


Certification

Submission of Environmental Impact Statement

This Environmental Impact Statement has been prepared under Division 5.2 of the (NSW) *Environmental Planning and Assessment Act 1979* and in accordance with Part 3 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*.

Environmental Impact Statement prepared by:

Name	Katrina Smallwood
Qualifications	Bachelor of Applied Science
Address	Jacobs/Arcadis Level 7, 177 Pacific Highway, North Sydney NSW 2060
In respect of	Sydney Metro West Environmental Impact Statement – Concept and Stage 1
Applicant Name	Sydney Metro
Applicant Address	Level 43, 680 George Street, Sydney NSW 2000 PO Box K659, Haymarket NSW 1240
Proposed development	Sydney Metro West involves the construction and operation of a metro rail line, around 24 kilometres in length, between Westmead and the Sydney CBD. New metro stations would be developed at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays and the Sydney CBD. Further details are provided in Chapter 6 (Concept description) and Chapter 9 (Stage 1 description).
Land to be developed	The Concept and Stage 1 would be carried out on land in the local government areas of Cumberland City, City of Parramatta, Strathfield, City of Canada Bay, Burwood, Inner West and City of Sydney. The track alignment would be mainly located underground in twin tunnels extending between Westmead and the Sydney CBD. New metro stations would be developed at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays and the Sydney CBD. A stabling and maintenance facility would be developed Clyde, with services facilities at Rosehill (within the Clyde stabling and maintenance facility construction site), Silverwater and between Five Dock and The Bays.
Environmental Impact Statement	An Environmental Impact Statement is attached that assesses all matters specified in the Secretary’s Environmental Assessment Requirements dated 11 December 2019, in accordance with Division 5.2 of the (NSW) <i>Environmental Planning and Assessment Act 1979</i> and other relevant legislation.
Declaration	I certify that I have prepared the contents of the Environmental Impact Statement in accordance with Schedule 2 of the <i>Environmental Planning and Assessment Regulation 2000</i> and the Secretary’s Environmental Assessment Requirements dated 11 December 2019, and that, to the best of my knowledge the information contained in the Environmental Impact Statement is not false or misleading.
Signature	
Name	Katrina Smallwood
Date	15 April 2020

Note: This document does not reflect the decision made by the NSW Government to not include Rydalmere as a station.

Executive summary

Executive summary

Overview

Sydney Metro is Australia’s biggest public transport program. Services between Rouse Hill and Chatswood started in May 2019 on this new stand-alone metro railway system, which is revolutionising the way Sydney travels. Sydney Metro’s program of work is shown in Figure E-1 and includes the Metro North West Line (which opened in May 2019), Sydney Metro City & Southwest (which is currently under construction and due to open in 2024), Sydney Metro West (this project) and Sydney Metro Greater West (which is currently in the final stages of planning).

Sydney is expanding and the NSW Government is working hard to deliver an integrated transport system that meets the needs of customers now and in the future. The delivery of Sydney Metro West is critical to keeping Sydney moving, and would:

- Provide a direct, fast, and frequent connection between Greater Parramatta and the Sydney CBD, linking communities along the way that have previously not been serviced by rail
- Relieve the congested T1 Western Line, T9 Northern Line (previously T1 Northern Line) and T2 Inner West and Leppington Line
- Double the existing rail capacity between the Sydney and Parramatta CBDs
- Significantly boost economic opportunities for Greater Parramatta
- Support new residential and employment zones along the Greater Parramatta to Sydney CBD corridor, including at Sydney Olympic Park and The Bays – providing improved transport for the additional 420,000 new residents and 300,000 new workers forecast to be located within the corridor over the next 20 years
- Allow customers fast and easy transfers with the T1 Western Line at Westmead, the T9 Northern Line at North Strathfield, and the suburban rail network and Sydney Metro in the Sydney CBD
- Allow for transfers with the future Parramatta Light Rail (Stage 1) at Westmead and Parramatta, as well as the planned future Parramatta Light Rail (Stage 2) at Sydney Olympic Park
- Create an anticipated 10,000 direct and 70,000 indirect jobs during construction (based on Sydney Metro analysis).

The planning approvals and environmental impact assessment for Sydney Metro West will be broken down into a number of stages recognising the size of the project. This includes:

- Sydney Metro West at a Concept level
- Stage 1 – All major civil construction works between Westmead and The Bays including station excavation and tunnelling
- Stage 2 – All stations, depots and rail systems between Westmead and The Bays.
- Stage 3 – All major civil construction works including station excavation, tunnels, stations, depots and rail systems between The Bays and the Sydney CBD Station, and operation of the line.

Whilst the content of these stages may be varied, this Environmental Impact Statement covers the Concept and Stage 1 comprising all major civil construction works between Westmead and The Bays including station excavation and tunnelling.

Key features of the Concept

Sydney Metro West (the Concept) would involve the construction and operation of a metro rail line, around 24 kilometres long, between Westmead and Sydney CBD (refer to Figure E-2).

The key components are expected to include:

- About 24 kilometres of twin tunnels between Westmead and the Sydney CBD
- New metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays and Sydney CBD. The location of the Sydney CBD station will be determined following further investigations and community and stakeholder engagement. Optional stations at Rydalmere and Pyrmont are also under investigation

