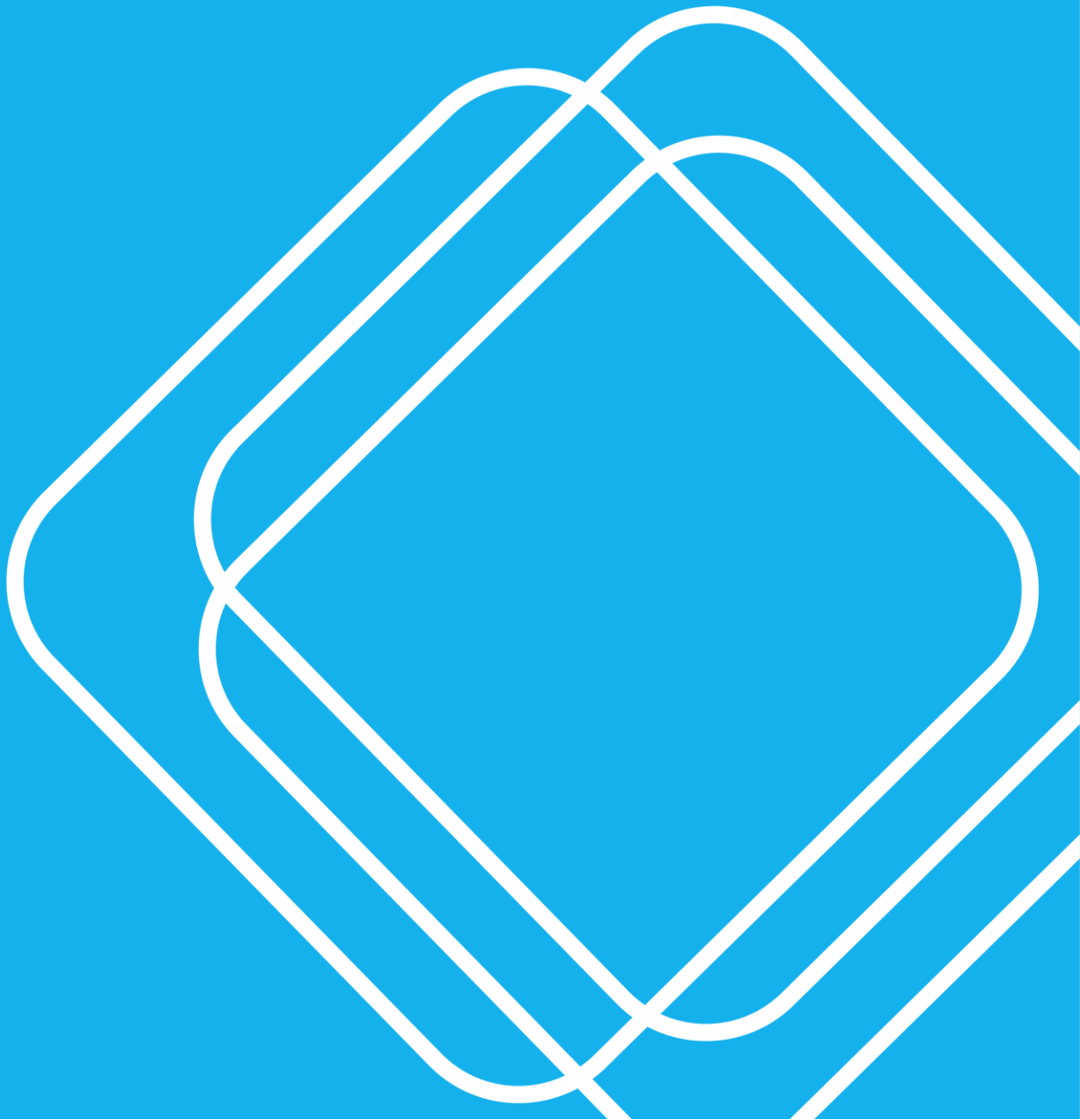
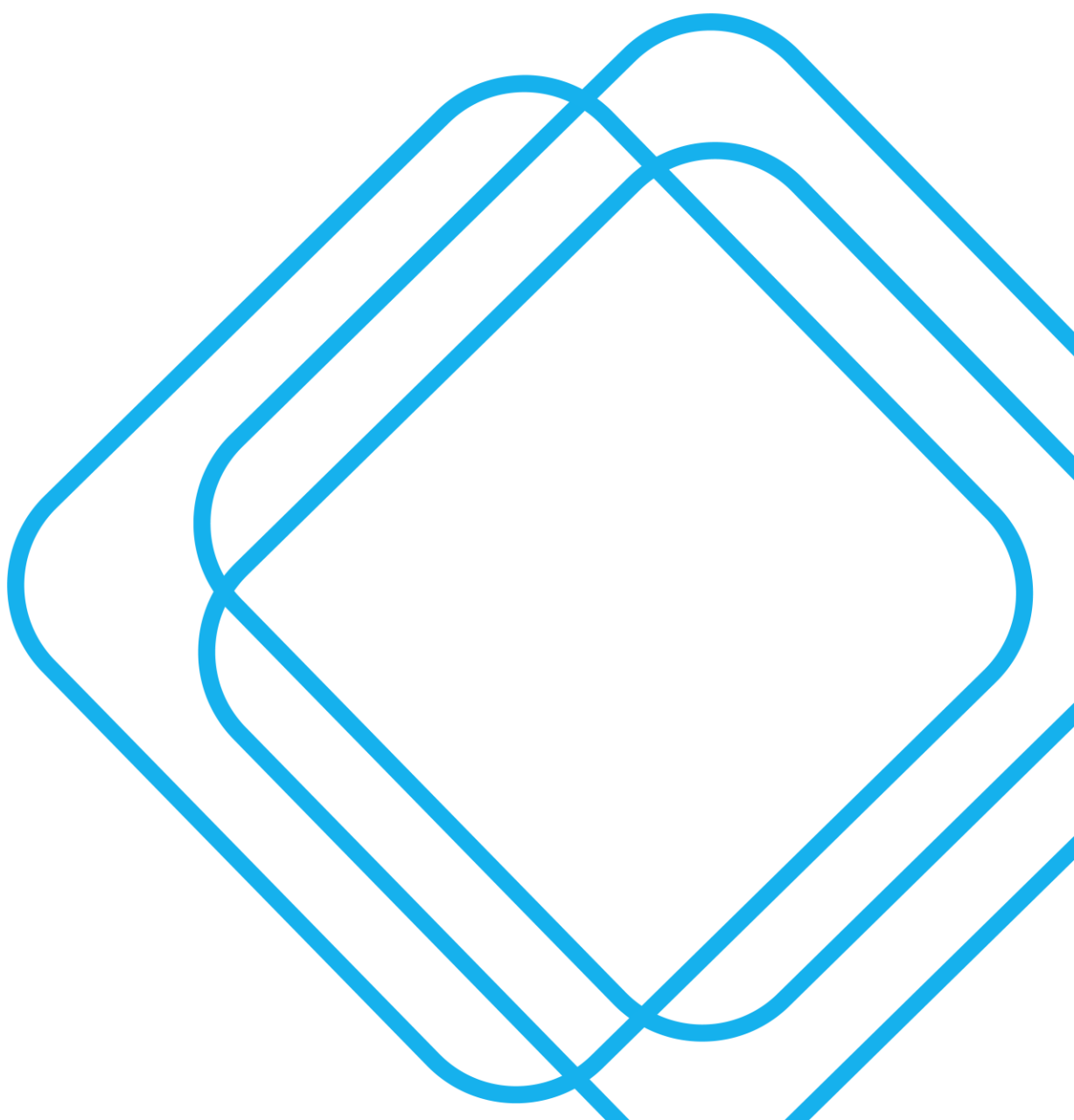


INGLESIDE PRECINCT REZONING

Updated Traffic and Transport Assessment

1 MARCH 2021





Quality Assurance

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Contents

Executive Summary	i
1.0 Introduction	1
1.1 Context	1
1.2 Background.....	2
1.3 Purpose of report	2
1.4 Scope and limitations.....	2
1.5 Report structure	3
2.0 Strategic Context	4
2.1 Regional planning and land use context	4
2.1.1 Greater Sydney Region Plan – A Metropolis of Three Cities	4
2.1.2 North District Plan	5
2.1.3 Northern Beaches Local Strategic Planning Statement	6
2.2 Future transport context.....	9
2.2.1 Future Transport 2056 Strategy	9
2.2.2 Greater Sydney Services Infrastructure Plan	10
2.2.3 Move – Northern Beaches Transport Strategy 2038.....	12
2.2.4 Northern Beaches Bike Plan.....	14
2.2.5 Northern Beaches Walking Plan	16
2.2.6 Mona Vale Road upgrades	17
3.0 Existing Conditions	21
3.1 Travel behaviour	21
3.1.1 Method of travel to work data.....	21
3.1.2 Household Travel Survey.....	22
3.2 Public transport network	24
3.2.1 On-demand public transport services	25
3.3 Active transport	26
3.4 Road network and classification	26
3.5 Heavy goods vehicle network	27
3.6 Existing traffic conditions	28
3.6.1 Intersection level of service.....	29
4.0 Ingleside Precinct Rezoning	30
4.1 Structure Plan	30
4.2 Proposed transport network.....	31
4.2.1 Road network and hierarchy	31
4.2.2 Public transport network	31
4.2.3 Active transport network	31
4.3 Travel Demand Management measures.....	32
5.0 Traffic and Transport Impact Appraisal	33
5.1 Public transport impacts.....	33
5.2 Active transport impacts.....	33
5.3 Road network impacts	33
6.0 Summary and conclusions.....	36
6.1 Summary	36
6.2 Conclusions	36

