Submission No 25

SYDNEY METRO WEST PROJECT

Organisation: The University of Sydney

Date Received: 19 September 2023

Professor Mark Scott AO
Vice-Chancellor and President

19 September 2023

Ms Lynda Voltz MP
Member for Auburn
Chair, Transport and Infrastructure Committee
Legislative Assembly
NSW Parliament
Macquarie Street, Sydney

Dear Ms Voltz,

Inquiry into the Sydney Metro West project

On behalf of the University of Sydney, I welcome the NSW Legislative Assembly inquiry into the Sydney Metro West project and thank you for the opportunity to provide feedback on the five terms of reference.

In the **attached** submission, the University highlights: concerns with the original business case for the project; the establishment of the route and selection of stations; avoidable blowouts in project costs and timeline; and the consideration of benefits of this project.

The submission notes the previous Government's lack of consideration for the Camperdown economic growth area in decisions regarding Sydney Metro West and the opportunity therein for future mass transport investment.

Despite being consistently overlooked in the Sydney Metro West project process - and recognising the investment made to date - the University is eager to continue exploring mass transport options with the NSW Government to address Camperdown's need.

The University has broad support from other anchor institutions in the Camperdown Ultimo district, who also support the need for a Metro connection in this location.

My colleagues and I welcome this opportunity to contribute to the public discussion of mass transit projects. Should you or members of the Transport and Infrastructure Committee require further information, please do not hesitate to contact me or [redacted], Chief University Infrastructure Officer, at [redacted] or [redacted].

Yours sincerely,

[redacted]

Professor Mark Scott AO
Vice-Chancellor and President

Attachment: University of Sydney submission to the NSW Legislative Assembly Committee on Transport and Infrastructure's inquiry into the Sydney Metro West project, September 2023

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THE UNIVERSITY OF SYDNEY

University of Sydney submission to the NSW Legislative Assembly Committee on Transport and Infrastructure inquiry into the Sydney Metro West project

September 2023

The University of Sydney welcomes the parliamentary inquiry into the Sydney Metro West project and thanks the Transport and Infrastructure Committee for the opportunity to provide responses to the terms of reference.

In our submission, we highlight our concerns with the original business case for the project; the establishment of the route and selection of stations; avoidable blowouts in project costs and timeline; and the consideration of benefits of this project. Specifically, the submission highlights the previous Government's lack of consideration for the **Camperdown economic growth area in decisions regarding Sydney Metro West and the opportunity therein for future mass transport investment**.

The University invested in significant explorations of Sydney West Metro station options and openly shared these with TfNSW and other agencies and departments during the previous Government. Our submissions were based on the advice of specialist transport advisor investigations carried out by Aurecon, Cardno, the Institute for Transport and Logistics Studies and Deloitte.

The University made submissions to TfNSW for a Camperdown station location that addressed Metro objectives, planning principles, patronage needs and cost objectives. We presented a **clear and compelling business case for a Sydney Metro West station at Camperdown, the State's primary research, education and health collaboration area, representing more than 70,000 jobs, servicing more than 600,000 people per year and generating and over $13.3 billion in annual economic output**. A Camperdown station would service two of Australia's leading universities, globally-renowned Royal Prince Alfred Hospital and an array of medical research institutes and other research bodies. A Camperdown station would play a key role in delivering the NSW Government objective of shifting to a knowledge-based economy in order to drive the State's future economic growth.

Despite the benefits and opportunities, and diligent advocacy from the University, the previous Government failed to engage with the key stakeholders in Camperdown and repeatedly overlooked this site for the Sydney Metro West project, without providing any transparent rationale. Nonetheless, the University remains ready to continue working with the current Government to realise future mass transit solutions that will capture the value presented in the Camperdown area.

ToR (a) Original business case for the project

The original business case has several flaws that may have contributed to the missed opportunity of a Camperdown station. Primarily, we highlight how neglecting key investments in the Camperdown area - and failing to engage with the key economic growth stakeholders in the area - means that the previous Government could not make the best economic decision regarding investment in the Sydney Metro West.

The business case summary (**Attachment 1**) has no consideration of the Tech Central Innovation district - Australia's most-mature research and development location, which encompasses the Camperdown area and is key to the development of a knowledge-based economy and the nation's broader ambitions for economic transformation. As founding members of the Tech Central Alliance, the University of Sydney, University of Technology Sydney and the Sydney Local Health District are impacted by this omission.

The business case fails to consider the significant growth in this area, including committed investment such as the Sydney Biomedical Accelerator ($650 million); Wentworth Capital's development of the University's Medical Foundation Building site into a Biomed, Science and Innovation Campus ($500 million); redevelopment of the Royal Prince Alfred Hospital ($750 million); and further large-scale investment in biomedical innovation research and industry partnerships to foster research translation, commercial impact and economic growth.

In addition to large scale investment in this area, local stakeholders offered further incentives to justify a Camperdown station. The University proposed to the previous Government a model of partnership in which it would contribute land and consider taking on some operational responsibilities. Despite these attractive offers, no discussions were undertaken to explore them. This failure to consider co-investment and additional leverage points in the business case may have resulted in a less than ideal outcome for the community that will use and fund the Sydney Metro West.

The University remains eager to work with the current Government to capitalise on the attractive and leveraged opportunity to invest in mass transit projects at Camperdown.

ToR (b) Establishment of route and selection of station locations

The process that was followed to establish the route and select the station locations is of concern. The University made numerous data-driven submissions between 2017 and 2020 on the topic of site selection that were based on specialist transport advisor investigations by Aurecon, Cardno, the Institute for Transport and Logistics Studies and Deloitte (**Attachments 2, [redacted] 4, [redacted]**). These investigations demonstrated a clear case for the benefits of a Camperdown location, as well as the risks and shortcomings of alternative routes and site locations. For example, modelling of growth and travel behaviour has shown that by 2036, a Camperdown station would service double the peak hour patronage of a White Bay station. Unlike Waterloo and other dormitory suburbs that primarily service morning and evening commuters, a Camperdown station would offer genuine all-day patronage, which has advantages for the efficiency of the transport network. Modelling [redacted] also showed that a Camperdown station would be one of the most used Sydney Metro stations, with an estimated 26,000 daily trips per day, reducing daily car trips to the central district by 16,000.

Concerns were presented to the previous Government about the White Bay Station, including time and cost blowout risk related to the complexity of the site and route as well as the lack of established economic generation surrounding the station. Alternative solutions that addressed these concerns were presented, such as a Camperdown station, which would be developed in preferable ground conditions and service multiple, established, large-scale institutions.

In addition to commissioned analyses and reports, the previous Government's own report on the Camperdown Ultimo Place Strategy (**Attachment 6**) identified the connectivity of Camperdown as a key priority and included the specific action to "advocate for a mass transit system that strengthens connections between the Collaboration Area and Greater Sydney's economic corridors" as an "immediate imperative" (p.19). These investigations into site selection were diligently presented to TfNSW with clear opportunities for action but were of no material impact to the business case and the decisions presented therein.

The poor consideration of site selection, and overlooking of a Camperdown station, not only represents a missed opportunity to facilitate and service growth in this precinct but also to reconcile public transport access limitations already impacting the area. A TfNSW report (**Attachment 7**) highlights how the "Camperdown node does not have direct access to rapid, regional mass transit", which is "accentuated by the high demand for regional travel to and from the area" (p.19) with patronage by essential health workers, students and specialised researchers who cannot perform their roles from home. Redfern station is the only metropolitan rail connection for Camperdown and only services the eastern side of the area. This station is still two kilometres - a 25-minute walk - from Royal Prince Alfred hospital through "high-risk areas" for pedestrians, according to another report by the Greater Sydney Commission (p.17).

Redfern station is one of the State's busiest stations and is subject to overcrowding, so much so that the Government has committed to rectifying actions including the development of a Southern Concourse. With the existing capacity challenge, as well as significant growth planned in Eveleigh such as the redevelopment of the Australian Technology Park) and Camperdown, the strain on Redfern station is expected to worsen. Despite the limitations of current facilities serving a large and growing demand, public transport service to the area has not only stalled but will be further diminished by the upcoming Sydney Metro City and Southwest alignment, which will remove direct train services to Redfern for commuters living west of Sydenham on the T3 Bankstown Line.

Provision of education services to the growing community in Western Sydney is a priority for the University. We are eager to ensure equitable accessibility through mass transit solutions. These challenges will not be alleviated by the current Sydney Metro West route and site selection, an oversight worth highlighting. The University remains eager to work with Government to develop mass transit interventions that can capture the opportunities and resolve the existing challenges highlighted for the Camperdown area.

ToR (c) Cause of blowouts in project cost and timelines

The University has presented to the previous Government, through TfNSW and other Government departments and agencies, analysis and rationale that highlighted the relative risk of The Bays route and station to. In 2018, the Government of the day was advised that The Bays precinct failed to deliver on patronage outcomes and presented significant construction challenges due to harbour crossing (**Attachment 2**). Risk assessments by transport advisors Aurecon highlighted that the proposed route from White Bay to Pyrmont "is not considered feasible at this stage because […] the route will be subject to significant delays, complexity and cost increases" (p.14), which would be due to, amongst other factors, staging delays, deep tunnelling to accommodate deep water tables and other transport channels, as well as significant land contamination. The report further stated that "from a transport capacity perspective, a Metro Station at The Bays does not add significant capacity to the Parramatta-Sydney CBD network" (p.14).

Whilst highlighting the risks of alternative locations, the University presented the previous Government with several lower-risk options. Multiple feasible routes and site options that include a Camperdown station have been analysed, evaluated, planned and proposed to the Government. These options would not face the same cost and timeline blowouts because they would tunnel under preferable ground conditions. Considering practical advantages, as well as contributions offered by the University, a Camperdown station would have offered a lower-risk option for project costs and timelines yet was not taken into account.

The University is eager to continue working with the current NSW Government to pursue collaborative and data-led analyses of sites such as Camperdown, to develop lower-risk, cost-effective, and time-efficient mass transit project options.

ToR (d) Consideration of other consequential benefits

Beyond a failure to meaningfully consider the opportunities presented in relation to a Camperdown station - including significant growth, the local investment context, co-investment and incentives, community demand, comparative patronage advantages, limited current servicing and risks with alternative options - TfNSW and the previous Government also overlooked other consequential benefits that this site would provide. We highlight here the innovation benefits that were presented which would support the selection of a Camperdown station.

The Sydney Metro West project presented an opportunity for the Government to progress its mandate for a knowledge-based economy by connecting knowledge hubs at Westmead, Camperdown, the CBD and Randwick. Connecting the nation's most significant economic development districts in this way would facilitate collaboration and convergence to empower innovation and bolster impact. Such connection would amplify investment being made in precincts such as Tech Central and the Westmead Innovation District and would further deliver "value add" outcomes in relation to attracting further investment and talent to the State, retaining innovative

industry and driving outcomes in relation to economic development on the basis of research and development (R&D) activity. By overlooking alternative but consequential benefits, the previous Government may have overlooked the opportunity for uplift in innovation intensity for the State that would be offered by a Camperdown station.

The University remains eager to work with the current Government to create this innovation uplift through future mass transit opportunities.

ToR (e) The missing link

An option that complements and optimises investment made to date is a route that passes through a Camperdown station. Route details have been presented in a report by Aurecon (**Attachment 2**). This option can be developed in line with existing commitments would achieve the benefits listed in this submission, namely:

- Direct and indirect economic benefits from improved access to multiple large-scale institutions (estimated to exceed $6.8 billion by 2036).
- Service to a rapidly-growing area that has significant investment in redevelopment.
- Leveraging large-scale investment in the area and complementing other Government investments, such as Tech Central.
- Innovation uplift through improved connection between innovation hubs.
- Unlocked capacity on T1 trainline.
- Unlocked capacity at Redfern station.
- Overcoming current public transport access challenges in the area.
- Improved access to key health and education infrastructure for essential workers, students, patients and researchers.
- Reduction in car trips (estimated to reduce by 16,000 car trips per day).
- Input from the University including land and operational contributions.
- Relatively high and all-day patronage (estimated to pass 26,000 daily trips).
- Land-locked and relatively low-risk construction.
- Committed, diligent and active partnership from the University.

The Sydney Metro West is an important project with a great opportunity to impact the community. The University supports an inquiry into the effective and efficient delivery of this project. To date, the University has engaged technical expertise at every step to review options and develop alternative strategies seeking to optimise the State's investment in transport infrastructure through a Camperdown station, to deliver our shared economic social and environmental objectives.

Despite being consistently overlooked in the Metro West process, and recognising the investment made to date, the University is eager to continue exploring mass transport options with the Government to address the Camperdown need. To this end, the University has engaged with the other anchor institutions in the Camperdown Ultimo district who also support the need for a Metro connection in this location (**Attachments 8, 9**).

With broad support and an opportunity to contribute to the impact of mass transit projects such as this, we look forward to ongoing conversations with the NSW Government for future opportunities in Camperdown.

Attachment 1

Final Business Case Evaluation Summary

Sydney Metro West

July 2020

we are insw
Infrastructure
New South Wales

About this report

Sydney Metro West (Metro West) is proposed as an integrated land use and transport project. The project will connect Greater Parramatta and the Sydney central business district (CBD) by delivering a new underground metro line.

Metro West is driven by a need to: increase public transport capacity; support employment growth and housing supply; and improve public transport options and benefits for customers by providing a reliable and frequent turn up and go service.

The project will double rail capacity between Greater Parramatta and the Sydney CBD, with a travel time target between the two CBDs of about 20 minutes.

Metro West will:

- Relieve the congested T1 Western Line, T9 Northern Line (previously T1 Northern Line) and T2 Inner West Line.
- Provide travel time savings for customers in Western Sydney and along the Greater Parramatta to Sydney CBD corridor.
- Reduce station crowding at some stations.
- Provide rail transport to areas where it is currently not available.
- Connect Greater Parramatta and the Sydney CBD to support the vision for a metropolis of three cities.
- Support delivery of the '30-minute city' as identified in the *Future Transport 2056* strategy.
- Reinforce the role of Greater Parramatta as the Central River City.
- Improve connectivity to major attractions and key precincts located along the corridor, including Sydney Olympic Park and The Bays Precinct.
- Support urban renewal and increased housing supply.
- Increase accessibility across Sydney and provide customers with a new world-class metro service.

The project will deliver underground metro tunnel and rail infrastructure; new rolling stock; signalling and train control systems; rail and line-wide systems and a depot; operation and maintenance; and; stations including integrated station and precinct developments at some station locations.

The Business Case for Metro West was developed by Sydney Metro and submitted to Government in October 2019. This Business Case Evaluation Summary has been prepared by Infrastructure NSW, the NSW Government's independent infrastructure advisory agency.

Sydney Metro overview

Sydney Metro is Australia's biggest public transport project. Services between Tallawong Station in 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 includes:

- The North West Metro Line – opened in May 2019 with driverless trains running every four minutes in the peak in each direction between Tallawong Station in Rouse Hill and Chatswood.
- Sydney Metro City & Southwest – A new 30-kilometre metro line extending the new metro network from the end of the North West Metro at Chatswood, under Sydney Harbour, through the Sydney CBD and south west to Bankstown. It is due to open in 2024 with capacity to run a metro train every two minutes each way under the centre of Sydney.
- Sydney Metro West (this project) – A new 24-kilometre metro line that would connect Greater Parramatta with the Sydney CBD. Confirmed stations include Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays and Sydney CBD. This infrastructure investment would double the rail capacity of the Greater Parramatta to Sydney CBD corridor with a travel time target between the two centres of about 20 minutes.
- Sydney Metro Western Sydney Airport – A new metro rail line that would connect the city's Greater West with Western Sydney International (Nancy-Bird Walton) Airport and the Western Sydney Aerotropolis to form the transport spine of the Western Parklands City.

Strategic context

Greater Sydney's population is growing

Metro West will make it easier and faster to get around, boosting economic productivity by bringing new jobs and education opportunities closer to home.

Sydney is a global city that will experience significant population and employment growth in the coming decades. Investment in public transport will play an important role in supporting this growth, ensuring Sydney's future liveability and global competitiveness.

Greater Sydney's population is forecast to grow by 1.7 million people from 2016 to 2036. This growth will require the city to accommodate an additional 725,000 new homes and 817,000 jobs including an additional 415,000 people and 170,000 jobs in Parramatta.

Currently the Sydney region experiences stresses that emerge from its monocentric nature. The majority of jobs are concentrated in and around the Eastern Harbour City, while residential homes are spread throughout the region. This creates an imbalance between the physical location of jobs and residents. A significant portion of Greater Sydney's residents need to travel over 30 minutes as part of their daily commute to work.

In 2016, more than 38 per cent of workers living in the Central River City area (which includes the Parramatta CBD) travelled to the Eastern Harbour City (which includes to the Sydney CBD) for work. In the same year, more than 51 per cent of workers in the Western Parkland City (which includes the Badgerys Creek Aerotropolis) travelled to either the Central River City (29 per cent) or Eastern Harbour City (21 per cent).

A Metropolis of Three Cities

Metro West will support well-connected and vibrant places that re-imagine Western Sydney and reduce the traditional reliance on long-hail, peak-hour-only commutes to and from major employment centres.

The Greater Sydney Region Plan sets out a vision that rebalances the city into a metropolis of three connected cities – an Eastern Harbour City (Sydney), Central River City (Parramatta) and Western Parkland City (the Western Sydney Airport and Badgerys Creek Aerotropolis).
This vision supports the development of '30-minute cities', where residents, wherever they live within the region, have access to jobs, schools, hospitals and other key services within 30 minutes of their homes.

The plan also highlights how productivity is driven by connectivity, stating that "A Metropolis of Three Cities requires a well-connected Greater Sydney with new jobs, shops and services in well-located centres connected by efficient transport and safe and convenient walking and cycling routes".

The same vision underpins the *Future Transport 2056* strategy and the State Infrastructure Strategy 2018-2038. These three plans recognise the need for greater integrated planning, including land use and transport planning, to support the productivity, liveability and sustainability of Sydney as it grows.

The *Future Transport 2056* strategy supports the Greater Sydney Region Plan in planning a hierarchy of city-shaping, city-servicing and centre-servicing corridors to support the three-cities vision. The strategy identifies a city-shaping mass-transit network for investigation and implementation over the next 20 or more years. Metro West will play a key role as the mass transit

spine between the Central River City and Eastern Harbour City before potential future extensions, such as to the Aerotropolis.

The Greater Sydney Region Plan and Metro West

Metro West plays a critical role in supporting the Greater Sydney Region Plan and the *Future Transport 2056* strategy. By creating a mass transport connection between two of the three cities in this vision, Metro West will directly support the growth of the Central River City to allow it to support the planned growth targeted by the Greater Sydney Commission.

By providing a 20-minute travel target link between the two city centres, Metro West will encourage investment in the Central River City, both state and international, and encourage the re-location, co-location and growth of businesses in the Central River City, accelerating its growth as a CBD.

The NSW Government's *Future Transport 2056* strategy supports the 30-minute cities concept and builds on the 2012 NSW Long Term Transport Master Plan, which has guided unprecedented investments in transport services and infrastructure across NSW.

Metro West forms the spine of a future city-shaping mass transit network, providing a key east-west connection which underpins the Greater Sydney Region Plan for three 30-minute cities, providing journey-time savings, expanding the catchment of the Parramatta and Sydney CBDs, and integrating with the future city-shaping network.

Project need

Metro West addresses a number of current and future transport and land use needs in its corridor. Westmead, Parramatta CBD, Sydney Olympic Park, The Bays and Sydney CBD account for more than 50 per cent of planned population growth and more than 70 per cent of planned jobs growth in the corridor by 2036.

The corridor is of national economic significance. It has some of the most productive centres in Greater Sydney. The corridor already contains nearly 620,000 high productivity jobs and generates seven per cent of the nation's GDP.

The corridor does, however, face some key transport and land use constraints. Key transport issues include the increasing demand on existing heavy rail lines in the western rail corridor, which is rapidly reaching capacity, and the local impacts of Greater Sydney's monocentric nature on key precincts and locales along the corridor.

Key land use issues include challenges in physically accommodating planned growth without more transport capacity, exacerbated by limited transport connectivity which limits access to jobs within a 30-minute catchment, compromising the amenity and quality of life for residents.

Transport Constraints

There is a demonstrated urgent need to develop the Project to enable land use outcomes and to meet the transport requirements of the western rail corridor, with its four rail lines all reaching capacity by 2027 (including the T1 Western Line from 2024).

Rail crowding and capacity constraints, dwell times with double-deck trains, station crowding, unreliable travel times and limited connectivity with planned precincts are constraining the achievement of planned growth in the corridor, even with significant transport network upgrades underway within the corridor.

By 2036, the number of rail trips on the T1 Western Line, T9 Northern Line and T2 Inner West Line during the one-hour AM peak is projected to increase from 90,000 to 140,000, this is a 56% increase.

The capacity of each line in the corridor is constrained to a maximum of 20 trains per hour, primarily due to signalling constraints and the dwell times required to service double-decker trains, as well as service patterns and the convergence of multiple lines approaching the Sydney CBD. At a reliable capacity of 1,200 passengers per train (900 seated and 300 standing) the maximum capacity for each line is 24,000 passengers per hour.

Rail patronage is forecast to exceed capacity by 2023 on the T2 Inner West Line, by 2024 on the T1 Western Line, and by 2027 on the T9 Northern Line.

The North West Metro Line has provided relief to the T1 Western Line, while Sydney Metro City & Southwest will provide further relief – meaning that suburban services on the line are forecast to reach capacity by 2024. By 2036, it is forecast that T1 Western Line services to the Sydney CBD will be at capacity by the time the services reach Parramatta and more than 120 per cent of capacity by the time the services reach Redfern.

By 2036, T9 Northern Line services are forecast to be at around 120 per cent of capacity by the time the services reach Northern Strathfield.

There are a number of key stations on the network that are experiencing crowding including Parramatta, Town Hall and Wynyard. While there are a number of projects currently under development to relieve station crowding, such as Sydney Metro City & Southwest and Central

Walk, crowding at these key stations will remain an ongoing issue as the need for access to key destinations and interchange opportunities continues to grow in line with patronage.

Train and station crowding reduces service reliability and leads to fewer services operating in a given time period. This in turn leads to further crowding. Reliability impacts in the Sydney CBD cause network-wide impacts, reducing network capacity and increasing crowding on trains and platforms. As crowding increases, reliability is projected to deteriorate, increasing average lateness, reducing the achievement of timetabled services and reducing effective hourly capacity.

Low levels of access to mass transit

Throughout the corridor, travel by private vehicle accounts for more than half of all trips (51%) over 24-hours on a typical weekday (Household Travel Survey, 2016-17). The use of car for travel depends on several factors including the purpose of trips, and the locations where the trip starts and end. For work trips, approximately 40% of residents within the Metro West corridor[1] drive a car or are driven in a car. This proportion is lower than many areas in Sydney but is skewed by the 25% of workers who travel to the Sydney CBD, largely by train (Journey to Work, 2016).

Metro West will result in faster travel times for many journeys undertaken on public transport. A flow-on effect of this is that travel by public transport will become more time-competitive with travel by car for certain trips. Areas where this is expected to be most pronounced are those trips that currently have relatively longer public transport journey times than car journey trips, where there is poor accessibility to public transport services. Improved public transport will result in higher public transport mode share, reduced traffic and a more reliable road network for high productivity users.

Bus network reliability

Along the Greater Parramatta to Sydney CBD corridor, communities that are not located along a heavy rail line, such as Concord, Five Dock, Rozelle and The Bays, rely heavily on bus services to access the Parramatta and Sydney CBDs and other strategic centres. These bus services experience relatively long and unreliable travel times. For example, a bus trip between Five Dock and the Sydney CBD currently takes around 45 minutes. A similar trip from Concord takes over one hour to complete.

There are more than 100 buses an hour in each direction on Parramatta Road during peak periods resulting in bus bunching along this corridor. There are also over 100 buses an hour on Anzac Bridge, which is at capacity during peak periods, impacting services from Victoria Road and The Bays. Similarly, in the Olympic Peninsula, the T7 Olympic Park Line provides shuttle services (six per hour) between Sydney Olympic Park and the T2 Inner West Line at Lidcombe.

Land Use – Jobs and Growth Imbalances

International research indicates that a monocentric region experiencing growth can eventually suffer from increasing costs of living, housing and health for residents and increasing costs of business and labour to its economy.[2]

The Greater Parramatta to Sydney Corridor is one of the great economic corridors of Australia. The corridor houses one million people and includes a number of sites of national and international significance including:

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[1] The Sydney Metro West corridor is defined for the purposes of analysis as a series of SA3 geographies – Sydney Inner City, Strathfield-Burwood-Ashfield, Parramatta, Leichhardt, Canada Bay and Auburn.

[2] Greater Sydney Commissions (March 2018), Greater Sydney Region Plan – A Metropolis of Three Cities – connecting people, p80.

- Five out of nine major office markets in Sydney,[3] including the Sydney and Parramatta CBDs.
- The largest health district in NSW at Westmead, serving almost 10 per cent of Australia's population.[4]
- More than ten sports, events and convention facilities, and one of the largest urban parklands in Australia at Sydney Olympic Park, which attracts 10 million visitors each year and 5,600 business and entertainment events each year worth more than $1 billion a year.
- One of the highest potential urban renewal sites in the world[5] at The Bays, which includes 94 hectares of government land and 5.5 kilometres of harbour foreshore located two kilometres from the Sydney CBD.
- Significant heritage sites in Sydney and Parramatta, including the world-heritage-listed Parramatta Park.

The corridor has some of the most productive centres in Greater Sydney, with the Sydney CBD generating $96 billion of gross domestic product each year at $122 per hour, and Sydney Olympic Park and Parramatta to Westmead generating $89 per hour and $80 per hour respectively. This compares to a median of $56 per hour across Greater Sydney. The corridor's highly productive nature attracts both demand for jobs and residents.

However, without addressing the accessibility and connectivity constraints of the corridor, the corridor's future potential is expected to diminish.

By 2036, reduced productivity and international competitiveness in the corridor is forecast to cost the NSW and Australian economies $570 million per year, as a result of reduced agglomeration and increased business transport costs.

This is due to limited transport accessibility and amenity. There is an inherent link between land use and transport outcomes, whereby insufficient transport accessibility and amenity reduce the attractiveness of investment and market-take up of planned growth; locations with limited transport connectivity and amenity are less attractive to businesses, workers and residents.

The corridor currently has insufficient transport accessibility and amenity to support planned land use outcomes, resulting in sub-optimal productivity and place-making outcomes

Consequences of delayed or no investment

There are substantial opportunities for planned growth in the Parramatta and Sydney CBDs and in planned precincts and urban renewal areas in the corridor including Westmead, Sydney Olympic Park, and The Bays. As part of the Greater Sydney Commission's vision for a metropolis of three cities, these areas aim to account for more than 60 per cent of planned population growth and more than 80 per cent of planned jobs growth in the corridor by 2036.

Even with currently planned transport investment in the corridor it is forecast that by 2036, the Parramatta and Sydney CBDs planned precinct and urban renewal areas in the corridor would achieve less than half of planned job and population growth. In addition to delaying the significant

[3] Greater Sydney Commission (March 2018), Greater Sydney Region Plan: A Metropolis of Three Cities – connecting people, p120: includes Sydney CBD, Parramatta CBD, Sydney Olympic Park, Green Square-Mascot and Rhodes.

[4] Greater Sydney Commission (March 2018), Greater Sydney Region Plan: A Metropolis of Three Cities – connecting people, p104.

[5] Infrastructure NSW (formerly UrbanGrowth NSW Development Corporation) (October 2015), Informing the Bays Precinct, Sydney Transformation Plan, p2.

benefits of unlocking growth in these areas, there could also be crowding out of future opportunities because:

- Development occurs with sub-optimal scale, and building heights cannot be increased in the future to achieve the optimal scale of development.
- Residential development occurs in employment areas that would otherwise benefit from significant clustering and agglomeration of economies.
- There will be insufficient mass transit accessibility in the corridor to support planned growth, with four rail lines over total capacity by 2027, more than 100 buses per hour on both Parramatta and Victoria Roads (including 11 bus routes over capacity) and 40 per cent of major arterial roads over capacity by 2036.

Project objectives and design

Customer Experience Framework

Delivering improved outcomes for customers and the transport network are critical to achieving Sydney Metro's vision for a world-class metro for Sydney. Sydney Metro places the customer at the centre of design and the customer experience incorporates all aspects of a journey from door-to-door. Sydney Metro aims to make it easy for all customers, regardless of trip purpose, to choose public transport. The Sydney Metro development process includes consideration of the best outcomes for customers, transport integration, and city-shaping and land use benefits. This includes the design of the trains, stations and precincts.

The following considerations have influenced the design of the Project in relation to the customer experience:

1. Key pedestrian access routes to each station have been identified and barriers such as roads, rivers and train lines have been considered to provide direct, safe access routes.
2. All station entrances have accessible gradients without steps so that customers with or without strollers, luggage or mobility scooters have equal independent access.
3. Cyclists will be able to use Metro bike storage.
4. Customers that use buses or light rail for their first or last mile will benefit from co-located services where changing modes is easy.
5. Easy and intuitive wayfinding with escalator and elevators placement supports crowd flow.
6. Making underground spaces feel safe and comfortable using skylights, comfortable temperatures and generous air flow.
7. Train features like: all trains stop at all stations, level access between platform and train, inside you can see from one end of the train to the other and real time travel information and live electronic route maps.
8. Efficient station entrance and exit placements.
9. Shelter and shade will make the Metro comfortable even on extreme weather days.

Sydney Metro features

Sydney Metro is designed to make the customer journey to and from the metro station as seamless as possible, by integrating walking, cycling, bus, ferries, light rail, taxi, on demand vehicle, ride share and kiss and ride infrastructure.

Key features include:

- No timetable – customers can just turn up and go.
- Opal ticketing – fares are the same as the rest of Sydney.
- Customer service assistants at every station and moving through the network during the day and night.
- Australian-first platform screen doors improving customer safety and allowing trains to get in and out of stations much faster. These doors run the full length of all metro platforms and open at the same time as the train doors.
- Continuous mobile phone coverage throughout the metro network.

- Operational performance requirements that include 98 per cent on time running and clean platforms and trains.
- Multi-purpose areas for prams, luggage and bicycles.
- Wheelchair spaces, separate priority seating and emergency intercoms inside trains.
- Safety benefits including security cameras on trains and the ability for customers to see inside the train from one end to the other.
- Video help points at platforms, connecting directly with train controllers – an Australian first.
- Level access between the platform and train and three double doors per side per carriage for faster loading and unloading.
- Heating and air-conditioning on all metro trains.
- On-board real time travel information and live electronic route maps.

Metro Rolling Stock (Trains)

An analysis of travel time, technical options and rolling stock options indicated that a metro product was preferred, due to its higher reliability.

The next generation fully air-conditioned metro train includes single-deck rolling stock with three or more doors to support rapid boarding and disembarking, which reduces train dwell times and allows platforms to clear faster. This in turn improves train reliability.

The trains will be purpose built, based on a proven platform and be ready, without need of additions or improvements, for service from Day One of project operation. The Metro trains will:

- Have a capacity of about 1,500 passengers.
- Deliver 15 trains per hour (targeting every four minutes) on day one operation.
- Allow for reliable speeds and high frequency due to automation.

Metro West Stations

Sydney Metro has been working with local communities, stakeholders and industry to create a project that will deliver fast, safe and reliable metro.

The Project alignment and design, including the number and location of stations, has resulted from over two years of options development and analysis, and the outcomes were confirmed through government and project governance arrangements.

The assessment of station locations considered:

- Population and supporting new jobs.
- Providing better connections.
- Transport integration.
- Stakeholder, industry and community feedback.
- Cost, value for money and feasibility.
- Protecting the environment and heritage.

Place making and integrated station and precinct development

Metro West is a chance to build more than just railway stations. Through excellence in design and delivery, Metro West will deliver places which:

- Respond to the community's needs.
- Are architecturally unique and easy to get around.
- Are intuitive and safe, and promote people's health and wellbeing.

Metro West stations and precincts will provide a new public domain as well as integrate with the existing public realm and adjoining lands to develop and promote vibrant retail, community and other spaces, as appropriate to the context and locality.

Metro West will support future economic development within the station precincts by being a key enabler for renewal and redevelopment. The Project would also provide opportunity for urban renewal at many station locations, appropriate to its local character and improve linkages to the surrounding precinct.

The operation of a metro service will support planned growth and land use change in a number of precincts across the corridor, including The Bays Precinct, the Parramatta Road Corridor, Sydney Olympic Park and Westmead.

New metro stations create opportunities to provide for community needs in consideration of the future vision, relevant planning controls and local character of each area. Provisions for integrated station and precinct developments are being made for: Westmead, Parramatta, Sydney Olympic Park, Burwood North, Five Dock, The Bays and Sydney CBD.

The evaluation of Rydalmere and Pyrmont as strategic station options will consider additional land uses and strategic planning visions for the areas, including the potential for integrated station and precinct development in these locations. Infrastructure NSW notes that the NSW Government has subsequently determined to not proceed with a strategic station option at Rydalmere, but will continue to investigate the viability of a potential strategic station option at Pyrmont.

Any proposed future development associated with station precincts will be subject to separate planning assessment processes and approvals.

Options identification and assessment

Development of the Business Case included a detailed assessment of a broad range of options, including alternative and deferral options, 53 station options, technical, operational, delivery, funding and finance options.

Stations Analysis

The options assessment was conducted in four broad phases and included detailed consultation on a number of issues such as station options, operating concepts, travel times and train types. The number and location of stations was developed using considerable inputs from project partners and careful consideration of the land use and transport needs along the Greater Parramatta to Sydney corridor.

The recommended station locations are Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays, and Sydney CBD.

The recommended strategic station options are Rydalmere and Pyrmont. Infrastructure NSW notes that the NSW Government has subsequently determined to not proceed with a strategic station option at Rydalmere, but will continue to investigate the viability of a potential strategic station option at Pyrmont.

A summary of the Metro West stations according to the vision and drivers underpinning the locational identification and assessment are outlined in Table 1 below.

Table 1: Metro West – Station vision and key design drivers

Station Location	Vision	Drivers
Westmead	Well connected and accessible to the health and education precinct, and a revitalised, high-amenity living and employment centre, serving as an extension of the Parramatta CBD.	• Provide an easy, efficient and accessible interchange with the T1 Western Line. • Serve and support the Westmead Health and Education Precinct. • Establish an easy, efficient and accessible interchange with Parramatta Light Rail, T-way and local bus services. • Connect, serve and support the revitalisation of both north and south Westmead.
Parramatta	Sydney's Central River City – A high-amenity and connected employment, living and cultural centre in the heart of Sydney.	• Reinforce Parramatta as the Central River City, with a station located to support high-value employment growth and renewal in the commercial core. • Create a second mass transit node in the Parramatta CBD to provide an easy, efficient and accessible interchange with buses and Parramatta Light Rail. • Support place making in Parramatta CBD by connecting with and activating the proposed Civic Link, and improving connections to Church Street and surrounding cultural and entertainment destinations.

Station Location	Vision	Drivers
		• Create an easy pedestrian connection to the existing Parramatta Station. • Safeguard for a potential future north-south mass transit connection.
Sydney Olympic Park	A metro station at Sydney Olympic Park will be a destination (including for major events), origin and interchange station. The station will support commercial, residential, retail, hotel, education, sports, recreation and entertainment uses.	• Support the transformation of Sydney Olympic Park into a mixed-use lifestyle super precinct. • Create a station to serve both Sydney Olympic Park business and residential community. • Support a safe, efficient and accessible multi-modal transport service during major events.
North Strathfield	A high-amenity living precinct well connected to Sydney's key employment and leisure destinations.	• Provide an easy, efficient and accessible interchange with the T9 Northern Line, extending the Metro West catchment to Sydney's north. • Support and serve the planned renewal and growth of residential and mixed-use land uses in the Homebush and Strathfield area. • Improve pedestrian amenity through better east-west movements, and revitalisation and activation of spaces within the station locality.
Burwood North	A high-density living and employment precinct centred on an improved Parramatta Road, providing a second mass transit node to support residential housing and employment growth in the surrounding catchment.	• Reinforce and facilitate development of Burwood strategic centre north along Burwood Road with a second mass transit node. • Support planned renewal as part of the Parramatta Road Corridor Urban Transformation Strategy. • Provide a direct rail service to a catchment not currently serviced by rail. • Provide an easy, efficient and accessible interchange with buses along Burwood Road and Parramatta Road.
Five Dock	A revitalised, diverse and vibrant local centre, well connected to all transport modes.	• Create an easy, efficient and accessible interchange linking the bus networks along Parramatta Road, Victoria Road, the Drummoyne peninsula and parts of the Inner West. • Serve and support renewal of the established local centre around Five Dock. • Provide a direct rail service to a catchment not currently serviced by rail.
The Bays	A new precinct including employment, civic, retail and residential activities in a high-amenity harbour-side setting.	• Provide a new high-quality public transport access to The Bays Precinct catalysing the establishment and growth of the future living

Station Location	Vision	Drivers
		and employment precinct by improving access to visitors and workers. • Provide mass transport access to highly productive business, technology and education activities. • Support the creation of a high-amenity living and mixed-use precinct, acknowledging its interface with existing port activities. • Provide an easy, efficient and accessible interchange.
Sydney CBD	The gateway to the commercial core of the Eastern Harbour City.	• Provide new and direct access to the Sydney CBD. • Provide an easy, efficient and accessible interchange with Sydney Metro City & Southwest, Sydney Trains, CBD and South East Light Rail, and city bus services. • Serve the financial and commercial core, civic precincts, and key recreational and tourist destinations and events within the Sydney CBD.

There exists a proposed scope outside of the stations, which includes: a stabling facility at Clyde to stable metro trains and house the maintenance and operational facilities; and a service facility to be built at Silverwater to provide fresh air ventilation into the tunnels and to provide an emergency exit out of them. Further planning is underway to determine the location of another service facility between Five Dock and The Bays Precinct.

Potential for Additional Stations

The addition of strategic station options within the corridor, or as a result of future extensions would be subject to feasibility and funding consideration.

Integrated Transport Opportunities

Metro West has been planned in parallel with a number of TfNSW initiatives being developed in the Greater Parramatta to Sydney CBD corridor, including Parramatta Light Rail, the *Future Transport 2056* strategy and the More Trains, More Services program. Collectively these projects and programs, together with planned changes to the bus network, will deliver a highly integrated transport outcome for Sydney.

Key features of the integrated transport plan for the corridor include:

- Provision of new interchanges between Sydney Trains and Metro West at Westmead Station (T1 Western Line), North Strathfield Station (T9 Northern Line), Sydney CBD (potential to interchange with T1 North Shore Line, T1 Western Line, T2 Inner West and Leppington Line, T4 Eastern Suburbs and Illawarra Line, and Sydney Metro City & Southwest, Intercity and Regional Services); with refined train timetables to enable new interchange opportunities.

- Provision of effective transfer with Parramatta Light Rail at Westmead, Parramatta CBD. Potential provision of transfer with the CBD and South East Light Rail at a Sydney CBD Station.
- Reconfiguration of the bus network and provision of interchanges at Westmead Station, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays and the Sydney CBD station.
- Provision of active transport access, including walk up and facilities for cycling access.
- Provision of kiss-and-ride facilities.

These proposed changes to the integrated transport network will provide significant transport benefits such as travel time savings, new and improved access to mass transit, and a growth in 30 minute city catchments for both the Eastern Harbour City and the Central River City. There is an opportunity to further improve these through continued integrated service and infrastructure planning. Examples include optimised service and infrastructure planning through the More Trains, More Services program, and refined and more detailed planning of bus services.

Collaboration with Key Partners

Developing Metro West as an integrated land use and transport project has provided benefits for cross-agency planning and development of metropolitan Sydney. This includes integrating corridor and precinct land use planning, community and stakeholder engagement, benefits realisation and delivery strategies, jobs strategies and transport network planning with initiatives such as the More Trains, More Services program and Parramatta Light Rail.

Community Consultation

Metro West undertook early stakeholder and community consultation throughout 2017 and 2018. Feedback gathered helped shape the project, including station locations. Consultation channels were targeted to reach different geographic areas, demographics, multicultural groups and areas of interest.

Economic evaluation

Metro West has been developed as an integrated land use and transport project which includes integrating corridor and precinct land use planning, community and stakeholder engagement, benefits realisation and delivery strategies, jobs strategies and transport network planning.

Through collaboration with key land use partners, the Project has been optimised to unlock key land use outcomes. The number and location of stations was developed using considerable stakeholder input and careful consideration of the land use and transport needs along the Greater Parramatta to Sydney corridor.

A broad range of benefits are expected to be generated by the Project, including city shaping, environmental and sustainability, transport, and productivity.

Costs

At the time of preparing this summary, the NSW Government is in the process of either procuring or preparing to procure various packages of works which form part of the overall rolling delivery program for Sydney Metro West. As such, NSW Government has requested that the estimated cost of the program is not publicised in this summary. Infrastructure NSW understands that the program cost will be released by the NSW Government at a commercially appropriate time.

Benefits

Metro West will provide a significant increase in mass transit accessibility and amenity in the Greater Parramatta to Sydney CBD corridor, which will boost Sydney's economic productivity and support and unlock planned land use outcomes in the CBDs, planned precincts and urban renewal areas. The Project will generate significant city-shaping, urban renewal, productivity and transport benefits. The key economic project benefits include:

- **Enabling the Greater Sydney Region Plan:** Support the 30-minute city concept, enabling an additional 820,000 jobs and 780,000 people to be within 30 minutes of the Central River and Eastern Harbour Cities.
- **Delivering land use change by supporting and unlocking planned growth:** Support an additional 169,000 jobs and an additional 46,000 dwellings within walking catchments of the proposed metro stations.
- **More jobs and increased productivity:** Connects the economic powerhouses of Parramatta and Sydney CBDs to each other and to emerging economic centres including Sydney Olympic Park, Westmead and The Bays Precinct. This will facilitate economic growth through agglomeration and job creation.
- **Doubling rail capacity:** At ultimate capacity Metro West will effectively double the rail capacity of the Greater Parramatta to Sydney CBD corridor.
- **Reduction in crowding on key rail lines:** Reduction in crowding on the T1 Western Line by up to 30%, T9 Northern Line by up to 30% and T2 Inner West Line by up to 18%.
- **Shorter travel times:** Travel time from Parramatta CBD to Sydney CBD of around 20 minutes.
- **Public transport customer experience benefits:** Customers will have access to the following experience benefits: increased turn-up-and-go services, seamless interchange, increased reliability, thermal comfort, equal accessibility, new underground pedestrian

subways, no gaps, intuitive wayfinding, increased safety, event management, and increased late-night travel options.

- **Road user benefits:** Total car trips on the road network will decrease with at least 83,000 fewer car trips on an average weekday by 2036, reducing congestion on the road network.

The outcomes of the analysis

The economic appraisal takes into consideration the broad range of benefits expected to be generated by the Project, including city shaping, transport and productivity benefits.

Benefit Cost Ratio (BCR)

The following table outlines the estimated benefits for the project:

Table 2: Economic appraisal summary ($millions)

	$ millions
City shaping or urban renewal benefits	3,519
Transport benefits	10,279
Productivity or Wider Economic Benefits (WEBS)	3,550
Total benefits	17,348
Net Present Value* **including Productivity Benefits*	**4,496**
Net Present Value* **not including Productivity Benefits*	**533**

Benefit cost ratio (BCR)* **including Productivity Benefits*	**1.34**
Benefit cost ratio (BCR) without WEBS* **not including Productivity Benefits*	**1.04**

A benefit cost ratio (BCR) is the ratio of a Project's benefits relative to its costs. The BCR for the Project is 1.34 (including WEBS), or 1.04 (excluding WEBS), to put it more simply, the Project will deliver $1.34 worth of benefits for each $1 invested.

At the time of preparing this summary, the NSW Government is in the process of either procuring or preparing to procure various packages of works which form part of the overall rolling delivery program for Sydney Metro West. As such, NSW Government has requested that the estimated cost of the program is not publicised in this summary. Infrastructure NSW understands that the program cost will be released by the NSW Government at a commercially appropriate time.

Deliverability

Procurement

A detailed proposed delivery strategy has been developed for the project, using extensive engagement with industry, evidence taken from global peer organisations, and guidance from a wide range of stakeholders.

The delivery strategy provides recommendations on client delivery requirements, market considerations, supply chain packaging, contracting and transaction process options, and the client model to manage and deliver the Project. It also acknowledges the potential to separate out parts of the Project to be delivered through a Public-Private-Partnership (PPP) and therefore has identified potential PPP opportunities supported by market feedback. The final delivery strategy for the project will be subject to ongoing refinement with both engagement and input from government.

Timeframe

The Project commenced the statutory planning process and property procurement in late 2019 with construction to commence in 2020. Timeframe for the commencement of first passenger services will be dependent on the market response to the procurement packaging. Delivery timeframes of individual packages could be subject to capacity constraints in the Australia engineering and construction sector.

Key risks and mitigation

The risk profile for the refined Metro West concept has evolved to reflect the maturation of the design, and value enhancement activities undertaken. Considerations have been made with respect to constructability, schedule sequence and commercial strategy.

The Infrastructure NSW view

Consistent with the NSW Government's Infrastructure Investor Assurance Framework[6], Infrastructure NSW has undertaken all required Gateway Reviews, project reporting and project monitoring activities on Sydney Metro West.

The Reviews, conducted by panels of independent experts and overseen by Infrastructure NSW, on the Metro West Final Business Case, found that the overall case for the 8-station configuration (Westmead to Sydney CBD) is considered strong and presents a compelling case for investment. The Review Team also noted that the future line expansion is also strong and should proceed, subject to funding availability and capital prioritisation.

The Final Business Case, as presented for the 8-station configuration, demonstrated strategic merit, and a Cost Benefit Analysis (CBA) greater than 1.34 (including Wider Economic Benefits), or 1.04 (excluding WEBs).

Interface and scope impacts between procurement packages needs to be carefully considered and accounted for commercially. In instances where core scope (such as the corridor) could be altered by future investment decisions, consideration should be given to cost and program impacts.

Given existing market conditions, significant scale of the project, complexity of the scope and known planned and current activity in the Australian construction sector, any planned opening to passenger service date is likely to be impacted by market response to procurement packaging. Delivery timeframes should not be artificially compressed by Government. Delivery partners should be permitted to bid their delivery programs, interface arrangements and timings on a value-for-money and best for project basis.

[6] Infrastructure NSW (2016), *Infrastructure Investor Assurance Framework.*

Attachment 2

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The University of Sydney transport analysis

Sydney Metro West route feasibility to the Bays Precinct and Harbourside – recommendations for alternatives and further investigation

The University of Sydney

3 April 2018

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Bringing ideas to life

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1 Introduction

The purpose of this report is to assess whether:

- The proposed Sydney Metro West via The Bays Precinct can be modified to include a Harbourside Station in Pyrmont Station; and
- An alternative route is feasible, removing the Bays Precinct and rerouting Sydney Metro West to a new station at Camperdown (adjacent to University of Sydney and Royal Prince Alfred (RPA) Hospital and a new Harbourside Station at Pyrmont.

The new stations at Camperdown and Harbourside will replace the need for a station at the Bays Precinct and will optimise the alignment of Sydney Metro West to benefit key origin-destination routes from already established innovation and retail districts from Western Sydney to the CBD.

The proposed routes in this report have been selected based on high-level route alignments, using industry standards and engineering best practice, but do not take into consideration detailed site feasibility or costs. The proposed routes will need to be investigated further to identify specific site conditions using cadastral information on basement depths and geotechnical matters to enable a more in-depth feasibility study.

This report should be read in conjunction with "USYD The Bays alternative transport options" and "USYD Metro West route realignment feasibility".

2 Background

2.1 The University of Sydney transport constraints

The University of Sydney's main Camperdown-Darlington Campus is inadequately served by public transport options. Redfern Station is the primary train station used by both staff and students; however the station is already at maximum capacity constraints, with future patronage projected to grow.

Redfern Station is located 2.1 kilometres away from the centre of the University, Sydney's second largest university, and even further from the RPA, Sydney's third largest hospital. The long walking distance, approximately 21 minutes, makes this station unsuitable to serve the Camperdown-Ultimo health and education precincts and makes the ambition for "30 minute" transport connections impossible to achieve to and from this precinct.

An upgrade for Redfern Station is vital for the University, the precinct and surrounding local economy, including the Australian Technology Park. However, an upgrade will not materially increase capacity, and Redfern Station remains a long walk from Sydney University and the RPA Hospital.

The University of Sydney is proposing a Sydney Metro West Station for the University's Camperdown-Darlington Campus, to cater for its known future growth and that of the surrounding precinct. The University is also exploring joining an alliance with the Harbourside / Pyrmont consortium that is considering lobbying for the realignment of the Sydney Metro West, for a station around the Harbourside, Pyrmont area. This group could support the University of Sydney's broad route realignment vision.