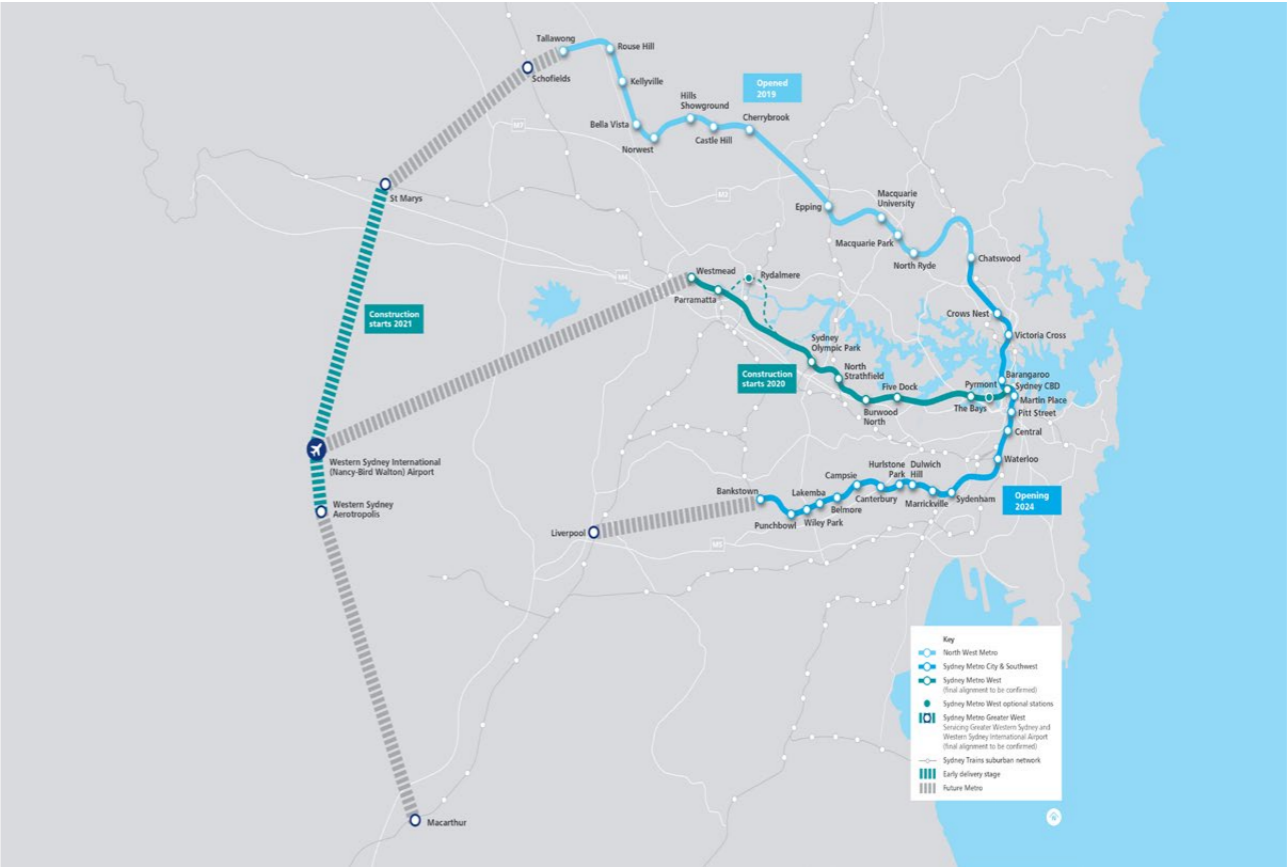


Figure E-1: The Sydney Metro network

- A turn-up-and-go metro service operating early morning to late at night, between Westmead and the Sydney CBD
- Pedestrian links and connections to other modes of transport (such as the existing suburban rail network and other parts of the metro network) and surrounding land uses
- Modifications to existing suburban stations and associated rail infrastructure (such as overhead wiring, signalling, access tracks/paths and rail corridor fencing) at Westmead and North Strathfield
- Services within each of the metro stations, including mechanical and fresh air ventilation equipment and electrical power substations to supply power for operation
- A stabling and maintenance facility at Clyde, including associated aboveground and belowground tracks to connect to the mainline tunnels
- Services facilities at Rosehill (within the Clyde stabling and maintenance facility construction site), Silverwater and between Five Dock and The Bays for fresh air ventilation and emergency evacuation
- Alterations to pedestrian and traffic arrangements, and cycling and public transport (e.g. bus) infrastructure around the metro stations
- Subdivision of station sites to support integrated station and precinct development and ancillary facilities
- Ancillary facilities to support construction.

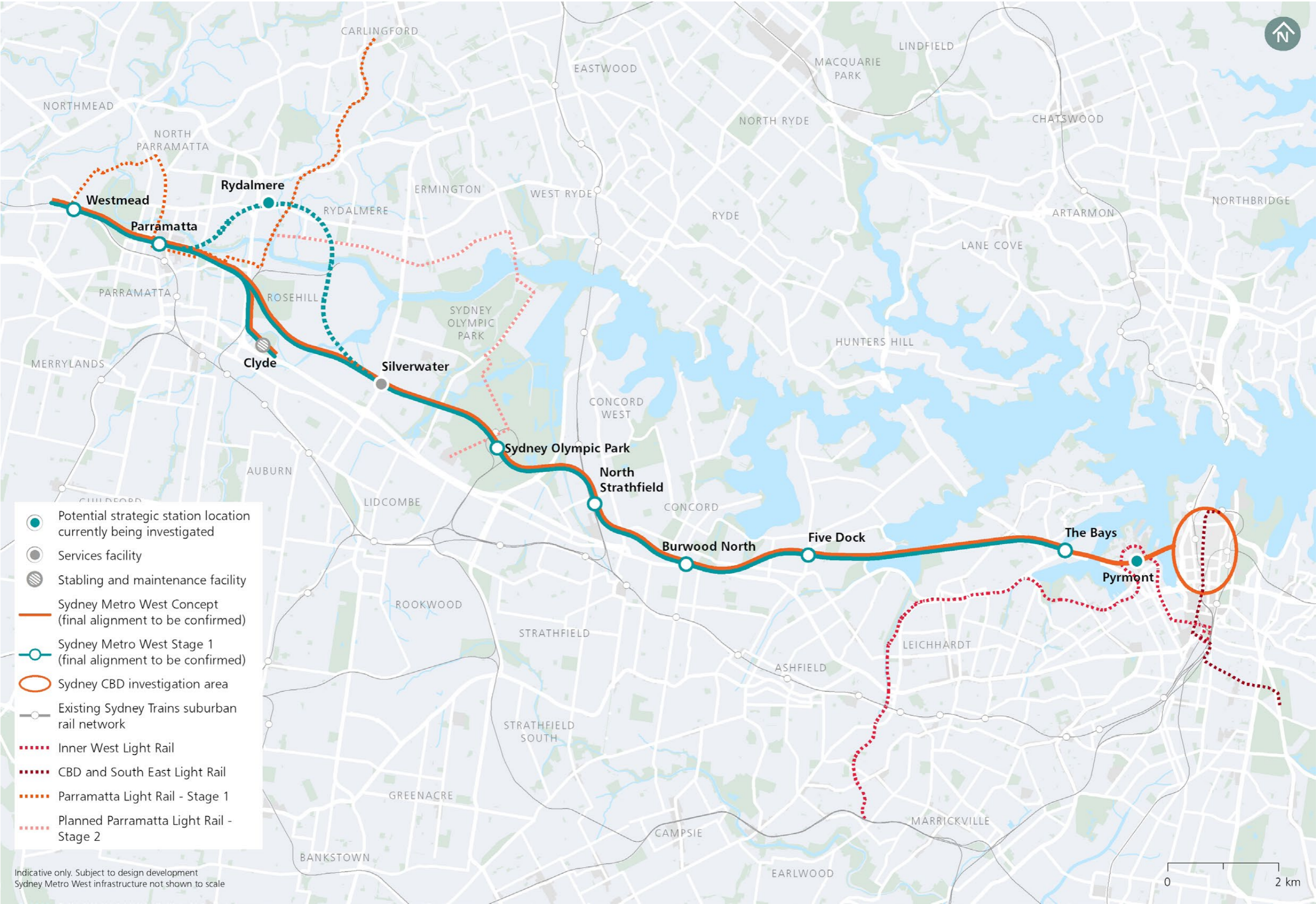


Figure E-2: Overview of the Concept

Key features of Stage 1

Stage 1 would involve major civil construction work between Westmead and The Bays, including:

- Enabling works
- Tunnel excavation including tunnel support activities
- Station excavation for new metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock and The Bays
- Shaft excavation for services facilities at Rosehill (within the Clyde stabling and maintenance facility construction site), Silverwater and for a facility between Five Dock and The Bays
- Civil works for the stabling and maintenance facility at Clyde including earthworks and structures for crossings at A’Becketts Creek and Duck Creek
- A concrete segment facility for use during construction located at the Clyde stabling and maintenance facility construction site
- Excavation of a tunnel dive structure and associated tunnels at Rosehill to support a connection between the Clyde stabling and maintenance facility and the mainline metro tunnels.

