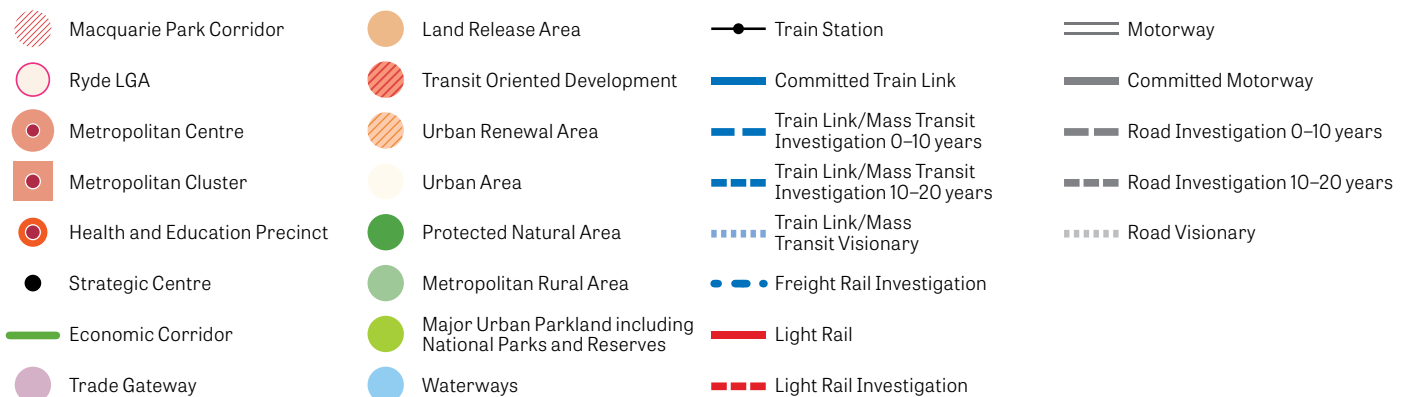
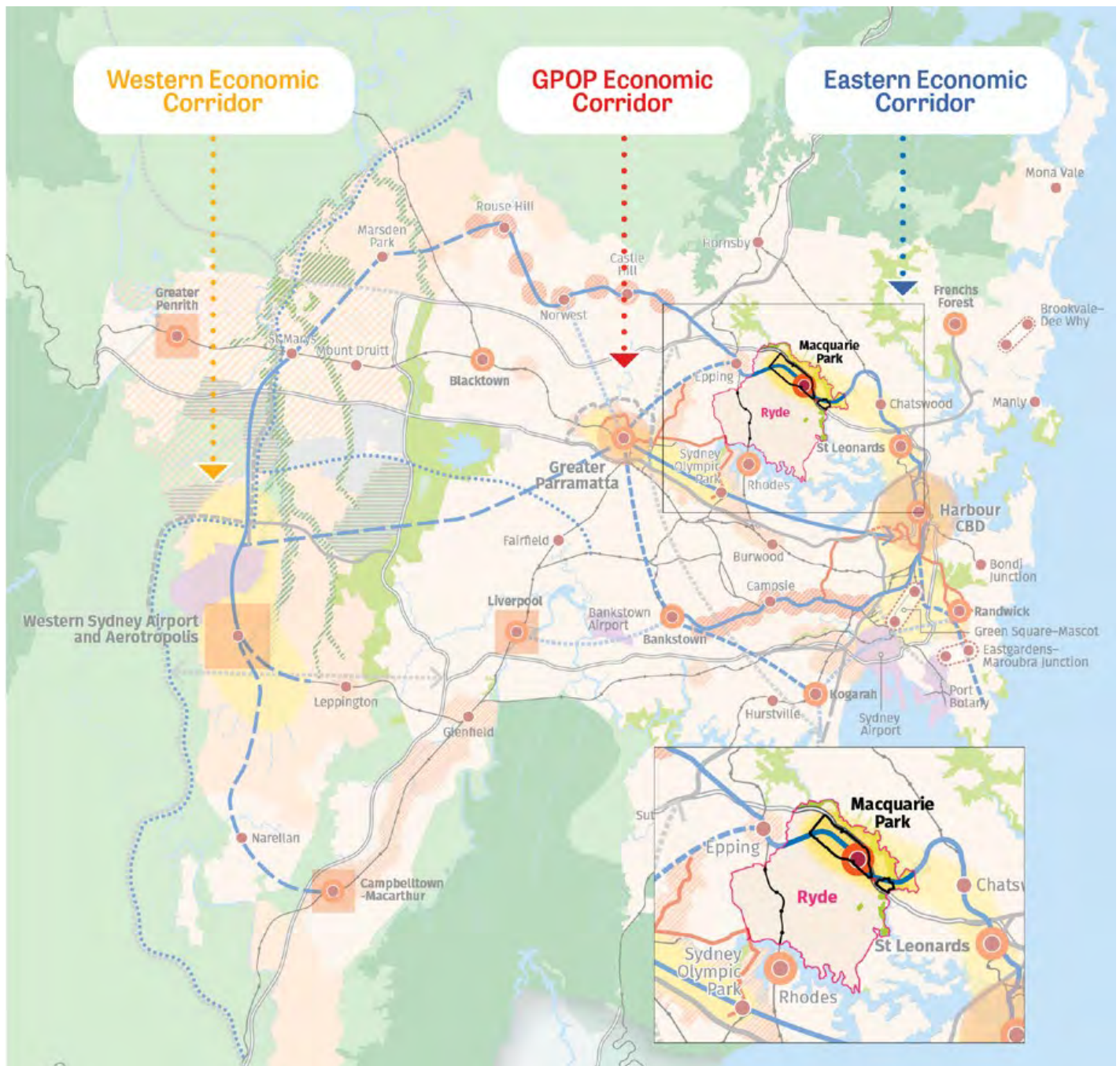


Macquarie Park Strategic Infrastructure and Services Assessment

Final Report

September 2022





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Acknowledgement of Country

The Greater Cities Commission proudly acknowledges Australia's First Peoples as the Traditional Owners and custodians of the lands and waters of what we call the six cities.

We pay respect to Elders past and present.

We recognise and value the extraordinary and ongoing contribution of First Nations peoples and communities to Australian life, and how this enriches all Australians.

We embrace the spirit of recognition, working towards ensuring both an equal voice and equity in all aspects of our society.

Published by the Greater Cities Commission

www.greatercities.au

Title: Macquarie Park Strategic Infrastructure and Services Assessment

Subtitle: Final Report

First published: September 2022

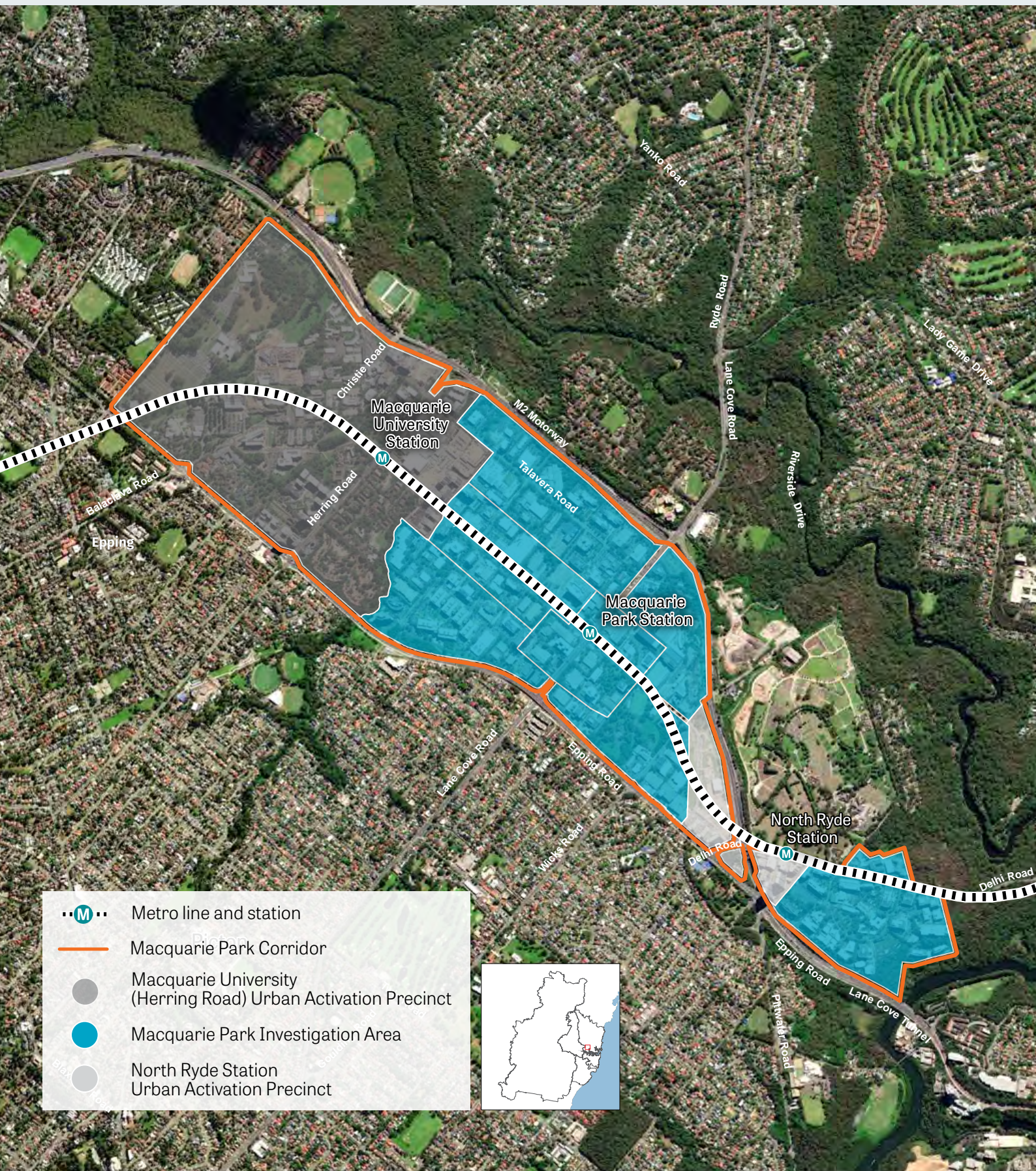


Figure 1: Macquarie Park Strategic Infrastructure and Services Assessment Area (Macquarie Park Corridor)

Executive summary

This report has been prepared to inform the *Macquarie Park Innovation Precinct Place Strategy (Place Strategy)* and *Macquarie Park Innovation Precinct Strategic Master Plan (Master Plan)* prepared by the Department of Planning and Environment (DPE).

The Greater Cities Commission (the Commission) has assisted DPE to bring together the City of Ryde Council (Council), state agencies and utilities to strategically understand the infrastructure and services needed to support recent and future growth and change across the 350-hectare area.

Macquarie Park has evolved since its conception in the 1960s as a business park anchored by a university, predominately accessed by private vehicles. The opening of three new rail stations at Macquarie University, Macquarie Park and North Ryde in 2009 (and subsequent conversion to metro) has spurred planning and delivery of a greater mix and intensity of land uses.

With this has come growing demand for infrastructure and services (such as schools, community facilities and open space) from the local community, workers and students. There is aspiration for Macquarie Park to continue to evolve into a vibrant, active and liveable place.

Liveability is essential for Macquarie Park to become a globally significant innovation precinct that is attractive to a highly skilled and talented workforce and local community.

The *Strategic Infrastructure and Services Assessment (SISA)* seeks to consider the need to support and facilitate the desired place outcomes for Macquarie Park, as outlined in the Place Strategy and Master Plan.

This report considers the impact of growth and change in three parts of the Macquarie Park Corridor (MPC) (illustrated at *Figure 1*) over the next 15 years:

- 1. North Ryde Station Urban Activation Precinct** (re-zoned in 2013): centred around the North Ryde Metro Station, across the M2 Motorway, connected by the Christopher Cassaniti pedestrian and cycle bridge.
- 2. Macquarie University (Herring Road) Urban Activation Precinct** (re-zoned in 2015): comprising Macquarie University, Macquarie Shopping Centre, the surrounds of Herring Road and northern parts of Waterloo Road.
- 3. Macquarie Park Investigation Area (MPIA):** spanning from the Macquarie Shopping Centre through to the commercial core, and south in the North Ryde Riverside Business Park. This area has not been rezoned and is the subject of a master planning process to facilitate potential future rezonings.

Exhibition of the SISA Draft Report

The SISA Draft Report was exhibited from July to August 2021, together with DPE's Draft Place Strategy and Master Plan, with over 110 submissions received. The SISA Final Report include updates from partner agencies in response to comments in the submissions.

Further investigations on the proposals identified in the SISA will now be undertaken through existing agency-led programs and as part of Place Strategy actions.

This report identifies for further investigation the infrastructure and services needed to support recent and approved development, as well as development anticipated under existing controls and further rezoning. It broadly identifies costs, land needs and funding sources, and is available for consideration by the community, stakeholders and decision makers.

Council, state agencies and utilities have assessed the infrastructure and services needed to support people living in around 5,000 new homes built over last five years in the MPC (focused in the North Ryde Station and Herring Road Precincts) and almost 10,000 new homes forecast to be delivered over the next 15 years. Consideration has also been given to the more than 15,000 new jobs to be created in the MPC over the same time period.

The forecasts have been moderated owing to the impact of COVID-19 (including accounting for delays in a number of large developments), although the full impacts of COVID-19 are still unknown at the time of preparing the assessment.

Findings

Infrastructure and services were assessed on a sector basis and covered state, regional and local infrastructure. A preliminary assessment of existing infrastructure and services was considered, with proposals nominated for further investigation by respective agencies to meet the anticipated growth based on a common set of land use forecasts through to 2036. This assessment considered existing demand, largely based on growth from 2016 to 2021, and future growth over a 15-year horizon from 2021 to 2036. More than 190 proposals were identified.



Cost

Based on this assessment, the high level estimated costs (excluding land costs) of infrastructure and service proposals to 2036 is approximately \$6.4 billion. This figure includes capital costs to deliver infrastructure and service proposals in the MPC through to 2036, as well as planning and development costs to enable delivery of future projects beyond 2036.

A significant proportion of these costs (about \$3.9 billion) is associated with major city-shaping and city-serving transport infrastructure, such as a potential future Parramatta to Epping mass transit/train link, several strategic rapid bus corridors and planning/development costs to enable future public transport links beyond 2036. This infrastructure will provide wide-ranging benefits for many communities across Greater Sydney, therefore, only a small portion of these costs can truly be attributed to the MPC.