2.2 Sydney Metro West

The aim of Metro West is to connect the Parramatta and Sydney central business districts, doubling rail capacity between the two areas, linking new communities to rail services and unlocking housing supply and employment growth between the two CBDs.

More mass transit services are needed between Greater Parramatta and Sydney CBD because:

- An extra 420,000 people are expected to move into the corridor between Greater Parramatta and central Sydney over the next 20 years;
- More than 300,000 new jobs will be created by 2036 in the corridor; and

- The T1 Western Line serving the corridor from Western Sydney via the inner west suburbs into Redfern Station will be severely overcrowded by early 2030[1].

Sydney Metro West has been identified as the solution to deliver a direct rail connection between Sydney CBD and Western Sydney Parramatta CBDs, linking communities along the way that have previously not been serviced by rail, unlocking housing supply and employment growth. The new Sydney Metro West line will become the fastest, easiest and most reliable journey between Sydney CBD and Parramatta CBDs, working together with the existing T1 Western line to increase rail capacity from the Central City. This supports the Greater Sydney Commission's visions for better connection between these two major centres[2].

The Sydney Metro West line is at the preliminary stage of development, with community and industry feedback currently under consideration. The final number of potential stations are yet to be confirmed, however the proposed route will serve the following key precincts (see Appendix A):

- Westmead, to support the growing residential area, and the established health, research and innovation precinct
- Parramatta CBD, to support the growing business and residential areas
- Sydney Olympic Park, to support the growing residential, sports and tourism areas
- The Bays Precinct, to initiate a proposed innovation precinct. The Bays Precinct is located 2 kilometres west of Sydney CBD and has been under investigation for development by Urban Growth NSW since 20143.
- Sydney CBD, allowing easy access to the existing public transport network and future Sydney Metro Stage 1 and Stage 2, which are currently under construction.

Following extensive community and industry consultation in 2016 and 2017, the Sydney Metro West scope of works has been expanded and refined. It now includes:

- a new metro station under an existing suburban station on the T1 Northern Line east of Sydney
- Olympic Park – allowing faster connections for customers from the Central Coast and Sydney's
- north to Parramatta and Sydney through a quick and easy interchange between suburban and metro services
- further consultation on new intermediate metro stations between Parramatta and Sydney
- Olympic Park and between Olympic Park and the Sydney CBD
- at least one Sydney Metro West station under the Sydney CBD, delivering an easy interchange between suburban rail, new light rail and the new metro stations currently under construction.

The NSW Government will also safeguard the ability to extend Sydney Metro to the south-east of the Sydney CBD via Zetland, serving the Green Square town centre, as well as towards the west beyond Westmead – where one option could be to the new Western Sydney Aerotropolis.

[1] NSW Government, Sydney Metro West, Project overview https://www.sydneymetro.info/west/project-overview [accessed 29 March]
[2] Sydney Metro West 'Project Overview' https://www.sydneymetro.info/west/project-overview [accessed 12 January 2018]
[3] The Bays Sydney, Vision [http://thebayssydney.nsw.gov.au/about/vision/] accessed 12 January 2018

3 Route 1 - Sydney West Metro via Bays Precinct and Harbourside, (Pyrmont) Stations

The current alignment of the Metro West route is proposed to serve five key precincts. There is also further consultation on potential new intermediate stations between Parramatta and Sydney.

A proposed Sydney Metro West route alignment to the Bays Precinct, including an additional station at Harbourside, Pyrmont has been prepared and is shown below in Figure 3-1:

An additional Metro West Station at Harbourside, Pyrmont could service demand for:

- The Sydney Fish Markets
- The Star Casino
- The International Convention Centre
- Harbourside Shopping Centre
- Pyrmont-Ultimo innovation precinct including organisations such as Google, media distributors, University of NSW, University of Technology Sydney and TAFE Sydney Campus.

Under the proposed alignment in Figure 3-1, the Sydney Metro West will take the following route from Sydney Olympic Park:

- Bays Precinct, with a station near the White Bay Power Station.
- a Harbourside Station in the North of Pyrmont (indicative underground station is shown in red, approximately under Pyrmont Street[4]),
- Sydney CBD, Pitt Street Metro Station.

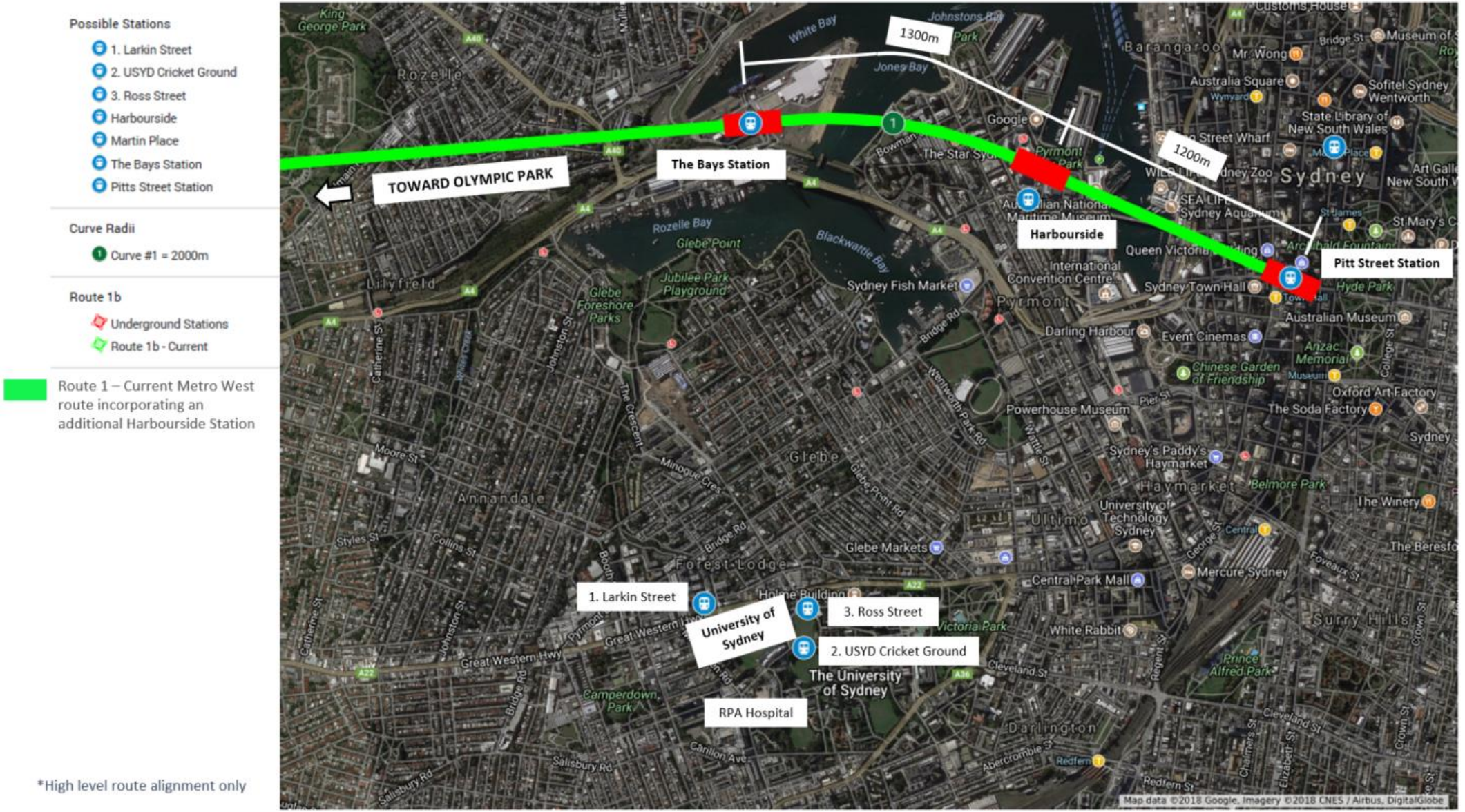
3.1 Assumptions

The following assumptions, based on engineering best practice and current Metro West design operations, were used to develop this route:

- Metro Stations should ideally be greater than 2 kilometres apart otherwise the Metro train is unable to gain adequate speed between stations, which reduces performance and increases travel times:
    - The distance between the Bays Station and Harbourside Station is 1.3 kilometres
    - The distance between Harbourside Station and Pitt Street Station is 1.2 kilometres.
    - The station alignments will depend on further investigation into Metro Train speed velocity, performance, travel times and travel time analysis for the impact on the entire route.
- Metro stations must be situated on straight lines, not curves:
    - The approaching curve 1 between the Bays Precinct and Harbourside Station is 2000 metres. The minimum tightness recommended for a Metro radius curve is 500 metres
    - The Harbourside Station would be situated on straight line of track aligning straight to Pitt Street Station
- Metro stations outlined in ‘red’ are indicative underground locations, not to scale. The stations can have multiple street level entrances and exits, including pedestrian tunnels to serve precinct areas directly around Pyrmont.

[4] exact location to be confirmed, pending further detailed investigations

Figure 3-1 Proposed Metro West alignment to the Bays Precinct including a Harbourside Station, Pyrmont



3.2 Feasibility

Based on the assumptions, there is adequate straight-line track to support both the Bays Station and Harbourside Station. However, the short distance between the two stations and the harbour in between is likely to result in extremely challenging engineering design and construction elements for both the track and underground stations.

Based on this assumption at this stage of investigation, it is **deemed unfeasible to locate the Bays Station and a Harbourside Station so close together on Sydney West Metro route**.

Table 3-1 below outlines the high-level rationale:

Table 3-1 Sydney Metro West the Bays Station and Harbourside Station assessment of feasibility

Description	Rationale
The route would require tunnelling under numerous sections of unfavourable ground conditions, which would result in increasing design and construction delays as well as planning approval and ultimately higher costs	The route would include: - Tunnelling under contaminated land from the disused White Bay Power Station; - Tunnelling under deep water tables as the port around Glebe Island/ White Bay is described as a "deep water port", excavated to berth large sea vessels; - Tunnelling in between water locked locations at Pyrmont Bay and Darling Harbour. There is approximately only 200 metres from Pyrmont Bay and 300 metres from Darling Harbour to the indicative Harbourside Station. - Excavation and tunnelling under deep basements and dense commercial and residential properties at the proposed Pyrmont Station, making it difficult to construct the station and entrances and exits
The two stations are too close together to provide sufficient additional benefits and passenger numbers that would justify the additional costs and increase travel times on the route	CBD Metro Stations are located relatively close together, in some instances less than 2 kilometres apart. These stations are justified to increase travel times on the route, from slower train speeds and incorporating passenger boarding time, as there is adequate patronage demand to justify the need. Patronage demand at the Bays Precinct Station will not be developed until the long term 15 – 20 years, and will incrementally increase as the precinct develops.

4 Route 2 - Alternative Sydney Metro West route, via The University of Sydney / RPA Hospital (Camperdown) and Harbourside (Pyrmont) Stations

4.1 A Sydney Metro West routed to the Bays Precinct does not add significant transport capacity between Parramatta and Sydney CBDs

Routing Sydney Metro West through the Bays Precinct does not add significant capacity to the Parramatta CBD to Sydney CBD transport route due to:

- The Bays Precinct is unlikely to develop as an innovation precinct for at least 10 -15 years for the following reasons:
    - The White Bay area being identified as a contaminated land spoil and construction compound for the Western Harbour Tunnel construction5 (Appendix D). After the White Bay site has been restored from a construction site, the area would still need to undergo contaminated land renewal from the decommissioned coal power station; and
    - The NSW Government released an Expression of Interest in 2015 to redevelop the White Bay Power Station, however the EOI did not attract any conforming bids and has not been reissued since. Major growth in transport demand is unlikely to significantly increase until housing and jobs become a reality on this site.
- The Bays Precinct already has a number of new transport options under development to service the area to its main origin destination points around the inner west, Victoria Road and Sydney CBD:
    - Transport for NSW has listed the light rail extension to the Bays Precinct as a key infrastructure initiative for investigation within 10-20 years6;
    - Transport for NSW is investigating bus rapid transit from the CBD along Victoria Road; and
    - There is currently active transport (walking and cycling) to the Bays Precinct, with recent future bicycle and walkway network upgrades announced for the Bays Precinct and surrounding CBD areas, in the Future Transport 2056 Strategy.

4.2 A Sydney Metro West alignment via Sydney University/RPA Hospital and Harbourside adds significant transport capacity to the Sydney Trains network

Sydney Metro West could be realigned, tunnelling under preferable ground conditions, to serve a Camperdown Station for the University of Sydney and RPA Hospital, travelling onto Harbourside Station, Pyrmont.

The underground track will route from the currently announced Sydney Olympic Park to North Burwood to integrate next to the existing T1 Western line (see Appendix A). The proposed route will then route south east to roughly follow the underground alignment of the Great Western Highway (A4 / A22) to the University of Sydney (USYD) Camperdown Station[7].

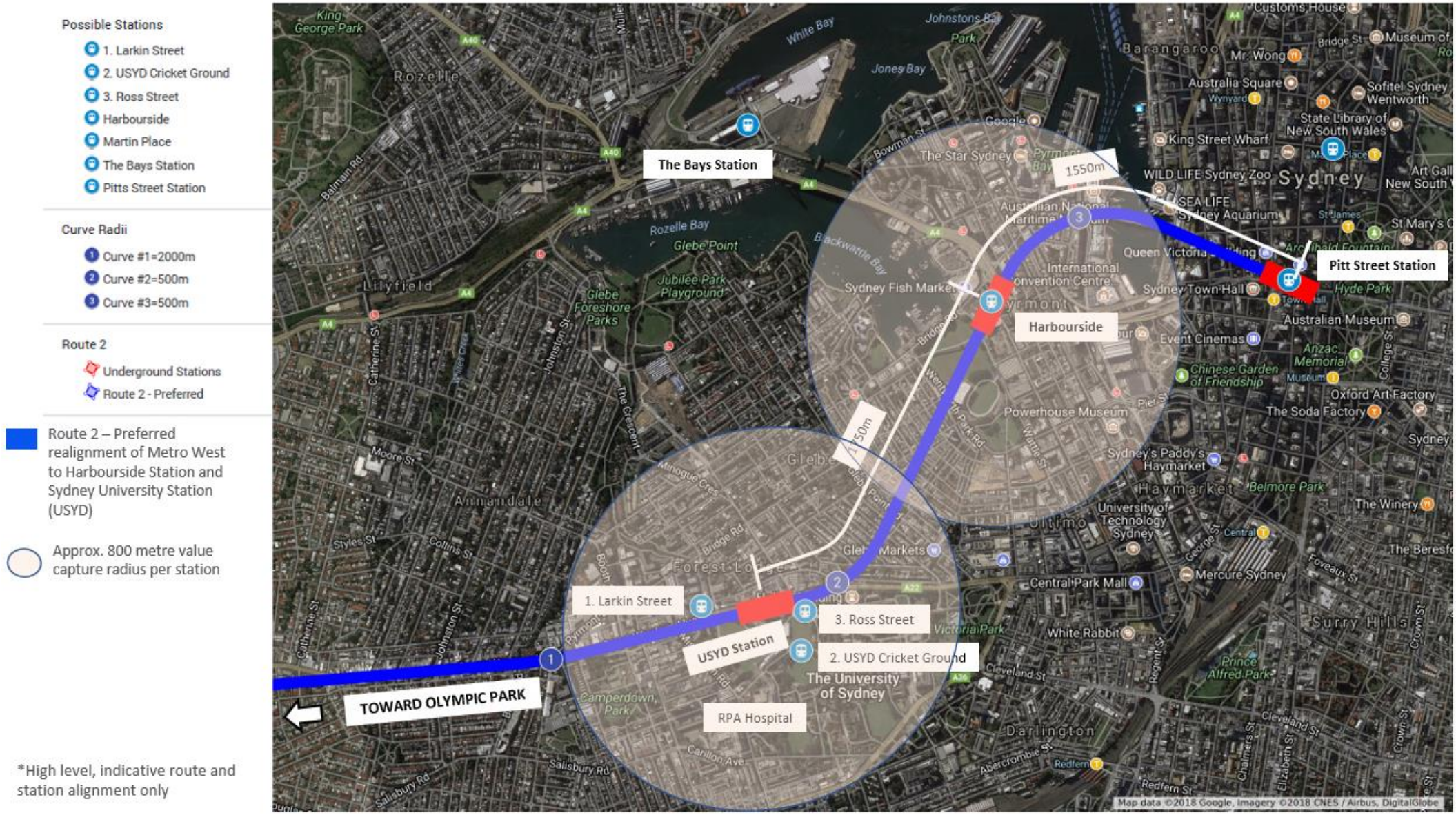
There are three potential station locations, to be confirmed pending further investigations[8] at Larkin Street; University of Sydney Cricket Ground and Ross Street (see Appendix B).

From the University of Sydney (USYD) Camperdown Station the route travels underneath the suburb of Glebe to a Harbourside Station (indicative station located to the South-West of Pyrmont, approximately under Wattle Street at Wentworth Park and Pyrmont Bridge Road). The Metro West will then have adequate, safe curvature of 500 metres, to curve round into Sydney CBD Pitt Street Station.

[5] ABC News, Western Harbour tollway construction to expose Sydney Harbour to toxic 'plumes', study finds, 12 March 2018 http://www.abc.net.au/news/2018-03-12/western-harbour-toll-construction-to-produce-toxicity-study/9537082
[6] NSW Government, Future Transport Strategy 2056, page 105
[7] The route has not taken into consideration proposed future infrastructure projects that may affect the alignment, such as WestConnex M4-M5 tunnel connections
[8] Exact location to be confirmed after thorough site and ground feasibility investigations

The location of the Harbourside Station, Pyrmont is indicative only. Other suitable locations can be explored within similar track alignments and different station entrances and exits should be explored to serve different areas of Pyrmont. This proposed alternative route is shown below in Figure 4-1:

Figure 4-1 Metro West proposed route realignment map – Route 2, The Unversity of Sydney Station and Harbourside Station, Pyrmont



4.3 Value capture around the proposed stations

Figure 4-1 above also highlights an 800-metre radius around the University of Sydney Station and the Harbourside Station, which are the area's most amenable to value capture.

Different levy rates could be placed on residents and businesses within the 800-metre radius to raise capital investment for the project by capturing future economic benefits through higher property values within the area.

This should be explored in-depth to understand the potential financial gain for investment, the ability to collect levy revenue and future benefits.

4.4 Assumptions

The following assumptions, based on engineering best practice and current Sydney Metro West design operations, were used to develop 'Route 2':

- Metro stations should ideally be greater than 2 kilometres apart, otherwise the Metro train is unable to gain adequate speed between stations, which reduces performance:
    - The distance between the University of Sydney Station and the Harbourside Station is approximately 1.8 kilometres;
    - The distance between the Harbourside Station and Pitt Street Station is approximately 1.6 kilometres; and the station alignments will depend on further investigation into Metro Train speed velocity, performance, travel times and travel time analysis for the impact on the entire route.
- Metro stations must be situated on straight lines, not curves:
    - 500 metres is around the minimum tightness recommended for a Metro radius curves. A curve smaller than approximately 500 metres would mean the track would be too tight for a Metro train to safely run and the stations would be situated on the track curve, rather than a straight section of track, deeming unfeasible;
    - The approaching curve 1 from the Olympic Park to the University of Sydney Station has adequate length of approximately 2000 metres, enabling a University of Sydney Station to be located on straight section of track;
    - The curve connecting the University of Sydney Station to Harbourside Station is approximately 500 metres, enabling the Harbourside Station to be located on straight section of track; and
    - The curve from the Harbourside Station to Pitt Street Station is approximately 500 metres, enabling the Pitt Street Station and termination point, to be located on straight section of track.
- Metro stations outlined in 'red' are indicative underground locations. The station platforms are approximately 170 metres in length, based on current Sydney Metro station designs[9]. The stations can have multiple street level entrances and exits, including pedestrian station tunnels to serve different areas.

Based on the above assumptions at this stage of investigation, **the proposed Metro West route outlined in Figure 4-1, incorporating a University of Sydney Station and Harbourside Station, is deemed feasible.**

The depth of the proposed route, as outlined in Figure 4-1, has not been assessed and will require further investigation taking into consideration basement depths and ground conditions, to develop a preferred, feasible route.

[9] NSW Government, Sydney Metro, Metro Trains https://www.sydneymetro.info/metro-trains [accessed 3 April 2018]

4.5 A Harbourside Station can integrate into transport networks, provide direct access to areas within Pyrmont and the Bays Market District, and generate additional retail and commercial opportunities

The proposed underground Sydney Metro West station at Harbourside, Pyrmont could have dedicated underground station walkways to directly serve various areas around the station. There is the potential to create retail, commercial and tourism developments from the underground pedestrian walkways to the ground level entrances and exits, as shown in Figure 4-2 below.

The underground station could connect to the existing transport network at the Wentworth Park Light Rail and future pedestrian and cycle tracks around the Bays Precinct waterfront, the Bays Markets District (Fish Markets) and Pyrmont. Examples of other walkways include the proposed underground Sydney Metro Central Walk that will connect the Sydney Metro to Sydney Trains, and Light Rail services[10] and the 180-metre underground Wynyard Walk connecting Wynyard Station to Barangaroo business district[11].

[10] NSW Government Sydney Metro, Central Walk, https://www.sydneymetro.info/station/central-walk [accessed 3 April 2018]
[11] Transport NSW, Wynyard Walk https://www.transport.nsw.gov.au/projects/current-projects/wynyard-walk [accessed 3 April 2018]

Figure 4-2 Metro West proposed route realignment map -Route 2, Harbourside Station

Route 2 – Preferred realignment of Metro West to Harbourside Station and University of Sydney Station (USYD)

Route 2 – Harbourside Station (underground)

Route 2 – Harbourside Station underground walkway connections to entrances / exits

1 Route 2 – Harbourside Station entrances and exits

*High level, indicative route and station alignment only

The proposed route alignment positions the Harbourside station in the south of Pyrmont, with the potential for four main entrance / exit points including:

1. **North Pyrmont – which could serve the Star Casino and Google**

A 450-metre underground pedestrian walkway has the potential unlock additional retail and commercial development along the walkway, including food and beverage and office lease, creating additional social and economic benefits.

2. **East Pyrmont – which could serve the International Convention Centre, Harbourside Shopping Centre, Darling Harbour and residential**

A 400-metre underground walkway could serve the eastern side of Pyrmont creating a direct connection to the International Convention Centre and Harbourside Shopping Centre. The walkway has the potential unlock additional retail and commercial development along the walkway, including food and beverage and office lease, creating additional social and economic benefits.

Alternatively, the underground walkway could have two dedicated entrance and exists points directly within the International Convention Centre and at the Harbourside Shopping Centre.

3. **South Pyrmont – which could serve the future Bays Market District, including Fish Markets**

The current Sydney Fish Markets is being transformed into the Bays Market District, opening up the Blackwattle Bay foreshore to create world class market food and dining offerings with pedestrian and cycling mixed use areas[12]. The proposed future location is shown below in Figure 4-3.

The underground walkway beneath Wattle Street and Bridge Road could connect pedestrians directly, safely and quickly to the proposed Bays Market District. This station exit can also serve the future White Bay Precinct development through pedestrian and cycle walkways. Figure 4-4 below, shows how the proposed Metro West Barangaroo Station exit design could be used at this station exit.

Figure 4-3 The Bays Market District

Source: UrbanGrowth NSW, Masterplanning, The Bays Market District, August 2017

[12] NSW Government, the Bays Precinct Sydney http://thebayssydney.nsw.gov.au/destinations/bays-market-district/ [accessed 3 April 2018]

Figure 4-4 Sydney Metro Barangaroo Station exit – an example for the proposed Metro West, South Pyrmont Station

Source: Sydney Metro, Barangaroo Station

4. Light rail connection

The proposed Station can provide a direct link to the over ground Light Rail at Wentworth Park. Passengers can transfer onto the Light Rail for travel around the Pyrmont loop and for residential access out to Dulwich Hill.

5 Conclusions and recommendations

5.1 Conclusion Route 1: Bays Precinct (White Bay) to Harbourside is not feasible

The proposed realignment of the Sydney Metro West route from The Bays Precinct (White Bay) to Harbourside is not considered feasible at this stage because:

- From an engineering and construction perspective, the Bays Precinct route will be subject to significant delays, complexity and cost increases due to:
    - Staging construction delays from the Western Harbour Tunnel, as White Bay is anticipated to be used as a construction site for contaminated tunnel soil (Appendix E)
    - Further deep tunnelling to accommodate proposed underground road tunnels for the WestConnex M4 to M5 Link (Appendix D) and Western Harbour Tunnel Link (Appendix C)
    - Significant land contamination to be rehabilitated at the disused White Bay Power Station;
    - Deep tunnelling to accommodate deep water tables, as the White Bay port is deep port excavated to berth large sea vessels;
- From a transport capacity perspective, a Metro Station at the Bays does not add significant capacity to the Parramatta – Sydney CBD network.

5.2 Conclusion Route 2: Sydney University / RPA Hospital to Harbourside is feasible

The proposed realignment of the Sydney Metro West route to the University of Sydney / RPA Hospital, Camperdown Station and Harbourside Station, Pyrmont, is more feasible than the currently proposed White Bay Precinct, because:

- The proposed realignment to the University of Sydney Station and the Harbourside Pyrmont Station will tunnel underneath approximately only 300 metres length, of relatively shallow water in Darling Harbour.
- The benefits of the preferred route realignment generates immediate direct and indirect economic benefits from stations location at the University / RPA Hospital and Harbourside, Pyrmont broadly including:
    - Direct, fast access from Sydney CBD to Western Sydney for two well developed health and education and innovation precincts (Westmead and Camperdown) – making the 30-minute commute achievable;
    - Unlocking capacity on the existing Sydney Trains T1 line for passengers commuting and travelling from Western Sydney to two key precincts, addressing immediate patronage needs; and
    - Unlocking much-needed capacity at Redfern Station – platforms, stairs, turnstiles, exits and major walking routes from the station.
- The proposed Harbourside Pyrmont Station could be adapted in the long term, to support the Bays Precinct and wider developments around the Fish Markets once developed. This could include a dedicated, undercover walkway and cycleway from Harbourside Station to White Bay, further opening up the foreshore.

However, the following issues should be investigated to create greater certainty of the proposed route:

- The alignment of the track route from Sydney Olympic Park to The University of Sydney/RPA Camperdown Station, considering the increase in track length and tunnelling to avoid the WestConnex M5 tunnel (Appendix D);
- The alignment of the track from Harbourside into Pitt Street must consider the Sydney Cross City Tunnel, running parallel under Park Street;
- Alignment from Harbourside Station to Pitt Street Station, ensuring adequate distance station distance and track curvature;

- Increase costs of a longer route via the University and Harbourside, including complexity of the curve to Pitt Street Station; and
- Increase in cost of an additional station, from the currently proposed five key stations to six stations.

5.3 Recommendations

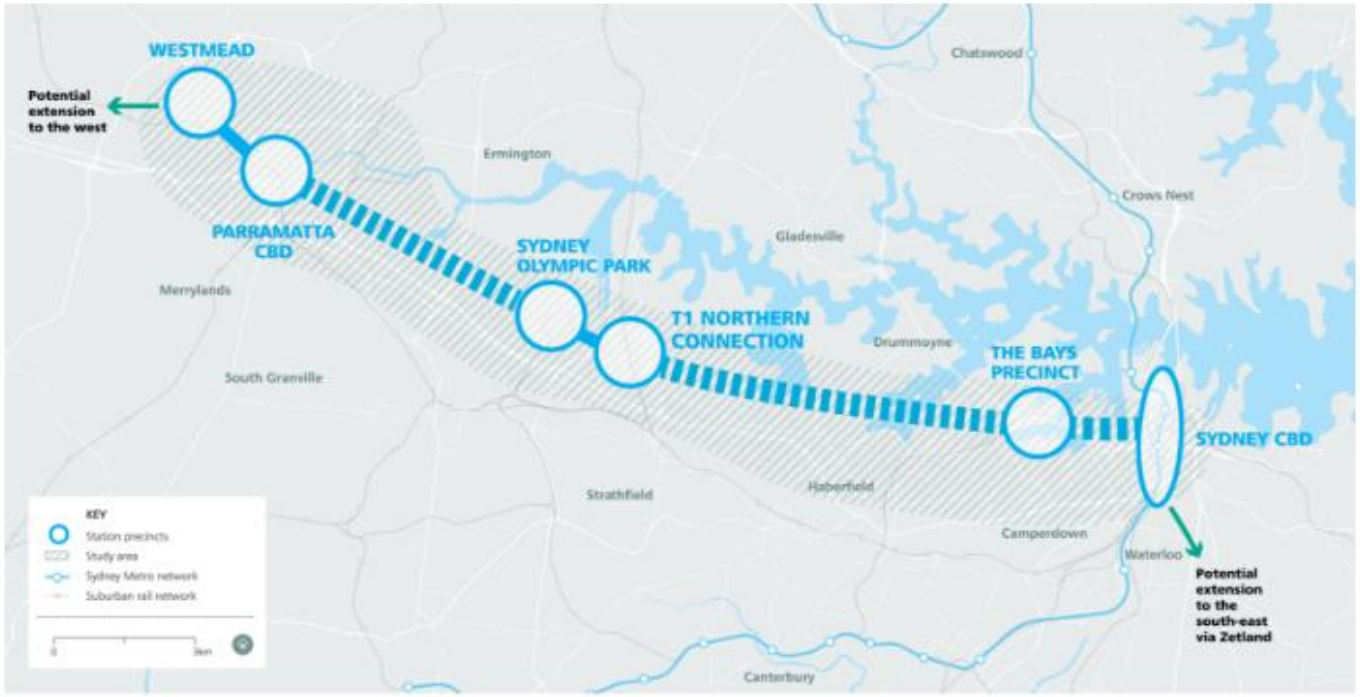
It is recommended that further investigations into site and cost feasibility, along with the social and economic impacts of the proposed stations are assessed to develop a more comprehensive alternative route. The benefits of the route realignment should be explored in further detail to highlight the immediate direct and indirect economic benefits of stations at the University of Sydney / RPA Hospital and Harbourside, Pyrmont.

The proposed route stated within this report has been selected based on high level route alignments using industry standards and engineering best practice, and does not take into consideration investigations into site feasibility or costs. The proposed route should be investigated further to identify specific site conditions using cadastral information on basement depths and known soil structures, and costs, to enable a more in-depth feasibility study.

6 Appendices

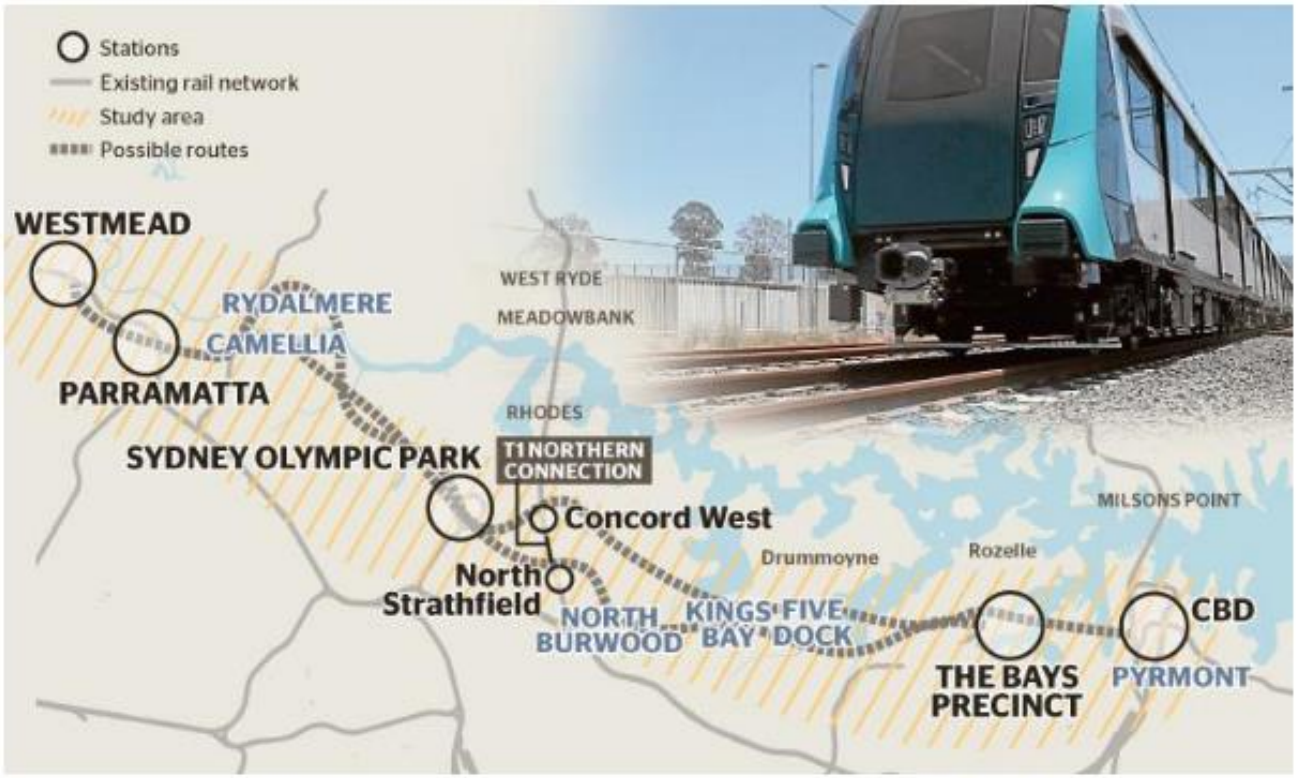
Appendix A – Sydney Metro West current proposed route,

Figure 6-1 Metro West proposed high level route



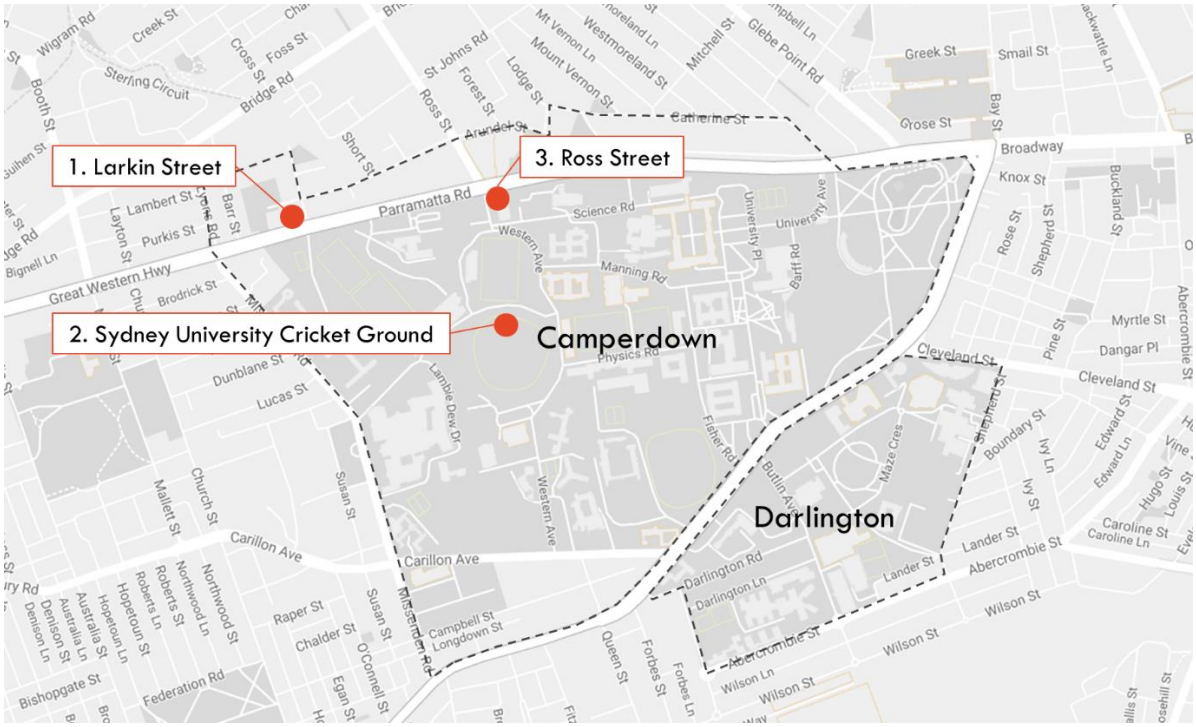
Source: Sydney Metro West 'Project overview' 27 March 2018

Figure 6-2 Metro West possible route variations within the proposed high-level route corridor



Source: Sydney Morning Herald “The Sydney suburbs on list of station sites for new metro line” 23 March 2018 https://www.smh.com.au/national/nsw/the-sydney-suburbs-on-list-of-station-sites-for-new-metro-line-20180323-p4z5vw.html

Appendix B – Potential University of Sydney Metro West Stations

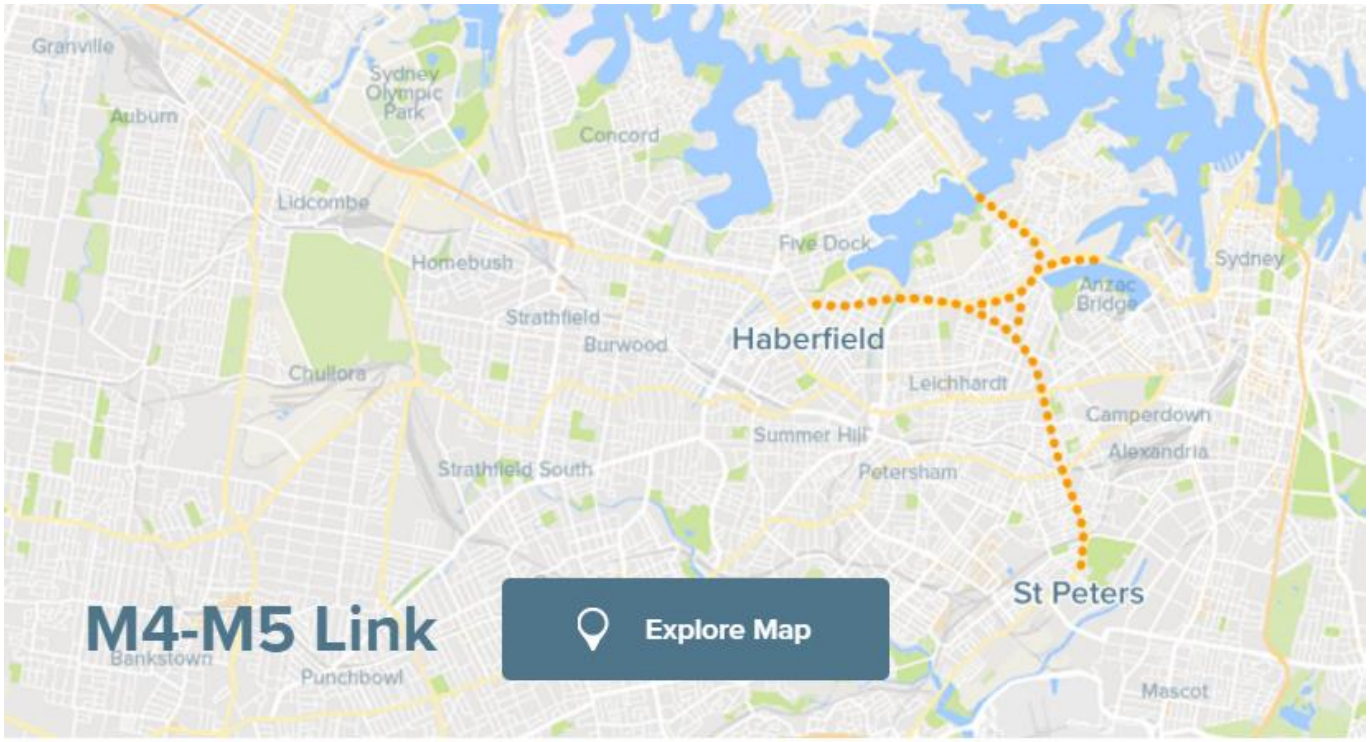


Source: The University of Sydney, Metro West Preliminary Submission (November 2017)

Appendix C – Western Harbour Tunnel to Northern Beaches Link

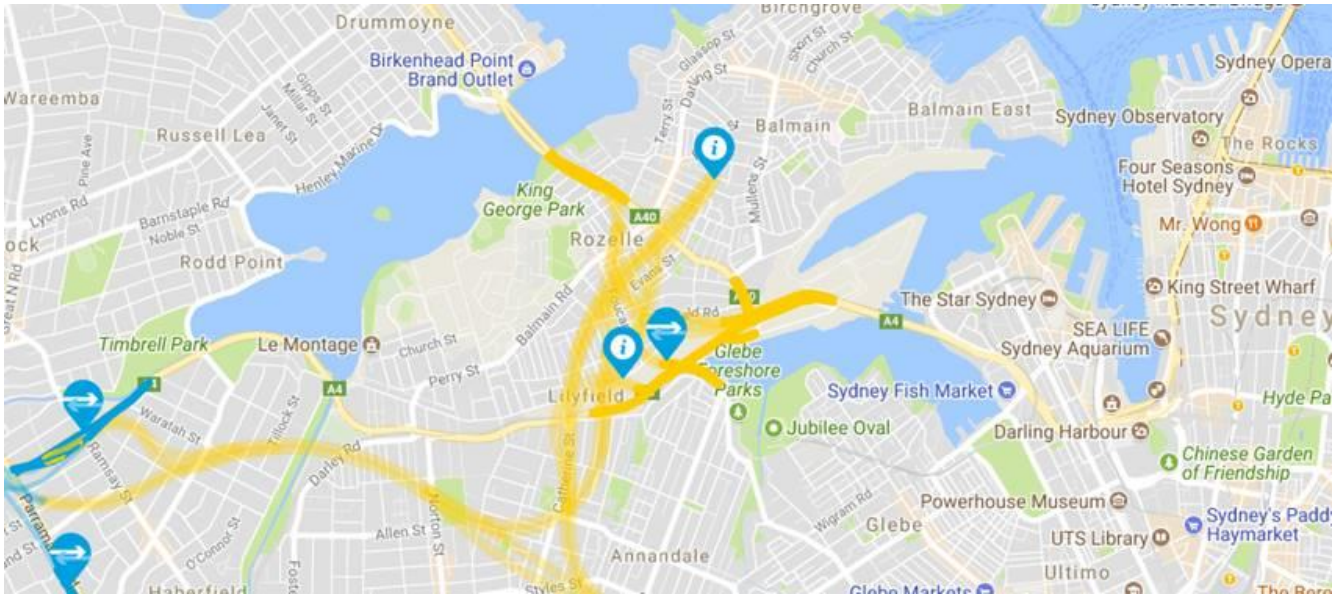
Source: NSW Government, Roads and Maritime Services – Western Harbour Tunnel and Beaches Link http://www.rms.nsw.gov.au/projects/sydney-north/western-harbour-tunnel-beaches-link/index.html [accessed 18 February 2018]

Appendix D – Proposed WestConnex M4-M5 road tunnel links



Source: NSW Government, Westconnex

Appendix E – Construction activity at White Bay planned for the Western Harbour Tunnel and Westconnex



Source: NSW Government, Westconnex

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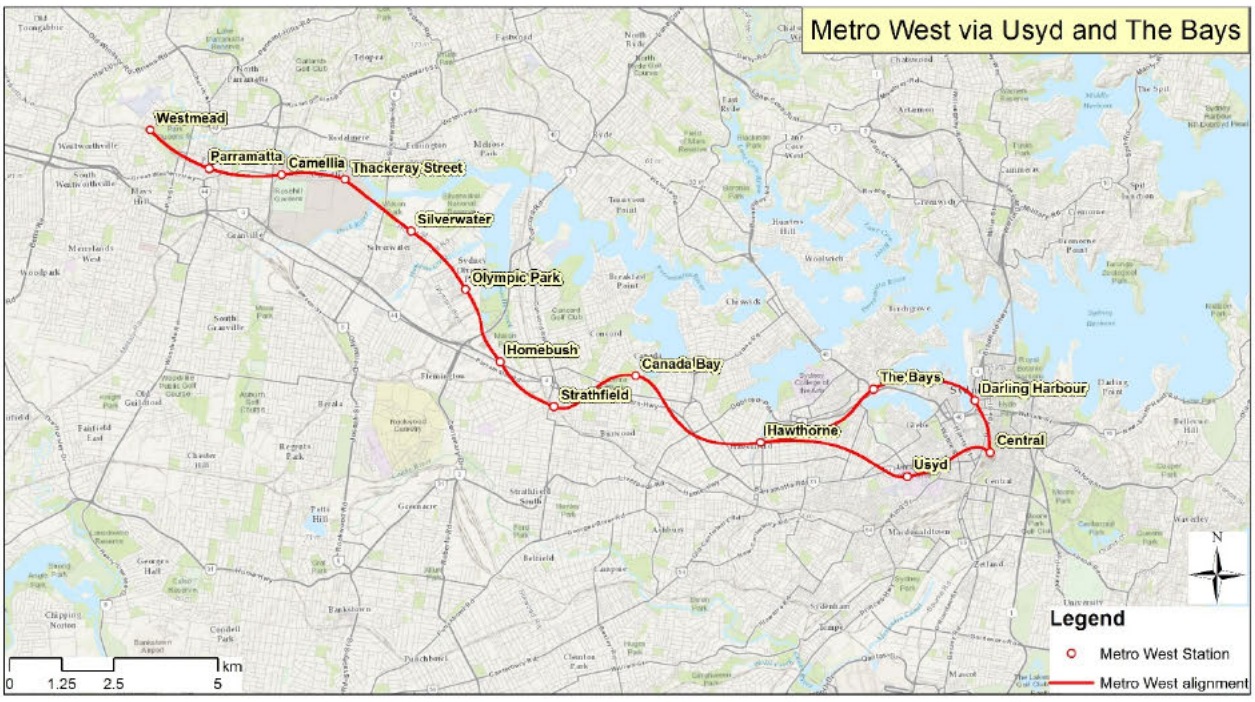
Metro West via USyd and The Bays: Patronage Forecasts and Benefit-Cost Analysis



8 June 2017

Prepared for

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1. Executive Summary

Objectives: The modelling work reported herein aims to quantify the benefits, costs and economic impacts of a Metro West that goes via both The Bays and The University of Sydney. Two alignments are proposed and their BCRs and economic impacts are compared with those of the optimum alignment that goes via the University at the Oval.

Methodology: All the modelling work and economic evaluations are undertaken using the MetroScan software developed by the Institute of Transport and Logistics Studies (ITLS) at The University of Sydney, in partnership with the Economic Research and Development Group (ERDG) based in Boston. Assumptions and inputs are exactly the same as those used in the previous submission.

Modelling Results: Of the two additional Metro West alignments that serve both The Bays and The University, the first connects Parramatta/Westmead with The Bays via the University and Central station (i.e., referred to as the Spur Model), has a greater Benefit-Cost Ratio, and generates significantly more agglomeration benefits and jobs with appropriate wage growth. Compared to the optimum alignment identified in the previous submission, however, these two additional alignments both have a lower benefit-cost ratio (BCR) (1.72 and 1.96 vs. 2.11). The Spur Model generates more benefits, but it also costs more to build due to longer tunnelling requirements. The table below summarises the total benefits, costs and jobs created in 2036 for the three alignments of the Metro West.

Summary of the BCA and EIA results for alternative alignments of Metro West

	Heathrow Model	Spur Model	USyd at Oval
NPV of Benefits ($m)	6,228	7,340	6,806
NPV of Cost ($m)	3,629	3,738	3,223
Net Benefit ($m)	2,600	3,602	3,584
BCR with Wider Economic Benefits (WEB)	1.72	1.96	2.11
WEB mark-up (%)	4%	17%	11%
Number of jobs created in 2036	7,036	7,288	5,779

1. Background and Objectives of the Report

Further to The University of Sydney's submission to the Greater Sydney Commission for a Sydney West Metro station at its campus, the University has engaged ITLS to carry out further analysis to understand options which include both a University station and one at the Bays. The following two route options are shortlisted for the current modelling work:

(i) Option 1: Routing Metro West via both USyd and The Bays in an alternate model similar to Heathrow airport, with every second train from Parramatta servicing one area (i.e., alternating the services via the Bays and the University)
(ii) Option 2: Routing Metro West from Westmead to the Bays via USyd and Central Station (train terminates at The Bays).

Figure 1 shows the alignment and stations of Option 1 and Figure 2 shows the same for Option 2.