Construction program and major civil construction works

A number of construction sites would be needed. These include locations for tunnel equipment and support, stations, surface track and ancillary facilities.

Enabling works (preliminary construction works required to facilitate the start of substantial construction) would likely begin before major construction works. The total period for Stage 1 construction works would be around five years. An indicative construction program is shown in Figure E-3. The actual program and commencement of works at each construction site is subject to the final delivery strategy being confirmed.

Need for and benefits of Sydney Metro West

Key challenges

Sydney is Australia’s financial and economic capital, housing half of the country’s globally competitive service sector jobs. The Greater Parramatta to Sydney CBD corridor is one of the city-shaping transport corridors nominated in the Greater Sydney Region Plan (Greater Sydney Commission, 2018a). The corridor is of national economic significance and contains nearly 620,000 high productivity jobs, which is around 20 per cent of the jobs in Greater Sydney, and generates eight per cent of the nation’s Gross Domestic Product per year.

Recognising the importance of the corridor, several land use planning and development initiatives have commenced in Westmead, Parramatta, Sydney Olympic Park, The Bays and the Sydney CBD. These initiatives are expected to account for more than 60 per cent of forecast population growth and more than 80 per cent of forecast jobs growth in the corridor by 2036

Sydney’s growing population will continue to increase demand on the existing transport network. Despite planned upgrades and additional services which will provide some short term relief, the T1 Western Line is expected to reach capacity in 2024 and the T9 Northern Line is expected to reach capacity in 2027. Reliability impacts in the Sydney CBD cause network-wide impacts, reducing network capacity and increasing crowding on trains and platforms.

Benefits of Sydney Metro West

Sydney Metro West would effectively double rail capacity from Parramatta to the Sydney CBD with the delivery of a new high capacity rail connection. At ultimate capacity, Sydney Metro West would be able to move more than 40,000 people an hour in each direction and would complement the suburban and intercity services between Parramatta and the Sydney CBD. Sydney Metro would result in numerous transport benefits, including:

- Reducing crowding on trains and on station platforms at key existing stations on the suburban rail network
- Substantially improving accessibility via the public transport network to key economic centres across the Greater Parramatta to Sydney CBD corridor
- Increasing the reach and use of Sydney’s public transport network by providing new station locations at Burwood North, Five Dock and The Bays

- Improving travel times for customers
- Reducing travel time between the Parramatta and Sydney CBDs to a target of around 20 minutes
- Providing an alternative to the existing Sydney Trains suburban rail network thereby reducing the impacts of scheduled maintenance and major unavoidable incidents
- Providing the opportunity to optimise the bus network by reducing the number of buses on congested corridors such as Parramatta Road and Victoria Road and increasing bus services on other parts of the network
- Providing the opportunity for mode shift from car to public transport, which could result in road user travel time savings.

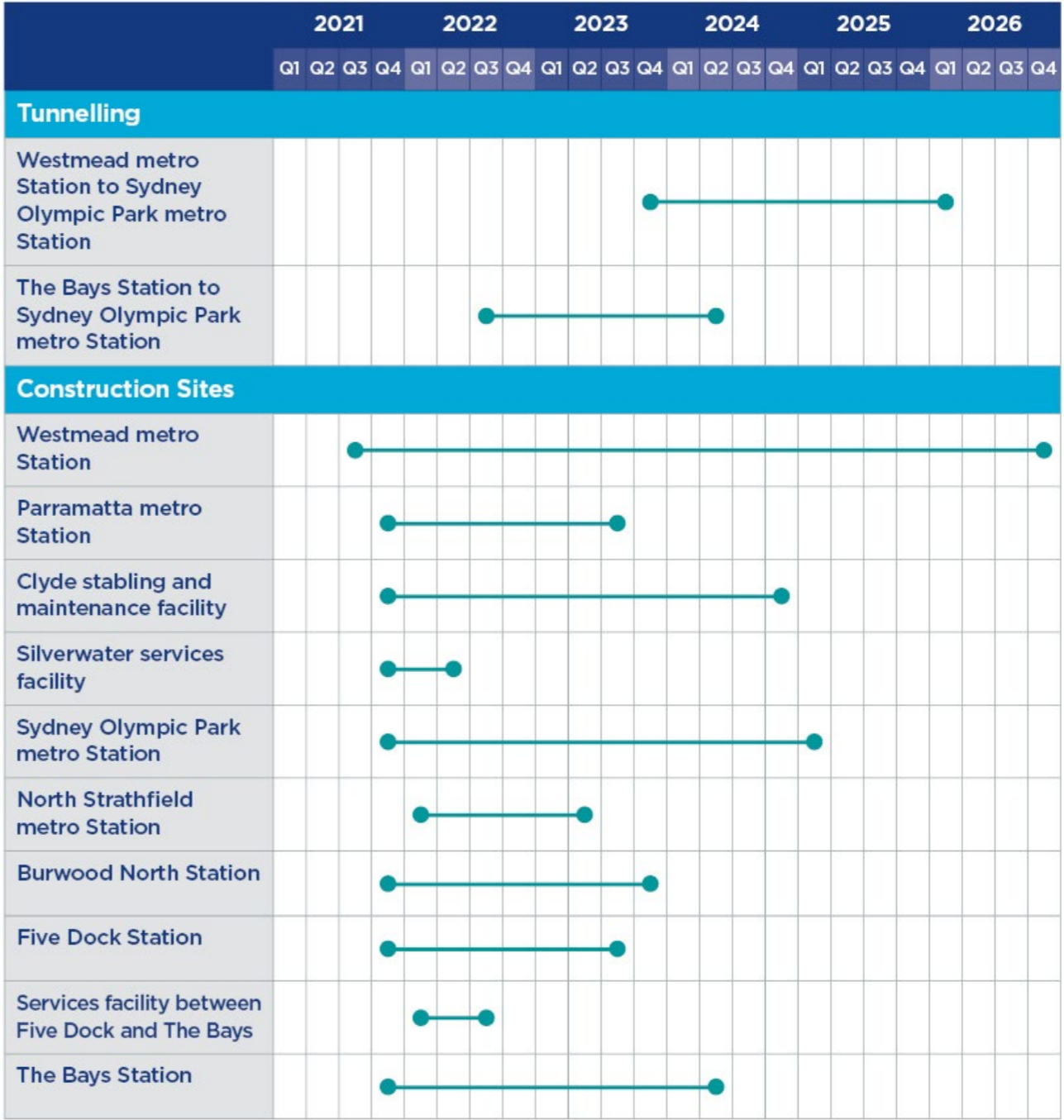


Figure E-3: Indicative construction program – Stage 1

Note: This program only shows major civil works (Stage 1) indicative duration and not the total works.