Key cost findings for each infrastructure and service category are as follows:

- **Public transport:** estimated to cost around \$4.2 billion. This includes around \$3.9 billion for major city-shaping and city-serving transport infrastructure (including planning and development costs for infrastructure planned for delivery beyond 2036), and around \$0.3 billion for the delivery of public transport infrastructure and service proposals within the MPC to 2036.
- **Health, justice, police and emergency services:** estimated to cost around \$553 million. This includes \$479 million announced by the NSW Government for the Ryde Hospital upgrade.
- **Roads and active transport:** estimated to cost around \$299 million. This includes the delivery of local roads such as the fine grain street network across the MPIA, as well as upgrades to major road intersections e.g. Lane Cove Road.
- **Education:** estimated to cost around \$430 million. This includes the delivery of two new primary schools and a new high school.
- **Sport and active recreation:** estimated to cost around \$159 million. This includes both indoor and outdoor sport and active recreation facilities.

- **Cultural and community infrastructure:** estimated to cost around \$153 million. This includes regional community facilities, creative and event spaces, and library facilities.
- **Green and blue infrastructure (including parkland and open space):** estimated to cost around \$56 million. This includes new open space and parks, embellishment of existing parkland and waterway improvements.
- **Water and electricity:** estimated to cost around \$484 million. This includes drinking water infrastructure, stormwater infrastructure and a recycled water scheme.

When looking at the level of investment over time, investment of \$1.6 billion has been assessed as being required within the next five years, while the remaining investment of \$4.8 billion is within the medium to longer term (6 to 15 years). The assessment has also considered a small number of recently completed proposals (around \$11 million).

Funding sources

This assessment recognises that the amount of infrastructure proposed requires a clear understanding of costs to guide better decision-making. It also considers the fundamental question of who should contribute to paying for the provision of infrastructure aligned to growth.

Of the estimated \$6.4 billion in costs to 2036, the NSW Government would be the likely funding source for the majority of these costs. This would either be the NSW Government in combination with Commonwealth funding (49 per cent), the NSW Government stand-alone (33 per cent), or the NSW Government in combination with a Special Infrastructure Contribution (SIC) (3 per cent). A SIC for the MPC would require further investigation as part of implementation and funding considerations.

Local government would be responsible for a proportion of infrastructure costs based on proposals identified in this assessment (6 per cent). However, more detailed neighbourhood level planning may suggest additional local infrastructure work is needed, such as further stormwater improvements.

The remainder of costs would likely be funded directly through a SIC, or via customer charges.



Land requirements

Land will need to be acquired to deliver the infrastructure and service proposals identified in this assessment. Excluding land already in Government ownership, around 60 hectares of land is required.

Most of this land is needed for sporting facilities and fields, open space and waterways, as well as roads and active transport. A breakdown of the key land requirements and purpose is as follows:

- around 25 hectares for sporting facilities and fields. A significant part of this is for four ovals (which can also be used as rectangular fields), requiring 18 hectares of land. However, opportunities for the shared use of existing facilities, or to locate some of these on underutilised land in proximity to the MPC could be considered.
- around 11 hectares for roads and active transport (the majority of this is attributed to the fine grain road network)
- around 10 hectares for green and blue infrastructure, such as local and district open space
- around 6 hectares for public transport including mass transit stations and bus layovers
- around 5.5 hectares of land for two new primary schools and one new high school.

While most of the land required is specifically within the MPC, some proposals could be delivered in nearby areas to meet service needs of the MPC. Further investigation is needed to determine the feasibility of this.

The land required for infrastructure could be reduced through co-location with other infrastructure (e.g. co-locating ovals/fields with new schools), through integrated proposals with private development, or be achieved through the purchase or dedication of building floorspace.

More detailed scoping, site and engineering investigations will be needed to refine the estimated land required to practically deliver each proposal.

This assessment has also identified a range of policy initiatives, non-capital proposals and innovative approaches to servicing and delivery that are designed to complement the infrastructure and service proposals. These contribute to meeting the demand and needs of future residents and workers, and achieving broader place-making objectives for the MPC.



Delivery and implementation considerations

The analysis has highlighted a range of key findings that require consideration as part of next steps and implementation, including:

- a substantial level of infrastructure investment is required to meet the growth in population and dwellings that has already occurred in the two Urban Activation Precincts (UAPs) – in particular social infrastructure (e.g. schools) to support new residential communities and recent new commercial developments occurring in the MPIA.
- the land acquisition requirements, particularly for sports facilities, open space, roads and active transport, and schools are significant within an already established urban environment. It is important that land identified for proposals in the medium and the longer term (beyond 2036) is reserved to reduce future acquisition costs and avoid further deficits in service provision.
- further work is required to optimise government owned land. More detailed scoping work should be undertaken to minimise acquisition where possible.
- a partnership with council, businesses and Macquarie University should be established to:
 - foster culture and the arts in the MPC
 - attract and support local artists and workers in creative industries
 - support the growth of a diverse innovation ecosystem
 - contribute to activation of the place for residents, workers, students and visitors.
- further investigations to support re-zoning at the neighbourhood level and to determine the final quantum of gross floor area (GFA) for residential, retail, commercial and community uses, infrastructure prioritisation and funding sources in consultation with stakeholders.
- more detailed work on development controls on a block by block basis to define the desired land use and built form outcomes for the area, as well as more accurate forecasts of the number of dwellings and building floorspace for employment.

- more detailed investigation, including the use of transport modelling, to develop and validate the scope of individual transport proposals and their contribution towards creating a safe, efficient and reliable transport system that manages and balances access with the movement and place functions on the street network.

Next steps

The SISA has informed the final Place Strategy and Master Plan from an infrastructure and service needs perspective.

The SISA will help guide strategic land use and infrastructure decision making by Council and the NSW Government, including detailed neighbourhood master plans for future re-zonings, and guide further technical investigation of infrastructure and service proposals.





1 Introduction

The Macquarie Park Corridor (MPC) is situated in Wallumedegal Country, in the North District of Greater Sydney. It is a strategic centre in Greater Sydney's Eastern Economic Corridor and is the largest non-CBD office market in Australia.

1.1 Overview

The MPC has transformed rapidly since its inception in the 1960's into a significant metropolitan hi-tech industrial business park employment area centred around Macquarie University. Highly skilled workers and tertiary students from across Greater Sydney travel to the MPC.

The MPC is now at the next stage of its evolution, catalysed by the opening of the Epping to Chatswood Rail Line and three stations (North Ryde, Macquarie Park, and Macquarie University) along the corridor in 2009, subsequently converted to Metro in 2019.

The new accessibility afforded by the rail link and the potential for transit orientated development gave rise to the establishment of two mixed-use precincts, formerly referred to as Urban Activation Precincts (UAP): North Ryde Station to the south-east (re-zoned in 2013), and Macquarie University (Herring Road) in the north-west (re-zoned in 2015).

At the centre of the MPC is the Macquarie Park Investigation Area (MPIA). This area is primarily zoned commercial and the subject of a master plan prepared by the Department of Planning and Environment (DPE). These areas are illustrated at *Figure 1*.

The Master Plan seeks to change the current 'campus style' office setting on large lots with little permeability, to a finer grain mixed use urban form to create a vibrant 24/7 place for residents, workers and tertiary students.

The SISA has considered the MPC, an area of approximately 350 hectares, and aligns with the geography of the Macquarie Park Place Strategy

(Place Strategy). It has sought to holistically identify the infrastructure and services needed to support recent and future growth.

The assessment has been prepared to help guide strategic land use and infrastructure decision making by the City of Ryde Council (Council) and the NSW Government.

1.2 Objectives

The objectives of the SISA are to:







1. Strategically understand the infrastructure and services needed to support:
 - a. Development that has occurred in the last five years and in the immediate pipeline;
 - b. Growth over medium to longer term horizon for the MPC, including:
 - i. the already re-zoned precincts of North Ryde Station and Macquarie University (Herring Road).
 - ii. potential additional mixed-use development in the MPIA.
2. Strategically understand the land requirements for new infrastructure and services prior to future re-zoning.
3. Identify at a strategic level the total costs and indicative delivery timeframes for infrastructure and services to be delivered and further investigated by the NSW Government and Council.
4. Identify potential funding options to guide decision making.

What is infrastructure?

Infrastructure and services are the basic facilities and installations to support society and are essential to creating liveable, productive and sustainable places.

Infrastructure and services assessed in the SISA include state and local infrastructure, broken down into the categories below.

Table 1: Infrastructure categories and examples

Category	Type	Responsible
 Cultural and community infrastructure	<ul style="list-style-type: none"> • Gallery • Performance space • Museum • Library • Community centre 	State government Local government
 Education	<ul style="list-style-type: none"> • Primary school • Secondary school • Support facilities 	State government
 Green and blue infrastructure	<ul style="list-style-type: none"> • Public open space (local and regional) • Passive open space • Tree planting • Blue infrastructure (stormwater, riparian areas, riparian corridor planting) 	State government Local government
 Health, justice, police and emergency services	<ul style="list-style-type: none"> • Hospital • Ambulance station • Community health facility • Courthouse / tribunal • Fire station • Police station 	State government
 Public transport	<ul style="list-style-type: none"> • Rail/metro • Interchange and stations (including bus stops, layovers) • Fleet (e.g. buses, trains) 	State government Local government
 Roads and active transport	<ul style="list-style-type: none"> • State road (e.g. Lane Cove Road) • Local road (e.g. Cottonwood Crescent) • Cycleways • Footpaths • Electric vehicle charging stations 	State government Local government
 Sport and active recreation	<ul style="list-style-type: none"> • Active open space / recreation facility • Sporting field • Indoor / outdoor court 	State government Local government
 Water and electricity	<ul style="list-style-type: none"> • Wastewater treatment plant / recycling plant • Water pumping station • Reservoir • Stormwater infrastructure • Electrical zone substation 	State government Local government Utilities

1.3 Methodology

The Commission has adopted elements of the Place-based Infrastructure Compact (PIC) model (www.greatercities.au/thought-leadership/infrastructure) and methodology to prepare a relatively small scale infrastructure and service needs assessment in the MPC.

Similar to a PIC, the SISA relies on collaborative effort between state agencies, utility providers and local councils to examine the relationship between growth and infrastructure. The following partners have contributed to the preparation of the SISA:

- Ausgrid
- City of Ryde Council
- Create NSW (Create Infrastructure)
- Fire and Rescue NSW
- Office of Sport
- NSW Department of Communities and Justice
- NSW Department of Education (School Infrastructure NSW)
- NSW Department of Planning and Environment
- NSW Health
- NSW Police
- Sydney Water
- Transport for NSW

The role of the Council in the SISA has been critical given its on-the-ground knowledge of the area and its role in delivering essential local infrastructure

such as parks, cycleways, local roads, libraries and community facilities – all of which are required to create great places.

The private sector also plays a key role in delivering infrastructure and services to support places e.g. private schools, private healthcare facilities, telecommunications and digital connectivity. Notwithstanding, these have not been included within the scope of this assessment.

The methodology involved the following seven steps. This report represents the outputs of steps five and six:

1. Scenario development and **land use forecasting**
2. **Preliminary infrastructure and services identification** for initial scenarios and forecasts
3. Targeted stakeholder **engagement** on future scenarios
4. Multi-criteria analysis to **select a preferred scenario**
5. Preferred scenario sector infrastructure and service **needs, land requirements and cost evaluation**
6. Consolidation of infrastructure and service needs, **spatially and temporally**
7. **Inputs to Place Strategy and Master Plan.**

Figure 2: Planning holistically for places that are growing and transforming



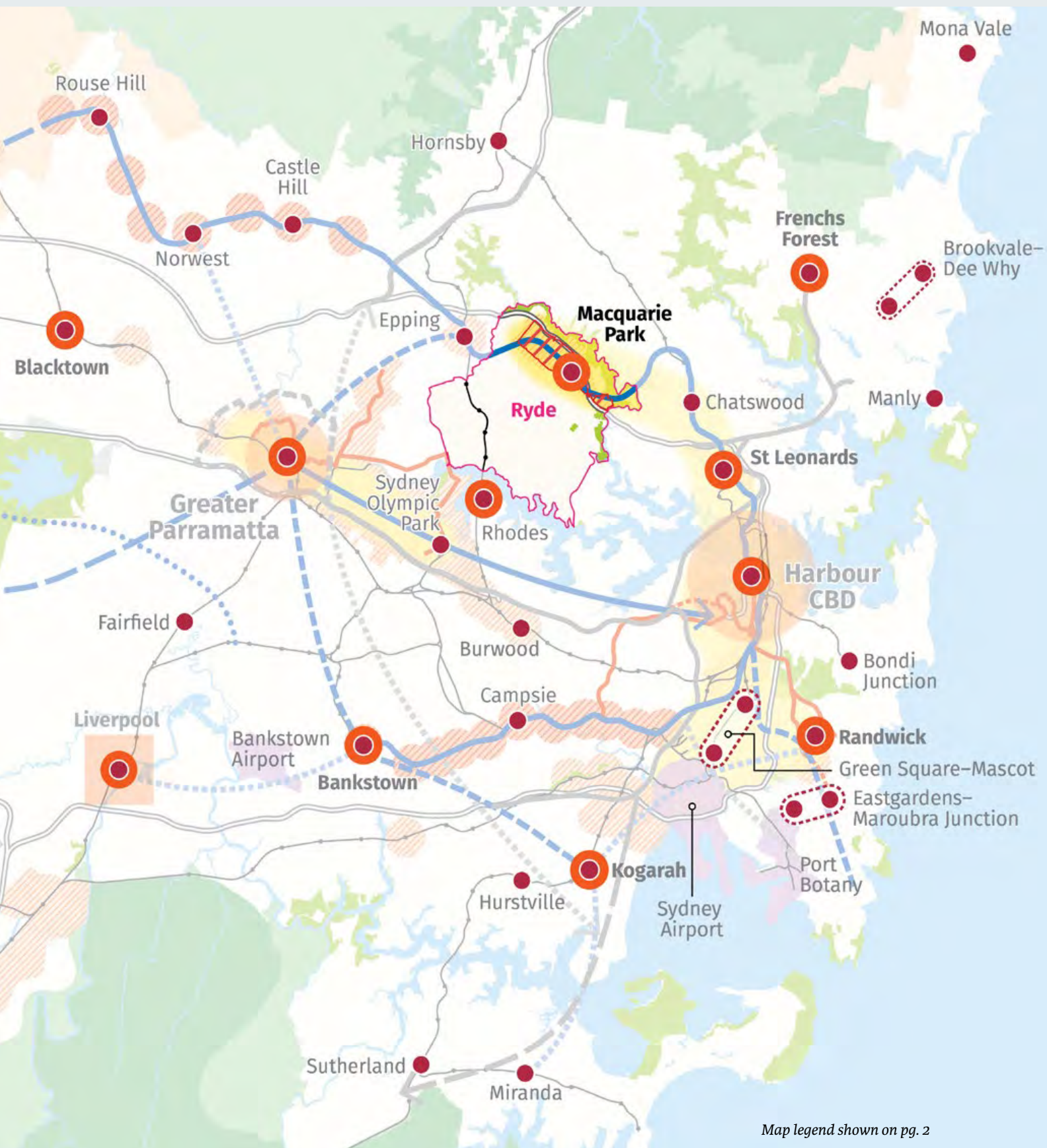


Figure 3: MPC location in the Eastern Harbour City and proximity to the Central River City

2 Context

The MPC is located in the Eastern Harbour City. As a key strategic centre, it is the northern anchor of the Eastern Economic Corridor from Macquarie Park, through to Sydney Airport in the south via Sydney CBD. The Eastern Economic Corridor is recognised as NSW's greatest economic asset with strong financial, business, professional services and innovation start-up sectors.

