepared in consultation with the Traffic and Transport Liaison Group, and would be approved by the relevant authority before construction commences.</p>	All
TC11	<i>Changes to public transport services and alternative transport arrangements</i>	Modification of existing bus stops, or implementation of new stops and alterations to service patterns, would be carried out by Transport for NSW in consultation with the Sydney Coordination Office, Roads and Maritime Services, the Inner West and Canterbury-Bankstown councils, and bus operators.	AS
TC12		<p>Transport for NSW would undertake an extensive community awareness and information campaign before changes to public transport services are implemented. This would include a range of communication activities such as:</p> <ul style="list-style-type: none"> • information at stations • wayfinding signage • clearly marked bus stop locations • letter box drops • web based information and transport 'app' where changes to travel are found in a single place • information via 131 500 • advertising in local papers • email information bulletins. 	AS
TC13	<i>Impacts on intersection performance</i>	Intersection operation would be optimised, where reasonable and feasible, to improve intersection performance at the worst affected intersections along construction haulage routes and/or rail replacement bus routes. This may include modifying signal phase times or sequences at traffic signal controlled intersections.	Affected intersections
TC14	<i>Impacts on special events</i>	Consideration of special events would be undertaken as part of construction work programming. For special events that require specific traffic and pedestrian management, measures would be developed and implemented in consultation with Roads and Maritime Services, the Inner West and Canterbury-Bankstown councils, and the organisers of the event.	All
TC15	<i>Impacts of construction compounds and work sites</i>	Vehicle access to and from construction sites would be managed to ensure pedestrian, cyclist, and motorist safety. Depending on the location, this may require manual supervision, barrier placement, temporary traffic signals, modifications to existing traffic signals, or police assistance.	All

ID	Impact	Mitigation measures	Relevant location(s)
TC16	<i>Construction vehicles</i>	Construction vehicles (including contractor staff vehicles) would be managed to: <ul style="list-style-type: none"> • minimise parking or queuing on public roads • minimise use of residential streets to gain access to work sites or compounds • minimise vehicle movements near schools, particularly during school start and finish times. 	All
TC17	<i>Signage</i>	Directional signage and line marking would be used to direct and guide drivers, pedestrians, and other road users past construction compounds and work sites, and on the surrounding road network. This may be supplemented by variable message signs to advise drivers of potential delays, traffic diversions, speed restrictions, or alternate routes.	All
TC18	<i>Construction parking impacts</i>	Construction sites would be managed to minimise construction worker parking on surrounding streets. A worker car parking strategy would be developed in consultation with the relevant local council to identify measures to reduce the impact on the availability of on street and off street parking. The strategy would identify potential mitigation measures including alternative parking locations. The strategy would encourage contractor staff to: <ul style="list-style-type: none"> • use public transport • car share • park in a designated off site area and access construction sites via shuttle bus. 	All
TC19	<i>Traffic incidents</i>	In the event of a traffic related incident, co-ordination would be carried out with the Sydney Coordination Office and Transport Management Centre's Operations Manager.	All
TC20	<i>Changes to road, pedestrian and cyclist networks</i>	The community would be notified in advance of proposed road and pedestrian network changes through appropriate forms of community notification.	All
TC21	<i>Impacts on pedestrian or cyclist paths</i>	A condition survey would be undertaken to confirm changes to routes proposed to be used by pedestrians and/or cyclists are suitable (e.g. suitably paved and lit), with identified modification requirements discussed with the Inner West and/or Canterbury-Bankstown councils and implemented prior to use of the routes.	All
TC22	<i>Pedestrian, cyclist and motorist safety</i>	Pedestrian, cyclist, and motorist safety in the vicinity of the construction sites would be addressed during construction planning and development of the construction traffic management plan. Measures that may be implemented to assist in multi modal traffic management include: <ul style="list-style-type: none"> • Speed awareness signs in conjunction with variable message signs near construction sites to provide alerts to drivers. • A community engagement program to provide road safety education and awareness to road users about sharing the road safely with heavy vehicles. • Heavy vehicle training for drivers to understand route constraints, safety issues, and limiting the use of compression braking. • Safety technology and equipment installed on heavy vehicles to enhance vehicle visibility, eliminate vehicles' blind spots, and monitor vehicle location, speeding compliance, and driver behaviour. 	All

ID	Impact	Mitigation measures	Relevant location(s)
TC23	<i>Impacts to access</i>	Access for residents, businesses, and community infrastructure would be maintained. Where disruption to access cannot be avoided, consultation would be undertaken with the owners and occupants of affected properties, to confirm their access requirements and to discuss alternatives.	All
TC24		Access to stations and surrounding properties for emergency vehicles would be provided at all times. Emergency service providers (i.e. police and ambulance) would be consulted throughout construction to ensure they are aware of changes to access, including lane, bridge or road closures, and changes to station or rail corridor access.	All
TC25	<i>Co-ordination of cumulative traffic effects</i>	The potential cumulative effects of construction traffic from multiple construction sites within the project (including bridge works) would be further considered during development of the construction traffic management plan. Where there is potential for cumulative impacts across the project, these issues would be addressed with the assistance of the Traffic and Transport Liaison Group.	All
Operation			
TO2	<i>Walking</i>	Transport for NSW would work with the Inner West and Canterbury-Bankstown councils to identify and provide improvements and minimise adverse impacts to the surrounding pedestrian network.	AS
TO3	<i>Cycling</i>	Transport for NSW would work with the Inner West and Canterbury-Bankstown councils and other relevant stakeholders to enhance areas around stations for cyclists.	AS
TO4	<i>Bus</i>	Transport for NSW would work with the Sydney Co-ordination Office, Roads and Maritime Services, the Inner West and Canterbury-Bankstown councils, and bus operators to identify improvements to bus stops and services.	AS
TO5	Active transport corridor	Transport for NSW would work with the Department of Planning and Environment to support the development of an active transport corridor along the alignment, including walking and cycling infrastructure. Transport for NSW would deliver sections of the active transport corridor around stations.	All
TO6	<i>Commuter parking</i>	Transport for NSW would monitor the demand for additional commuter car parking spaces and consider opportunities for, and implications of, meeting this demand between Bankstown and Marrickville stations. Transport for NSW would consider provision for additional commuter car parking, subject to consideration of local station and town centre implications, including local traffic conditions.	AS
Noise and vibration			
Design/pre-construction			
NVC1	<i>Predicted construction noise impacts</i>	A construction noise and vibration review would be undertaken during detailed design. This would include noise modelling to confirm the results of modelling previously undertaken. Where changes in noise levels and exceedances are modelled, reasonable and feasible mitigation measures would be reviewed.	All

ID	Impact	Mitigation measures	Relevant location(s)
NVC2		<p>In accordance with the <i>Construction Noise and Vibration Strategy</i>, all employees, contractors and subcontractors would receive an environmental induction. The induction must at least include:</p> <ul style="list-style-type: none"> • relevant project specific and standard noise and vibration mitigation measures • relevant licence and approval conditions • permissible hours of work • any limitations on high noise generating activities • location of nearest sensitive receivers • designated loading/unloading areas and procedures • site opening/closing times (including deliveries). 	All
NVC3	<i>Predicted vibration impacts</i>	Where vibration levels are predicted to exceed the screening criteria, a more detailed assessment of the structure would be carried out to determine the appropriate vibration limits for that structure.	All
NVC4		For heritage items where screening vibration levels are predicted to be exceeded, the more detailed assessment would include condition assessment and specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.	Heritage items along the project area
NVO1	<i>Predicted operational noise impacts</i>	An operational noise and vibration review would be undertaken to guide the approach to identifying reasonable and feasible mitigation measures to incorporate in the detailed design. This would include noise modelling to confirm the results of modelling previously undertaken. Where changes in noise levels and exceedances are modelled, reasonable and feasible mitigation measures would be reviewed.	All
NVO2		The height and extent of noise barriers adjacent to the project would be confirmed during detailed design with the aim of not exceeding trigger levels from the <i>Rail Infrastructure Noise Guidelines</i> (EPA, 2013). At-property treatments would be offered either on their own or in combination with a noise barrier where there are exceedances residual exceedances of the noise trigger levels.	All
NVO3		Operational noise from substations would be controlled by inclusion of appropriate mitigation, such as shielding or enclosures, and specification of equipment selection, to comply with the <i>Industrial Noise Policy</i> (EPA, 2000).	All

ID	Impact	Mitigation measures	Relevant location(s)
Construction			
NVC5	Construction noise and vibration management	<p>The <i>Construction Noise and Vibration Strategy</i> would be implemented with the aim of achieving the noise management levels where feasible and reasonable. This may include the following example mitigation measures alone or in combination, where feasible and reasonable:</p> <ul style="list-style-type: none"> • The provision of noise barriers around each construction site. • The coincidence of noisy plant working simultaneously close together would be avoided. • Offset distances between noisy plant and sensitive receivers would be increased. • Residential grade mufflers would be fitted to all mobile plant. • Dampened rock hammers would be used. • Non-tonal reversing alarms would be fitted to all permanent mobile plant. • High noise generating activities would be scheduled for less sensitive periods considering the nearby receivers, where reasonable and feasible. • The layout of construction sites would consider opportunities to shield receivers from noise. • Stationary noise sources would be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained. • Loading and unloading of materials/deliveries is to occur as far as possible from noise sensitive receivers. • Select site access points and roads as far as possible away from noise sensitive receivers. • Dedicated loading/unloading areas to be shielded if close to noise sensitive receivers wherever feasible and reasonable. • Use quieter and less vibration emitting construction methods where feasible and reasonable. • The noise levels of plant and equipment must have operating Sound Power Levels compliant with the criteria in the <i>Construction Noise and Vibration Strategy</i>. • Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site. • Where feasible and reasonable, the offset distance between noisy plant items and nearby noise sensitive receivers would be as great as possible. • Where reasonable and feasible heavy vehicle movements would be limited to daytime and evening hours, with night-time movements avoided where possible. • Active community consultation and the maintenance of positive, cooperative relationships with schools, local residents and building owners and occupiers, through: <ul style="list-style-type: none"> – periodic notification or work activities and progress (eg regular letterbox drops, e-consult) – specific notification (letter-box drop) prior to especially noisy activities – comprehensive website information – project information and construction response telephone line – email distribution lists. 	All

ID	Impact	Mitigation measures	Relevant location(s)
NVC6		Ballast tamping and hydraulic breaking would not be undertaken during the night-time period (10pm to 7am). Other noise intensive construction activities such as platform demolition, earthworks and track works would generally be limited to day time and evening periods (between 7am and 10pm), unless technical constraints exist such as: <ul style="list-style-type: none"> works requiring a rail shutdown requirements of road authorities, emergency services or Sydney Coordination Office. 	All
NVC7		When working adjacent to schools, medical facilities and childcare centres, particularly noisy activities would be scheduled outside normal working hours, where reasonable and feasible.	All
NVC8		When working adjacent to churches and places of worship, particularly noisy activities would be scheduled outside services, where reasonable and feasible.	All
NVC9		Alternative accommodation may be offered to residents living in close proximity to construction works, where detailed design investigations confirm unreasonably high noise impacts over a prolonged period. Alternative accommodation arrangements will be offered and discussed with residents on a case-by-case basis.	All
NVC10		High noise and vibration generating activities including rock breaking, ballast tamping, demolition and ground and track earthworks may only be carried out in continuous blocks, not exceeding 3 hours each, with a minimum respite period of one hour between each block and these works.	All
NVC11		Ongoing noise monitoring during construction at sensitive receivers during critical periods (ie times when noise emissions are expected to be at their highest - eg piling and hammering) to identify and assist in managing high risk noise events.	All
NVC12	<i>Vibration monitoring</i>	Where vibration levels are predicted to exceed the screening criteria, attended vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure.	All
NVC13	<i>Groundborne noise</i>	Reasonable and feasible measures would be implemented to minimise groundborne noise where exceedances are predicted.	All
NVC14	<i>Utility adjustments/relocation works</i>	Reasonable and feasible mitigation measures would be implemented where power supply works would result in elevated noise levels at receivers. This would include: <ul style="list-style-type: none"> carrying out works during the daytime period when in the vicinity of residential receivers where out of hours works are required, scheduling the noisiest activities to occur in the evening period (up to 10pm) use of portable noise barriers around particularly noisy equipment. 	All
NVC15	<i>Road traffic noise</i>	The routes for construction haulage vehicles and bus services associated with the Temporary Transport Strategy would be selected on the basis of compliance with the relevant night time road traffic noise criteria, where reasonable and feasible.	All

ID	Impact	Mitigation measures	Relevant location(s)
Operation			
NVO4	<i>Predicted vibration impacts</i>	Where vibration levels are predicted to exceed the screening criteria, a more detailed assessment of the structure and vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure. For heritage items where screening vibration levels are predicted to be exceeded, the more detailed assessment would specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.	All
Non-Aboriginal heritage			
Design/pre-construction			
NAH1	<i>Minimising impacts during design</i>	The project design would be sympathetic to impacted items (including retained significant elements) and surrounding heritage items by minimising impacts to sight lines, views and setting. Detailed design would be carried out in accordance with the relevant specific element principles, including the significant fabric strategy, provided in the Design Guidelines.	All heritage items
NAH2		Except for the heritage significant elements affected by the project, direct impacts to other heritage significant items and elements would be avoided.	All heritage items
NAH3		The appropriately qualified and experienced heritage architect who is part of the Sydney Metro City & Southwest Design Review Panel would provide independent review periodically throughout detailed design.	All heritage items
NAH4		Where heritage significant items or elements are to be retained within the operational area, detailed design would consider appropriate retrofitting and reuse in consultation with a heritage architect and the Design Review Panel. Where retrofitting and reuse is not practicable for significant elements, justification would be provided to the Design Review Panel, and for State Heritage Register listed items, to the NSW Heritage Council.	All heritage items
NAH5		Design and construction planning within the Marrickville Station State Heritage register curtilage would consider the recommendations of the 2016 Conservation Management Plan and the significant fabric strategy.	MA
NAH6	<i>Interpretation</i>	Appropriate heritage interpretation would be incorporated into the design in accordance with the <i>NSW Heritage Manual</i> , the NSW Heritage Office's <i>Interpreting Heritage Places and Items: Guidelines</i> (August 2005), and the NSW Heritage Council's <i>Heritage Interpretation Policy</i> .	AS Hurlstone Park Railway Underbridge Overbridge - Illawarra Road Canterbury (Cooks River) Underbridge Canterbury (Cooks River/Charles St) Underbridge - Main Line

ID	Impact	Mitigation measures	Relevant location(s)
			Post-war bus shelter and public lavatories Bankstown Parcels Office (former)
NAH7	<i>Management of moveable heritage and heritage fabric</i>	A moveable heritage item strategy would be prepared by a suitably qualified heritage consultant in consultation with Sydney Trains, and would include a comprehensive record of significant railway elements to be impacted. This would include items contained within station and platform buildings as well as of any other significant equipment within the curtilage of the heritage railway stations. The moveable heritage item strategy would form part of the broader interpretation strategy.	Bankstown Line: AS apart from BA and Bankstown Parcels Office (former)
NAH8		Fabric of high and exceptional significance of items proposed for removal would be identified and catalogued according to the significant fabric strategy prior to design development, and would be re-used where possible. Where not able to be re-used, the significant fabric strategy would indicate appropriate storage locations, as well as appropriate types of buildings and structures where salvaged elements may be reused in the future. Where large elements are impacted, a sample of fabric may be appropriate.	MA: Overbridge-Illawarra Road DU: overhead booking office and access stairs HP: Platform 1 building CP: overhead booking office and Parcels office WP: Platform 1 building, Platform 2 building and overhead booking office PB: overhead booking office and footbridge
NAH9	<i>Impacts to the Old Sugarmill</i>	A landscape scheme would be prepared for the Old Sugarmill to re-instate planting within and close to the curtilage of the item. The scheme would consider appropriate period plants and trees. Any boundary wall treatment would be designed in consultation with a heritage architect.	Old Sugarmill
NAH10	<i>Impacts to archaeology</i>	An archaeological research design would be prepared and implemented to identify the need for archaeological testing or monitoring. Archaeological mitigation measures recommended in the archaeological research design would be implemented in accordance with relevant guidelines, and where identified in the archaeological research design, would be supervised by a suitably qualified Excavation Director with experience in managing State significant archaeology.	MA Catchment (specific requirements) CB Catchment and work site (specific requirements) BE Catchment (specific requirements) LA Catchment (specific requirements)