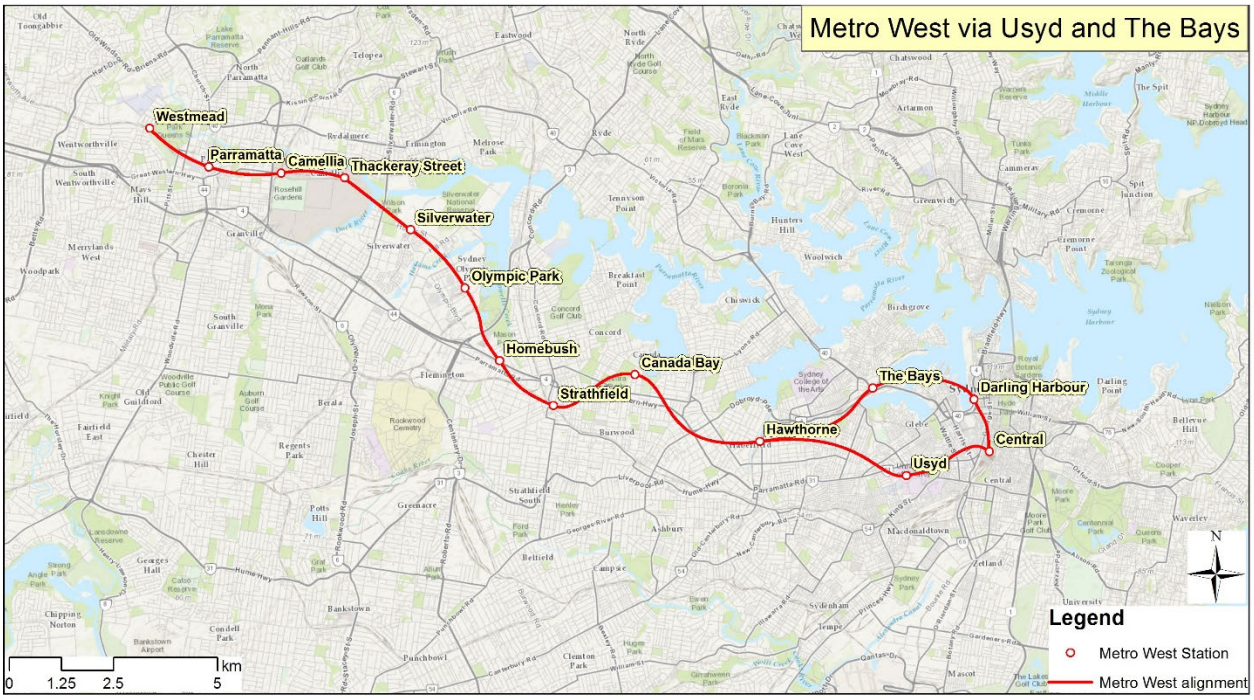

Figure 1. Route Option 1: Metro West via USyd and The Bays (the Heathrow Model)

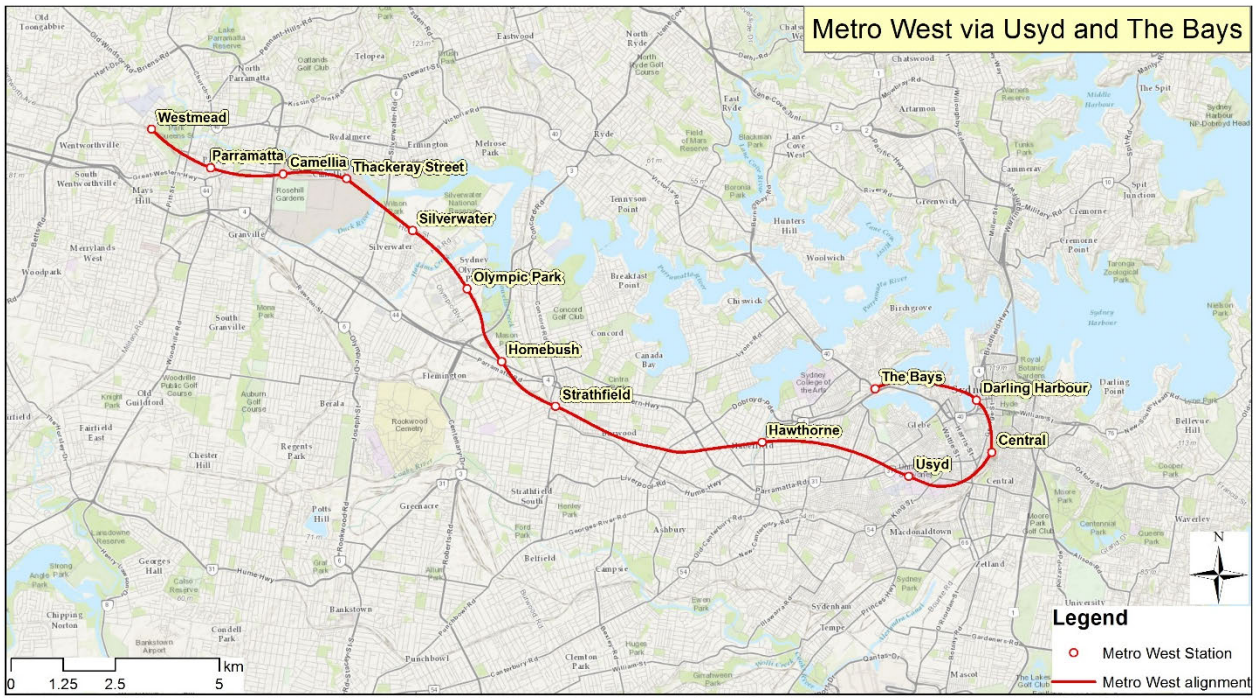

Figure 2. Metro West Route Option 2: Westmead to The Bays via USyd and Central (the Spur Model)

This report summarises rail patronage forecasts in 2036 at an aggregate level (i.e., Statistical Local Area) as well as Benefit-Cost Analysis (BCA) and Economic Impact Analysis (EIA) results. In doing so, we run a full application of MetroScan-TI – an integrated planning tool developed by the Institute of Transport and Logistics Studies (ITLS) – and employ the same assumptions/inputs as described in the previous report dated 21 March 2017.

2. Patronage Forecasts

This section presents the MetroScan patronage forecast for the two options of the Metro West Link and compares the scenarios against the base (i.e., no Metro West) and other route options examined in the previous work. Only aggregate results are reported here to identify the impact of the Metro West on network patronage and model share, as well as change to travel demand in and out of the Central District.

2.1 Impact of the Metro West on network patronage

Table 1 provides the forecast number of motorised trips generated in the Sydney Greater Metropolitan Area (SGMA) on an average weekday in 2036 for Route Option 1 and Option 2, and compares these two options against the optimum Metro West alignment via USyd at the Oval which was submitted to the GSC. As can be seen in the last row of Table 1, the impact of the Metro West on induced demand, represented by an increase in Total Trips between the Base and the Scenarios, is very small. The main impact is modal shift (i.e., switching from one mode to another). Figure 3 shows this switching effect for all alternative alignments, compared to the base. Overall, alternating Metro West via the University and The Bays in a model similar to the Heathrow airport is predicted to increase train trips by 38,000 trips/day while reducing car trips by 33,800 trips/day (27,300 Drive Alone trips + 6,500 Shared Ride trips). The impact on modal shift is larger under Route Option 2, which connects Westmead/Parramatta and The Bays via the University and Central station.

Table 1 Daily trips by mode in 2036 within the SGMA: Impact of the Metro West and alternative alignments

Daily trips by	No Metro West (Base)	Option 1 (Heathrow Model)	Option 2 (Spur Model)	via Usyd @ Oval
Train	1,057,118	1,095,187	1,099,355	1,091,931
Bus	556,882	552,675	552,219	553,051
Drive alone	10,503,036	10,475,739	10,472,790	10,478,136
Shared ride	4,459,492	4,453,010	4,452,254	4,453,482
Total trips	**16,576,529**	**16,576,610**	**16,576,618**	**16,576,600**

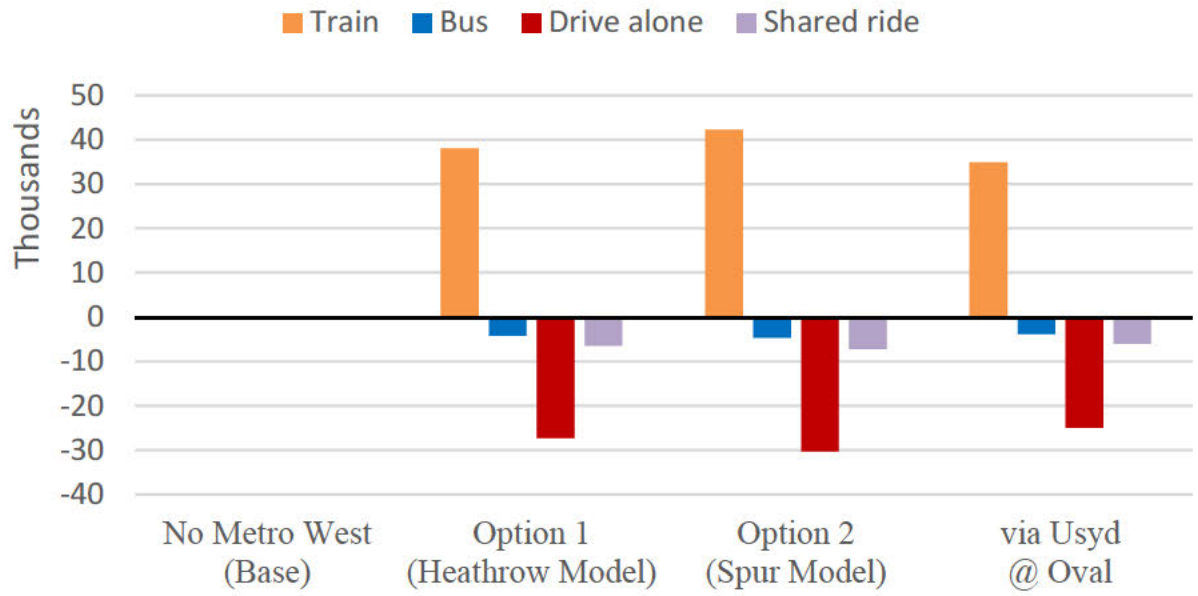

Figure 3 Impact of Metro West on daily trips in 2036: a comparison of alignments

2.2 Impact of the Metro West on the Central District

Focusing on the Central District, the two route options are forecast to increase train trips to/from the Central District by 53,600 (the Heathrow Model) and 60,000 (the Spur Model) trips per day, compared to an increase of 50,000 trips per days if going via the University at the Oval. Conversely, car trips (including drive alone and shared ride) to/from this area are estimated to reduce by 20,380 to 22,900 trips per days (see Figure 4).

Table 2 Daily trips to/from Central District in 2036: Impact of the Metro West and alternative alignments

	No Metro West (Base)	Option 1 (Heathrow Model)	Option 2 (Spur Model)	via Usyd @ Oval
Train	874,445	928,087	934,370	924,755
Bus	534,534	528,322	527,643	528,817
DA	3,189,950	3,172,831	3,170,806	3,173,624
SR	1,237,564	1,234,301	1,233,823	1,234,185
Total	**5,836,492**	**5,863,541**	**5,866,642**	**5,861,382**

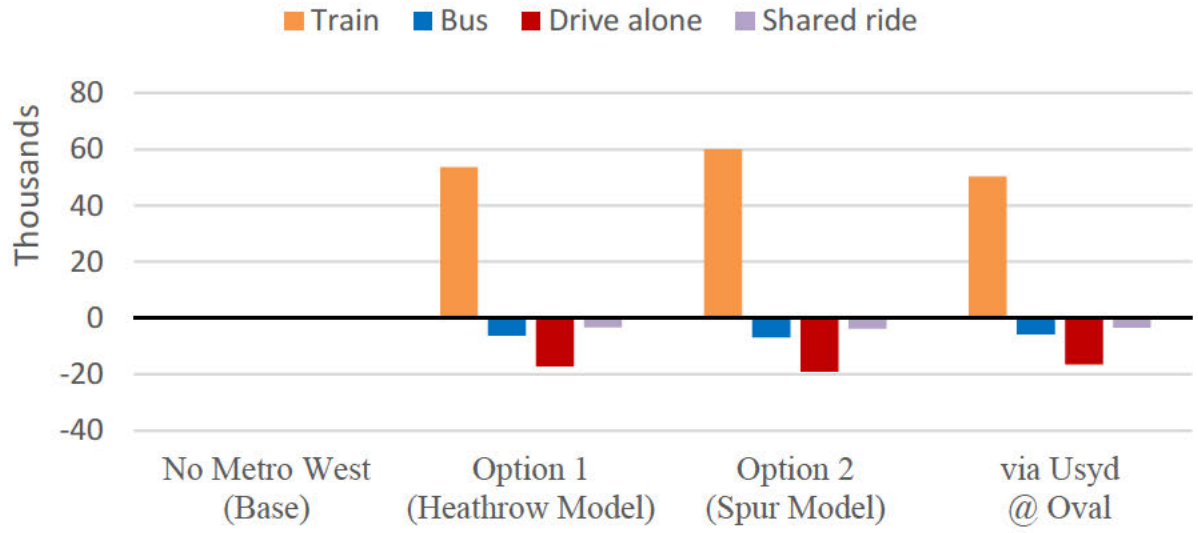

Figure 4 Changes to daily trips to/from Central District in 2036 due to Metro West

2.3 Employment agglomeration and social accessibility impacts of Metro West

Figure 5 show the employment agglomeration effect of Metro West for the alternative alignments. Routing Metro West via both USyd and The Bays in an alternate service (the Heathrow Model) or a continuous service (the Spur Model) combines the agglomeration benefits from the two alternative alignments which travel via either The Bays or the University. This can be seen in Figure 5 by comparing the agglomeration benefits across different Metro West Route Options for Sydney South, Lower North, Eastern Suburbs, and Leichardt Statistical Local Areas (SLAs) where the differences are most clear.

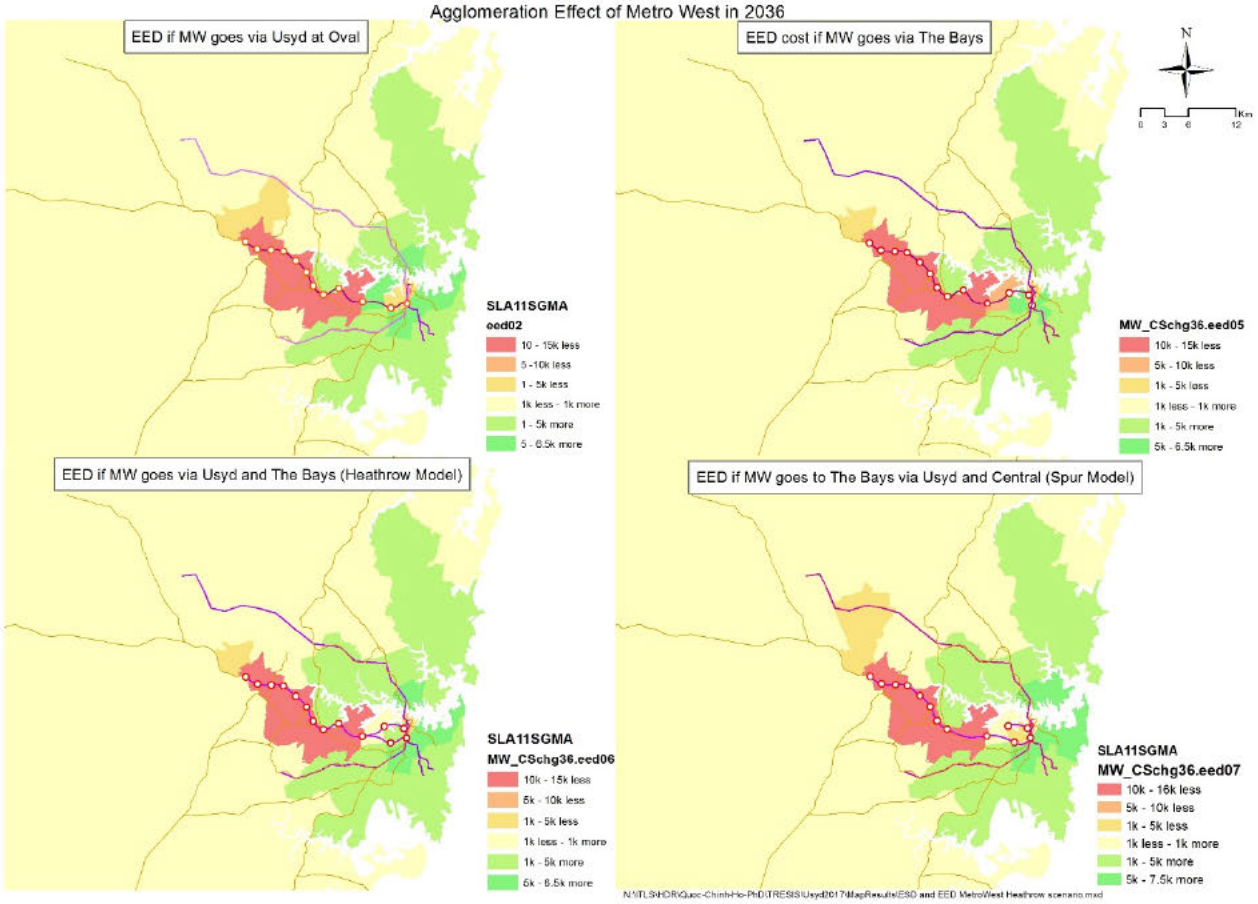

Figure 5 Employment agglomeration benefits of Metro West

2.4 Impact of Metro West on work location and job growth

Figure 6 shows MetroScan forecasts of filled jobs (i.e., employment numbers) by SLA of the Central District in 2036 for the do nothing scenario and how different Metro West alignments will allow different SLAs to grow employment numbers. We focus on the Sydney West SLA where the University and the Health Precinct are based, and Leichardt SLA where the Technology and Innovation Hub is earmarked. As can be seen in Figure 6, routing Metro West via both The Bays and The University has much merit in terms of providing support for the Sydney CBD, Sydney West and Leichardt to grow employment numbers by increasing connectivity.

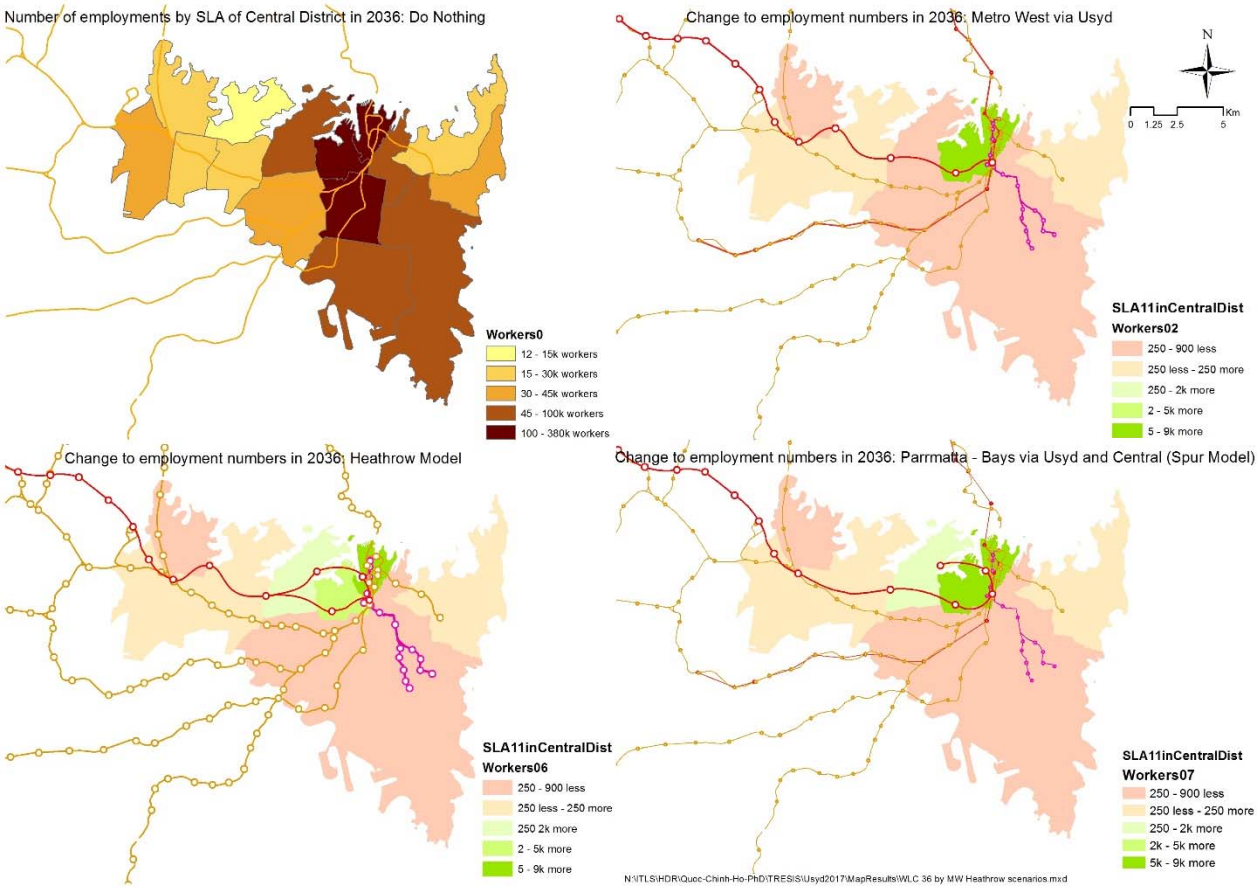

Figure 6 Predicted employment numbers in 2036 and the impact of Metro West

3. Benefit - Cost and Economic Impact Analyses

Similar to the previous report dated 21 March 2017, we report herein two sets of BCA and EIA results, assuming two different tunnelling costs of $120 m per km (same as the Southwest Metro) and a higher tunneling cost of $220 m per km tunneling. Annual maintenance and operation costs are assumed to be the same as the City-Southwest Metro.

3.1 Option 1: The Heathrow Model

Table 3 presents the CBA results of the Metro West that alternates its services via The University and The Bays in a model similar to Heathrow airport. Interpretation of the results are straightforward with a note that the present values are in $2016 units. In evaluating the Metro West, we use a standard discount rate of 7% and two different tunnelling costs. Table 3 shows that Route Option 1 has a BCR range between 1.06 and 1.72, depending on the tunnelling cost assumed and the benefits accounted for (travellers benefit only, or also including environmental and wider economic benefits). A higher tunnelling cost results in a higher wider economic benefit but also a much higher construction cost, and hence lower BCRs.

Table 3 Benefit – Cost Analysis results of Metro West via The Bays and USyd in an Alternate Model

Mero West via The Bays and Usyd2	7% discount rate ($M) $120m/km tunnelling	7% discount rate ($M) $220m/km tunnelling
Present Value of Benefit Stream	6,228	7,184
Travel Benefits	5,904	5,904
Value of Vehicle Operating Cost (VOC)	1,054	1,054
Value of In-Vehicle Travel Time (IVTT)	-693	-693
Value of Out-of-Vehicle Travel Time (OVTT)	0	0
Value of Improved Travel Time Reliability	5,483	5,483
Value of Safety Improvement	61	61
Value of Consumer Surplus From Induced New Activity	0	0
Environmental and Social Benefits	130	130
Value of Emission Reduction For Mobile Source Pollutants	21	21
Value of Emission Reduction For Carbon Dioxide	109	109
Wider Economic (Productivity) Benefits	277	1,150
Transfer Benefit Effects (net benefit adjustment)	-83	0
Present Value of Cost Stream	3,629	5,568
Project Costs	4,589	7,038
Capital Investment Costs	4,072	6,521
Operation and Maintenance Costs	517	517
Cost Adjustments	-960	-1,470
Residual Value of Capital Spending	-877	-1,388
Reduction in Effective Capital Cost Due to Added Fees Collected by Govt.	-83	-83
Net Benefit (Benefits - Costs)		
Transportation System Efficiency – Traveler Benefits Only	2,193	336
Traditional BCA – Traveler Benefits + Environmental Benefits	2,323	467
Full Societal BCA – All Benefit Categories	2,600	1,617
Benefit Cost Ratio (Benefits / Costs)		
Transportation System Efficiency – Traveler Benefits Only	1.60	1.06
Traditional BCA – Traveler Benefits + Environmental Benefits	1.64	1.08
Full Societal BCA – All Benefit Categories	1.72	1.29

Metro West also has a significant long-term economic impact, with Figure 7 showing that more than 6,000 jobs per year are created from 2026 when the Metro West is opened. The largest beneficiary by industry is Property and Business Services, which in 2036 is predicted to grow by about 1,800 jobs with very small differences in the number of jobs created between the two assumed tunnelling costs (see Figure 8). A significant increase in business output and wages is also predicted as a result of the Metro West investment.

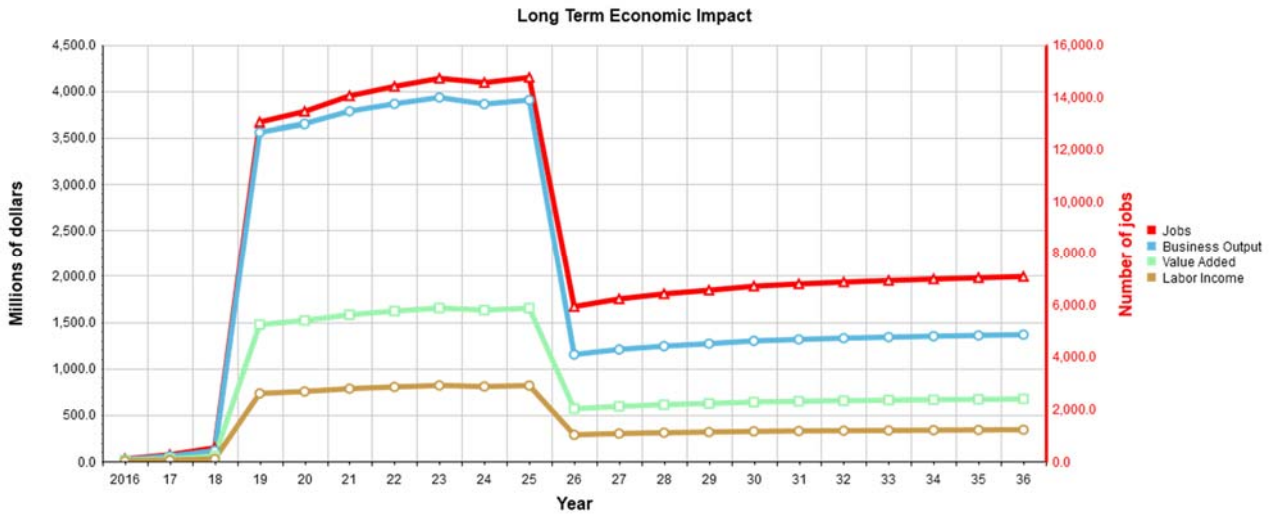

Figure 7 Economic Impact of the Metro West Option 1: Heathrow model assuming $220 m per km tunnelling

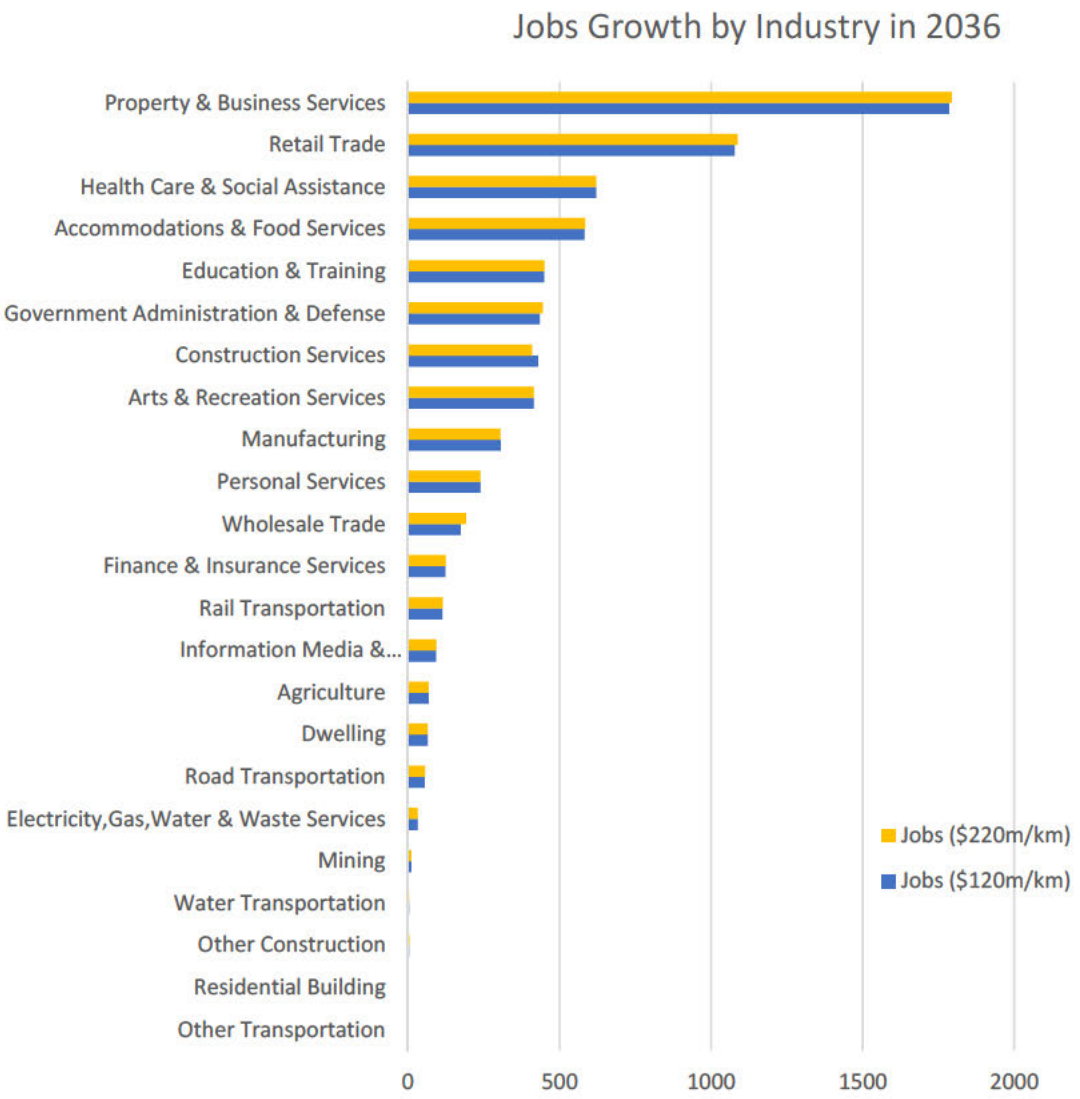

Figure 8 Number of jobs by Industry created in 2036 by Metro West Option 1: Heathrow model

3.2 Option 2: Metro West goes to The Bays via USyd and Central

In exactly the same way as described in section 3.1, this section reports the BCA and EIA results of the Route Option 2 which connects Parramatta/Westmead with The Bays via The University and Central.

Table 4 Benefit – Cost Analysis results of Metro West via the Bays

Parramatta - The Bays via Usyd and Central (Spur Model)	7% discount rate ($M) $120m/km tunnelling	7% discount rate ($M) $220m/km tunnelling
Present Value of Benefit Stream	7,340	7,340
Travel Benefits	5,988	5,988
Value of Vehicle Operating Cost (VOC)	1,096	1,096
Value of In-Vehicle Travel Time (IVTT)	-674	-674
Value of Out-of-Vehicle Travel Time (OVTT)	0	0
Value of Improved Travel Time Reliability	5,499	5,499
Value of Safety Improvement	68	68
Value of Consumer Surplus From Induced New Activity	0	0
Environmental and Social Benefits	135	135
Value of Emission Reduction For Mobile Source Pollutants	22	22
Value of Emission Reduction For Carbon Dioxide	113	113
Wider Economic (Productivity) Benefits	1,216	1,216
Transfer Benefit Effects (net benefit adjustment)	0	0
Present Value of Cost Stream	3,738	5,419
Project Costs	4,691	6,728
Capital Investment Costs	3,998	6,035
Operation and Maintenance Costs	693	693
Cost Adjustments	-953	-1,309
Residual Value of Capital Spending	-861	-1,217
Reduction in Effective Capital Cost Due to Added Fees Collected By Govt.	-92	-92
Net Benefit (Benefits - Costs)		
Transportation System Efficiency - Traveler Benefits Only	2,251	569
Traditional BCA - Traveler Benefits + Environmental Benefits	2,386	705
Full Societal BCA - All Benefit Categories	3,602	1,921
Benefit Cost Ratio (Benefits / Costs)		
Transportation System Efficiency - Traveler Benefits Only	1.60	1.11
Traditional BCA - Traveler Benefits + Environmental Benefits	1.64	1.13
Full Societal BCA - All Benefit Categories	1.96	1.35

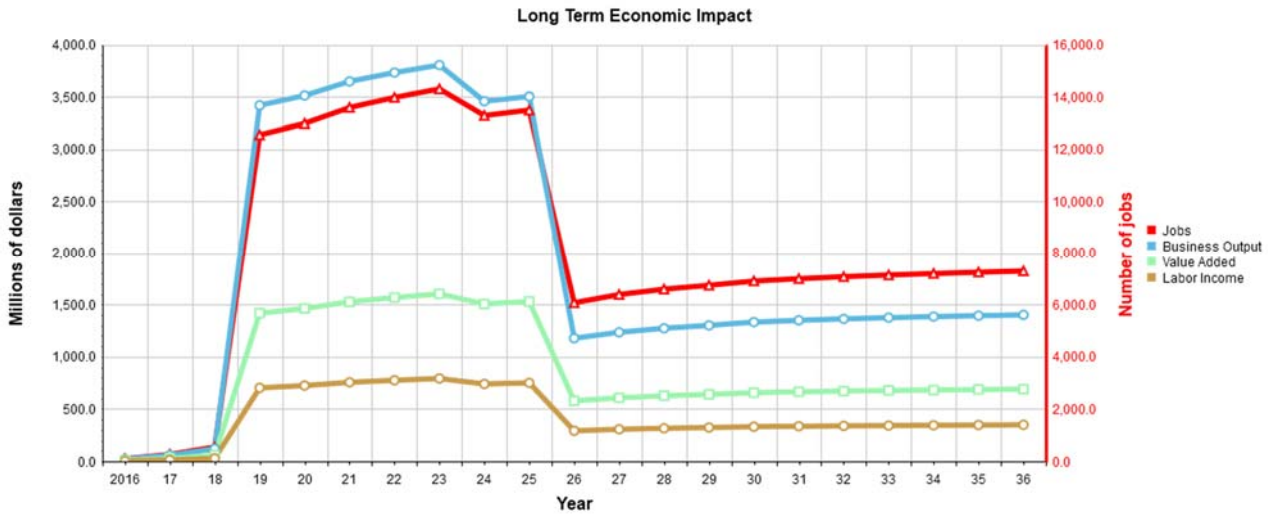

Figure 9 Economic Impact of the Metro West Route Option 2: the Spur Model

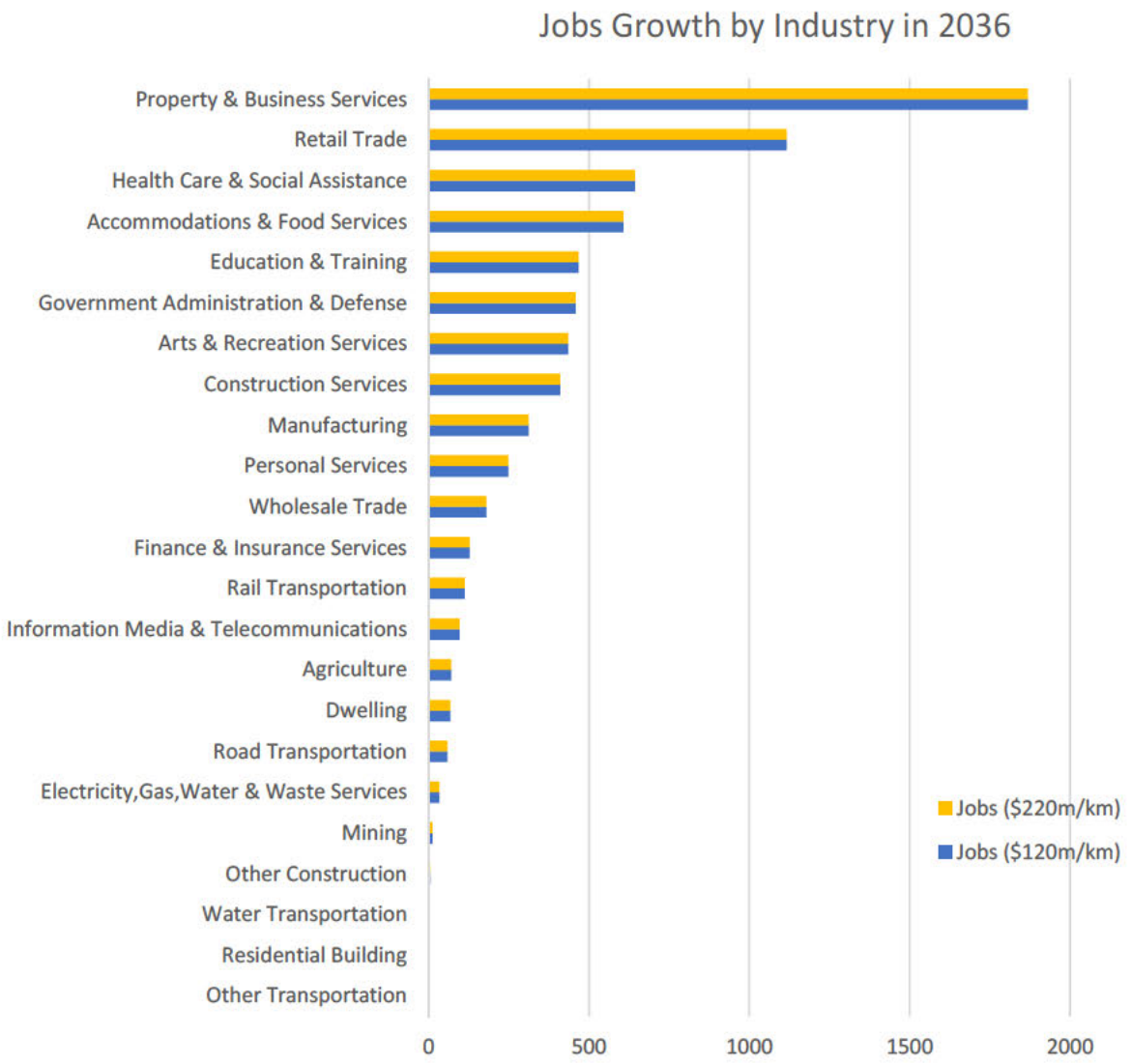

Figure 10 Number of jobs by Industry created in 2036 by Metro West Route Option 2: the Spur Model

Attachment 6

Greater Sydney Commission

COLLABORATION AREA

Camperdown–Ultimo Place Strategy

CA Collaboration Area – Place Strategy

February 2019

Acknowledgement of Country

The Greater Sydney Commission acknowledges the Gadigal people of the Eora Nation, the traditional owners of the lands that include the Camperdown–Ultimo Collaboration Area, and the living culture of the traditional custodians of these lands.

The Commission recognises that the traditional owners have occupied and cared for this Country over countless generations and celebrates their continuing contribution to the life of Greater Sydney.

List of shortened terms

ATP	Australian Technology Park
CoS	Council of the City of Sydney
DoI	Department of Industry
DPE	Department of Planning and Environment
GSC	Greater Sydney Commission
INSW	Infrastructure NSW
IWC	Inner West Council
LAHC	Land and Housing Corporation
NCIE	National Centre of Indigenous Excellence
NSW Health	representing the Health Cluster
OEM	Office of Emergency Management
RMS	Roads and Maritime Services
RPA	Royal Prince Alfred Hospital
SLHD	Sydney Local Health District
TAFE NSW	Technical and Further Education NSW, Ultimo campus
TfNSW	Transport for NSW
UGDC	UrbanGrowth NSW Development Corporation
UND	University of Notre Dame
USyd	University of Sydney
UTS	University of Technology Sydney

Foreword

Maria Atkinson AM*
Eastern City District Commissioner

The Camperdown–Ultimo Collaboration Area offers education, health and skills institutions where collaboration adds value for students, researchers and practitioners. It is a burgeoning innovation ecosystem that thrives on opportunities for convergence and disruption, co-creation and the sharing of information and ideas.

This Place Strategy sets the parameters to add value to current relationships, partnerships, functions and connections. It aims to bring government, business and the Collaboration Area's diverse community together to learn from each other, share information and stories, and grow an outstanding precinct of world-leading research and innovation.

We've identified the need to protect affordable commercial space for start-ups and scale-ups, protect industrial land for new jobs and industries, and better connect the Collaboration Area's places – particularly between Central and Redfern Stations and the University of Sydney and RPA Hospital.

We want to use investment in the area to renew ageing energy, water and waste assets with shared community infrastructure at a precinct scale. We want the Collaboration Area to be greener, with more open spaces, safer streets and a built environment that reflects the area's character and heritage. We want to be innovative in the way we plan for more affordable housing for students, key and creative workers.

Importantly, we're using this Place Strategy and the Collaboration Area process to focus on one agreed vision – this supports the way we can advocate for the right change and makes better use of investment and planning strategies. This work will draw on the area's Indigenous history to welcome people from all over the world and will help to create an edgy, connected and dynamic place of depth, diversity and activity.

Camperdown–Ultimo is a mix of fast, loud and colourful backstreets and laneways; cherished and celebrated institutions; terraced housing and vast apartment blocks. With targeted, collaborative investment and planning it will be one of Australia's leading innovation districts, creating a rich mix of old and new, slow and fast, and elegance and grittiness.

*Maria Atkinson served as Eastern City District Commissioner until September 2108.

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1 Introduction

The Camperdown–Ultimo Collaboration Area stretches from Camperdown to Ultimo, and covers Darlington and Eveleigh; most of Haymarket, Ultimo and Camperdown; and parts of Glebe, Forest Lodge, Newtown, Redfern and Surry Hills.

It has evolved into a mix of activities, creating an innovation eco-system supported by health and education institutions including the Royal Prince Alfred Hospital, TAFE NSW, University of Notre Dame, University of Sydney and University of Technology Sydney.

This innovation ecosystem presents opportunities for collaboration, beyond typical research and innovation partnerships. As critical clusters of knowledge, talent and innovation, the anchor institutions strengthen the potential for new collaborations and synergies. The range and depth of activities across different sectors in this Collaboration Area present exceptional potential.

The Collaboration Area has evolved in an established urban environment, on the doorstep of a global city and close to an international airport, the Harbour CBD, the tourism and entertainment precinct of Darling Harbour, and hotels and conference facilities.

Having these attributes together in one place is unique in the context of Australia innovation districts. Camperdown–Ultimo offers a point of difference as a place that can facilitate collaboration, cooperation and sharing knowledge across multiple disciplines, specialties and fields. With better connections it will meet its potential as a renowned innovation district.

This Camperdown–Ultimo Collaboration Area Place Strategy will inform public and private policy and investment decisions by identifying and recognising the complex, place-specific issues inhibiting growth and change, bringing together multiple and diverse stakeholders and identifying priorities for growth. It identifies the complexity and interrelatedness of significant challenges and opportunities, which require a deliberate and coordinated effort by many stakeholders to work out a pathway to solutions.

The Place Strategy was collectively designed by the stakeholders involved in planning for the Collaboration Area's future. Specifically, it:

- establishes a vision and narrative for the Camperdown–Ultimo Collaboration Area
- identifies impediments and opportunities
- sets priorities for the Collaboration Area
- identifies actions to deliver the vision.

2 The vision for the Camperdown–Ultimo Collaboration Area

In 2036, Camperdown–Ultimo Collaboration Area is Australia's innovation and technology capital. Industry, business, health, education and skills institutions work together, and talent, creativity, research and partnerships thrive. Low carbon living, green spaces, places for people and easy connections support resilience, amenity, vitality and growth.

2.1 Shared objectives to achieve the vision

The Camperdown–Ultimo Collaboration Area stakeholder group has agreed to nine objectives to guide growth and change and achieve the vision through the Place Strategy (Figure 1). These objectives act as markers that will test whether future projects align with the vision.

Working with a shared ambition for environmental design and sustainability excellence, the stakeholder group's vision for the Camperdown–Ultimo Collaboration Area is a place that is globally recognised for its:

1. high growth sectors, new jobs and new investment
2. economic and social contribution to NSW
3. major contribution to research, discovery and innovation
4. excellence in research and industry collaboration
5. excellent public transport, walking and cycling, and great places
6. authenticity, character, outstanding architecture, engaging streetscapes and built environment
7. resilient local community and businesses
8. diverse local community
9. attractiveness, liveability and reliance on sustainable shared resources.

2.2 Strengths, opportunities and key assets

Camperdown–Ultimo's world-class health, education and research institutions bring value-add opportunities through collaboration, research and innovation. These institutions include:

Health
RPA Hospital; Professor Marie Bashir Mental Health Facility; RPA Institute of Rheumatology & Orthopaedics; RPA Institute of Academic Surgery; and Chris O'Brien Lifehouse.

Education
TAFE NSW Ultimo; University of Notre Dame; University of Sydney; University of Technology Sydney; TAFE Eora College; TAFE Community Education and Arts Development (CEAD) Centre; Sydney School of Entrepreneurship (SSE); RPA Surgical and Robotic Training Institute; and Creative Industries Knowledge Hub UTS.

Research
Baird Institute; Brain and Mind Centre; Heart Research Institute; Sydney Health Partners; Centenary Institute of Cancer – Medicine and Cell Biology; George Institute for Global Health; Woolcock Institute of Medical Research; Sydney Research; Blackfriars Precinct Industry Hub; Australian Centre for Field Robotics; Sydney Nano; Microscopy Australia; Charles Perkins Centre; Statewide Biobank research facility; United States Studies Centre; and CSIRO Data61.

Figure 1: A Place Strategy for Camperdown–Ultimo

The Collaboration Area is already distinguished by its scale and concentration of people, jobs and institutions. This wealth of knowledge and research is shared by the anchor institutions – the broad network of specialisations provides opportunities for wide-ranging connections, chance cross-fertilisation and unexpected convergences. High growth industry sectors have the potential to continue strengthening the area's economy.

This Collaboration Area's specialisations, many of which will be supported by the proposed Sydney Innovation and Technology Precinct stretching from Central to Eveleigh, include:

- arts and creative enterprises
- biomedical, clinical and population research
- biotechnology industry clusters
- digital and design
- health sciences, public health and medical services
- ICT and telecommunications
- media, social science and public policy
- nano-scale technology
- robotics, artificial intelligence and data science
- sustainable technologies and smart utility solutions.

In addition to the mature health and education precinct, the Camperdown–Ultimo Collaboration Area benefits from other assets and opportunities:

- The surrounding community main streets and centres of business each have a distinct character and economy.
- Diverse communities and people include the presence and history of the Aboriginal community.
- Nearby institutions and organisations include the Australian Broadcasting Corporation (ABC), the Museum of Applied Arts & Sciences – the Powerhouse Museum, Australian Technology Park (ATP), Carriageworks and Cicada Innovations.
- As the health and education precinct matures, it will have a multiplier effect on existing innovation and creative industries, and tech start-ups.
- As well as two major transport interchanges (Central and Redfern) and frequent bus services, there is easy access to the Harbour CBD, City and South East Light Rail and Sydney Airport.
- Major retail outlets include Broadway Shopping Centre, King Street Newtown, Central Park and Ultimo.
- A network of bicycle and pedestrian connections suit the area – many internal trips are too far to walk, and too short for public transport, making cycling an ideal mode.
- Major urban renewal and redevelopment is planned in and around Redfern and Central stations.

2.3 Complex urban challenges

The Camperdown–Ultimo Collaboration Area is part of a mature innovation corridor along the western and southern fringes of the Harbour CBD. It includes the Camperdown–Ultimo Health and Education Precinct, home to the health, education and research anchors that supply research, skills and talent for knowledge jobs in science-based 'deep tech' (the term for fundamental game-changing science and engineering breakthroughs), health and medicine, business and creative sectors.

There is capacity to significantly expand the reach of these organisations through the added benefits of active and strategic collaboration.

Surrounding high density and mixed-use precincts with workers, residents and students can support local vitality and growth. The area's characteristics include a higher proportion of working-age adults and people in rental accommodation, extremes of advantage and disadvantage, significant Aboriginal and culturally and linguistically diverse (CALD) populations. The strong presence and history of Aboriginal organisations and community in Redfern and surrounds makes it a unique and distinct area.