2.1 Strategic planning

North District Plan

The North District Plan sets the strategic priorities for Macquarie Park. The strategic investigation is guided by the following actions for Macquarie Park:

- enable additional capacity for commercial floor space and maintain a commercial core
- improve urban amenity, including reducing the impact of vehicle movements on pedestrian and cyclist accessibility
- deliver a finer grain road network to enhance pedestrian connections and provide new access points
- promote excellence in urban design by upgrading public areas
- deliver an innovation ecosystem in Macquarie Park, capitalising on the relationship with Macquarie University and nearby high-tech and medical corporations
- improve public transport connections to Parramatta and the MPC's other strategic centres, including the Northern Beaches Hospital
- enhance the quality and improve access to open space and increase urban tree canopy.

The Plan recognises that over the past 10 years the North District has had an annual average dwelling completion rate of 2,950. It estimates the need for 92,000 additional dwellings in the District, over the next 20-years (2016-2036).

The MPC is recognised as a key destination for increased housing supply in the North District and City of Ryde Local Government Area (LGA), noting location and opportunity for urban renewal around new metro stations.

City of Ryde Council Local Strategic Planning Statement

The City of Ryde Council (Council) Local Strategic Planning Statement (LSPS) recognises the city-shaping role of Macquarie Park to Greater Sydney, and accordingly proposes a key goal to “*maintain the precinct's role as a key economic powerhouse for Sydney and transform it into a vibrant and accessible CBD*”.

To achieve this, a series of planning priorities and actions are proposed. The SISA seeks to align with those relevant to infrastructure:

- reinvigorate the MPIA
- collaborate with relevant stakeholders to achieve appropriate outcomes from existing renewal projects
- ensure that transport infrastructure is provided at the appropriate capacity and timing to service existing and growth areas
- prepare a Local Infrastructure Strategy.

The City of Ryde Local Housing Strategy 2020 indicates the MPC is set to accommodate the majority of the City of Ryde LGA growth.

Figure 3 illustrates the MPC's location in the Eastern Harbour City and proximity to the Central River City.

2.2 Statutory planning

Ryde Local Environmental Plan 2014

The Ryde Local Environmental Plan 2014 (LEP) is the principal planning instrument for the City of Ryde LGA. It incorporates two state-led rezonings – North Ryde Station and Macquarie University (Herring Road), through the NSW Government's Urban Activation Precincts Program initiated in 2012.

Re-zoning 2013: North Ryde Station Urban Activation Precinct

Approximately 14 hectares centred around North Ryde Station of largely government-owned land was rezoned in 2013 from various classifications – Business Special, B3 Commercial Core, a small area of R2 and a large portion identified as a reservation for road widening purposes. This was rezoned to a mix of R4, R3, B3, B4 and RE1 (refer *Figures 4 and 5*).

This allowed for a greater range of mixed uses and a higher density of residential development in the precinct. These changes also brought about an increase in floor space ratios across the precinct, which now vary from 1.15:1 to 4.3:1.

The anticipated land use mix and quantum (at time of the rezoning) was:

- Dwellings – 2,625 (including 125 student accommodation dwellings)
- Commercial – 85,000m² GFA (including 125 serviced apartments)
- Retail – 6,000m² GFA (including a small supermarket)
- Open Space – 2.1ha (15 per cent of precinct area).

Re-zoning 2015: Macquarie University (Herring Road) Urban Activation Precinct

This 157-hectare precinct includes Macquarie University, Macquarie Shopping Centre and the Ivanhoe Estate. Under the former LEP, the precinct comprised a mix of business classifications – B3, B4 and B7 zones. Macquarie University had a 'Special Purposes' classification (refer *Figure 6*).

The re-zoning reclassified most of the University land and other parts of the precinct to a B4 – Mixed

Use zone, apart from some areas identified for recreation purposes and an environmental corridor. Building height, floor space and car parking controls were also amended (refer *Figure 7*).

At the time of re-zoning it was estimated the precinct could deliver around 2,000–2,400 new homes by 2021 rising to 4,500–5,400 new homes by 2031.

Contributions Framework

There is no tailored developer contributions framework for state and regional infrastructure for MPC at present. Developer contributions towards designated state public infrastructure are negotiated under provisions in the Council's LEP for development in specified areas.

Council relies on its Voluntary Planning Agreement Policy to negotiate local and regional infrastructure contributions from developers preparing a planning proposal or a major development application.

Planning Agreements are used in the MPC to provide monetary contributions, affordable housing, public domain improvements, libraries and other cultural

infrastructure, road works, land dedication and traffic management upgrades. Council's register of Voluntary Planning Agreements can be accessed here:

www.ryde.nsw.gov.au/Business-and-Development/Voluntary-Planning-Agreements-Register

Council has Development Contributions Plans under Section 7.11 and 7.12 of the *Environmental Planning and Assessment Act 1979* which came into effect on 1 July 2020. Only the Section 7.11 Plan applies to the MPC. Levies are applied for non-residential and residential development for the Council.

Figure 4: Former zoning
(Ryde LEP 2010)



Figure 5: Current zoning
(Ryde LEP 2014)

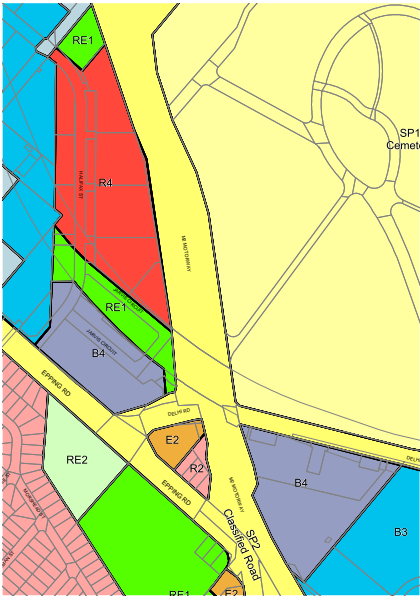


Figure 6: Precinct zoning
before UAP zoning amendment

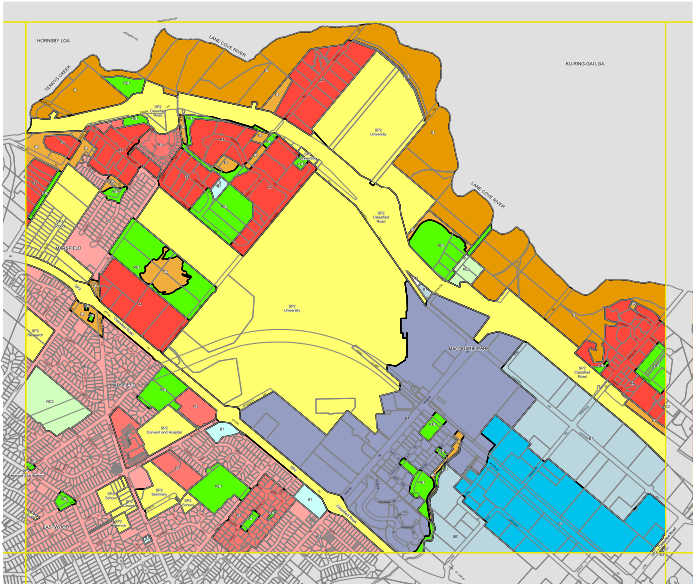
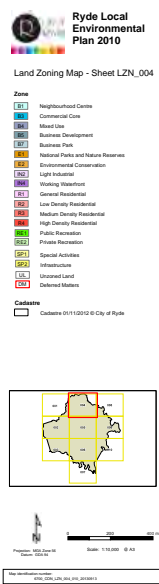
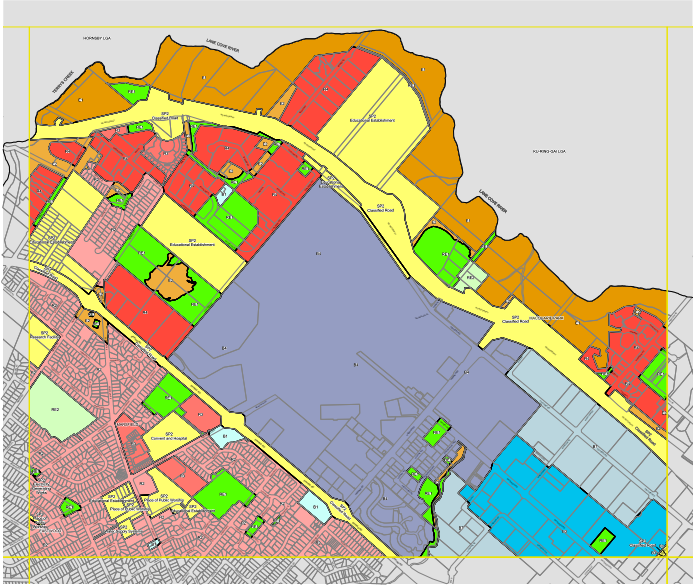


Figure 7: Precinct zoning after
UAP zoning amendment



2.3 Existing infrastructure and services

Prior to considering new infrastructure and service proposals, it is important to understand the current infrastructure in the MPC. This section provides an overview for each sector.



Cultural and community infrastructure

Cultural infrastructure provides spaces where arts and culture can be created, shared and enjoyed. It includes theatres, galleries, museums, artist studios and other creative “making” spaces, libraries, archives, community halls, cinemas, and outdoor event spaces.

Create NSW (through Create Infrastructure) plans and manages the delivery of NSW Government investment in cultural infrastructure. It also provides support and guidance to local councils to develop local and regional cultural facilities to ensure communities have access to spaces and opportunities for making art and culture part of their everyday lives.

The majority of the area’s cultural facilities are found within Macquarie University, including a new History Museum which opened in 2020, an Aboriginal outdoor gathering place (the Walanga Muru pavilion), art gallery, and the largest sculpture park in the Southern Hemisphere, with 130 artworks spread over 125 hectares. Other cultural facilities in Macquarie Park include the Wilga Park open-air amphitheatre, an auditorium and outdoor stage at Lachlan’s Line, and the Macquarie Centre’s Event cinemas.

Space for a new library and creative hub (to be delivered by 2030) has been committed through a Voluntary Planning Agreement (VPA) as part of the redevelopment of Macquarie Shopping Centre.





Education

Under the *Education Act 1990* the Department of Education is required to ensure that every child can enrol at their local school and receive a high-quality education.

Two-thirds of the NSW student population are enrolled in the public education system of primary and secondary schools and school support facilities. Early childhood education services are predominately privately operated.

The MPC is covered by intake areas of four public primary schools and three public secondary schools. Primary schools include Truscott Street Public School (PS), North Ryde PS, Eastwood Heights PS and Kent Road PS. Secondary schools include Ryde Secondary College, Epping Boys High School (HS) and Hunters Hill HS.



Green and blue infrastructure

Green infrastructure considered for the SISA includes waterways, open space (both active and passive) and tree canopy.

The MPC currently contains high environmental value waterways and water dependent ecosystems, such as Shrimptons Creek, Kikkiya Creek and Mars Creek, and a scattering of small parks with some larger pockets such as at Macquarie University.

Green and blue infrastructure is the network of green spaces, natural systems, and semi-natural systems that support sustainable communities and includes waterways; bushland; tree canopy and green ground cover; parks; and open spaces that are strategically planned, designed, and managed to support a good quality of life in an urban environment.

(Government Architect NSW).



Key Concept





Health, justice, police and emergency services

Health

Healthcare in NSW is provided by a network of services ranging from large principal referral hospitals providing highly complex emergency and planned services, through to community health centres and care in people's homes. It includes ambulance services, population health and preventative services, mental health, primary care (including general practice), allied health services, pharmacy, dental and residential aged care. As a network, not all services are provided at a facility in every location, with residents expected to travel outside their local hospital catchment to access a full range of services. Many healthcare needs are also met through the private healthcare system.

Existing public health facilities servicing the area include hospitals at Ryde, Royal North Shore, Macquarie, The Children's Hospital at Westmead, as well as community, child and family health centres in Top Ryde and Marsfield. The Ryde Ambulance Station is located at Ryde Hospital.

In 2019, the NSW Government announced a \$479 million redevelopment of the Ryde Hospital.

Justice, police and emergency services (Stronger Communities)

The Stronger Communities cluster is responsible for delivering a diverse range of social infrastructure and services. This includes Justice (including Courts and Tribunals Services, Corrective Services and Youth Justice), NSW Police, Emergency Services (including Fire and Rescue NSW, Rural Fire Service and State Emergency Services), and Community Services.

The services considered in this assessment are justice, police, and emergency services (Fire and Rescue NSW).

Although there are no justice, police or emergency service facilities located within the MPC, service coverage is provided by established infrastructure and services in neighbouring areas and includes the Ryde Courthouse, Eastwood Police Station, and Ryde Fire Station.

The NSW Government is relocating the existing Ryde fire station to Coxs Road in North Ryde in late 2022, which will reduce response times to the MPC.



Sport and active recreation

The need for sport and active recreation infrastructure is highly dependent upon the existing facilities available to the community, the expected population growth, speed and density of development and the population nexus with commercial developments.

In the MPC, there are a range of sport and active recreation facilities including: two basketball courts, one gymnastics facility, one hockey field, three multi-use indoor courts, six squash / racquet ball courts, two 25m swimming pools, two skate parks and one ice skating rink. In addition, a range of other sport and active recreation facilities are within close (2km) proximity, including athletics facilities, baseball, cricket, tennis, and golf courses.



Transport

The *Future Transport Strategy* sets the strategic direction for transport in NSW over the next 40 years. This is supported by Transport for NSW's *Greater Sydney Services and Infrastructure Plan*, which identifies the policy, service and infrastructure initiatives needed to achieve the targeted transport customer outcomes in Greater Sydney.

Public transport

The MPC is serviced by the North West Metro, with three stations at Macquarie University, Macquarie Park and North Ryde, with 15 services per hour at peak times.

The Macquarie University Bus Interchange, located at Macquarie University metro station/Macquarie Shopping Centre, is a significant transit stop for over 20 bus routes that service the area, providing connections to the North Shore, Sydney CBD, Parramatta, Epping, and the wider Ryde area.

Committed projects in the area include the Macquarie University Bus Interchange upgrade, and the Bus Priority Infrastructure Program (BPIP).

The opening of Sydney Metro City and Southwest in 2024 will provide increased services to the three stations in the MPC.

Roads and active transport

State roads in the area include the M2 motorway, Lane Cove Road, Delhi Road and Epping Road. Council managed regional and local roads include Talavera Road, Herring Road and Waterloo Road.

Cycle facilities include shared paths along Epping Road, Waterloo Road, Talavera Road, and along Shrimptons Creek.