ID	Impact	Mitigation measures	Relevant location(s)
NAH11	<i>Archival recording</i>	Photographic archival recording and reporting would be carried out in accordance with the NSW Heritage Office's <i>How to Prepare Archival Records of Heritage Items</i> (1998), and <i>Photographic Recording of Heritage Items Using Film or Digital Capture</i> (2006).	Overbridge-Illawarra Road Hurlstone Park Railway Underbridge Canterbury (Cooks River) Underbridge Canterbury (Cooks River/Charles St) Underbridge - Main Line Post-war bus shelter and public lavatories Bankstown Parcels Office (former)
NAH12	<i>Conservation management</i>	A conservation management plan would be prepared for all State Heritage Register listed stations, in accordance with NSW Heritage Council guidelines. The plan would address any changes to the item, including updated assessment of significance of elements and recommendations on curtilage changes. It would also provide suggested site specific exemptions and management policies.	MA, CA, BE
NAH13		A conservation management strategy would be prepared for nominated Section 170 register listed stations not listed on the State Heritage Register, in accordance with NSW Heritage Council guidelines.	HP, CP, LA, BA
NAH14	<i>Unexpected finds</i>	An unexpected finds procedure would be developed and included in the construction heritage management plan.	All
Construction			
NAH15	<i>Minimising impacts during construction</i>	Methodologies for the removal of existing structures and construction of new structures would be developed and implemented during construction to minimise direct and visual impacts to other elements within the curtilages of the heritage items, or to heritage items located in the vicinity of works.	All heritage items
NAH16	<i>Unexpected finds</i>	In the event that unexpected archaeological remains, relics, or potential heritage items are discovered during construction, all works in the immediate area would cease, and the unexpected finds procedure would be implemented.	All
NAH17	<i>Human skeleton material</i>	In the event that a potential burial site or potential human skeletal material is exposed during construction, the procedure recommended by the historic heritage impact assessment would be followed in accordance with the Policy Directive – <i>Exhumation of Human Remains</i> (NSW Department of Health, 2008), <i>Skeletal Remains – Guidelines for the Management of Human Skeletal Remains under the Heritage Act 1977</i> (NSW Heritage Office, 1998) and the <i>Aboriginal Cultural Heritage Standards and Guidelines Kit</i> (NPWS, 1997).	All

ID	Impact	Mitigation measures	Relevant location(s)
Aboriginal heritage			
Design/pre-construction			
AH1	<i>Consultation</i>	Aboriginal stakeholder consultation would continue to be undertaken in accordance with <i>Aboriginal Cultural Heritage Consultation Requirements for Proponents</i> (DECC, 2010b).	All
AH2	<i>Avoiding impacts to Aboriginal heritage</i>	An Aboriginal cultural heritage assessment report would be prepared in accordance with the <i>Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW</i> (Office of Environment and Heritage, 2011a). The report would include: <ul style="list-style-type: none"> • details of Aboriginal stakeholder consultation conducted • an assessment of cultural significance for the project area and identification of any specific areas of cultural significance based on consultation with Aboriginal stakeholders • a methodology for archaeological test excavation and salvage, to be undertaken by suitably qualified personnel • procedures for any unexpected finds. 	All (this item has already commenced)
AH3	<i>Managing impacts to identified PADs</i>	Direct impacts to S2B PAD02 at Punchbowl Station would be avoided where practicable. If impacts to S2B PAD02 cannot be avoided, archaeological test excavation (and salvage when required) would be undertaken prior to construction in accordance with the methodology defined by the Aboriginal cultural heritage assessment report.	S2B PAD02
AH4	<i>Interpretation</i>	Appropriate Aboriginal heritage interpretation would be incorporated into the design in consultation with Aboriginal stakeholders.	All
Construction			
AH5	<i>Unexpected finds</i>	If potential Aboriginal items are uncovered, works within 10 metres of the item would cease. The item would then be assessed and managed by a suitably qualified person in accordance with the unexpected finds procedure in the Aboriginal cultural heritage report. During pre-work briefings, employees would be made aware of the unexpected finds procedures and obligations under the NPW Act.	All
Land use and property			
Design/pre-construction			
LU1	<i>Acquisitions</i>	All acquisitions/adjustments would be undertaken in consultation with landowners and in accordance with the requirements of the <i>Land Acquisition (Just Terms Compensation) Act 1991</i> .	All
LU2	<i>Future planning</i>	Transport for NSW will continue to work the Department of Planning and Environment and the Greater Sydney Commission in relation to future planning for the Sydenham to Bankstown corridor.	All
LU3		Transport for NSW will contribute funding towards, and work with, the Department of Planning and Environment and Canterbury-Bankstown Council, on a master plan and business case for the Bankstown town centre, including how the station fits with the centre.	BA

ID	Impact	Mitigation measures	Relevant location(s)
Construction			
LU4	<i>Temporary use</i>	Temporary use areas, including public open space, would be restored to their pre-existing condition (as a minimum) as soon as practicable following completion of construction. This would be undertaken in consultation with the relevant council and/or the landowner.	All
Socio-economic impacts			
Design/pre-construction			
SO1	<i>Socio-economic impacts</i>	<p>Transport for NSW would continue to work with stakeholders and the community to ensure they are informed about the project and have opportunities to provide feedback to the project team.</p> <p>The existing community contact and information tools would remain in place throughout the duration of the project.</p> <p>Consultation prior to and during construction would involve the use of appropriate tools, including, but not limited to, tools such as community information sessions, forums, briefings, and displays; distribution of project materials in a variety of languages; door knocks; Place Managers; and site signage.</p>	All
SO2	<i>Community facilities</i>	Prior to construction, consultation would be undertaken with sensitive community facilities (including aged care, childcare centres, educational institutions, and places of worship). Consultation would aim to identify and develop measures to manage the specific construction impacts for individual sensitive community facilities. These measures would be incorporated into the relevant management plans.	All
Construction			
SO3	<i>Community facilities and infrastructure</i>	Access to community facilities and infrastructure would be maintained during construction. Where alternative access arrangements need to be made, these would be developed in consultation with relevant service providers, and communicated to users.	All
SO4	<i>Employment</i>	A workforce development plan would be prepared and implemented during construction, to support local employment and business opportunities, provide skills development, and increase workplace diversity.	
Business impacts			
Design/pre-construction			
BI1	<i>Managing construction impacts</i>	<p>A business management plan would be prepared and implemented during construction, to define the location specific measures and strategies to minimise impacts on individual businesses during construction.</p> <p>The plan would also include:</p> <ul style="list-style-type: none"> • a business consultation forum • roles and responsibilities • monitoring, auditing, reporting, and complaints management procedures. 	All

ID	Impact	Mitigation measures	Relevant location(s)
BI2	<i>Supporting businesses during construction</i>	A small business owners support program would be developed and implemented to provide assistance to small business owners adversely impacted by construction. The program would be administered by a retail advisory/support panel established by Transport for NSW.	All
Landscape and visual impacts			
Design/pre-construction			
LV1	<i>General visual impacts</i>	The design would continue to be guided by the <i>Sydney Metro City & Southwest Sydenham to Bankstown Design Guidelines</i> .	All
LV2		Urban design and landscaping would be incorporated as part of the detailed station designs and precinct plans to provide a consistent approach to the management and mitigation of landscape and visual impacts across the project, and implementation of the proposed mitigation strategies.	All
LV3		Fencing would be designed to be of a high quality urban finish near stations.	AS
LV4	<i>Impacts to trees and screening vegetation</i>	The management of trees during detailed design and construction planning would be guided by the project's tree management strategy. Where removal cannot be avoided, trees would be replaced in accordance with the tree management strategy. Opportunities to retain and protect existing trees would be defined during detailed design and construction planning, in accordance with the project's tree management strategy. The design would aim to reduce tree removal to the extent practicable, particularly where they contribute to screening vegetation or landscape character.	All
LV5	<i>Light spill</i>	Lighting would be designed in accordance with AS 4282 <i>Control of the Obtrusive Effects of Outdoor Lighting</i> . Lighting would be designed to minimise light spill and glare into adjoining areas.	All
LV6	<i>Impacts of noise barriers</i>	The selection of materials and colours for noise barriers and hoardings would aim to minimise their visual prominence.	Noise barrier locations
LV7		The use of transparent panels in noise barriers would be considered where views to local landscape features and district views would be obstructed.	Noise barrier locations
LV8	Substations	The detailed design of the substations would ensure that they incorporate appropriate architectural treatments and landscaping, guided by the design guidelines, to minimise the potential for visual impacts.	Substations
Construction			
LV9	<i>Visual impacts</i>	A visual amenity management plan would be prepared and implemented during construction, to define the measures to minimise visual impacts during construction. The plan would include requirements in relation to construction site remediation.	All
LV10		Mitigation measures for landscape and visual impacts would be implemented as soon as feasible and reasonable after the commencement of construction, and remain for the duration of the construction period.	All

ID	Impact	Mitigation measures	Relevant location(s)
LV11	<i>Impacts to trees</i>	Trees to be retained would be protected prior to the commencement of construction in accordance with <i>AS4970-2009 Protection of trees on development sites</i> and the project's tree management and replacement strategy. Any tree pruning would be undertaken in accordance with the project's tree management strategy, guided by a tree report prepared by a qualified arborist.	All
LV12	<i>Impacts from construction, including compounds and work sites</i>	The design and maintenance of construction compound hoardings would aim to minimise visual amenity and landscape character impacts. Graffiti would be removed promptly, and public art opportunities would be considered.	All
LV13		The selection of materials and colours would aim to minimise their visual prominence.	All
LV14		Lighting of work areas, compounds and work sites would be oriented to minimise glare and light spill impact on adjacent receivers.	All
LV15		Following completion of construction, site restoration would be undertaken in accordance with the visual amenity management plan. Temporary impacts to public open space would be rehabilitated in consultation with the relevant local council and/or landowner.	All
Soils and contamination			
Design/pre-construction			
SC1	<i>General soil and erosion management</i>	Erosion and sediment control measures would be implemented in accordance with <i>Managing Urban Stormwater: Soils and Construction Volume 1</i> (Landcom, 2004) and <i>Managing Urban Stormwater: Soils and Construction Volume 2A</i> (DECC, 2008a). Measures would be designed as a minimum for the 80th percentile, five day rainfall event.	All
SC2	<i>Acid sulfate soils</i>	Prior to ground disturbance in high probability acid sulfate areas, testing would be carried out to determine the 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) and the <i>Waste Classification Guidelines - Part 4: Acid Sulfate Soils</i> (EPA, 2014).	MA, CB, CP
SC3	<i>Saline soils</i>	Prior to ground disturbance in areas of potential soil salinity, testing would be carried out to confirm the presence of saline soils. If saline soils are encountered, they would be managed in accordance with <i>Site Investigations for Urban Salinity</i> (DLWC, 2002).	PB, BA
SC4	<i>Contamination</i>	WorkCover dangerous goods searches would be carried out for properties that have potential contamination near Belmore Station, to provide additional site characterisation and identify the risk of contamination in these areas.	BE
SC5		A detailed contamination assessment would be undertaken in areas with a medium to high risk of contamination, to confirm the nature and extent of contamination, specific requirements for further investigation and remediation, and/or management requirements of any contamination.	MA, CP, BE, PB, BA

ID	Impact	Mitigation measures	Relevant location(s)
SC6		Hazardous materials surveys would be undertaken during detailed design for all proposed demolition activities, and for utility adjustments as required.	All
SC7		In the event a Remediation Action Plan is required, it would be developed in accordance with <i>Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land</i> (Department of Urban Affairs and Planning and Environment Protection Authority, 1998) and a NSW Environment Protection Authority Accredited site auditor would be engaged to audit the works.	MA, CP, BE, PB, BA
Construction			
SC8	Unexpected contamination	In the event that indicators of contamination are encountered during construction (such as odours or visually contaminated materials), work in the area would cease, and the finds would be managed in accordance with the unexpected contamination finds procedure.	All
Operation			
SC9	Soil erosion and sedimentation	During any maintenance work where soils are exposed, sediment and erosion control devices would be installed in accordance with <i>Managing Urban Stormwater: Soils and Construction</i> (Landcom, 2004).	All
Hydrology, flooding and water quality			
Design/pre-construction			
FHW1	Flooding	<p>The design would be reviewed to, where feasible and reasonable, not worsen existing flooding characteristics up to and including the one per cent AEP event (incorporating a 10 per cent allowance for climate change) in the vicinity of the project.</p> <p>Detailed flood modelling would consider:</p> <ul style="list-style-type: none">• potential changes to flood prone land and flood levels, including areas of flood risk not already addressed• potential changes to overland flow paths• redistribution of surface runoff as a result of project infrastructure• behaviour of existing stormwater runoff, including the results of any recent flood events• results of detailed asset surveys (e.g. floor levels)• potential changes required to flood evacuation routes, flood warning systems and signage. <p>Flood modelling to support detailed design would be carried out in accordance with the following guidelines:</p> <ul style="list-style-type: none">• <i>Floodplain Development Manual</i> (DIPNR, 2005)• <i>Floodplain Risk Management Guideline: Practical Consideration of Climate Change</i> (DECC, 2007)• <i>Floodplain Risk Management Guide: Incorporating Sea Level Rise Benchmarks in Flood Risk Assessments</i> (DECCW, 2010c)• <i>New guideline and changes to section 117 direction and EP&A Regulation on flood prone land, Planning Circular PS 07-003</i> (NSW Department of Planning, 2007). <p>Flood modelling and consideration of mitigation measures would be carried out in consultation with the relevant local councils, and the NSW State Emergency Service.</p>	All