The Collaboration Area's challenges are complex and inter-related, and include:

- lack of a cohesive identity, narrative or objectives
- unequally distributed public transport, pedestrian and cycling links within and beyond the area, particularly a mass transit system to connect Camperdown activity node (see 2.4)
- poor pedestrian amenity on high-traffic volume roads
- heavily congested roads and limited transport modal options
- the conversion of industrial and commercial building stocks to residential or mixed-use developments, limiting availability of employment land and affordable spaces for innovation, research, creative industries and artists, and collaborative projects

Figure 2: Place Strategy structure

- lack of affordable housing for the community, students, key and creative workers, and limited short-medium term accommodation for academic and health visitors
- the need for investment in public and private infrastructure
- the lack of and growing demand for local open space and community facilities and services and limited capacity to provide these services and facilities.

2.4 Collaboration Area structure

The Collaboration Area process over the past 12 months identified a structure concept that consists of:

- three activity nodes – **Haymarket**, **Camperdown** and **Eveleigh**
- three connecting axes – the **Ultimo** axis, **Darlington** axis and **Surry Hills** axis
- the neighbourhoods between the activity nodes and connecting axes.

Each activity node has its own character, yet each requires better connections to strengthen the activities that happen within them. The connecting axes within and beyond the area will themselves be places for people to meet, interact, innovate and connect – globally or locally. Each activity node and each connecting axis will need individual projects and responses. Collaboration is generally strong within the activity nodes – it is collaboration between the activity nodes that needs to be purposefully pursued.

The Place Strategy structure (see Figure 2) shows what is, and could be, happening within the Collaboration Area. Other influences, contributors, partnerships and interactions occur beyond the Collaboration Area boundaries, including at Green Square; ICT companies in Pyrmont; or finance and professional services in the Harbour CBD. Collaborative approaches to strengthen the Collaboration Area must recognise and nurture these external connections. Broader interactions and connections within and beyond the Collaboration Area such as The Bays Precinct will also evolve.

3 Summary of priorities and actions

	Connectivity			Liveability		
Priorities:	**Priority 1:** Integrate and connect the Collaboration Area, within and beyond its edges	**Priority 2:** Improve local transport options and amenity within the Collaboration Area	**Priority 3:** Promote smart technology, drive innovation and connect locally and globally	**Priority 4:** Provide housing supply, choice and affordability in great places for people	**Priority 5:** Foster healthy, creative, culturally rich, socially connected and welcoming communities	**Priority 6:** Provide social and civic infrastructure for current and future generations
Actions:	**Action 1:** Develop a strategy for transport investigations and initiatives, underpinned by the principles of movement and place, to enhance safety, accessibility and permeability within and surrounding the Collaboration Area by prioritising pedestrian safety and amenity, encouraging cycling, and planning for public transport, freight movements and parking. **Action 2:** Advocate for better connections between Greater Sydney's collaboration areas, innovation clusters and health and education precincts, including transport, technology, utility and digital networks, and information sharing. **Action 3:** Advocate for a mass transit system that strengthens connections between the Collaboration Area and Greater Sydney's economic corridors. **Action 4:** Advocate for a Sydney Metro West station in Camperdown activity node. **Action 5:** Facilitate the renewal of Central Station and surrounding lands to improve pedestrian and cycling connectivity within and surrounding the Collaboration Area and integrate the transport interchange with the surrounding area. **Action 6:** Prioritise and deliver Redfern Station improvements and accessibility.	**Action 7:** Improve public transport, pedestrian and cycling connectivity between the three activity nodes: • Haymarket to Camperdown along the Ultimo axis • Camperdown to Eveleigh along the Darlington axis (particularly Redfern Station to University of Sydney) • Haymarket to Eveleigh along the Surry Hills axis. **Action 8:** Implement a pilot project along Broadway and Parramatta Road to reallocate road space and prioritise pedestrians between Central Station and key land uses on the Ultimo axis, while achieving an acceptable level of service for vehicles at the gateway to the Harbour CBD. **Action 9:** Identify shared partnership transport solutions to optimise connectivity within the Collaboration Area. **Action 10:** Explore improved pedestrian and cycling connections between ATP, North Eveleigh/ Carriageworks, and Waterloo Station.	**Action 11:** Consider piloting a Smart Places program in the Collaboration Area. **Action 12:** Investigate a partnership to digitally connect local communities, including hospital visitors, people on lower incomes, people experiencing homelessness or marginalised social groups. **Action 13:** Explore opportunities to share knowledge and intellectual property across key institutions, including a dedicated high performance managed network (such as Science DMZ) for the Collaboration Area and standardised data management and open source access.	**Action 14:** Require the provision of affordable housing in and close to the Collaboration Area, including in mixed-use developments, consistent with government targets. **Action 15:** Explore initiatives to provide diverse housing, including affordable housing for key workers and students.	**Action 16:** Encourage active street frontages and prioritise pedestrians and cyclists along identified streets with a high place value, such as Steam Mill Lane, sections of Harris Street and City Road. **Action 17:** Foster vibrant places by activating night-time precincts, activating ground floor areas, and developing and promoting meeting places and cultural assets. **Action 18:** Encourage partnership projects that celebrate local culture and events through cross-promotion and concurrent locational events and leverage opportunities to create destination activities. **Action 19:** Investigate partnership projects to improve education and health outcomes, and enhance cultural and economic opportunities, in local Aboriginal communities	**Action 20:** Integrate and connect existing institutional campuses to provide shared open space and access to amenity for the area's communities and encourage weekend use. **Action 21:** Develop an Infrastructure Strategy that identifies the open space, social and civic infrastructure needed for growing resident, worker, student and visitor populations.

Immediate imperatives

• Action 3 • Action 8 • Action 22 • Action 35 • Action 36

Productivity		Sustainability		Governance
Priority 7: Cultivate an internationally competitive health, education, research and innovation area	**Priority 8:** Support the role and function of employment lands	**Priority 9:** Enhance the network of high quality open and public space linked by the Greater Sydney Green Grid	**Priority 10:** Create a resilient place	**Priority 11:** Demonstrate leadership that is place-first, cohesive and collaborative
Action 22: Prepare and implement an economic development strategy that: • reinforces the strengths and local identity of Haymarket, Camperdown and Eveleigh activity nodes and the Ultimo, Darlington and Surry Hills connecting axes • retains existing and attracts new businesses and industries, including cultural and creative industries and artists • links industry, researchers and investors; and encourages their collaboration and interaction • supports convergence, attracts tech start-ups, encourages research and innovation clusters, and supports scaleups to reach commercial aspirations • builds the entrepreneurial, business and commercial skills of talented people • attracts investment and drives jobs growth • supports commercialisation and translation of research into practice • improves the destination experience and grows the Collaboration Area's global economic prosperity. **Action 23:** Enhance medical innovation, research and health services by supporting future growth of RPA Hospital to service increased population growth. **Action 24:** Provide spaces and events to encourage local and international student connections, networking and innovation and increase commercial outcomes. **Action 25:** Encourage the recruitment and retention of talented people by promoting the Collaboration Area's world-leading research and anchor institutions and providing ongoing support.	**Action 26:** Retain and manage commercial and business activities, particularly small businesses and tech start-ups, by safeguarding business zoned land from conversion that allows residential development. **Action 27:** Establish a biotechnology hub in Camperdown activity node (Parramatta Road, Mallet Street and Pyrmont Bridge Road area), and safeguard innovative, incubator and research activities from unrelated commercial land uses through planning controls. **Action 28:** Advocate for and deliver a minimum percentage requirement for affordable space in developments for tech start-ups, innovation, creative industries, cultural uses, community uses and artists within and beyond the Collaboration Area.	**Action 29:** Identify, prioritise and implement projects that enhance the Liveable Green Network and Greater Sydney Green Grid, increase tree canopy cover and vegetation, encourage health and activity, and optimise access to multi-use, shared green spaces, including: • Broadway and Parramatta Road • City Road • Harris Street and the Powerhouse Precinct • the Johnston's Creek Green Grid cycling and pedestrian connection to Bicentennial Park. **Action 30:** Promote community use and activities in shared or public open spaces.	**Action 31:** Identify partnership projects and research to direct low-carbon initiatives, improve energy, waste and water efficiency, and improve health outcomes through design excellence and best practice in building and public domain projects. **Action 32:** Facilitate partnership research and innovation projects to support and inform the OEM's urban-based pilot Disaster Preparedness Program. **Action 33:** Investigate power and energy bank sharing; peer-to-peer trading; precinct solutions for energy, water, waste management, loading and servicing; and infrastructure investment and sharing. **Action 34:** Investigate community engagement in 'living lab' research programs.	**Action 35:** Establish a Collaboration Area Leadership Group to: • strengthen and promote the Camperdown-Ultimo Collaboration Area as an innovation district • create opportunities for private sector investment, tech start-ups and research commercialisation • advocate for critical infrastructure • drive collaboration and partnerships • address impediments to growth, permeability and activation • implement shared projects, manage shared funds, secure collective capital and identify opportunities for innovative finance. **Action 36:** Create an international brand and narrative that emphasises the Collaboration Area's strengths and character. **Action 37:** Develop a place-based monitoring and performance evaluation framework to inform planning and investment decisions. **Action 38:** Identify funding sources and advocate for funding (such as sponsorships, grants, contributions, planning agreements, value capture and agency budgets) to deliver Place Strategy actions. **Action 39:** Identify pilot projects to build early engagement and commitment between RPA Hospital, University of Sydney, University of Notre Dame, University of Technology Sydney and TAFE NSW.

4 A collaborative process

Collaboration Areas are a place-based, multi-stakeholder approach to solving complex urban issues, conducted by the Greater Sydney Commission over 12 months. *A Metropolis of Three Cities* identifies Camperdown–Ultimo as a Collaboration Area and the Camperdown–Ultimo Collaboration Area Place Strategy documents a pathway to realising the area's metropolitan role. This recognises the significance of health and education precincts in driving economic development, growing sustainable employment and promoting equity and social sustainability.

The Commission established the Camperdown–Ultimo Collaboration Area stakeholder group in August 2017. The Commission chairs the stakeholder group, which includes:

- Carriageworks
- Council of the City of Sydney
- Create NSW
- Department of Finance, Services and Innovation
- Department of Planning & Environment
- Government Architect NSW
- NSW Health
- Infrastructure NSW
- Inner West Council
- Jobs for NSW
- Roads and Maritime Services
- Sydney Business Chamber
- Sydney Local Health District
- TAFE NSW
- The University of Notre Dame Australia
- The University of Sydney
- The University of Technology Sydney
- Transport for NSW
- UrbanGrowth NSW Development Corporation

More than 70 stakeholders and participants provided input at meetings and workshops held between August 2017 and August 2018. Other stakeholders include Australian Technology Park, Cicada Innovations, National Centre of Indigenous Excellence (NCIE), South Sydney Business Chamber, TechSydney, Sydney Start-up Hub and The Warren Centre.

4.1 Understanding the context

The collaboration process explored and uncovered the challenges and opportunities facing Camperdown–Ultimo through:

- *A Metropolis of Three Cities*: the NSW Government's 40-year vision and 20-year plan to rebalance growth and deliver benefits more equally and equitably to residents across Greater Sydney
- *Future Transport Strategy 2056*: focusing on the decisions the NSW Government needs to make now to address Greater Sydney's growth and change over the next 40 years
- *State Infrastructure Strategy 2018–2038*: sets out the NSW Government's priorities for the next 20 years and, combined with the *Future Transport Strategy 2056* and *A Metropolis of Three Cities*, brings together infrastructure investment and land use planning for cities
- *Eastern City District Plan*: translating the metropolitan-level objectives set out in *A Metropolis of Three Cities* to inform local planning.

These documents should be consulted alongside this Place Strategy to understand the wider policy context for the Collaboration Area's future. Other strategies, local plans and studies that have informed the Place Strategy include:

- City of Sydney community strategic plan *Sustainable Sydney 2030*
- City of Sydney *Central Sydney Planning Strategy*
- City of Sydney *Tech Startups Action Plan*
- City of Sydney *International Education Action Plan 2018*
- Greater Sydney Commission *Exploring Net Zero Emissions for Greater Sydney* (Kinesis)
- Inner West Council community strategic plan *Our Inner West* 2036
- Redfern – Waterloo Authority *Contributions Plan 2006*
- *Resilient Sydney* – a strategy for city resilience 2018.

4.2 Framework and response

To deliver on the vision and shared objectives, this Place Strategy proposes 11 priorities and 39 actions. To align with *A Metropolis of Three Cities* and the *Eastern City District Plan*, the priorities and actions are set around five themes of connectivity, liveability, productivity, sustainability and governance.

Five actions are immediate imperatives that must be commenced as a matter of priority:

Action 3: Advocate for a mass transit system that strengthens connections between the Collaboration Area and Greater Sydney's economic corridors.

Action 8: Implement a pilot project along Broadway and Parramatta Road to reallocate road space and prioritise pedestrians between Central Station and key land uses on the Ultimo axis, while achieving an acceptable level of service for vehicles at the gateway to the Harbour CBD.

Action 22: Prepare and implement an economic development strategy that:

- reinforces the strengths and local identity of Haymarket, Camperdown and Eveleigh activity nodes and the Ultimo, Darlington and Surry Hills connecting axes
- retains existing and attracts new businesses and industries, including cultural and creative industries and artists
- links industry, researchers and investors; and encourages their collaboration and interaction
- supports convergence, attracts tech start-ups, encourages research and innovation clusters, and supports scaleups to reach commercial aspirations
- builds the entrepreneurial, business and commercial skills of talented people
- attracts investment and drives jobs growth
- supports commercialisation and translation of research into practice
- improves the destination experience and grows the Collaboration Area's global economic prosperity.

Action 35: Establish a Collaboration Area Leadership Group to:

- strengthen and promote the Camperdown–Ultimo Collaboration Area as an innovation district
- create opportunities for private sector investment, tech start-ups and research commercialisation
- advocate for critical infrastructure
- drive collaboration and partnerships
- address impediments to growth, permeability and activation
- implement shared projects, manage shared funds, secure collective capital and identify opportunities for innovative finance.

Action 36: Create an international brand and narrative that emphasises the Collaboration Area's strengths and character.

The Place Strategy uses the following terms to provide this guidance:

- **Priorities:** the most important focus areas to progress *A Metropolis of Three Cities* and the *Eastern City District Plan* as they apply to the Camperdown–Ultimo Collaboration Area
- **Outcomes:** what each priority will achieve by 2036
- **Actions:** allocated initiatives and projects that stakeholders will lead to realise the outcome.

These priorities, outcomes and actions are in addition to those set out in *A Metropolis of Three Cities* and the *Eastern City District Plan*. Current legislation and NSW Government endorsed policies will apply to all projects and initiatives. The Place Strategy also identifies the next steps (Chapter 9) required to bring the vision to reality.

5 Connectivity

5.1 Analysis of opportunities and impediments

The Camperdown–Ultimo Collaboration Area has a competitive advantage due to its location at the south-west edge of the Harbour CBD and its direct access to Sydney Airport.

Major city-shaping assets include the heavy rail system, with Central and Redfern transport interchanges serving the T1, T2, T3, T4 and T8 lines; and Central Station serving existing and new light rail services including the proposed Sydney Metro City and Southwest line. The area is also served by light rail and frequent bus services along heavily congested routes (see Figure 3). The stakeholder group believes an increase in public transport services can reduce congestion and improve walkability and safety.

Sydney Metro West will connect Greater Parramatta with the Harbour CBD, servicing Parramatta, Sydney Olympic Park, The Bays Precinct and the Harbour CBD. Current proposals show Sydney Metro West running generally to the north of the Camperdown–Ultimo Collaboration Area.

Major city-serving road assets include Parramatta Road, City Road, Broadway, Harris Street through to Botany Road, Cleveland Street and Foveaux Street.

Current or planned transport projects include:

- CBD and South East Light Rail (Transport for NSW)
- Central Station Precinct (Transport for NSW)
- Cleveland Street Road Network Plan (RMS)
- Guided electric transit system (Inner West Council)
- Inner West to CBD corridor Road Network Plan (RMS)
- Mascot to Eveleigh Road Network Plan (RMS)
- Redfern Station improvement works (Transport for NSW)
- Sydney Metro City & Southwest (Sydney Metro)
- WestConnex (Sydney Motorway Corporation).

Transport for NSW is focused on completing key missing links in the bicycle network within 10 kilometres of metropolitan centres, and establishing the Principal Bicycle Network (PBN), which will provide high quality, high priority cycling routes across Greater Sydney. Within a 10-kilometre radius of the Harbour CBD the Sydney Regional Bike Network, developed by an alliance of local councils, provides safe, connected and direct cycleways that are integrated with the Greater Sydney Green Grid and contribute to the broader PBN.

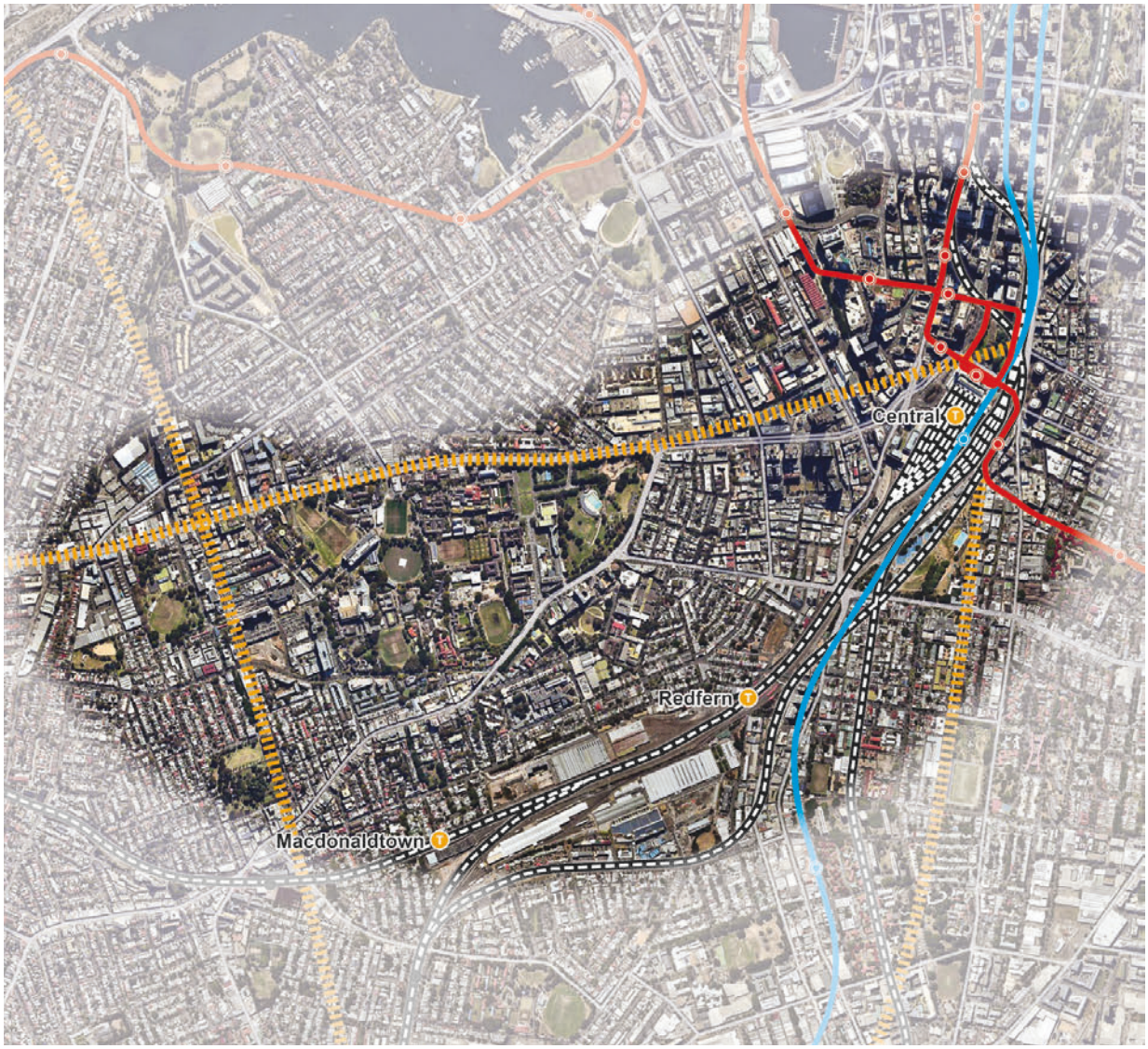
By 2036, the number of people living in the Collaboration Area is expected to increase from 52,952 to 81,648 (54%), and local jobs from 89,176 to 125,552 (41%).[1] Student numbers are also anticipated to increase.

The Central Station Precinct project will allow for an increase in users from more than 250,000 now to more than 450,000 in 20 years. Redevelopment of ATP, as well as urban renewal in Redfern, Eveleigh, Sydney CBD South, the Parramatta Road Urban Transformation Strategy Camperdown Precinct, and to the south east of the Collaboration Area at Waterloo are being planned to address this expected growth.

Accessibility to the three activity nodes differs significantly. Approximately 404,000 people live within 30 minutes by public transport of Haymarket activity node, whereas only 237,400 people have access to Camperdown activity node within 30 minutes by public transport. When compared to

1 Transport for NSW *Open Data Hub and Developer Portal* https://opendata.transport.nsw.gov.au/search/type/dataset

Figure 3: Transport connections



City-Serving Transport Corridor

Light Rail (under construction)

Rail

Sydney Metro

the Camperdown activity node, more people can access Randwick (257,865), Kogarah (266,163) and Bankstown (279,513) Collaboration Areas within 30 minutes by public transport.

Access to jobs in Camperdown activity node (291,515 jobs within 30 minutes by public transport) is also constrained compared with Haymarket activity node (access to 688,300 jobs) and Eveleigh activity node (access to nearly 545,000 jobs).[2]

Activity node	Population 2016	Jobs 2016
Haymarket	404,040	688,302
Camperdown	237,401	291,515
Eveleigh	212,130	544,971

Public transport

Mass transport capacity must increase to service the current and future worker, student, resident and visitor populations, and to connect the Collaboration Area with metropolitan and strategic centres, and health and education precincts. This would provide unprecedented access to jobs and services and a level of potential convergence not seen in other global cities. An east-west metro connection would offer a key advantage in a competitive global market.

The Collaboration Area's mass transit services are not distributed consistently. While the Haymarket and Eveleigh activity nodes are on the rail system, access from Camperdown activity node is limited. RPA Hospital is two kilometres from Redfern Station and nearly three kilometres from Central Station. Several stakeholders have advocated for a Sydney Metro West station to be located on Parramatta Road in the Camperdown activity node, serving RPA Hospital and the University of Sydney.

Accessibility and walkability

Accessibility and walkability in the area is poor. Planning for transport initiatives should follow the principles of the Movement and Place Framework, which is a tool to manage the road network in a way that supports safe, efficient and reliable journeys for people and freight while enhancing the liveability and amenity of places[3] to fully consider all customer and place needs. The Central Station Precinct project and, in part, the Inner West to CBD corridor Road Network Plan will be a start.

The **Ultimo axis** is dominated by heavy vehicle traffic, with limited pedestrian and cycling safety and amenity. This may be addressed by the Central Station Precinct project, and future investigations into The Goods Line South. A pilot project along Broadway and Parramatta Road could focus on pedestrian amenity and safety in areas identified as streets with a high place value in the Haymarket and Camperdown activity nodes – reinforcing the Parramatta Road Urban Transformation Strategy.[4] By examining opportunities to reallocate road space and prioritise pedestrians between Central Station and other land uses on the Ultimo axis, such as the universities and shopping precincts, there could also be an acceptable level of service for vehicles at the gateway to the Harbour CBD and enhanced public areas around, and accessibility to, Broadway.

The **Darlington axis** suffers from limited amenity, legibility and safety, with heavy rail lines restricting access between the Camperdown and Eveleigh activity nodes. This could be addressed by a connection between North Eveleigh and ATP, as detailed by the Redfern–Waterloo Authority.[5]

The connection between Redfern Station and the University of Sydney campus is a high-risk area for pedestrians. This may be improved by the University of Sydney's 'future campus' proposals in the City and the Engineering precincts. However, accessibility issues require immediate action.

2 Travel catchments by all modes of public transport to arrive at identified locations at 08:30am on a normal weekday – Source TfNSW/Census/Greater Sydney Commission
3 Transport for NSW *Future Transport Strategy 2056* pp17–18
4 *Parramatta Road Corridor Urban Transformation Strategy 2016*
5 Redfern–Waterloo Authority *Contributions Plan 2006*, page 17

Significant revitalisation and development around Redfern Station will increase rail patronage, highlighting the need for an upgrade.

The **Surry Hills axis** has limited amenity, and poor pedestrian and cycling accessibility. Road network plans for Cleveland Street, and Mascot to Eveleigh, may address these issues.

The Pyrmont Bridge construction site for WestConnex, in the Collaboration Area's west, may also impact on amenity in the short term, but provides an opportunity to add value in the longer term.

Freight movements

Metropolitan freight is forecast to grow by almost 50% over the next 20 years, with total freight (inbound and outbound) in the Eastern City projected to increase by 28%; and waste (outbound) projected to increase by 32%.[6]

Freight trips in heavy and light vehicles serve major institutions, retail centres, residential areas, and construction and waste needs. As the area grows, freight trips will need to be managed to ensure efficient access that balances the needs of the area and of other transport customers.

Transport initiatives will need to serve current and increasing travel demand in more efficient ways. Best practice levels of service are required to allow the innovation and agglomerative potential of the Collaboration Area to be achieved.

Digital connectivity

Digital connectivity within and beyond the Collaboration Area generally relies on existing fixed line and WiFi networks, with the National Broadband Network (NBN) only available in small pockets. Most of the area is identified as 'build commenced', except for Redfern and parts of Eveleigh and Surry Hills. This may be an impediment for tech start-ups, innovation and creative industries. It does not affect the major institutions, including the universities, TAFE NSW, hospitals and some schools, which use AARNet (the Australian Academic and Research Network) to provide ultra-high-speed internet services to Australian education and research communities and their research partners.

Seamless digital connectivity within and beyond to international destinations is a key differentiator for this Collaboration Area. Local improvements could include promoting free public Wi-Fi, free solar powered charge points, charging hubs in public spaces, and other smart infrastructure. With strong health, education and research partnerships, a multifaceted network of start-ups, and new focus on the Sydney Innovation and Technology Precinct from Central to Eveleigh, there is an opportunity to pilot a Smart Places program in the Collaboration Area.

6 Transport for NSW draft *Freight and Ports Plan*

5.2 Priorities and actions

The following priorities and actions are important to achieving the vision for the Camperdown–Ultimo Collaboration Area, while also giving effect to *A Metropolis of Three Cities* and the *Eastern City District Plan* (including its planning priorities and actions).

Priority 1
Integrate and connect the Collaboration Area, within and beyond its edges

Outcome
Excellent public transport, walking and cycling; encouraging greater connectivity of ideas and talent; new jobs and new industries; and research, discovery and innovation.

Actions	Primary stakeholder	Supporting stakeholder
Action 1: Develop a strategy for transport investigations and initiatives, underpinned by the principles of movement and place, to enhance safety, accessibility and permeability within and surrounding the Collaboration Area by prioritising pedestrian safety and amenity, encouraging cycling, and planning for public transport, freight movements and parking	TfNSW	RMS, CoS, IWC
Action 2: Advocate for better connections between Greater Sydney's collaboration areas, innovation clusters and health and education precincts, including transport, technology, utility and digital networks, and information sharing	Collaboration Area Leadership Group	Jobs for NSW, TfNSW, all stakeholders
Action 3: Advocate for a mass transit system that strengthens connections between the Collaboration Area and Greater Sydney's economic corridors	Collaboration Area Leadership Group	TfNSW, all stakeholders
Action 4: Advocate for a Sydney Metro West station in Camperdown activity node	Collaboration Area Leadership Group	All stakeholders
Action 5: Facilitate the renewal of Central Station and surrounding lands to improve pedestrian and cycling connectivity within and surrounding the Collaboration Area and integrate the transport interchange with the surrounding area	TfNSW	All stakeholders
Action 6: Prioritise and deliver Redfern Station improvements and accessibility	TfNSW	UGDC, CoS, USyd, ATP

Priority 2
Improve local transport options and amenity within the Collaboration Area

Outcome
Seamless connections, more serendipitous interactions and greater economic growth.

Actions	Primary stakeholder	Supporting stakeholder
Action 7: Improve public transport, pedestrian and cycling connectivity between the three activity nodes: • Haymarket to Camperdown along the Ultimo axis • Camperdown to Eveleigh along the Darlington axis (particularly Redfern Station to University of Sydney) • Haymarket to Eveleigh along the Surry Hills axis	TfNSW	All stakeholders
Action 8: Implement a pilot project along Broadway and Parramatta Road to reallocate road space and prioritise pedestrians between Central Station and key land uses on the Ultimo axis, while achieving an acceptable level of service for vehicles at the gateway to the Harbour CBD	TfNSW	RMS, CoS, USyd, NSW Health, SLHD, UND, UTS
Action 9: Identify shared partnership transport solutions to optimise connectivity within the Collaboration Area	Collaboration Area Leadership Group	TfNSW, CoS, IWC, USyd, NSW Health, SLHD, UTS, TAFE NSW
Action 10: Explore improved pedestrian and cycling connections between ATP, North Eveleigh/ Carriageworks, and Waterloo Station	UGDC	TfNSW, CoS, USyd, ATP, Carriageworks

Priority 3
Promote smart technology, drive innovation and connect locally and globally

Outcome
New jobs and new industries; commercialised research, discovery and innovation; and increased social interactions.

Actions	Primary stakeholder	Supporting stakeholder
Action 11: Consider piloting a Smart Places program in the Collaboration Area	INSW	All stakeholders
Action 12: Investigate a partnership to digitally connect local communities, including hospital visitors, people on lower incomes, people experiencing homelessness or marginalised social groups	USyd	NSW Health, SLHD, UTS, UND, TAFE NSW
Action 13: Explore opportunities to share knowledge and intellectual property across key institutions, including a dedicated high performance managed network (such as Science DMZ) for the Collaboration Area and standardised data management and open source access	UTS	NSW Health, SLHD, UND, USyd, TAFE NSW, CoS, IWC, eHealth NSW

6 Liveability

6.1 Analysis of opportunities and impediments

Using the Government Architect NSW's *Better Placed* policy as a reference, efforts should focus on improving the Collaboration Area's health (particularly its limited amenity, walkability, connectivity and sense of safety), equity and resilience.

Future projects in activity nodes and connecting axes will improve overall design and function, including new squares and parks as multi-use destinations, streets as public spaces, linking a public health agenda to a public space agenda, and designing buildings in a way that creates better places. Starting with small, cost-efficient, experimental or pilot projects can bring about major benefits.

Equity can be increased by connecting and opening up adjacent institutions – the institutions and the community benefit by increased permeability and meeting places, enhanced opportunities for social interactions, and access to open space and places that were previously less welcoming.

Redfern's dynamic Aboriginal and Torres Strait Islander community and its cluster of Indigenous organisations should complement creative, research and economic sectors in a way that no other Australian urban community can. It is an opportunity to embed a contemporary Aboriginal and Torres Strait Islander community into the culture and shape of the area's future.

The surrounding community main streets and centres of business activity, each with a distinct character and economic makeup, also create opportunities (see Figure 4).

Haymarket activity node sits at the convergence of four of the City of Sydney 'villages':

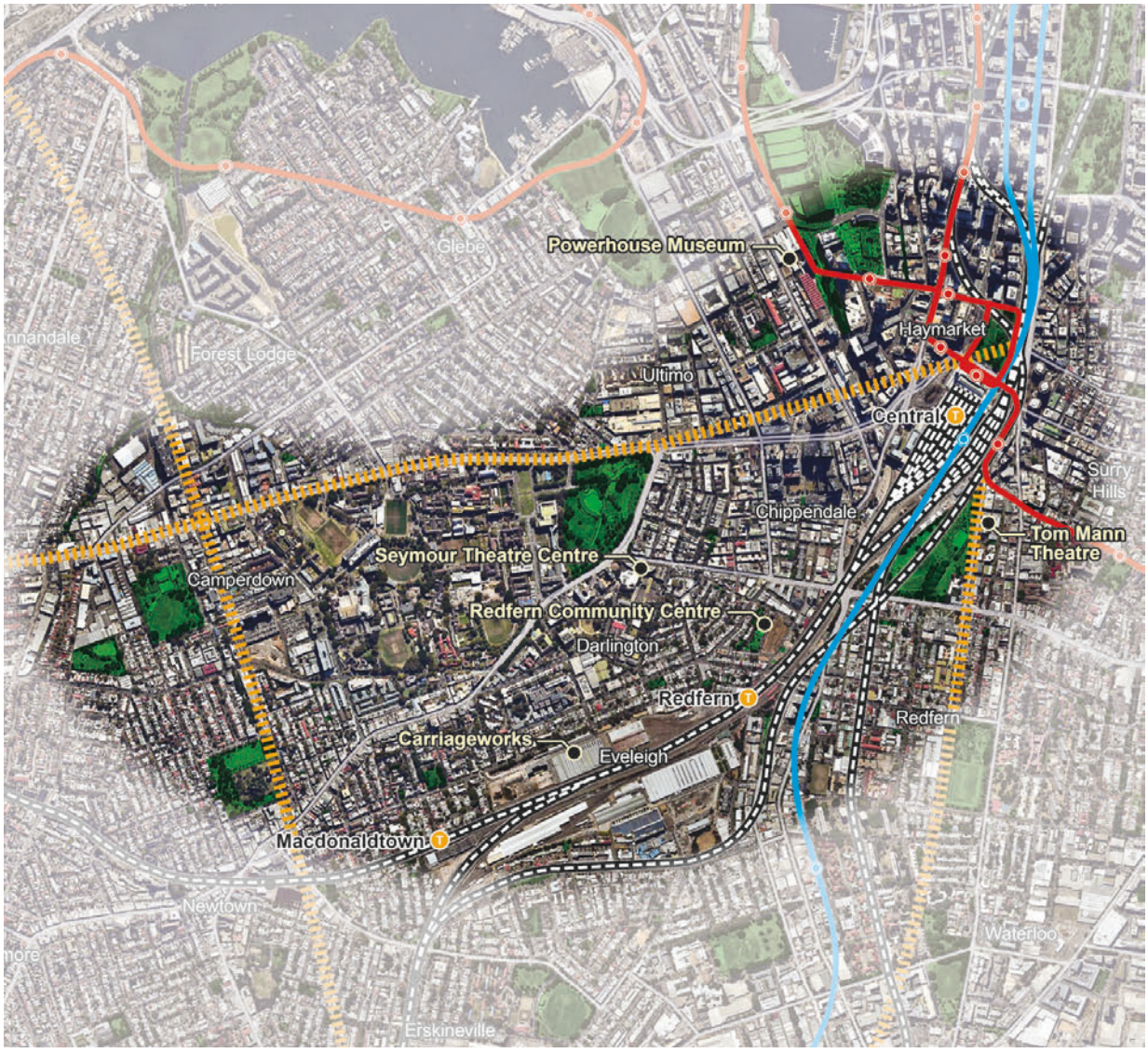
- The multicultural atmosphere of Chinatown is enhanced by Chinese, Korean and Indonesian communities and a large student population, living mainly in apartment buildings. Open space is provided in local parks and around Darling Harbour.
- The former warehouses and wool stores in Harris Street have converted to apartments and office buildings, populated by wealthy young professionals, particularly couples and young families, and a large Chinese community. Parks on the harbour foreshore provide open space for residents.
- In the diverse inner-city community of Crown and Baptist streets, historic houses sit side-by-side with new developments in leafy streets, mirroring the diversity of residents, with parks and open spaces. The village is home to a vibrant retail and dining scene that attracts visitors from across Sydney, including the Surry Hills Markets.
- Redfern village includes culturally, ethnically and economically diverse communities, influenced by creative and small businesses. The area's character, traditionally associated with the Aboriginal and Torres Strait Islander community and public housing tenants, is changing with urban renewal and reactivation.[7]

In each village, residents report that they like the proximity to transport, local shops and cafés, and multicultural and diverse communities.[8]

Haymarket activity node is also home to the ABC, University of Notre Dame, TAFE NSW Ultimo, the SSE, the Powerhouse Museum, and the University of

7 City of Sydney http://www.cityofsydney.nsw.gov.au/business/business-support/business-in-your-local-area
8 City of Sydney Resident Consultations

Figure 4: Liveability opportunities and assets



Technology Sydney. The Central Station Precinct will revitalise local open space and community services.

Camperdown activity node is at the north end of the City of Sydney's King Street Village and extends in the Inner West Local Government Area. With a melting pot of people from different social, cultural and economic backgrounds, the activity node includes a mix of housing, including older terraces and newer apartment buildings, the vibrant and ever-evolving King Street shopping and dining precinct, and Sydney Park. As well as regular festivals and events, residents enjoy the community's diversity, tolerance and openness.[9]

Camperdown activity node is home to RPA Hospital, Professor Marie Bashir Mental Health Facility, Chris O'Brien Lifehouse, medical and research institutes and the University of Sydney.

The University of Sydney's cultural precinct is focused on the Chau Chak Wing Museum. Plans to open up the campus to the broader community, including a new gateway to City Road, will contribute to a more active and dynamic activity node. Future redevelopment and expansion of RPA Hospital will improve local health services and increase jobs, while urban renewal in the Camperdown Precinct, identified in the Parramatta Road Urban Transformation Strategy, will revitalise the activity node's western edge.

Eveleigh activity node is in the City of Sydney's Redfern Street Village, which supports culturally, ethnically and economically diverse communities, influenced by creative and small businesses. Redfern residents appreciate their proximity to transport, local shops and cafés, and their multicultural and diverse community, including the 'dirty, grungy, dangerous, fun' identity of their place.[10]

Eveleigh activity node is home to ATP, CSIRO Data61, Cicada Innovations and Carriageworks. Planned urban renewal, including the Redfern Station upgrade, will revitalise the area, enhance existing open space, improve accessibility and walkability, and provide community facilities and services. Recognising and celebrating Aboriginal and Torres Strait Islander culture must be a focus across the Collaboration Area, particularly for this activity node. Music, dance and theatre represent a means of cultural, political and spiritual expression for urban Aboriginal and Torres Strait Islander people.

Quality lifestyle

Workers and students in the Collaboration Area should have the opportunity to live close to where they work or study. The provision and retention of affordable housing is an issue, whereas housing at higher price points is available. Any urban renewal should build on the valued diversity of the community and protect that diversity from gentrification and rising property values.

Social housing is a form of affordable housing that caters to households experiencing the highest housing stress and social disadvantage. Social housing supply and renewal is being addressed through government-subsidised programs and the community sector. There may be opportunities to partner with LAHC, community housing providers and short-term accommodation providers to deliver student housing, social housing and affordable housing in and close to the Collaboration Area, and to prioritise housing with a direct connection or collaboration with key institutions.

Another challenge is the lack of pleasant public areas, accessibility and connectivity (particularly for pedestrians and cyclists), adequate open space, and places to meet and socialise. A mature innovation district and growing innovation ecosystem needs opportunities for workers to interact socially and build contacts for collaboration, learning and inspiration. Open or public space must also provide opportunities for reflection, quiet and a break from people and noise.

Streets, plazas, parks and recreation spaces provide places for community events, markets and festivals, encouraging social interaction and active lifestyles. Growth and renewal will increase opportunities to expand and connect these places and to explore innovative public places, such as rooftops and podiums.

9 City of Sydney http://www.cityofsydney.nsw.gov.au/business/business-support/business-in-your-local-area and Resident Consultations
10 City of Sydney Resident Consultations

The Ultimo, Darlington and Surry Hills axes provide great opportunities for vibrant hot spots to meet and interact. Other cultural assets such as Carriageworks; cultural places such as the theatre district in Haymarket, and local eat streets in Chippendale and Surry Hills inspire social activity.

The Department of Planning and Environment, City of Sydney Council and Inner West Council use strategies and plans to help enhance local character and identity by reinforcing appropriate built forms, and requiring a high standard of architectural, urban and landscape design for new development, redevelopment, public space works and shared infrastructure. They also work to balance a mix of land uses that enable people to live, work, play and visit the area, while accommodating growth and density.

6.2 Priorities and actions

The following priorities and actions are important to achieving the vision for the Camperdown–Ultimo Collaboration Area, while also giving effect to *A Metropolis of Three Cities* and the *Eastern City District Plan* (including its planning priorities and actions).

Priority 4
Provide housing supply, choice and affordability in great places for people

Outcome
Increased housing affordability and choice in vibrant and safe places.

Actions	Primary stakeholder	Supporting stakeholder
Action 14: Require the provision of affordable housing in and close to the Collaboration Area, including in mixed-use developments, consistent with government targets	CoS, IWC	DPE
Action 15: Explore initiatives to provide diverse housing, including affordable housing for key workers and students	USyd, SLHD	CoS, IWC

Priority 5
Foster healthy, creative, culturally rich, socially connected and welcoming communities

Outcome
Authenticity, character, outstanding architecture, and engaging streetscapes and built environment.

Actions	Primary stakeholder	Supporting stakeholder
Action 16: Encourage active street frontages and prioritise pedestrians and cyclists along identified streets with a high place value, such as Steam Mill Lane, sections of Harris Street and City Road	CoS	TfNSW, RMS
Action 17: Foster vibrant places by activating night-time precincts, activating ground floor areas, and developing and promoting meeting places and cultural assets	CoS, IWC	All stakeholders
Action 18: Encourage partnership projects that celebrate local culture and events through cross-promotion and concurrent locational events and leverage opportunities to create destination activities	Collaboration Area Leadership Group	All stakeholders
Action 19: Investigate partnership projects to improve education and health outcomes, and enhance cultural and economic opportunities, in local Aboriginal communities	NCIE	All stakeholders

Priority 6
Provide social and civic infrastructure for current and future generations

Outcome
Supported local communities, with the infrastructure and services they need.

Actions	Primary stakeholder	Supporting stakeholder
Action 20: Integrate and connect existing institutional campuses to provide shared open space and access to amenity for the area's communities and encourage weekend use	USyd	NSW Health, SLHD, UTS, TAFENSW, CoS
Action 21: Develop an Infrastructure Strategy that identifies the open space, social and civic infrastructure needed for growing resident, worker, student and visitor populations	DPE, CoS, IWC	INSW, TfNSW, GSC, all stakeholders

7 Productivity

7.1 Analysis of opportunities and impediments

As the Collaboration Area's innovation, tech start-ups and creative industries grow alongside its world-leading health, education, training and research institutions, there will be more opportunities for a new generation of workers (see Figure 5). As well as funding for infrastructure, the Eastern City District Plan identifies that this requires:

- *planning for the diversification and expansion of the precincts, and protecting surrounding employment areas for health, education, research, innovation and creative/industry land uses*
- *exploring flexible zoning to accommodate ancillary and complementary uses such as health and medical research activities, private hospitals, allied health, start-ups, innovation and creative industries, ancillary retail, visitor, carer and aged accommodation, in the right locations*
- *planning for infrastructure, improved access and urban amenity within and around the precincts.*[11]

Innovation is increasingly a process of convergence[12], in which collaboration, co-creation and commons (equally shared and available resources) support new ideas and new ways. Major city-shaping trends highlight the need for different types of space, high degrees of flexibility, multipurpose accommodation, significant improvements in connectivity, safe places at all times and an agile management system. The area's range of functions attract diverse groups of people at different times. Effective transport connections are also critical enablers of productivity.

Significant employment, knowledge and skills contributors in **Haymarket** activity node include the ABC; the Museum of Applied Arts & Sciences – the Powerhouse Museum; University of Notre Dame; TAFE NSW Ultimo; the SSE; the University of Technology Sydney; and the proposed renewal of Central Station and surrounding lands. Haymarket activity node will also benefit from developments across the University of Technology Sydney campus as part of its *City Campus Master Plan.*

Significant employment, knowledge and skills contributors in **Camperdown** activity node include RPA Hospital; the University of Sydney; the Professor Marie Bashir Mental Health Facility; RPA Institute Of Rheumatology & Orthopaedics; RPA Institute of Academic Surgery; RPA Surgical and Robotic Training Institute; Chris O'Brien Lifehouse; the Baird Institute; Brain and Mind Centre; Heart Research Institute; Sydney Health Partners; Centenary Institute of Cancer – Medicine and Cell Biology; George Institute for Global Health; Woolcock Institute of Medical Research; Australian Centre for Field Robotics; Sydney Nano; Microscopy Australia; Charles Perkins Centre; United States Studies Centre; and the Statewide Biobank research facility.

RPA Hospital will need to increase its capacity to serve the growing and ageing population in its catchment, including the new residents that will move to the area with renewal through the Parramatta Road Corridor Urban Transformation Strategy and around Eveleigh, The Bays Precinct, Green Square and Redfern-Waterloo. Redevelopment of RPA Hospital is likely over the next 20 years.

A Camperdown biotechnology hub – a home for innovative, incubator and research activities representing a synergy of health, education, technology and reinvention – is planned on Pyrmont Bridge Road. This could be a globally significant

11 Greater Sydney Commission *Eastern City District Plan* March 2018 p64
12 Julie Wagner, Brookings Institution

Figure 5: Productivity opportunities and assets

Health, education and research anchors

Innovation ecosystem

biotechnology hub, connecting with the existing research cluster and biomedical innovation institutions.

Camperdown activity node will benefit from potential redevelopment opportunities on the University of Sydney's campus. Current development includes the Chau Chak Wing Museum, the co-location and consolidation of the Macleay Museum, Nicholson Museum and University Art Gallery; redevelopment of the University's teaching and research building to accommodate the relocated Faculty of Health Sciences, Faculty of Nursing and Midwifery and Central Clinical School; development of the University's Life, Earth and Environmental Sciences teaching and research building and the new administration building (F23), which will create a new gateway at the City Road entrance; and development of the Faculty of Engineering and IT and Faculty of Arts and Social Sciences teaching and research buildings.

Camperdown and **Eveleigh** activity nodes, along the Darlington axis, will also benefit from development of the University of Sydney's Regiment student accommodation; and redevelopment of its Darlington Terraces student accommodation.

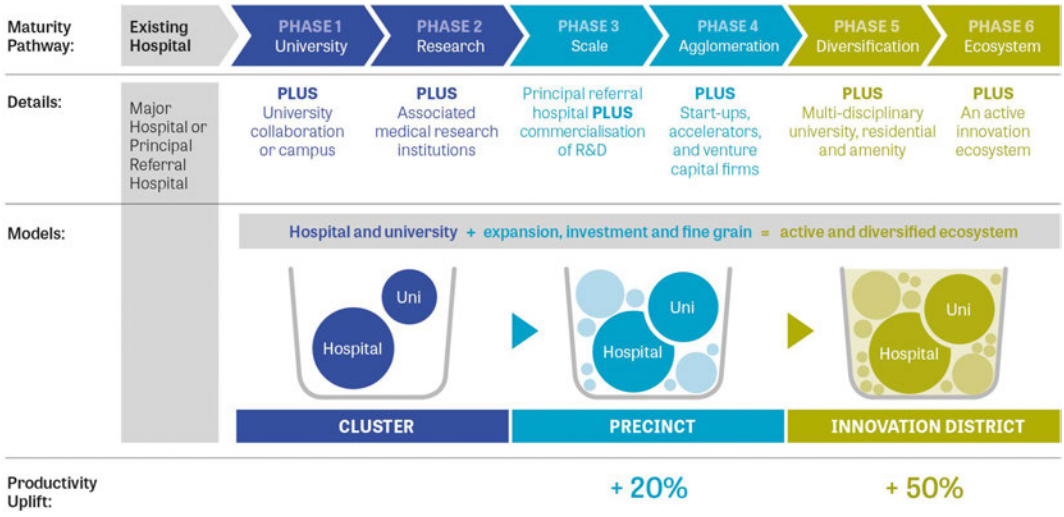
Significant employment, knowledge and skills contributors to Eveleigh activity node include ATP, which is being redeveloped; CSIRO Data61; Cicada Innovations; and Carriageworks. Urban renewal is planned in Redfern and North Eveleigh.

Industries

Higher education and research is a strong industry in all three activity nodes, and creative industries are stronger in Haymarket and Eveleigh. Health and education precincts evolve and progress along a 'maturity pathway' (see Figure 6). As precincts evolve, the economic productivity of the precinct increases substantially. This Place Strategy facilitates the area's continuing maturity as an innovation district, which benefits from the multiplier effect of innovation and creative industries, and tech start-ups. Improved connectivity, both physical and virtual, will assist growth.