By improving the connections between key economic centres, Sydney Metro West would foster significant growth in jobs, including directly supporting the creation of new jobs within the corridor particularly at the key precincts of Westmead, Parramatta, Sydney Olympic Park and The Bays.

There is a strong link between public transport and land use change. Transport accessibility and amenity are critical to supporting employment, housing supply and urban renewal opportunities and ultimately to support Sydney’s economic and population growth. Transport accessibility and amenity issues include crowding and capacity constraints within the Greater Parramatta to Sydney CBD corridor, and traffic congestion from high levels of car use. These issues are limiting the achievement of planned growth because these areas are less attractive to households and developers.

Sydney Metro West would provide city-shaping benefits including:

- Supporting planned growth and land use outcomes in the CBDs, planned precincts and urban renewal areas
- Supporting the implementation of 30-minute cities as outlined in the Greater Sydney Region Plan by providing turn-up-and-go services to key destinations
- Supporting the creation of jobs and housing opportunities in Western Sydney with improved liveability and better access to services and employment
- Promoting healthier and more sustainable travel behaviours through enhanced pedestrian environments, opportunities for incidental exercise and potential for reduced travel related stress.

Placemaking

The delivery of Sydney Metro West offers the opportunity to transform areas with new places, or to reinforce and enhance existing places. The approach to placemaking at each locality would be contextual, taking into consideration that metro stations would:

- Function as ‘places’ in their own right, creating focal points in the communities each station serves. The stations would attract a range of benefits and land uses, including reducing dependence on private vehicles, providing public places for gathering and human interaction supported by commercial and retail, as well as encouraging exercise by promoting walking and cycling to and from the stations
- Have a role in contributing to their surrounding environment or ‘place’ in which they are located by supporting planned growth and renewal, and acting as a catalyst for transit-oriented development within their catchments.

Further details regarding placemaking outcomes at each site will be assessed in subsequent assessment stages.

Sydney Metro West objectives

The Sydney Metro West network objectives are:

- Ensure transport services are meeting the needs of customers
- Deliver outcomes that align with and support key strategic land use and transport frameworks including the Smart Cities Plan, Greater Sydney Region Plan, Future Transport Strategy and the relevant District Plans
- Boost Sydney’s international competitiveness, productivity and employment growth by supporting new and existing strategic centres
- Support future housing needs by increasing housing supply, choice and affordability
- Improve liveability and provide a catalyst for positive change by unlocking urban renewal opportunities, enhancing housing supply and supporting productivity of centres
- Improve access to and resilience of the transport network through integrated land use and transport planning, including integration of Sydney Metro West with other transport modes
- Ensure value for money and a sustainable and deliverable solution.

The Sydney Metro West Greater Parramatta to Sydney CBD corridor objectives are:

- Contribute towards the vision for a three cities metropolis established by the Greater Sydney Commission including the ‘30-minute city’ concept
- Support additional housing supply and employment growth opportunities and support urban renewal initiatives within the Greater Parramatta to Sydney CBD corridor including key government precincts such as the Greater Parramatta and Olympic Peninsula and The Bays
- Achieve customer outcomes including relieving congestion on the busy T1 Western Line and T2 Inner West and Leppington Line, increased rail patronage and mode shift, reduced travel times between key destinations, providing new access to mass transit rail and relieving bus and road congestion in the western corridor.

Options considered

The Sydney Metro West development process has been driven by the identified strategic need to improve connectivity between Greater Parramatta and the Sydney CBD, and has included:

- Development of a solution to improve transport capacity and amenity between Parramatta and the Sydney CBD, and support population growth
- Consideration of alignment options and the type of service, including determining the optimal balance of travel times between the Parramatta and Sydney CBDs, and the number of stations to enable people to access metro services
- Analysis of options for station locations
- Analysis of options for a stabling and maintenance facility
- Analysis of options for the approach to tunnelling
- Investigations into safeguarding measures for potential future extensions of Sydney Metro West.

The option selection process has taken into account issues raised during consultation with key stakeholders, including government agencies and the community. Options were assessed against a range of criteria, including customer outcomes, constructability, operation, environmental impacts, accessibility, heritage and placemaking considerations, risk and cost effectiveness.

Stakeholder and community engagement

Stakeholder and community consultation for Sydney Metro West has played an integral part of the projects development and has informed scoping investigations for this Environmental Impact Statement, and will continue to do so through ongoing project development and construction.

Sydney Metro has developed a comprehensive community and stakeholder engagement program and has been proactive in engaging with local communities, key stakeholders, industry and government agencies throughout project development. A key objective of this engagement has been to encourage participation and obtain input for consideration in the development of Sydney Metro West and its future implementation.

Since the announcement of Sydney Metro West by the NSW Government in 2016, consultation has been undertaken with state government departments and agencies, local government, peak organisations, the community and industry. This has involved:

- A first round of community and industry consultation from June 2017 to September 2017 along a broad study area between Greater Parramatta and the Sydney CBD
- A stakeholder deliberative forum held on 30 August 2017, which was attended by 37 senior stakeholders from a range of state government departments and agencies, councils and some key local institutions
- A second round of community and industry consultation from March 2018 to May 2018 over a refined study area between Greater Parramatta and the Sydney CBD
- Community and stakeholder engagement after lodgement of the Scoping Report and during preparation of this Environmental Impact Statement between October 2019 and April 2020.

In addition to the consultation sessions undertaken with the community and industry, the following consultation activities have been undertaken:

- Letterbox drop to more than 220,000 residents and businesses
- Proactive media strategy, which resulted in broad coverage across Sydney metropolitan and local print, radio and television outlets
- Advertisements in local and multicultural newspapers
- Email alerts to registered community members and stakeholders
- Social media via the Sydney Metro Facebook page, which has a reach of almost 37,000 people
- Paper survey – via completing a form at a public information session
- Online survey – ‘Have your say’ on the Sydney Metro and Transport for NSW websites
- Two ‘Project Overview’ information booklets (published in June 2017, March 2018 and October 2019)
- Newsletter – ‘Sydney Metro West – the city’s next underground metro railway’ (September 2018), delivered via letterbox drop and placed on the project website
- Newsletter – ‘Sydney Metro West stations confirmed’ (October 2019), delivered via letterbox drop and placed on the project website.

Ongoing communication channels have also been established for Sydney Metro West since the project announcement to provide for ongoing engagement with stakeholders and communities.

The Department of Planning, Industry and Environment will place this Environmental Impact Statement on public exhibition for a minimum of 28 days (as per Schedule 1 of the NSW *Environmental Planning and Assessment Act 1979*). During the exhibition period, government agencies, stakeholders and the community will be able to review the Environmental Impact Statement and will have an opportunity to make a written submission to the Department of Planning, Industry and Environment for consideration in its assessment of Sydney Metro West.