List of Figures

Figure 1–1 Ingleside Precinct	1
Figure 2–1 Vision of A Metropolis of Three Cities	4
Figure 2–2 North District Plan	5
Figure 2–3 North Beaches Structure Plan	7
Figure 2–4 Greater Sydney Strategic transport corridors	8
Figure 2–5 A future metropolis of three cities	9
Figure 2–6 Different movement environments under the Movement and Place Framework	10
Figure 2–7 Greater Sydney and 2056 transport network vision	11
Figure 2–8 Current/committed and 2056 Greater Sydney Principal Bicycle Network	12
Figure 2–9 Northern Beaches Council 2038 transport network	13
Figure 2–10 Northern Beaches Safe Cycling Network	14
Figure 2–11 Safe Cycling Network near Ingleside	15
Figure 2–12 Northern Beaches Road Cycling Network	16
Figure 2–13 Mona Vale Road East Planned Infrastructure Upgrades	18
Figure 2–14 Mona Vale Road West Planned Infrastructure Upgrades	18
Figure 3-1 Study area for the travel behaviour reference for method of travel to work analysis	21
Figure 3-2 Study area for the travel behaviour reference for household travel survey analysis	22
Figure 3-3 Public transport around the precinct	24
Figure 3-4 On Demand public transport zone map	25
Figure 3-5 Road network around the precinct	26
Figure 3-6 B-double routes	28
Figure 4–1 Revised Ingleside Precinct Structure Plan	30

List of Tables

Table 2-1 Mona Vale Road intersection performance	19
Table 3-1 Household travel survey – residents within Pittwater, travel by mode	22
Table 3-2 Household travel survey – residents within Pittwater, travel by purpose	23
Table 3-3 Mona Vale Road traffic volume comparison	28
Table 3-4 Level of Service definitions	29
Table 3-5 Existing intersection performance	29
Table 5-1 Review of proposed public transport provision	33
Table 5-2 Review of proposed active transport provision	33
Table 5-3 Review of proposed intersection upgrades	34
Table 6-1 Proposed transport infrastructure / service provisions	36
Table 6-2 Proposed intersection upgrades	37

Executive Summary

Purpose of study

SCT Consulting was engaged by Cox Architecture on behalf of the Department of Planning, Industry and Environment (DPIE) to prepare a traffic and transport assessment to support the rezoning of part of the Ingleside Precinct located in the Northern Beaches local government area (LGA).

The Ingleside Structure Plan and Precinct Plan was informed by a number of studies over the years to determine an appropriate land use and density. These studies included a Traffic and Transport Assessment completed in August 2016. Following an extensive review of the bushfire risk in the Ingleside Precinct, the 2016 Draft Structure Plan has been significantly revised and the revised Rezoning Investigation Area is now focused on the area south of Mona Vale Road, with the area north of Mona Vale Road excluded from the investigation area. An updated Traffic and Transport Assessment is therefore required to assist in the preparation, lodgement and gazettal for the rezoning of the Investigation Area.

Existing conditions

The Ingleside Precinct is mostly rural in nature and includes a mix of land uses comprising predominantly lifestyle blocks, plant nurseries and small-scale commercial agriculture. Other land uses include places of worship and a conference facility.

Currently, there is a high level of private car use, about 70 per cent, with the combined public transport usage only about eight per cent for journey to work trips. Bus is the main public transport provision for the Ingleside Precinct. These mode shares are a likely result of land use, distance to jobs, population income and inadequate public transport facilities. Given the rural nature and the topography in the vicinity of the precinct, there is limited to no pedestrian or cycling activities in the surrounding areas to the Ingleside Precinct.

The main access to the precinct is via Mona Vale Road, which is a high movement corridor. The intersections along Mona Vale Road in the vicinity of the precinct current operate at a good level of service. Powderworks Road is a local distributor road, which provides a connection between Mona Vale Road and Pittwater Road through the suburbs of Ingleside / Elanora Heights.

Future planning context

The development of the precinct is supported by regional and local planning documents, such as the Greater Sydney Region Plan, the North District Plan, and the Northern Beaches Local Strategic Planning Statement.

The development or implementation of transport initiatives, such as the Greater Sydney Services Infrastructure Plan, the Principal Bicycle Network, and the Northern Beaches Transport Strategy, would provide benefits to the Ingleside Precinct through improved connectivity and accessibility, and reduced car dependency.

Since the release of the Draft Land Use and Infrastructure Strategy and Draft Structure Plan in December 2016, the NSW Government has progressed with upgrading Mona Vale Road from two lanes to four lanes between Terrey Hills and Mona Vale. The project will be staged as east and west components to provide customers with a better travelling experience and to improve safety and traffic efficiency. The Mona Vale Road East upgrade is expected to be completed by 2022, while the detailed design for the Mona Vale Road West upgrade is being prepared. Construction of the Mona Vale Road West upgrade will commence when funding becomes available.

The Mona Vale Road upgrades would include intersection upgrades works previously identified in the Transport and Traffic Assessment completed in August 2016. The Mona Vale Road upgrades will provide sufficient capacity for the development of Ingleside Precinct as well as travel time reliability improvements for customers, including future residents of Ingleside Precinct, using this corridor to access other major centres and employment areas.

Proposed development

The proposed development in revised Rezoning Investigation Area is predominantly low and medium density residential dwellings, with a neighbourhood centre, a school and community facilities to serve local residents. Current projections estimate that about 980 new dwellings will be provided as part of the proposed development.

The proposed transport network for the revised Rezoning Investigation Area (south of Mona Vale Road) remains the same as what was proposed in the 2016 Draft Structure Plan. Access to the wider Sydney region is provided by

Mona Vale Road with intersections at Powderworks Road and Manor Road. Access to the south is also provided by Powderworks Road.

Mona Vale Road remains as the high order urban arterial and Powderworks Road is the urban distributor / sub-arterial. Manor Road and Wattle Road are the major local roads / collectors, linking Mona Vale Road and Powderworks Road, and are supported by the other minor local roads that provide local access.

Transport for NSW is improving bus stop infrastructure as part of the Mona Vale Road upgrades and the intent of improved service provision between Mona Vale and Macquarie Park that provides interchange with the B-Line and metro services respectively. Apart from Mona Vale Road, Powderworks Road, Manor Road and Wattle Road would accommodate buses to provide improved public transport accessibility to the precinct.

A comprehensive bicycle network is proposed for the precinct, which will link the neighbourhood centre, school, and residential neighbourhoods with key strategic routes and onward destinations. The proposed bicycle network will include a mixture of dedicated bicycle facilities, such as off-road (shared path), on-road (cycle lane) and off-road (shared path – green corridor). All proposed roads in the precinct will have dedicated pedestrian footpaths to create a comprehensive network following proposed road alignments. There is also an opportunity to provide recreational paths on the riparian corridors adjacent to Mullet Creek to encourage leisure walking within the precinct.

Traffic and transport responses and infrastructure upgrades required

The overall proposed development in the revised Rezoning Investigation Area has been reduced significantly, across the whole precinct as well as South Ingleside.

NSW Government has committed upgrades of Mona Vale Road between Terrey Hills and Mona Vale. The intersection upgrades required to support the proposed development of Ingleside Precinct (up to 3,400 dwellings) will now be delivered as part of the Mona Vale Road upgrades. The traffic assessments for the Mona Vale Road Upgrade East and West confirmed that Mona Vale Road / Pittwater Road is expected to operate with acceptable Level of Service during the peak hours in 2036 under the full yield of Ingleside (up to 3,400 dwellings). Hence this intersection would no longer require any upgrades and should operate even better with the significantly reduced yield of Ingleside.

The proposed intersection upgrades as a result of development in Ingleside North would no longer be required as there is no proposed development in Ingleside North due to bushfire and evacuation risks.

A number of intersection upgrades along Powderworks Road (within the revised Rezoning Investigation Area) from priority intersections to roundabouts were proposed to ensure safe access to Powderworks Road by future residents (rather than for intersection capacity reasons). Hence these upgrades should remain due to the proposed development in Ingleside South. There were some minor works proposed for Powderworks Road / Garden Street, which should still be required given proposed development still in Ingleside South.

All other previously proposed active and public transport infrastructure and service improvements remain valid for the delivery of proposed development within the revised Rezoning Investigation Area.

The proposed transport responses and infrastructure upgrades listed in the two tables below are recommended to be delivered to support the development of the precinct.

Table E-1 Proposed transport infrastructure / service provisions

Mode	Infrastructure / service improvements	Responsibility
Public Transport	Bus priority treatment at Mona Vale Road intersections with Samuel Street and Foley Street	TfNSW (as part of Mona Vale Road East upgrade)
Public Transport	Enhanced bus services along Mona Vale Road	TfNSW
Public Transport	Enhanced local services through Ingleside	TfNSW
Public Transport	Improved bus stop facilities along Mona Vale Road	TfNSW (as part of Mona Vale Road East and West upgrades)
Public Transport	New / upgraded bus stops on local roads	Developers / Council
Active Transport	Utility path alongside Mona Vale Road	TfNSW (as part of Mona Vale Road East and West upgrades)

Mode	Infrastructure / service improvements	Responsibility
Active Transport	Off-road shared paths (collector roads)	Developers / Council
Active Transport	Off-road shared paths (green corridors)	Developers / Council

Table E-2 Proposed intersection upgrades

Intersection	Existing layout	Proposed upgrade
Mona Vale Rd Powderworks Rd Baha'i Temple Way	4-arm signalised intersection	Realignment of Baha'i Temple Way to the 4-arm signalised intersection and upgrade of the Powderworks Road approach of the intersection to be delivered under the Mona Vale Road West upgrade project (currently no funding and timing commitment by TfNSW)
Powderworks Rd Wattle Rd	4-arm priority intersection	Roundabout provided to facilitate access across Powderworks Road
Powderworks Rd Wilson Ave	3-arm priority intersection	Roundabout provided to facilitate safer access to Wilga-Wilson
Powderworks Rd Ingleside Rd	3-arm priority intersection	Roundabout provided to facilitate safer access to Ingleside Road
Powderworks Rd Wilga St	3-arm priority intersection	Roundabout provided to facilitate safer access to Wilga-Wilson
Powderworks Rd Garden St	3-arm signalised intersection	Extension / formalisation of left turn bays on Garden St and Powderworks Road

Where appropriate, the implementation of a targeted Travel Plan for the Ingleside Precinct would also provide significant opportunities for alternative travel options and reduce the need of car travel.