A location quotient (LQ) is a way of identifying the main industries in an area, compared to a wider region. A LQ of 1.5 or over identifies a concentration of related industries with a level of specialisation and potential future opportunities. However, the proportional economic share that industry represents is also relevant (for example,

Figure 6: Maturity pathway for health and education precincts



if an industry is specialised but only represents three percent of the local economy, it may not be significant).[13]

Self-sufficient, specialised and highly specialised industries in the Collaboration Area include:

Traded clusters (groups of related industries that serve markets beyond the area where they are located):

- health and education industries with a location quotient (LQ) of 6.09 (highly specialised)
- media and telecoms industries with an LQ of 5.51 (highly specialised)
- creative industries with an LQ of 3.58 (highly specialised)
- finance and professional services with an LQ of 1.27 (self-sufficient)
- tourism with an LQ of 1.10 (self-sufficient)

Local clusters (groups of related industries that primarily serve the local area market):

- public administration with an LQ of 1.67 (specialised).

Arts and creative enterprises and industries includes small-scale, informal activity through to large institutions such as Carriageworks.

Innovation

The City of Sydney's *Tech Startups Action Plan* identifies how the City can support entrepreneurs, with 'tech start-ups' considered those innovative, new businesses based on technology and designed for fast growth. The Action Plan aims to create a knowledge-based, innovation-driven business ecosystem and highlights the importance of access to entrepreneurship information, mentors and investors.

Planning for the Sydney Innovation and Technology Precinct, extending from Central Station to Eveleigh, was announced by the NSW Government in August 2018. This is an ideal location for technology firms to attract and retain Australian and international talent. The NSW Premier has established a panel, which includes Atlassian, Fishburners, TechSydney, the University of Technology Sydney and University of Sydney, along with state and local government representatives.

> *"This will cement Sydney as the technology capital of Australia and create more secure jobs. Central to Eveleigh is already home to Australia's largest cluster of start-up firms. We want to use that as a base to grow new jobs and new businesses."*
>
> *Premier of NSW, Gladys Berejiklian*

Forecast jobs growth, as outlined earlier, is likely to be a conservative estimate, given the potential that that may be identified through a broader Collaboration Area economic development strategy and the panel's analysis of technology and innovation opportunities. The City of Sydney's *Central Sydney Planning Strategy* proposes expanding the geographic boundaries of Central Sydney to include areas around Ultimo, the University of Technology Sydney and Central Station to maximise growth opportunities. It aims to stem the loss of employment floor space so that as the city grows, new employment floor space can meet demand for jobs.

The *Central Sydney Planning Strategy*, *Tech Startups Action Plan*, and new panel may be able to influence the loss of employment spaces, especially affordable spaces, to support the health, education, research, innovation and creative sectors. While Action 51 of the *Eastern City District Plan* focuses on the loss of industrial lands through conversion to residential uses, loss of space for employment activities in the Collaboration Area is happening more in mixed-use areas adjacent to the commercial and business zones. Planning mechanisms should limit residential and serviced apartment floor space and protect employment activities and uses in these areas while ensuring available floor space to support scaleups to

13 id: the population experts https://blog.id.com.au/2014/how-to/what-is-a-location-quotient-and-how-do-i-calculate-it/

reach commercial aspirations.

Planning and strategy

An economic development strategy is required to develop a richer understanding of how the area functions – its drivers, partnerships and influences. This will guide decision-making by:

- identifying existing and emerging industry sectors, particularly those with high LQs that add economic value
- detailing the main drivers of the Collaboration Area's economy, and mapping the complex system of industry growth
- considering the lifecycles of economic clusters and support responses, while recognising key economic opportunities
- encouraging the night-time economy
- identifying how to maintain a diversity of jobs and industries.

This could guide the curation of businesses and activities to achieve the benefits of co-location, including research (for instance, at the proposed biotechnology hub). The strategy will also inform stakeholder advocacy for investment in landmark research facilities aligned with key research and education priorities.

Students and residents

Students could get involved as a partnership project with the University of Sydney and councils collaborating on an academic analysis of economic clusters. Defining the Collaboration Area's baseline economy will support effective strategies and subsequent monitoring.

Connections between international and local students bring together different cultures and knowledge for innovation and creativity. International students can share information and promote the Collaboration Area through connections with innovation precincts in other countries – becoming brand ambassadors for the Collaboration Area as they move to international locations following graduation.

International students also contribute to the area's cultural diversity and strengthen the international links to Greater Sydney as a global city. The City of Sydney's *International Education Action Plan* complements initiatives and agreements with the universities and other partners.

Contributions to the local economy, especially tech start-ups, can also emerge from residents' connections and innovations. There may be future possibilities for a shared 'maker space' for residents in the area.

Broader thinking

There may also be opportunities to align with the planning for other metropolitan and strategic centres and health and education precincts along Sydney Metro West through a Sydney Metro West corridor economic development strategy. Initiatives that link industry, researchers and investors, and encourage collaboration and interaction increase the value-add and economic benefit for the Collaboration Area and beyond.

7.2 Priorities and actions

The following priorities and actions are important to achieving the vision for the Camperdown–Ultimo Collaboration Area, while also giving effect to *A Metropolis of Three Cities* and the *Eastern City District Plan* (including its planning priorities and actions).

Priority 7
Cultivate an internationally competitive health, education, research and innovation area

Outcome
Additional economic and social contribution to NSW through new jobs and new industries; increased investment in small scale and start up enterprises; and enhanced medical innovation and health services.

Actions	Primary stakeholder	Supporting stakeholder
Action 22: Prepare and implement an economic development strategy that: • reinforces the strengths and local identity of Haymarket, Camperdown and Eveleigh activity nodes and the Ultimo, Darlington and Surry Hills connecting axes • retains existing and attracts new businesses and industries, including cultural and creative industries and artists • links industry, researchers and investors; and encourages their collaboration and interaction • supports convergence, attracts tech start-ups, encourages research and innovation clusters, and supports scaleups to reach commercial aspirations • builds the entrepreneurial, business and commercial skills of talented people • attracts investment and drives jobs growth • supports commercialisation and translation of research into practice • improves the destination experience and grows the Collaboration Area's global economic prosperity	Collaboration Area Leadership Group	DoI, CoS, IWC, Create NSW, all stakeholders
Action 23: Enhance medical innovation, research and health services by supporting future growth of RPA Hospital to service increased population growth	NSW Health	SLHD
Action 24: Provide spaces and events to encourage local and international student connections, networking and innovation and increase commercial outcomes	UTS	USyd, UND
Action 25: Encourage the recruitment and retention of talented people by promoting the Collaboration Area's world-leading research and anchor institutions and providing ongoing support	Collaboration Area Leadership Group	All stakeholders

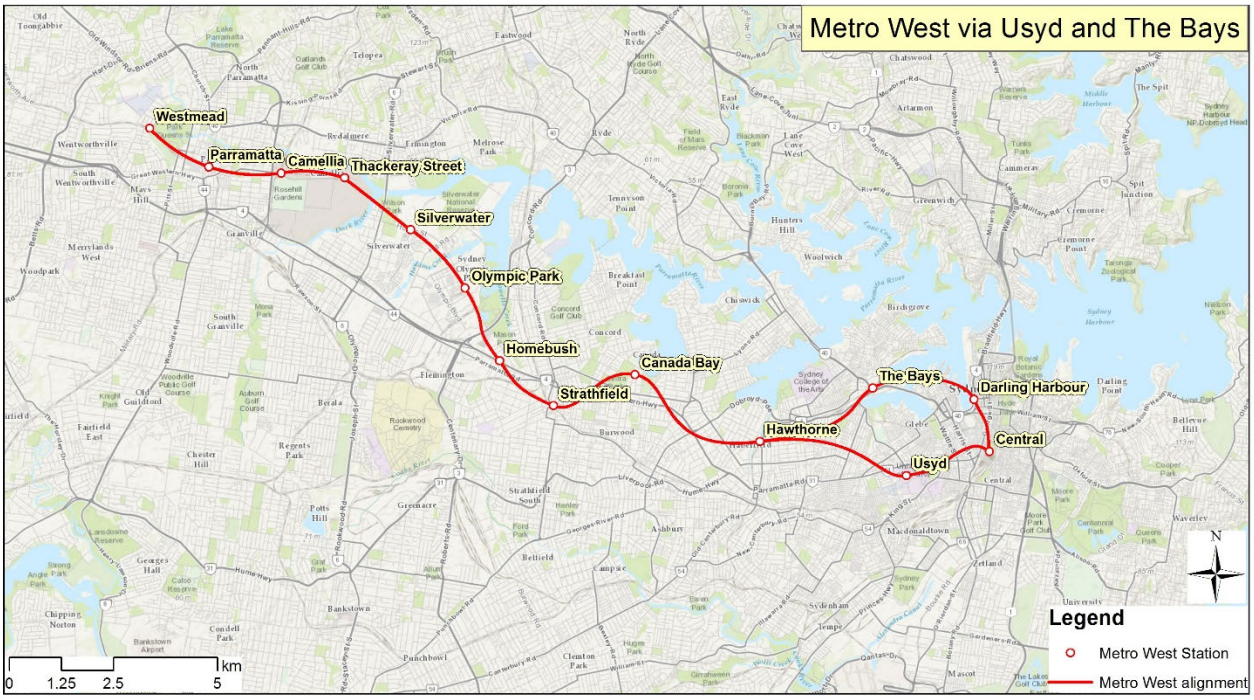
Priority 8
Support the role and function of employment lands

Outcome
Potential for high growth and new investment through continued growth in jobs, new industries, innovation enterprises and tech start-ups, and service industries.

Actions	Primary stakeholder	Supporting stakeholder
Action 26: Retain and manage commercial and business activities, particularly small businesses and tech start-ups, by safeguarding business zoned land from conversion that allows residential development	CoS, IWC	DPE, Collaboration Area Leadership Group
Action 27: Establish a biotechnology hub in Camperdown activity node (Parramatta Road, Mallet Street and Pyrmont Bridge Road area), and safeguard innovative, incubator and research activities from unrelated commercial land uses through planning controls	IWC	DPE, NSW Health, SLHD, USyd & UTS
Action 28: Advocate for and deliver a minimum percentage requirement for affordable space in developments for tech start-ups, innovation, creative industries, cultural uses, community uses and artists within and beyond the Collaboration Area	CoS, IWC	DPE, Collaboration Area Leadership Group

Attachment 4

Metro West via USyd and The Bays: Patronage Forecasts and Benefit-Cost Analysis



8 June 2017

Prepared for

Campus Infrastructure Services
The University of Sydney

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1. Executive Summary

Objectives: The modelling work reported herein aims to quantify the benefits, costs and economic impacts of a Metro West that goes via both The Bays and The University of Sydney. Two alignments are proposed and their BCRs and economic impacts are compared with those of the optimum alignment that goes via the University at the Oval.

Methodology: All the modelling work and economic evaluations are undertaken using the MetroScan software developed by the Institute of Transport and Logistics Studies (ITLS) at The University of Sydney, in partnership with the Economic Research and Development Group (ERDG) based in Boston. Assumptions and inputs are exactly the same as those used in the previous submission.

Modelling Results: Of the two additional Metro West alignments that serve both The Bays and The University, the first connects Parramatta/Westmead with The Bays via the University and Central station (i.e., referred to as the Spur Model), has a greater Benefit-Cost Ratio, and generates significantly more agglomeration benefits and jobs with appropriate wage growth. Compared to the optimum alignment identified in the previous submission, however, these two additional alignments both have a lower benefit-cost ratio (BCR) (1.72 and 1.96 vs. 2.11). The Spur Model generates more benefits, but it also costs more to build due to longer tunnelling requirements. The table below summarises the total benefits, costs and jobs created in 2036 for the three alignments of the Metro West.

Summary of the BCA and EIA results for alternative alignments of Metro West

	Heathrow Model	Spur Model	USyd at Oval
NPV of Benefits ($m)	6,228	7,340	6,806
NPV of Cost ($m)	3,629	3,738	3,223
Net Benefit ($m)	2,600	3,602	3,584
BCR with Wider Economic Benefits (WEB)	1.72	1.96	2.11
WEB mark-up (%)	4%	17%	11%
Number of jobs created in 2036	7,036	7,288	5,779

1. Background and Objectives of the Report

Further to The University of Sydney's submission to the Greater Sydney Commission for a Sydney West Metro station at its campus, the University has engaged ITLS to carry out further analysis to understand options which include both a University station and one at the Bays. The following two route options are shortlisted for the current modelling work:

(i) Option 1: Routing Metro West via both USyd and The Bays in an alternate model similar to Heathrow airport, with every second train from Parramatta servicing one area (i.e., alternating the services via the Bays and the University)
(ii) Option 2: Routing Metro West from Westmead to the Bays via USyd and Central Station (train terminates at The Bays).

Figure 1 shows the alignment and stations of Option 1 and Figure 2 shows the same for Option 2.

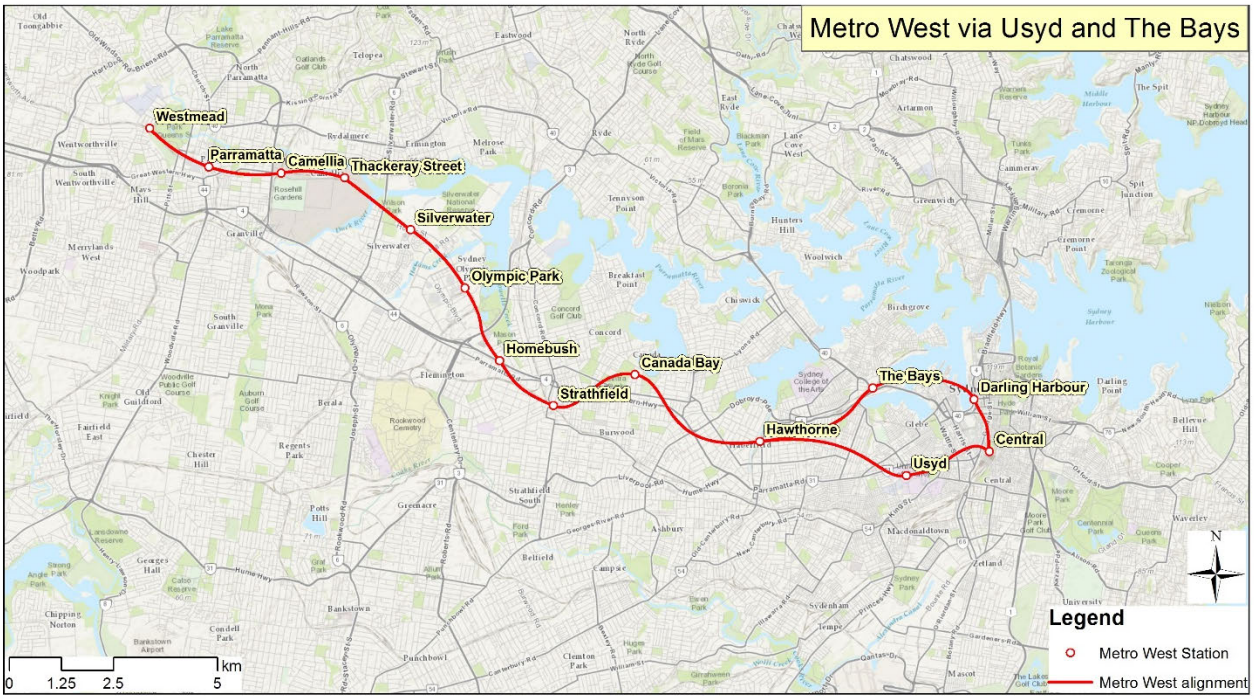


Figure 1. Route Option 1: Metro West via USyd and The Bays (the Heathrow Model)

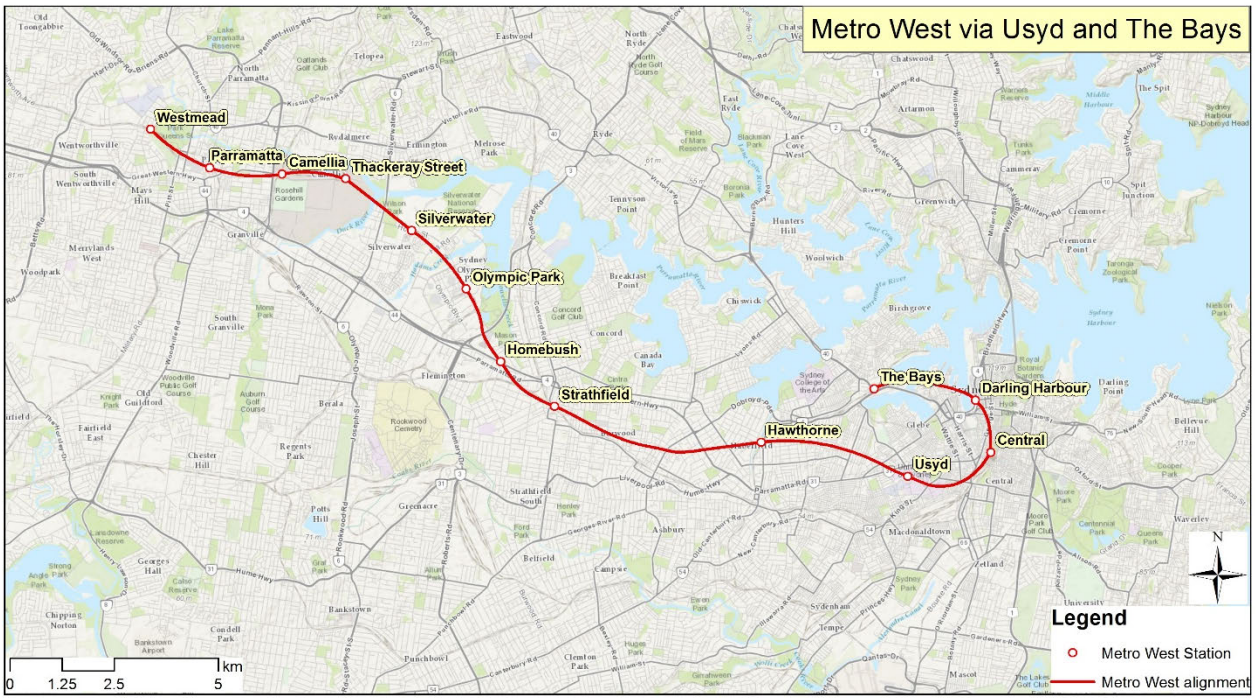


Figure 2. Metro West Route Option 2: Westmead to The Bays via USyd and Central (the Spur Model)

This report summarises rail patronage forecasts in 2036 at an aggregate level (i.e., Statistical Local Area) as well as Benefit-Cost Analysis (BCA) and Economic Impact Analysis (EIA) results. In doing so, we run a full application of MetroScan-TI – an integrated planning tool developed by the Institute of Transport and Logistics Studies (ITLS) – and employ the same assumptions/inputs as described in the previous report dated 21 March 2017.

2. Patronage Forecasts

This section presents the MetroScan patronage forecast for the two options of the Metro West Link and compares the scenarios against the base (i.e., no Metro West) and other route options examined in the previous work. Only aggregate results are reported here to identify the impact of the Metro West on network patronage and model share, as well as change to travel demand in and out of the Central District.

2.1 Impact of the Metro West on network patronage

Table 1 provides the forecast number of motorised trips generated in the Sydney Greater Metropolitan Area (SGMA) on an average weekday in 2036 for Route Option 1 and Option 2, and compares these two options against the optimum Metro West alignment via USyd at the Oval which was submitted to the GSC. As can be seen in the last row of Table 1, the impact of the Metro West on induced demand, represented by an increase in Total Trips between the Base and the Scenarios, is very small. The main impact is modal shift (i.e., switching from one mode to another). Figure 3 shows this switching effect for all alternative alignments, compared to the base. Overall, alternating Metro West via the University and The Bays in a model similar to the Heathrow airport is predicted to increase train trips by 38,000 trips/day while reducing car trips by 33,800 trips/day (27,300 Drive Alone trips + 6,500 Shared Ride trips). The impact on modal shift is larger under Route Option 2, which connects Westmead/Parramatta and The Bays via the University and Central station.

Table 1 Daily trips by mode in 2036 within the SGMA: Impact of the Metro West and alternative alignments

Daily trips by	No Metro West (Base)	Option 1 (Heathrow Model)	Option 2 (Spur Model)	via Usyd @ Oval
Train	1,057,118	1,095,187	1,099,355	1,091,931
Bus	556,882	552,675	552,219	553,051
Drive alone	10,503,036	10,475,739	10,472,790	10,478,136
Shared ride	4,459,492	4,453,010	4,452,254	4,453,482
Total trips	**16,576,529**	**16,576,610**	**16,576,618**	**16,576,600**

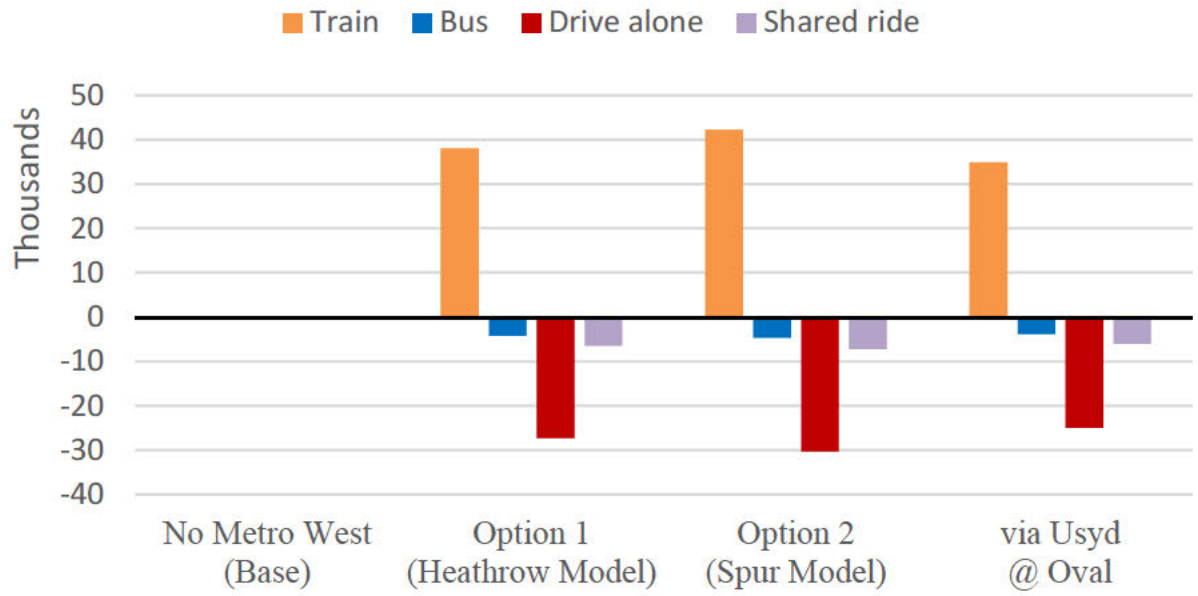


Figure 3 Impact of Metro West on daily trips in 2036: a comparison of alignments

2.2 Impact of the Metro West on the Central District

Focusing on the Central District, the two route options are forecast to increase train trips to/from the Central District by 53,600 (the Heathrow Model) and 60,000 (the Spur Model) trips per day, compared to an increase of 50,000 trips per days if going via the University at the Oval. Conversely, car trips (including drive alone and shared ride) to/from this area are estimated to reduce by 20,380 to 22,900 trips per days (see Figure 4).

Table 2 Daily trips to/from Central District in 2036: Impact of the Metro West and alternative alignments

	No Metro West (Base)	Option 1 (Heathrow Model)	Option 2 (Spur Model)	via Usyd @ Oval
Train	874,445	928,087	934,370	924,755
Bus	534,534	528,322	527,643	528,817
DA	3,189,950	3,172,831	3,170,806	3,173,624
SR	1,237,564	1,234,301	1,233,823	1,234,185
Total	**5,836,492**	**5,863,541**	**5,866,642**	**5,861,382**

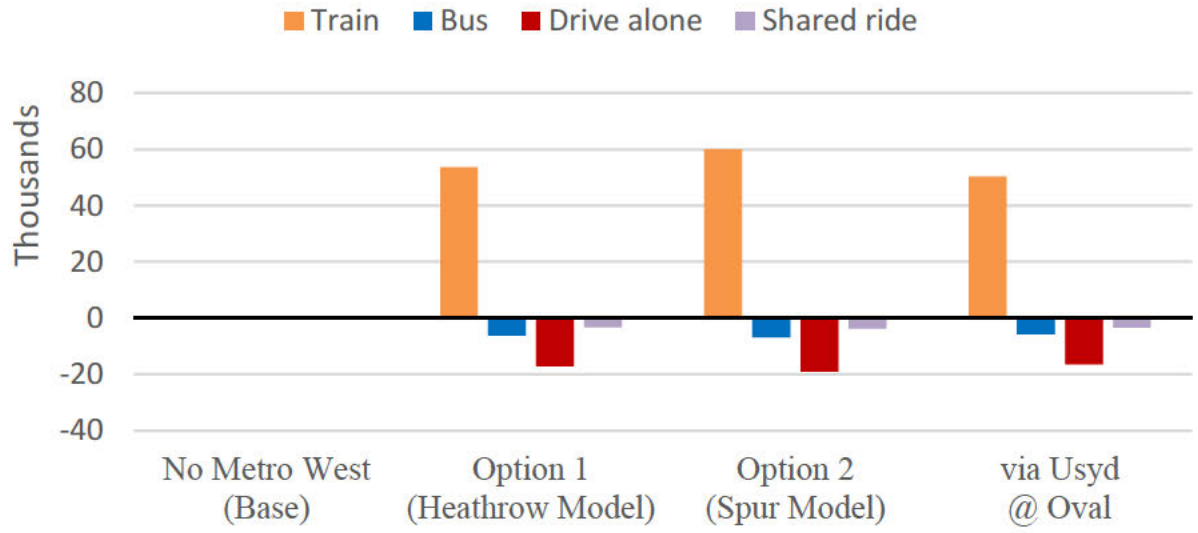


Figure 4 Changes to daily trips to/from Central District in 2036 due to Metro West

2.3 Employment agglomeration and social accessibility impacts of Metro West

Figure 5 show the employment agglomeration effect of Metro West for the alternative alignments. Routing Metro West via both USyd and The Bays in an alternate service (the Heathrow Model) or a continuous service (the Spur Model) combines the agglomeration benefits from the two alternative alignments which travel via either The Bays or the University. This can be seen in Figure 5 by comparing the agglomeration benefits across different Metro West Route Options for Sydney South, Lower North, Eastern Suburbs, and Leichardt Statistical Local Areas (SLAs) where the differences are most clear.

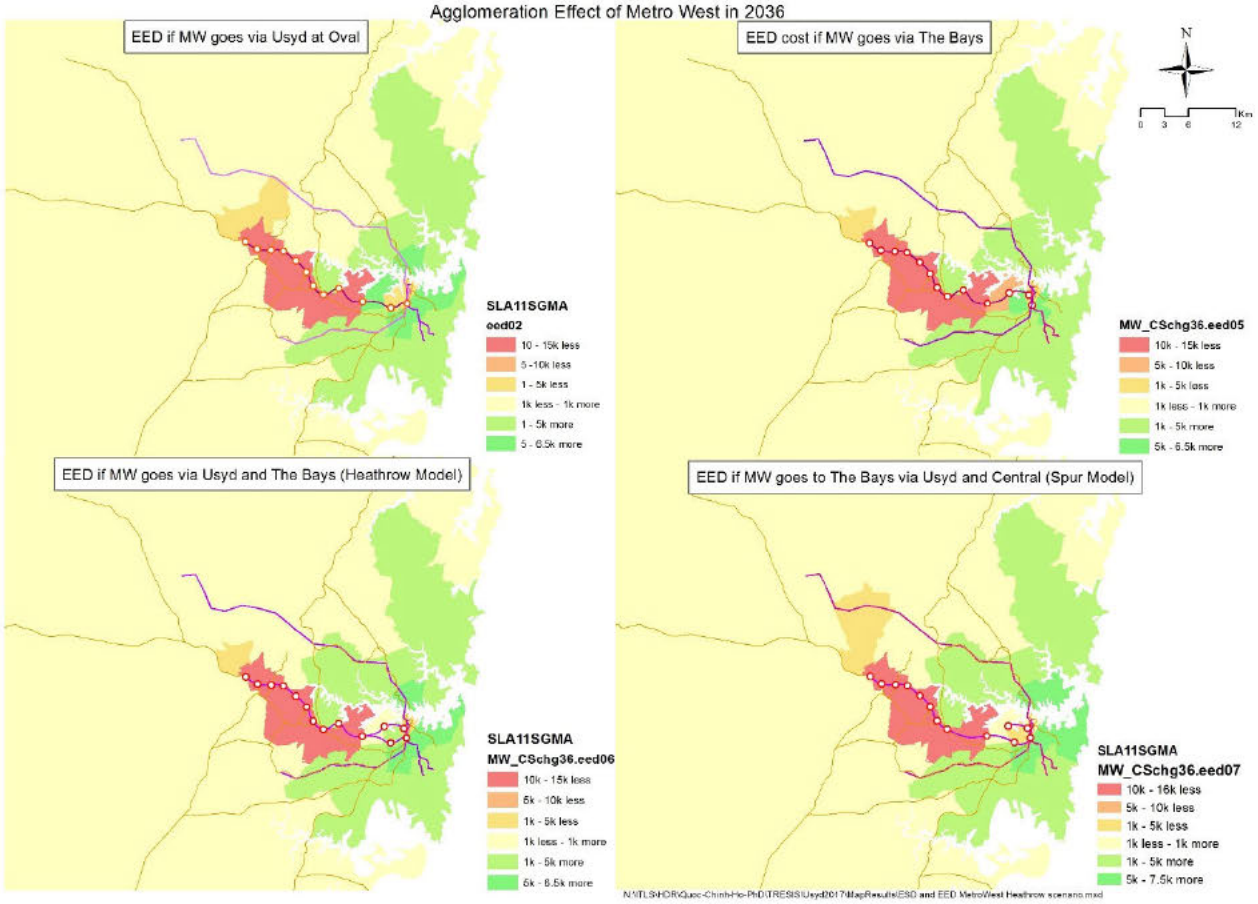


Figure 5 Employment agglomeration benefits of Metro West

2.4 Impact of Metro West on work location and job growth

Figure 6 shows MetroScan forecasts of filled jobs (i.e., employment numbers) by SLA of the Central District in 2036 for the do nothing scenario and how different Metro West alignments will allow different SLAs to grow employment numbers. We focus on the Sydney West SLA where the University and the Health Precinct are based, and Leichardt SLA where the Technology and Innovation Hub is earmarked. As can be seen in Figure 6, routing Metro West via both The Bays and The University has much merit in terms of providing support for the Sydney CBD, Sydney West and Leichardt to grow employment numbers by increasing connectivity.

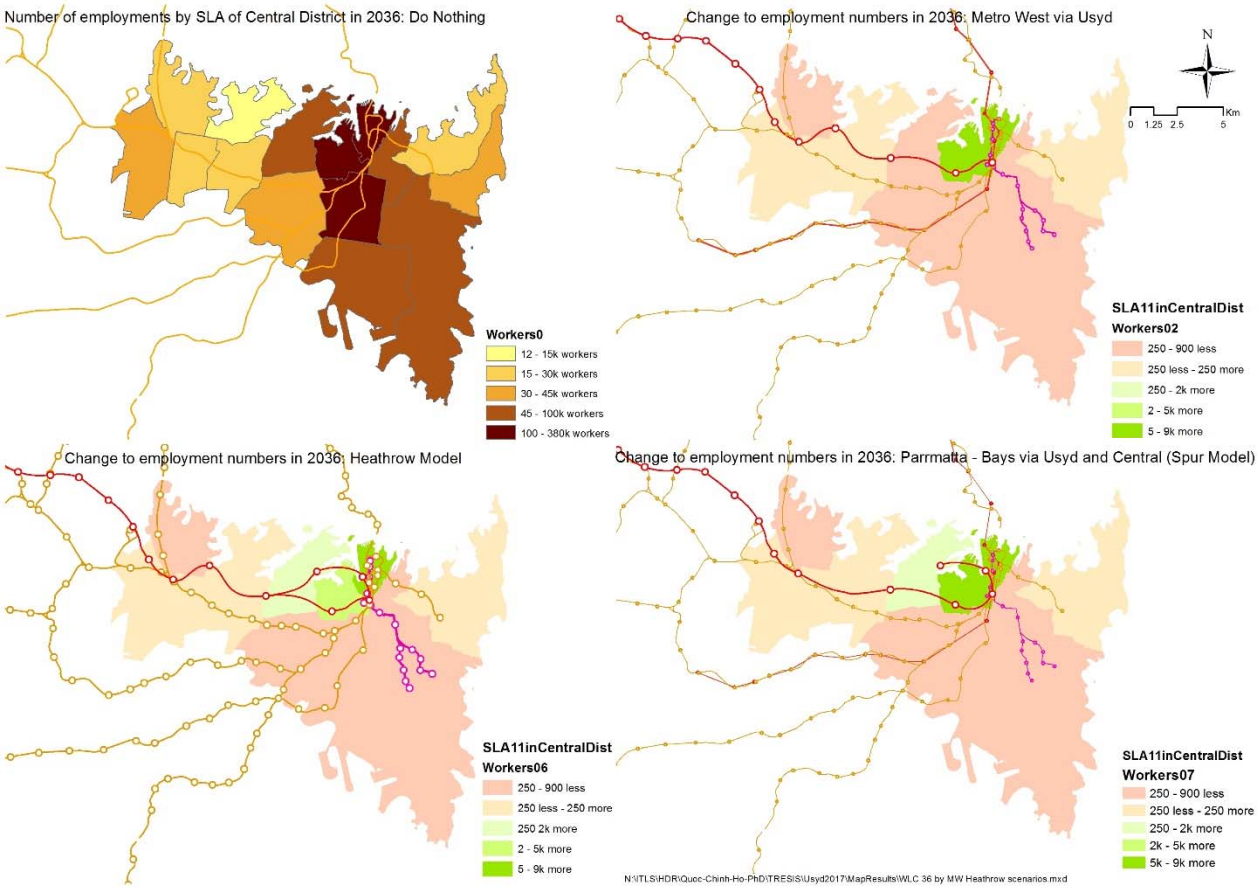


Figure 6 Predicted employment numbers in 2036 and the impact of Metro West

3. Benefit - Cost and Economic Impact Analyses

Similar to the previous report dated 21 March 2017, we report herein two sets of BCA and EIA results, assuming two different tunnelling costs of $120 m per km (same as the Southwest Metro) and a higher tunneling cost of $220 m per km tunneling. Annual maintenance and operation costs are assumed to be the same as the City-Southwest Metro.

3.1 Option 1: The Heathrow Model

Table 3 presents the CBA results of the Metro West that alternates its services via The University and The Bays in a model similar to Heathrow airport. Interpretation of the results are straightforward with a note that the present values are in $2016 units. In evaluating the Metro West, we use a standard discount rate of 7% and two different tunnelling costs. Table 3 shows that Route Option 1 has a BCR range between 1.06 and 1.72, depending on the tunnelling cost assumed and the benefits accounted for (travellers benefit only, or also including environmental and wider economic benefits). A higher tunnelling cost results in a higher wider economic benefit but also a much higher construction cost, and hence lower BCRs.

Table 3 Benefit – Cost Analysis results of Metro West via The Bays and USyd in an Alternate Model

Mero West via The Bays and Usyd2	7% discount rate ($M) $120m/km tunnelling	7% discount rate ($M) $220m/km tunnelling
Present Value of Benefit Stream	6,228	7,184
Travel Benefits	5,904	5,904
Value of Vehicle Operating Cost (VOC)	1,054	1,054
Value of In-Vehicle Travel Time (IVTT)	-693	-693
Value of Out-of-Vehicle Travel Time (OVTT)	0	0
Value of Improved Travel Time Reliability	5,483	5,483
Value of Safety Improvement	61	61
Value of Consumer Surplus From Induced New Activity	0	0
Environmental and Social Benefits	130	130
Value of Emission Reduction For Mobile Source Pollutants	21	21
Value of Emission Reduction For Carbon Dioxide	109	109
Wider Economic (Productivity) Benefits	277	1,150
Transfer Benefit Effects (net benefit adjustment)	-83	0
Present Value of Cost Stream	3,629	5,568
Project Costs	4,589	7,038
Capital Investment Costs	4,072	6,521
Operation and Maintenance Costs	517	517
Cost Adjustments	-960	-1,470
Residual Value of Capital Spending	-877	-1,388
Reduction in Effective Capital Cost Due to Added Fees Collected by Govt.	-83	-83
Net Benefit (Benefits - Costs)		
Transportation System Efficiency – Traveler Benefits Only	2,193	336
Traditional BCA – Traveler Benefits + Environmental Benefits	2,323	467
Full Societal BCA – All Benefit Categories	2,600	1,617
Benefit Cost Ratio (Benefits / Costs)		
Transportation System Efficiency – Traveler Benefits Only	1.60	1.06
Traditional BCA – Traveler Benefits + Environmental Benefits	1.64	1.08
Full Societal BCA – All Benefit Categories	1.72	1.29

Metro West also has a significant long-term economic impact, with Figure 7 showing that more than 6,000 jobs per year are created from 2026 when the Metro West is opened. The largest beneficiary by industry is Property and Business Services, which in 2036 is predicted to grow by about 1,800 jobs with very small differences in the number of jobs created between the two assumed tunnelling costs (see Figure 8). A significant increase in business output and wages is also predicted as a result of the Metro West investment.

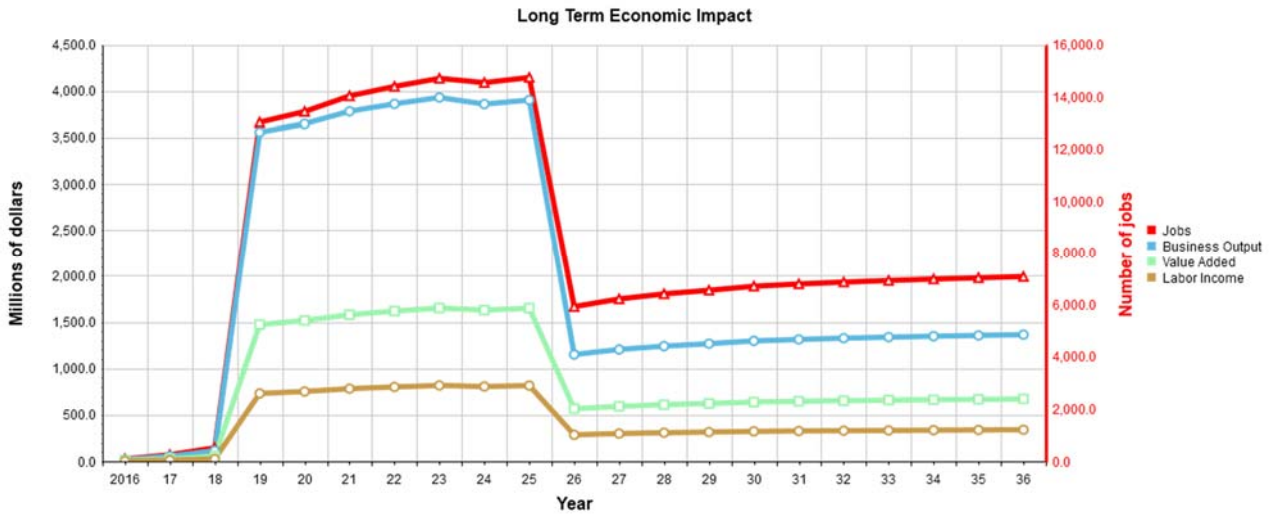


Figure 7 Economic Impact of the Metro West Option 1: Heathrow model assuming $220 m per km tunnelling

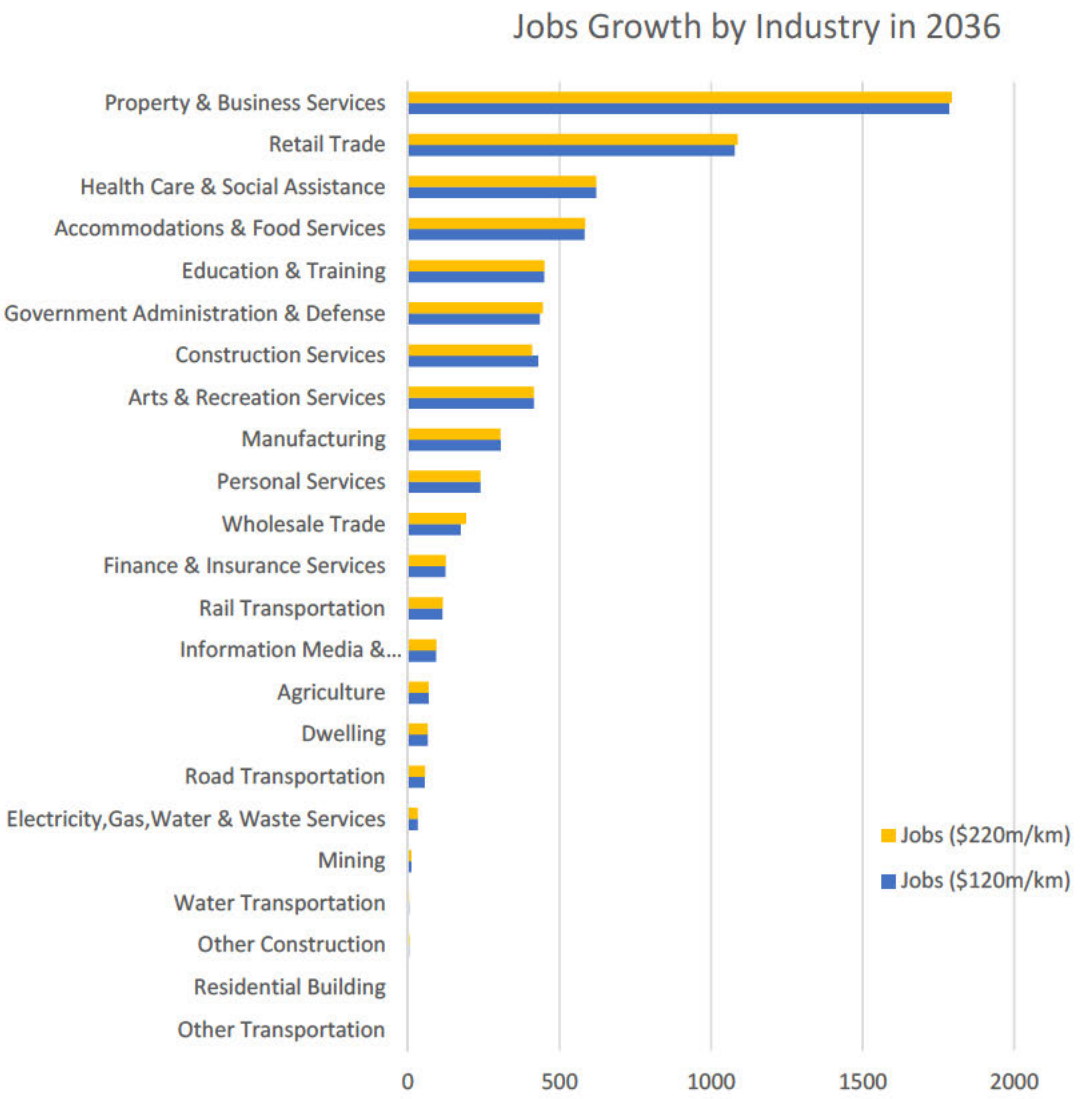


Figure 8 Number of jobs by Industry created in 2036 by Metro West Option 1: Heathrow model

3.2 Option 2: Metro West goes to The Bays via USyd and Central

In exactly the same way as described in section 3.1, this section reports the BCA and EIA results of the Route Option 2 which connects Parramatta/Westmead with The Bays via The University and Central.

Table 4 Benefit – Cost Analysis results of Metro West via the Bays

Parramatta - The Bays via Usyd and Central (Spur Model)	7% discount rate ($M) $120m/km tunnelling	7% discount rate ($M) $220m/km tunnelling
Present Value of Benefit Stream	7,340	7,340
Travel Benefits	5,988	5,988
Value of Vehicle Operating Cost (VOC)	1,096	1,096
Value of In-Vehicle Travel Time (IVTT)	-674	-674
Value of Out-of-Vehicle Travel Time (OVTT)	0	0
Value of Improved Travel Time Reliability	5,499	5,499
Value of Safety Improvement	68	68
Value of Consumer Surplus From Induced New Activity	0	0
Environmental and Social Benefits	135	135
Value of Emission Reduction For Mobile Source Pollutants	22	22
Value of Emission Reduction For Carbon Dioxide	113	113
Wider Economic (Productivity) Benefits	1,216	1,216
Transfer Benefit Effects (net benefit adjustment)	0	0
Present Value of Cost Stream	3,738	5,419
Project Costs	4,691	6,728
Capital Investment Costs	3,998	6,035
Operation and Maintenance Costs	693	693
Cost Adjustments	-953	-1,309
Residual Value of Capital Spending	-861	-1,217
Reduction in Effective Capital Cost Due to Added Fees Collected By Govt.	-92	-92
Net Benefit (Benefits - Costs)		
Transportation System Efficiency - Traveler Benefits Only	2,251	569
Traditional BCA - Traveler Benefits + Environmental Benefits	2,386	705
Full Societal BCA - All Benefit Categories	3,602	1,921
Benefit Cost Ratio (Benefits / Costs)		
Transportation System Efficiency - Traveler Benefits Only	1.60	1.11
Traditional BCA - Traveler Benefits + Environmental Benefits	1.64	1.13
Full Societal BCA - All Benefit Categories	1.96	1.35

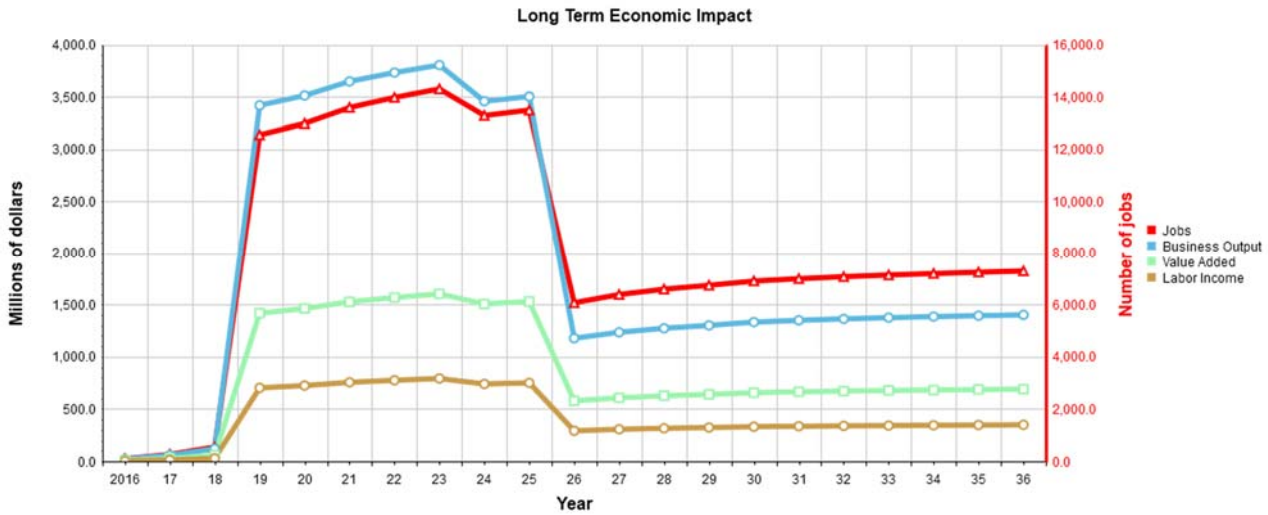


Figure 9 Economic Impact of the Metro West Route Option 2: the Spur Model

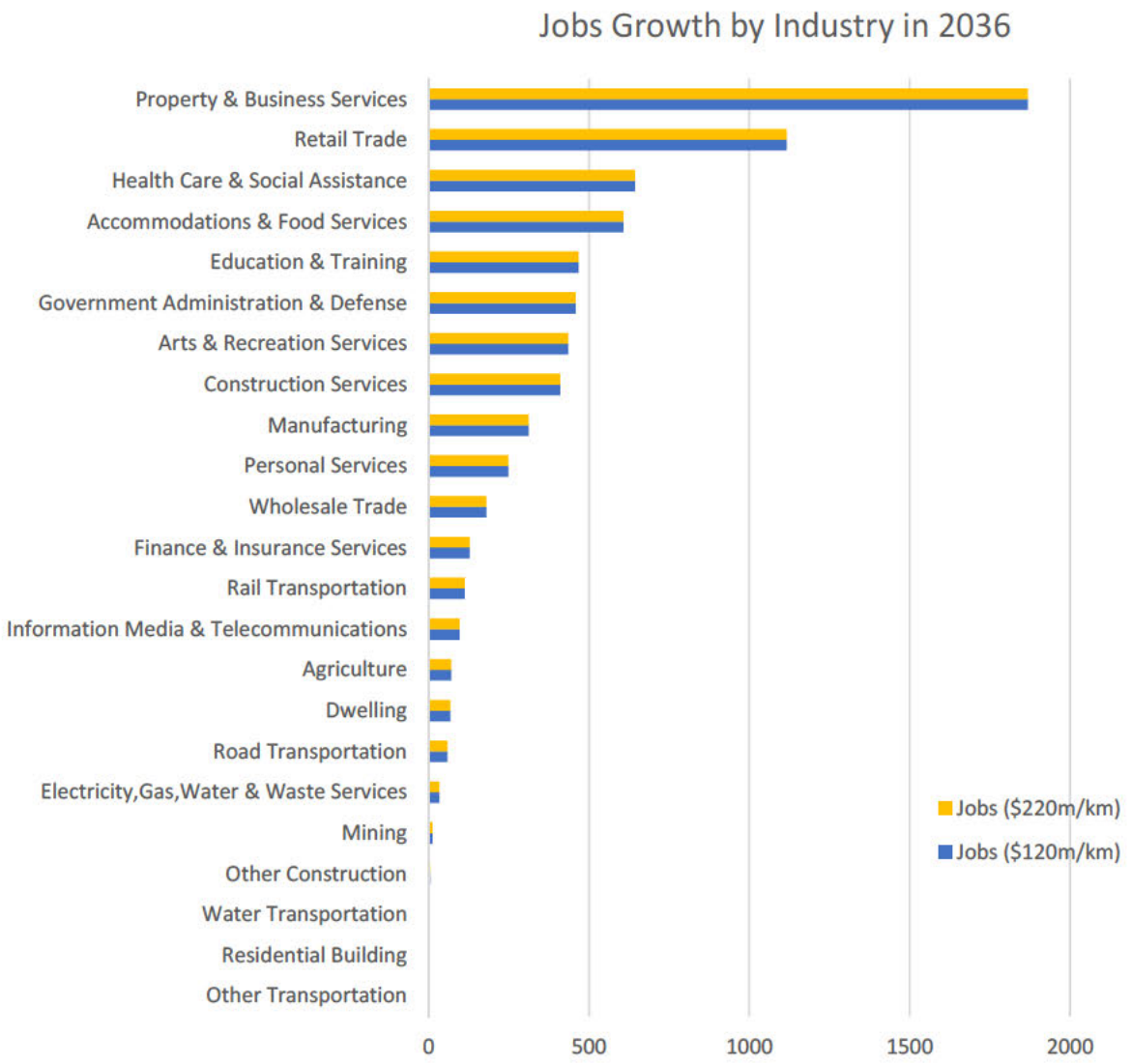


Figure 10 Number of jobs by Industry created in 2036 by Metro West Route Option 2: the Spur Model

8 Sustainability

8.1 Analysis of opportunities and impediments

The number of extreme weather events that require response services are increasing. As the city grows, more people and organisations need to understand risks and engage in building resilience in their local area.