Water

Sydney Water is responsible for the delivery of water management in the MPC. The area is located within Sydney Water's Northern Regional operating area. It is generally equipped with existing infrastructure to provide drinking water and wastewater services for growth.

Currently there are no existing recycled water schemes operating in or near Macquarie Park.

Drinking water

The MPC is serviced by the Marsfield and Chatswood reservoirs within the Ryde water delivery system. The supply to the area is mostly sourced from the Marsfield reservoir, except for the North Ryde Riverside neighbourhood, which is supplied by the Chatswood reservoir.

The water source for the Ryde delivery system is the Prospect Water Filtration Plant via the Ryde Water Pumping Station at West Ryde.

Wastewater

The MPC is serviced by the Lane Cove wastewater system. Wastewater from the Lane Cove catchment is transferred by gravity and treated at the North Head wastewater treatment plant in Manly. Treated wastewater is discharged to the ocean.

The wastewater network has capacity to satisfy dry weather performance requirements, except for at one location, where an existing main is proposed for amplification.

The network has capacity limitations and cannot satisfy wet weather performance requirements. To address this issue, Sydney Water is implementing source control works as part of the wet weather overflow abatement program, which will include installation of a wet weather storage tank.

Stormwater

There are no declared Sydney Water stormwater catchments for waterway management in the area.



Electricity

The MPC is located in the Carlingford network area of Ausgrid's electricity supply network. It contains significant commercial load arising from key areas including Macquarie University and the Macquarie Park commercial area.

Significant commercial development is expected to continue in this area and can drive very large electricity demand, especially data centres, many of which are located in the area.

In addition to the significant commercial load, there is also significant residential load from high density areas including the Macquarie University (Herring Road) UAP, and the North Ryde Station UAP.

The network is supplied by two separate sub-transmission systems: a 66kV system connected to Endeavour Energy's Carlingford sub-transmission substation, and a 132kV system connected to TransGrid's Sydney North Bulk Supply Point and Lane Cove Switching Station.

Ausgrid has two zone substations at Epping and Macquarie Park which distribute electricity to customers in the MPC.

Delivery of an additional sub-transmission station, primarily to service large industrial electricity consumers, was recently completed at the existing Macquarie Park zone substation.



Local infrastructure

A significant amount of infrastructure and service needs in the area are categorised as local infrastructure. This includes stormwater, local and regional roads (including walking and cycling), open space and recreation, as well as community and cultural facilities. Council has worked with relevant NSW Government agencies to provide direct input on local infrastructure items required in green infrastructure, cultural infrastructure and transport.

In addition, Council has an existing schedule of items under section 7.11 and 7.12 contribution plans, which identify infrastructure required to support growth in Macquarie Park and the wider LGA. Relevant items from Council's existing contribution plans were included in this assessment for each sector to provide a more holistic view on the scale and costs of infrastructure required.

However, further assessment by Council is likely to be required to identify additional local infrastructure items required to support the growth forecasted in the SISA.





3 Determining future infrastructure and service needs

There has been significant growth in population and dwellings in the MPC. There is growing demand for infrastructure and services from the local community, with future demand from new residents, workers and students expected to grow.

3.1 Overview

This section of the report identifies infrastructure and service proposals to support recent and future growth in the MPC. To do this, each partner agency considered their respective sector requirements to meet the infrastructure and service needs over the past five years to meet existing demand, and over the next 15 years to service existing and future growth.

This was achieved through a facilitated, consistent and coordinated process to identify:

- infrastructure and service proposals required to cater for the forecasted demands to meet desired service levels and targets where known and established
- strategic and preliminary capital cost estimates using practically available information, i.e. benchmark costs to provide an indicative cost estimate
- land requirements associated with infrastructure
- an indicative primary funding source.

A common set of growth projections guided partner agencies in their planning. These projections were based on assumptions for floorspace provision developed in the Master Plan, and projected growth per the common planning assumptions for the North Ryde Station and Macquarie University (Herring Road) UAPs.

The projections for the MPIA were contextualised by projections for the City of Ryde and Greater Sydney as whole with a redistribution of dwellings and jobs undertaken in the MPIA with the common planning assumptions.

Noting that updated common planning assumptions (TZP 2019) were released during the course of the original assessment in 2020, sensitivity testing was undertaken to further check these underlying projections.

These projections are summarised in *Table 2* on page 26.

Sector assessment

Infrastructure and services were assessed on a sector basis and covered state, regional and local infrastructure. An overview of the methodologies and key assumptions applied in each sector to identify the infrastructure proposals, capital cost estimates and land requirements are outlined at **Appendix A**. Although the assessment is based on identified needs by 2036, infrastructure and service proposals involving planning and investigation to enable future delivery of proposals beyond 2036 have also been included.

Identified infrastructure and services proposals are presented in **Chapter 4**.

Table 2: Summary land use projections to 2036

	Urban Activation Precincts		Macquarie Park Investigation Area	Macquarie Park Corridor Total
	North Ryde Station	Macquarie University (Herring Road)		
Population				
Base – 2016	2,150	4,950	100	7,200
2021	2,850	7,400	2,550	12,800
2026	5,150	10,100	6,450	21,700
2031	6,900	13,100	10,400	30,400
2036	7,900	16,500	13,650	38,050
Dwellings				
Base – 2016	750	2,100	0	2,850
2021	1,100	3,350	1,000	5,450
2026	2,150	4,850	2,550	9,550
2031	3,050	6,700	4,000	13,750
2036	3,550	8,800	5,400	17,750
Jobs				
Base – 2016	2,650	9,550	54,500	66,700
2021	2,850	10,500	59,500	72,850
2026	3,050	11,050	61,800	75,900
2031	3,300	11,700	64,350	79,350
2036	3,550	12,400	67,550	83,500

Who pays for infrastructure?

Providing the right infrastructure at the right time requires coordinated funding from a range of sources:

- **Commonwealth and NSW Government:** This is a combination of NSW and Australian Government funding for infrastructure that will strengthen the national economy.
- **NSW Government:** This includes NSW consolidated revenue or any special-purpose funds or grant programs for state and regional infrastructure for items such as Sydney Metro, rail, motorways, schools, hospitals, or arts and cultural facilities.
- **Special Infrastructure Contributions (SIC):** These fund the State and regional infrastructure required under planning legislation to support new communities, such as regional roads, schools, health centres, regional open space, or regional and district sporting facilities.
- **Combination of NSW Government and Special Infrastructure Contributions:** Often needed where there are multiple drivers for infrastructure investment and multiple beneficiaries. In urban renewal areas this typically includes infrastructure needed to improve or expand a service that brings benefits to existing and future communities.
- **Direct customer charges:** Where an existing customer base is the primary funding source. Applies to utilities such as water, wastewater and electricity.
- **Local Government:** Funding sources including direct developer contributions (works-in-kind), local infrastructure contributions, local government rates, special rates and voluntary planning agreements. Identified primarily for local infrastructure which councils are responsible for such as local roads, community facilities, local parks and local libraries.



Key
Concept

3.2 High level cost evaluation

The estimated costs (excluding land costs) of infrastructure and service proposals to 2036 are around **\$6.4 billion**. This figure includes an estimate of capital costs to deliver infrastructure and service proposals in the MPC through to 2036, as well as planning and development costs to enable delivery of future projects beyond 2036.

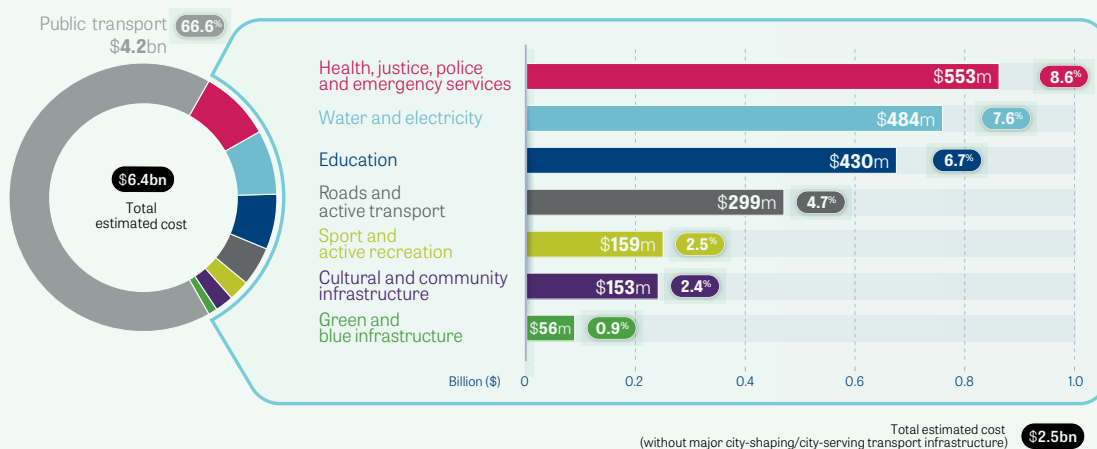
This assessment is the first step in holistically understanding the nature and breadth of infrastructure and service needs for the MPC. Many proposals are in their early stages of identification and development and as such benchmark costs have been used in many instances to enable an estimate of costs at this initial stage, and therefore this figure should be regarded as strategic and indicative only. Further work is required to adequately define the

scope of individual projects to understand risks and provide greater certainty on estimated project costs.

A significant proportion of these costs (around **\$3.9 billion**) is associated with major city-shaping and city-serving transport infrastructure such as a potential future Parramatta to Epping mass transit/train link, and several strategic rapid bus corridors and planning/development costs to enable future transport links beyond 2036. This infrastructure will provide wide-ranging benefits for many communities across Greater Sydney, therefore, only a small portion of these costs could truly be attributed to the MPC.

Key cost findings for each infrastructure and service category are outlined below.

Figure 8: Estimated cost of proposals by sector



When looking at the level of investment over time, of the \$6.4 billion, \$1.6 billion has been assessed as being required within the next five years, while the remaining \$4.8 billion is within the medium to longer term (6 to 15 years). The assessment also considers a small amount of proposals either in delivery with completion imminent, or recently completed (around \$11 million). Figure 9 illustrates the breakdown of costs over these time horizons.

Figure 9: Estimated cost of proposals by time horizon

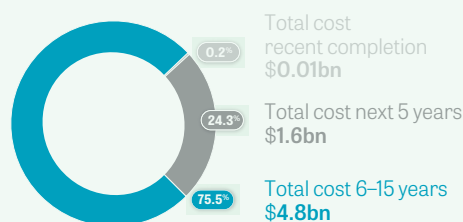


Figure 10: Overview of cost estimates by sector



Public transport

\$4.2bn

Estimated to cost around \$4.2 billion. This includes:

- around \$3.9 billion for major city-shaping and city-serving transport infrastructure (including planning and development costs to enable infrastructure planned for delivery beyond 2036).
- around \$0.3 billion for the delivery of public transport infrastructure and service proposals within the MPC to 2036, including upgrades to allow increased metro and bus services.



Education

\$240m

Estimated to cost around \$430 million. This includes delivery of two new primary schools and one new high school.



Sport and active recreation

\$159m

Estimated to cost around \$159 million. This includes outdoor sporting facilities, and indoor sport and active recreation facilities.



Health, justice, police and emergency services

\$553m

Estimated to cost around \$553 million. This includes:

- \$479 million of NSW Government funding announced for the Ryde Hospital upgrade.
- costs for new community health, ambulance, police and fire facilities.



Cultural and community infrastructure

\$153m

Estimated to cost around \$153 million. This includes regional community facilities (including for the wider LGA), creative and event spaces, and library facilities.



Roads and active transport

\$299m

Estimated to cost around \$299 million. This includes:

- state led infrastructure including upgrades to major regional roads and intersections, and delivery of additional pedestrian crossings, and regional cycling links.
- local led infrastructure including the delivery of local roads, such as the fine grain street network across the MPIA, local intersection upgrades, electric vehicle charging stations, pedestrian links, and footpaths.



Green and blue infrastructure

\$56m

Estimated to cost around \$56 million. This includes both state and local led proposals for new open space and parks, embellishment of existing parkland and waterway improvements.



Water and electricity

\$484m

Estimated to cost around \$484 million. This includes upgrades and new infrastructure to sufficiently support the MPC with drinking water, stormwater infrastructure, a recycled water scheme and an additional electricity substation.

3.4 Primary funding source

This assessment recognises that the scale of necessary infrastructure proposed requires a clear understanding of costs to guide better decision-making. It also considers the fundamental question of who should contribute to paying for the provision of infrastructure aligned to growth.

An indicative primary funding source has been identified for each of the proposals. This is based on the eligibility of proposals for funding from these sources, in alignment with existing Government policies (rather than approved funding in most instances). The broad funding source categories are:

- Combination of general Commonwealth Government and NSW Government
- General NSW Government
- Special Infrastructure Contributions (SIC)
- Combination General NSW Government and SIC
- Local government
- Customer.

Of the estimated \$6.4 billion in costs to 2036, the NSW Government would be the likely funding source of the majority of these costs. This would either be the NSW Government in combination with Commonwealth funding (49 per cent), the NSW Government stand-alone (33 per cent), or the NSW Government in combination with a Special Infrastructure Contribution (SIC) (3 per cent).

Given the significant costs attributed to major city-shaping and city-serving transport infrastructure, and the potential for seeking Australian Government funding, these proposals have been identified as being funded through a combination of Australian Government and NSW Government as the primary funding source. Alternatively, funding would likely need to be provided by the NSW Government.

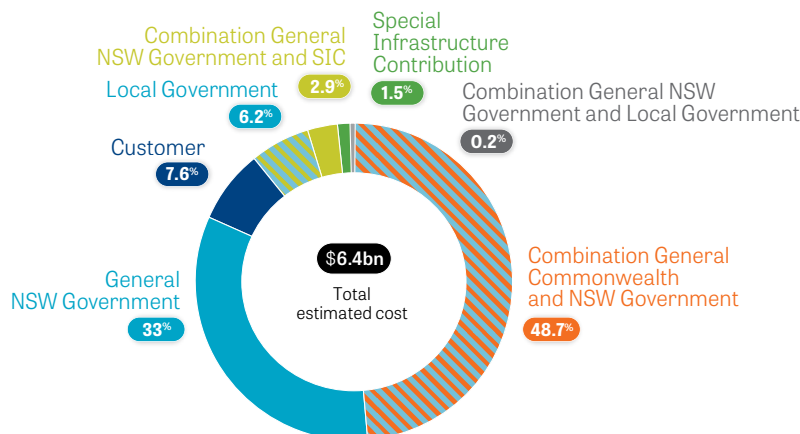
Although a SIC has not been identified for the MPC, the potential for funding through a contribution mechanism has been considered in this assessment. Decision-making on whether a SIC would be feasible and apply to the MPC will be subject to further consideration by the NSW Government. Alternatively, funding would likely need to be provided by the NSW Government or Council through local contributions and Planning Agreements.