ID	Impact	Mitigation measures	Relevant location(s)
FHW2	<i>Stormwater runoff</i>	Where feasible and reasonable, detailed design would result in no net increase in stormwater runoff rates in all storm events, unless it can be demonstrated that increased runoff rates as a result of the project would not increase downstream flood risk.	All
FHW3		Where space permits, 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
FHW4	<i>Consultation</i>	Where relevant, detailed design would occur in consultation with the NSW State Emergency Service, and the Inner West and Canterbury-Bankstown councils, to ensure that flood related outcomes are consistent with floodplain risk management studies.	All
FHW5	<i>Scour potential</i>	Further analysis of potential scour would be undertaken during detailed design. This would include the development of appropriate mitigation measures where required, including the installation of detention basins for the duration of construction.	All
FHW6	<i>Water quality</i>	The project would be designed to ensure there is minimal potential for water quality impacts, including incorporating water sensitive urban design elements.	All
Construction			
FHW7	<i>Flooding</i>	Detailed construction planning would consider flood risk for all compounds and work sites. This would include identification of measures to not worsen existing flooding characteristics. Not worsen is defined as: <ul style="list-style-type: none"> a maximum increase in flood levels of 50 mm in a one per cent AEP event a maximum increase in time of inundation of one hour in a one per cent AEP event no increase in the potential for soil erosion and scouring from any increase in flow velocity in a one per cent AEP flood event. 	All
FHW8		The site layout and staging of construction activities would: <ul style="list-style-type: none"> avoid or minimise obstruction of overland flow paths and limit the extent of flow diversion required consider how works would affect the existing stormwater network such that alternatives are in place prior to any disconnection or diversion of stormwater infrastructure. 	All
FHW9	<i>Watercourse impacts</i>	Works within or near watercourses (including the Cooks River) would be undertaken with consideration given to the NSW Office of Water's guidelines for controlled activities.	All
FHW10	<i>Water quality</i>	Erosion and sediment mitigation measures would be installed and maintained for the duration of the construction period.	
FHW11	<i>Water quality monitoring</i>	A water quality monitoring program would be developed and implemented, to monitor water quality at identified discharge points. The program would include relevant water quality objectives, parameters, and criteria and specific monitoring locations identified in consultation with DPI (Water) and the EPA.	All

ID	Impact	Mitigation measures	Relevant location(s)
FHW12		Discharges from construction water treatment devices would be monitored to ensure compliance with the discharge criteria in the environment protection licence.	All
Operation			
FHW13	<i>Water quality</i>	Operational water discharges would be managed in accordance with the water quality management requirements specified in the environment protection licence.	All
Biodiversity			
Design/pre-construction			
B1	<i>Direct impacts to biodiversity</i>	Detailed design and construction planning would minimise direct impacts to vegetation mapped as threatened ecological communities as far as practicable, and have regard to the habitat management measures provided in the biodiversity assessment report.	All
B2		Pre-clearing surveys and inspections for endangered and threatened flora and fauna species would be undertaken by qualified ecologists prior to any clearing occurring. The surveys and inspections, and any subsequent relocation of species, would be undertaken in accordance with the measures provided in the biodiversity assessment report.	All
B3	<i>Biodiversity offsets</i>	The biodiversity offset strategy prepared for the Environmental Impact Statement would be updated to confirm the approach to retiring the required biodiversity credits (including appropriate biobank sites). It would also include a timeframe to retire the required credits based on the confirmed construction schedule and biobank site owner agreements/requirements.	All
Construction			
B4	<i>Direct impacts to biodiversity</i>	Areas of biodiversity value outside the project area would be marked on plans, and fenced or signposted where practicable, to prevent unnecessary disturbance.	All
B5		Impacts to Downy Wattle would be avoided. The locations of Downy Wattle stems would be marked on plans, fenced on site, and avoided.	PB, BA
B6		Equipment storage and stockpiling would be restricted to identified compound sites and already cleared land.	All
B7		A trained ecologist would be present during the clearing of native vegetation or removal of potential fauna habitat to avoid impacts on resident fauna and to salvage habitat resources as far as is practicable.	All
B8	<i>Management of weeds</i>	Noxious weeds would be managed in accordance with the <i>Noxious Weeds Act 1993</i> . Weeds of national environmental significance would be managed in accordance with the <i>Weeds of National Significance Weed Management Guide</i> .	All
Operation			
B9	<i>Management of weeds</i>	Annual inspections would be undertaken for weed infestations and to assess the need for control measures.	All
B10		Any outbreak of noxious and/or weeds of national environmental significance would be managed in accordance with the relevant guidelines.	All

ID	Impact	Mitigation measures	Relevant location(s)
Air quality			
Design/pre-construction			
AQ1	<i>Air quality impacts</i>	An air quality management plan would be prepared and implemented during construction, to define the measures to minimise air quality impacts during construction.	All
Sustainability and climate change			
Design/pre-construction			
SCC1	<i>Sustainability</i>	Sustainability initiatives and targets would be reviewed and incorporated into the detailed design to support the achievement of the project's sustainability objectives. A best practice level of performance would be targeted using relevant sustainability rating tools eg ISCA as built 'excellent' level rating.	All
SCC2		A sustainable procurement strategy would be developed and implemented to apply to Principal Contractors, their subcontractors and their suppliers.	All
SCC3		A workforce development and industry participation strategy would be developed covering both construction and operation.	
SCC4	<i>Climate change</i>	Climate change risk treatments would be incorporated into the detailed design, including ensuring that adequate flood modelling is carried out and integrated with design.	All
SCC5	<i>Greenhouse gas emissions</i>	An iterative process of greenhouse gas assessments and design refinements would be carried out during detailed design and construction to identify opportunities to minimise greenhouse gas emissions. Performance would be measured in terms of a percentage reduction in greenhouse gas emissions from a defined reference footprint.	All
Construction			
SCC6	<i>Sustainability</i>	Sustainability reporting (and corrective action where required) would be undertaken during construction.	All
SCC7		The construction workforce development would be implemented.	All
SCC8	<i>Greenhouse gas emissions</i>	25 per cent of the greenhouse gas emissions associated with consumption of electricity during construction would be offset.	All
Operation			
SCC9	<i>Sustainability</i>	Prior to operation commencing, sustainability initiatives would be reviewed and updated, and relevant initiatives would be implemented to support the achievement of the project's sustainability objectives.	All
SCC10		The operation workforce development plan would be implemented.	All
SCC11	<i>Climate change risks</i>	Periodic review of climate change risks would be carried out to ensure ongoing resilience to the impacts of climate change.	All

ID	Impact	Mitigation measures	Relevant location(s)
SCC12	Greenhouse gas emissions	100 per cent of the greenhouse gas emissions associated with consumption of electricity during operation would be offset.	All
Hazards, risks and safety			
Design/pre-construction			
HRS1	Public safety	A hazard analysis would be undertaken during the detailed design stage to identify risks to public safety from the project, and how these can be mitigated through safety in design.	All
Construction and operation			
HRS2	Hazardous materials and substances	All hazardous substances that may be required for construction and operation would be stored and managed in accordance with the <i>Storage and Handling of Dangerous Goods Code of Practice</i> (WorkCover NSW, 2005) and the <i>Hazardous and Offensive Development Application Guidelines: Applying SEPP 33</i> (Department of Planning, 2011).	All
Waste management			
Design/pre-construction			
WM1	Waste generation and recycling	Detailed design would include measures to minimise excess spoil generation. This would include a focus on optimising the design to minimise spoil volumes, and the reuse of material on-site.	All
WM2		A recycling target of at least 90 per cent would be adopted.	All
Construction			
WM3	Waste and spoil management	Spoil would be managed in accordance with the spoil management hierarchy.	All
WM4		Target 100 per cent reuse of reusable spoil.	All
WM5		Construction waste would be minimised by accurately calculating materials brought to the site and limiting materials packaging.	All
WM6		All waste would be assessed, classified, managed and disposed of in accordance with the <i>Waste Classification Guidelines</i> (EPA, 2014a).	All
WM7		Waste segregation bins would be located at various locations within the project area, if space permits, to facilitate segregation and prevent cross contamination.	All
Cumulative impacts			
Pre-construction and construction			
CI1	Cumulative impacts	Transport for NSW would manage and co-ordinate the interface with projects under construction at the same time. Co-ordination and consultation with the following stakeholders would occur, where required: <ul style="list-style-type: none">• Department of Planning and Environment• Roads and Maritime Services• Sydney Trains• NSW Trains• Sydney Buses	All

ID	Impact	Mitigation measures	Relevant location(s)
		<ul style="list-style-type: none"> • Inner West Council • Canterbury-Bankstown Council • Sydney Motorways Corporation • emergency service providers • utility providers • construction contractors. <p>Co-ordination and consultation with these stakeholders would include:</p> <ul style="list-style-type: none"> • provision of regular updates to the detailed construction program, construction sites and haul routes • identification of key potential conflict points with other construction projects • developing mitigation strategies in order to manage conflicts. Depending on the nature of the conflict, this could involve: <ul style="list-style-type: none"> – adjustments to the construction program, work activities or haul routes; or adjustments to the program, activities or haul routes of Sydney Metro or other construction projects – co-ordination of traffic management arrangements between projects. 	

28.6 Compilation of performance outcomes

The Secretary's environmental assessment requirements identify a number of desired performance outcomes for the project. These desired performance outcomes outline the broader objectives to be achieved during design, construction, and operation. Based on the outcomes of the environmental impact assessment summarised in Part C, and implementation of the mitigation measures compiled in Section 28.4.2, environmental performance outcomes have been established. These are listed in Table 28.6. The first and second columns provide the key issue and desired performance outcome from the Secretary's environmental assessment requirements, and the third column provides the project specific environmental performance objectives to achieve the desired outcome.

Future design development and any design changes would be considered against these environmental performance outcomes.

Table 28.6 **Compilation of environmental performance outcomes**

Key issue (as listed in the SEARs)	SEARs desired performance outcomes	Project specific environmental performance outcomes
5 . Biodiversity	<p>The project design considers all feasible measures to avoid and minimise impacts on terrestrial and aquatic biodiversity.</p> <p>Offsets and/or supplementary measures are assured which are equivalent to any remaining impacts of project construction and operation.</p>	<p>The project is designed to minimise impacts on biodiversity. Where practicable, the design minimises the need to clear vegetation.</p> <p>Potential impacts on biodiversity are managed in accordance with relevant legislation, including the EP&A Act, TSC Act, EPBC Act, and the <i>Noxious Weeds Act 1993</i>.</p> <p>The biodiversity outcome is consistent with the <i>Framework for Biodiversity Assessment</i> (OEH, 2014a).</p>

Key issue (as listed in the SEARs)	SEARs desired performance outcomes	Project specific environmental performance outcomes
		Offsets are provided in accordance with the <i>NSW Biodiversity Offsets Policy for Major Projects</i> (OEH, 2014).
6. Flooding and hydrology	<p>The project minimises adverse impacts on existing flooding characteristics.</p> <p>Construction and operation of the project avoids or minimises the risk of, and adverse impacts from, infrastructure flooding, flooding hazards, or dam failure.</p> <p>Long term impacts on surface water and groundwater hydrology (including drawdown, flow 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>Construction is undertaken in a manner that minimises the potential for adverse flooding impacts, through staging of works and the implementation of mitigation measures.</p> <p>Construction compounds and work sites are laid out such that flows are not significantly impeded.</p> <p>The project maintains or reduces flood levels within and adjacent to the rail corridor.</p> <p>The project avoids long term impacts to surface water.</p> <p>Opportunities to reuse water resources are considered during the design process.</p> <p>The use of water during construction is minimised.</p>
7. Heritage	<p>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 and Aboriginal objects and places.</p> <p>The design, construction and operation of the project avoids or minimises impacts, to the greatest extent possible, on the heritage significance of environmental heritage and Aboriginal objects and places.</p>	<p>The design is sympathetic to the historic significance of existing stations and the heritage significance of surrounding listed heritage items, and where practicable, avoids and minimises impacts to heritage.</p> <p>The design and mitigation strategies are reviewed by the Sydney Metro Design Review Panel.</p> <p>Impacts on heritage are managed in accordance with relevant legislation, including the EP&A Act, the <i>Heritage Act 1977</i>, and relevant guidelines.</p> <p>The potential impacts identified are mitigated by the mitigation measures provided.</p>
8. Noise and vibration – amenity	<p>Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise adverse impacts on acoustic amenity.</p> <p>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.</p>	<p>The project minimises impacts to the local community by:</p> <ul style="list-style-type: none"> controlling noise and vibration at the source controlling noise and vibration on the source to receiver transmission path controlling noise and vibration at the receiver implementing practicable and reasonable measures to minimise the noise and vibration impacts of construction activities on local sensitive receivers.
9. Noise and vibration – structural	<p>Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise</p>	<p>The project minimises impacts to structures by:</p> <ul style="list-style-type: none"> controlling vibration at the source controlling vibration on the source to receiver transmission path

Key issue (as listed in the SEARs)	SEARs desired performance outcomes	Project specific environmental performance outcomes
	<p>adverse impacts on the structural integrity of buildings, items including Aboriginal places and environmental heritage, and nearby road infrastructure.</p> <p>Increases in noise emissions and vibration affecting environmental heritage as defined in the Heritage Act 1977 during operation of the project are effectively managed.</p>	<ul style="list-style-type: none"> implementing practicable and reasonable measures to minimise vibration impacts of construction activities on structures.
10. Socio-economic, land use and property	<p>The project minimises adverse social and economic impacts and capitalises on opportunities potentially available to affected communities.</p> <p>The project minimises impacts to property and business and achieves appropriate integration with adjoining land uses, including maintenance of appropriate access to properties and community facilities, and minimisation of displacement of existing land use activities, dwellings and infrastructure.</p>	<p>The project minimises impacts to the local community, community infrastructure, and businesses.</p> <p>Impacts to existing land use and properties are minimised.</p> <p>The project is appropriately integrated with adjoining land uses, and access to private properties is maintained.</p> <p>The project is appropriately integrated with local and regional land use planning strategies, including the <i>Sydenham to Bankstown Corridor Urban Renewal Strategy</i>.</p> <p>During operation, the project would improve access to local facilities, services and destinations, supporting opportunities for community interaction.</p>
11. Soils	<p>The environmental values of land, including soils, subsoils and landforms, are protected.</p> <p>Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to acid sulfate soils and site contamination.</p>	<p>Site-specific soil characteristics are taken into consideration during detailed design and construction.</p> <p>Any contamination is managed in accordance with relevant regulatory requirements.</p> <p>Any soil waste is assessed, classified, managed and disposed of in accordance with the <i>Waste Classification Guidelines</i> (EPA, 2014).</p>
12. Sustainability	<p>The project reduces the NSW Government's operating costs and ensures the effective and efficient use of resources.</p> <p>Conservation of natural resources is maximised.</p>	<p>Sustainability considerations are integrated throughout design, construction, and operation.</p> <p>The project would be carried out in accordance with the Sydney Metro City & Southwest Sustainability Policy.</p>
13. Traffic, transport and access	<p>Network connectivity, safety and efficiency of the transport system in the vicinity of the project are managed to minimise impacts.</p> <p>The safety of transport system customers is maintained.</p> <p>Impacts on network capacity and the level of service are effectively managed.</p> <p>Works are compatible with existing infrastructure and future transport corridors.</p>	<p>The project would reduce station crowding, increase rail network reach and use, improve network resilience, and improve travel times within the global economic corridor.</p> <p>Impacts to traffic and transport are minimised.</p> <p>Motorist, pedestrian and cyclist safety will be maintained or improved.</p> <p>Safe access to properties is maintained.</p> <p>The project is integrated with existing and future local and regional transport infrastructure and planning strategies.</p> <p>Metro customers would be provided with a safe and secure service.</p>

Key issue (as listed in the SEARs)	SEARs desired performance outcomes	Project specific environmental performance outcomes
14. Place making and urban design	<p>The project capitalises on opportunities to improve place, character and quality of the surrounding build and natural environment (including adjoining public spaces).</p> <p>The project contributes to the accessibility and connectivity of communities.</p>	<p>The project is designed to have regard to the surrounding landscape and visual environment and to minimise the potential for visual impacts.</p> <p>The project is visually integrated with its surroundings.</p> <p>The stations provide a sense of place, and contribute positively to the surrounding urban environment.</p> <p>The design takes into account future planning for the <i>Sydenham to Bankstown Corridor Urban Renewal Strategy</i>.</p> <p>Vegetation providing screening to the rail corridor is retained where practicable.</p>
15. Water - quality	<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>Impacts to water quality during construction and operation are minimised.</p> <p>Erosion and sediment controls during construction are implemented in accordance with <i>Managing Urban Stormwater: Soils and Construction Volume 1</i> (Landcom, 2004) and <i>Managing Urban Stormwater: Soils and Construction Volume 2</i> (Department of Environment and Climate Change, 2008a).</p> <p>The project would protect or contribute to achieving the Water Quality Objectives, during construction and operation.</p> <p>Construction water quality discharge would comply with the requirements of an environment protection licence issued to the project.</p>
16. Utilities	<p>The project is designed, constructed and operated to minimise impacts to utilities and provision of such to the public.</p>	<p>Impacts to utilities during construction are minimised.</p> <p>The design takes into account the input of utility providers and owners.</p>

28.7 Project justification

28.7.1 Summary of project justification

The project forms a key part of Sydney Metro, which is Australia's largest public transport project. A new standalone railway, this 21st century network will deliver 31 metro stations and 66 kilometres of new metro rail for Australia's biggest city – revolutionising the way Sydney travels.