Resilient Sydney – a strategy for city resilience 2018[14], developed in collaboration with 100 Resilient Cities, aims to strengthen the ability for Greater Sydney to survive, adapt and thrive in the face of increasing global uncertainty and local shocks and stresses. *Resilient Sydney* adopted the City Resilience Framework to assess the strengths and weaknesses of cities within four dimensions and 12 drivers. The four dimensions are:

- **health and wellbeing**: the essential city services that safeguard human health and diverse and secure livelihoods
- **economy and society**: the social and financial systems that enable urban populations to live peacefully, and act collectively
- **infrastructure and environment**: the way in which built and natural assets provide critical services and protect residents
- **leadership and strategy**: effective leadership and management, empowered stakeholders and integrated planning.

Resilient Sydney identifies five directions and 35 actions, including one flagship action for each direction, to build resilience in Sydney. It informs and guides the sustainability actions in this Place Strategy (with cultural identity included in the Liveability chapter, consistent with the *Eastern City District Plan*).

Resilient Sydney notes that *Local government plays a vital role in risk management and emergency prevention, preparedness, response and recovery. They connect local communities to other organisations and agencies in times of disruption, but they need support to integrate with critical infrastructure providers, run exercise scenarios and help our communities prepare.*

The Office of Emergency Management (OEM) has initiated a pilot Disaster Preparedness Program to build resilience across NSW. The program focuses on building awareness of disaster resilience issues and responsibilities through emergency risk assessments, emergency exercise planning and general emergency management training.

Councils and State agencies must continue to work with the community to build their resilience and wellbeing during periods of significant growth and change.

14 *Resilient Sydney – A strategy for city resilience 2018*

Figure 7: Greater Sydney Green Grid and open space opportunities and assets

Green spaces

The Camperdown–Ultimo Collaboration Area's green spaces and parks include:

- Victoria Park (nine hectares) where community events such as Yabun Festival (an annual celebration of Aboriginal and Torres Strait Islander cultures held on 26 January) and Fair Day (a family and dog-friendly fundraiser for the Sydney Gay and Lesbian Mardi Gras) take place
- Prince Alfred Park (7.5 hectares) with a transformation that was awarded the NSW medal at the Australian Institute of Landscape Architects state awards in December 2013
- Belmore Park, Camperdown Park, Camperdown Memorial Rest Park, Mary Ann Street Park, McKee Street Reserve, Peace Park, Hollis Park and Green Bans Park
- significant green space at the University of Sydney, which can be accessed by the community.

Councils create and implement strategies that reinforce a place's local character and identity, enable shared access to spaces and integrate the Greater Sydney Green Grid (see Figure 7).

Waterways

The Collaboration Area sits primarily within the Port Jackson Basin, which drains to Sydney Harbour. The area lies across four local catchment areas – Darling Harbour, Blackwattle Bay, Johnstons Creek and Alexandra Canal. Urbanisation means there are not many natural creeks or open surface water bodies in the catchment areas to accommodate stormwater. While rainwater is generally managed by conventional pits and pipe systems, the combination of steep and flat terrain and high density residential, commercial and industrial areas means some places are susceptible to flash flooding. The City of Sydney has floodplain risk management plans for the four catchments.

Tree canopy

Tree canopy cover across the Collaboration Area varies. While more established and unchanged residential areas still have large street trees, redeveloped residential, business and commercial areas have fewer trees along the streets or on private land. A major city-serving road such as Broadway has minimal tree canopy. There are opportunities to reduce heat island effects, improve connectivity, health and amenity, and encourage safe walking and cycling, by providing shaded, tree-lined corridors that link open space areas and parks.

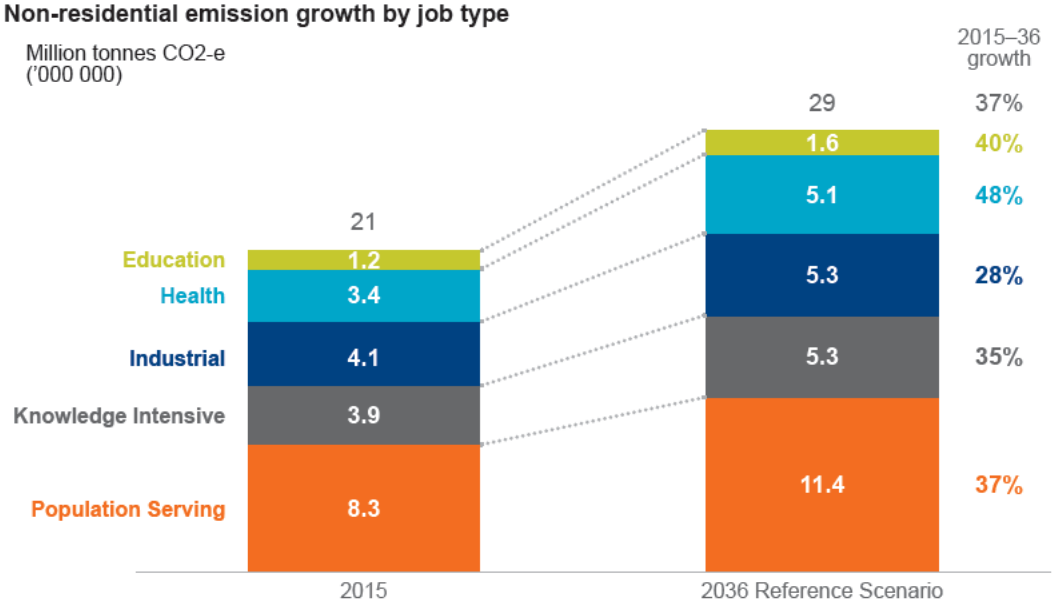
The City of Sydney's Liveable Green Network aims to create a pedestrian and cycling network that connects people with centres, transport, entertainment, cultural precincts, parks and open spaces.

Energy use

A recent Commission study[15] demonstrates how place-based emission-saving interventions can support the NSW Government's long-term objective of net zero emissions by 2050:

- Land use, transport and infrastructure planning interventions in Greater Sydney can reduce overall emissions from energy, residential transport and waste by 50% by 2036. These interventions include government and market-led strategies across building standards, renewable energy, transport infrastructure and increased waste diversion.
- Placed-based interventions must respond to local land use, infrastructure and transport patterns, given that strategic centres, renewal corridors, collaboration areas and planned precincts will have a greater influence than other areas in reducing Greater Sydney's emissions due to the opportunities of coordinated infrastructure delivery (for renewable energy and transport).

Figure 8: Greater Sydney non-residential greenhouse gas emissions by job type



15 Kinesis *Exploring Net Zero Emissions for Greater Sydney* 2017

Electricity is the major source of emissions in health and education job types, whereas emissions in residential multi-unit areas are caused by electricity, followed by transport, gas and waste.

Figure 8 shows projected emission growth to 2036 by type of job.

Land use, transport and infrastructure planning policy can help to reduce greenhouse gas emissions through:

- planning controls and design standards
- integration of renewable energy in master planning
- improvements to transport access
- parking strategies
- increased waste diversion from landfill, with a focus on waste minimisation.[16]

The *Eastern City District Plan* (Action 74) aims to establish low-carbon precincts in Collaboration Areas.

Anticipated growth will require investment in energy, water, waste and transport infrastructure and new buildings. This creates an opportunity to invest in low-carbon high efficiency measures at the precinct scale, particularly as infrastructure is renewed or replaced. New buildings should be designed as smart green assets and appropriately sized and shared utility infrastructure installed to lower greenhouse gas emissions from the Collaboration Area.

Precinct-wide energy, water and waste efficiency solutions can replace inefficient infrastructure to enable new utility models and technologies.

Contributions to local sustainability can also emerge from residents' connections and innovations. This could be made possible through community engagement in 'living lab' research programs.

8.2 Priorities and actions

The following priorities and actions are important to achieving the vision for the Camperdown–Ultimo Collaboration Area, while also giving effect to *A Metropolis of Three Cities* and the *Eastern City District Plan* (including its planning priorities and actions).

Priority 9
Enhance the network of high quality open and public space linked by the Greater Sydney Green Grid

Outcome
Liveable and sustainable shared resources, active people, and a cooler Collaboration Area.

Actions	Primary stakeholder	Supporting stakeholder
Action 29: Identify, prioritise and implement projects that enhance the Liveable Green Network and Greater Sydney Green Grid, increase tree canopy cover and vegetation, encourage health and activity, and optimise access to multi-use, shared green spaces, including: • Broadway and Parramatta Road • City Road • Harris Street and the Powerhouse Precinct • the Johnston's Creek Green Grid cycling and pedestrian connection to Bicentennial Park	CoS, IWC	TfNSW, RMS
Action 30: Promote community use and activities in shared or public open spaces	CoS, IWC	All stakeholders

Priority 10
Create a resilient place

Outcome
An area prepared for stresses and shocks that builds the resilience of people and communities.

Actions	Primary stakeholder	Supporting stakeholder
Action 31: Identify partnership projects and research to direct low-carbon initiatives, improve energy, waste and water efficiency, and improve health outcomes through design excellence and best practice in building and public domain projects	Collaboration Area Leadership Group	CoS, IWC, all stakeholders
Action 32: Facilitate partnership research and innovation projects to support and inform the OEM's urban-based pilot Disaster Preparedness Program	UTS	CoS, IWC, OEM
Action 33: Investigate power and energy bank sharing; peer-to-peer trading; precinct solutions for energy, water, waste management, loading and servicing; and infrastructure investment and sharing	UTS	All stakeholders
Action 34: Investigate community engagement in 'living lab' research programs	USyd, UTS	All stakeholders

16 Kinesis *Exploring Net Zero Emissions for Greater Sydney* 2017

9 Governance

9.1 Analysis of opportunities and impediments

This Place Strategy requires a governance arrangement that gives industry, institutions and partners a gateway for interactions, investment and development. As the Collaboration Area process indicates, no single governance structure is responsible for the Camperdown–Ultimo Collaboration Area as a 'place' – many partners are responsible. The area requires a viable, efficient and effective governance structure.

While the NSW Government has influence over, and an effect on, this area, no frameworks commit the active participation of all stakeholders, including State agencies.

The stakeholder group has identified the governance framework in Figure 9 for consideration.

Figure 9: Governance framework

Potential working group projects

- Advocacy
- Branding and marketing narrative
- Economic Development Strategy
- Innovation and Technology Precinct
- Partnership projects
- Pilot projects (immediate)

The Collaboration Area does not have a global vision, branding or narrative. An agreed, cohesive story repeated by individuals and institutions will be more effective than a lone voice or two.

The evolution of the Collaboration Area into a mature innovation district relies on all stakeholders, as a cohesive group, to invest in its economic growth by:

- continuing to lead in core health, education and skills
- driving greater connectivity of ideas and talent
- growing intellectual property and research
- supporting entrepreneurship and commercialisation of research
- attracting investment and the brightest minds
- supporting small scale and start-up enterprises
- programming activities to grow skills, strengthen business and build networks
- being outward looking and inclusive
- cultivating jobs and new industries
- jointly promoting and marketing the Collaboration Area.

Action 14 in *A Metropolis of Three Cities* requires the Commission to develop indicators, in consultation with State agencies and councils. This process is underway. The Leadership Group will need to consider applying a place-based monitoring and evaluation framework for the Collaboration Area, which is aligned with the Commission's indicators for the region and district plans.

9.2 Priorities and actions

The following priorities and actions are important to achieving the vision for the Camperdown–Ultimo Collaboration Area, while also giving effect to *A Metropolis of Three Cities* and the *Eastern City District Plan* (including its planning priorities and actions)

Priority 11
Demonstrate leadership that is place-first, cohesive and collaborative

Outcome
A strong and cohesive leadership group drives the growth of the Collaboration Area.

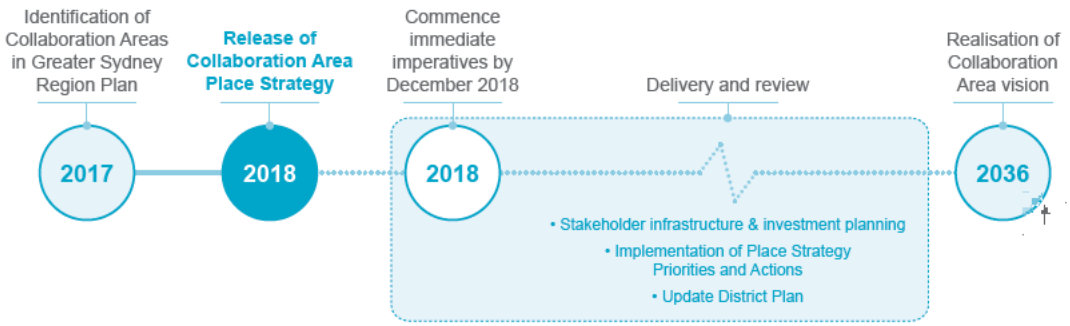
Actions	Primary stakeholder	Supporting stakeholder
Action 35: Establish a Collaboration Area Leadership Group to: • strengthen and promote the Camperdown–Ultimo Collaboration Area as an innovation district • create opportunities for private sector investment, tech start-ups and research commercialisation • advocate for critical infrastructure • drive collaboration and partnerships • address impediments to growth, permeability and activation • implement shared projects, manage shared funds, secure collective capital and identify opportunities for innovative finance	GSC, anchor institutions	All stakeholders
Action 36: Create an international brand and narrative that emphasises the Collaboration Area's strengths and character	Collaboration Area Leadership Group	All stakeholders
Action 37: Develop a place-based monitoring and performance evaluation framework to inform planning and investment decisions	Collaboration Area Leadership Group	GSC
Action 38: Identify funding sources and advocate for funding (such as sponsorships, grants, contributions, planning agreements, value capture and agency budgets) to deliver Place Strategy actions	Collaboration Area Leadership Group	All stakeholders
Action 39: Identify pilot projects to build early engagement and commitment between RPA Hospital, University of Sydney, University of Notre Dame, University of Technology Sydney and TAFE NSW	Collaboration Area Leadership Group	All stakeholders

10 Next steps

Implementing this Place Strategy requires collective action and resourcing from all stakeholders, recognising that State agencies and councils will undertake their own review and prioritisation processes before committing to infrastructure investment. Stakeholders may also need to seek resource allocations, prior to committing to projects.

Some actions are considered immediate imperatives. The Commission recommends these actions are commenced by the end of 2018. The time needed to formally establish the Collaboration Area Leadership Group must not delay work on the other immediate imperatives (see Figure 10).

Figure 10: Road map to realising the vision for the Camperdown–Ultimo Collaboration Area



10.1 The role of the NSW Government

The Collaboration Area process involved State agencies to understand the key issues, articulate the vision and identify projects that might address the impediments to growth. The NSW Government will:

- consider the timing, costs and benefits of the projects and initiatives to achieve the Collaboration Area vision in the context of the *State Infrastructure Strategy* and respective programs
- where necessary, prepare business cases to support investment
- continue to collaborate with the Greater Sydney Commission, City of Sydney and Inner West Council, and across State agencies, to improve investment decisions that deliver infrastructure, employment and great places for people, and support the vision.

10.2 The role of the Greater Sydney Commission

The Greater Sydney Commission facilitates whole-of-government coordination, partnerships with councils and the stakeholder-driven governance arrangement to oversee the long-term implementation of Collaboration Area place strategies. The Commission will:

- transition the leadership role, and put governance arrangements in place, including the Collaboration Area Leadership Group, to continue planning and development for the Camperdown–Ultimo Collaboration Area
- recognise the District Commissioner's strategic oversight for implementing the Place Strategy so that it continues to align with the *Eastern City District Plan*
- include the Place Strategy's priorities and actions in future updates to the *Eastern City District Plan*, giving them a statutory basis
- assure the progress and continued collaboration around the vision and associated projects through local planning processes such as updated local environmental plans
- elevate strategic issues and/or decision-making to the Infrastructure Delivery Committee where appropriate.

10.3 The role of local government

The ongoing participation and leadership of the Council of the City of Sydney and Inner West Council in the Collaboration Area is critical. The councils will:

- help establish the Collaboration Area Leadership Group
- help identify and facilitate opportunities for partnerships, particularly with the business community
- lead the strategic planning process at the local level, in collaboration with State agencies, RPA Hospital, University of Sydney, University of Notre Dame, University of Technology Sydney, TAFE NSW and other key stakeholders
- provide opportunities for community engagement as the Place Strategy is implemented
- leverage community and local stakeholder input to decision-making
- help implement the Strategy's actions through place-making, identifying funding mechanisms and supporting advocacy with the Collaboration Area Leadership Group to deliver the vision.

10.4 The role of anchor institutions

RPA (represented by NSW Health), SLHD, TAFE NSW and the universities will:

- help establish the Collaboration Area Leadership Group
- support investment in activities, particularly research, that leverage existing and new partnerships with health, education and the private sector
- work with other anchor institutions and stakeholders
- help implement the Strategy's actions through place-making, identifying funding mechanisms and supporting advocacy with the Collaboration Area Leadership Group to deliver the vision.

10.5 The role of the community

This Place Strategy reflects the community's input into the development of the *Eastern City District Plan*, and the City of Sydney and Inner West Council's community strategic plans. People will be offered further opportunities to have their say about planning for the Camperdown–Ultimo Collaboration Area through:

- future updates of the *Eastern City District Plan*
- community strategic plans, local strategic planning statements and local environmental plans
- individual agency programs and projects.

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Attachment 7

future transport 2056

TECH CENTRAL
CAMPERDOWN-ULTIMO

Place-based Transport Strategy

NSW GOVERNMENT

NSW Common Planning Assumptions

Common Planning Assumptions are used across agencies to ensure alignment and understanding of the relevant data, policies and assumptions to underpin planning decisions and policy analysis for government strategies and investment decisions. This supports consistency in the advice provided to Government and the community.

The Common Planning Assumptions represent a consistent baseline or a starting point and are developed based on current and past trends and agreed policies and plans. They are not targets nor scenarios.

This strategy and supporting analysis are based on the agreed Common Planning Assumptions as at November 2018. Details of the Common Planning Assumptions used are set out in the Common Planning Assumptions Book version 4.2

Acknowledgement of Country

Transport for NSW acknowledges the Gadigal people of the Eora Nation, the traditional owners of the lands that include Tech Central and the living culture of the traditional custodians of this land.

Note on the timing of the Place-based Transport Strategy

This Place-based Transport Strategy was developed using the best available information at the time of writing. In 2021, the long term impacts of the COVID-19 pandemic on customer behaviours and investment have not been fully understood. Despite this uncertainty, the strategic intent and long term (20-year planning horizon) vision presented within this Strategy are deemed suitable for planning purposes.

Travel data, including traffic volumes and pedestrian counts are based on surveys from 2019 or earlier and do not reflect the altered activity due to COVID-19. Many of the photographs used in this report were taken during June and July 2020 when restrictions on trading activity and non-essential travel were in place; as such, they do not necessarily reflect a ‘typical’ level of street activity or activation.

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Chapter 1: Introduction and Approach

Tech Central (Camperdown-Ultimo Collaboration Area)

Tech Central, formerly known as Camperdown-Ultimo Collaboration Area, is home to a diverse set of world class research, education, health and creative institutions, as well as residential, retail and recreational destinations. With the backing of tech company Atlassian, world class universities and a leading hospital precinct, the NSW Government is committed to making Tech Central the biggest technology hub of its kind in Australia.

Tech Central is already a vibrant place with the potential to continue to attract international talent to the institutions and industries located here. To enable this vision, this Transport Strategy has been developed using the Movement and Place approach – a cross-disciplinary, "place-based" approach to the planning, design, delivery, and operation of transport networks. The recommended priorities for investigation and actions could allow Tech Central to continue to thrive and grow as a place of innovation, employment and recreation for people who walk, dwell, learn, work and play whether they travel by foot, bike, bus, train, car or truck.

With a once in a generation investment in Sydney Metro and motorways, the renewal of Central Station and redevelopment of North Eveleigh, this is the moment to plan for a transformation of the way people use the roads and travel between destinations in this place. This Transport Strategy outlines a 20-year vision for transport in Tech Central. It covers an area of approximately 6 square kilometres on the south-western edge of the Sydney CBD, encompassing the suburbs of Darlington and Eveleigh, the majority of Ultimo, Camperdown and Haymarket and parts of Glebe, Newtown, Redfern, Forest Lodge and Surry Hills.

Figure 1 shows the steps taken to develop the Transport Strategy, and next steps.

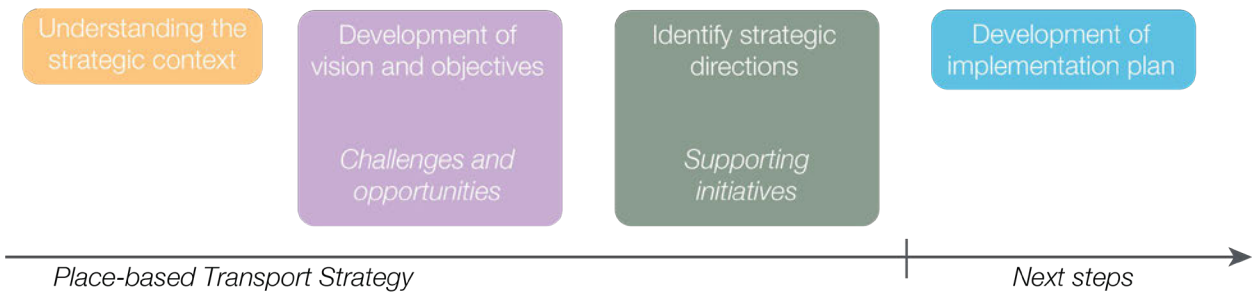

Figure 1 Developing the Transport Strategy, and next steps

Our Approach

The Transport Strategy's approach relates to the place (Tech Central/Camperdown-Ultimo Collaboration Area) and the people that use it, represented by a group of key stakeholders known as the Camperdown Ultimo Alliance. The approach has underpinned each step of the strategy development, from context gathering, to transport analytics to the development of the integrated transport solutions. The approach has ensured close alignment with other strategies that impact on Tech Central from the NSW Government, such as *Future Transport 2056* and the *Camperdown-Ultimo Place Strategy*, as well as planning work currently underway for key precincts within Tech Central.

The strategy represents the vision for the next 20 years, but new priorities outlined will require further, more detailed investigation and consultation prior to investment decision and government approval. Continued collaboration will be required, with Transport for NSW working alongside other parties that have a role in planning or implementation. In Tech Central, these parties include the City of Sydney and Inner West Council; other NSW Government departments and agencies; tertiary education institutions; major hospitals, community groups and key long-term tenants.

A shared vision with the Camperdown-Ultimo Place Strategy

In 2018, the Greater Sydney Commission worked with key stakeholders to release the *Collaboration Area – Camperdown-Ultimo Place Strategy* (the *Place Strategy*), which set out the vision for Camperdown-Ultimo Collaboration Area. The *Place Strategy* is defined around three key nodes and axes within the Collaboration Area, as shown in Figure 2. The vision for the *Camperdown-Ultimo Collaboration Area* is:

> *"In 2036, Camperdown–Ultimo Collaboration Area is Australia's innovation and technology capital. Industry, business, health, education and skills institutions work together, and talent, creativity, research and partnerships thrive. Low carbon living, green spaces, places for people and easy connections support resilience, amenity, vitality and growth."*

The priorities and actions identified in the *Camperdown-Ultimo Place Strategy* recognise the complexities of place, with a strong focus on building and sustaining communities through physical, social, economic and intellectual connections.

A collaborative approach

Following the collaborative NSW Movement and Place approach, this Transport Strategy has been undertaken in collaboration with Transport for NSW and key stakeholders in the Camperdown Ultimo Alliance and across the NSW Government. The Alliance was established to drive the outcomes of the Place Strategy. It comprises representatives of key institutions and governing agencies with an interest in Tech Central. These are City of Sydney, Inner West Council, Health Infrastructure NSW, Sydney Local Health District, TAFE NSW, University of Sydney and University of Technology Sydney.

Local knowledge and endorsement ensure that the Transport Strategy addresses the priorities set out in the *Camperdown-Ultimo Place Strategy* and that there is a clear path to follow for implementation and further development of strategic interventions.

Other State Government agencies, including the Department of Planning, Industry and Environment (DPIE), Greater Sydney Commission, NSW Treasury and NSW Schools Infrastructure collaborated to define the transport vision.

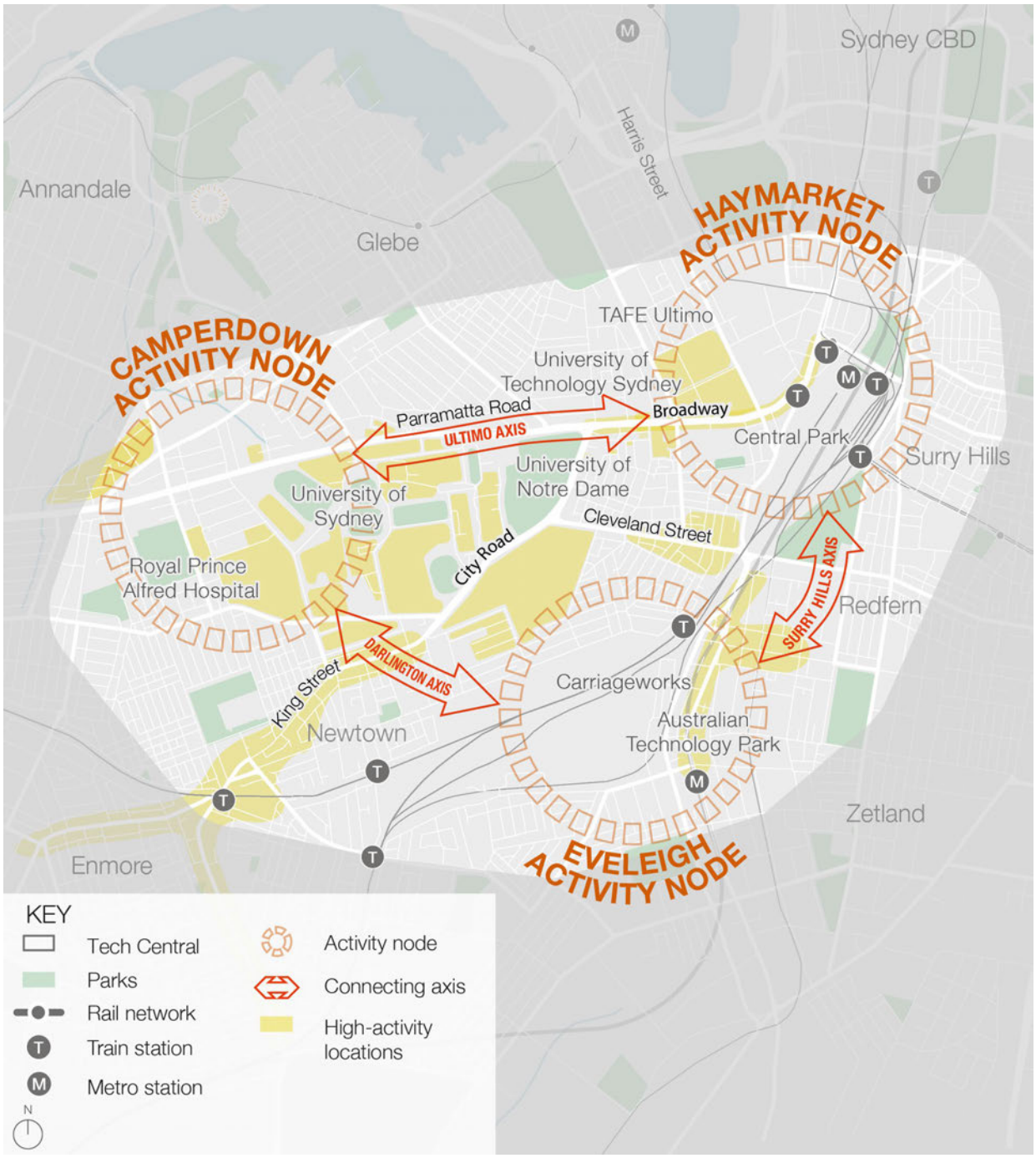

Figure 2 Structure of Tech Central

A 'Place-based' approach for Tech Central

In *Future Transport 2056*, TfNSW adopted the Movement and Place Framework for planning and managing the road network. Subsequent to this, the NSW Government has been refining its approach to Movement and Place, leading to the release of the *NSW Practitioner's Guide to Movement and Place* developed by the NSW Government Architect and TfNSW in early 2020. *The Practitioner's Guide to Movement and Place* seeks to change some established working practices and standards to produce more consistent, higher quality place outcomes.

'Place-based' planning is an emerging approach across NSW Government that involves taking a collaborative, spatial, long term approach to develop contextual responses that better meet the needs of local people and their environment in a defined geographic location. It aims to support and build thriving communities and is ideally characterised by partnering and shared design, shared stewardship, and shared accountability for outcomes and impacts. A 'Place-based' approach is embedded within this Transport Strategy, in which the interplay of contextual elements like land use, urban form and population demographics play a key role.

About Tech Central

Identified by the Greater Sydney Commission as a key innovation precinct, the area is home to major health, research and education institutions, technology and creative industries. The density of these industries, coupled with Tech Central's proximity to neighbouring centres and trade gateways including the Sydney CBD, the Randwick Health and Education Precinct, Sydney (Kingsford Smith) Airport, and Port Botany have shaped, and will continue to shape its keystone role in the economy of Greater Sydney.

In 2016, there were 53,000 people living and 89,000 people working in or near Tech Central[1]. The population is highly diverse, with extremes of social-economic advantage, including established social-housing developments at Waterloo and Glebe.

There are up to 123,000 students studying at universities in Tech Central. In a typical year, the student population also includes a significant portion of international students with diverse cultural and language backgrounds.

The vast majority of jobs in Tech Central are in health and education industries, driven by nearby universities, hospitals and research institutes as shown in Figure 3.

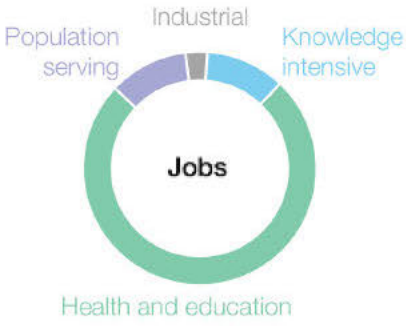

Figure 3 Types of jobs in Tech Central (Australian Census 2016)

[1] NSW Travel Zone Projections (TZP16) v1.51

Destinations like Royal Prince Alfred Hospital draw patients from a wider regional area. The hospital also has a higher proportion of visitors with differing physical abilities and mobility requirements.

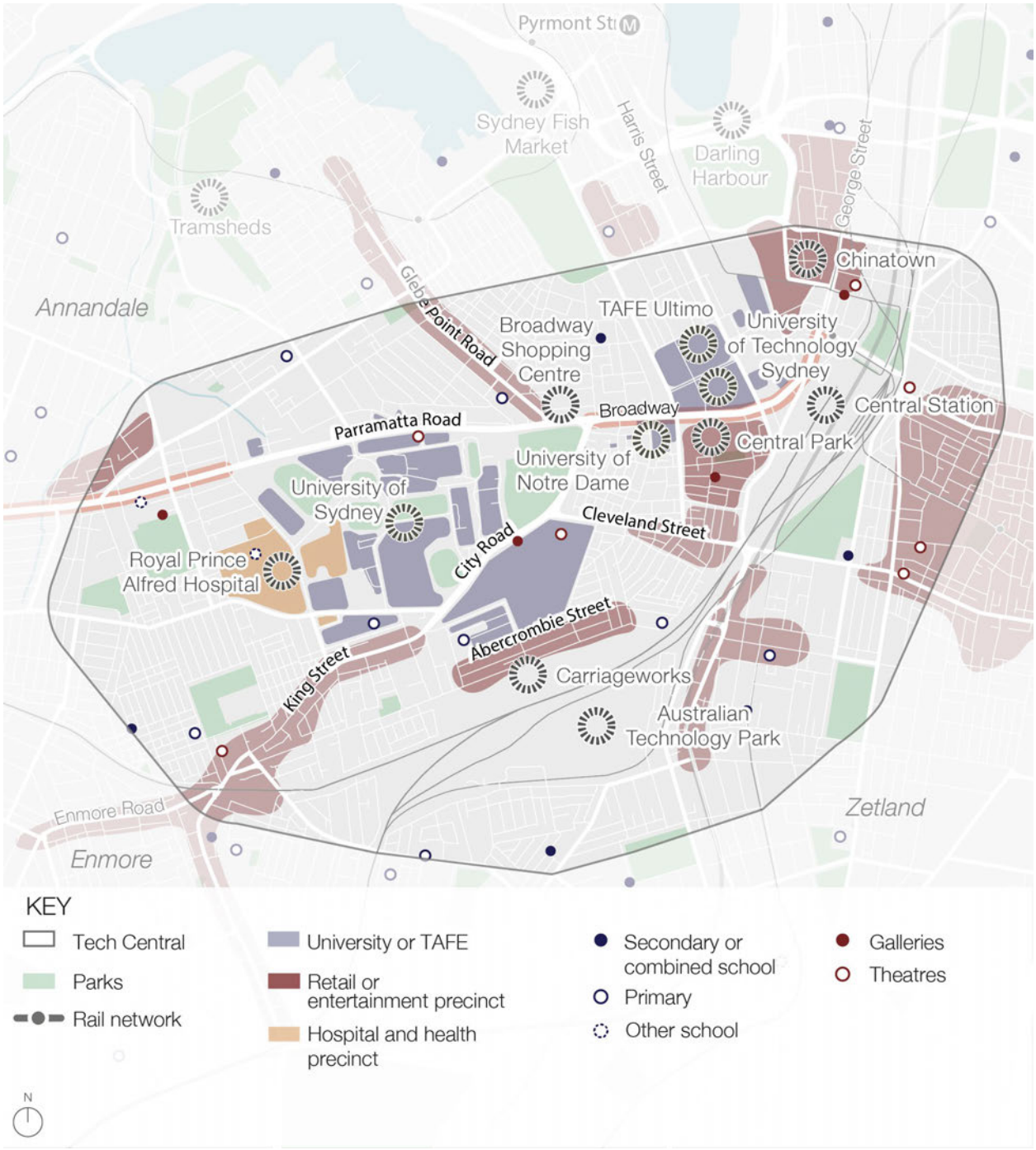

Figure 4 Key destinations within Tech Central

The future of Tech Central

Future visitors

Education and research are key industries in Tech Central, as well as being home to a significant number of social and cultural entertainment venues.

Education – Tertiary institutions already have a significant presence in Tech Central, with plans for future expansion. A selection of student growth forecasts is shown in Figure 5.

Health – The number of people accessing medical facilities in Tech Central is expected to increase, including hospital outpatients and visitors as well as hospital staff. The forecast growth in trips to RPA on a typical weekday is shown in Figure 6. Many of these patients and visitors will require transport options that meet specialised mobility needs, as well as place-based amenity including wayfinding, parks and cafes for respite.

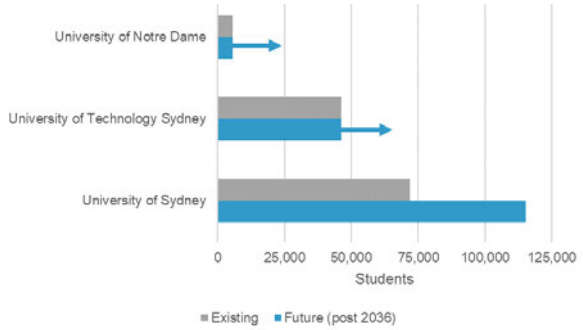

Figure 5 Existing students and projected enrolment for selected universities

Source: Projections provided to TfNSW by University of Sydney, prepared October 2019

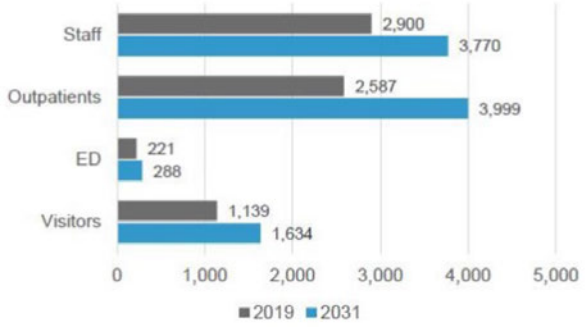

Figure 6 Projected number of person trips to Royal Prince Alfred Hospital (all modes)

Source: Camperdown Health Education and Research Precinct – Traffic and Transport Plan (Health Infrastructure, SCT Consulting)

Entertainment and retail visitors will continue to be an important customer group. Planning for future change, the City of Sydney has identified key precincts where night-time trading is desirable and should be supported. These include Glebe Point Road, King Street, Broadway, Redfern Street and southern parts of Regent Street. The Central Precinct Renewal and Redfern North Eveleigh will also include cafes, bars and small retail. Safe, reliable, 24-hour transport options will be critical to support these precincts as they develop and form part of a wider 'Neon Grid' for Greater Sydney.

Future residents

There is an expected 55% growth of residents, from the existing 53,000 to an estimated 82,000 in 2036[2]. Growth is concentrated in Waterloo, Green Square, Glebe, and areas around Macdonaldtown.

[2] NSW Travel Zone Projections, TZP16 v151

This suggests the need to ensure north-south connectivity across the rail line corridor is achieved to maximise collaboration and passive movement of people to, from and within Tech Central.

New and enhanced transport connections will be needed to service new and existing community and social infrastructure around Waterloo and Redfern in particular. As the population grows and medium and high-density development occurs, access to high-quality open space will also be critical.

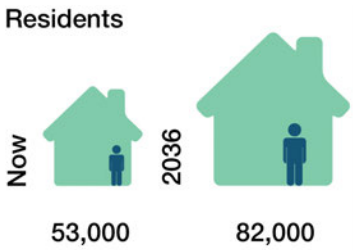

Figure 7 Population growth in Tech Central

Future workers

In 2016, there were 89,000 jobs in Tech Central; by 2036, this is expected to grow by almost half to 125,000 jobs[3].

There will be an intensification of employment density across Tech Central – particularly at the University of Sydney and Australian Technology Park and emerging tech district of Central Station. South of Tech Central, Green Square will house up to 25,000 new jobs.

Figure 8 Jobs growth in Tech Central

Future precincts

Key developments include planned expansions of university and hospital precincts as well as major urban renewal projects that will influence people living and working in Tech Central. Those urban renewal projects are shown in Figure 9.

While some of these precincts and urban renewal projects are subject to further NSW Government consideration, they include:

- The **Camperdown precinct**, identified in the **Parramatta Road Corridor Urban Transformation Strategy**. This precinct is intended to support the nearby health and education uses by providing additional complementary employment land. There is an opportunity for a Biotech Hub at Bignell Lane, north of Parramatta Road.
- The **Royal Prince Alfred Hospital redevelopment** will deliver a new hospital building and refurbishment of existing spaces, including more adult inpatient beds and expanded emergency department, intensive care unit, medical imaging services, operating theatres, and maternity, birthing and neonatal services.

[3] NSW Travel Zone Projections, TZP16 v151

- The **Central Precinct** combines urban renewal and redevelopment of Central Station, including new and improved public space and pedestrian connectivity
- Phased development of the **Australian Technology Park**, which could house 18,000 workers at completion.
- At **Waterloo State Significant Precinct (SSP)**, new planning controls allow for high-density development above and adjacent to the forthcoming Waterloo Metro Station.
- The **Redfern North Eveleigh Precinct**, located within the Redfern-Waterloo Authority Sites SSP, will be opened up to create homes for new residents, including affordable housing, spaces for the jobs of the future, opportunities for local business, and retail, socialising and cultural spaces.
- Across **Tech Central**, the NSW Government has committed to delivering a new, innovative business hub and public spaces.

At the edges of Tech Central, development and urban renewal at The Bays, Pyrmont Peninsula and Green Square will see increased demand on the transport network.

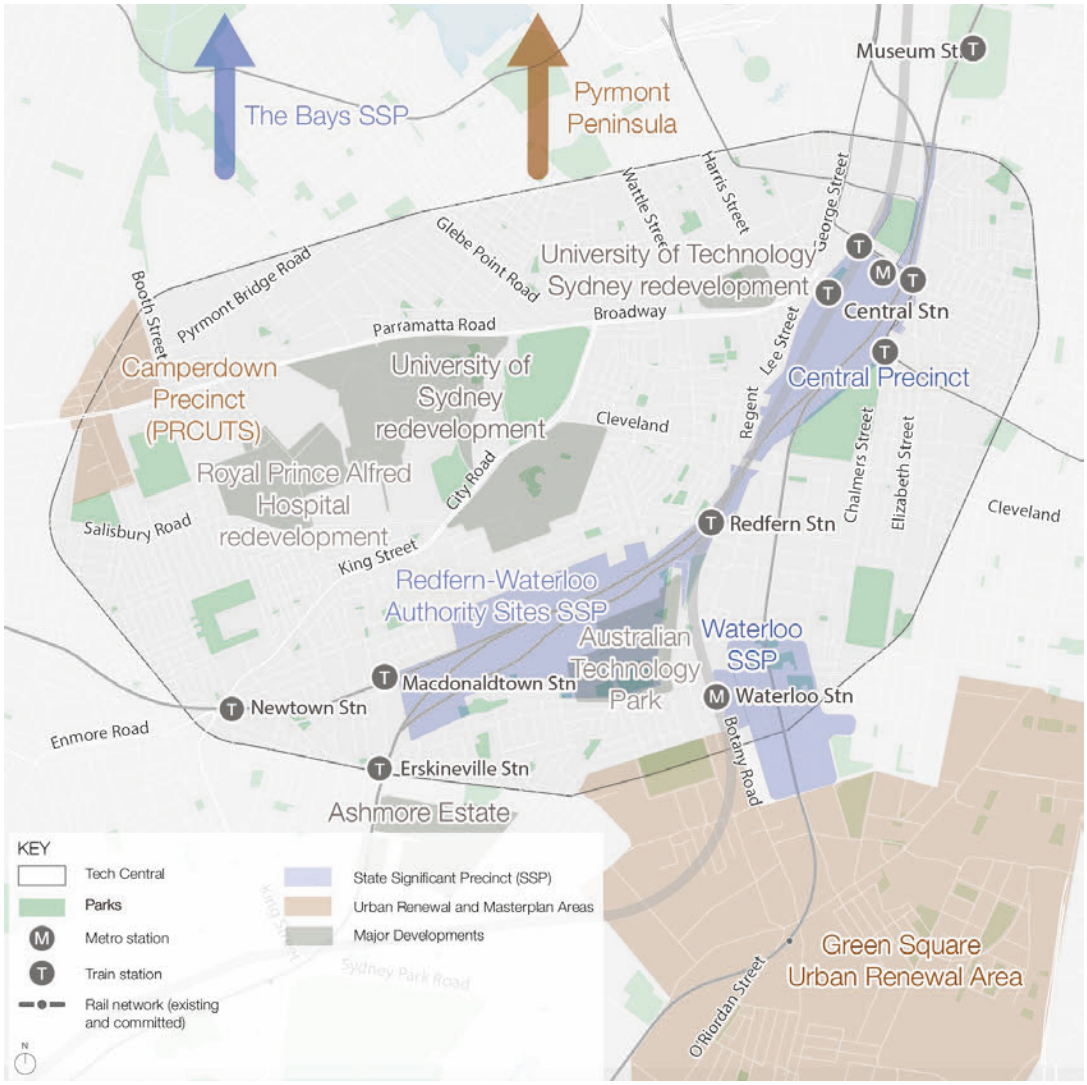

Figure 9 Interfacing precincts and developments

Chapter 2: Vision, Objectives and Indicators

Vision

The strategic vision for Tech Central builds upon previous visioning work for Greater Sydney, the precinct and related strategies. This vision, and its supporting objectives, serve to guide Tech Central's future transport interventions that will enhance accessibility and place outcomes. The vision, presented below, provides a vivid mental picture for the way that transport should contribute to the overall success of Tech Central.

> *Tech Central is integrated and connected within and beyond its edges. Local transport options within Tech Central offer customers a real choice of safe, high-amenity ways to travel. The transport network is managed and enhanced by adopting new and emerging technologies.*
>
> *Health, education, research and innovation clusters within Tech Central thrive by being socially and physically connected by transport. Local businesses and institutions are supported by sustainable local freight and servicing.*
>
> *People living in or visiting Tech Central have the opportunity to live, work, socialise, rest, learn and play nearby in great places and open spaces. Infrastructure is lasting and shapes the precinct for future generations.*
>
> *Walking, cycling and public transport are the preferred mode for most trips to, from and within Tech Central. The transport network supports the NSW Government vision for a net-zero emissions economy by 2050.*

Objectives

Table 1 presents the vision and objectives for Tech Central. Sitting under the *Metropolis of Three Cities* themes of Connectivity, Productivity, Liveability and Sustainability, together these articulate the vision for transport to and from, within and through Tech Central, and how we measure success.

These objectives and indicators don't just help us to develop priorities and actions within the strategy but will also form the basis for how success is measured for future projects within Tech Central. Priorities identified in this strategy to deliver the strategic directions in line with the vision and objectives are not commitments and are subject to further investigation and business case processes prior to a Government decision.