Conclusion

This updated Traffic and Transport Assessment has reviewed the revised Structure Plan for the Ingleside Precinct. The significant reduction in the development yield and the extent of the revised Rezoning Investigation Area means there would be a reduced impact on the transport network and services compared to previously assessed.

The proposed transport network, along with the recommended transport responses and infrastructure upgrades, would cater for the travel characteristics of the proposed precinct land uses and support its integration with the surrounding network.

1.0 Introduction

1.1 Context

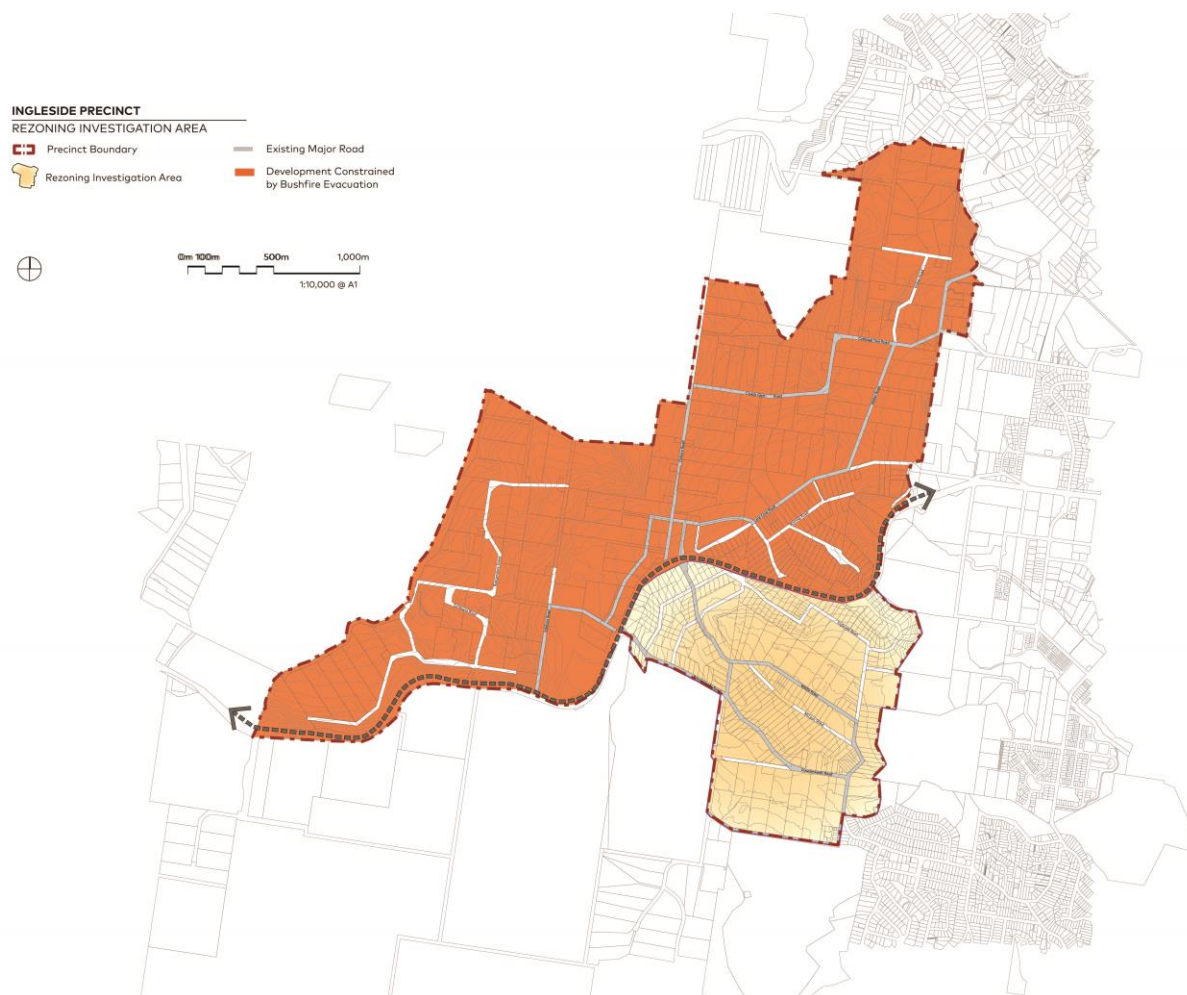
SCT Consulting was engaged by Cox Architecture on behalf of the Department of Planning, Industry and Environment (DPIE) to prepare a traffic and transport assessment to support the rezoning of part of the Ingleside Precinct. The Ingleside Precinct is located within the Northern Beaches local government area (LGA), about 28 km north of Sydney.

The precinct is bounded by Ku-Ring-Gai Chase National Park to the north and the suburbs of Elanora Heights and Warriewood to the south. It lies between Terrey Hills and Mona Vale and is located off the Mona Vale Road, the main access road linking the northern beaches to northern and western suburbs of Sydney. The precinct comprises about 170 hectares and the precinct extent is shown in **Figure 1–1**.

The Ingleside Precinct is mostly rural in nature and includes a mix of existing land uses comprising predominantly lifestyle blocks, plant nurseries and small-scale commercial agriculture. Other land uses include places of worship and a conference facility. Neighbouring land uses consist of mostly low density residential (Bayview Heights, Elanora Heights) as well as recreation facilities such as the Monash County Club and Elanora Country Club, a commercial centre (Elanora Heights – a small village centre) and schools.

As shown in **Figure 1–1**, development on the part of the precinct north of Mona Vale Road is constrained by bushfire evacuation and so the revised Rezoning Investigation Area is focused on the part of the precinct south of Mona Vale Road.

Figure 1–1 Ingleside Precinct



Source: Cox Architecture, 2020

1.2 Background

Precinct planning for the Ingleside Precinct is being led by DPIE in collaboration with Council. The vision for the precinct – a connected, liveable and sustainable community that embraces and respects its landscape setting – was developed with stakeholders and the project partners.

The Ingleside Structure Plan and Precinct Plan was informed by a number of studies over the years to determine an appropriate land use and density given the opportunities and constraints within the Precinct. These studies included a Traffic and Transport Assessment completed in August 2016. A Draft Land Use and Infrastructure Strategy and a Draft Structure Plan were released in December 2016 for community consultation.

In 2018, in response to community submissions and to comply with the *Planning for Bushfire Protection* guidelines, a Bushfire Risk Assessment was completed, which highlighted bushfire concerns. Following an extensive review of the bushfire risk in the Ingleside Precinct, the Draft Structure Plan was significantly revised and the revised Rezoning Investigation Area is now focused on the area south of Mona Vale Road, with the area north of Mona Vale Road excluded from the investigation area.

The anticipated dwelling yield for the Ingleside Precinct, which was previously about 3,400 dwellings, is set to be capped at about 980 new dwellings within the revised Rezoning Investigation Area and other uses and services are to be reduced commensurate with the reduced dwelling yield. Cox Architecture was engaged by DPIE as the lead consultant to:

- Prepare a revised Structure Plan for the precinct and indicative uses and densities
- Prepare and submit a revised Land Use and Infrastructure Strategy that will amend planning controls to facilitate the realisation of the master plan.

An updated **Traffic and Transport Assessment** is required, together with a suite of other technical specialist studies, to assist in the preparation, lodgement and gazettal for the rezoning of part of the Ingleside Precinct.

1.3 Purpose of report

The purpose of this updated traffic and transport assessment is to support the rezoning of the Ingleside Precinct, based on the design of the revised Structure Plan, including:

- Informing future planning controls to ensure a coordinated and efficient approach to land use planning, environmental management, and transport infrastructure
- Providing an integrated approach to determining the optimal mix of land uses and density concentrations as a means of minimising (where possible) trip generation and transport-related demand
- Ascertaining the cumulative and regional traffic and transport impacts associated with future land-based demands associated with the rezoning
- Maximising efficiency and safety of the existing / proposed transport systems in proximity to the precinct.

1.4 Scope and limitations

Since the release of the Draft Land Use and Infrastructure Strategy and Draft Structure Plan in December 2016, the NSW Government has progressed with upgrading Mona Vale Road from two lanes to four lanes between Terrey Hills and Mona Vale. The project will be staged to provide customers with a better travelling experience and to improve safety and traffic efficiency.

The Mona Vale Road East upgrade has commenced and is expected to be completed by 2022, while the detailed design for the Mona Vale Road West upgrade is being prepared. Construction of the Mona Vale Road West upgrade will commence when funding becomes available (there is currently no funding and timing commitment by TfNSW). Further details of the proposed upgrade are discussed in **Section 2.2.6**.

Since the Mona Vale Road upgrades have accounted for the yield proposed in the 2016 Draft Land Use and Infrastructure Strategy and Draft Structure Plan for Ingleside – about 3,400 dwellings – the delivery of the full Mona Vale Road upgrade would more than accommodate for the revised yield of about 980 new dwellings. The same would apply to the transport responses and upgrades proposed in the 2016 Transport and Traffic Assessment.

Therefore, this updated Transport and Traffic Assessment has been prepared as a qualitative appraisal that discusses the latest policy context, existing traffic and transport context, and the updated Structure Plan and then

reviews the appropriateness of the proposed transport responses and infrastructure upgrades. The qualitative appraisal of the likely traffic and transport impacts as a result of the revised Structure Plan is provided in **Section 5**.

1.5 Report structure

This report has been structured into the following sections:

- Section 2 provides a review of relevant policy and background documents
- Section 3 describes the existing transport conditions for all modes of transport
- Section 4 describes the proposed Structure Plan and the proposed transport infrastructure and measures to support the plan
- Section 5 outlines the qualitative traffic and transport appraisal, which describes the previous proposed infrastructure and how this is impacted due to the revised Structure Plan
- Section 6 summarises the report content and presents the final conclusions.