Sydney is experiencing sustained population and economic growth. The need for the project, as part of Sydney Metro as a whole, is driven by the challenges being experienced in responding to this growth, including the existing and future capacity of the Sydney's transport system.

The rail network is heavily congested, with customers on most rail lines often experiencing significant crowding on trains and station platforms during the morning and evening peaks.

Sydney's current suburban system can reliably carry 24,000 people an hour per line. As population and employment continue to grow, rail is forecast to experience the highest growth in travel demand, with about an additional 100,000 trips expected on Sydney's rail network during the morning peak by 2036. This will place additional pressure on the rail network.

It is forecast that without further investment, Sydney's rail network will reach capacity in the Sydney CBD and on critical suburban rail lines by the mid to late 2020s. Sydney Metro (including the project) will have a long-term target capacity of about 40,000 customers per hour in each direction, similar to other metro systems worldwide. Sydney Metro, together with signalling and infrastructure upgrades across the existing Sydney rail network, will increase the capacity of train services entering the Sydney CBD – from about 120 an hour today to up to 200 services beyond 2024. This is an increase of up to 60 per cent capacity across the network to meet demand.

Over the next 15 years, NSW will require infrastructure to support 40 per cent more train trips, 30 per cent more car trips and 31 per cent more households. Sydney Metro, including the project, is identified as a key infrastructure project as part of the NSW Government's infrastructure investment program.

Sydney Metro will transform Sydney, cutting travel times, reducing congestion and delivering economic and social benefits for generations to come. It will boost economic activity by more than \$5 billion a year, supporting major jobs and business growth along its route with better connectivity and land development opportunities, and greatly improving business logistics, especially for knowledge-based businesses.

With at least 15 trains an hour in the peak when services start in 2024, the conversion of the T3 Bankstown Line to metro operations would address one of Sydney's biggest rail bottlenecks, delivering benefits across Sydney's rail network. These benefits would further increase when the number of trains increases to 20 per hour as part of the ultimate operations.

The T3 Bankstown Line effectively slows down the Sydney Trains network because of the way it merges with other railway lines closer to the city, including the T2 Airport, Inner West & South Line.

Parts of the T3 Bankstown Line are over 120 years old with existing infrastructure in varying conditions. A key challenge for this line is customer accessibility, with five of the stations not having lifts. In addition, a number of these stations have larger than desirable gaps between the platforms and trains, which makes access difficult for some customers, particularly the disabled, elderly, and those travelling with young children, prams or luggage.

28.7.2 Summary of project benefits

The project would have the following benefits:

- all stations fully accessible, with lifts and level access between trains and platforms
- more job opportunities faster, more frequent and direct access to key employment centres
- better access to education, with fast, more frequent and direct connections
- no timetable required – customers can just turn up and go
- new and direct access to major CBD stations, including Martin Place, Pitt Street, Barangaroo and North Sydney
- increased train frequency in AM and PM peak services – a train at least every four minutes
- improved interchange with bus, light rail, pedestrian and cycling networks, and provision of taxi, kiss and ride and bike parking facilities at key stations
- fast, safe and reliable – a new generation of 21st century metro trains.

28.7.3 Consequence of not proceeding

The project is a section of Sydney Metro as a whole, and one of two components of Sydney Metro City & Southwest. Without the project, the benefits of Sydney Metro City & Southwest would not be

fully realised. The bottleneck created by the T3 Bankstown Line would remain. There would not be sufficient rail capacity to provide for Sydney's growth, as summarised in Section 28.7.1.

28.7.4 Environmental considerations

Environmental investigations were undertaken during preparation of the Environmental Impact Statement to assess the potential impacts of the project. These included specialist assessments of traffic and transport, noise and vibration; heritage; hydrology, flooding and water quality; landscape and visual amenity; biodiversity; socio-economics; and business impacts. The Environmental Impact Statement has documented the potential environmental impacts, considering both potential positive and negative impacts, and identifies mitigation measures to protect the environment where required.

The key potential impacts on the biophysical, social and cultural environments are summarised in Section 28.3.

As described in Chapters 7 to 9 and Section 28.4, the project would incorporate environmental management and design features to ensure that potential impacts are managed and mitigated as far as practicable.

28.7.5 Ecologically sustainable development

The EP&A Act adopts the definition of ecologically sustainable development contained in the *Protection of the Environment Administration Act 1991*. An assessment of the project against the principles of ecologically sustainable development as per clause 7(4) of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* is provided below.

Precautionary principle

A range of environmental investigations, as described in Part C of the Environmental Impact Statement, have been undertaken during the development of the project and the environmental assessment process, to ensure that potential impacts are understood with a high degree of certainty. The assessment of the potential impacts of the project is considered to be consistent with the precautionary principle. The assessments undertaken are consistent with accepted scientific and assessment methodologies, and have taken into account relevant statutory and agency requirements. The assessments have applied a conservative approach with regard to construction and operational arrangements, and the modelling used.

Examples of the application of the precautionary principle include the biodiversity assessment, and the noise and vibration assessment. For the biodiversity assessment, although the Long-nosed Bandicoot population in inner western Sydney was considered unlikely to occur in the project area, the potential impacts on this species were still assessed.

The noise and vibration assessment involved a 'worst case' construction noise impact assessment, even though the likelihood of the worst-case is considered to be low and therefore potential noise impacts are considered to be lower than assessment. Due to much of the works being undertaken during possession periods many of the predicted noise impacts would be limited to these periods and therefore would not occur throughout the construction period.

The project has evolved to avoid impacts where possible, and to reflect the findings of the assessments undertaken. A number of safeguards have been proposed to minimise potential impacts. These safeguards would be implemented during construction and operation. No safeguards have been postponed as a result of lack of scientific certainty.

Principle of inter-generational equity

Construction along a long linear corridor has the potential for some degree of environmental and social disturbance. These disturbances include the clearing of vegetation; amenity impacts during construction; impacts to heritage items; and changes to traffic movements and access. However, the potential for environmental and social disturbance as a result of construction has to be balanced against the long term benefits of Sydney Metro overall.

Once operational, the project (in conjunction with other Sydney Metro projects) would benefit future generations. The project would provide long-term benefits by strengthening connections and access across Sydney, through the provision of a more efficient means of public transport. These benefits would be most felt by future generations as the population along the project area increases in line with future development proposed by the draft *Sydenham to Bankstown Urban Renewal Strategy*.

In addition to the broader Sydney transport operational benefits, the 'door-to-door' experience provided by Sydney Metro would also result in long-term health benefits with the creation of safer and more appealing conditions for pedestrians, cyclists, and other transit users. This would make modes of transport like walking and cycling more desirable, which would result in increased health of future generations.

The project would also facilitate future delivery of active transport corridor that would further improve the health of the community including future generations. In addition, the project would promote better access for all people, by upgrading stations to meet statutory accessibility requirements.

Conservation of biological diversity and ecological integrity

The majority of the project area is located within an existing transport corridor, with minimal habitat value. The few areas of Downy Wattle (*Acacia pubescens*) located between Punchbowl and Bankstown stations have been excluded from the project area.

A biodiversity assessment was undertaken in accordance with the *Framework for Biodiversity Assessment* to identify potential adverse impacts on biodiversity. The main potential impact on biodiversity would occur as a result of clearing of vegetation to enable the project to be constructed. It was assumed for the purpose of the assessment that construction would require removal of all vegetation located along the rail corridor in the project area. This would involve removal of 29.8 hectares of vegetation, the majority of which comprises exotic plants (about 21.5 hectares) or planted, often non-indigenous, native species on fill material (about 7.3 hectares). Removing all vegetation in the rail corridor would impact on one hectare of native vegetation.

The assessment concluded that the project would not significantly impact any listed ecological community or species.

To mitigate potential impacts to biodiversity as a result of clearing of native vegetation in the rail corridor, the proposed Biodiversity Offset Strategy would be implemented in accordance with the *NSW Biodiversity Offsets Policy for Major Projects*. The offset strategy requires the purchase and retirement of biodiversity credits calculated in accordance with the *Framework for Biodiversity Assessment*.

Improved valuation and pricing of environmental resources

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

The assessment has identified the environmental and other consequences of the project, and identified mitigation measures where appropriate to manage potential impacts. If approved, construction and operation would be undertaken in accordance with relevant legislation, the conditions of approval, and the environmental management plans described in Section 28.4. These requirements would result in an economic cost to the proponent. The implementation of mitigation measures would increase the capital and operating costs of the project. This signifies that environmental resources have been given appropriate valuation.

The design has been developed with an objective of minimising potential impacts on the surrounding environment. This indicates that the design has been developed with an environmental objective in mind.

28.8 Conclusion

The project involves upgrading 10 existing stations west of Sydenham (Marrickville to Bankstown inclusive), and a 13 kilometre long section of the Sydney Trains T3 Bankstown Line, between west of Sydenham Station and west of Bankstown Station, to improve accessibility for customers and meet the standards required for metro operations. The project is needed to support the development of Sydney Metro, in line with the objectives of *Sydney's Rail Future*.

The detailed design would be developed with the objective of minimising potential impacts on the local and regional environment and community. The design and construction methodology would continue to be developed with this overriding objective in mind, taking into account the input of stakeholders and the local community.

To manage the potential impacts identified by the Environmental Impact Statement, and in some cases remove them completely, the assessment chapters detail a range of management and mitigation measures that would be implemented during construction and operation. The project's environmental performance would be managed in accordance with the approach described in Section 28.4. This includes implementing the Construction Environmental Management Framework, Construction Environmental Management Plan, Construction Noise and Vibration Strategy, Temporary Transport Strategy, Utilities Management Framework, and the Operational Environmental Management Plan. These plans would also ensure compliance with relevant legislation and any conditions of approval.

Section 28.5 compiles the mitigation measures that would be implemented.

With the implementation of the proposed management and mitigation measures, the potential environmental impacts of the project are considered manageable.

29. Reference list, definitions and abbreviations

Reference list

Acid Sulfate Soil Management Advisory Committee (ASSMAC), 1998, *Acid Sulfate Soil Manual* (including the Acid Sulfate Soils Assessment Guidelines), August 1998

AEC Group, 2015, *Draft Sydenham-Bankstown Corridor - Employment Lands Analysis of Opportunity Sites*, report prepared for the NSW Department of Planning and Environment as an input to the Sydenham to Bankstown Urban Renewal Corridor Strategy

AECOM Australia and Parsons Brinkerhoff Australia (PB), 2016, *Southwest Stations and Corridor (SSC) Station and Urban Design Report*, 13 February 2017

ANZECC/ARMCANZ, 2000, *National Water Quality Management Strategy – Paper No. 4: Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Volume 1*, October 2000

Attenbrow, V., 2010, *Sydney's Aboriginal Past: Investigating the archaeological and historical records*

Audit Office of New South Wales, 2016, *Auditor-General's Report Financial Audit Volume Nine Report on Transport*, 1 December 2016

Australia International Council on Monuments and Sites (ICOMOS) Incorporated, 2013, *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance*, adopted in October 2013

Australian Government, 2013, *Sustainable Procurement Guide*

Australian Government, 2015, *National Climate Resilience and Adaptation Strategy*

Australian Greenhouse Office, 2006, *Climate Change Impacts and Risk Management – A Guide for Business and Government*

Australian Museum Consulting, 2014, *Railway Overhead Booking Offices heritage Conservation Strategy*

Australian Transport Council, 2006, *National Guidelines for Transport System Management in Australia*

Bankstown City Council, 2011a, *Salt Pan Creek Stormwater Catchment Study*, 2007 Report including 2009 Addendum, produced by Bewsher Consulting and BMT WBM, August 2011

Bankstown City Council, 2011b, *Bankstown CBD Local Area Plan – A City for the City*, September 2011

Bankstown City Council, 2013, *Salt Pan Creek Catchments Floodplain Risk Management Study and Plan*, prepared by Bewsher Consulting, December 2013

Bankstown City Council, 2016, *North East Local Area Plan*, April 2016

British Standards Institution, 1992, *BS 6472:1992 Evaluation of human exposure to vibration in buildings*

British Standards Institution, 2009, *BS 5228-2:2009 Code of practice for noise and vibration on construction and open sites – Part 2: Vibration*

Cardno, 2016, draft *Overland Flow Study Canterbury LGA Cooks River Catchment*, prepared for Canterbury City Council, 12 February 2016

Cooks River Catchment Management Committee, 1999, *Cooks River Catchment Management Strategy*, December 1999

CRC for Rail Innovation, 2013, *Improving Rail Station Access in Australia*, prepared under the Australian Government's Cooperative Research Centres Programme

CSIRO and Bureau of Meteorology, 2015, *Climate Change in Australia – East Coast Cluster Report*

Department of Environment, 2013, *Matters of National Environmental Significance Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999*, Australian Government Department of the Environment

Department of Environment and Conservation (DEC), 2005, *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*, August 2005

DEC, 2006a, *Assessing Vibration: A Technical Guideline*, February 2006

DEC, 2006b, *Using the ANZECC Guidelines and Water Quality Objectives in NSW*, June 2006

DECC, 2007, *Floodplain Risk Management Guideline: Practical Consideration of Climate Change*, October 2007

Department of Environment and Climate Change (DECC), 2008, *Managing Urban Stormwater: Soils and Construction, Volume 2A Installation of services*, January 2008

DECC, 2009, *Interim Construction Noise Guideline*, July 2009

DECC, 2010a, *Code of practice for archaeological investigation of Aboriginal objects in New South Wales*, prepared under Part 6 of the National Parks and Wildlife Act 1974, September 2010

DECC, 2010b, *Aboriginal cultural heritage consultation requirements for proponents 2010*, prepared under Part 6 of the National Parks and Wildlife Act 1974, April 2010

Department of Environment, Climate Change and Water (DECCW), 2010c, *Floodplain Risk Management Guide Incorporating Sea Level Rise Benchmarks in Flood Risk Assessments*

DECCW, 2011, *NSW Road Noise Policy*, March 2011

Department of Infrastructure, Planning and Natural Resources (DIPNR), 2005, *Floodplain Development Manual: the management of flood liable land*

Department of Infrastructure and Regional Development, 2015, *State of Australian Cities 2014-2015*, December 2014

Department of Land and Water Conservation, 2002, *Site Investigations for Urban Salinity*, Local Government Salinity Initiative

Department of Mineral Resources, 1983, *Sydney 1:100,000 Geological Series Sheet 9130*