Table 1 Vision and Objectives for the Tech Central Place-based Transport Strategy

Theme	Vision statements	Objectives
Connectivity	*Tech Central is integrated and connected within and beyond its edges.*	**C01** – The Camperdown, Eveleigh and Haymarket nodes of Tech Central are integrated through easy and direct transport connections.
		C02 – Tech Central is connected to other innovation, health and education precincts by high quality public transport.
		C03 – The transport network integrates with and capitalises on large infrastructure projects like WestConnex, Sydney Metro West, Sydney Metro City, Southwest, the CBD, South East Light Rail, and other transformative place-based trip generators.
		C04 – An increased number of workers, students and visitors can travel to Tech Central by walking, cycling and public transport within 30 minutes.
	Local transport options within Tech Central offer customers a real choice of safe, high-amenity ways to travel.	**C05** - Spaces for walking are safe and comfortable to use.
		C06 - A separated cycle network provides safe and convenient access to all major origins and destinations.
		C07 - It is easy and convenient for people walking and cycling to cross major road and rail corridors.
		C08 - Residents, visitors and workers can access medical facilities at Royal Prince Alfred Hospital in a timely manner in both emergency and non-emergency situations.
		C09 - The transport network encourages flexibility and offers individuals mode choices, while enhancing place values.
		C10 - A high sense of personal security while travelling and accessing public transport, walking and cycling.
		C11 - There are no fatalities or serious injuries on the transport network.
		C12 - The transport network is accessible for all customers, regardless of age, ability, socioeconomic, physical or self-identified characteristics.
		C13 - Transport interchanges enhance public spaces and provide for quality multimodal trips that prioritise access by walking and cycling.
		C14 - End-of-trip facilities are highly visible and built into the urban fabric and streetscape.
	The transport network is managed and enhanced by adopting new and emerging technologies.	**C15** - The transport network uses smart technologies to drive customer outcomes.
		C16 - Customers can easily access information before, during and after their trip.

Theme	Vision statements	Objectives
Productivity	*Health, education, research and innovation clusters within Tech Central thrive by being socially and physically connected by transport.*	**P01** - Emergency services located within Tech Central can be delivered to the community in a safe and timely manner.
		P02 - People who work and study at the businesses and anchor institutions of the precinct can access diverse opportunities to collaborate and study across institutional boundaries.
		P03 - Public spaces and streets are managed to support flexible uses by businesses and the community.
	Local businesses and institutions are supported by sustainable local freight and servicing.	**P04** - Local freight logistics are facilitated by last-mile access and facilities at destinations within Tech Central.
		P05 - Local freight logistics are managed flexibly to retain essential services to businesses, residences and institutions throughout the day and night, while considering its impact on other street users.
Liveability	*People living in or visiting Tech Central have the opportunity to live, work, socialise, rest, learn and play nearby in great places and open spaces.*	**L01** - The street design and the transport network support active frontages by providing access, as well encouraging people to actively use streets to travel and linger in a welcoming, engaging environment.
		L02 - The street design is safe, legible and adopts a Safe System approach.
		L03 - The transport network accommodates the travel task across the entire day and 7-day week to support daytime and night-time economies, including a 'Neon Grid' for Greater Sydney.
		L04 - High-quality and well-maintained green and blue spaces are accessible to everyone by walking, cycling or public transport.
		L05 - The built form of transport infrastructure enables people to experience the stories, heritage and identity of places they encounter, and supporting Aboriginal peoples' connection to Country.
		L06 - Urban heat island effect is reduced throughout Tech Central.
		L07 - Equitable access to places and spaces enables people to live a comfortable daily life and interact with a diverse community.
		L08 - People can access their daily needs within an easy walk.
	Infrastructure is lasting and shapes the precinct for future generations.	**L09** - The transport network and public spaces adapt to customers' changing needs across the day, seasons and years to come.
		L10 - Multi-use places and networks are flexible and resilient to social, economic and climate-related disruptions, including capitalising on new technologies.

Theme	Vision statements	Objectives
Sustainability	*Walking, cycling and public transport are the preferred mode for most trips to, from and within Tech Central.*	**S01** - Mode shift towards public transport, walking and cycling away from private vehicles.
		S02 - Manage demand across the transport network through digital collaboration.
	The transport network supports the NSW Government vision for a net-zero emissions economy by 2050.	**S03** - Freight servicing and public transport are provided using zero emissions technology.
		S04 - Private vehicle use is minimised for access to Tech Central.
		S05 - New transport infrastructure uses more sustainable products with reduced environmental impacts.

Measuring success

Implementing this Transport Strategy calls for ways to measure progress towards the Vision and Objectives. Clearly defined performance indicators ensure that there is accountability to the transport customers and collaborators in the Strategy. They should be applied throughout the detailed planning, delivery and review stages for programs and individual projects that may stem from this Strategy.

A range of measure are outlined in Table 2 with reference to the objectives. This list forms a starting point for planners and administrators to draw from as the Transport Strategy is delivered. When assessing the indicators, the minimum expectation is that any intervention should maintain or improve each of the relevant indications, with a benefit in one indicator not achieved at the detriment to another indicator.

More information on how to measure these indicators is included in the *NSW Practitioners Guide to Movement and Place* developed by Transport for NSW and the NSW Government Architect.

Table 2 Indicators

Indicator	Measure	Desired outcome	Objectives
Collaboration area integration	Proportion of Tech Central that is accessible from point to point within 30 minutes by walk and public transport (daytime)	Positive indicates an increase in proportion	C01, C04 L08
Collaboration area connectivity to other innovation areas	Travel time from each node to Randwick, Bays, Pyrmont, Westmead and the Aerotropolis	Positive indicates a reduction in travel time	C02, C04, C03

Indicator	Measure	Desired outcome	Objectives
Walking directness between nodes	Distance of most direct walking route between nodes when compared to direct point to point distance	Positive indicates a low deviation from direct point to point distance	C01, C04
30 minute city - population	Number of residents and visitors that can access each node within 30 minutes by walking, cycling and/or public transport	Positive indicates a greater population	C01, C02, C03, C04,
30 minute city - collaboration	Number of jobs accessible from each node within 30 minutes by walking, cycling and/or public transport	Positive indicates a greater number of jobs	C01, C02, C03, C04,
Mode share	Sustainable mode share - Surveyed mode share for walking, cycling and public transport	Positive indicates a higher sustainable mode share	C05, C06, C07, C08, C09, C10 L01, L02
Casualty crash rate (by degree, user, and road type)	Number/rate of fatal and serious injuries occurring on the transport network	Positive indicates reduced number of serious crashes or likelihood of serious crashes due to removal of cause	C11 L02
Safe speed limits	KM of roads with safe speed limits for pedestrians and cyclists (separately for 40, 30, 20, 10)	Positive indicated an increased length of road with safe speeds	C04, C05, C06, C07, C11, L02, S01
Permeability (walking, cycling)	Average pedestrian and cycle crossing spacing	Positive indicates greater crossing opportunities (time, space)	C01
Public space	Number of dwellings within 10 minutes of public space and high-quality green space	Positive indicates increase in number of dwellings within 10 minute catchment of public space	L04
Tree canopy	Proportion of tree canopy within Tech Central	Positive indicates greater tree canopy cover	L04, L06
Cycling attractiveness	Access to cycleways	Positive indicates greater access to cycleways	C01, C02, C04, C06, C09
Cycle network length	KM of bicycle network in place (separately by network type)	Positive indicates greater cycle network length	C01, C02, C04, C06, C09, S01

Indicator	Measure	Desired outcome	Objectives
Public transport frequency	Frequency of public transport stopping within area	Positive indicates higher frequency	C01, C02, C04, C08
Journey time reliability (public transport)	Deviation from average trip time by that mode on select links by time of day	Positive indicates a reduction in differential	C15 P01
Safe System Assessment	Safe System Assessment risk score	Positive indicates greater safety	C11
Equitable access	Equitable access for people with disabilities or reduced mobility (e.g. pram) in comparison to the able or unencumbered	Positive indicates reduced differential	C15, C16
Journey time reliability (freight)	Deviation from average trip time by that mode on select links by time of day	Positive indicates a reduction in differential	C15 P04
Access to loading opportunities	Business and freight operator access to managed loading opportunities	Positive indicates an increase in access to loading opportunities	C15, P04, P05
Flexible use of space	Business and public access to managed, flexible-use spaces	Positive indicates greater access	P03 L01
Environmental quality	Exposure to air and noise pollution	Positive indicates reduced per capita exposure	L06, L07, L09
Walking space	Compliance with Walking Space Guide level of service benchmark	Positive indicates a greater level of service	L01
Engagement in spaces	Community engagement in public spaces and public life	Positive indicates increased engagement	L01, L05, L07
Community safety and security	Crime Prevention Through Environmental Design assessment	Positive indicates greater perceived safety	L02
Carbon emissions	Transport-related emissions for travel to, from, within and through Tech Central	Positive indicates a reduction	S01, S03, S04, S05
Sustainable materials use	Proportion of materials for transport infrastructure sourced by reusing or recapture.	Positive indicates a greater proportion	S05

Chapter 3: Challenges and Opportunities

Competing demands for movement and place functions within Tech Central, alongside major changes to its future function and the surrounding transport network, present a set of unique challenges and opportunities for Tech Central. These are summarised below and explored further through the strategic directions in Chapter 5.

Challenges identified also present opportunities to make positive change and achieve the vision for Tech Central. These challenges and the opportunities they create are:

- The Camperdown node does not have direct access to rapid, regional mass transit.
- Unreliable travel times for on-road public transport.
- Transport corridors and campuses impede direct routes for walking and cycling.
- Major roads and corridors detract from the walking and cycling experience.
- Connections to open spaces are fragmented.
- A diverse population with different levels of need and opportunities.

In addition, there are further opportunities to:

- Supercharge innovation, productivity and collaboration.
- Leverage Tech Central's strategically important location in the Eastern Harbour CBD.
- Support and expand successful and vibrant places for people.
- Align with policy and strategy to move towards a sustainable future.
- Capitalise on committed investment in transport infrastructure.
- Make the area a testbed for innovation in transport infrastructure and services.

Challenges

The Camperdown node does not have direct access to rapid, regional mass transit

Tech Central is highly connected by mass-transit, with frequent heavy rail connections to Central, Redfern and Newtown Stations, as well as light rail from Central Station to the Sydney CBD and Eastern Suburbs. However, the Camperdown node of Tech Central does not have direct access to rapid, regional mass transit.

Some parts of the University of Sydney are reached by a short walk from Redfern Station but Macdonaldtown and Newtown Stations sit just outside of a 10 minute walking catchment to RPA Hospital and the proposed Camperdown Health Education and Research Precinct. The area reachable from Camperdown within 30 minutes by walking and public transport is significantly smaller than from elsewhere in Tech Central.

This challenge is accentuated by the high demand for regional travel to and from the area. In particular, the limited supply of affordable housing in and near Tech Central means that people with low and middle incomes who work or study in the area often choose to travel from elsewhere. This includes essential health workers, students and specialised researchers, many of whom are unlikely to be able to perform their roles from home.

Notable challenges include:

- Cross regional travel between the Inner West and South East suburbs is slower and less convenient by public transport (bus) than it is by car (or point to point or rideshare services).
- Rail stations are only present in the eastern and southern side of the study area and generally serve radial north-south local connectivity and regional connectivity throughout Greater Sydney.
- Rapid public transport with a dedicated right-of-way does not exist at the western end of Tech Central, meaning that people need to walk longer distances to stations, or travel on buses and then transfer.
- Local bus services often do not have priority along major bus corridors or at intersections, meaning these trips are often less reliable and less attractive compared to other modes. See next Challenge for further discussion.

Planned expansion of the Metro network has varying impacts and may open future opportunities to better serve the precinct. Waterloo Metro Station will further enhance the rapid mass transit available for the southern areas of Tech Central. The planned Sydney Metro West alignment passes north of Tech Central via Five Dock and The Bays, although these stations will not be within the walking catchment of Tech Central. The NSW Government has committed to building a new metro station at Pyrmont as part of the Sydney Metro West project.

In the future there is an opportunity to serve the Camperdown node with high-capacity public transport services which are fast, frequent and reliable, better connecting the area into the Greater Sydney public transport network and supporting Camperdown's role as a truly integrated part of Tech Central.

Unreliable travel times for on-road public transport

Despite extensive bus coverage throughout Tech Central, there is variable provision of on-street bus priority. On some corridors in Tech Central, the available road space is constrained, and space allocation tends to prioritise general traffic and freight over public transport.

Within Tech Central, the longest sections of bus lane are along Parramatta Road and Broadway. Despite acting as key bus corridors, Cleveland Street and Harris Street do not provide bus priority. There are also no bus priority intersections in Tech Central, reducing the competitiveness of bus travel compared to cars and rideshare services.

Much of the existing bus lane provision is narrow and shared with left turning traffic, resulting in buses being delayed behind turning vehicles or wide vehicles in the adjacent lane. King Street, which carries around 100 buses in the AM peak (both directions between 7-9am) does not have any dedicated bus priority and buses compete with turning traffic and queuing at intersections. In the evenings and on weekends, limited stops services along King Street are delayed by all-stop services due to lack of bus stop indentation and high traffic volumes in the adjacent lanes.

Enhancement of priority on key routes would provide the more competitive travel times and better reliability for on-road public transport compared to cars and rideshare services. Improved reliability would support areas of Tech Central that are not within walking distance of rapid, regional mass transit and elevate the attractiveness of on road public transport services to customers.

Reallocating existing road space to buses can be a challenge where the road corridors are not very wide, so implementing changes to realise the vision for movement in Tech Central will require careful consideration of the trade-offs between buses and other road users.

Transport corridors and campuses impede direct routes for walking and cycling

The transport network within Tech Central is defined by major road and rail corridors. While these facilitate the movement of large volumes of people in vehicles, these corridors can form barriers that impede people walking and cycling from taking the most direct route. This means that walking and cycling journeys in Tech Central are longer, less convenient and less desirable when compared to alternative travel modes.

For people walking from Waterloo to Sydney University Darlington campus, the barrier formed by the railway line and absence of crossing points results in an additional 700 metre detour compared to a direct route although this will be reduced by the opening of the Southern Concourse at Redfern Station. Southern sections of Surry Hills (east of the rail corridor) are geographically close to Haymarket and Ultimo (west of the rail corridor), but there are few walking connections through and across the Central Station Precinct that separates them. Future developments at Redfern North Eveleigh and Central Station provide opportunities to investigate new connections and help bring communities on each side of the rail corridor together.

Similarly, major road corridors such as Parramatta Road and Cleveland Street have limited crossing opportunities and priority for pedestrians. Traffic signals causes delays for pedestrians crossing major roadways, which creates slower and less enjoyable journeys that exposes people to prolonged periods in poor safety, air quality and noise quality environments. Limited crossing opportunities can also lead to an increase in uncontrolled crossings that creates a risk of serious injury to vulnerable road users. There is an opportunity to introduce additional crossings and change how the road network and traffic signals are operated, reducing the barrier effect and improving pedestrian connections in the area.

Large campus developments, such as the University of Sydney campus at Camperdown and the Royal Prince Alfred Hospital campuses on either side of Missenden Road, contribute to the area's vibrancy and character, but act as barriers to walking and cycling. While these blocks contain some internal walking networks, which are often well lit and signposted, their scale and permeability makes them less accessible or easily navigable to the general public. Proposed redevelopment of these large campuses creates an opportunity to enhance walking connections within them and invite the community in, creating a seamless experience with the surrounding areas.

Major roads and corridors detract from walking and cycling experience

Connectivity to, from and between key destinations in Tech Central is challenged by sections of poor walking and cycling links. A key challenge, as referred to above, is a lack of crossing opportunities at signalised intersections along major road corridors, so that people need to walk further or wait multiple cycles to cross.

Road space allocation that favours motorised vehicles and speed limits of 60km/h on major roads presents safety concerns for vulnerable users. Road safety issues can detract and discourage walking and cycling, and crash data for Tech Central (Figure 10) shows the clusters of crashes involving pedestrians in Tech Central between 2013 – 2019. The highest densities of crashes occurred near train stations, along Broadway and around Central Station, particularly Railway Square.

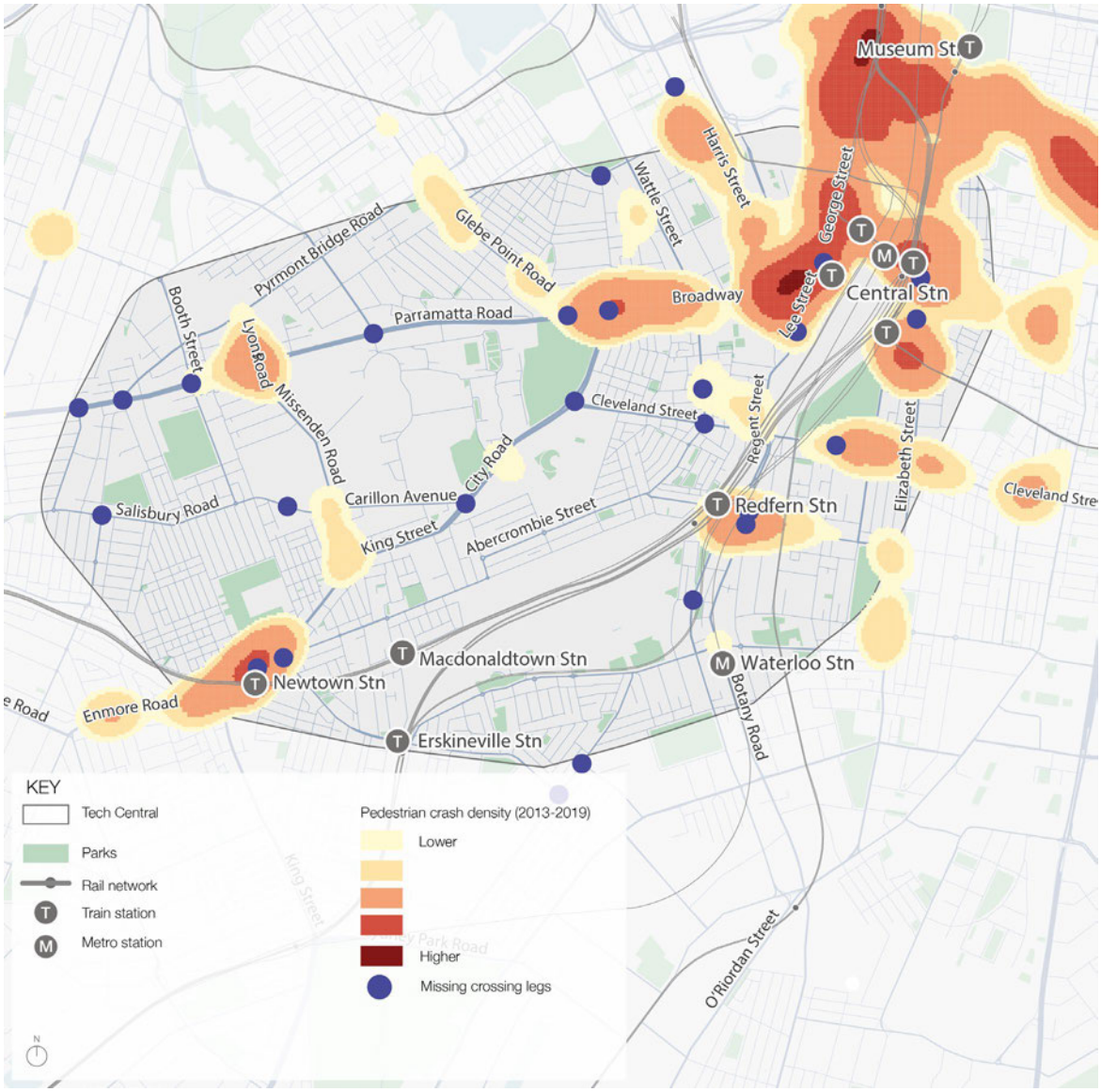

Figure 10 Pedestrian crossing facilities and crash hotspots

Similarly, adverse noise and air quality also detract from the walking and cycling experience along major roads and corridors in Tech Central. On major corridors such as Broadway, the composition of cars, freight and buses over multiple lanes results in a noisy and polluted experience for other users.

There is an opportunity to improve the experience for people walking and cycling by providing wider footpaths, separated bicycle paths and lower speed limits to reduce the level of noise and air pollution, reducing the chance of death and serious injury and increasing comfort.

Connections to open spaces are fragmented

People living, working and visiting Tech Central need access to public open spaces, particularly greenery and watercourses (green and blue spaces). These spaces not only help to make suburbs more liveable by providing opportunities for recreation, but canopy cover and urban greening also helps to reduce urban heat island effects. Open or public space also provides opportunities for reflection, quiet and a break from people and noise.

While there are major parks such as Victoria Park, Camperdown Memorial Rest Park, Camperdown Oval and Prince Alfred Park, there is an opportunity for pedestrian access to be improved through reduced delay crossing roads and better walking links. Much of the nearby green space is located on university campuses (University of Sydney and University of Technology Sydney) and there is an opportunity to encourage more public access in the future.

Some streets and roads in Tech Central have lower levels of shade, shelter, sense of safety and maintenance, particularly around key intersections such as Regent Street / Cleveland Street and Railway Square (Figure 11). There is an opportunity to recognise the value of streets as public space with canopy coverage and landscaping that can support healthy living.

Figure 11 At Camperdown Memorial Rest Park (L), pedestrian priority is mainly enacted through signage; at Regent Street/Cleveland Street, multi-stage pedestrian crossings are highly exposed to air pollution and noise

Source: Arup (June 2020)

A diverse population with different levels of need and opportunities

There is a diverse population that resides within Tech Central and many people use or rely on public transport and active transport for their travel. People travel to the city centre and to key job markets via public transport. There is a component of the population that is reliant on public transport, walking and cycling for all of their travel needs due to low car ownership; around 1 in 3 (33%) of households do not own a vehicle, compared to 12% in Greater Sydney[4]. While median incomes of residents in Tech Central is comparable to Greater Sydney, this does not account for disparities across the area, with extreme disadvantage in northern and south-eastern areas of Tech Central.

Improving public transport services across the day and week and providing access to safe walking and cycling infrastructure provides an opportunity to ensure that all residents in the area have access to a broad range of services, education and employment.

Opportunities

Supercharge innovation, productivity and collaboration

The concentration and potential for technology, research and creative industries within Tech Central means there is an opportunity to enhance productivity and collaboration though improved internal and external connectivity.

Figure 12 Existing travel patterns (Household Travel Survey 2018/19)

Many trips across Tech Central are within a range that could be taken on foot, by bicycle or other micromobility modes. Current travel patterns already indicate a high take-up of walking, cycling and public transport, and use of emerging micromobility and other modes is also on the rise. Further mode shift could be enacted by improving walking and cycling infrastructure and making the street environment more safe, comfortable and attractive.

This would facilitate opportunities for collaboration between institutions (such as university-to-university, or university-to-industry), provide students and workers with greater exposure to each other's knowledge-base and create opportunities for both informal networking in shared public spaces and formal collaboration. At the Australian Technology Park, a new collaborative workspace allows companies to come together and co-create the next big ideas. With current uncertainty about how traditional office spaces will operate in the future, 'on-demand' workspaces such as these may emerge as the new setting for industry collaboration.

[4] [4] 2016 Australian Census for SA2s surrounding Tech Central: Leichhardt - Annandale, Petersham - Stanmore, Erskineville - Alexandria, Glebe - Forest Lodge, Newtown - Camperdown - Darlington, Pyrmont - Ultimo, Redfern - Chippendale, Surry Hills, Waterloo – Beaconsfield. The Sydney CBD (Sydney - Haymarket - The Rocks) has been excluded,

Both universities and Royal Prince Alfred Hospital are established centres of education, research and innovation; these are located alongside medical research institutes, clusters of start-ups and smaller, more agile businesses throughout Chippendale, Camperdown, Darlington and Surry Hills, and a planned hub at the Tech Central Precinct (see Breakout 1). At the Australian Technology Park, developers Mirvac and partners have established a $2.1 million innovation and technology incubator fund.

On a regional scale, improved mass transit connections to Tech Central could support collaboration with surrounding health and education precincts such as at Randwick and Westmead, emerging future centres such as the Aerotropolis, as well as attracting industry partners to collaborate with research institutions in Tech Central.

Breakout 1 Innovation districts

INNOVATION DISTRICTS

Source: Innovation District Audit (Brookings Institute)

Physical 'places' supported by a responsive transport system are critical for successful innovation districts. By "auditing" innovation districts and assets that comprise local innovation ecosystems, a number of key spatial and social considerations can be identified. Key actions that will impact on Tech Central include:

- Facilitate physical proximity between institutions and organisations to achieve the critical mass for innovation to occur.
- Support connectivity and partnerships across Tech Central to achieve innovation capacity - a district's capacity to translate ideas into new products and services. Innovation represents a chief source of high-quality jobs. Regions that have a critical mass of the skilled workers and institutions needed to create and deploy new technologies are best positioned.
- Support access into and from the Area to ensure diversity and inclusion. Innovation relies on a diverse set of actors.
- Create quality places: connectivity, proximity, and vibrant, inclusive public spaces. The extent to which the physical landscape is strengthening networks and relationships and enticing people from a diversity of backgrounds to mix.
- Enact leadership and meaningful engagement with stakeholders.

Leverage Tech Central's strategically important location in the Eastern Harbour CBD

Tech Central sits across the southern boundary of the Eastern Harbour CBD, along the Eastern Economic Corridor and at the centre of a proposed Innovation Corridor (see Breakout 2). This key location is close to Australia's busiest and most connected international airport and surrounded by quality international hotels and accommodation.

Other key employment centres are less than 10 kilometres away, including Randwick Health and Education Precinct (4.5 kilometres), Sydney Airport (5 kilometres), St Leonards (7.5 kilometres) and Chatswood (10 kilometres). Westmead and the metropolitan centre of Parramatta are both less than 20 kilometres away to the west. The planned Bays Precinct is less than five kilometres to the north, with plans to accommodate tech industries as well as a high-density residential centre.

High quality mass transit connections to centres such as these would bring economic benefits to Tech Central by making it accessible (within 30 minutes) to a wider pool of potential workers, visitors and students – some of whom may study or work across multiple places. Regional co-location and connections also supports opportunities for businesses and institutions to collaborate and share learnings, attend conferences, give talks or mentor.

Breakout 2 The Innovation Corridor

INNOVATION CORRIDOR

Source: Pyrmont Peninsula Place Strategy (Draft), TfNSW (2020)

The NSW Government's promotion of the emerging Innovation Corridor will increase connectivity across thriving new technology industries in Redfern, Eveleigh and the Australian Technology Park in the south, through to Tech Central, the Pyrmont Peninsula, Bays West and western parts of the Sydney CBD around Barangaroo and Darling Harbour. It supports and leverages investment opportunities around Tech Central.

The Innovation Corridor houses diverse industries including Health and Meditech, Digital and Design, Fintech, Creative production, Financial and Professional Services, Tourism and Entertainment and Media and Adtech.

Tech Central's connectivity to and integration with other centres in the innovation corridor will strengthen both Tech Central and the Innovation Corridor as a whole, creating benefits for all of Greater Sydney and New South Wales.

Support and expand successful and vibrant places for people

Tech Central is home to a vast array of popular destinations for travel, culture and entertainment. Galleries, theatres, shops (both major shopping centres and boutique shopfronts), restaurants, bars and cafes are scattered throughout, with concentrations along existing high streets like King Street (Newtown) and Glebe Point Road (Glebe) and precincts such as Chinatown and Thai Town in Haymarket. Carriageworks and the Australian Technology Park at Eveleigh have emerged as landmark destinations for events and exhibitions. Community groups run popular events including the annual Mardi Gras Fair Day at Victoria Park and the Newtown Festival at Camperdown Memorial Rest Park, while universities attract a dynamic student population. Planned urban renewal precincts centred on Waterloo Metro Station need to provide liveable spaces for residents in one of Sydney's densest communities.

Improved transport links enable more people to access these places quickly and safely, particularly at night. Designing streets where people and traffic can interact safely encourages and supports people travelling on foot or by bicycle. At the same time, reconsidering the role of footpaths and plazas as public spaces that house other uses like outdoor dining, entertainment and retail (such as markets) suggests a rebalancing of space and priority for people on foot compared to people in cars.

Align with policy and strategy to move towards a sustainable future

This Transport Strategy presents an opportunity to capitalise on growing momentum for a more sustainable approach to development and growth. This is reflected globally, with drivers such as the United Nations Sustainable Development Goals, as well as locally, with commitments to achieve net-zero carbon emissions made by the NSW Government (for 2050), the City of Sydney (for 2040)[5]. Similarly, Inner West Council is targeting a 75% reduction in community emissions by 2036 and net-zero emissions by 2050[6].

The transport sector alone can potentially reduce a city's carbon emissions by a fifth[7], and there is an opportunity to realise this reduction in Tech Central where many trips are local and car ownership is relatively low. Nearby research hubs at the University of Technology Sydney and University of Sydney are already addressing sustainability challenges.

International trends, technology and policies that support lower emissions sketch a possible future for the precinct. These include electric vehicles (particularly when powered by renewable energy sources), hydrogen-cell fuelled buses, enactment of Low Emission Zones and street design guidance that places walking and cycling at the top of the transport hierarchy.

As travel patterns change in response to increased workplace flexibility, demand for travel in the peaks can be spread across the day. The reduced need to expand capacity allows more sustainable use of existing vehicles and infrastructure to serve our customer's whole lives.

In Tech Central, the density of attractive destinations and public transport interchanges, combined with the fine-grain street network (a legacy of the pre-motor vehicle development) supports end-to-end and first/last-mile travel by walking and cycling, which have minimal carbon impact.

Capitalise on committed investment in transport infrastructure

An unprecedented level of investment in transport infrastructure is taking place in and around Tech Central. This investment provides opportunities to change networks and services and change the operations of roads to enhance the quality and amenity of places – which will further support the achievement of the vision and objectives for the area. Breakout 3 summarises the need to capitalise on this investment and enforce new travel behaviours before undesirable patterns are entrenched.

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[5] 'Net zero by 2040: Ambitious new emissions target set' (City of Sydney, February 2020), accessed at <https://news.cityofsydney.nsw.gov.au/articles/net-zero-by-2040-city-of-sydney-ambitious-new-carbon-emissions-target-set>

[6] Inner West Council Climate and Renewables Strategy (Inner West Council, December 2019)

[7] National Greenhouse Gas Inventory: September 2019 (Department of Industry, Science, Energy and Resources, February 2020)

New motorway projects that reduce traffic on the surface road network will provide opportunities for lowering the speed of vehicles, increasing pedestrian crossings and re-allocating road space to provide higher quality public domain and landscaping, increased public transport priority and safer cycling (see Figure 13).

In Tech Central, some notable opportunities include:

- **WestConnex (all stages, construction)** – When complete in 2023, WestConnex will provide motorists with a continuous, 33km traffic-light free motorway network, with connections for future projects linking the north shore and northern beaches, Sydney Airport and the southern suburbs. Traffic and freight on Parramatta Road will be reduced, allowing for more opportunities to access Tech Central.
- **Western Harbour Tunnel (planning and design phase)** – The new underground motorway link could divert some north-south regional through traffic away from road links such as Wattle Street, Harris Street and Botany Road.
- **Waterloo Metro Station (construction)** – Delivered as part of the Sydney Metro City and Southwest line, the station will provide enhanced public transport accessibility to Waterloo, Redfern, Alexandria and South Eveleigh. With high quality bus services along Botany Road, it will allow for further development and expansion of the Global Economic Corridor between Sydney CBD and Green Square.
- **Redfern Station Upgrade and New Southern Concourse (construction)** – The station upgrade will provide enhanced public transport accessibility to Darlington, Redfern, and Eveleigh, including the South Eveleigh and Redfern North Eveleigh Precinct Renewal. There are opportunities to leverage on this new connectivity through improved bus service integration and better walking and cycling to connect to public transport services.
- **Sydney CBD Traffic Capacity Reductions** – Reduced capacity on the Sydney CBD road network has occurred through the completion of the L2 and L3 light rail lines, and the full pedestrianisation of George Street between Hunter Street and Hay Street in the Sydney CBD. The reduced traffic capacity and increase in public transport options have resulted in reduced demand for vehicle travel to Sydney CBD, which in turn provides opportunities for the re-allocation of road space from traffic to walking, cycling and public domain uses on major road corridors approaching the City Centre.

Breakout 3 Leveraging time-sensitive opportunities

TIME SENSITIVE OPPORTUNITIES

Induced demand is the well-studied behavioural response by motorists to increased roadway capacity. A short-term travel time reduction is gained by an increased capacity of a roadway.

However, the travel time reduction may encourage more motorists to use the roadway. The growth of motorists increases the journey time in the longer term; losing the benefit of the roadway upgrade.

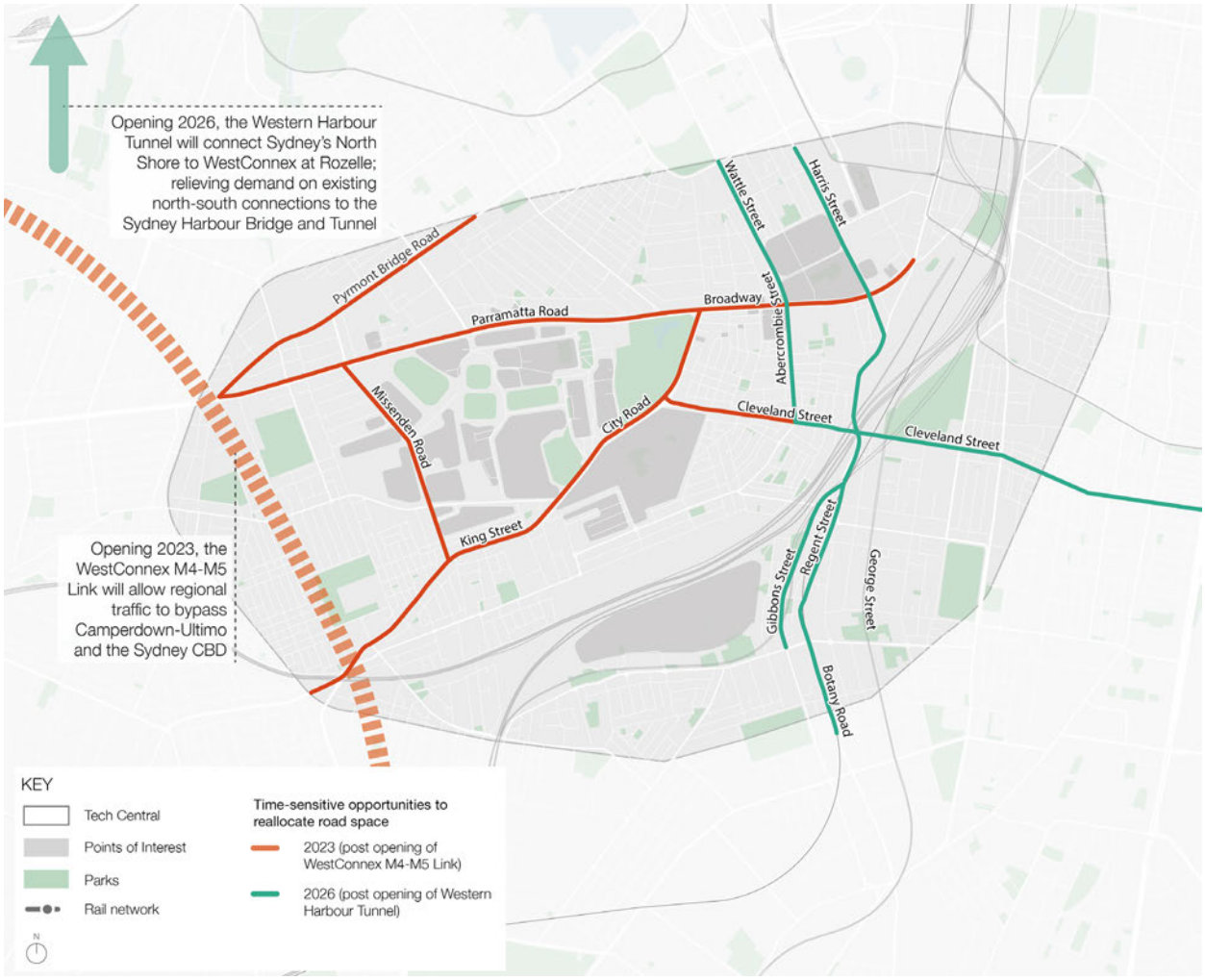


Figure 13 Investment in major transport infrastructure presents opportunities to reduce traffic speed and reallocate road space for walking and cycling

Make the area a testbed for innovation in transport infrastructure and services

The *Camperdown-Ultimo Place Strategy* identifies Tech Central as ideally situated to become a testbed and/or a living-lab for developing and trialling new technologies, policies and ways of working / collaborating between governments, institutions and the public. While the NSW Government will continue to consider the opportunities for delivering innovation within the precinct, ideas could include:

- **Street layout and space allocation –** including temporary and 'pop-up' footpaths, pocket parks, outdoor dining or meeting space, kerb-buildouts, footpath widenings, cycleways and street closures;
- **Space management and programming –** including temporary art, meeting and cultural events, community fairs and events;

- **Information and wayfinding technologies** – including dynamic parking supply and demand indicators, walking and cycling wayfinding, rideshare and point to point travel information, space interpretation and feedback points;
- **Clean vehicle technologies** – including electric motor vehicle charging, service the precinct green public transport fleet, electric bicycle or micromobility facilities; and
- **Transport service and freight provision** – including freight hubs, and digital platforms for Mobility as a Service.
- **Promotion of walking and cycling** – exploring 'living lab' opportunities to explore ways of encouraging people to switch towards sustainable modes of travel.

These opportunities can be delivered on a temporary, trial or pilot basis and can be ideated, developed and delivered as collaborative partnerships between key institutions within Tech Central, emerging innovative industries and start-ups, local governments, state government and the public.

Breakout 4 Trialling microfreight in Inner City areas

FREIGHT HUBS

In 2016, TfNSW and the City of Sydney developed a micro-distribution hub (the Courier Hub) by repurposing a disused wash bay in the Goulburn Street car park, Sydney. Today, a number of couriers making deliveries on foot or by bike into the city use the Courier Hub as a central distribution and collection point. While it is a small space, this open-access, multi-user facility delivers urban environmental benefits and time savings, by switching inner city deliveries from van couriers to bike couriers.

A study showed that bike couriers can meet their delivery targets with less distance travelled, up to 50% less time taken – mainly because bike couriers were able to find parking more easily and spent less time walking from their parking space to the delivery destination.

9.7 hours less driving time

50% fewer vehicle emissions

**Results from 2019 assessment*

Chapter 4: Realising the Vision

The future of connectivity within and beyond Tech Central

Subject to further investigation, consultation and government approval, the priorities outlined in this chapter could achieve the vision for a future where Tech Central is a truly integrated innovation district where residents, visitors and workers can interact and linger in great places and public spaces, enabling planned and unplanned interactions between people in support of innovation and creativity.

Tech Central could be one of the most connected places in Greater Sydney, with easy and direct connections to other key strategic and metropolitan centres, health and education precincts and innovation districts by train, metro, rapid bus and safe, efficient cycleways, ensuring that connections and partnerships with complementary and supporting businesses and institutions throughout Greater Sydney.

A possible future extension of Sydney Metro West from the CBD through Tech Central could provide residents of the Western and Central cities access to the great jobs of the future, and educational opportunities at some of the best educational institutions in Australia.

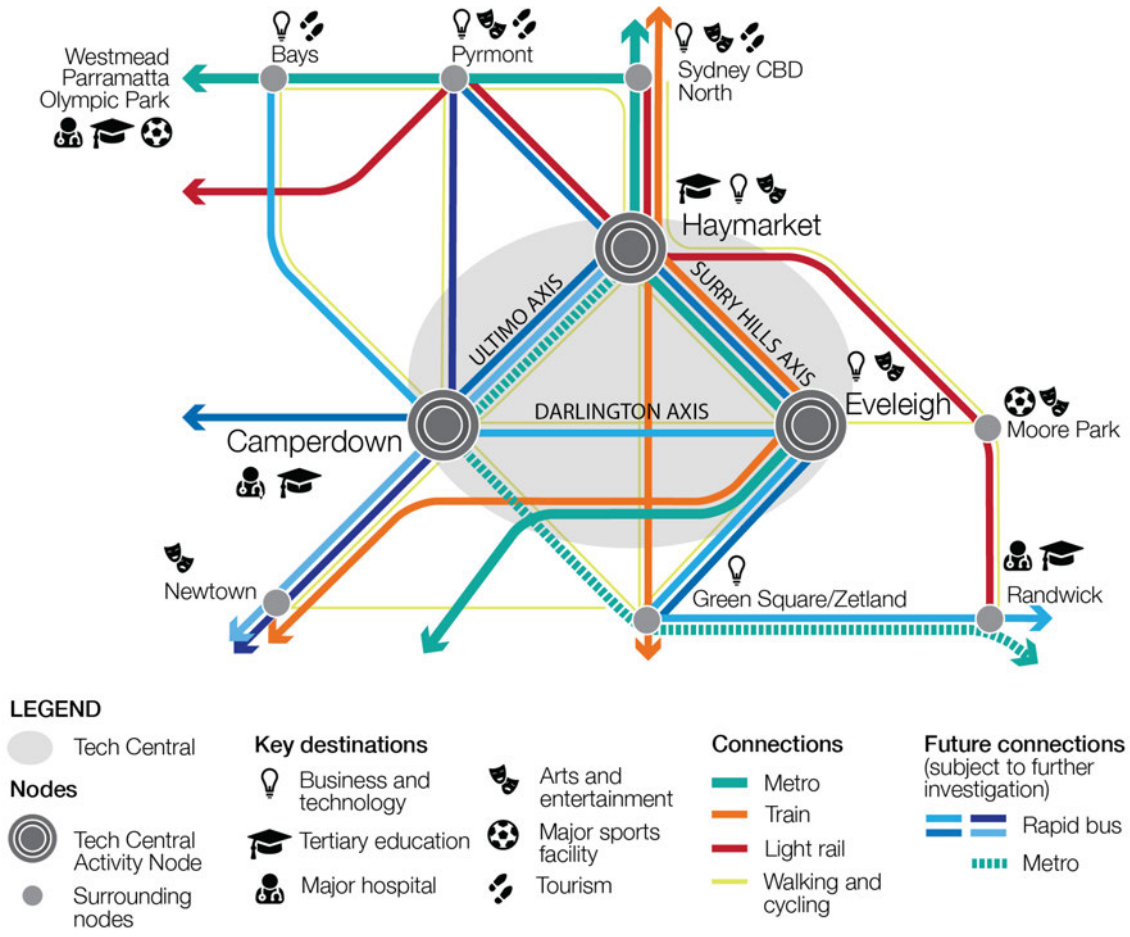


Figure 14 Connectivity framework for Tech Central and its surrounds

Rapid bus lines, with high quality stops supported by bus priority that makes them a more convenient option than driving, could connect directly between the Haymarket, Eveleigh and Camperdown nodes of Tech Central, as well as connecting to the north, south, east and west to truly integrate the area into the surrounding areas of the Eastern City.

People could travel anywhere within Tech Central in under 30 minutes by walking and public transport, cycling and new forms of micromobility, allowing businesses and institutions to partner and collaborate to ensure that the area functions as a single and unified whole.

Large campuses, like Royal Prince Alfred Hospital and the University of Sydney could be integrated with each other and their surrounds, with easy and direct paths allowing people to walk through and across each campus.

Roads and rail could no longer be a barrier, with regularly spaced road crossings that people don't have to wait long to cross. Rail corridor crossings between Central and Eveleigh could strengthen connection and integration between Sydney Metro Waterloo Station, Australian Technology Park, Redfern North Eveleigh and the University of Sydney, and between the University of Technology Sydney, Central Precinct Renewal and Surry Hills.

Vehicles traveling at safe speeds on all streets in the area could reduce deaths and serious injuries on the road Towards Zero and complement wider footpaths and increased space for walking to make public spaces comfortable and inviting for people of all ages and abilities.

Workers and visitors to Tech Central living within 5-10km could choose to ride a bike on a safe, direct and connected network of separated cycle infrastructure that allows them to get to their destination quicker than they could by driving or public transport. Convenient and secure end of trip facilities throughout the area help make cycling a stress free experience.

A once in a generation investment in new motorway links could allow streets to be transformed, with through traffic and freight attracted to an efficient motorway network. WestConnex and the Western Harbour Tunnel will offer free flowing tolled road links to the west, north and south, while high quality free alternatives remain available such as City West Link between Western Sydney and the CBD, Sydenham Road between Western Sydney and Sydney Airport, and Southern Cross Drive between the CBD and Sydney Airport. This could allow streets in Tech Central such as Parramatta Road, Broadway, City Road, King Street, Harris Street and Regent Street to be transformed to support walking, cycling, public transport, freight servicing and access by local residents and visitors.

Freight servicing to local businesses and institutions could be innovative, low impact, and take advantage of innovative new approaches, such as consolidated freight hubs and last mile micro freight.

Deep and ongoing partnership between universities, hospitals, businesses, state and local government could break down traditional barriers to change, making Tech Central a centre for innovation in the way transport is delivered and great places are created. Businesses, hospitals and universities would work with their employees to embed sustainable travel behaviours which complement public and private the investment in the area.

Strategic directions and initiatives

Initiatives were developed following a review of relevant strategic documents, a review of the existing and planned context for Movement and Place, analysis of existing transport data and a co-design process undertaken with stakeholders. These initiatives identified are collated and presented here under strategic directions to achieve the vision and objectives for Tech Central and Greater Sydney.

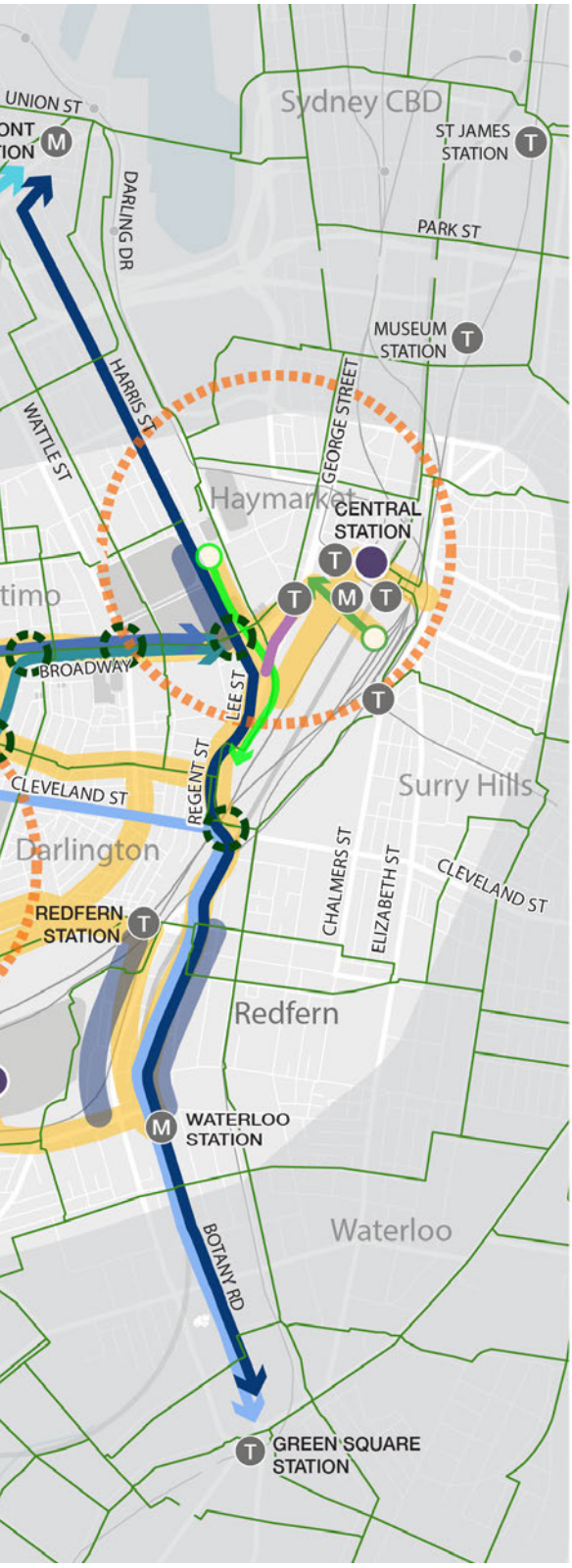
The four strategic directions of this Transport Strategy are:

- **Creating walkable streets and places** - maximise opportunities for in-person collaboration, both formal and informal, between institutions within and immediately adjacent to Tech Central, and increase local amenity for residents, students, workers and visitors.
- **Enhancing access by cycling and public transport**, within and beyond Tech Central's boundaries - better connect Tech Central to surrounding centres and reinforce more sustainable transport choices.
- **Shaping and sustainable and resilient precinct** - facilitate new transport services which are environmentally sustainable, social and economically equitable and contribute towards economic and environmental resilience.
- **Foster Innovation** – this strategic direction seeks to explore new transport interventions and opportunities to trial new technologies, policies or approaches that support the three other strategic directions.

Each strategic direction sets out its relevance to this Transport Strategy and how it will impact on Tech Central. It details how the strategic direction supports the vision and objectives for this Transport Strategy that were developed in collaboration with stakeholders including the Camperdown Ultimo Alliance.