Local government would be responsible for a proportion of infrastructure costs based on proposals identified in this assessment (6 per cent). However, more detailed neighbourhood level planning may suggest additional local infrastructure work is needed such as further stormwater improvements.

The remainder of costs would likely be funded directly through a SIC, or via customer charges.

A breakdown of the cost of proposals by primary funding source is illustrated below at *Figure 11*.

Figure 11: Cost of proposals by primary funding source



3.5 Land requirements

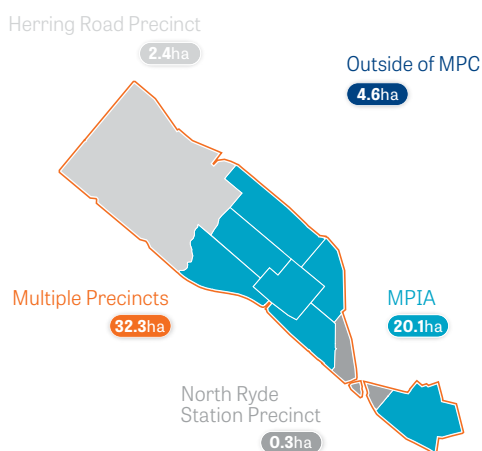
Land will need to be acquired to deliver the infrastructure and service proposals identified in this assessment. Excluding land already in government ownership, around 60 hectares of land has been assessed as being required.

As the acquisition of this quantum of required land within the MPC will be challenging, some proposals could feasibly be delivered in nearby areas and still service the MPC, such as ovals and tennis courts.

The identified land required for infrastructure could be reduced through co-location with other infrastructure, as an integrated proposal with private development, or through the purchase or dedication of building floorspace. More detailed scoping, site and engineering investigations will be needed to refine the estimated land required to practically deliver each proposal.

Figure 12 illustrates the identified land requirements by location. The already rezoned Macquarie University (Herring Road) and North Ryde Station precincts are relatively constrained, particularly for new infrastructure requiring larger amounts of land. As such, land requirements should be considered in the Master Plan.

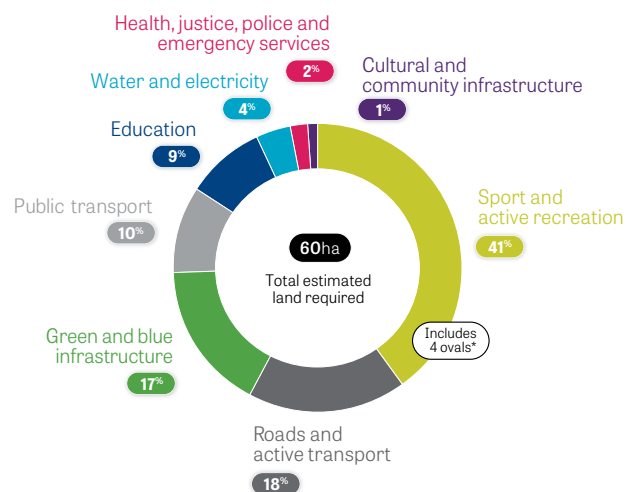
Figure 12: Identified land requirements by location



Most of this land is needed for sporting facilities and fields, open space and waterways, as well as roads and active transport. A breakdown of the key land requirements and purpose for use is as follows:

- around 25 hectares for sporting facilities and fields. A significant part of this is for four ovals (which can also be used as rectangular fields), requiring 18 hectares of land. For sporting fields and open space in particular, opportunities exist to consider locating these on underutilised land in proximity to the MPC, or by partnering with landholders to consider shared use of existing facilities
- around 10 hectares for roads and active transport (the majority of this requirement being attributed to the fine grain road network)
- around six hectares for green and blue infrastructure such as local and district open space
- around five hectares for public transport including mass transit stations and bus layovers
- around 5.5 hectares of land to locate two new primary schools and one new high school.

Figure 13: Identified land requirements by infrastructure type





4 Proposals and delivery timeframes

Over 190 proposals have been identified in the SISA for the MPC. These proposals are presented by sector, along with their proposed primary funding sources and development and delivery timeframes.

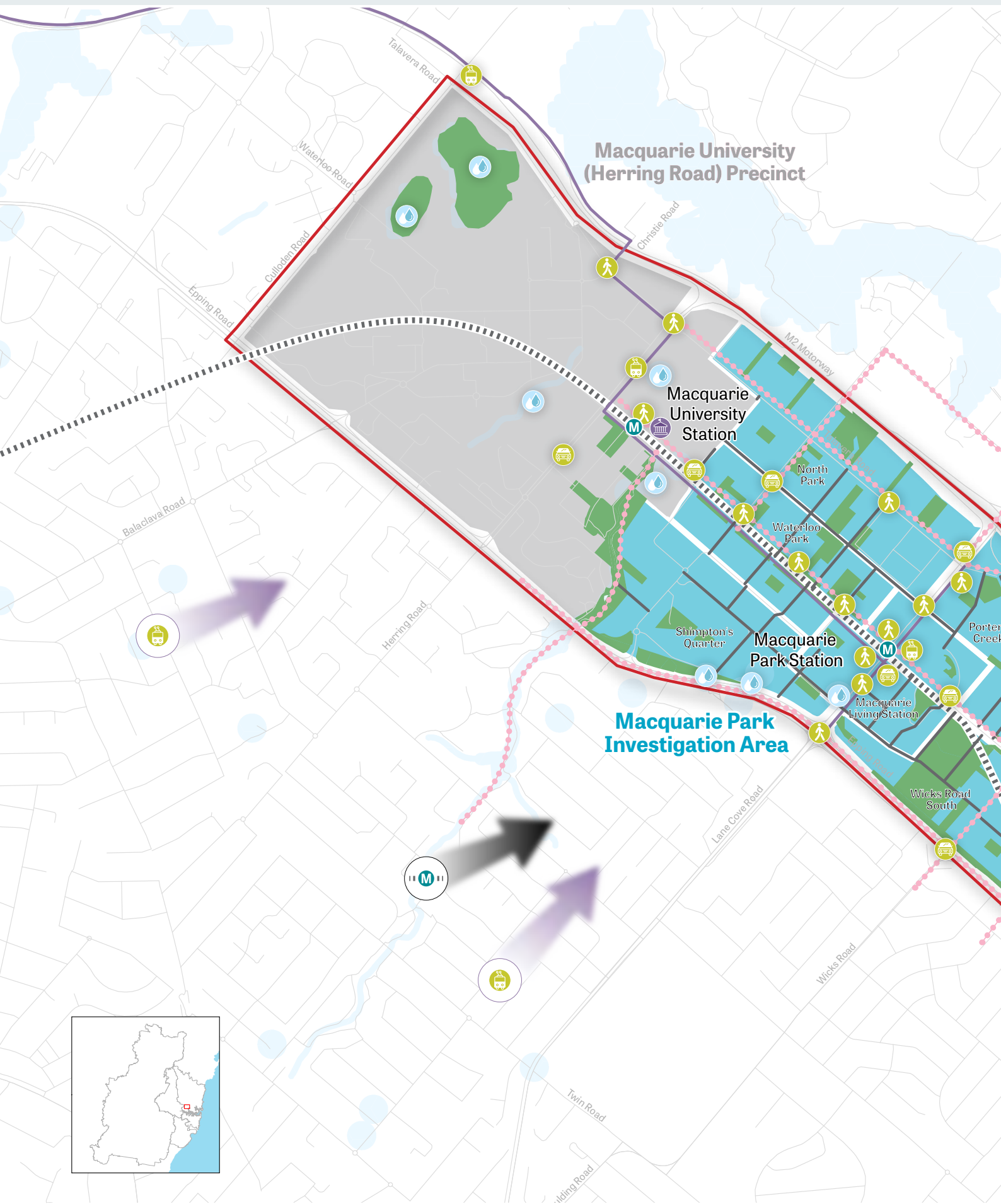
The timeframe indicated for development and delivery of proposals spans from the scoping and detailed project definition phase (e.g. preparation of business cases), procurement, and delivery/construction, through to completion or start of operation. Some proposals span across multiple timeframes, based on the assumed delivery program.

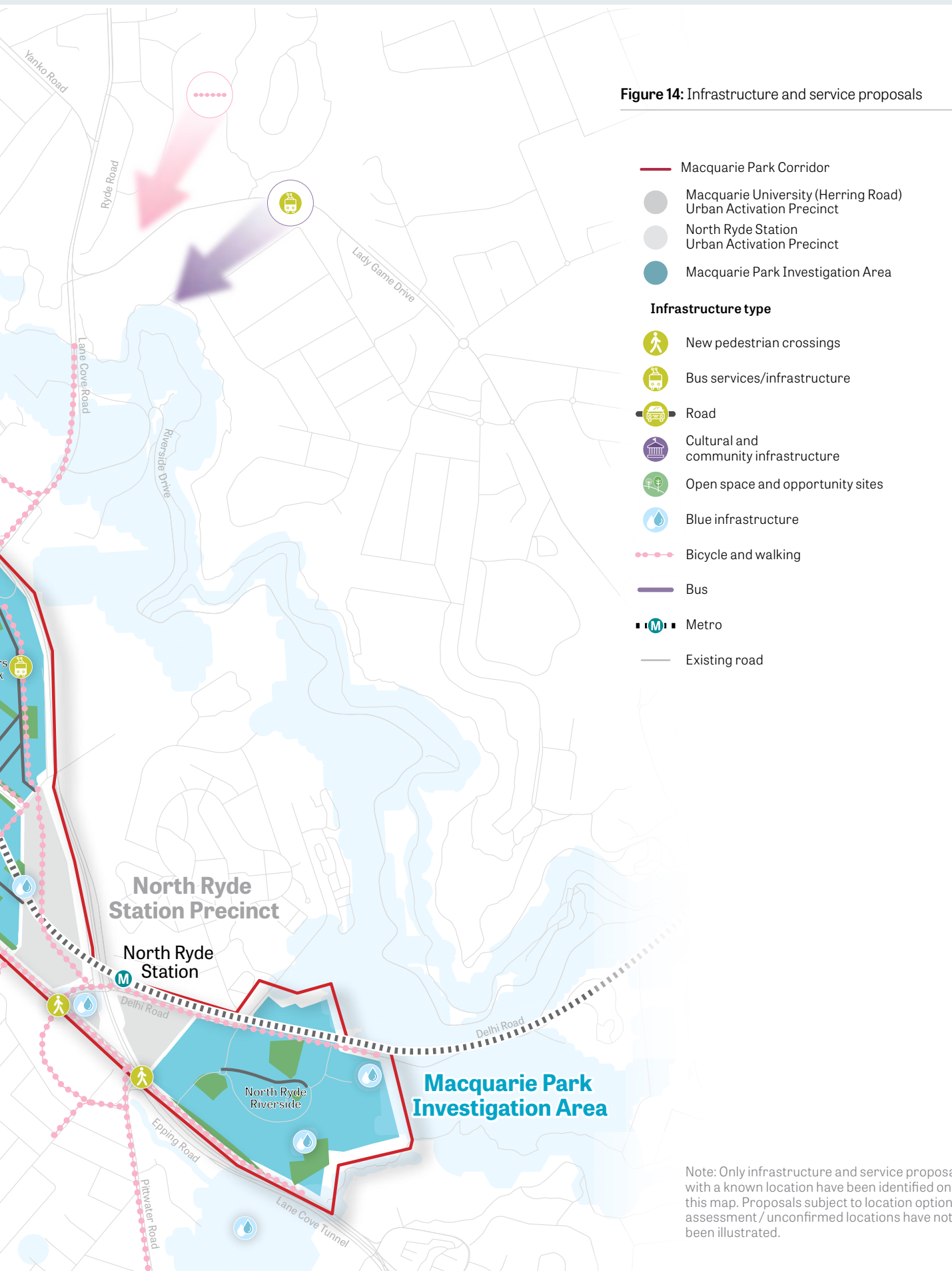
Proposals shown in Years 0–5 (2016–2021) reflect those recently completed.

Proposals with a delivery timeframe beyond 2036 are also identified in recognition of lead times needed for planning and project development – and to reserve land for future delivery.

Most proposals shown are not funded or committed for delivery. As a result, they should be regarded as initiatives subject to further development, scoping, business case investigation and investment decisions.





Proposals with similar attributes have been rolled-up to single line-items in the tables.






Proposals and delivery timeframes

Table 3: Infrastructure and service proposals located in Macquarie University (Herring Road) UAP

Proposal name	Primary funding source	Delivery timeframe			
		Yr 0–5 (2016–2021)	Yr 6–10 (2022–2026)	Yr 11–20 (2027–2036)	20 Yr+ (post-2036)
 Public transport					
BPIP Stage 1B: Upgrades to Herring Road and the intersections with Waterloo Road, Epping Road and Ivanhoe Place	Combination General Commonwealth/NSW Government		●		
Macquarie University Bus Interchange (MUBI)	Combination General Commonwealth/NSW Government		●		
Macquarie Park northern bus layover	General NSW Government		●		
 Roads and active transport					
Electric vehicle charging stations	Local government		●		
Talavera Road/Christie Road intersection – pedestrian crossings on all legs	Combination General NSW Government and SIC		●		
Talavera Road/Macquarie Shopping Centre intersection – pedestrian crossings on all legs	Combination General NSW Government and SIC		●		
Herring Road intersection improvements	General NSW Government and SIC		●		
 Cultural and community infrastructure					
Macquarie Centre library and creative hub fitout	Local government			●	
 Green and blue infrastructure					
Improving waterways and water dependent ecosystems in Herring Road precinct	Local government			●	●
Street tree planting on new roads (131 trees)	Local government		●	●	
Enhancing tree canopy in existing local and district open space (541 trees)	Local government		●	●	
Enhancing tree canopy in new local and district open space (96 trees)	Local government		●	●	
Street tree planting on existing roads (2164 trees)	Local government		●	●	
More access points to existing local and district open space (51 access points)	Local government		●		
Waterloo Road Linear Park	Local government		●	●	



Proposal name	Primary funding source	Delivery timeframe			
		Yr 0-5 (2016-2021)	Yr 6-10 (2022-2026)	Yr 11-20 (2027-2036)	20 Yr+ (post-2036)
New local and district open space	Local government		●	●	
Quandong Reserve, Cottonwood Reserve and Wilga Park shared user path upgrade	Local Government		●		
 Water and electricity					
Herring Road stormwater improvements	Local government		●		
Lachlan Avenue stormwater work	Local government		●		
Macquarie Shopping Centre culvert gross pollutant trap (GPT)	Local government		●		

*Most proposals shown are not funded or committed for delivery. As a result, they should be regarded as initiatives subject to further investigation and investment decisions.