Department of Planning, 2007, *New guideline and changes to section 117 direction and EP&A Regulation on flood prone land*, Planning Circular, issued 31 January 2007

Department of Planning, 2008, *Development Near Rail Corridors and Busy Roads – Interim Guideline*

Department of Planning, 2011, *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33*

Department of Planning and Environment, 2014, *A Plan for Growing Sydney*, December 2014

Department of Planning and Environment, 2016, *Social impact assessment: Draft guidelines for State significant mining, petroleum production and extractive industry development* December 2016

Department of Planning and Environment, 2017, *Draft Sydenham to Bankstown Urban Renewal Corridor Strategy*, October

Department of Primary Industries (DPI) Water, 2012, *NSW Aquifer Interference Policy*

Department of Urban Affairs and Planning and Environment Protection Authority, 1998, *Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land*

Deutsches Institute fur Normung, 1999, *DIN 4150: Part 3-1999 Structural vibration – Effects of vibration on structures*

Ecologically Sustainable Development Steering Committee, 1992, *National Strategy for Ecologically Sustainable Development*, December 1992

Engineers Australia, 1999, *Australian Rainfall and Runoff*

Environment Protection and Heritage Council (EPHC), 2009, *National Waste Policy: Less Waste, More Resources*, November 2009

Environment Protection Authority (EPA), 2000, *NSW Industrial Noise Policy*, January 2000

EPA, 2013, *Rail Infrastructure Noise Guideline* (the RING), May 2013

EPA, 2014a, *Waste Classification Guidelines*, November 2014

EPA, 2014b, *NSW Waste Avoidance and Resource Recovery Strategy 2014–21*, December 2014

EPA, 2015a, *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*, September 2015

EPA, 2015b, *New South Wales State of the Environment 2015*, December 2015

Georges River Combined Councils' Committee, 2016, *2015-2016 River Health Georges River Report Card*

Government Architect's Office, 2015, *Draft Bankstown to Sydenham Corridor Strategy: Open space and recreation strategy*, May 2015

Government Architect NSW, 2016, *Better Placed: A design led approach: developing an Architecture and Design Policy for New South Wales*

Greater Sydney Commission, 2016, *Draft South District Plan – co-creating a greater Sydney*, November 2016

Hammonds, A., 2011, *Urban Design and Placemaking Manual*, second edition, endorsed by the Planning Institute of Australia

Heritage Council Victoria, 2013, *Adaptive Reuse of Industrial Heritage: Opportunities & Challenges*, July 2013

Heritage Office, 1998, *Skeletal remains: Guidelines for the management of human skeletal remains under the Heritage Act 1977*

Heritage Office, 2001, *Assessing heritage significance*, a NSW Heritage Manual update, July 2001

Heritage Office, 2002, *Statements of Heritage Impact*, Heritage Office and Department of Urban Affairs & Planning 1996, revised 2002

Heritage Office, 2006a, *Historical Archaeology Code of Practice*, June 2006

Heritage Office, 2006b, *Design in Context Guidelines for Infill Development in the Historic Environment*, June 2006

Heritage Office and Department of Urban Affairs and Planning, 1996, *NSW Heritage Manual 1996*

ICOMOS, 2011, *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties*, a publication of the International Council on Monuments and Sites, January 2011

Infrastructure Australia, 2011, *Creating Places for People: An Urban Design Protocol for Australian Cities*

Infrastructure Australia, 2016 and 2017, *Australian Infrastructure Plan, Priorities and Reforms for our Nation's Future*, and *The Infrastructure Priority List Project and Initiative Summaries*, February 2017

International Standard ISO 14837-1 2005 *Mechanical vibration - Ground-borne noise and vibration arising from rail systems - Part 1: General Guidance*

Landcom, 2004, *Managing Urban Stormwater: Soils and Construction Volume 1*, 4th Edition, March 2004

Landscape Institute and Institute of Environmental Management and Assessment, 2013, *Guidelines for Landscape and Visual Impact Assessment*, third edition, UK

Macroplan, 2011, *Anzac Mall Place Management Strategy*, prepared for Bankstown City Council

Marrickville Council and NSW Government, 2013, *Marrickville Valley Flood Study*, Final Report, April 2013

Marrickville Council, 2015, *Cooks River Floodplain Risk Management Study and Plan*, prepared by WMA Water and Storm Consulting, February 2015

National Environment Protection Council (NEPC), 1998, *National Environment Protection (Movement of Controlled Waste between States and Territories) Measure 1998*

NEPC, 2013, *National Environment Protection (Assessment of Site Contamination) Amendment Measure (No. 1)*

NEPC, 2003, *National Environment Protection (Ambient Air Quality) Measure*

National Occupational Health and Safety Commission (NOHSC), 2004, *Approved Criteria for Classifying Hazardous Substances* (NOHSC: 1008(2004))

National Parks and Wildlife Service, 1997, *Aboriginal Cultural Heritage Standards and Guidelines Kit*, Sydney

National Transport Commission, 2016, *Australian Code for the Transport of Dangerous Goods by Road & Rail Dangerous Goods Code* NSW Department of Environment and Conservation (DEC), 2006, *Using the ANZECC Guidelines and Water Quality Objectives in NSW*

NSW Government, 2015, *State Priorities: NSW Making it Happen*

NSW Government, 2016a, *Rebuilding NSW – State Infrastructure Strategy*, October 2016

NSW Government, 2016b, *Sydney Metro City & Southwest, Final Business Case Summary*, October 2016

NSW Government Architect's Office, 2016, *Railway Footbridges Heritage Conservation Strategy*, August 2016

NSW Health, 2013, *Exhumation of Human Remains*, Policy Directive Ministry of Health, NSW, PD2013_046, 5 December 2013

NSW Heritage Division, 2009, *Assessing Significance for Historical Archaeological Sites and Relics*

Office of Environment and Heritage (OEH), 2011a, *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW*, prepared under Part 6 of the *National Parks and Wildlife Act 1974*, April 2011

OEH, 2011b, *Guidelines for Consultants Reporting on Contaminated Sites*, August 2011

OEH 2014a, *Framework for Biodiversity Assessment*, NSW Biodiversity Offsets Policy for Major Projects, September 2014

OEH, 2014b, *NSW Biodiversity Offsets Policy for Major Projects*, September 2014

OEH, 2014c, *BioBanking Assessment Methodology 2014*, September 2014

OEH, 2014d, *NSW Government Resource Efficiency Policy*, July 2014

OEH, 2015, *Urban Green Cover in NSW Technical Guidelines*, February 2015

OEH, 2016, *Beachwatch State of the beaches 2015-16*, Sydney region, October 2016

Parsons Brinckerhoff, 2016, *Sydney Metro City and Southwest – Bankstown Line Temporary Transport Plan Existing Conditions Report*

Paul Davies Pty Ltd, 2016, *Hurlstone Park Heritage Assessment Study - Stage 1 Report*, September 2016

Price, C. and Banks, P, 2016, *Inner West Light Rail Expansion Long-nosed Bandicoot Population Research Project Final Report to Transport for NSW*. Report prepared for Transport for NSW by the University of Sydney.

Roads and Maritime Services (Roads and Maritime), 2012, *Bridge Aesthetics: Design guidelines to improve the appearance of bridges in NSW*

Roads and Maritime, 2013a, *Environment Impact Assessment Practice Note – Socio Economic Assessment* (EIA N05), July 2013

Roads and Maritime Services, 2013b, *Environmental Impact Assessment Guidance Note – Guidelines for landscape character and visual impact assessment*, 3rd edition

Roads and Maritime Services, 2014, *Beyond the Pavement: urban design policy, procedures and design principles*

Chapman G.A., Murphy, C.L., Tille P.J., Atkinson G. and Morse R.J., 2009, *Soil Landscapes of the Sydney 1:100,000 Sheet map*, Department of Environment, Climate Change and Water, Sydney

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

Standards Australia, 2005, *AS4482:2005 Guide to investigation and sampling of site with potentially contaminated soil*

Standards Australia, 2013, *AS 5334:2013 Climate change adaptation for settlements and infrastructure – a risk based approach*

Standards Australia/Standards New Zealand Standard Committee, 2009, *AS/NZS ISO 31000:2009 Risk Management-Principles and Guidelines*, November 2009

Sydney Trains, 2015, *Heritage Platforms Conservation Management Strategy*

Sydney Trains, 2016, *Canopies and Shelters, Design Guide for Heritage Stations*, December 2016

Tamwoy, SM, 2003, *MetroGrid Project Test Excavation of Buried Shell Bed at Fraser Park, Marrickville, NSW – Preliminary Report*.

Transport for NSW, 2012a, *Sydney's Rail Future - Modernising Sydney's Trains*, June 2012

Transport for NSW, 2012b, *NSW Long Term Transport Master Plan*, December 2012

Transport for NSW, 2013a, *Sydney City Centre Access Strategy*, December 2013

Transport for NSW, 2013b, *NSW Sustainable Design Guidelines*, Version 3.0

Transport for NSW, 2013c, *Transport Environment and Sustainability Policy Statement*, June 2013

Transport for NSW, 2013d, *Sydney's Cycling Future*, Cycling for everyday transport, December 2013

Transport for NSW, 2013e, *Sydney's Bus Future*, Simpler, faster, better bus services, December 2013

Transport for NSW, 2016a, *Sydney Metro City & Southwest Chatswood to Sydenham Environmental Impact Statement*, May 2016

Transport for NSW, 2016b, *TfNSW Climate Risk Assessment Guidelines*, TP-SD-081/1.0

Transport for NSW, 2017a, *Sydenham to Bankstown Upgrade - State Significant Infrastructure Application Report*, February 2017

Transport for NSW, 2017b, *Sydney Metro City & Southwest Sydenham to Bankstown Design Guidelines*

Vanclay, F. 2003. *International Principles for Social Impact Assessment*, Impact Assessment & Project Appraisal 21(1), pp. 5-11

Vanclay, F., Esteves, A.M., Aucamp, I. & Franks, D. 2015. *Social Impact Assessment: Guidance for assessing and managing the social impacts of projects*, International Association for Impact Assessment, April 2005

WorkCover NSW, 2005, *Storage and Handling of Dangerous Goods Code of Practice*

World Commission on Environment and Development (the Brundtland Commission), 1987, *Report of the World Commission on Environment and Development: Our Common Future*

World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), 2014, *The Greenhouse Gas Protocol*, A Corporate Accounting and Reporting Standard

Abbreviations

Abbreviation	Definition
µg/m ³	micrograms per cubic metre
AEP	annual exceedance probability
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal heritage impact permit
Air NEPM	<i>National Environment Protection (Ambient Air Quality) Measure</i>
ANZECC	Australian and New Zealand Environment and Conservation Council
ARTC	Australian Rail Track Corporation
AS	Australian Standard
ASSMAC	Acid Sulfate Soils Management Advisory Committee
BoM	Bureau of Meteorology
BS	British Standard
CBD	central business district
CEMP	construction environmental management plan
CH ₄	methane
Clean Air Regulation	<i>Protection of the Environment Operations (Clean Air) Regulation 2010</i>
CO	carbon monoxide
CO ₂	carbon dioxide
CPTED	crime prevention through environmental design
CSIRO	Commonwealth Scientific and Industrial Research Organisation
dB	Decibel (A-weighted)
DDA	<i>Disability Discrimination Act 1992</i>
DEC	NSW Department of Environment and Conservation
DECC	Department of Environment and Climate Change
DECCW	Department of Environment, Climate Change and Water
DIPNR	NSW Department of Infrastructure, Planning and Natural Resources
DPI	Department of Primary Industries
DSAPT	<i>Disability Standards for Accessible Public Transport 2002</i>
EIS	environmental impact statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
EPA	Environment Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
ESD	<i>ecologically sustainable development</i>
FM Act	<i>Fisheries Management Act 1994</i>
HFCs	hydrofluorocarbons
Hz	hertz
ICNG	<i>Interim Construction Noise Guideline</i>
Infrastructure SEPP	<i>State Environmental Planning Policy (Infrastructure) 2007</i>
km	kilometres

Abbreviation	Definition
km/hr	kilometres per hour
LEP	local environmental plan
LGA	local government area
m	metres
m/s	metres per second
m ³	cubic metre
mg	milligram
N ₂ O	nitrous oxide
NCA	noise catchment areas
NEPC	National Environment Protection Council
NO ₂	nitrogen dioxide
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NSW	New South Wales
NW Act	<i>Noxious Weeds Act 1993</i>
OEH	Office of Environment and Heritage
PAD	potential archaeological deposit
PFCs	perfluorocarbons
PMF	probable maximum flood
POEO Act	<i>Protection of the Environment Operations Act 1974</i>
RAP	remediation action plan
RBL	rating background level
RING	<i>Rail Infrastructure Noise Guideline</i> (EPA, 2013)
RNP	<i>Road Noise Policy 2011</i>
Roads and Maritime	Roads and Maritime Services
SEPP	State environmental planning policy
SEPP 33	<i>State Environmental Planning Policy No 33 – Hazardous and Offensive Development</i>
SF ₆	sulphur hexafluoride
SHR	State heritage register
SO ₂	sulphur dioxide
State and Regional Development SEPP	<i>State Environmental Planning Policy (State and Regional Development) 2011</i>
Waste Regulation	<i>Protection of the Environment Operations (Waste) Regulation 2014</i>
TSC Act	<i>Threatened Species Conservation Act 1995</i>
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2007</i>

Definitions

Term	Definition
100-year flood	A 100-year flood is the flood that will occur or be exceeded on average once every 100 years. It has a one per cent probability of occurring in any given year. The same principle applies to other flooding events, such as the 10-year, 20-year and 50-year floods.
Aboriginal object	Defined by the <i>National Parks and Wildlife Act 1974</i> as 'any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains'.
Aboriginal site	A place where physical remains or modification of the natural environment indicate past and 'traditional' activities by Aboriginal people. Site types include artefact scatters, isolated artefacts, burials, shell middens, scarred trees, quarries, and contact sites. Includes sites listed on the AHIMS. Also known as Aboriginal objects.
Aboriginal place	Declared by the Minister for the Environment, in accordance with Section 84 of the <i>National Parks and Wildlife Act 1974</i> and by an order published in the Gazette, as a place that, in the opinion of the Minister, is or was of special significance with respect to Aboriginal culture.
Aboriginal places of heritage significance	Defined in the <i>Standard Instrument - Principal Local Environmental Plan</i> as an area of land, the general location of which is identified in an Aboriginal heritage study adopted by the Council, and that may be shown on the Heritage Map. The term may include (but is not limited to) places that are declared as Aboriginal places under section 84 of the <i>National Parks and Wildlife Act 1974</i> .
Accessibility	A public transport customer's ability to reach their destination unhindered and as independently as possible. Includes compliance with relevant disability standards such as the <i>Disability Discrimination Act 1992</i> and the <i>Disability Standards for Accessible Public Transport 2002</i> . Also refers to a measure of the ability or ease of customers to travel between various origins and destinations.
Annual exceedance probability	The annual exceedance probability (AEP) is a measure of the frequency of a rainfall event. It is the probability that a given rainfall total, accumulated over a given duration, will be exceeded in any one year. A one per cent AEP event is a rainfall event with a one per cent chance of being exceeded in magnitude in any year.
Anti-throw screen	Installed on structures such as bridges or overhead walkways to prevent injury and damage resulting from objects being thrown off the structure.
Archaeological potential	The likelihood of unregistered surface and/or subsurface archaeological materials to be present at a location.
Australian height datum	A common reference surface level used in Australia which is approximately equivalent to the height above mean sea level.
Average delay	Duration, in seconds, of the average vehicle waiting time at an intersection.
Average recurrence interval	The long-term average number of years between the occurrence of a flood larger than the selected event.
Ballast	Crushed rock, stone etc used to provide a foundation for a railway track. Ballast usually provides the bed on which railway sleepers are laid, transmits the load from train movements, and restrains the track from movement.
Biobank site	A site to which a biobanking agreement applies.
Biobanking agreement	Landowners enter into a biobanking agreement with the Minister for the Environment to establish a biobank site. A biobanking agreement is a conservation covenant that is attached to the land title. It specifies the management actions to be undertaken on biobank sites to improve biodiversity values and allow biodiversity credits to be created.
Biodiversity credits	In accordance with the <i>Framework for Biodiversity Assessment</i> (OEH, 2014b), biodiversity credits, which consist of ecosystem credits and species credits, represent the impacts on threatened species as a result of a proposal. A decision support tool produced by OEH is used to determine the number of biodiversity credits required to offset the impacts of a development.