Environmental assessment

This Environmental Impact Statement has been prepared in accordance with the provisions of Part 5.1 of the *Environmental Planning and Assessment Act 1979*. In particular it addresses the requirements of the Secretary of the Department of Planning, Industry and Environment. It also includes consideration of the issues raised by the community and stakeholders during the development of the project.

Key environmental issues have been examined throughout the design and development process. Consultation has been carried out with affected stakeholders to identify key potential impacts at an early stage. Where possible, these would be avoided or appropriate mitigation measures have been developed. This has resulted in a number of design changes and refinements that have mitigated many of the potential significant impacts.

The main impacts identified in the environmental assessment are described in the following sections.

Concept environmental issues

As described above, the construction and operation of Sydney Metro West would result in numerous transport benefits, foster significant growth in jobs and support planned land use outcomes in the Parramatta and Sydney CBDs, planned precincts and urban renewal areas. Potential environmental impacts associated with the Concept have been broadly assessed by considering the existing environment of the Concept corridor.

Specific performance outcomes have been established so that potential environmental impacts associated with construction and operation of the Concept are avoided or minimised.

Potential key operational benefits and impacts of the Concept include:

- Positive traffic, transport and access benefits including increased capacity and reliability of the public transport network, improved travel times and comfort, reduced crowding, increased customer catchment, and improved connectivity and transfer opportunities for customers
- Changes to traffic arrangements, permanent or temporary loss of loading zones and parking spaces, altered pedestrian and cyclist arrangements
- Minimal ground-borne and structure-borne noise and vibration from train operations, the stabling and maintenance facility, ventilation facilities and other ancillary facilities
- Potential impacts on the heritage significance of listed heritage items and conservation areas due to the establishment of new infrastructure that detracts from the values of a heritage item and/or changes to the visual setting of a heritage item
- Support for planned growth and land use change in a number of precincts across the corridor, including Westmead, the Parramatta Road Corridor, Sydney Olympic Park and The Bays
- Permanent acquisition of property to enable the establishment and operation of Sydney Metro West infrastructure
- Changes to local visual and landscape character (both positive and negative) associated with the establishment of new stations, ancillary infrastructure, and the stabling and maintenance facility
- Increased business access to local and regional labour markets and improved customer access to businesses
- Support potential private development and investment within areas around new metro stations resulting in favourable business conditions
- Long-term positive social and community impacts including improved physical and mental health, amenity and placemaking benefits, increased access to jobs, universities and services, and improved air quality.

Performance outcomes would avoid, minimise or appropriately manage potential environmental impacts during construction of the Concept. Potential construction impacts would generally be temporary and would be offset by the significant transportation and other benefits that Sydney Metro West would provide over the medium to longer term and particularly for future generations. Potential key construction impacts would include:

- Potential temporary impacts to traffic performance on the road network surrounding construction sites due to changes to traffic arrangements, loss of loading zones and parking spaces, alteration of public and active transport arrangements, and temporary construction traffic
- Potential temporary ground-borne noise, airborne noise and vibration impacts on surrounding land uses and sensitive receivers due to temporary construction activities
- Potential direct impacts (from demolition and excavation works) and indirect impacts (from visual and vibration impacts) on non-Aboriginal heritage and potentially significant archaeological remains
- Potential direct impacts to known Aboriginal sites in Parramatta and potential impacts to previously unrecorded archaeological deposits with high archaeological significance
- Potential temporary disruption of utilities, services and transport assets
- Potential temporary impacts on landscape character and visual amenity for nearby sensitive receivers due to the presence of construction sites, acoustic sheds or other acoustic measures, removal of trees, construction vehicles, and potential temporary loss of open space
- Potential temporary impacts to local businesses associated with increased traffic congestion, utilities adjustments, and potential reduced visibility
- Potential temporary social and community impacts due to reduced local amenity, access and changes to local character
- Potential groundwater drawdown/lowering of the water table due to tunnelling, resulting in potential impacts on nearby groundwater users
- Ground disturbance potentially leading to soil erosion, exposure of acid sulfate soils and a reduction in surface water quality
- Potentially encountering contamination during excavation works associated with previous historic land uses.

Stage 1 environmental issues

Stage 1 would involve temporary construction activities associated with tunnelling, excavation and other major civil works between Westmead and The Bays. As a result, the potential temporary impacts associated with Stage 1 would be limited to the construction phase.

Where possible, Sydney Metro has avoided and minimised impacts as part of project development and design. Potential impacts would be adequately managed through the implementation of construction environmental management documentation and the specific performance outcomes and mitigation measures identified in this Environmental Impact Statement. This would include the use of the Sydney Metro Construction Environmental Management Framework, Construction Noise and Vibration Standard and Construction Traffic Management Framework which set out the overall approach to environmental management approach. These documents have been successfully implemented on previous Sydney Metro projects including Sydney Metro Northwest and City & Southwest.

Transport and traffic

Potential transport and traffic impacts of Stage 1 have been avoided and minimised, primarily by minimising the use of local roads, identifying the most efficient haul route to the arterial road network and minimising movements during existing network peak periods. In addition, the management of construction traffic would be in accordance with the Sydney Metro Construction Traffic Management Framework and site specific mitigation measures. This includes measures to manage pedestrian, cyclist and motorist safety around construction sites.

Stage 1 would require construction work to be carried out adjacent to areas with high volumes of traffic and pedestrians in busy urban areas. This would result in some potential temporary impacts to traffic performance on the surrounding road network due to the temporary addition of construction vehicles and temporary road closures. This potential temporary decrease in road network performance would result in delays at some intersections and increased queue lengths at some locations, particularly near the Westmead metro station, North Strathfield metro station and Five Dock Station construction sites.

Horwood Place in the Parramatta CBD would be closed for the duration of Stage 1 and alternative temporary access arrangements would be made for properties with rear access to Horwood Place. The demolition of the City Centre multi-level car park is identified in the Draft Parramatta CBD Public Car Parking Strategy (City of Parramatta, 2017). The City of Parramatta strategy identifies the potential measures to offset this loss of car parking. The Parramatta metro station construction site would require the demolition of this car park and some off-street parking spaces - a loss of 850 parking spaces.

Construction works would temporarily impact public transport including temporary relocation of bus stops and changes to bus routes. This could result in temporary minor delays and the need for commuters to walk further to reach their destinations.

Potential impacts on the active transport network are generally expected to be limited to the temporary closure of some footpaths near some construction sites. Alternative arrangements would be made, such as diversions onto the footpath on the opposite side of the road, to maintain pedestrian access in these areas. The closure of Batman Walk and Horwood Place would have minor impacts on pedestrians and cyclists travelling within the Parramatta CBD. Detours would be established and signposted in these areas.

Measures would be put in place to limit any potential temporary impacts on pedestrians and traffic during the large number of special events which occur within the Parramatta CBD area, Sydney Olympic Park and the Rosehill Gardens racecourse.