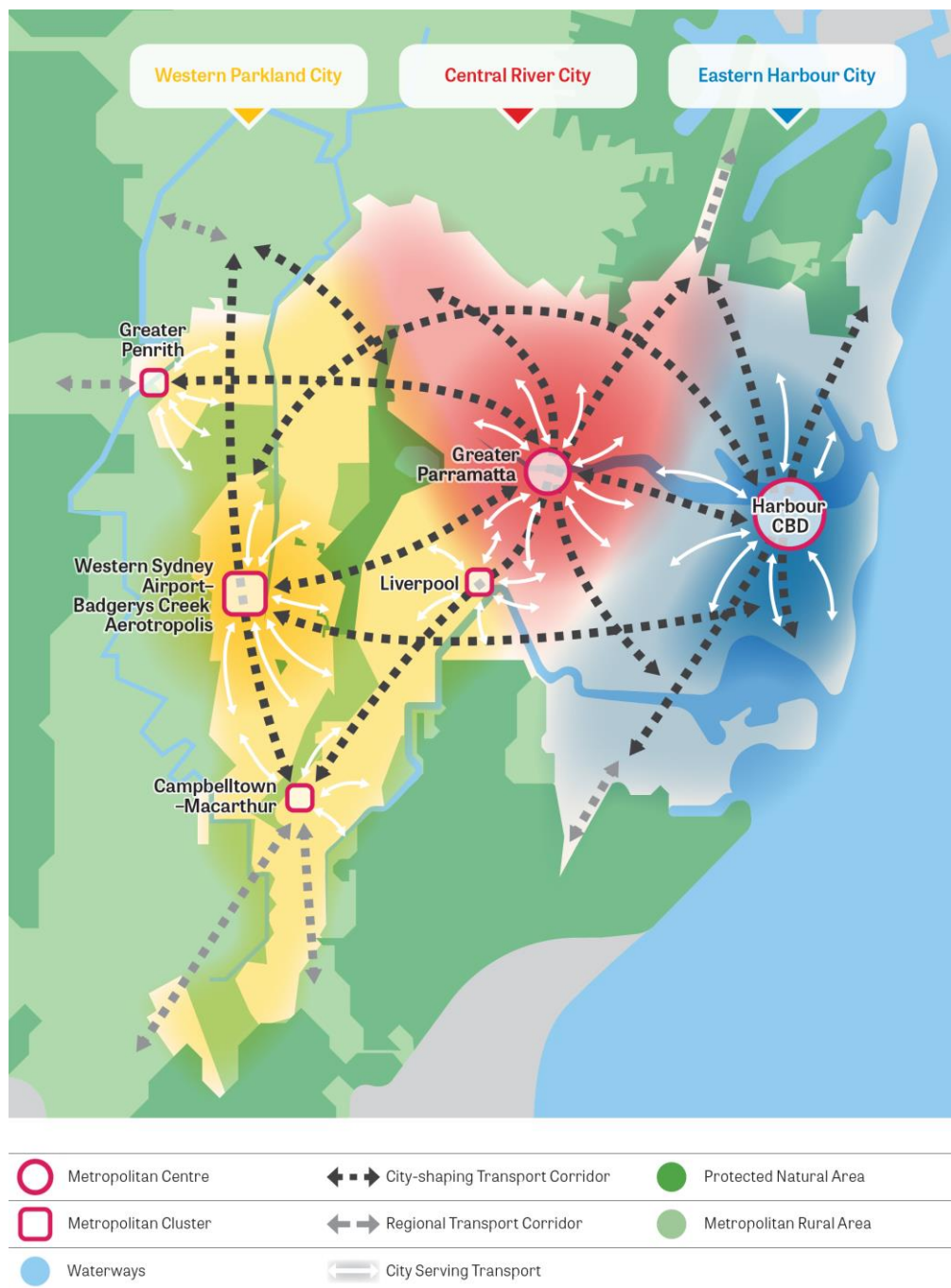
2.0 Strategic Context

2.1 Regional planning and land use context

2.1.1 Greater Sydney Region Plan – A Metropolis of Three Cities

The Greater Sydney Region Plan, *A Metropolis of Three Cities* (Greater Sydney Commission, March 2018), aims to deliver three cities where most residents are within a 30-minute commute to employment, education, and health facilities, services, and great places. The vision seeks to develop Greater Sydney into a metropolis comprised of the Western Parkland City, Central River City, and Eastern Harbour City, as shown in **Figure 2–1**.

Figure 2–1 Vision of A Metropolis of Three Cities



Source: Greater Sydney Commission, March 2018

As the population of Greater Sydney is projected to grow to 8 million over the next 40 years, and with almost half of that population residing west of Parramatta, rebalancing economic and social opportunities will leverage that growth and deliver the benefits more equally and equitably across Greater Sydney. Residents will have quick and easy access to jobs and essential services. Housing supply and choice will increase to meet the growing and changing needs of the community. The environment and precious resources will be protected. Importantly, infrastructure will be sequenced to support growth and delivered concurrently with new homes and jobs.

Having three cities, each with supporting metropolitan and strategic centres, will put workers closer to knowledge-intensive jobs, city-scale infrastructure and services, entertainment and cultural facilities. In an inclusive Greater Sydney freedom of expression and creativity will be supported and acknowledged as part of the innovation economy. Managing and retaining industrial land close to centres and transport will ensure critical services are available to support businesses and residents.

Green infrastructure such as urban tree canopy, green ground cover, bushland, waterways, parks and open spaces will be valued for its economic, social and environmental benefits and will help to establish the Greater Sydney Green Grid, a network of walking and cycling links that will become increasingly important in daily travel arrangements improving sustainability and the wellbeing of residents.

2.1.2 North District Plan

The North District Plan is a 20-year plan to manage growth in the context of economic, social and environmental matters to achieve the 40-year vision for Greater Sydney (Greater Sydney Commission, March 2018). The plan is a guide for implementing the Greater Sydney Region Plan, *A Metropolis of Three Cities*, at a district level and is a bridge between regional and local planning. The North District Plan is shown in **Figure 2–2**.

Figure 2–2 North District Plan



Source: Greater Sydney Commission, March 2018

The vision for Greater Sydney as a metropolis of three cities means residents in the North District will have quicker and easier access to a wider range of jobs, housing types and activities. The vision will improve the North District's lifestyle and environmental assets and will be achieved by:

- Enhancing the role of the **Eastern Economic Corridor**, including North Sydney as part of the Harbour CBD
- Supporting jobs growth in **strategic centres**, including **health and education precincts** and facilitating innovation
- Sustaining **local centres** to provide jobs, services and amenity
- Providing **fast** and **efficient transport** connections to achieve a 30-minute city
- Retaining and managing **industrial and urban services land**
- Creating and renewing great places while protecting **heritage and local character** and improving **places for people**
- Improving **walking** and **safe cycling** ways
- Enhancing **foreshore access** to Sydney Harbour and the District's waterways
- Enhancing the quality and improving access to open space, and increasing **urban tree canopy**
- Retaining the environmental, social and economic values of the **Metropolitan Rural Areas**
- Protecting and enhancing the District's **unique natural assets** including **waterways, coastlines** and **bushland**.

The North District Plan responds to major transport, health and education investments either committed or planned across the District, such as the Northern Beaches Hospital, Sydney Metro Northwest, Sydney Metro City & Southwest, Western Harbour Tunnel and Beaches Link and NorthConnex, which align with Future Transport 2056 and will provide faster access to the Harbour CBD to bolster business and jobs growth.

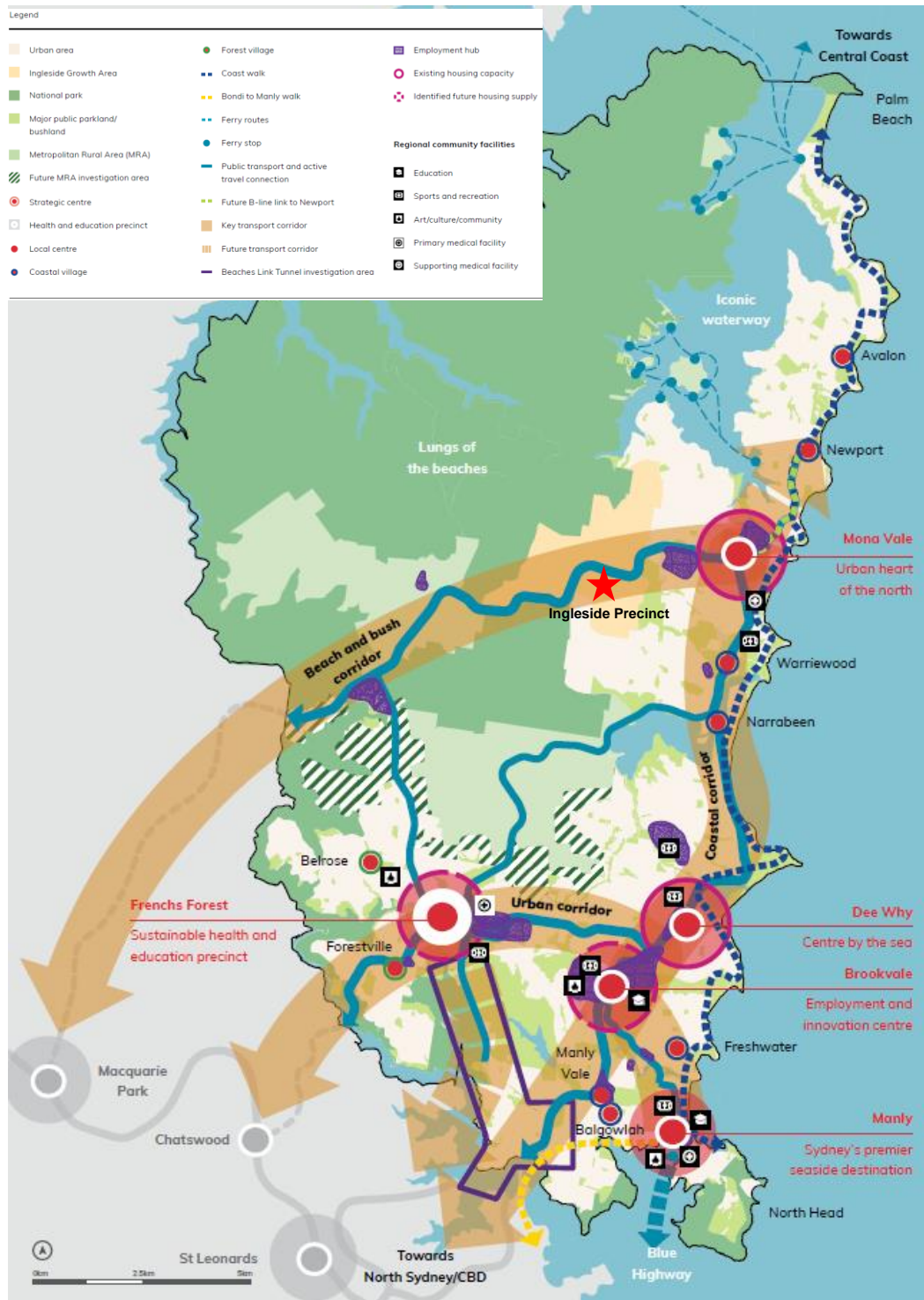
Ingleside was identified as a Growth Area with new community near environmental areas, to provide housing supply in the North District with a targeted housing growth of 92,000 dwellings.