Term	Definition
Biodiversity offsets	Biodiversity offsets are measures that benefit biodiversity by compensating for the adverse impacts elsewhere of an action, such as clearing for development. Biodiversity offsets work by protecting and managing biodiversity values in one area in exchange for impacts on biodiversity values in another.
Biodiversity offset strategy	The section of a Biodiversity Assessment Report prepared in accordance with the <i>Framework for Biodiversity Assessment</i> , which presents the approach to the delivery of biodiversity offsets for a project, including the quantum of offsets required, options to deliver these offsets, an estimate of the costs involved, and the additional steps required to finalise their delivery.
Biodiversity values	The composition, structure and function of ecosystems, including native species, populations and ecological communities, and their habitats.
Biophysical environment	The physical environment (water, soil etc) as well as the biological activity within it (plants, animals etc.).
Catchment	The area drained by a stream or body of water, or the area of land from which water is collected.
Chatswood to Sydenham project	One of the two components of the Sydney Metro City & Southwest project, the other being the Sydenham to Bankstown upgrade.
Classified road	A road that meets the definition of a classified road and is listed as such under the <i>Roads Act 1993</i> – includes main roads, highways, freeways etc.
Climate	The average weather experienced at a site or region over a period of many years, ranging from months to many thousands of years. The relevant measured quantities are most often surface variables such as temperature, rainfall, and wind.
Community	A physical or cultural grouping of stakeholders with common interests created by shared proximity or use.
Concourse	The paved open area at a station – can be located either behind or in front of ticket barriers.
Construction compound	An area used as the base for construction activities, usually for the storage of plant, equipment and materials, and/or construction site offices and worker facilities.
Crossover	Points and tracks enabling trains to switch from one line to another.
Cutting	Excavation from the surface down, so that the new surface level sits below the adjacent ground level.
Dangerous goods	Dangerous goods are substances or articles that pose a risk to people, property or the environment, due to their chemical or physical properties. They are usually classified with reference to their immediate risk.
Degree of saturation	The ratio between traffic volumes and capacity of an intersection used to measure how close to capacity an intersection is operating. Degree of saturation is a direct measure of the congestion level at the intersection. As it approaches 1.0, both queue length and delays increase rapidly. Satisfactory operations usually occur with a degree of saturation between 0.8-0.9 or below.
Discharge	The quantity of water per unit of time flowing in a stream, for example cubic meters per second or megalitres per day.
Ecologically sustainable development	Development that uses, conserves and enhances the resources of the community so that ecological processes on which life depends are maintained, and the total quality of life, now and in the future, can be increased.
Ecosystem credit	A measurement of the value of endangered ecological communities, critically endangered ecological communities, and threatened species habitat for species that can be reliably predicted to occur with a plant community type. Ecosystem credits measure the loss in biodiversity values as a result of a proposal, and the gain in biodiversity values at an offset site.
Emission	A substance discharged into the air.
Embankment	A structure to allow rail lines (or other infrastructure) to be located above the natural ground surface.
Erosion	A natural process where wind or water detaches a soil particle and provides energy to move the particle.

Term	Definition
Flood	The inundation of normally dry land by water which escapes from, is released from, is unable to enter, or overflows from the normal confines of a natural body of water or watercourse, such as rivers, creeks or lakes, or any altered or modified body of water, including dams, canals, reservoirs and stormwater channels.
Flood liable land	Land which is within the extent of the probable maximum flood and therefore prone to flooding.
Floodplain	The area of land subject to inundation by floods up to and including the probable maximum flood.
Flora and fauna	Plants and animals
Formation	Refer to track formation
Glare	The uncomfortable brightness of a light source when viewed against a dark background.
Groundwater	All waters occurring below the land surface. The upper surface of the soils saturated by groundwater in any particular area is called the water table.
Habitat tree	A tree that is recognised as being of value as a shelter, roosting, and/or nesting resource for fauna species. Includes hollow-bearing trees, snags (standing dead trees), and trees with nests or other signs of fauna occupancy.
Heritage listed	An item, building or place included on statutory heritage lists maintained by local, State and/or the Australian Government.
Impervious	Surfaces that are not permeable to water, such as paved areas.
Infiltration	The downward movement of water into soil and rock, which is largely governed by the structural condition of the soil, the nature of the soil surface (including presence of vegetation), and the moisture content of the soil.
Interchange	A location where customers transfer from one mode of transport to another or between two services of the same mode. Also includes a place where customers join or leave the public transport system on foot, by bicycle, motorcycle, or car.
Kiss and ride	An area allocated for cars to pull out of the active traffic lane and drop passengers off at a station.
L _{A90} (period)	The sound pressure level exceeded for 90 per cent of the measurement period.
L _{Aeq} (1 hour)	The busiest one hour 'equivalent continuous noise level', representing the typical L _{Aeq} noise level from all the proposal noise events during the busiest one hour of the assessment period.
L _{Aeq} (15 hour)	The daytime 'equivalent continuous noise level', representing the cumulative effects of all the proposal noise events occurring in the daytime period from 7am to 10pm.
L _{Aeq} (24 hour)	The 'equivalent continuous noise level', sometimes also described as the 'energy-averaged noise level', representing the cumulative effects of all the proposal noise events occurring in one day.
L _{Aeq} (9 hour)	The night-time 'equivalent continuous noise level', representing the cumulative effects of all the proposal noise events occurring in the night-time period from 10pm to 7am.
L _{Aeq} (time)	Typically used to describe ambient (background) noise levels.
L _{Amax}	The maximum sound level recorded during the measurement period.
Landform	A specific feature of the landscape or the general shape of the land.
Landscape	All aspects of a tract of land, including landform, vegetation, buildings, villages, towns, cities, and infrastructure.
Landscape character	The combined quality of built, natural and cultural aspects that make up an area and provide its unique sense of place.
Landscape character zone	An area of landscape with similar properties or strongly defined spatial qualities, distinct from areas immediately adjacent.
Landscape feature	A component, part or feature of the landscape that is prominent or eye-catching, e.g. hills, buildings, vegetation.
Landscape quality	Largely subjective judgement based on particular characteristics that influence the way in which the environment is experienced, including special interests such as cultural associations or heritage interests, the presence and/or type of elements, and condition.

Term	Definition
Level of service	Defined by Austroads as a measure for ranking operating road and intersection conditions, based on factors such as speed, travel time, freedom to manoeuvre, interruptions, comfort, and convenience.
Light spill	The spilling of light beyond the boundary of a property or lit area.
Local road	Road used mainly to access properties located along the road.
pH	A measure of the degree of acidity or alkalinity expressed on a logarithmic scale of one to four, with one being most acid, seven neutral, and 14 most basic (alkaline).
PM ₁₀	Particulate matter 10 micrometres or less in diameter. Particles in this size range make up a large proportion of dust that can be drawn deep into the lungs. This is a classification of particles by size rather than chemical properties.
Platform screen doors	Screens the platform from an approaching train. The doors open after the train doors have opened to let passengers move between the train and platform, and close before the train doors have been closed, to improve safety and efficiency.
Possession	A period of time during which a rail line is shut down to trains, to permit work to be carried out on or near the line.
Potential archaeological deposit	An area where sub-surface stone artefacts and/or other cultural materials are likely to occur.
Power supply feeder	Electricity distribution line
Probable maximum flood	The largest flood that could conceivably occur (a worst-case flood event). It is typically estimated from probable maximum precipitation coupled with the worst flood-producing catchment conditions. The probable maximum flood extent defines the floodplain and incorporates all flood-prone land.
Project	The construction and operation of the Bankstown to Sydenham upgrade component of Sydney Metro City & Southwest.
Project area	The area that would be directly affected by construction works (also known as the construction footprint). It includes the location of project infrastructure, the area that would be directly disturbed by the movement of construction plant and machinery, and the location of the storage areas/compounds sites etc, that would be used to construct that infrastructure.
Rail alignment	The exact positioning of the track, accurately defined both horizontally and vertically, along which the rail vehicles operate.
Rail corridor	The corridor within which the rail tracks and associated infrastructure are located.
Rail junction	A point where two or more rail lines either meet or cross.
Rating background level	The underlying level of noise present in an area once transient and short-term noise events are filtered out.
Relic	A relic is defined by the NSW <i>Heritage Act 1977</i> as 'any artefact, object or material evidence which relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and which is of State or local heritage significance.'
Riparian	Pertaining to, or situated on, the bank of a river or other water body.
Runoff	The amount of rainfall which ends up as streamflow, also known as rainfall excess.
Salinity	The total soluble mineral content of water or soil (dissolved solids), with concentrations of total salts are expressed as milligrams per litre (equivalent to parts per million).
Sediment	Material of varying sizes that has been, or is being moved from its site of origin by the action of wind, water or gravity.
Sky glow	The brightening of the night sky above towns, cities, and countryside.
Surface water	Water that is derived from precipitation or pumped from underground and may be stored in dams, rivers, creeks and drainage lines.
Section 170 register	Under section 170 of the <i>Heritage Act 1977</i> , all state government agencies must keep and administer a database of heritage assets called a Section 170 Heritage and Conservation Register.
Sensitive receivers	Land uses which are sensitive to potential noise, air, and visual impacts, such as residential dwellings, schools and hospitals.

Term	Definition
Sensitivity	The sensitivity of a landscape character area or view and its capacity to absorb change. In the case of visual impact this also relates to the type of viewer and number of viewers.
Species credit	The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land. based on habitat surrogates. Species that require species credits are listed in the threatened species profile database.
Spoil	Material generated by construction
Station area	A subset of the project area. It includes the station and the area around the station where works are proposed as part of the project – mainly to provide facilities/space for customers to transfer between other forms of transport (such as bus stops, taxi parking bays, kiss and ride bays, cycle parking/storage).
Station catchment	That part of each suburb located within a radius of about 400 metres of a station.
Study area	The study area is defined as the wider area including and surrounding the project area, with the potential to be directly or indirectly affected by the project (for example, by noise and vibration, visual or traffic impacts). The actual size and extent of the study area varies according the nature and requirements of each impact assessment technical report.
Sydenham to Bankstown upgrade	The Sydenham to Bankstown upgrade forms the project for the purposes of this EIS. It is one of the two components of the Sydney Metro City & Southwest project, the other being the Chatswood to Sydenham project.
Sydney Metro	Sydney Metro is a new standalone automated rapid transit rail network under construction in Sydney. The Sydney Metro network consists of Sydney Metro Northwest (under construction) and Sydney Metro City & Southwest, which together would provide 66 kilometres of metro rail line and 31 metro railway stations.
Sydney Metro City & Southwest	Part of the Sydney Metro network proposed between Chatswood and Bankstown, comprising two core components - the Chatswood to Sydenham project and the Sydenham to Bankstown upgrade.
Sydney Trains	The agency responsible for the provision of suburban passenger train services in/around Sydney.
Tree	A long lived woody perennial plant growing to greater than (or usually greater than) three metres in height, with one or relatively few main stems or trunks.
Threatened biota	Threatened species, populations or communities listed under the EPBC Act, FM Act and/or the TSC Act.
Topography	Representation of the features and configuration of land surfaces.
Track	The structure consisting of the rails, fasteners, sleepers, and ballast, which sits on the track formation.
Track formation	The earthworks/material on which the ballast, sleepers, and tracks are laid.
Trackside intruder detection system	A system where information is fed to the control centre whenever a large object moves from the platform to the tracks.
Traction substation	An electrical substation that converts electric power from the form provided by the electricity provider to an appropriate voltage, current type and frequency, which can be used to supply the rail network with power.
View	The visual experience from the viewer's perspective.
Visual amenity	The value of a particular area or view in terms of what is seen.
Visual catchment	Extent of potential visibility to or from a specific area, feature or proposal.
Visual impact	The impacts on the views from residences, workplaces, and public places. This can be positive (i.e. benefit or an improvement) or negative (i.e. adverse or a detractor).
Waste	Waste is defined by the EPA as any matter (whether liquid, solid, gaseous or radioactive) that is discharged, emitted, or deposited in the environment in such volume, constituency, or manner as to cause an alteration to the environment.
Waste management hierarchy	The waste management hierarchy is a set of priorities for the efficient use of resources, which underpins the objectives of the <i>Waste Avoidance and Resource Recovery Act 2001</i> . The waste management hierarchy progresses from avoidance (most preferred), to re-use/recycling, to disposal (least preferred).

Term	Definition
Watercourse	Refers to waterways, such as rivers, streams and creeks
Water quality	Chemical, physical and biological characteristics of water, including the degree (or lack) of contamination.
Water sharing plan	A legal document prepared under the <i>Water Management Act 2000</i> (NSW) that establishes rules for sharing water between the environmental needs of the river or aquifer and water users and also different types of water use.
Water table	The surface of saturation in an unconfined aquifer, or the level at which pressure of the water is equal to atmospheric pressure.