Figure 15: Macquarie University (Herring Road) UAP



Table 4: Infrastructure and service proposals located in North Ryde Station UAP



Proposal name	Primary funding source	Delivery timeframe			
		Yr 0–5 (2016–2021)	Yr 6–10 (2022–2026)	Yr 11–20 (2027–2036)	20 Yr+ (post-2036)
 Roads and active transport					
Electric vehicle charging stations	Local government		●		
Epping Road/Delhi Road intersection – pedestrian crossings on all legs	Combination General NSW Government and SIC		●		
 Green and blue infrastructure					
Improving waterways and water dependent ecosystems in North Ryde precinct	Local government			●	●
Street tree planting on new roads (263 trees)	Local government		●	●	
Enhancing tree canopy in existing local and district open space (198 trees)	Local government		●	●	
Enhancing tree canopy in new local and district open space (93 trees)	Local government		●	●	
More access points to existing local and district open space (4 access points)	Local government		●		
New local and district open space	Local government		●		

*Most proposals shown are not funded or committed for delivery. As a result, they should be regarded as initiatives subject to further investigation and investment decisions.

Figure 16: North Ryde Station UAP



Table 5: Infrastructure and service proposals located in Macquarie Park Investigation Area




Proposal name	Primary funding source	Delivery timeframe			
		Yr 0–5 (2016–2021)	Yr 6–10 (2022–2026)	Yr 11–20 (2027–2036)	20 Yr+ (post–2036)
 Public transport					
Macquarie Park to South – East Sydney Transit / Train Link (land for transport hub and project development only)	Combination General Commonwealth/NSW Government				●
Macquarie Park southern bus layover	General NSW Government		●		
BPIP Stage 1A: Waterloo Road and Lane Cove Road intersection upgrade	General NSW Government		●		
BPIP Stage 2: Waterloo Road (Lane Cove Road and Herring Road)	General NSW Government		●		
 Roads and active transport					
Fine Grain Street Network	Local government	●	●	●	●
Waterloo Road intersection improvements (Byfield Road, Khartoum Road, Thomas Holt Dr, Eden Park Road)	Local government		●		
Waterloo Road pedestrian improvements	Special Infrastructure Contribution		●		
Waterloo Road local area traffic management improvements	Special Infrastructure Contribution		●		
Talavera Road road space reallocation	Special Infrastructure Contribution			●	
Lower speed limit on local roads	General NSW Government		●		
Electric vehicle charging stations	Local government		●		
More signalised pedestrian and cyclist crossings (Waterloo Road, Talavera Road)	Combination General NSW Government and SIC		●	●	
Khartoum Road/Banfield Road intersection improvements	Combination General NSW Government and SIC			●	
Rennie Street / Pittwater Road, North Ryde – Active transport crossing over Epping Road	Special Infrastructure Contribution			●	
Lower speed limit on Lane Cove Road	General NSW Government			●	
Lane Cove Road: Intersection improvement at Talavera Road (at grade)	Special Infrastructure Contribution			●	
Epping Road: Intersection improvement at Wicks Road (at grade)	Special Infrastructure Contribution			●	
Lane Cove Road intersections – pedestrian crossings on all legs (Waterloo Road, Talavera Road, Epping Road)	Combination General NSW Government and SIC		●		


Continued on page 40

*Most proposals shown are not funded or committed for delivery. As a result, they should be regarded as initiatives subject to further investigation and investment decisions.

Proposals and delivery timeframes

Table 5: Infrastructure and service proposals located in Macquarie Park Investigation Area (continued)

Proposal name	Primary funding source	Delivery timeframe			
		Yr 0–5 (2016–2021)	Yr 6–10 (2022–2026)	Yr 11–20 (2027–2036)	20 Yr+ (post-2036)
Lane Cove Road pedestrian bridges near Hyundai Drive, Dirrabari Road and Waterloo Road	Combination General NSW Government and SIC			●	
 Health, justice, police and emergency services					
New Ryde Police Area Command (PAC) policing centre	General NSW Government		●	●	
 Sports and active recreation					
Four standard regional fields (Four ovals with three rectangular fields)	Combination General NSW Government and SIC		●	●	
Aquatic facility (land only by 2036)	Combination General NSW Government and SIC			●	●
Skate park (land only by 2036)	Local Government			●	●
Indoor multi-use courts	Combination General NSW Government and SIC		●	●	
Eight tennis courts	Local government		●	●	
Seven outdoor netball courts	Local government		●	●	
 Green and blue infrastructure					
Central Park embellishment	Local government		●		
Improving waterways and water dependent ecosystems in MPIA	Local government		●	●	
More access points to existing local and district open space (46 access points)	Local government		●		
New local and district open space	Local government		●		
Street tree planting on existing roads (799 trees)	Local government		●	●	
Street tree planting on new roads (1,277 trees)	Local government		●	●	
Enhancing tree canopy in existing local and district open space (135 trees)	Local government		●	●	
Enhancing tree canopy in new local and district open space (331 trees)	Local government		●	●	
Tree canopy along Waterloo Road Linear Park (380 trees)	Local government		●	●	
Waterloo Road Linear Park	Local government		●	●	

Proposal name	Primary funding source	Delivery timeframe			
		Yr 0–5 (2016–2021)	Yr 6–10 (2022–2026)	Yr 11–20 (2027–2036)	20 Yr+ (post-2036)
 Water and electricity					
Waterloo Road stormwater work	Local government		●		
Wastewater main amplification	Customer		●		








*Most proposals shown are not funded or committed for delivery. As a result, they should be regarded as initiatives subject to further investigation and investment decisions.


Figure 17: Macquarie Park Investigation Area



Proposals and delivery timeframes

Table 6: Infrastructure and service proposals – multi-precinct*

Proposal name	Primary funding source	Delivery timeframe			
		Yr 0–5 (2016–2021)	Yr 6–10 (2022–2026)	Yr 11–20 (2027–2036)	20 Yr+ (post-2036)
 Public transport					
New and upgraded bus stops	Combination General NSW Government and SIC		●	●	
Increase NorthWest Metro services	General NSW Government			●	
 Roads and active transport					
Create a network of dedicated cycle and micro-mobility connections	Combination General NSW Government and SIC		●	●	
Increase publicly accessible bicycle parking	Local government		●	●	
Complete missing links in Macquarie Park's centre-serving local / regional cycling network	Combination General NSW Government and SIC; Local government		●	●	
Lower speed limit on regional roads	General NSW Government		●		
 Education					
Two new primary schools	General NSW Government		●	●	
One new high school	General NSW Government			●	
 Health, justice, police and emergency services					
Community health facility	General NSW Government			●	
New ambulance station (8 bays)	General NSW Government		●		
 Sports and active recreation					
Multipurpose Indoor recreation, community and youth hub centre	Local Government			●	
 Cultural and community infrastructure					
Creative production space	Local government		●		
Creative gallery and event space	Local government		●		
 Green and blue infrastructure					
City of Ryde: embellishment of existing parks for senior leisure needs	Local government		●		
City of Ryde: park and open space tree planting program	Local government	●	●		
City of Ryde: street tree planting program	Local government	●	●		

Proposal name	Primary funding source	Delivery timeframe			
		Yr 0–5 (2016–2021)	Yr 6–10 (2022–2026)	Yr 11–20 (2027–2036)	20 Yr+ (post-2036)
 Water and electricity					
New Macquarie Park West Zone Substation	Customer			●	
New recycled water treatment plant and network	Customer		●		

*Most proposals shown are not funded or committed for delivery. As a result, they should be regarded as initiatives subject to further investigation and investment decisions.






* These proposals can be located in either Herring Road precinct, North Ryde precinct or MPIA. There is also opportunity for some of these to be located nearby but outside the MPC to meet the service need.

Figure 18: Multi-precinct (all of MPC)






Proposals and delivery timeframes

Table 7: Infrastructure and service proposals located outside the MPC

Proposal Name	Primary funding source	Delivery timeframe			
		Yr 0–5 (2016–2021)	Yr 6–10 (2022–2026)	Yr 11–20 (2027–2036)	20 Yr+ (post-2036)
 Public transport					
Investigate Parramatta to Epping mass transit / train link	Combination General Commonwealth / NSW Government				●
Strategic bus corridors for rapid services from Macquarie Park (to Hurstville, Parramatta via Eastwood, Blacktown via M2)	General NSW Government			●	
Mona Vale to Macquarie Park public transport improvements for rapid services	General NSW Government			●	
Upgrade Ryde bus depot	Combination General NSW Government and SIC		●		
 Roads and active transport					
Epping Road / Pittwater Road, North Ryde - Intersection upgrade	Combination General NSW Government and Local Government		●		
Browns Waterhole Track – Lane Cove River crossing upgrade	Local government		●		
New eastern footpath on Lane Cove Road – Talavera Road to Fontenoy Road	Local government*		●		
Cycle link to Northern Beaches via A3	Combination General NSW Government and SIC		●	●	
 Education					
Expand existing primary facilities	Combination General NSW Government and SIC		●		
Expand school for specific purposes capacity	Combination General NSW Government and SIC		●		
 Health, justice, police and emergency services					
New Ryde hospital	General NSW Government		●	●	
New Ryde fire station in North Ryde	General NSW Government		●		
 Sports and active recreation					
West Ryde Multi-sports Facility	General NSW Government		●		
Ryde community sports centre – two additional multi use courts	Local government		●	●	
Christie Park sporting facility upgrade stages 2 and 3	Local government		●	●	
ELS Hall – Field 3 surface upgrade	Local government		●		
ELS Hall Park – indoor facility	Local government			●	
ELS Hall Park – masterplanned upgrades, youth space, and car park	Local government		●		

* Co-funding opportunity with NSW Government

Proposal name	Primary funding source	Delivery timeframe			
		Yr 0–5 (2016–2021)	Yr 6–10 (2022–2026)	Yr 11–20 (2027–2036)	20 Yr+ (post–2036)
Marsfield Park, fields 1 and 2 surface renewal	Local government		●		
Waterloo Park – surface renewal	Local government		●		
North Ryde Park – upgrade to playing surface, fencing and irrigation	Local government		●		
 Cultural and community infrastructure					
Ryde Central – regional community facilities	Local government		●		
Top Ryde community services hub	Local government			●	
City of Ryde: library public multimedia lab	Local government		●		
 Green and blue infrastructure					
Improving waterways and water dependent ecosystems at Lane Cove River	Local government			●	●
Tuckwell Park upgrades	Local government	●		●	
Fontenoy Park – irrigation and drainage systems	Local government	●	●		
Blenheim Park – design and construction of masterplanned work	Local government		●		
ELS Hall – masterplanned upgrades	Local government		●		
North Ryde Park – amenities upgrade	Local government		●		
Dunbar Park – amenities upgrade	Local government		●		
Marsfield Park, Darall Park and Waterloo masterplanned upgrades	Local government		●		
Pioneer Park – masterplanned upgrades	Local government		●		
Waterloo Park – Amenities updates	Local government		●		
Dunbar Park – masterplanned upgrades	Local government			●	
 Water and electricity					
Reinstate existing disused Ryde to Pymble ('RP03') trunk drinking water main	Customer		●		
Local water network duplication	Customer			●	
Marsfield Reservoir – new 10 mega litre reservoir	Customer		●		
Wet weather storage tanks at controlled emergency relief structures of wastewater mains	Customer			●	

*Most proposals shown are not funded or committed for delivery. As a result, they should be regarded as initiatives subject to further investigation and investment decisions.

4.2 Policy initiatives and non-capital proposals

The SISA has also identified a range of policy initiatives, non-capital proposals and innovative approaches to servicing and delivery that are designed to complement the infrastructure and service proposals. These contribute to meeting the demand and needs of future residents, workers and broader place-making objectives for the MPC.



Cultural and community infrastructure

- Developing an overarching Macquarie Park Cultural Policy / Framework taking a 'Connect, Multiply, Expand' approach to ensure arts and culture are embedded in the fabric of Macquarie Park. This should include a focus on prioritising (First Nations First) and embedding Aboriginal culture and heritage in the fabric of Macquarie Park.
- Designing public open space to be multi-functional so that it enables temporary arts and cultural activation such as performance, cultural events and markets. This may include a small stage area with basic storage, power, etc.
- Co-locating cultural spaces with the commercial sector to help innovation through the cross-fertilisation of ideas and improving the economic viability of cultural venues.
- Co-locating and joint use of cultural and social infrastructure, becoming community hubs that foster a vibrant community identity.
- Programs and partnerships between creative practitioners, Macquarie University and the technology and innovation industries to leverage student talents, encourage the joint use of existing and future cultural facilities, and foster connections and collaboration across sectors.
- Opportunities to support a diverse and vibrant evening and night-time economy through arts and cultural activation.



Education

- Collaborative school infrastructure delivery with assets integrated as part of mixed-use developments or other educational and community facilities.
- Co-location of schools with other facilities (e.g. open space) to enable shared uses such as sports and recreation, community and health services, and early childhood education services.
- Opportunities for sharing sporting fields with schools and increasing field use by changing playing surfaces.



Green and blue infrastructure

- Urban greening alternatives such as green roofs and walls on buildings and infrastructure, and communal green open space within private high-density developments should be delivered by industry.
- A need to consider actions and adaptation strategies to mitigating climate risk and its effects on people and asset failures. The number of human heat stress events (days over 35 degrees) are expected to increase, with more people affected as population grows. See Appendix B.



Health

- Co-location with community services and other government assets to support shared use.
- Investing in technology to improve service delivery in healthcare, through telehealth and virtual health services.



Transport

- Consider establishing freight and local distribution hubs to consolidate and manage deliveries to residents and businesses.
- Incentives to encourage shared bikes and micro-mobility for first and last mile access from metro stations.
- Short-range mobility options including emerging micro-mobility to help provide a uniqueness to the precinct as well as local trade / jobs for university students.
- Review the level of parking supply and availability, both car space requirements in new developments, and the pricing and availability of on and off-street parking.



Sport and active recreation

- Consolidating sporting fields and facilities into larger sites to accommodate more multi-use fields and facilities.
- Developing separate training venues to free up playing fields for competition only play.
- Consider playing surfaces that support multiple uses and allow an increase in the number playing hours.
- Incorporating facilities such as tennis courts, aquatic centres, skate parks and indoor multi-use courts as part of a larger public open space area and/or within a large footprint commercial or mixed-use development site. This approach can provide synergies with other community facilities, wellness and allied health businesses.



Water and electricity

- Several stormwater management projects were identified through the study. These include:
 - Waterway health improvement projects at Granny Smith Memorial Park, Kotara Park, Bunbar Park and Pioneer Park.
 - Streetscape Water Sensitive Urban Design pilot aligned with DPE-supported new planning precincts and Parramatta River Catchment Group (PRCG) objectives.
 - On-lot rainwater harvesting and infiltration pilot in Terry's Creek.
- Further planning and coordination with Sydney Water and Council could take place to address recycled water and stormwater in the Ryde transit corridor.