2.1.3 Northern Beaches Local Strategic Planning Statement

The Northern Beaches Local Strategic Planning Statement (LSPS) was developed in 2019 to set the Northern Beaches Council's strategic planning vision for the next 20 years. By 2036, the Northern Beaches population is expected to increase by more than 39,000 residents. Based on projected population growth, an additional 11,747 dwellings over the next 20 years need to be provided in the LGA. This is likely to be achieved in existing areas, with Warriewood-Mona Vale, Dee Why-North Curl Curl and Narrabeen-Collaroy accommodating most new housing in recent years.

Under the North District Plan, the LGA contains four strategic centres: Brookvale-Dee Why, Mona Vale, Manly and Frenchs Forest. Mona Vale, which is of most relevance to Ingleside, as seen in **Figure 2–3**, serves people in the northern end of the peninsula and is expected to grow from 4,300 jobs to between 5,000 and 6,000 jobs by 2036.

Figure 2–3 North Beaches Structure Plan



Source: Northern Beaches Council, 2019

Actions identified in the Northern Beaches Council Draft LSPS, with regards to land use include:

- Under the Northern Beaches Affordable Housing Policy, Council has committed to a ten per cent affordable rental housing target for all planning proposals, urban renewal or greenfield development, with higher rates where financially feasible. This policy is planned to be implemented in the Ingleside Growth Area.
- Investigate the provision of sports fields in new housing development areas including Warriewood Valley and potentially Ingleside.
- Resolve the future of Ingleside so that any development is sustainable and resilient to natural hazards.

A number of actions outlined under the planning principals in the LSPS are relevant to the Ingleside Precinct. For transport Infrastructure, these actions include:

- Increased connections to Macquarie Park through the Mona Vale Road upgrade and accompanying public transport improvements
- Improve bus services between Mona Vale and Macquarie Park, which could transition to a bus rapid transit (BRT)
- Implement Move, Council's Walking Plan and Shared Transport Policy and prepare and implement a bike plan, public transport plan, parking plan, smart communities' framework and pedestrian access and mobility plan
- Investigate new safe cycling routes separated from traffic within five kilometres of strategic centres or connecting to local centres, villages and destinations, such as school and beaches, including regional cycle routes in the Greater Sydney Principal Bicycle Network, as seen in **Figure 2–4**. The implementation of the draft cycle network would significantly improve bicycle access along these segments as well as between the corridor and major centres, such as Mona Vale and Hornsby.

Figure 2–4 Greater Sydney Strategic transport corridors



Source: Draft Northern Beaches Local Strategic Planning Statement (LSPS), 2019

Actions identified in the Northern Beaches Council Draft LSPS, with regards to future services and technologies include:

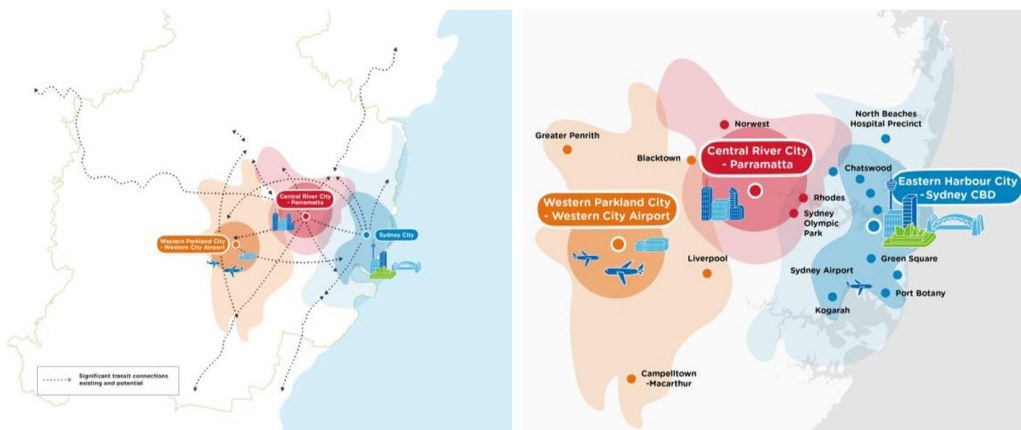
- New modes of transport, such as electric bikes, on-demand services and car share to extend the reach of the transport network
- On-demand point-to-point transport services are being trialled at Mona Vale and Manly (Northern Beaches Council)
- Car share services are growing, with Go Get increasing by more than 400 members in the Northern Beaches in 2018 (Northern Beaches Council)
- Council will engage with State agencies, the community and the private sector to trial new systems and technology, as required under the Shared Transport Policy (Northern Beaches Council).

2.2 Future transport context

2.2.1 Future Transport 2056 Strategy

The *Future Transport Strategy 2056* (NSW Government, March 2018) is an update of NSW's Long-Term Transport Master Plan. It is a vision for how transport can support growth and the economy of New South Wales over the next 40 years. The strategy is underpinned by the *Regional Services and Infrastructure Plan* and the *Greater Sydney Services and Infrastructure Plan*, as well as a number of supporting plans including Road Safety and Tourism. It sets out a vision of three cities to guide many of the planning, investment and customer outcomes including faster, convenient and reliable travel times to major centres, as shown in **Figure 2–5**.

Figure 2–5 A future metropolis of three cities



Source: Future Transport 2056 Strategy, 2018

Existing and potential transit connections, together with new technology and innovation, will make the network surrounding the precinct more responsive to demand and better able to manage congestion in the future.

For the three cities, more specific outcomes listed as part of the Strategy that will benefit the precinct's transport context, include:

- A 30-minute access for customers to their nearest Centre by public transport seven-days a week
- Fast and convenient interchanging with walking times no longer than five minutes between services
- Walking or cycling is the most convenient option for short trips around centres and local areas, supported by a safe road environment and attractive paths
- Fully accessible transport for all customers.

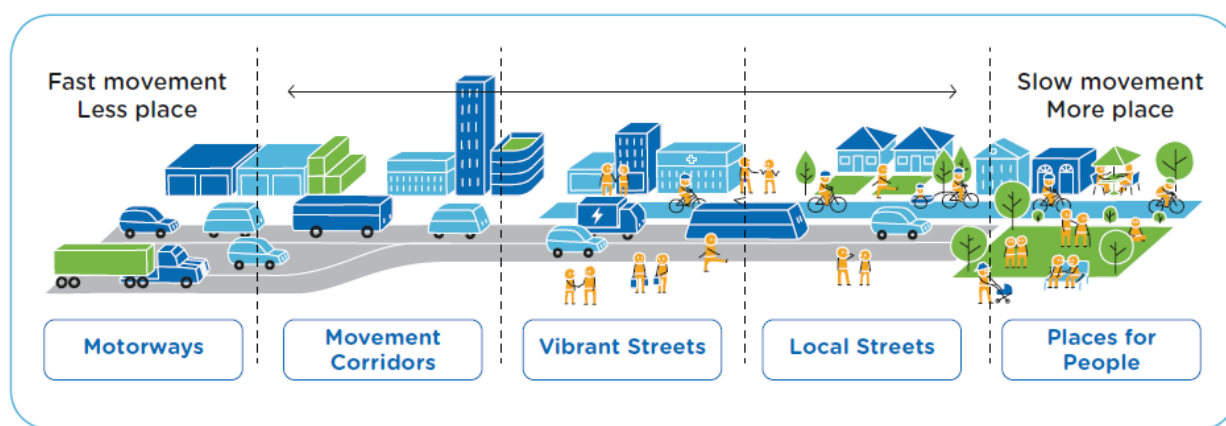
Implications for the Precinct: Future transport initiatives aimed to connect residents to centres will increase permeability of public transport networks throughout residential areas. This benefits the precinct through improved accessibility to employment opportunities in the region and to other city centres. Specific provision for pedestrian and cyclist activity and efficient interchanging contributes to a safe and comfortable walking environment, promoting public transport mode share.

2.2.2 Greater Sydney Services Infrastructure Plan

The *Greater Sydney Services and Infrastructure Plan* is a 40-year plan for transport in Sydney. It is designed to support the land use vision for Sydney. Building on the state-wide transport outcomes identified in the Future Transport Strategy 2056, the Plan establishes the specific outcomes transport customers in Greater Sydney can expect and identifies the policy, service and infrastructure initiatives to achieve these.