Document Status



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Appendices

Appendix A – Secretary's environmental assessment requirements

Appendix B – Environmental Planning and Assessment Regulation 2000 checklist

Appendix A – Secretary’s environmental assessment requirements

Table A.1 General standard SEARs

Item	Requirement	Where addressed?
1. Environmental Impact Assessment Process	1. The Environmental Impact Statement must be prepared in accordance with Part 3 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (the Regulation).	Certification page, Section 3.1.3 and Appendix B
	2. It is the Proponent's responsibility to determine whether the project needs to be referred to the Commonwealth Department of the Environment for an approval under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act). The Proponent must contact the Commonwealth Department of the Environment immediately if it is determined that an approval is required under the EPBC Act, as supplementary environmental assessment requirements may need to be issued to ensure a streamlined assessment under the Bilateral agreement can be achieved.	No approval is required. Refer to Section 3.2.2
	3. Where the project requires approval under the EPBC Act and is being assessed under the Bilateral Agreement the EIS should address: (a) Consideration of Protected Matters that may be impacted by the development where the Commonwealth Minister has determined that the proposal is a Controlled Action (b) Identification and assessment of those Protected Matters that are likely to be significantly impacted (c) Details of how significant impacts to Protected Matters have been avoided, mitigated and, if necessary, offset (d) Consideration of, and reference to, relevant conservation advices, recovery plans and threat abatement plans	No approval is required. Refer to Section 3.2.2
	4. The onus is on the Proponent to ensure legislative requirements relevant to the project are met.	The statutory context and approval pathway is provided in Chapter 3
2. Environmental Impact Statement	1. The EIS must include, but not necessarily be limited to, the following: (a) executive summary (b) a description of the project, including all components and activities (including ancillary components and activities) required to construct and operate it (c) a statement of the objective(s) of the project (d) a summary of the strategic need for the project with regard to its critical State significance and relevant State Government policy (e) an analysis of any feasible alternatives to the project (f) a description of feasible options within the project (g) a description of how alternatives to and options within the project were analysed to inform the selection of the preferred alternative / option. The description must contain sufficient detail to enable an understanding of why the preferred alternative to and options(s) within the project were selected (h) describe opportunities for further network expansion and consideration of relationship to other Government public transport initiatives (i) a concise description of the general biophysical and socio-economic environment that is likely to be impacted by the project (including offsite impacts). Elements of the environment that are not likely to be affected by the project do not need to be described (j) a demonstration of how the project design has been developed to avoid or minimise likely adverse impacts	Executive summary Chapter 8 and Chapter 9 Section 28.1.5 Chapter 5 Sections 6.1 and 6.4 Sections 6.3, 6.5 and 6.6 Sections 6.1, 6.3, 6.5 and 6.6 Section 6.8 Chapter 2 Section 7.3

Item	Requirement	Where addressed?
	(k) the identification and assessment of key issues as provided in the 'Assessment of Key Issues' performance outcome	Chapters 10 to 27
	(l) a statement of the outcome(s) the proponent will achieve for each key issue	Chapters 10 to 27
	(m) measures to avoid, minimise or offset impacts must be linked to the impact(s) they treat, so it is clear which measures will be applied to each impact	Section 28.5
	(n) consideration of the interactions between measures proposed to avoid or minimise impact(s), between impacts themselves and between measures and impacts	Chapters 10 to 27
	(o) an assessment of the cumulative impacts of the project taking into account other projects that have been approved but where construction has not commenced, projects that have commenced construction, and projects that have recently been completed (for example WestConnex and approved construction in the relevant precincts)	Chapter 27
	(p) statutory context of the project as a whole, including: <ul style="list-style-type: none"> how the project meets the provisions of the EP&A Act and EP&A Regulation a list of approvals that must be obtained under other Acts or laws before the project may lawfully be carried out 	Section 3.1 Section 3.2
	(q) a chapter that synthesises the environmental impact assessment and provides: <ul style="list-style-type: none"> a succinct but full description of the project for which approval is sought a description of uncertainties that still exist around design, construction methodologies and/or operational methodologies and how these will be resolved in the next stages of the project a compilation of the impacts of the project that have not been avoided a compilation of the proposed measures associated with each impact to avoid or minimise (through design refinements or ongoing management during construction and operation) or offset these impacts a compilation of the outcome(s) the proponent will achieve the reasons justifying carrying out the project as proposed, having regard to the biophysical, economic and social considerations, including ecologically sustainable development and cumulative impacts 	Chapter 28 Section 28.1 Section 28.2 and Table 28.2 Section 28.4.2 Section 28.3 Sections 28.5 and 28.6 Section 28.6 Section 28.7
	(r) relevant project plans, drawings, diagrams in an electronic format that enables integration with mapping and other technical software.	Throughout the EIS
	2. The EIS must only include data and analysis that is reasonably needed to make a decision on the proposal. Relevant information must be succinctly summarised in the EIS and included in full in appendices. Irrelevant, conflicting or duplicated information must be avoided.	Throughout the EIS
	3. Assessment of key issues	Chapters 10 to 27
	1. The level of assessment of likely impacts must be proportionate to the significance of, or degree of impact on, the issue, within the context of the proposal location and the surrounding environment. The level of assessment must be commensurate to the degree of impact and sufficient to ensure that the Department and other government agencies are able to understand and assess impacts	
	2. For each key issue the Proponent must:	

Item	Requirement	Where addressed?
	<p>(a) describe the biophysical and socio-economic environment, as far as it is relevant to that issue</p> <p>(b) describe the legislative and policy context, as far as it is relevant to the issue</p> <p>(c) identify, describe and quantify (if possible) the impacts associated with the issue, including the likelihood and consequence (including worst case scenario) of the impact (comprehensive risk assessment), and the cumulative impacts</p> <p>(d) demonstrate how potential impacts have been avoided (through design, or construction or operation methodologies);</p> <p>(e) detail how likely impacts that have not been avoided through design will be minimised, and the predicted effectiveness of these measures (against performance criteria where relevant)</p> <p>(f) detail how residual impacts will be managed or offset, and the approach and effectiveness of these measures.</p> <p>3. Where multiple reasonable and feasible options to avoid or minimise impacts are available, they must be identified and considered and the proposed measure justified taking into account the public interest.</p>	<p>A general description of the biophysical and socio-economic environment is provided in Sections 2.3 and 2.4. Further detail is provided in Chapters 10 to 27.</p> <p>Section 3.2 and Chapters 10 to 27</p> <p>Chapters 10 to 27 and Technical papers 1 to 9.</p> <p>An overview of how the design has been developed to minimise potential impacts is provided in Section 7.5. A description of how further impacts would be avoided during construction and operation are provided in Chapters 10 to 27.</p> <p>A description of how impacts would be further refined during detailed design to minimise potential impacts is provided in Chapters 10 to 27.</p> <p>Chapters 10 to 27</p> <p>Refer to the approach to mitigation and management in Chapters 10 to 27.</p>
4. Consultation	<p>1. The project and its assessment must be informed by consultation, including with relevant government agencies (including the Department of Planning and Environment (Growth, Designs and Programs) and within the Transport for NSW cluster (such as Roads and Maritime Services and Sydney Trains), local councils, infrastructure and service providers, special interest groups, affected landowners, businesses and the community. The consultation process must be undertaken in a manner commensurate with expected levels of impact and stakeholder significance.</p> <p>2. The Proponent must document the consultation process, and demonstrate how the project has responded to the inputs received (inclusive of a strategy of engagement with key stakeholders on key design elements of the project).</p> <p>3. The Proponent must describe the timing and type of community consultation proposed during the design and delivery of the project, the mechanisms for community feedback, the mechanisms for keeping the community informed, and procedures for complaints handling and resolution.</p>	<p>Chapter 4</p> <p>Sections 4.1, 4.2 and 4.3</p> <p>Section 4.4</p>

Table A.2 Key issue requirements

Key issue	Requirement	Where addressed?
5. Biodiversity	1. The Proponent must assess biodiversity impacts in accordance with the current guidelines including the Framework for Biodiversity Assessment (FBA).	A summary of the results of the biodiversity assessment is provided in Chapter 22. The full results are provided as Technical paper 9.
	2. The Proponent must assess impacts on biodiversity values not covered by the FBA as specified in s2.3.	Section 22.3.7
	3. The Proponent must assess impacts on the Long-nosed Bandicoot Inner Western Sydney Population (including an assessment of vehicle strike (from more frequent trains) and a loss of threatened species and their habitat which is not associated with vegetation (e.g. building demolition, bridge reconstruction, etc.). and provide the information specified in s9.2 of the FBA.	Sections 22.3.2, 22.3.3 and 22.3.5
	4. The Proponent must identify whether the project as a whole, or a component of the project, would be classified as a Key Threatening Process (KTP) in accordance with the listings in the <i>Threatened Species Conservation Act 1997</i> (TSC Act), <i>Fisheries Management Act 1994</i> (FM Act) and <i>Environmental Protection and Biodiversity Conservation Act 2000</i> (EPBC Act).	Section 22.3.4
6. Flooding and hydrology	1. The Proponent must assess and model (where appropriate), taking into account any relevant Council-adopted flood model or latest flood data available from Councils, the impacts on flood behaviour during construction and operation for a full range of flood events up to the probable maximum flood (taking into account storm intensity due to climate change) including:	A summary of the results of the hydrology, flooding and water quality assessment is provided in Chapter 21. The full results are provided as Technical paper 8.
	(a) detrimental increases in the potential flood affectation of other properties, assets and infrastructure	Sections 21.3.2 and 21.3.4
	(b) consistency (or inconsistency) with applicable Council floodplain risk management plans	Sections 21.3.2 and 21.3.4
	(c) compatibility with the flood hazard of the land	Sections 21.3.2 and 21.3.4
	(d) compatibility with the hydraulic functions of flow conveyance in flood ways and storage areas of the land	Sections 21.3.2 and 21.3.4
	(e) downstream velocity and scour potential	Sections 21.3.2 and 21.3.4
	(f) impacts the development may have upon existing community emergency management arrangements for flooding. These matters must be discussed with the State Emergency Services and Council	Sections 21.3.2 and 21.3.4
	(g) impacts the development may have on the social and economic costs to the community as consequence of flooding.	Sections 21.3.2 and 21.3.4
	2. The Proponent must describe (and map) the existing hydrological regime for any surface and groundwater resource (including reliance by users and for ecological purposes) likely to be impacted by the project, including stream orders, as per the Framework for Biodiversity Assessment (FBA).	Section 21.2

Key issue	Requirement	Where addressed?
	3. The Proponent must assess (and model if appropriate) the impact of the construction and operation of the project and any ancillary facilities (both built elements and discharges) on surface and groundwater hydrology in accordance with the current guidelines, including: (a) minimising the effects of proposed stormwater and wastewater management during construction and operation on natural hydrological attributes (such as volumes, flow rates, management methods and re-use options) and on the conveyance capacity of existing stormwater systems where discharges are proposed through such systems (b) water take (direct or passive) from all surface and groundwater sources with estimates of annual volumes during construction and operation.	Sections 21.3.2 and 21.3.4 Section 21.3.2
	4. The Proponent must identify any requirements for baseline monitoring of hydrological attributes.	Section 21.4.1
7. Heritage	1. The Proponent must identify and assess direct and/or indirect impacts (including cumulative impacts) to the heritage significance of: (a) Aboriginal places and objects, as defined under the <i>National Parks and Wildlife Act 1974</i> and in accordance with the principles and methods of assessment identified in the current guidelines (b) Aboriginal places of heritage significance, as defined in the Standard Instrument – Principal Local Environmental Plan (c) environmental heritage, as defined under the <i>Heritage Act 1977</i> (d) items listed on the National and World Heritage lists.	A summary of the results of the non-Aboriginal heritage impact assessment is provided in Chapter 14. The full results are provided as Technical paper 3. A summary of the results of the Aboriginal heritage impact assessment is provided in Chapter 15. The full results are provided as Technical paper 4. Section 15.3 Section 15.2.6 Section 14.3 No such items would be impacted by the project
	2. Where impacts to State or locally significant heritage items are identified, the assessment must: (a) include a statement of heritage impact for all heritage items (including significance assessment) (b) consider impacts to the item of significance caused by , but not limited to, vibration, demolition, archaeological disturbance, altered historical arrangements and access, visual amenity, landscape and vistas, curtilage, subsidence and architectural noise treatment (as relevant) (c) outline measures to avoid and minimise those impacts in accordance with the current guidelines (d) be undertaken by a suitably qualified heritage consultant(s) (note: where archaeological excavations are proposed the relevant consultant must meet the NSW Heritage Council's Excavation Director criteria)	Section 14.3 Section 14.3 Section 14.4 Section 14.1.2 and Section 1.5 of Technical paper 3

Key issue	Requirement	Where addressed?
	(e) have regard to the specific and broader values of historic structures (such as footbridges, overhead booking offices, platforms and platform buildings) and conservation approaches provided in the relevant conservation strategies and design guides and conservation management plans, as applicable	Section 14.3
	(f) identify potential uses for heritage items to be retained within the corridor.	Section 14.3
	3. Where archaeological investigations of Aboriginal objects are proposed these must be conducted by a suitably qualified archaeologist, in accordance with section 1.6 of the <i>Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW</i> (DECCW 2010).	Section 15.4.2
	4. Where impacts to Aboriginal objects and/or places are proposed, consultation must be undertaken with Aboriginal people in accordance with the current guidelines. The significance of cultural heritage values for Aboriginal people who have a cultural association with the land must be assessed.	Sections 15.1.3 and 15.3.3
8. Noise and Vibration - Amenity	1. The Proponent must assess construction and operational noise and vibration impacts in accordance with relevant NSW noise and vibration guidelines. The assessment must include consideration of impacts to sensitive receivers including small businesses, and include consideration of sleep disturbance and, as relevant, the characteristics of noise and vibration (for example, low frequency noise).	A summary of the results of the construction and operational noise and vibration assessment is provided in Chapters 12 and 13. The full results are provided as Technical paper 2. Construction amenity impacts and sleep disturbance impacts are considered in Section 12.5. Operational amenity impacts and sleep disturbance impacts are considered in Section 13.4.2. The characteristics of noise and vibration are explained in Technical paper 2.
	2. The EIS must include a framework for both an Out of Hours Works Strategy and the development of an Out of Hours Works Plan which incorporates community consultation.	Sections 9.7.4 and 12.6.1

Key issue	Requirement	Where addressed?
9. Noise and Vibration - Structural	1. The Proponent must assess construction and operation noise and vibration impacts in accordance with relevant NSW noise and vibration guidelines. The assessment must include consideration of impacts to the structural integrity and heritage significance of items (including Aboriginal places and items of environmental heritage).	A summary of the results of the construction vibration assessment is provided in Chapter 12. The full results are provided as Technical paper 2. Operational vibration impacts are considered in Chapter 13. Consideration of potential construction impacts to structural integrity and heritage items is provided in Section 12.5. Impacts to the heritage significance of items is considered in Chapter 14 (Non-Aboriginal Heritage).
	2. The Proponent must demonstrate that blast impacts are capable of complying with the current guidelines, if blasting is required.	Blasting would not be required.
10. Socio-economic, Land Use and Property	1. The Proponent must assess social and economic impacts of the project. This must be done having regard to issues raised by relevant communities and businesses.	Chapters 17 and 18. Amenity impacts are also a key potential socio-economic impact. As such Chapter 17 and Technical paper 5, also consider the potential impacts of the project on amenity.
	2. The Proponent must assess impacts from construction and operation on: <ul style="list-style-type: none"> potentially affected properties businesses recreational users land and water users <ul style="list-style-type: none"> including property acquisitions/adjustments access amenity relevant statutory rights. 	<p>Section 16.4</p> <p>Chapter 18</p> <p>Section 16.4</p> <p>Section 16.4</p> <p>No water users would be impacted by the project.</p> <p>Section 16.4.2</p> <p>Chapters 10 and 11</p> <p>Chapter 17</p> <p>Section 16.4.2 and Chapter 17</p>