Chapter 6 looks at the proposed time frames and avenues for implementing the initiatives, with opportunities for collaboration. Figure 14 shows the proposed connectivity between activity nodes in Tech Central and its surrounds. Figure 15 shows the key transport initiatives, including priority areas for improvements to pedestrian amenity and safety, a connected metropolitan cycling network, the locations for possible future metro stations, the rapid bus network and locations for multimodal last-mile freight hubs.

Figure 15 Key initiatives across Tech Central



Walkable streets and places

- Safer speeds for local streets, High Pedestrian Activity Areas and areas of higher place significance
- Traffic calming to strengthen existing low traffic neighbourhoods
- Consistent and integrated wayfinding

Enhancing access by cycling and public transport

- A safe and connected local cycle network and low speed, low stress local streets
- Secure and convenient cycling end of trip facilities
- Consistent and integrated wayfinding
- High quality bus priority infrastructure and technology
- High amenity places along rapid bus routes and around rapid bus stops
- Fully accessible interchanges, stops and stations
- Increased public transport service frequency across the day, night and week to flatten peaks and support the 24 hour economy
- Reduced through traffic in key places
- Smart technology and dynamic prioritisation of demand
- Dynamic kerb technology to manage freight access and increase space for dining and dwelling

Shaping a sustainable and resilient precinct

- Safer speeds and traffic calming for local streets, High Pedestrian Activity Areas and areas of higher place significance
- Streets that are self-explaining environments
- Streets and intersections designed according to Safe Systems principles
- Safe and integrated interchanges
- Travel Demand Management Strategy and precinct Travel Plans
- A sustainable and consistent approach to parking
- Electric and zero emissions trains and buses
- Promote zero emissions freight vehicles
- Reduced hard surfaces, increased street planting and shade
- Micro-freight solutions such as electric cargo bikes
- Flexible kerbside management for parking and loading

Fostering innovation

- Test and learn through tactical urbanism
- Innovation in collaboration and delivery
- Trials and pilots of new forms of mobility
- Partnership with precinct researchers, industry and entrepreneurs
- Partnership with the private sector, including Mobility-as-a-Service opportunities
- Smart and flexible technology, such as e-ink bus stop displays

Strategic Direction 1: Creating walkable streets and places

Walking forms the first and last leg of almost all trips to, from, within and through Tech Central. For residents (including children), students, workers and visitors, walking connectivity impacts the ease of getting around, the accessibility of nearby opportunities and the chance for formal and informal collaboration that an innovation precinct requires.

People of all ages and abilities, working, living, studying in, or visiting Tech Central would benefit from increased permeability and the ability to better engage with streets, businesses, galleries, parks, watercourses and other land uses on foot. Walkable streets are a strong indicator of high place value. Travelling by walking or cycling also fosters social equity in access, lowers the environmental impacts of travel and improves overall health and wellbeing.

Growth patterns and historic prioritisation of vehicle traffic on roads within Sydney mean that major road corridors within Tech Central carry large volumes of traffic. One of the consequences is that walking infrastructure at some locations in Tech Central serves its customers poorly. Crossing major roads can involve long wait times at signalised intersections and connections across the railway line are infrequent and widely spaced.

With historic levels of investment in new motorway links such as WestConnex and Western Harbour Tunnel that will take many longer distance road trips off the surface road network, there is a once in a generation opportunity to make more of the existing road space available for other road users and improve the overall street amenity. Improvements such as wider footpaths, a transition to lower-impact last-mile freight delivery, more space for street trees and seating to provide additional rest opportunities would improve the experience of walking within one of the most walked places in Greater Sydney.

Supporting the vision and objectives

This strategic direction supports the vision and objectives for this Transport Strategy. The initiatives identified under this strategic direction contribute to achieving the vision and objectives for Tech Central and Greater Sydney by:

- **Moving more people more efficiently**: as Tech Central and the adjacent Sydney CBD develops, there is a need to move people more efficiently through the transport network. Walking enables people to move around in a space-efficient manner and address the need for efficient first and last leg trips to and from public transport.
- **Improving safety:** Protecting and prioritising our most vulnerable road users, including people walking, makes streets safer places and reduces the risk of fatal and serious injuries, in line with the NSW Government target of zero fatalities and serious injuries on NSW roads by 2056 (see Breakout 5).
- **Improving local amenity and supporting businesses and innovation:** Reducing dependence on travel by private vehicle through shifting trips to walking improves the local amenity of places and supports the innovation economy through encouraging

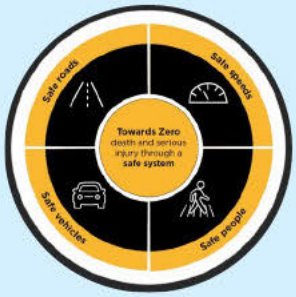
spontaneous interaction and knowledge transfer. Furthermore, high amenity places can attract greater footfall for businesses in the area.

- **Shared use of space:** The shared use of spaces (spatially or temporally) provides greater opportunities for people to gather or for programmed or informal events and gatherings to take place. Examples of this include markets and performance spaces.
- **Supporting social equity:** Spaces for walking play an important role in creating public space, including networks of laneways, plazas and streets where people gather. Providing for publicly accessible modes with a low barrier to entry means that all people living, working or visiting Tech Central can travel where they need to, regardless of age, ability or socioeconomic advantage.

The *Walking Space Guide - Towards Pedestrian Comfort and Safety* (TfNSW, 2020) is aimed at making sure that streets provide sufficient space for people to walk comfortably side by side and overtake one another without crowding.

Breakout 5 A Safe System approach to designing roads and streets

SAFE SYSTEM



Source: Towards Zero (NSW Government)

The Safe System approach involves different elements of the system working together to help eliminate death and serious injury. As part of the NSW Road Safety Plan 2021, NSW has committed to deliver on a target of zero trauma on the transport system by 2056, the central principle of the Safe System approach. This sets NSW Government the challenge of ensuring safety is at the forefront of all decisions that impact upon the design, operation and maintenance of the built environment.

The assessment considers how the transport arrangement at the location would perform against the Safe System risk elements; the exposure to that crash risk, the likelihood of it occurring and the severity of the crash should it occur.

Planning principles for walking

The following principles should guide planning for walking for all actions implemented out of this strategy:

- Adopt a Safe Systems approach in all intersection and roadway designs.
- Reallocate road space away from general traffic to expand footpaths on key streets in Tech Central, using the *Walking Space Guide* to identify the space required.
- Reduce speed limits through Tech Central to reduce road noise, improve safety and support surrounding land uses, complemented by traffic calming and street design measures that reinforce lower traffic speeds.
- Introduce pedestrian priority areas or restricted vehicle access zones.
- Increase the priority and safety of pedestrians at signalised intersections by considering changes such as:

  - Shorter cycle times (including possible changes in priority by time of day).
  - Prioritising pedestrian crossing phases and pedestrian protection.
  - Pedestrian countdown timers.
  - Provision of pedestrian crossings on all legs of signalised intersections.
  - Removal of slip lanes at signalised crossings.
- Provide additional signalised and unsignalised pedestrian crossings along key desire lines.
- Provide street trees and other shade along routes within Tech Central.
- Adopt electric buses and freight vehicles to reduce road noise.
- Provide convenient public thoroughfares through large private blocks and along green corridors.
- Prioritise safe walking infrastructure around primary and secondary schools, hospitals and other sensitive land uses.
- Prioritise safe walking access to open space.

Priorities for investigation

Priorities supporting this strategic direction have been identified that respond to Strategic Direction 1 – Creating walkable streets and places. In addition to the work TfNSW is undertaking on Parramatta Road public transport improvements, priorities for investigation and further consideration are listed in this section. Figure 16 maps priorities that apply to specific locations.

1.1 - A better Parramatta Road and Broadway

Create a better pedestrian environment along and across Parramatta Road and Broadway, with wider footpaths, increased dwell space and improved priority for walking at traffic signals, recognising its key role in connecting the Camperdown and Haymarket nodes.

1.2 - Camperdown Park to Victoria Park Green Spine

Create a direct, friendly and green pedestrian corridor from Camperdown Park to Victoria Park through Royal Prince Alfred Precinct and the University of Sydney, including improved wayfinding and removal of barriers between the University of Sydney and Victoria Park, recognising its complementary role to Parramatta Road in connecting the Camperdown and Haymarket nodes.

1.3 - A Vehicle Calmed Heart for Royal Prince Alfred Precinct

Create a vehicle calmed heart for Royal Prince Alfred Precinct and improve the environment for pedestrians by restricting Missenden Road to bikes, buses and vehicles accessing the precinct only.

1.4 - Better connections from Royal Prince Alfred precinct and University of Sydney to Eveleigh, Redfern and Waterloo

Improve walking connections, including improved wayfinding, between Royal Prince Alfred precinct and the University of Sydney in the Camperdown node and North Eveleigh,

Australian Technology Park, Redfern Station and Waterloo Station in the Eveleigh nodes, including:

a) Extending the Eastern Avenue pedestrian spine south of City Road to North Eveleigh with increased walking space and priority.
b) Increase walking space and priority between the university and Redfern Station along Little Eveleigh, Lawson, Wilson and Abercrombie Street.
c) Investigating a new rail corridor crossing between North Eveleigh and Australian Technology Park.
d) Increase walking space and priority between Australian Technology Park and Waterloo Station along Garden Street and Henderson Road.

1.5 - Better connections from Royal Prince Alfred Precinct to Macdonaldtown, Newtown and Erskineville

Improve walking connections, including improved wayfinding, between Royal Prince Alfred Precinct and Newtown, Macdonaldtown and Erskineville Stations with increased walking space and priority along Missenden, King and Burren Streets, and a shared zone along Bucknell Street.

1.6 - Better connections from Haymarket to Eveleigh, Redfern and Waterloo

Improve walking connections, including improved wayfinding, between the Haymarket and Eveleigh nodes, including:

a) Extending the Goods Line to the south under Railway Square.
b) Increased walking space and priority along Regent Street, through Chippendale, along City Road, across Cleveland Street and towards Redfern Station.
c) Reconfiguration of the one-way pairs through Redfern to create a people friendly public transport spine along Regent Street and a traffic bypass on Wyndham Street.

1.7 - A transformed Central Precinct

Better places and spaces for walking and lingering around Central Precinct, including:

a) Improving connections to Surry Hills by extending Central Walk to the west and creating new connections over the railway line between Central and Cleveland Street.
b) Opening of road space on Lee Street to walking and cycling by removing through vehicle traffic while retaining place sensitive local servicing.
c) Opening of road space on Eddy Avenue for walking and public transport by reducing through vehicle movements.

1.8 - Safer speeds for High Pedestrian Activity areas and areas of high place value

Create a safer environment for pedestrians through reduced speed limits in areas of higher place and High Pedestrian Activity areas such as Broadway, King Street (Newtown), Glebe Point Road, Regent Street (Redfern), Botany Road (Waterloo), throughout the City Centre and around Australian Technology Park.

1.9 - Strengthen low traffic neighbourhoods

Strengthen the existing low traffic neighbourhoods in Chippendale, Ultimo, Surry Hills, Redfern, Darlington, Camperdown and Newtown with lower speed limits and additional traffic calming to create a low stress environment for pedestrians where people driving vehicles feel like guests.

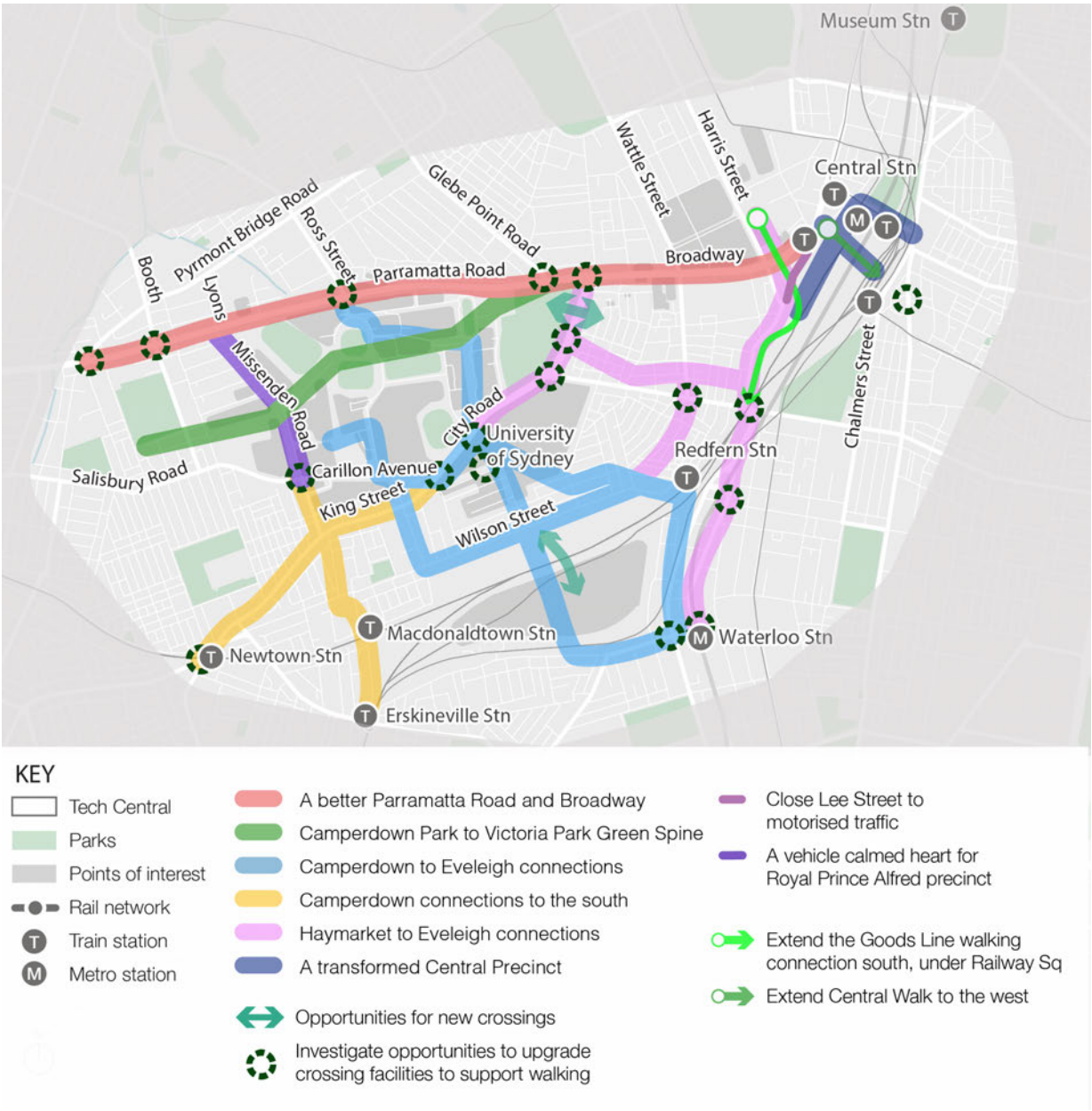


Figure 16 Priorities for investigation to improve walking connectivity

Strategic Direction 2: Enhancing access by cycling and public transport within and beyond Tech Central's boundaries

To achieve the vision of a sustainable, equitable and liveable precinct, modes such as walking, cycling and public transport should be prioritised over private vehicles. Public transport is critical to move large numbers of people to and from Tech Central from other parts of Greater Sydney – including adjacent health and education precincts such as Randwick. It complements walking and cycling links between key destinations within Tech Central; for example, between the University of Sydney and University of Technology Sydney, a distance of around one kilometre. A well-designed public transport service is broadly accessible to all users regardless of age, income or ability.

While Tech Central accommodates major public transport nodes such as Central Station and Redfern Station, areas such as Camperdown are less well connected, while nearby suburbs like Annandale, Balmain, Waterloo and Green Square are poorly connected to some parts of Tech Central. This is the result of severance from the rail corridor and a transport network that emphasises travel to and from the Sydney CBD at the expense of cross-regional links.

The way that the network is operated can limit the attractiveness of public transport reflecting the strong preference and high demand for peak hour services into the Eastern Harbour CBD. This includes minimal servicing of Macdonaldtown Station, reduced services in off-peak periods and bus routes that are noticeably slower than driving. This can result in high private vehicle usage for non-work trips and trips outside of CBDs which does not support the use of sustainable modes to access to the night-time economy, supporting an emerging 'Neon Grid' for Greater Sydney and supporting employment . Public transport is most attractive when it is fast, frequent and reliable.

Since COVID-19 and the pivot to work from home, increased flexible working will allow a spreading of peak demand across the day, with a greater focus on all-day and all-night public transport frequency that connects our customer's whole lives, maximising use of existing vehicles and infrastructure.

The way that the road network is operated can also have an impact on the places major streets pass through. One-way pairs, such as Regent Street and Gibbons Street through Redfern, can have benefits to the operation of the road network by providing increased capacity and reducing conflicting movements at intersections. This, however, can lead to faster travel speeds that create an intimidating environment for walking and dwelling, while reducing the legibility of public transport services by forcing buses to use different streets in opposing directions of travel.

Removal of one-way pairs through places like Redfern has the potential to support the safety and amenity of the place and legibility of the public transport network. By concentrating calmed two-way traffic and a rapid bus service on Regent Street and allowing general traffic to bypass the centre of Redfern, there is the potential to create a safe and welcoming place supported by an easy to use public transport network.

With many driving trips to Tech Central originating in areas less than five kilometres away, cycling has the potential to achieve a substantial mode share of those working, studying and visiting the area if people are provided with safe, direct and connected cycle infrastructure. Cycling can be faster door-to-door than car or public transport for trips up to five kilometres in urban areas. Emerging forms of micromobility, such as e-bikes, are also increasing the range and convenience of travel on cycling networks.

Meeting the vision of improving the travel experience and achieving a 30-minute city while undergoing considerable residential and employment growth will require changes in travel behaviour. Transport needs to be more efficient in the future, while using the same amount of road space. Private car trips will become slower and on-street parking may be reduced as road space is allocated to rapid bus lines and cycleways to support more people moving more reliably.

This strategic direction seeks to improve access to Tech Central by public transport and cycling and ensure that by 2036, more people choose to travel by sustainable modes, leveraging off confirmed and proposed investments in safe, connected cycling networks, major road and rail infrastructure and public transport services.

Supporting the vision and objectives

This strategic direction supports the vision and objectives for this Transport Strategy. The initiatives identified under this strategic direction contribute to achieving the vision and objectives for Tech Central and Greater Sydney by:

- **Supporting the vision of the 30-minute city**: Transport to, from and within Tech Central creates connections that means people can access their day to day needs within 30 minutes by public transport, walking or cycling. This is particularly important for key destinations further from high-quality mass transit like Royal Prince Alfred Hospital and parts of the University of Sydney.
- **Supporting existing and planned land use**: Providing fast, convenient access by public transport to key precincts like Australian Technology Park and Central Station are critical to realising their vision as vibrant and sustainable innovation precincts that attract global talent to Sydney and support the organic transfer of knowledge between professionals. Connecting institutions to health, education and research hubs outside of Tech Central, such as The Bays, Randwick and Westmead, creates more opportunity for collaboration, innovation and economic.
- **Encourage sustainable travel behaviours**: Providing high-quality public transport links that are comfortable, reliable, frequent and time-competitive with private vehicle will help reduce the environmental impacts and space requirements for travel to and from Tech Central, reinforcing its vision as a leader in low-carbon initiatives[8]. Journey to Work data indicates that in Tech Central, cycling is more common than in other parts of Greater Sydney. It can also be faster than car or public transport for

[8] *Camperdown Ultimo Place Strategy*, (Greater Sydney Commission 2019)

short everyday trips, and, if supported by a safe, connected network, would cater for a growing range of short everyday trips by riders of all ages and abilities.

- **Supporting social equity**: Providing low-cost ways and easily accessible ways of travelling means that all people living, working or visiting Tech Central can access their daily travel needs (including medical and education needs) regardless of income or financial commitments.

Priorities for investigation

Priorities supporting this strategic direction have been identified that respond to Strategic Direction 2: Enhancing access by cycling and public transport within and beyond Tech Central's boundaries. Priorities for investigation and further consideration are listed in this section and Figure 17 maps priorities that enhance access by cycling and public transport.

2.1 - A Metro connected precinct

Investigate the inclusion of one or more stations on a future Sydney Metro West extension to the South East within Tech Central, such as at Haymarket to serve the University of Technology Sydney and Central Precinct Renewal and Camperdown to serve the University of Sydney and Royal Prince Alfred Precinct.

2.2 - A high quality public transport solution for Parramatta Road

Investigate a fast, frequent and reliable public transport solution on Parramatta Road between Burwood and the Harbour CBD, connecting the Camperdown and Haymarket nodes along the Ultimo axis.

2.3 - A fast, frequent, reliable and connected rapid bus network

Investigating implementation of a network of rapid bus lines that support travel to, from and within Tech Central including:

a) A rapid bus line from Coogee to The Bays via UNSW, Green Square, Waterloo, Redfern, the University of Sydney and Royal Prince Alfred Precinct, connecting the Eveleigh and Camperdown nodes along the Darlington axis and providing key connections to the Bays and Randwick.
b) A rapid bus line from La Perouse to Harbour CBD/Pyrmont via Mascot, Green Square, Waterloo, Redfern and along Harris Street in Pyrmont.
c) A rapid bus line from Miranda to Harbour CBD/Pyrmont via Newtown, Royal Prince Alfred Hospital and Glebe.
d) A rapid bus line from Canterbury to Harbour CBD along Enmore Road, King Street, City Road and Broadway.
e) Complete a network of high quality bus priority infrastructure to support the rapid bus lines to be a faster option than driving, with interventions like bus lanes and priority at intersections above turning traffic.
f) Use of smart technology to provide signal priority and regulate the headway of the frequent rapid bus services.
g) Great, safe and high amenity places along rapid bus lines and around rapid bus stops, with bus infrastructure that integrates with and enhances the surrounding area.
h) A layover strategy for new rapid bus lines that supports reliable service while recognising the competing demands for space in the CBD

2.4 - Safe, convenient and connected cycling and micromobility network

Investigate a safe, convenient and connected network of cycle and micromobility infrastructure within Tech Central and surrounding areas including:

a) Implement a connected metropolitan cycling network to support access between the nodes of Tech Central and surrounding areas, with priority links between Central and Redfern, along Parramatta Road/Broadway and along Missenden Road (or a nearby alternative route.)
b) Implement a safe and connected local cycle network that supports local trips and access to the metropolitan cycling for longer trips.
c) Reduce speed limits and through traffic volumes on local streets to support a 'low stress' street environment for safe shared use and last mile access to the cycle network.
d) Provide cycleways and bicycle crossing facilities as part of major transport projects, including road upgrades.
e) Providing consistent, integrated wayfinding to and from key destinations on the cycleway network.

2.5 - Secure and convenient cycling end of trip facilities

Provide secure and convenient bicycle parking, end of trip facilities and cycling and micromobility hubs at all key employment sites, anchor institutions, public transport interchanges, town centres and other destinations.

2.6 - Supporting new and emerging forms of micromobility

Support the safe introduction of new and emerging forms of micromobility by collaborating with private operators of micromobility share schemes, investigating opportunities for Mobility as a Service platforms and incentives for multimodal integration, ensuring that all cycling and micromobility networks can safely accommodate a wide range of future micromobility devices, and ensuring that any bike parking, end of trip facilities and cycling and micromobility hubs can accommodate future forms of micromobility.

2.7 - A convenient public transport network accessible to all

Provide a frequent, convenient and connected public transport network and ensure that all vehicles, stops, stations, footpaths and other infrastructure are accessible to people or all ages and abilities including:

a) Upgrade Macdonaldtown station to be fully accessible.
b) Provide an all-day increase in service frequency at Newtown and Macdonaldtown stations across the week.
c) Review and upgrade all bus stops to ensure they are fully accessible, are supported by clear wayfinding and are located to support convenient interchange.
d) Review the existing bus network and make staged changes to routes and increases in frequency towards the future rapid bus services.
e) Regularly review the frequency, routing and hours of operations for bus routes across Tech Central to improve network legibility and improve travel times.
f) A layover strategy for buses that supports reliable service while recognising the competing demands for space in the CBD

2.8 - An efficient and equitable allocation of road space and capacity

Take advantage of the opportunities created by WestConnex and the Western Harbour Tunnel to review current road space allocation, road network priority and road network operations throughout Tech Central, including:

a) Reduced through traffic in key places such as Newtown, Camperdown, Redfern and Ultimo.
b) Increased priority on walking, cycling and public transport.
c) Management of freight and servicing access by time of day.
d) Protected emergency vehicle access to Royal Prince Alfred Precinct.
e) Support for the night-time economy in key precincts such as Glebe, Newtown and Redfern.
f) Utilisation of smart technology and dynamic prioritisation to respond to changes in demand over different time periods where spatial prioritisation isn't possible.
g) Use of dynamic kerb technology to increase space available for outdoor dining and dwelling.
h) The conversion of one-way pairs to two-way operations on roads that support rapid bus lines and to support lower traffic speeds and volumes in locations with high place function such as Regent Street/Botany Road in Redfern and Harris Street in Ultimo.

Figure 17 Priorities for investigation that enhance access by cycling and public transport

Strategic Direction 3: Shaping a sustainable and resilient precinct

The future success of Tech Central depends on its resilience – its ability to withstand social, economic and environment transitions, shocks and stresses, and the response of the transport network. Shaping a resilient precinct requires preparation and adaptation to uncertain demands. These can be short term – for example, mitigating the impacts of traffic disruptions or partial network closure, or long term, such as cumulative global warming, the heat island effect and the effects of increasing temperatures on the liveability, productivity and environmental health of our communities.

The global COVID-19 pandemic has brought a profound shift in the way that people live and work in cities, and Tech Central is no exception. Furthermore, there are likely to be lasting economic implications associated with lockdowns, increased public debt and economic recession impacting people's ability to work, access essential services and otherwise engage in society. Cities have been at the epicentre of the COVID-19 pandemic, but they also offer an opportunity to accelerate the transition to a resilient, equitable and low-carbon future. The pandemic has shone a spotlight on cities as the confluence of people, economy and assets; when they stop working, so does the global economy.

Whether talking about the impact of a pandemic, mitigating the impact of increased temperatures and the heat island effect or providing opportunities for spontaneous interaction and collaboration, space is a key ingredient. Space for people is one of the key inputs for a competitive innovation precinct, and can support a tree canopy for heat mitigation, enable social distancing and enable a vibrant public realm. In a constrained environment such as in Tech Central, space is at a premium, and so requires the prioritisation of space efficient modes like walking, cycling and public transport over space inefficient modes like single occupant vehicles to achieve resilience and thrive.

The contribution to net zero carbon in Tech Central needs to address opportunities for clean mobility, active transport and green construction availed over the life cycle of the project. This includes:

- High mode share for walking and cycling
- Reducing the need to build new infrastructure through the efficient use of existing road space and transport network capacity
- Design and material use – specification and design efficiencies
- Planning for behavioural change and demand for new infrastructure (current and future needs)
- Operational/management and incentivising use
- End-of-life demolition and recycling factors.

In Tech Central, TfNSW has the opportunity to work with the City of Sydney and Inner West Council to deliver transport infrastructure that adopts a sustainable, whole-of-life approach. This includes a coordinated approach to parking provision in new developments, encouraging parking structures that can be adaptively reused in the future, rightsizing of planned infrastructure investments and considering the construction impacts and scalability of on-road public transport solutions.

Supporting the vision and objectives

This strategic direction supports the vision and objectives for this Transport Strategy. The initiatives identified under this strategic direction contribute to achieving the vision and objectives for Tech Central and Greater Sydney by:

- **Reducing transport-related emissions**: Moving towards a net-zero precinct to support the NSW Government's target of net-zero emissions by 2030, and the vision for Tech Central as a low-carbon precinct[9]. Each kilometre cycled avoids 250g of CO_2 emissions[10]. See Breakout 6.
- **Creating a resilient transport network**: Responding to known and unknown economic impacts by creating a network that can respond to shocks, has planned spare capacity and where routes can be flexibly managed. The flexible management of parking to control demand and encourage sustainable travel behaviours will also enhance the ability of Tech Central to respond to external changes.
- **Mitigating rising temperatures**: As global temperatures increase and urban heat island effects are compounded, ensuring that canopy cover, greening and the use of materials is necessary to provide a cooler, more liveable environment for residents, visitors and workers. See Breakout 7.
- **Leveraging investment in major transport infrastructure**: Committed projects like WestConnex, Western Harbour Tunnel and Sydney Metro City and Southwest provide an opportunity to rethink how streets operate within Tech Central. By shaping surface transport networks and policies that direct demand onto these facilities and promote more space-efficient modes like public transport, walking and cycling, more growth can be accommodated within the existing footprint of the transport network, with reduced environmental impact.
- **Maintaining connection to people and place**: Incorporating local Aboriginal and non-Aboriginal heritage and stories into the built form, including transport infrastructure helps create more liveable places and contributes to a stronger sense of community and connection for residents and visitors.

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[9] *Camperdown-Ultimo Place Strategy* (Greater Sydney Commission, 2019)

[10] Coalition for Urban Transitions, 2020. The Economic Case of Greening the Global Recovery through Cities. Available at: https://urbantransitions.global/wp-content/uploads/2020/09/The_Economic_Case_for_Greening_the_Global_Recovery_through_Cities_web_FINAL.pdf . Accessed 17 September 2020

Breakout 6 Promoting use of electric vehicles

ELECTRIC VEHICLES

Image source: NSW Electric Vehicle Strategy

In the NSW Electric Vehicle Strategy, released in mid-2021, the NSW Government has identified five areas for action required to make New South Wales the easiest place to buy and use an EV in Australia. These five areas for action are:

- Helping drivers buy an electric vehicle
- Building a world-class electric vehicle charging network
- Making it easy to drive an electric vehicle
- Creating jobs and growing the economy
- Keeping road funding fair and sustainable

Breakout 7 Mitigating the impacts of urban heat

COOLER CITIES

Image source: One Central Park, Green Façade, accessed at tensile.com.au/project/one-central-park

Cities experience Urban heat island effects that make urban areas hotter during the day, and slower to cool down at night. The predominance of hard surfaces (including streets, car parks and dark roofs) and scarcity of green and blue spaces means that heat is stored during the day and radiated back into the surrounds. Hotter temperatures can have adverse effects on human health, as well as making it less attractive to walk, cycle, wait for public transport or spend time in outdoor spaces.

Elements of the built environment can help to mitigate urban heat island effects, including:

- Use of cool, permeable paving that stores less heat
- Use of green walls, roofs and canopies
- Surface water features that provide evaporative cooling
- Planting tree canopy
- Providing shading structures/shade canopies
- Minimising hard, dark surfaces like bitumen carparks and roads
- Minimising the use of dark materials for roofs, including transport infrastructure.

Priorities for investigation

This section shows the priorities for investigation and further consideration that respond to Strategic Direction 3 – Shaping a sustainable and resilient precinct.

3.1 - Safer streets for all

Improve safety for all road users, particularly vulnerable road users such as pedestrians and cyclists, by implementing a Safe Systems approach to road safety while transforming the streets identified in Strategic Direction 1 and Strategic Direction 2, including:

a) Review of speed limits throughout Tech Central, particularly in High Pedestrian Activity Areas and on local streets.
b) Design streets that are self-explaining environments, with infrastructure that supports the speed environment.
c) Redesign streets and intersections according with Safe System principles so that crashes don't result in serious injury or death.
d) Remove green-on-green conflicts at all signalised intersections.
e) Ensure that the network is operated in a way that provides greater priority through reduced wait time for pedestrians, reducing the likelihood of risk taking by people waiting to cross the road.
f) Implement traffic calming measures that prioritise pedestrian and cyclist access in low traffic neighbourhoods, areas of higher place value and High Pedestrian Activity areas.
g) Create safe and integrated transport interchanges for future high priority modes (like rapid bus, light rail, metro and rail) that prioritise pedestrian access.

3.2 - Encourage sustainable travel patterns and reduced demand for travel

Work with businesses, institutions and councils to manage travel demand by developing a focused and data-led Travel Demand Management Strategy for Tech Central, supported by precinct wide Travel Plans for Haymarket, Camperdown and Eveleigh activity nodes. The Travel Plans will:

a) Identify strategies that encourage the use of public and active transport and reduce the proportion of single-occupant car journeys.
b) Include Transport Access Guides that provides information to employees, patients and visitors about the range of travel modes, access arrangements and supporting facilities.
c) Establish mode share targets and outline robust actions to achieve the targets.
d) Identify relevant workplace policies such as flexible working arrangements that enable office-based staff to travel outside peak periods, or which reduce the need for work related travel.
e) Consider any relevant parking policies to manage travel demand.
f) Detail end of trip facilities and incentives to encourage walking and cycling, as well as consideration of bike sharing schemes and e-bikes.
g) Detail carpooling operations and monitoring of parking priority.
h) Appoint a Travel Plan Coordinator to oversee the implementation of the Travel Plans or Workplace travel plans.

3.3 - Respond to the challenges of a changing climate

Deliver infrastructure and policy that supports sustainability and resilience in Tech Central including:

a) Reduce the urban heat island effect with the selection of construction materials, reduced hard surfaces and increased street planting and shade to support walking and cycling trips.
b) Prioritise shared vehicle use through infrastructure, policy and travel plans.
c) Adopt electric buses and support the use of electric vehicles.
d) Work with anchor institutions to develop a coordinated collaboration area approach to parking.
e) Ensure that development controls on parking within Tech Central support sustainable travel behaviours.
f) Consider the expansion of the parking space levy and area-wide demand and constraints on parking.
g) Investigate opportunities to use recycled and/or low-carbon materials for transport infrastructure, including pavements, buildings, shelters and street furniture.
h) Transition to renewable power sources for transport infrastructure, including train stations, light rail stops, bus stops and bike sheds.

3.4 - Celebrate Aboriginal culture and heritage

Collaborate with Aboriginal people and community groups within Tech Central to deliver urban design, transport infrastructure (vehicles and built form) that celebrate local Aboriginal heritage and culture.

3.5 - A vibrant local economy serviced by sustainable local freight

Deliver infrastructure and policy to support local freight access including:

a) Investigate the location of consolidated, shared, multimodal freight hubs for shared use in Tech Central at key locations, particularly in:
    - Royal Prince Alfred Hospital/University of Sydney precinct
    - Broadway
    - Australian Technology Park
    - Central Precinct
    - Waterloo Precinct
b) Investigate use of supporting flexible freight operations such as micro-freight (electric cargo bikes), especially for last mile access from multimodal freight hubs.
c) Investigate smart management of loading zones close to businesses, including occupancy information, flexible time-of-day access restrictions and the use of dynamic kerb allocation.

Strategic Direction 4: Fostering innovation

Relevance for this Transport Strategy

Tech Central, through its central Sydney location, has access to some of Australia's top universities and other key educational institutions that produce the quality and type of talent and exchange of ideas drives an innovative and technology-focused approach to solving problems. This approach should extend to the way we plan, collaborate and deliver to achieve a connected, liveable, productive and sustainable transport network in the area.

Strategic Direction 4 - Fostering innovation highlights the ways in which creative and agile approaches could be harnessed to develop and trial new ways of travelling, new technologies for transport infrastructure (digital and physical) or new approaches to policy setting.

This strategic direction is intended to support the other three strategic directions that directly relate to the transport task within, to and from Tech Central. Innovative approaches and technologies that are successfully trialled within Tech Central could be applied in other parts of NSW or Australia.

For this Transport Strategy, innovation can mean:

- Adapting proven technologies or policies to a new context within Tech Central.
- Developing new technologies that help deliver the vision for transport in Tech Central, such as new construction materials, modes, power sources or digital platforms (see Breakout 8).
- Finding new ways of delivering infrastructure, policy and services through collaboration between TfNSW, local council, universities, technical specialists, developers, businesses, residents and community groups.

Breakout 8 Embracing digital

DIGITAL SOLUTIONS

Source: Visionect

The widespread availability of real-time operating data makes it possible to apply digital solutions to flexibly manage the network and customer experience. For example:

- TfNSW are rolling out 'e-ink' timetable information displays at bus stops that automatically update with expected arrival and departure times. Similar technology has been trialled on parking restriction signage for clearways and special events.
- The NSW Government is developing options to trial Mobility as a Service (MaaS), which are likely to commence in 2022. Under a MaaS platform, customers are able to use a digital platform to plan and pay for trips by public and shared transport, including subscription packages with discounts.
- Geofencing and digital wayfinding can assist during special events- for example, during large events at Western Sydney Stadium at Parramatta, rideshare bookings do not allow pickups from within a designated zone close to the stadium, to encourage crowds to disperse after events.

Pilot implementation is a valuable way for transport agencies or governments to quickly test new interventions. They enable change to happen quickly and can demonstrate the practical benefits that could be gained from more permanent infrastructure, as well as providing an opportunity to respond to feedback and adapt the final design based on experience.

Breakout 9 Piloting new ways of delivering transport

ON-DEMAND BUSES

Source: TfNSW (2020)

TfNSW launched the On Demand Public Transport program in November 2016 alongside its Future Transport Technology Roadmap.

Temporary pilots were used to test and learn new and creative transport services and delivery models and identify the technology required to underpin the models. The aim was to see whether these models could improve customer outcomes and achieve better value for money in the delivery of public transport services.

Since the metropolitan pilots commenced in October 2017, more than 610,000 passenger trips had been delivered to the end of January 2020, with monthly patronage across the remaining 5 pilots at that time being approximately 27,000 trips.

In Sydney, recent examples include rapid responses to the COVID-19 pandemic to cater for greater numbers of people walking and cycling in their local area. The City of Sydney and Transport for NSW has expanded the scope of 40 km/h speed zones (reduced from 50 km/h) on local streets, as well as 'pop-up' separated cycleways along Pyrmont Bridge Road, Bridge Road and Pitt Street.

Breakout 10 Pop-up infrastructure

POP-UP CYCLEWAYS

Source: Transport for NSW (2020)

In response to COVID-19 and demands for alternatives to crowded public transport services, Transport for NSW has begun delivering 'pop-up' transport infrastructure to give people more options to travel safely.

Delivered in the second half of 2020, the first stage of work focussed on cycling access to the Sydney CBD, with pop-up cycleways installed on six routes, including Bridge Road/Pyrmont Bridge Road in Glebe and Pyrmont. Typically, these are signposted and partially marked routes with semi-permanent barriers and flags between cycle and traffic lanes.

Since the first stage of work, further pop-up cycleways have been delivered at High Street, Randwick, Petersham to Newtown in the Inner West, and Wigram Street, Parramatta.

In Tech Central, a number of the transport initiatives identified in the previous sections are suitable for short term trials or testing.

Supporting the vision and objectives

This strategic direction supports the vision and objectives for this Transport Strategy. The initiatives identified under this strategic direction contribute to achieving the vision and objectives for Tech Central and Greater Sydney by:

- **Accelerating progress** towards NSW Government goals of net-zero carbon emissions and road safety by developing new, innovative solutions.
- **Supporting the local economy** by promoting Sydney as a global hub of technology and cutting-edge development, as well as a place to study or research.
- **Unlocking change** by showcasing and trialling new technologies or policy, providing the community and decision-makers with tangible examples of new ways of living and travelling.

Priorities for investigation

This section lists the priorities for investigation and further consideration that respond to Strategic Direction 4 – Fostering innovation.

4.1 - Test and learn through tactical urbanism.

Use a low cost tactical urbanism approach to test new interventions quickly through the use of trial changes and pop-up infrastructure, such as:

a) Trial bus lanes on busy bus corridors, such as Botany Road, Enmore Road, King Street and City Road.
b) Pop-up cycleway routes that can fill missing links in the safe and connected cycle network.
c) Pop-up parklets and places to linger implemented through trial closures of side streets to major roads like King Street, Parramatta Road and Broadway.
d) Programmed street closures for events and outdoor dining, pop-up footpath widening, temporary street furniture and landscaping – trees/planters, as implemented in Coogee and George Street between Bathurst Street and Haymarket.
e) Trial changes to road network operations, such as changes to signal timings to support walking, cycling green waves and public transport priority.
f) Trial low-traffic neighbourhoods through the use of tactical calming and street closures to discourage through traffic.

4.2 - Innovation in collaboration and delivery

Support local government in the implementation of initiatives to support the strategy through:

a) Identifying opportunities to delegate powers, such as through the Streets as Shared Spaces program.
b) Identifying opportunities to fast-track approval of changes that require TfNSW approval, such as speed zone reductions and traffic calming.

4.3 - Partnering with institutions and the private sector

Collaborating with institutions and the private sector to:

a) Encourage partnerships with precinct researchers, industry and entrepreneurs to develop and pilot sustainable transport intiatives in the collaboration area.
b) Safely trial new forms of shared micromobility, such as e-bikes.
c) Assess opportunities for the use of Mobility-as-a-Service (MaaS) platforms and associated incentives and multimodal integration.
d) Expand the use of microfreight for last mile deliveries, leveraging multimodal freight hubs.

4.4 - A smart and flexible Tech Central

Use smart technology to support flexible use of the transport network and the use of Mobility-as-a-Service platforms, such as:

a) E-ink bus stop and parking restrictions signs that can change over the day, week and year as the transport network changes.
b) Flexible use of the kerbside and trials of dynamic kerb management.

Chapter 5: Implementing the Transport Strategy

Priorities outlined in this strategy will require further, more detailed investigation and consultation prior to investment decision and government approval. Continued collaboration will be required, with Transport for NSW working alongside other parties that have a role in planning or implementation. In Tech Central, these parties include the City of Sydney and Inner West Council; other NSW Government departments and agencies; tertiary education institutions; major hospitals, community groups and key long-term tenants.

Ongoing and committed initiatives

Committed and ongoing initiatives in and around Tech Central include:

- WestConnex Stage 3 (under construction)
- Sydney Metro City and Southwest, including Central Walk (under construction)
- Sydney Metro West (pre-construction has commenced)
- Redfern Station Upgrade and New Southern Concourse (under construction)
- Central Precinct Renewal (in planning)
- Redfern North Eveleigh Precinct Renewal (in planning)
- Western Harbour Tunnel (in planning)

Other ongoing schemes include the Transport Accessibility Program (TAP) administered by Transport for NSW to make stations and ferry wharves accessible (alongside other amenity improvements).

Ongoing trials of electric vehicles in Sydney's bus fleet are underway, providing an avenue and lessons learned for Tech Central.

Opportunities for collaboration

Residents, workers and visitors to Tech Central will benefit if the transport network and places are enhanced through collaboration with nearby community groups and institutions to leverage:

- Research capabilities and act as a test bed for trialling new technologies, products and manufacturing or a 'living lab' to co-develop solutions with the community.
- Local knowledge, including Aboriginal heritage, to incorporate local histories and cultural identity into the public art, wayfinding and urban design that supports the transport network.

Opportunities for collaboration include:

- Build on existing wayfinding implemented by City of Sydney and continuing to work with councils, major institutions and key tenants to develop a recognisable brand for Tech Central and wayfinding design elements.
- Work with industry to develop digital wayfinding solutions.

- University partnerships to develop and design software and battery technology for electric vehicles.
- University and business partnerships to develop and deliver Mobility as a Service products.
- University partnerships, targeting architecture, industrial design and urban design schools, to create bespoke street designs for shared spaces and pedestrian-calmed environments that respond to different uses and times of day.
- University and industry partnership to explore solutions for street design that mitigates urban heat island impacts through material choice, plantings and microclimates.
- Work with community groups and university students of design to incorporate heritage elements into transport infrastructure projects.
- Work with community groups and university students to design tailored ‘pop up parklets’.
- Leverage opportunities to incorporate heritage elements in Redfern North Eveleigh Precinct Renewal and Central Precinct Renewal development and ‘themed’ pop up parks.
- Industry, university and council partnerships to consolidate freight within sub-precincts, and work with local councils to implement freight consolidation policies in planning controls for residential and commercial tenancies.

Next Steps

At present, most initiatives presented in this Transport Strategy are unfunded, are not designed / planned, nor costed. As such, the next step is to develop a detailed implementation plan that will identify a delivery pathway and sequencing for each of the initiatives identified in the strategy, subject to funding and funding requirements and opportunities, such as private sector investment and value capture. All new priorities would need business cases prior to investment decisions to progress. Outcomes of the implementation plan could include to:

- Work with Councils and other key stakeholders to identify mutually agreed immediate, easily implementable and affordable actions available, and funding to implement pilot programs or other trials over next 12 months.
- Develop a plan for the road network that takes advantage of traffic changes associated with the opening of WestConnex Stage 3 and Western Harbour Tunnel to calm traffic and reallocate road space to support walking, cycling and public transport.
- Take advantage of the opportunity provided by Sydney Metro West to consider a strategic investigation of the alignment for an extension to South East Sydney. Options for investigation could include locations such as Haymarket and Camperdown to link key destinations along the Innovation Corridor beyond the Eastern Harbour CBD to Pyrmont, Bays West and Westmead. Technical and economic feasibility assessments would need to be undertaken prior to an investment decision.

- Proceed with discrete packages of work where possible under existing avenues within TfNSW – e.g. Travel Plans/Travel Demand Management.
- Investigate next steps through the Business Case process for initiatives which require an investment decision.
- Investigate opportunities to collaborate or share work with current or planned Business Cases such as South East Sydney Transport Strategy and Parramatta Road Integrated Transport.
- Review the impact of new and updated policies such as Road User Space Allocation Policy (TfNSW) and NSW Speed Zoning Guidelines update.

Transport for NSW will continue to build upon the successful collaboration with state agencies, local government and stakeholders in developing and implementing the Strategy. Transport for NSW recognises that delivering place-based outcomes requires action across multiple agencies and local government and new ways of working across government.

Tech Central Camperdown-Ultimo
Place-based Transport Strategy

Disclaimer

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231 Elizabeth Street
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transport.nsw.gov.au

Attachment 8

SD23/095005
SF23/199

Health
Sydney
Local Health District

Professor Mark Scott AO
Vice Chancellor and President
University of Sydney
Camperdown NSW 2050

Via email: [redacted]

Dear Professor Mark Scott,

Re: Inquiry into Metro West Project by the Parliamentary Committee on Transport and Infrastructure

I write on behalf of Sydney Local Health District (SLHD) in support of the University of Sydney's (USyd) submission to the NSW Government's Parliamentary Inquiry on the Metro West Project, and in particular its case for consideration of a proposed complementary route alignment and a station at Camperdown to service the needs of Australia's premier hospital and leading health, education, research and innovation precinct.

We acknowledge appreciate and support the extensive work undertaken by the University of Sydney over many years, highlighting the critical need for a rail connection at Camperdown to service the rapidly growing area, and connect the significant research, education, health and industry activities at Camperdown and the work undertaken by SLHD on this matter.

The creation of a rapid transit link between two of Sydney's most significant "innovation intensive" locations, Camperdown and Westmead, is critical to delivering the State's vision and a shift to knowledge-intensive industry-driven economic growth.

The University's investigations have demonstrated that the proposed link is also long overdue for workers, patients and their families, visitors and students who currently travel long distances to and from Redfern Station, the current connecting heavy rail station, before then continuing their journey to Camperdown via other transport modes. Redfern Station is poorly located, particularly for patients and their families, health workers, students, USyd and RPA employees and well beyond efficient operational capacity.

Should you require any additional information, please contact [redacted], Deputy Director, Sydney Research and Sydney Innovation Precinct for Health Education Research (SIPfHER) via [redacted].

Yours sincerely

[redacted]

Dr Teresa Anderson AM
Chief Executive, SLHD
Date: 8-9-23

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Attachment 9

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Professor Mark Scott AO
Vice Chancellor and President
University of Sydney
Camperdown NSW 2050

19 September 2023

Dear Professor Scott

Re: Inquiry into Metro West Project by the Parliamentary Committee on Transport and Infrastructure

I write on behalf of the University of Technology Sydney (UTS) in support of the University of Sydney's submission to the NSW Government's Parliamentary Inquiry on the Metro West Project, and in particular its case for consideration of a proposed complementary route alignment and a station at Camperdown to service the needs of the rapidly emerging biotech node in Tech Central.

UTS acknowledges the extensive work undertaken by the University of Sydney over many years, highlighting the critical need for a rail connection at Camperdown to service the rapidly growing area, and connect the significant research, education, health and industry activities at Camperdown to western Sydney.

Creation of a rapid transit link between two of the Sydney's most significant "innovation intensive" locations, Tech Central and Westmead, is critical to delivering the State's vision and a shift to knowledge-intensive industry-driven economic growth.

The University of Sydney's investigations have demonstrated that the proposed link is also long overdue for workers, visitors and students who currently travel long distances to and from Redfern Station, the current connecting heavy rail station, before then continuing their journey to Camperdown via other transport modes. Redfern Station is poorly located, particularly for health workers, and well beyond efficient operational capacity.

Should you require any additional information, please contact me on [redacted] or by email [redacted]

Yours sincerely

[redacted]

Prof Glenn Wightwick

Deputy Vice-Chancellor and Vice-President (Enterprise)