To support the liveability, productivity and sustainability of places for the transport network, a Movement and Place Framework was developed. The Framework acknowledges that transport networks have different functions and roles and serve as both a destination and as a means to move people and goods. The Movement and Place Framework will enable us to plan, design and operate the transport network to meet these different needs by providing greater transparency, supporting collaboration between those responsible for land use, transport and roads while also encouraging input from the community. Through the framework a future network will be designed that is better used and supports the safe, efficient and reliable movement of goods and the need for liveability of places along it.

Figure 2-6 Different movement environments under the Movement and Place Framework



Source: https://future.transport.nsw.gov.au/wp-content/uploads/2018/plans/Greater_Sydney_Services_Infrastructure_Plan.pdf (2018)

2.2.2.1 City-shaping network

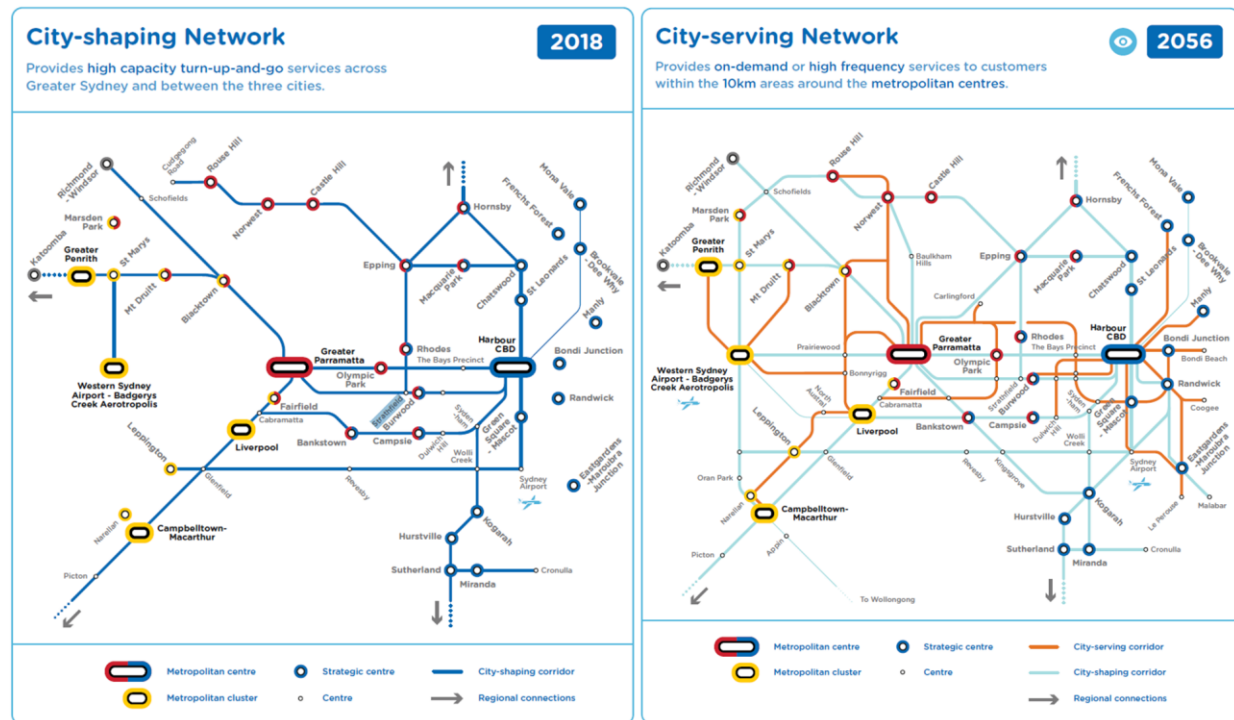
The city-shaping network includes higher speed and volume linkages between our cities and centres. The function of this network is to enable people living in any of the three cities to access their nearest metropolitan centre within 30 minutes and to be able to travel efficiently between these metropolitan centres.

As Greater Sydney transitions to a metropolis of three cities, the city-shaping network will need to expand to provide improved access to and between each metropolitan city/centre, particularly Greater Parramatta and centres in the metropolitan cluster in the Western Parkland City.

2.2.2.2 City-serving network

The city-serving network will provide high-frequency services within a ~10km radii of the three metropolitan cities/centres. This will support access within some of the densest land use in Greater Sydney where demand for travel is most concentrated. As these inner urban areas in each of the three cities develop and become denser, the government will investigate the prioritisation of on-street public transport services and invest in higher frequency services.

Figure 2-7 Greater Sydney and 2056 transport network vision



Source: https://future.transport.nsw.gov.au/wp-content/uploads/2018/plans/Greater_Sydney_Services_Infrastructure_Plan.pdf (2018)

Implication for the Precinct: The development of transport infrastructure both within and between metropolitan centres provides benefits to the Ingleside Precinct by providing accessibility to a wider community, providing connectivity to employment, education, recreation, and commercial spaces.

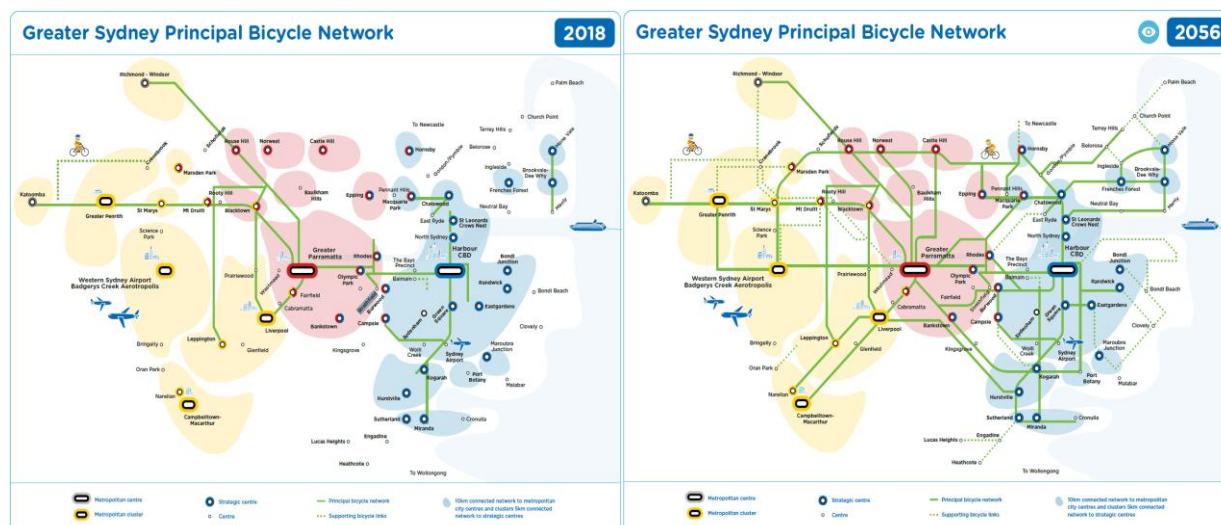
2.2.2.3 Principle Bicycle Network

Building on the existing network, TfNSW's immediate focus is working with local councils to deliver committed Priority Cycleway projects to address key missing links around the Harbour CBD, Greater Parramatta, Greater Penrith, Blacktown and Liverpool. Council partnership programs are delivering local bicycle infrastructure. Bicycle parking is also being rolled out at interchanges. By 2056:

- Walking and cycling network coverage will be improved by using state held corridors for public transport, pipelines, waterways, crown land and service easements for bicycle network infrastructure.
- That all strategic centres have connected walking and cycling networks, including strategic centres across the Western Parkland City.
- Further investment in connections to strategic centres and in the Principal Bicycle Network will support walking or cycling being the most convenient option for short trips, improving health outcomes, safety and convenience for customers as well as boosting the productivity, liveability and sustainability of Greater Sydney.

Figure 2-8 shows the current / committed Greater Sydney Bicycle Network alongside the envisioned 2056 Bicycle Network.

Figure 2–8 Current/committed and 2056 Greater Sydney Principal Bicycle Network



Source: https://future.transport.nsw.gov.au/wp-content/uploads/2018/plans/Greater_Sydney_Services_Infrastructure_Plan.pdf (2018)

Implication for the Precinct: The implementation of the Principal Bike Network between Mona Vale and Macquarie Park via Ingleside would significantly improve bicycle access for future residents to connect with major centres (including Mona Vale, Frenchs Forest and Terry Hills), which could encourage an increase in cycle movements and allowing customers to cycle between centres across Greater Sydney.

2.2.3 Move – Northern Beaches Transport Strategy 2038

The *Move – Northern Beaches Transport Strategy 2038* (Northern Beaches Council, 2018) aims to set the policy direction for improving transport for the next 20 years. The strategy prioritises the use of rapid buses along Council's east-west and north-south transport corridors. It will support opportunities for walking and cycling between homes centres and recreational areas as well as improving regional connections into Greater Sydney.

A summary of Council's vision for a 2038 transport network is shown in **Figure 2–9**.

The map illustrates the proposed transport network for Northern Beaches in 2038. Key features include:

- B-Line Route:** A yellow line running along the coast from Mona Vale to Manly.
- B-Line Stops:** Orange circles marking stations along the B-Line route.
- Mona Vale Road Upgrade:** A blue line indicating the upgrade of Mona Vale Road.
- Hospital Road Upgrade:** A red line indicating the upgrade of Hospital Road.
- NB Tunnel Link (indicative):** A dashed line representing a potential tunnel link.
- NB Tunnel Connections:** Pink circles indicating connections to the tunnel.
- Coast Walk:** A green line along the coast.
- Ferry Stops:** Green circles marking ferry stops.
- Ferry Routes:** Blue lines indicating ferry routes.
- Bus Rapid Transit:** A green line indicating the BRT route.
- Active Travel Corridors:** Dashed lines indicating corridors for walking and cycling.
- Future Metro Bus Route:** A blue line indicating a future metro bus route.
- Wakehurst Parkway Upgrade to four lanes:** A blue line indicating the upgrade of Wakehurst Parkway.
- Future Bus route:** A dashed line indicating a future bus route.