Noise and vibration

The management of construction noise and vibration would be in accordance with the Sydney Metro Construction Noise and Vibration Standard which provides standard mitigation measures and additional mitigation measures for certain noise and vibration impact levels. Site specific mitigation measures have also been identified to reduce noise and vibration impacts, including acoustic sheds (or other acoustic measures), the use of alternative construction methods and programming works around more sensitive periods.

Consistent with most major infrastructure projects in urban areas, where receivers are close to construction sites (such as at Westmead, Clyde, North Strathfield, Burwood North and Five Dock) the noise impacts during some of the works are expected to temporarily be 'high', particularly when noise intensive equipment such as rockbreakers are in use close to receivers. The worst-case impacts are generally predicted to occur in the early stages of the works, such as during enabling works, piling and initial excavation, which require noise intensive equipment to be used prior to the construction of acoustic sheds (or other acoustic measures). Enabling works such as roadworks and power supply works could occur during daytime, evening or night-time hours. Other early stage works including piling and initial excavation would generally occur during daytime hours.

Noise intensive works (such as excavations) within the construction sites during the night-time would generally only be completed inside acoustic sheds (or once other acoustic measures have been established) however, 'moderate' worst-case impacts are expected at some receivers.

The main potential sources of construction ground-borne noise and vibration are associated with the use of tunnel boring machines, roadheaders and rockbreakers during tunnelling and station shaft excavation. The worst-case predicted ground-borne noise impacts are generally compliant with the management levels or result in only 'minor' impacts for most receivers. 'Moderate' or 'high' impacts are, however, predicted for the Westmead metro station, Parramatta metro station, Clyde stabling and maintenance facility, North Strathfield metro station, Burwood North Station and Five Dock Station construction sites, either due to the tunnel being shallow at this location or sensitive receivers being near the station shaft excavation works. Alternative construction methods such as the use of blasting may be adopted in some locations to reduce these impacts.

There is potential for temporary exceedances of vibration cosmetic damage screening criteria at Parramatta, Clyde, Silverwater, Burwood North, Five Dock and The Bays, due to vibration sensitive structures being adjacent to the boundary of these sites. Further investigation would be carried out to determine appropriate vibration levels for these structures. Exceedances of the human comfort vibration criteria are also predicted at the nearest receivers to all construction sites, meaning occupants of affected buildings may be able to perceive the impacts at times when vibration intensive equipment is in use nearby.

There would also be minor construction and operational traffic noise impacts to receivers near the Westmead metro station construction site particularly along Grand Avenue and Alexandra Avenue.

Non-Aboriginal heritage

Potential non-Aboriginal heritage impacts of Stage 1 have been avoided and minimised where possible. For example, locally listed heritage items within the Parramatta metro station construction site would be retained and protected. In addition to archival recordings, management and mitigation measures have been identified to minimise direct and indirect impacts to heritage items. Where direct impacts are unavoidable such as at White Bay Power Station, this would include opportunities for salvage for the retention, conservation and reuse of original and significant heritage fabric. Further archaeological investigations would be undertaken as required in accordance with Heritage Council guidelines.

Stage 1 has potential to have direct and indirect impacts on three heritage items of State significance; Roxy Theatre, State Abattoirs and White Bay Power Station. Both the State Abattoir and White Bay Power Station would experience moderate direct impacts to the item as well as moderate indirect impacts on views and vistas associated with the introduction of construction elements near these items. There would be no direct impacts on Roxy Theatre and four other local heritage items however there would be moderate indirect impacts to views and vistas.

Potential temporary impacts due to construction vibration would be limited, with potential minor impacts identified for State Abattoirs, the White Bay Power Station, two local heritage items at Parramatta, one local heritage item at Clyde and one local heritage item at The Bays.

The Parramatta metro station construction site has low to moderate potential to contain State significant archaeological remains associated with the earliest phases of European settlement including convict huts, yards and gardens. The site also has low to moderate potential to contain archaeological resources relating to early colonial residences and yards, and the convict drain. These resources, should they be present, would likely be of local to State significance, depending on the intactness of remains. The Bays Station construction site is identified as having non-Aboriginal archaeological potential of local significance. Ground disturbance or excavation at these sites could impact on archaeological resources.

Aboriginal heritage

Development of Sydney Metro West has largely avoided direct impacts to known Aboriginal sites, and minimised the potential interface with areas with high Aboriginal archaeological potential. At sites with higher Aboriginal archaeological potential, test excavation would be carried out. If Aboriginal archaeological remains are identified during Stage 1, archaeological results would be used for Aboriginal heritage interpretation in future stages in consultation with registered Aboriginal parties.

Aboriginal archaeological sensitivity has been identified at the Parramatta metro station, Clyde stabling and maintenance facility, and The Bays Station construction sites. Of these, the Parramatta metro station site includes one registered Aboriginal site (AHIMS ID 45-6-3582) as well as the Parramatta Sand Body, which has demonstrated archaeological potential.

Archaeological sensitivity at the Clyde stabling and maintenance facility, and The Bays Station construction sites is subject to confirmation by archaeological test excavation and/or identification of intact soil profiles during non-Aboriginal (historical) archaeological investigation.

For the remaining construction sites, due to the landscape context and largely modified nature of the construction sites and surrounding areas, the likelihood of intact artefact bearing archaeological deposits is low. There is low potential for impact to Aboriginal objects, and any Aboriginal objects that might be located within the impact area are likely to be within a disturbed context and would therefore be of low archaeological significance.

Property and land use

Sydney Metro makes every effort to avoid the need to acquire private property. For example, the sites at North Strathfield and The Bays are wholly located on existing NSW Government owned land. Where existing government land is not available, site selection generally sought to minimise acquisition of residential land.

All property acquisitions would be managed in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* and the land acquisition reforms implemented by the NSW Government. Sydney Metro has appointed Personal Managers to offer residents and small businesses assistance and support throughout the acquisition process.

During Stage 1, the main property impact would be the acquisition for construction sites proposed for station excavation, service facilities, the stabling and maintenance facility and ancillary facilities or services. Where possible, these construction sites would be located where permanent operational infrastructure would also be required, to avoid the need for temporary property impacts and minimise residual land holdings at the completion of construction.

It would also be necessary to acquire stratum for the tunnels below the surface of properties under the *Transport Administration Act 1988*. In most cases, subsurface acquisition does not affect the continued existing or intended future uses of property at the surface.

Landscape character and visual amenity

Measures would be implemented to reduce potential landscape character and visual amenity impacts. This would include retaining and protecting trees where possible, and offsetting trees removed to ensure no net loss of tree numbers.

Landscape and visual impacts would be experienced during construction near construction sites. Temporary visible elements would be introduced including acoustic sheds or other acoustic measures, machinery and equipment, site hoardings, partially complete structures, and other construction works. The introduction of these elements would affect landscapes and views including those which are considered to have high sensitivity due to the value of the landscape or urban place to the community.