4.3 Funding, delivery and implementation considerations

The assessment has highlighted a range of key considerations:

- a substantial level of infrastructure investment is required to meet the growth in population and dwellings that has already occurred in the two Urban Activation Precincts – in particular social infrastructure (e.g. schools) to support new residential communities and new commercial developments occurring in the MPIA.
- the land acquisition requirements, particularly for sports facilities, open space, education, roads and active transport are significant within an already established urban environment. It is important that land required in the medium and the longer term (beyond 2036) are identified for reservation to reduce future acquisition costs and avoid further deficits in service provision.
- state agencies and Council need to further refine and scope these proposals to optimise already owned government land and to minimise acquisition where possible.
- develop partnerships with Council, businesses and Macquarie University to foster culture and the arts in the MPC. This will help to attract and support local artists and workers in the creative

industries, support the growth of a diverse innovation ecosystem, and contribute to vibrancy and place activation for residents, workers, students and visitors.

- more detailed work on development controls to be applied on a block by block basis to define the desired land use and built form outcomes sought for the area as well as more accurate forecast of dwellings and building floorspace for employment. This would also better inform more detailed scoping of infrastructure work, for improved cost estimates and understanding of property impacts.
- more detailed investigation including traffic modelling is necessary to develop and validate the scope of individual transport proposals, confirm how infrastructure can be delivered, and to pursue policy initiatives identified to create a safe, efficient and reliable transport system.

Agency and sector specific considerations are outlined in the following pages.





Cultural and community infrastructure

Funding for local and regional cultural facilities is generally a responsibility of Council and may be sourced partially through developer contributions, including Voluntary Planning Agreements.

In Macquarie Park there are opportunities for direct private sector involvement given the potential to link artists and creative workers with local industries and Macquarie University.

Production space (working spaces for artists and creative industries practitioners) could be provided as floorspace located within a commercial building or tenancy.

Gallery and event space could likewise be located within a commercial building or tenancy; however, as these are public-facing facilities, they would also require good exposure to public realm and activity. These spaces will operate best if offered in coordination with commercial premises such as retail and food and beverage.



Education

Early childhood education facilities (e.g. pre-school and childcare centres) are generally funded and operated privately or by other agencies. An increase in student places at early childhood education facilities and private primary and secondary schools will be needed to meet the total demand for education needs from population growth in the MPC.

Benchmark land requirements for primary school sites is 1.5ha while for secondary school sites is 2.5ha in existing urban areas. This may vary depending on site constraints and design.

Securing land ahead of future rezoning and new development is essential to enable future delivery and ensure schools are located close to transport and where students reside.





Green and blue infrastructure

Funding waterway work of local significance, local and district open space (active and passive), tree canopy along local and regional roads, and local and district open spaces is typically Council's responsibility. Council is also responsible for funding and delivering local sporting facilities.

The NSW Government typically funds regionally significant waterways, regional open space, regional sporting facilities, tree planting in corridors of regional significance and along major roads. The NSW Government can also provide grant funding to Council for delivering local green infrastructure.

Any future tree planting is assumed to be on existing government owned land, such as open space and the road reserve. Additional land is required to deliver Council's Strategy for Waterloo Road Linear Park beyond the existing local road reserve.

Land required for open space is indicative of the area needed, with exact location and extent requiring refinement following land use trade off considerations. Opportunities exist to repurpose existing underutilised government owned land for open space.



Health, justice, police and emergency services

Health

The potential site for a new ambulance station to service growth in MPC can be located either within Macquarie Park, or in nearby Marsfield. The potential for a community health facility and new ambulance station will be subject to further investigations as part of established NSW Health capital planning processes to confirm future investment and funding needs.

Justice, police and emergency services

The site for a new policing centre would ideally be close to Macquarie Park metro station and Lane Cove Road for ease of access.



Transport

The identified funding source and the share of costs to the NSW Government and SIC are based on similar projects funded for delivery and align with NSW Government policies.

Council is responsible for the regional and local road network, including pedestrian and cycling facilities. Local development contributions and Council's developer incentive scheme for the finer grain road network is a key element in delivering the required local transport infrastructure.

Future travel demand to and from Macquarie Park by private vehicles cannot be met by additional infrastructure. Complementary policy, travel options, and travel demand management measures such as reducing parking supply for developments and integrating land use with transport will be required to encourage behavioural changes such as mode-shift, and trip destination/distance.

Many of the proposals identified have not been subject to technical and/or engineering investigations. As such, high level scoping and an 'order of magnitude' cost estimate based on comparable sized projects has been used in most cases. Project business case investigations will be required to further define the scope of projects, including likely cost and land requirements.

As a strategic network-wide assessment, the proposals identified are for planning purposes only unless otherwise committed or announced. More detailed investigation and analysis including transport modelling will be required to provide a more localised gap analysis and consider city-wide and cumulative impacts. This further work would also allow for the validation of the identified proposals to achieve the intended place and transport outcomes, and ability to accommodate increased demand from forecasted growth.

While several identified proposals will not be delivered by 2036, there will be a need for initial funding to allow for further investigations, planning/development and/or land acquisition.



Sport and active recreation

The primary funding source for local and neighbourhood sports and active recreation is local government through developer contributions or voluntary planning agreements. For regional sports and active recreation, this varies between local and state government.

Land required for sports infrastructure includes land to enable future expansion of existing or new facilities to accommodate growth beyond 2036. Some of the sports infrastructure could be provided outside of the MPC in other parts of the Ryde area, or could be as floorspace as part of a new development.



Water

The funding source for Sydney Water's infrastructure is the customer base within Sydney Water's area of operations.

Pipelines in the MPC are underground and do not require easements due to their small diameter.

The Marsfield reservoir which services the area with drinking water is located south west of the MPC. An additional reservoir would be needed to service growth and would occupy approximately 2,000 square metres of land within the existing site.

Underground wet weather storages connecting to the wastewater system would also need to be installed. A precinct-based recycled water scheme in the area was investigated. The assessment of financial viability and funding mechanism is still in progress and needs to be finalised prior to any commitment. A clear mandate for new developments to provide a 'third pipe' reticulated recycled water service is required to support the delivery of the scheme and needs to be decided once the financial viability is finalised. A collaborative approach is needed for this to be implemented successfully.

The estimated costs are high level based on options assessment and will need to be further developed based on detailed designs.



Electricity

The funding source for Ausgrid's infrastructure is the customer base within Ausgrid's area of operations.

Electricity feeders are generally built along road corridors and do not require additional land. The Macquarie Park sub-transmission station was built on the footprint of the existing Macquarie zone substation.

The need for an additional Macquarie Park substation will be subject to a detailed assessment to determine the economic and commercial viability in accordance with regulatory and governance requirements.



Local infrastructure

Council has an existing schedule of items under their section 7.11 and 7.12 contribution plans, which identified infrastructure required to support growth in Macquarie Park and the wider Ryde LGA. Relevant items from Council's existing contribution plans were included in this assessment for each sector to provide a more holistic view on the scale and costs of infrastructure required. However, further assessment by Council will be required to identify additional local infrastructure items required to support the growth forecasted in the SISA.



5 Next steps

The SISA informed the infrastructure and service needs of the Macquarie Park Innovation Precinct Place Strategy and Strategic Master Plan. The proposals identified in the SISA will be the basis for the implementation of the Place Strategy and its actions.

Feedback received during the public exhibition of the draft SISA in June–August 2021 from industry, landowners, the community and other key stakeholders has informed the finalisation of the SISA. This final report will help guide strategic land use and infrastructure decision making by the City of Ryde and the NSW Government, including detailed neighbourhood master plans to enable future rezonings and guide further investigation of infrastructure and service proposals.

Appendix A:

Sector methodology and assumptions



Cultural and community infrastructure

Methodology and Assessment

The cultural infrastructure needs assessment led by Create NSW seeks to support the proposed cultural vision of “A global innovation precinct fuelled by local talent to continuously evolve, Macquarie Park nurtures creative activity that feeds back into enterprise, provides activation and vibrancy both day and night for residents, workers and students, and strengthens its sense of Country, community and distinctiveness.”

The assessment approach involved desktop review and stakeholder consultation with Council and Macquarie University to establish a baseline understanding of existing facilities, current plans, aspirations, and challenges in the area. Benchmarks on cultural infrastructure provision were identified and evaluated from local, national, and international sources, and considered in-line with the projected increase in residents and workers. This benchmarking approach in conjunction with the proposed Cultural Vision acted as a guide to determine the appropriate level of provision for the area.

A high-level demand analysis for libraries, museums, galleries and multi-use venues/theatres was completed using attendance and visitation rates from ABS and other survey data to ensure the provision would be appropriate for the actual demand or usage rate. Consideration was also given to existing and committed cultural facilities within a 15 to 30 minute radius.

Key assumptions

The following level of service benchmarks were used for this assessment:

Table 8: Facility floorspace assessment

Type of facility	Floorspace to population ratio	Min. acceptable size (sqm)
Libraries	35 sq.m. per 1,000 people	500 to 1,000 sq.m.
Museums	28 sq.m. per 1,000 people	2,000 sq.m.
Arts (galleries)	15 sq.m. per 1,000 people	3,000 sq.m.
Arts (multi-use venues and theatres)	15 sq.m. per 1,000 people	–
Arts (production, rehearsal and education)	15 sq.m. per 1,000 people	–

Source: Arts Council England and Museums, Libraries, Archives Council (UK).

The Arts Council provision for libraries aligns with the levels of service for Australian public libraries which are used in NSW.

The following indicative attendance/visitation rates were used for this assessment:

Table 9: Indicative visitation rates

Facility type	Attendance / visitation rates
Libraries and archives	31.8%
Museums	29.6%
Arts (galleries)	41%
Arts (multi-use venues and theatres) ⁹	42%

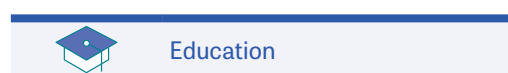
Source: Australia Council for the Arts National Arts Participation Survey (2019); 2017-2018 Bureau of Statistics data for Attendance at Selected Cultural Venues and Events (used for Libraries and Museums facility type).

The benchmark capital cost rate applied is **\$5,850** per sq.m. (gross floor area), based on the recommended costing for new facilities from the Planning Sydney's Cultural Facilities report, commissioned by Create NSW in 2011, escalated to 2020 rates.

Funding and delivery (including land requirements)

Funding for local and regional cultural facilities is generally a responsibility of Council and may be funded through developer contributions, such as Voluntary Planning Agreements. There are also opportunities for direct private sector involvement linked to local industries and potential partnerships with Macquarie University.

Production space (working spaces for artists and creative industries practitioners) could be provided as floorspace located within a commercial building or tenancy. Gallery and event space could likewise be located within a commercial building or tenancy; however, as these are public-facing facilities, they would also require good exposure to public realm and activity. These spaces will operate best if offered in coordination with commercial premises such as retail and food and beverage.



Methodology and Assessment

Schools Infrastructure NSW's (SINSW) Student by Area (SbA) Population Projections model was used to project future demand for school facilities. The model uses demographic data associated with the residential population projections and the government vs. Non-government school participation ratio derived from Census data to inform the future demand on government primary and secondary school teaching spaces. Assumed ratios were applied to projected growth to determine demand for students attending SSPs, and to determine demand for early childhood education spaces.

Key assumptions

A range of demographic and other factors including government share are applied to the assumptions for student projections.

For primary school teaching spaces, an average class size of 23 students is used. For secondary schools, an average class size of 20 students is used. Primary schools can accommodate up to approximately 1000 students while secondary schools can accommodate up to approximately 2000 students.

For student places at SSPs, an assumption of 0.4 per cent of government students was used to determine such need with an average class size of 9. A Greater Sydney applied ratio of 0.45:1 for population in the 0–4yr age group was used to determine early childhood education spaces, with an average of 50 children per centre.

To assess the minimum number of new schools required, it is assumed that existing schools would be expanded to the maximum size possible on the school site to help meet the overall demand. The cost of new schools or expansion of existing schools are based on recent similar tendered costs.

Main cost related assumptions include:

- for expansion proposals, existing buildings are retained without refurbishment except for required upgrades to core facilities to meet additional demand.
- proposals would be designed and constructed to their maximum capacity in a single phase.
- sites are fully serviced with no significant external works e.g. road or intersection works.
- costs associated with local authority contributions and site remediation or acoustic facades for neighbouring properties are excluded.

Funding and delivery (including land requirements)

The primary source of funding for government school infrastructure is a combination of NSW Government and the SIC where available. Early childhood education facilities (e.g. pre-school, and child care) may be privately funded and operated.

Benchmark land requirements for primary school sites is 1.5ha while for secondary school sites is 2.5ha. This may vary depending on site constraints and design.

Securing land ahead of future rezoning and new development is essential to enable future delivery and ensuring schools are well located close to transport and where students reside.



Green and blue infrastructure

Methodology and Assessment

The green infrastructure needs assessment was undertaken in collaboration between DPE's Resilience and Urban Sustainability Division and the Environment, Energy and Science (EES) Group), and the City of Ryde.

For passive open space, waterways and tree canopy, the needs based assessment used GIS analysis to compare baseline data of existing provision with an agreed target level of service as identified in Government plans and through collaboration with the key stakeholders to determine needs. This assessment considered both the provision of new sites for passive open space and new access points to existing open space to increase accessibility.

Key findings from the assessment include that only 41 per cent of future residents are currently within a 5 minute walk (400 metres) to passive open space. Average tree canopy cover is around 20 per cent, compared to a 35 per cent target for most neighbourhoods.

Key assumptions

All existing waterways and water dependent ecosystems are to be protected and improved regardless of the level of growth.

Targets for access to passive open space are based on 400 metre access to local open space for all residents and workers, and 200 metre access for high density areas. Targets for tree canopy are based on 35 per cent canopy cover in business areas, and 40 per cent in residential areas. Trees along the road network are assumed to be medium sized trees with a canopy diameter of 50 sqm. Typical new access points to existing open space is the equivalent of 5 metres of kerb works.

The capital cost rates applied were:

- \$5 per sqm for revegetation around waterways and water dependent ecosystems
- \$200 per sqm to develop new passive open space
- \$100 per sqm for new access points to existing open space
- \$408 per tree.

Funding and Delivery (including land requirements)

Land required for open space is indicative of the area needed, with exact location and extent requiring refinement following land use trade off considerations. Opportunities exist to repurpose existing underutilised government owned land for open space.

Council is responsible for funding waterway works of local significance, local and district open space (active and passive), tree canopy along local and regional roads, and local and district open spaces. Council is also responsible for funding and delivering local sporting facilities.

The NSW Government funds regional significant waterways, regional open space, regional sporting facilities, tree planting in corridors of regional significance and along major roads.

Any future tree planting is assumed to be on existing government owned land, such as open space and the road reserve, and not private land. Additional land is required to deliver Council's Strategy for Waterloo Road Linear Park beyond the existing local road reserve.



Health

Methodology and Assessment

The population projections used for the SISA were compared to the 2016 and 2019 DPE population projections for the Ryde LGA. The comparison was undertaken at the LGA level due to the varying catchment sizes for health facilities. The difference in population projections was then compared to the assumptions used in the planning currently underway for the Ryde Hospital redevelopment and provision of ambulance services.