Key issue	Requirement	Where addressed?
11. Soils	<p>1. The Proponent must assess whether the land is likely to be contaminated and identify if remediation of the land is required, having regard to the ecological and human health risks posed by the contamination in the context of past, existing and future land uses.</p> <p>Where assessment and/or remediation is required, the Proponent must document how the assessment and/or remediation would be undertaken in accordance with current guidelines.</p>	<p>The potential for contamination is considered in Section 20.2.4.</p> <p>The need for remediation would be confirmed as an outcome of the more detailed contamination assessment to be undertaken for the detailed design, as described in Sections 20.3.2 and 20.4.1.</p>
12. Sustainability	1. The Proponent must assess the sustainability of the project in accordance with the Infrastructure Sustainability Council of Australia (ISCA) <i>Infrastructure Sustainability Rating Tool</i> or equivalent and relevant rating tool.	Section 24.3.1
	2. The Proponent must review the project against the current guidelines including targets and strategies to improve Government efficiency in use of water, energy and transport.	Sections 24.2 and 24.3
13. Transport and Traffic	<p>1. The Proponent must assess construction transport and traffic (vehicle, pedestrian and cyclists) impacts, including, but not necessarily limited to:</p> <p>(a) a considered approach to route identification and scheduling of transport movements</p> <p>(b) the number, frequency and size of construction related vehicles (passenger, commercial and heavy vehicles, including spoil management movements)</p> <p>(c) blank</p> <p>(d) need to upgrade roads proposed for construction vehicle routes including impacts of road closures, construction worker parking and impacts on availability of public parking</p> <p>(e) the nature of existing traffic (types and number of movements) on construction access routes (including consideration of peak traffic times and sensitive road users and parking arrangements)</p> <p>(f) information on how construction and scheduling of works will be coordinated in regard to cumulative traffic impacts resulting from concurrent work on WestConnex and other approved key construction projects</p> <p>(g) access constraints and impacts on public transport, pedestrians and cyclists including:</p> <ul style="list-style-type: none"> impacts on customers and the reliability of suburban and intercity rail services (including increased demand for rail services on other lines, particularly the T2 Inner West, T1 North Shore, Northern and Western Lines) during possession periods and testing and commissioning of metro trains 	<p>A summary of the results of the operation traffic, transport and access assessment is provided in Chapter 10. The full results are provided as Technical paper 1.</p> <p>Section 9.7.4 and 9.8.8</p> <p>Sections 9.8.9</p> <p>Section 10.3.3</p> <p>Section 10.2.2</p> <p>Section 10.4.8</p> <p>Section 10.4.5</p>

Key issue	Requirement	Where addressed?
	<ul style="list-style-type: none"> alternative transport arrangements for customers during rail possessions and closure of the rail line (including how the Temporary Transport Plan will be developed in consultation with relevant Councils and the community) identification of key traffic performance issues in the surrounding areas during rail shutdowns and implementation of alternate transport arrangements. 	Sections 9.11 and 10.3.4
	(h) the need to close, divert or otherwise reconfigure elements of the road and cycle network associated with construction of the project.	Section 10.4.2 and 10.4.5
	2. The Proponent must assess the operational transport impacts of the project, including the wider transport interactions:	Sections 10.3.3 and 10.4.3
	<ul style="list-style-type: none"> local and regional roads changes to commuter parking and loading zones provision of kiss and ride facilities, cycling, public and freight transport <p>The EIS must define a transport hierarchy and a framework for an active transport strategy.</p>	<p>A summary of the results of the operation traffic, transport and access assessment is provided in Chapter 11. The full results are provided as Technical paper 1.</p> <p>Section 11.4.2</p> <p>Section 11.4.2, 11.4.4 and 11.4.13</p> <p>Sections 11.4.2, 11.4.4 to 11.4.13</p> <p>Sections 11.3.2 and 11.3.4</p>
14. Place Making and Urban Design	1. The Proponent must deliver functional 'place' outcomes of public benefit, inclusive of how the project integrates with proposed land use changes occurring within the corridor, and how it contributes to the accessibility and connectivity of existing and future communities {with specific consideration given to the Sydenham to Bankstown Urban Renewal Corridor Strategy {as updated}}. This must be done in collaboration with the Department of Planning and Environment and Councils, and must include but is not limited to:	Chapter 7 and Appendix H
	(a) the defining of existing and proposed station precincts including implications for urban renewal	Section 7.2
	(b) identifying design principles, strategies and opportunities to enhance healthy, cohesive and inclusive communities (including consideration of government strategies and plans)	Section 7.3
	(c) identifying the urban design and landscaping aspects and user facilities of the project and its components	Section 7.3.8
	(d) assessing the impact of the project on the urban and natural fabric	Section 7.3.4
	(e) incorporating the use of Crime Prevention Through Environmental Design (CPTED) principles during the design development process.	Section 7.2.5
	2. The Proponent must describe the accessibility elements of the project including relevant accessibility legislation and guidelines and:	Chapters 7 and 11
	(a) impacts on pedestrian access in and around stations and connecting streets (including consideration of land use change)	Section 11.4.4 to 11.4.13
	(b) enhancing the accessibility of each station and the general vicinity of walking and cycling catchments	Sections 7.3.8, 11.4.2 and 11.4.4 to 11.4.13

Key issue	Requirement	Where addressed?
	(c) the provision of infrastructure to support accessible paths of travel and interchange	Sections 7.3.8 and 11.4.4 to 11.4.13
	(d) impacts on cyclists (including provision of and integration with active transport routes) and pedestrian access and safety	Sections 7.3.8, 11.4.4 to 11.4.13
	(e) minimising barriers across the rail corridor and opportunities to integrate cycling and pedestrian elements with surrounding networks and in the project.	Section 7.2.4 and 11.4.3
	3. The Proponent must assess the visual and landscape impacts of the project and ancillary infrastructure on: (a) views and vistas (b) streetscapes, key sites and buildings (c) landscaping, green spaces and existing trees (d) heritage items including Aboriginal places and environmental heritage (e) the local community.	Section 19.3 Section 19.3 Section 19.3 The project would not impact any Aboriginal places Visual impacts on environmental heritage are considered in Chapter 14. Section 19.3
	4. The Proponent must provide artist impressions and perspective drawings of the project from key receiver locations to illustrate the project.	Section 8.1
15. Water - Quality	1. The Proponent must: (a) state the ambient NSW Water Quality Objectives (NSW WQO) and environmental values for the receiving waters relevant to the project, including the indicators and associated trigger values or criteria for the identified environmental values (b) identify pollutants that may be introduced into the water cycle and describe the nature and degree of impact that discharge(s) may have on the receiving environment, including consideration of all pollutants that pose a risk of non-trivial harm to human health and the environment (c) identify the rainfall event that the water quality protection measures will be designed to cope with (d) assess the significance of identified impacts including consideration of the relevant ambient water quality outcomes (e) demonstrate how construction and operation of the project will, to the extent that the project can influence, ensure that: <ul style="list-style-type: none"> where the NSW WQOs for receiving waters are currently being met they will continue to be protected where the NSW WQOs are not currently being met, activities will work toward their achievement over time. (f) justify, if required, why the WQOs cannot be maintained or achieved over time (g) demonstrate that all practical measures to avoid or minimise water pollution and protect human health and the environment from harm are investigated and implemented (h) identify sensitive receiving environments (which may include estuarine and marine waters downstream) and develop a strategy to avoid or minimise impacts on these environments	Section 21.5 Sections 21.3.3 and 21.3.5 Requirements (c) to (f) - limited water quality modelling was undertaken as described in Section 21.1.2. Further information is provided in Appendix A and Technical Paper 8. Section 21.4 Section 21.2 and 21.4

Key issue	Requirement	Where addressed?
	(i) identify proposed monitoring locations, monitoring frequency and indicators of surface water quality.	Section 21.4.1
16. Utilities	1. The Proponent must identify and assess potential impacts on key identified active or disused public trunk utilities infrastructure (including communications, electricity, gas, and water and sewerage).	Section 9.10
	2. Where impacts on utilities are expected, the Proponent must prepare a utilities management framework, to identify a management strategy for options, including relocation or adjustment of the utilities.	Section 9.10 and Appendix I
	3. The utilities management framework must identify ways in which opportunities to integrate with and support initiatives adopted by Councils and utilities providers and how access to assets will be maintained during construction.	Section 9.10 and Appendix I

Table A.3 Agency requirements – responses to the SEARs

Agency	Issues raised	Where addressed in the EIS
Ausgrid	A number of assets are located within the corridor and would potentially be impacted. These assets need to be accounted for in designs and during construction.	Section 9.10
	Specifically concerned with ensuring that safety risks associated with operating in the vicinity of high voltage cables is addressed.	Sections 9.10 and 25.3.2
Canterbury-Bankstown Council	Would like to be involved in the design to ensure that place making is captured in the design, including the development of urban design principles.	Chapter 4
	The project is a good opportunity to transform the Bankstown CBD and connect the CBD which is currently severed by the existing train line. This could include the provision of an at grade crossing of the corridor.	Table 7.5
	The project should include the provision of an active transport corridor which connects into existing active transport routes.	Section 8.1.4
	Concerned about impacts to business and the community during construction.	Chapter 17 and 18
	Flooding mitigation considered as part of the project should be based on future growth associated with the Draft Sydenham to Bankstown Urban Renewal and not existing flood conditions.	Sections 21.3 and 21.4
	Any over station development associated with metro should be considered as part of the Draft Sydenham to Bankstown Urban Renewal Strategy and not through the State Significant Development process due to reduced opportunities for sound place making.	Chapter 8
Department of Primary Industries and Department of Industry - Lands	Standard SEARs provided adequately addressed their requirements.	Tables A.1 and A.2
Environment Protection Authority	Standard SEARs adequately address their requirements.	Tables A.1 and A.2
Heritage Council of NSW	Standard SEARs provided are adequate with the exception of the below additional requirements:	Tables A.1 and A.2
	<ul style="list-style-type: none"> Requirement for an assessment of the impacts to the broader heritage assets of the Sydenham to Bankstown Railway Line. This should include a history, assessment of significance of the broader Bankstown to Sydenham Line, and an assessment of its contribution to the heritage significance of the NSW suburban network. 	Section 14.3 Technical paper 3 (Section 9.1)
	<ul style="list-style-type: none"> Consider conservation approaches and rarity/integrity values of historic structures. 	Technical paper 3 (Section 6)
	<ul style="list-style-type: none"> Consideration of the Conservation Management Plans for all impacted items listed on the State Heritage Register. 	Technical paper 3 (Section 6)
	<ul style="list-style-type: none"> Consider alternate uses for heritage items no longer required for operational activities. 	Sections 7.2.3 and 14.3.1
	<ul style="list-style-type: none"> Consideration of the guideline, Assessing Significance for Historical Archaeological Sites and Relics. 	Section 14.1.2 Technical paper 3 (Section 2.3)
Inner West Council	<ul style="list-style-type: none"> Due to impacts on heritage (particularly at stations) key stakeholders should be consulted throughout the project. 	Sections 4.3.2 and 14.4
	Fully independent access should be provided across the project including at station. This should not be limited to the stations only but the wider station precincts.	Chapter 8 and Section 11.4

Agency	Issues raised	Where addressed in the EIS
	A detailed accessibility report should be provided to examine each aspect of the travel journey from a best practice access perspective, to ensure functional and seamless independent provision to/from and within the surrounding precinct of each station.	A description of how accessibility has been incorporated into the design is provided in Chapter 7. Chapter 11 provides an assessment of impacts in terms of accessibility.
	Project should include flood management solutions rather than just saying negative impacts would be reduced.	Section 21.4
	The project should refer to the NSW Government WSUD Guideline (2016) for NSW transport projects.	The project would be designed to incorporate water sensitive urban design elements. Refer to Section 21.4.2.
	Contribution to climate change during both construction and operation. The project should include performance outcomes to minimise contribution to climate change during the works and in the final product.	Section 24.3
Office of Environment and Heritage	Identification and description of Aboriginal cultural heritage values that exist within the project area and the assessment of impacts on these areas of value. This should be guided by the <i>Guide to Investigating, assessing and reporting on Aboriginal Cultural heritage in NSW</i> (DECCW, 2011). The assessment must demonstrate attempts to avoid impact upon cultural heritage values and identify any conservation outcomes. Where impacts are unavoidable, measures to mitigate impacts must be outlined. Any objects recorded as part of the assessment must be documented and notified to OEH.	Sections 15.2 and 15.3 The full assessment is provided as Technical paper 4.
	Consultation with Aboriginal people should be undertaken where high values are identified in accordance with the <i>Aboriginal cultural heritage consultation requirements for proponents 2010</i> (DECCW). The significance of cultural heritage values for Aboriginal people who have cultural association with the land must also be documented.	Section 15.1.3 and 15.4.1
	Biodiversity impacts to be assessed in accordance with the <i>NSW Biodiversity Offsets Policy for Major Projects 2014</i> and the Framework for Biodiversity Assessment, by a person accredited in accordance with s142B(1) of the <i>Threatened Species Conservation Act 1995</i> .	Chapter 22. The full assessment is provided as Technical paper 9.
	Impacts on the Long-nosed Bandicoot Inner Western Sydney Population (including an assessment of vehicle strike for more frequent trains and a loss of threatened species and their habitat not associated with vegetation) are to be considered in line with the requirements of the Framework for Biodiversity Assessment.	Section 22.2.2, 22.2.3 and 22.2.5. The full assessment is provided as Technical paper 9.
Sydney Water	Demands and servicing arrangements for drinking water, wastewater and recycled water to be considered.	Section 9.10.1
	Consideration of impacts on Sydney Water assets during both construction and operation. The proponent should seek confirmation from Sydney Water to ensure that the project does not impact on Sydney Water's assets. Landscaping options should avoid tree species that cause cracking or blockages to Sydney Water pipes.	Section 9.10.2

Agency	Issues raised	Where addressed in the EIS
	Ensure satisfactory protection for stormwater assets, building bridges over stormwater assets, potential flood, water quality, heritage impacts and creation of easements.	Sections 9.10, 21.3 and 21.4
	Flood mitigation assets and water quality for drainage into the Cooks River (and its tributaries) should be factored in as part of the project.	Section 21.4
	Impacts to Sydney Water owned State Heritage items, Sydenham Pit and Drainage Pumping Station and Sewage Pumping Station 271.	Section 14.3.2. Impacts to Sydenham Pit and Drainage Pumping Station would not occur as part of the project.
	Sustainability initiatives that would reduce the demand for drinking water including any proposed alternative water supply, proposed end uses of drinking and non-drinking water, demonstration of water sensitive urban design and any proposed water conservation measures should be outlined.	Sections 24.3.1, 24.4 and 24.5

Table B.1 Requirements of Schedule 2 (Part 3) of the Regulation

Requirement	EIS reference
6. Form of the environmental impact statement	
An environmental impact statement must contain the following information:	
(a) the name, address and professional qualifications of the person by whom the statement is prepared	Refer certification at the front of the EIS with respect to a-f
(b) the name and address of the responsible person	
(c) the address of the land: (i) in respect of which the development application is to be made, or (ii) on which the activity or infrastructure to which the statement relates is to be carried out	
(d) a description of the development, activity or infrastructure to which the statement relates	
(e) an assessment by the person by whom the statement is prepared of the environmental impact of the development, activity or infrastructure to which the statement relates, dealing with the matters referred to in this Schedule	
(f) a declaration by the person by whom the statement is prepared to the effect that: (i) the statement has been prepared in accordance with this Schedule, and (ii) the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure to which the statement relates, and (iii) that the information contained in the statement is neither false nor misleading.	
7. Content of environmental impact statement	
(1) An environmental impact statement must also include each of the following:	
(a) a summary of the environmental impact statement	Executive summary
(b) a statement of the objectives of the development, activity or infrastructure	Chapter 28
(c) an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives, including the consequences of not carrying out the development, activity or infrastructure	Chapter 6
(d) an analysis of the development, activity or infrastructure, including: (i) a full description of the development, activity or infrastructure, and	Chapters 8 and 9
(ii) a general description of the environment likely to be affected by the development, activity or infrastructure, together with a detailed description of those aspects of the environment that are likely to be significantly affected, and	Chapter 2 and Part C
(iii) the likely impact on the environment of the development, activity or infrastructure, and	Part C
(iv) a full description of the measures proposed to mitigate any adverse effects of the development, activity or infrastructure on the environment, and	Part C
(v) a list of any approvals that must be obtained under any other Act or law before the development, activity or infrastructure may lawfully be carried out	Chapter 3
(e) a compilation (in a single section of the environmental impact statement) of the measures referred to in item (d) (iv)	Chapter 28
(f) the reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development set out in subclause (4).	Chapter 28