The Abattoir Heritage Precinct gardens in Sydney Olympic Park, a regionally sensitive landscape, could be impacted through the removal of the southern portion of the palm grove and surrounding carriage loop gardens. This impact could be lessened with the reinstatement of the gardens with appropriate similar species and plantings in keeping with the provisions of the Conservation Management Plan. This would result in high level of visual impact. Sydney Metro is investigating the feasibility of design and construction options to avoid direct impacts to this heritage item.

Where vegetation removal is required for construction sites, there would be a reduction in the quality of landscape character and potential visual impacts from the introduction of construction sites near sensitive receivers.

At other construction sites, such as The Bays Station and Clyde stabling and maintenance facility, the works would be viewed within the context of a highly developed and dynamic urban environment, where construction and associated works are frequent occurrences.

Business impacts

Construction of Stage 1 would result in broad economic benefits by way of job generation. Locally, many businesses would benefit from increased demand from construction workers requiring food and beverage services and other goods. Construction of Stage 1 is anticipated to create 10,000 direct and 70,000 indirect jobs.

Direct impacts to business would occur where they are located within properties to be acquired. This would be managed in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991*. Sydney Metro has appointed Personal Managers to offer small businesses assistance and support throughout the acquisition process.

Measures would be also be implemented to support businesses potentially temporarily indirectly impacted during Stage 1 construction. Potential temporary indirect business impacts could include temporary constraints or restrictions on servicing and delivery/access, amenity issues such as increased traffic congestion, noise, vibration and dust, changes to customer access and parking.

Social impacts

Potential temporary social impacts associated with Stage 1 would generally be managed through appropriate mitigation of other aspects such as noise, traffic, visual and air quality. Sydney Metro would also develop a community benefit plan to guide the development of community benefit initiatives (by Principal Contractors).

The area around the Stage 1 construction sites includes a wide range of regional and local social infrastructure, with open spaces, community centres, recreation facilities, childcare centres, medical centres, nursing homes and creative and cultural facilities. The ability of certain community facilities to function, or the community's enjoyment of them, may be reduced where they are located close to construction sites.

There would be temporary changes to community character, such as changes to streetscape, access, businesses, increased numbers of workers and visitors in the area due to construction activity. Stage 1 would also potentially result in changes to sense of place and potential loss of community connections to the surrounding area due to temporary impacts of construction, potential impacts to heritage items, changes to the local business environment, changes to streetscape and urban fabric.

Groundwater and ground movement

To limit potential groundwater inflows and groundwater drawdown, the metro tunnels would be tanked (designed to prevent the inflow of groundwater, typically using concrete lining and waterproofing membrane). Similarly, the cross passages and some of the station caverns would be tanked. As a result, limited change is expected to groundwater levels.

Excavations at Stage 1 construction sites would act as local groundwater sinks, causing the surrounding groundwater to flow towards the excavations and leading to groundwater drawdown. While groundwater drawdown could affect two groundwater users (one near Westmead and one near Burwood North), potential impacts are expected to be minimal and groundwater supply is not expected to be affected. There could be some impacts to groundwater dependent ecosystems due to drawdown, although the affected plant communities are not likely to be entirely dependent on groundwater. At some locations (Westmead, Clyde, North Strathfield) groundwater drawdown could affect baseflows in nearby creeks.

Stage 1 would result in the potential migration of contaminated groundwater towards, and into, station excavations. This would pose a potential exposure risk to site users and workers and adjacent site users. This would also potentially reduce the beneficial use of the aquifer.

The majority of the Stage 1 alignment has been assessed as having a negligible ground movement risk, with superficial damage to buildings unlikely. Small areas at station sites and dive sites may require future building strain and structural assessment to address settlement related risks.

Soils and surface water quality

Given the relatively small areas of surface disturbance anticipated during construction, soil erosion would be adequately managed in accordance with proven standard mitigation measures.

Standard construction management measures would be implemented to manage the potential risk to downstream water quality from station excavation and tunnelling construction activities. Construction activities can impact on watercourses through disturbing and mobilising soil or other materials, which could result in discharges of substances to watercourses which could affect the water quality and ecosystem health. Surface construction activities would be generally be carried out in highly modified and urban environments and would not be located within or near waterways with the exception the Clyde stabling and maintenance facility construction site and The Bays Station construction site. The partial realignment and crossing of Duck Creek and A'Becketts Creek has the potential to result in a temporary change in in creek flows and velocities. The earthworks could also expose soils or sediments resulting in soil erosion and movement of soils into receiving waterways.

Water volumes generated during Stage 1 would vary based on construction activities both above and below the ground surface, the amount of groundwater inflow into the tunnels and the length of tunnels that have been excavated.

Considering the prevailing drought conditions in Sydney and across NSW, Sydney Metro is further investigating options to minimise potable water use and maximise wastewater reuse. This includes investigating opportunities for the reuse of water both on-site and off-site, and reduce reliance on potable water supply.

Contamination

The potential risks associated with encountering existing contamination would be appropriately managed by well-established mitigation processes and measures. All construction sites have a moderate to high potential for contamination. Contaminants that could be encountered during excavation and other ground disturbing activities include those associated with leaks and spills from fuel storage, processing of heavy end hydrocarbons, land reclamation and the use of uncontrolled fill materials and current and former industrial uses.

Known and potential contamination was an important consideration during construction site selection. The location of the stabling and maintenance facility at Clyde, while having moderate risks associated with localised contamination, avoided impacting areas with widespread contamination (in the general Camellia/Rosehill locality). This potentially reduces challenges in relation to substantial contamination remediation, which could pose risks to worker health and safety and nearby ecosystems.

Hydrology and flooding

Potential flooding impacts are expected to be minor to negligible at the majority of Stage 1 construction sites.

The drainage catchments across the Stage 1 area are highly urbanised, with large impervious surfaces created by roads, footpaths and buildings. These impervious surfaces are interspersed with pervious surfaces in parks and other unsealed surfaces (such as vacant land and landscaped areas). Due to the highly urbanised drainage catchments surrounding the Stage 1 area, flooding behaviour is expected to be largely controlled by the capacity of stormwater drainage systems and roadways that form overland flow paths.

Stage 1 construction activities and infrastructure have the potential to impact existing flooding behaviour through disruption of existing conditions (such as drainage systems and/or overland flow paths). In addition, flooding events during construction could impact areas within and near the Stage 1 construction sites, including the potential inundation of construction sites.

Key areas of potential flooding risk include the Parramatta metro station, Clyde stabling and maintenance facility and The Bays Station construction sites. At Clyde stabling and maintenance facility there would be a minor increase in peak flooding levels, an increase in the extent of floods and an increase in flood hazard during flooding events although these are all considered to be within acceptable levels. Increases in flow velocity and scour potential may result where Stage 1 alters flood flow patterns and significantly divert or concentrate flood flows although this would be managed using standard measures.

Further investigation and modelling would be carried out during detailed design so that the function of the floodplain is not materially affected by construction of Stage 1. Appropriate arrangements would also be in place to manage any flood events should they occur during either construction or operation.