For community health facilities, a desktop review of the location and services delivered in community health facilities was undertaken to identify any gaps in services.

Key assumptions

The population projections used for the SISA at an LGA level are generally similar to DPE's population projections. The population projections used for the SISA are slightly greater than the 2016 DPE projections, but lower than the 2019 projections.

With the redevelopment of the Ryde Hospital, it is considered that an increase in the demand for services can be accommodated in the redevelopment.

In assessing ambulance services and station needs, it is estimated that incidents will increase by approximately 37 per cent as a result of growth.

Benchmark rates for the capital cost estimate and land requirements based on similar infrastructure projects were used.

Funding and Delivery (including land requirements)

The NSW Government is the primary source of funding for hospitals. Community health care facilities and ambulance facilities are funded by the NSW Government.

The potential location of a new ambulance station to service growth in Macquarie Park can be located either within Macquarie Park, or in nearby Marsfield.



Justice, police and emergency services

Methodology and Assessment

Justice facilities in this established part of Greater Sydney are considered adequate to meet the current and future needs of the community.

The current level of police resourcing is considered adequate for the anticipated growth in the area. However, there is a need for infrastructure improvements to existing aging assets and to move towards the new model of multi-purpose policing hubs that support a variety of police tenancies and support functions, such as Traffic and Highway Patrol. This would include the opportunity to consolidate the Ryde Police Area Command (PAC) to a single location, currently based across Eastwood and Gladesville police stations.

Key assumptions

The benchmark construction costs for the multipurpose policing centres were based on a cost of \$8,500 per sqm and considers a range of pricing factors such as design, building construction, services, driveways and pavements.

Funding and Delivery (including land requirements)

The primary funding source for Justice, Police, and Emergency Services in established areas is the NSW Government.

The site for a new policing centre would ideally be in close proximity to Macquarie Park metro station and Lane Cove Road for ease of access.



Sport and active recreation

Methodology and Assessment

An assessment of sport facility provision or service levels has previously been undertaken by the Office of Sports across Greater Sydney's five districts. These current levels of service were then reviewed to assess whether the current sport and active recreation infrastructure were over or under capacity to decide whether the current levels of service were meeting demand or the demand was being capped by the lack of provision of sport and active recreation infrastructure and/or diversity of opportunity.

The Greater Sydney sport and active recreation infrastructure baseline level of service (facilities) and demand (sport participation) was then applied to the City of Ryde's sport facility provision for its existing community and a gap analysis was undertaken.

A review of the gap analysis through a demographic analysis of the future population, including cultural mix and any trends in sport participation, then allowed the development of future sport facility needs for the various pathways, provided by the Commission, to be modelled. City of Ryde open space and recreation officers were consulted, as part of the assessment and analysis of the SISA. Council had several sport and active recreation projects in the planning and design phase, i.e., ELS Hall Park - Indoor Facility – additional indoor courts, but these facilities would only relieve current over capacity issues and not support the proposed increase in residential and job populations projected.

The key finding of the analysis was that all existing facilities are at or over a sustainable carrying capacity, therefore they are unable to absorb any new participants from the projected population increases.

Key assumptions

Sport and recreation infrastructure needs are based on a sustainable number of participants per facility type using population benchmarks developed from data for similar sporting facilities from across Greater Sydney.

The specified 'levels of service' are derived from the guiding principles for sport facility planning as per the draft Greater Sydney Sport Infrastructure Plan: Distribution, Access, Collaboration, Culture, Fit-for-purpose, Multi-use, Hubs, Sustainability, Ecologically sustainable development, Flexible design, Universal design, and Technology.

Typical capital construction costs from similar sporting facilities in Greater Sydney were used. The estimate relates only to the building of sport surfaces, fencing, lighting, and ancillary structures. It does not include the cost of site decontamination or large scale earth works (a flat site is assumed).

Funding and delivery (including land requirements)

The primary funding source for local and neighbourhood sports and active recreation is local government through developer contributions or voluntary planning agreements.

The sports and active recreation facilities identified in this report are mostly regional. The NSW Government provides funding for District and Regional sporting facilities.

Land required for sports infrastructure includes land to enable future expansion of existing or new facilities to accommodate growth beyond 2036. Some of the sports infrastructure could be provided outside of the MPC in other parts of the Ryde area, or could be as floorspace as part of a new development.

The land for any proposed sport and/or active recreation facility is also assumed to have a flat site not requiring extensive earthworks with access to: potable water and recycled water for sports field watering, three phase power (without the need to build a substation), sewer connections; and not be: a contaminated site requiring remediation, not highly flood prone, however open space is useful for flood mitigation, and within a high voltage electricity easement.



Transport

Methodology and assessment

Transport for NSW (TfNSW) led a high-level assessment to identify both State and local transport infrastructure and service requirements to meet current challenges and future needs of the network. The assessment was completed in two phases:

Phase 1 – An analysis of future multi-modal demands and capacity on the network up to 2041 using the Sydney Strategic Travel Model (STM). The analysis was undertaken with land use forecasts for the SISA, and with TZP16 v1.51 and STM3.6 standard future year business case network assumptions as reference.

Phase 2 – Options identification and assessment. This assessment is based on the movement and place core process as identified in the Practitioner's Guide to Movement and Place, which was adapted for the SISA to generate a list of infrastructure and service proposals. This phase involved a collaborative process with workshops involving TfNSW, City of Ryde, the Commission, DPE and Connect Macquarie Park Innovation District.

Informed by the stakeholder workshops held during the second phase, a transport vision and objectives was developed for the area, followed by the generation of a longlist of potential proposals. The longlist of proposals reflect stakeholders' understanding of strategic issues, challenges, and identified problem areas from the analysis of model results.

A qualitative Strategic Merit Test (SMT) was applied using a high-level Multi Criteria Analysis which included consideration on how the potential options demonstrated strategic alignment with the agreed transport objectives and delivery feasibility. This created a refined shortlist of proposals which were taken forward as those being necessary to support growth in the area.

Key assumptions

Many of the proposals identified have not been subject to technical and/or engineering investigations. As such, high level scoping and an 'order of magnitude' cost estimate based on comparable sized projects is used in most cases. Project business case investigations will be required to further define the scope of projects, including determining likely cost and land requirements.

As a strategic network-wide assessment, the proposals identified are for planning purposes only unless otherwise committed or announced. More detailed investigation and analysis including the use of transport modelling will be required to provide a more localised gap analysis and consider city-wide and cumulative impacts. This further work would also allow for the validation of the identified proposals to achieve the intended place and transport outcomes, and ability to accommodate the increased demand from forecasted growth.

Funding and delivery (including land requirements)

The choice of funding source and the share of costs to the NSW Government and the SIC are based on similar projects funded for delivery and align with NSW Government policies.

Council is responsible for the regional and local road network, including pedestrian and cycling facilities. Local development contributions and Council's developer incentive scheme for the finer grain road network is a key element in delivering the required local transport infrastructure.

Strategic bus corridor infrastructure and cycling facilities may require road widening at selected locations.

While several identified proposals will not be delivered by 2036, there will be a need for initial funding to allow for further investigations, and/or for the acquisition of land to enable future delivery.



Water

Methodology and assessment

Sydney Water completed a sub-regional strategic planning study in 2018 to develop an integrated water servicing strategy for growth in Macquarie Park (akin geographically to the MPC). This study was aimed at exploring long-term opportunities and challenges for integrated water cycle management and to provide sustainable water services to support growth.

It considered growth over the next 30 years to develop a plan for short, medium, and long-term servicing and staged investment. Growth forecasts were based on 2017 data from the Housing Supply Forecast Model (HSFM), Bureau of Transport Statistics (BTS), and Council and development applications.

Following this, Sydney Water completed an options assessment study in 2019 to analyse the existing network capacity in detail using hydraulic models and to determine the preferred servicing solutions and timing. This was based on updated 2019 growth forecasts from the same sources identified above.

Key assumptions

The growth forecasts used for the SISA differed from those used by Sydney Water in their planning studies. However, the difference was not material when the forecast number of dwellings and jobs was converted to Equivalent Population (EP) which Sydney Water use to estimate future drinking water demand and wastewater flow. Accordingly, the previous studies undertaken by Sydney Water are appropriate to inform the SISA and the same capital projects identified from these are relevant for inclusion in the SISA.

Additional assumptions include:

- Occupancy rate of 2.2 for multi dwellings and 2.6 for single dwellings to forecast population
- each job is equal to 0.225 EP
- cost estimates are from Sydney Water's cost estimator tool
- Sydney Water's future operating licence and regulatory requirements will remain the same as current requirements.

Funding and delivery (including land requirements)

The funding source for Sydney Water's infrastructure is the customer base within Sydney Water's area of operations.

Pipelines in the MPC are underground and do not require easements due to their small diameter.

The Marsfield reservoir which services the area with drinking water is located south west of the MPC. An additional reservoir on the existing site would be needed to service growth and this would be approximately 2,000m².

Wet weather storage tanks connecting to the wastewater mains would also need to be installed. The size, location and cost of tanks required is under investigation.

Delivery of a precinct-based recycled water scheme in the area would need to be supported by a clear mandate for new developments to provide a 'third pipe' reticulated recycled water service. A collaborative approach is needed for this to be implemented successfully.



Electricity

Methodology and assessment

Ausgrid provided input based on its analysis of the electricity network's capacity to service the MPC. This was prepared through a review of Ausgrid's Distribution and Transmission Annual Planning Report 2020 (DTAPR) and through an audited internal forecasting model to determine the spatial contribution of additional customer demand.

The growth forecasts used to inform the DTAPR 2020 were primarily sourced from the 2019 DPE population projections which were less than the forecasts used for the SISA. Ausgrid reviewed the forecasts used for the SISA to verify if any additional electricity infrastructure would be required to service this additional growth.

Key assumptions

Significant commercial developments are expected to continue to drive very large electricity demand, especially for data centres.

Funding and delivery (including land requirements)

The funding source for Ausgrid's infrastructure is the customer base within Ausgrid's area of operations.

Electricity feeders are generally built along road corridors and do not require additional land. Land required for a new zone substation would be in the order of 0.5–1ha with adequate street frontage on a level site.



Local infrastructure

A significant amount of infrastructure and service needs in the area are in local infrastructure such as stormwater, local and regional roads (including walking and cycling), open space and recreation, and community and cultural facilities. Council has worked with the project partners to provide direct input on local infrastructure items required in Green Infrastructure, Cultural Infrastructure and Transport.

In addition, Council has an existing schedule of items under their section 7.11 and 7.12 contribution plans, which identified infrastructure required to support growth in Macquarie Park and the wider LGA. Relevant items from Council's existing contribution plans were included in this assessment for each sector to provide a more holistic view on the scale and costs of infrastructure required. However, further assessment by Council will be required to identify additional local infrastructure items required to support the growth forecasted in the SISA.

Appendix B:

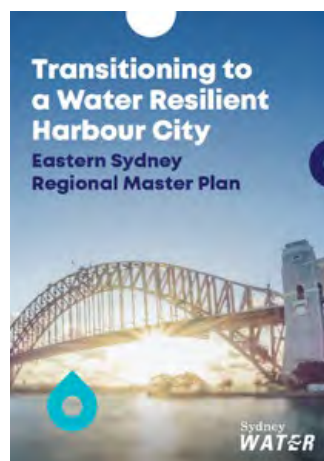
Adaption for Climate Risk in Macquarie Park

Sydney Water and Climate Risk released the *Adapting the East* report in early 2021, a study which analysed future heat impacts to Sydney Water's Eastern Sydney region. The study assessed the climate impact in the context of urban renewal and densification in three study areas including the Macquarie Corridor which encompasses the SISA area.

This analysis was used to support Sydney Water's *Eastern Sydney Regional Master Plan* released in early 2022. The development of a regional-scale integrated water servicing master plan reimagines the role of water to fulfil the GCC's vision for a more liveable, productive and sustainable Greater Sydney and the Greater Sydney Region Plan's direction for a more resilient city.

The study report and master plan are available on Sydney Water's website.

A sub-set of the data from the report covering the SISA area was analysed to understand more locally the climate risk projected for the area, more specially, the impact of extreme heat events (i.e. days over 35 degrees) on assets and people. The data also shows how by applying various adaptation strategies (i.e. through a combination of natural and built mitigation measures and actions that result in temperature reductions of 2, 4 and 7 degrees), it may reduce this impact in future years.



Observations from the data shows:

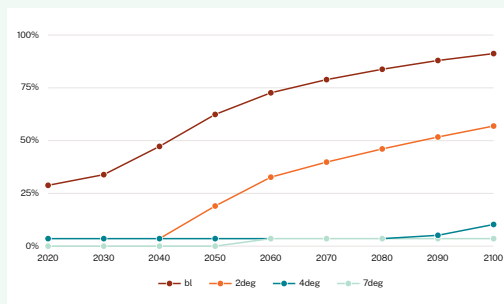
- The risk probability of building asset failure is projected to increase from 26% in 2020 to 61% in 2050.
- Applying adaptation strategies at 2 degrees can reduce failure probability (FP) to 15.7% in 2050, while adaptation strategies at 4 degrees or higher can reduce FP to 0% in 2050.
- Based on the current population, the average number of people impacted by extreme heat events is projected to increase by 40.7% between 2020 to 2050. This is equivalent to over 6 Human Heat Stress (HHS) impact events per person in 2050.

- By applying adaptation actions to reduce temperatures, the number of HHS impact events can be reduced.

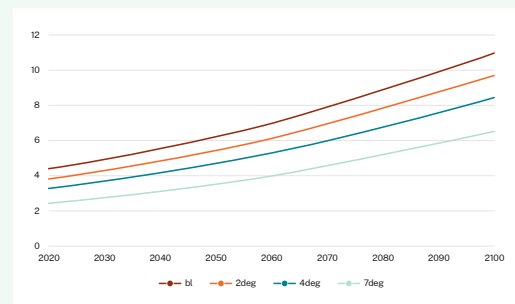
Adaptation actions at:	HHS events in 2050 (approx.)
2 degrees	11.8%
4 degrees	23.5%
7 degrees	41.2%

- The total number of HHS impact events would increase with population growth.

Infrastructure heat failure rate, by year and mitigation scenario



Average human heat stress events per person, by year and mitigation scenario



It is recommended that future detailed land use planning in the SISA area should include climate adaptation planning as part of the planning process and seek to incorporate adaptation strategies to achieve a reduction in HHS events and asset heat failure risk. As a start, the SISA has identified green infrastructure projects such as increased tree canopy in each neighbourhood, forest zones as part of the Waterloo Linear Park, and improved waterway management which will contribute to urban cooling.

Further considerations and actions could include:

- provisions in the Development Control Plan that implements adaptation actions and mandates mitigation measures in new developments,
- working closely and early with developers on building and site orientation to support air flow, and shading in outdoor areas,
- explore recycled and stormwater water servicing options to support urban cooling and greening,
- place a strong focus on the level of shading, choice of ground cover and the selection of building materials as part of public domain and infrastructure design.