The map also shows existing roads, parks, and water bodies. A compass rose is in the top left corner.

The transport network needed on the Northern Beaches in 2038

The following key directions were identified in the Northern Beaches Transport Strategy that are relevant to Ingleside:

- ## Ingleside Precinct Rezoning

Implication for the Precinct: Northern Beaches Council has proposed various projects and initiatives within its LGA that would improve connectivity and enhance accessibility for future residents.

Council's plans to advocate for the full delivery of the Mona Vale Road upgrade by 2023 and will help to ease congestion for residents of Ingleside Precinct travelling to Mona Vale and Macquarie Park.

Council's plans to partner with State Government to deliver a bus rapid transit (BRT) service and an active travel corridor between Mona Vale and Macquarie Park will improve accessibility for Ingleside Precinct residents to link key centres, transport hubs, schools, employment opportunities and residential areas, reducing the community's reliance on cars resulting in a less congested road network.

2.2.4 Northern Beaches Bike Plan

The *Northern Beaches Bike Plan* (Northern Beaches Council, 2020) sets out the directions and actions required to help the community choose cycling as a transport option and create a safer cycling environment. To do this, the Bike Plan proposes two separate cycling networks for the Northern Beaches, namely the Safe Cycling Network and the Road Cycling Network.

2.2.4.1 Safe Cycling Network

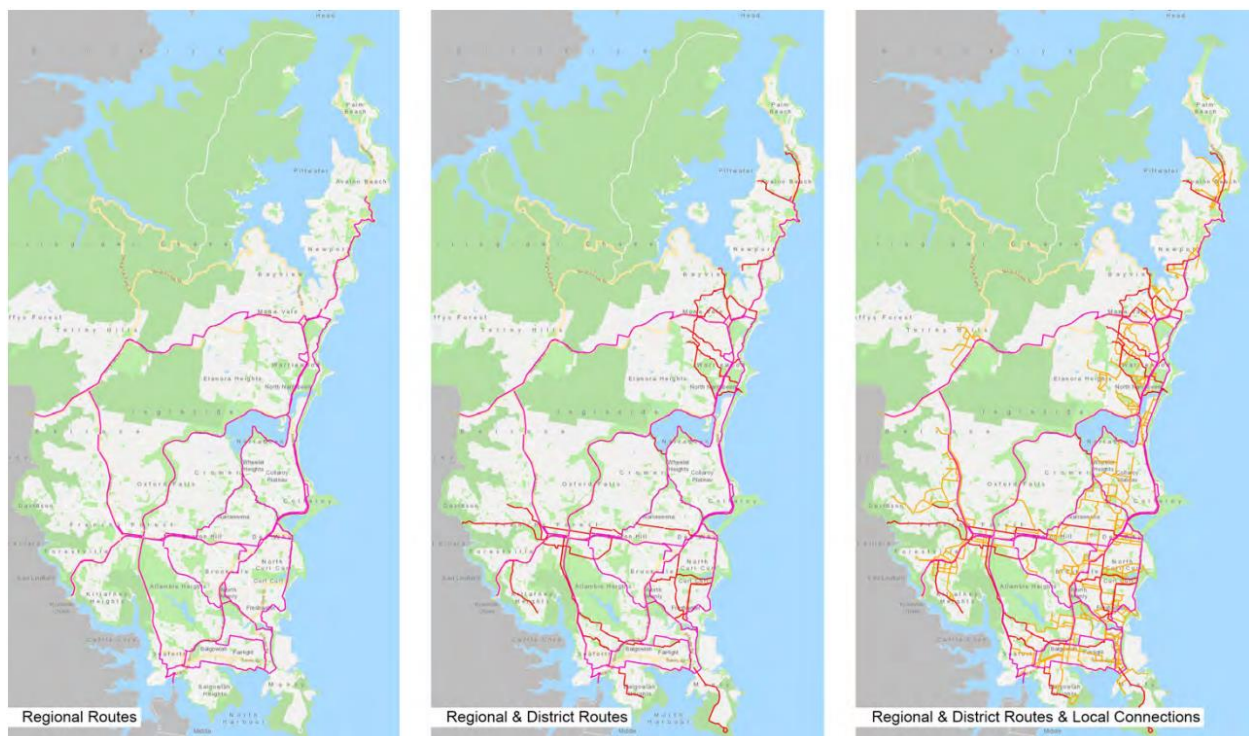
The Safe Cycling Network is aim provide a safe and connected cycling environment that is largely separated from motor vehicle traffic. This network will encourage cycling for transport with a focus on short trips.

Cycling infrastructure that will form part of the Safe Cycling Network includes:

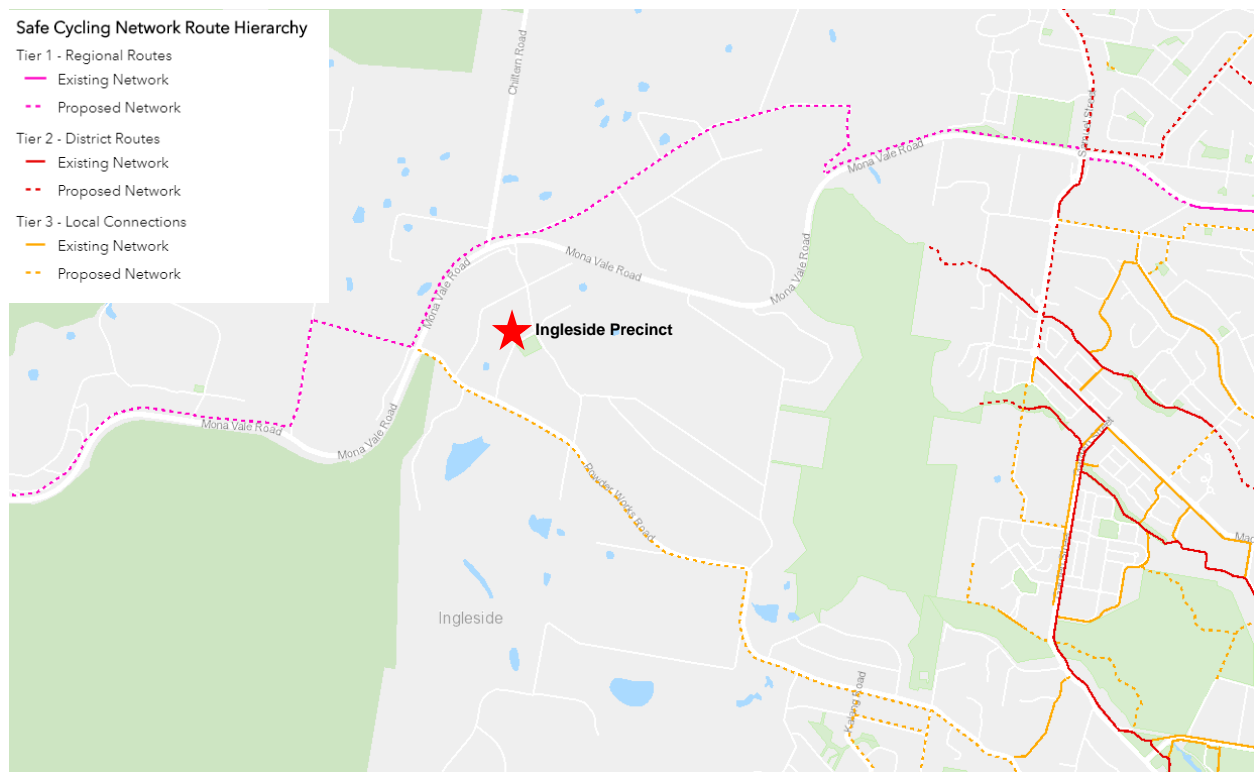
- Separated cycleways
- Shared paths
- Shared zones
- Quiet local streets (40km/h)
- Safe road crossings

A summary of the Safe Cycling Network is shown in **Figure 2–10** and **Figure 2–11**.

Figure 2–10 Northern Beaches Safe Cycling Network



Source: Northern Beaches Bike Plan, 2020

Figure 2–11 Safe Cycling Network near Ingleside

Source: <https://northernbeaches.maps.arcgis.com/apps/webappviewer/index.html?id=abedc5db2afb4951a5596b64acc2641e>, 2020

In relation to Ingleside Precinct, a regional route is proposed between Mona Vale and Macquarie Park, generally following Mona Vale Road with some local deviations to the local street network.

A local connection is also proposed along Powderworks Road which will connect Ingleside Precinct to nearby suburbs like Elanora Heights, Narrabeen and Warriewood.

2.2.4.2 Road Cycling Network

The Road Cycling Network identifies the major routes that bike commuters will generally use and provides actions to make these areas safer for all road users.