Biodiversity

The Stage 1 construction footprint is mainly in built up areas and has substantially avoided direct biodiversity impacts. The limited amount of native vegetation to be disturbed is of poor to moderate quality and threatened species habitats are limited. Residual biodiversity impacts, primarily at the Clyde stabling and maintenance facility construction site would be offset in accordance with the requirements of the *Biodiversity Conservation Act 2016* and relevant guidelines.

Stage 1 would involve the direct removal of 0.18 hectares of native vegetation including 0.15 hectares of Mangrove Forests at the Clyde stabling and maintenance facility construction site and 0.03 hectares of Grey Box-Forest Red Gum grassy woodland at the Westmead metro station construction site. No threatened flora species would be directly impacted.

No threatened fauna species are likely to be significantly impacted by Stage 1. One threatened fauna species, the Southern Myotis (listed as vulnerable under the *Biodiversity Conservation Act 2016*) is considered likely to occur based on the presence of suitable foraging habitat. Other threatened fauna species may use vegetation, including both native and exotic planted trees and shrubs, that are within the Stage 1 construction footprint, however it is unlikely that Stage 1 would detrimentally affect these species.

The Stage 1 construction footprint is located within a highly disturbed landscape where most habitats have been cleared. The habitats that do remain are fragmented and isolated, however impacts to the vegetated riparian zones of Duck Creek and A'Becketts Creek may limit the movement of threatened species in that area.

To mitigate potential impacts to biodiversity associated with Stage 1, biodiversity credit obligations were calculated using the Biodiversity Assessment Method Calculator. A total of six credits would be required associated with impacts to the Mangrove Forest (PCT 920) and Southern Myotis (*Myotis macropus*). The NSW Department of Primary Industries Policy and Guidelines for Fish Habitat Conservation and Management (NSW Department of Primary Industries, 2013) are applicable and the 0.15 hectares of impacted Mangrove Forest would be offset at a 10:1 ratio due to impacts on a mapped Coastal Wetland area.

Sustainability and climate change

The Sydney Metro West Sustainability Plan will set out the sustainability policy and objectives and identify key activities so that sustainability considerations are embedded across the project life cycle.

Six principles have been developed to govern environmental and socio-economic outcomes and performance for Sydney Metro West based around demonstrating leadership, tackling climate change, managing resources efficiently, driving supply chain best practice, valuing community and customers and respecting the environment. Targets and initiatives have been developed to support these sustainability principles.

Cumulative impacts

Given the potential overlap of construction with a number of large infrastructure projects particularly in Parramatta, The Bays and Sydney CBD, the key potential cumulative impact is expected to be experienced at these locations. Cumulative impacts would be highly dynamic and time/activity specific, so are difficult to define in any detail at this stage of the assessment process. Sydney Metro would work closely with the proponents of other nearby projects and stakeholders such as the Sydney Coordination Office to manage and coordinate the interface with other major projects under construction at the same time.

Other issues

A number of other issues were assessed including climate change and greenhouse gas, air quality, hazards, and waste management and resource use. No issues of major risk or consequence were identified. Notwithstanding this, management and mitigation measures have been identified to minimise any potential impacts.

Justification and conclusion

Sydney Metro West would provide a fast, reliable and frequent connection between Greater Parramatta and the Sydney CBD and would:

- Relieve the congested T1 Western Line, T9 Northern Line and T2 Inner West and Leppington Line
- Double the existing rail capacity between the Parramatta and Sydney CBDs
- Significantly boost economic opportunities for Greater Parramatta
- Support new residential and employment zones along the Greater Parramatta to Sydney CBD corridor, including at Sydney Olympic Park and The Bays – providing improved transport for the additional 420,000 new residents and 300,000 new workers forecast to be located within the corridor over the next 20 years
- Allow customers fast and easy transfers with the T1 Western Line at Westmead, T9 Northern Line at North Strathfield and the suburban rail network and Sydney Metro in the Sydney CBD
- Allow for transfers with the future Parramatta Light Rail (Stage 1) at Westmead and Parramatta, as well as the planned future Parramatta Light Rail (Stage 2) at Sydney Olympic Park
- Create an anticipated 10,000 direct and 70,000 indirect jobs during construction.

Sydney Metro West would provide city-shaping benefits as the significant increase in transport connectivity, capacity and amenity in the Greater Parramatta to Sydney CBD corridor, would boost the economic productivity of Sydney and unlock planned land use outcomes in the CBDs, planned precincts and urban renewal areas.

Sydney Metro West has been justified in relation to its strategic transport need and its anticipated benefits, taking into account the objectives of the *Environmental Planning and Assessment Act 1979* and matters of ecologically sustainable development. It best meets the network and corridor objectives when compared to all other alternatives considered.

Key environmental issues have been examined throughout the design development process. Consultation has been carried out with affected stakeholders to identify key potential impacts at an early stage. This has resulted in a number of design changes that have avoided or mitigated many of the potential significant impacts. Provided the measures and commitments specified in the Environmental Impact Statement are applied and effectively implemented during the design, construction and operational phases, the identified environmental impacts are considered to be acceptable and manageable.

Next steps

Sydney Metro is seeking approval from the Minister for Planning and Public Spaces for the Sydney Metro West Concept and construction of Stage 1. Subsequent steps in the process include:

- Exhibition of the Environmental Impact Statement for a minimum of 28 days and invitation for the community and stakeholders to make submissions
- Consideration of submissions. Submissions received by the Secretary of the Department of Planning, Industry and Environment would be provided to Sydney Metro who may then be required to prepare and submit:
 - A submissions report, responding to issues raised in the submissions
 - A preferred infrastructure report and/or an amendment report, outlining any proposed changes to the Concept or Stage 1 to minimise its environmental impacts or to deal with any other issues raised
- Determination of the Environmental Impact Statement by the Minister for Planning and Public Spaces including, if approved, any Conditions of Approval.

Consultation with the community and stakeholders would continue throughout the detailed design and construction phases.

Any person wishing to make a submission should use the online form if possible. To find the online form go to the web-page for the proposal via www.planningportal.nsw.gov.au/major-projects/projects/on-exhibition.

Your submission must reach the Department of Planning, Industry and Environment by close of business on 26 June 2020. Before making your submission, please read the Privacy Statement at www.planning.nsw.gov.au/privacy or for a copy, telephone the number below. The Department of Planning, Industry and Environment will publish your submission in accordance with the Privacy Statement.

If you cannot lodge online, you can write to the address below. If you want the Department of Planning, Industry and Environment to delete your personal information before publication, please make this clear at the top of your letter. You need to include:

- Your name and address (at the top of the letter only)
- The name of the application and the application number (SSI-10038)
- A statement on whether you support or object to the proposal
- The reasons why you support or object to the proposal
- A declaration of any reportable political donations made in the previous two years. To find out what is reportable, and for a disclosure form, go to <https://www.planning.nsw.gov.au/donations> or phone 1300 305 695 for a copy.

Address:

Department of Planning, Industry and Environment
Locked Bag 5022
Parramatta NSW 2124

Your submission should be marked Attention: Director, Transport Assessments.

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