Typical treatments that will form part of the Road Cycling Network include:

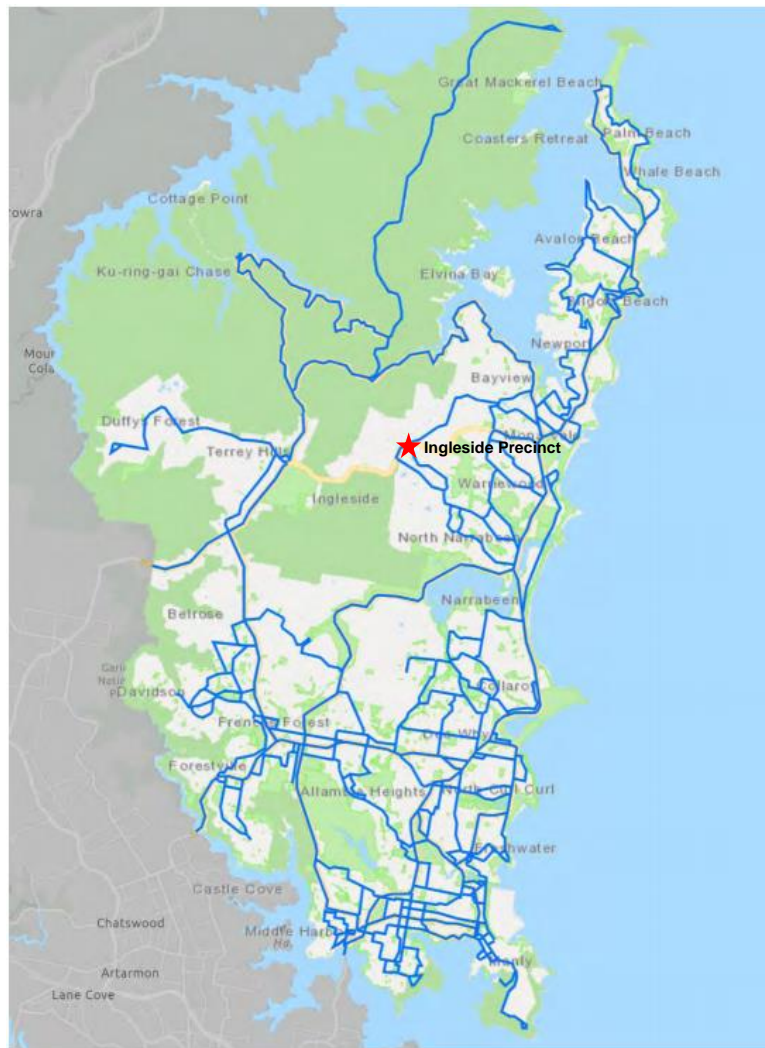
- Marked bicycle lanes
- Stencilling
- Awareness signage
- Traffic calming that is cycle safe
- Wide kerbside lane
- Road shoulder improvements

A summary of the Road Cycling Network is shown in **Figure 2–12**.

In addition to Mona Vale Road and Powderworks Road, Manor Road and Wattle Road are included in the Road Cycling Network, allowing recreational and commuter cyclists to travel from Ingleside Precinct to the rest of the Northern Beaches LGA like Palm Beach, Narrabeen and Manly.

Implication for the Precinct: The proposed cycle network planned by Northern Beaches Council around the Ingleside Precinct would improve connectivity and enhance accessibility for future residents, especially for shorter trips to be undertaken by cycling to connect with key centres, transport hubs, schools, local employment opportunities and surrounding residential areas, reducing the community's reliance on cars resulting in a less congested road network.

Figure 2–12 Northern Beaches Road Cycling Network



Source: Northern Beaches Bike Plan, 2020

2.2.5 Northern Beaches Walking Plan

The *Northern Beaches Walking Plan* (Northern Beaches Council, 2020) sets out Northern Beaches Council's directions and priorities for walking and recommends a range of goals to address key walking issues facing the LGA. The Plan also sets out the desired characteristics for a "world-class" pedestrian network across the Northern Beaches. The walking plan comprises of 5 directions.

Connecting the network by:

- Creating connections to where people want to go
- Integrating walking with other transport modes
- Connecting walking networks with local destinations, employment and public transport
- Connecting walking networks through pathways, tracks and reserves
- Delivering walking wayfinding signage to improve connectivity

Delivering the network by:

- Using walking data to inform pedestrian priorities
- Prioritising new footpaths in a consistent way to benefit the community
- Working with the State Government to facilitate delivery of the Walking Plan

Making walking safe by:

- Creating facilities that are accessible, safe and well designed
- Reducing conflicts between pedestrians and other transport modes
- Improving safety for pedestrians in high-risk zones
- Improving pedestrian crossing opportunities

Creating walking neighbourhoods by:

- Providing a high-level pedestrian priority in the network to pedestrian-focused areas
- Ensuring the accessibility of walkable places
- Providing shaded and comfortable pedestrian environments
- Designing for pedestrians first

Encourage walking by:

- Promoting walking
- Partnering with local schools to encourage more children to walk to school
- Encouraging walking trips as part of daily travels

Implication for the Precinct: While there are no specific projects for walking proposed around Ingleside Precinct in the Walking Plan, overall improvements to the pedestrian network will improve accessibility for future residents and reduce their reliance on cars. Potential pedestrian improvements could include:

- Creating better access to public transport through improving footpath connections will encourage more residents to walk to bus stops along Mona Vale Road to catch BRTs between Mona Vale and Macquarie Park.
- Providing appropriate end-of-trip facilities at key trip attractors within the precinct. These facilities will help ensure that active transport is safe, convenient and an attractive travel choice.
- Creating footpaths that are accessible and comfortable to walk along (e.g. Footpaths that are not exposed to unpleasant noise, wind, heat, rain or pollution) will encourage people of all ages and mobility to move around their neighbourhoods.
- Providing formal crossing opportunities (especially along Mona Vale Road and Powderworks Road) will help to improve the walking network and create a safer environment for Ingleside residents catching public transport and accessing local facilities.

2.2.6 Mona Vale Road upgrades

In 2009, TfNSW (formerly Roads and Maritime Services) prepared a Corridor Strategy from Mona Vale to Macquarie Park. The Strategy identified short- and long-term priorities for Mona Vale Road. In 2013, a fatal tanker crash occurred on Mona Vale Road just east of the roundabout at Ponderosa Parade / Samuel Street. The clean-up of this crash took more than 24 hours and resulted in total closure of Mona Vale Road in this location.

A combination of the community concern and the crash history in this area resulted in TfNSW elevating the priority of further road upgrades. As a result, the NSW Government is upgrading Mona Vale Road from two lanes to four lanes between Terrey Hills and Mona Vale. The project will be staged to provide customers with a better travelling experience and to improve safety and traffic efficiency.

The NSW Government is investing \$140 million to upgrade Mona Vale Road between Manor Road, Ingleside, and Foley Street, Mona Vale, from two to four lanes to improve safety and traffic efficiency. The Mona Vale Road East project started on January 2019 and is expected to complete in 2022. Details of the Mona Vale Road East upgrade are summarised in **Figure 2-13**.

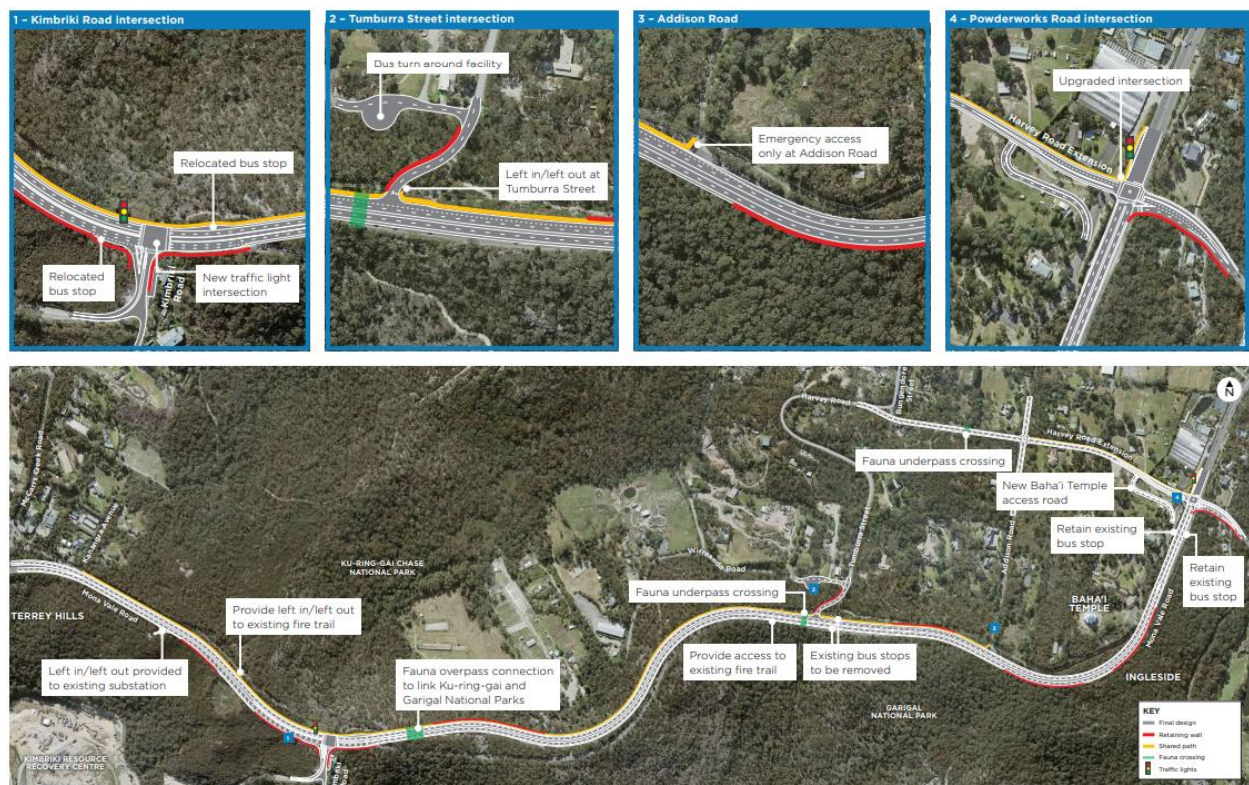
The proposed road upgrade for Mona Vale Road East would provide:

- Additional lanes for climbing and descending to improve travel time in both directions
- Widened shoulders and median separation to improve safety
- 80km/h speed limit between Mona Vale and Belrose once the road upgrades for both Mona Vale Road East and Mona Vale Road West are completed
- Facilities for cyclists and pedestrians, as well as bus priority measures.

Figure 2-13 Mona Vale Road East Planned Infrastructure Upgrades

Source: Mona Vale Road East upgrade - Manor Road, Ingleside to Foley Street, Mona Vale (2020)

In addition to the committed works for Mona Vale Road East, Mona Vale Road West between McCarrs Creek Road, Terrey Hills, and Powderworks Road, Ingleside is at the detailed design stage and construction is expected to begin when funding becomes available (there is currently no funding and timing commitment by TfNSW for the upgrade of Mona Vale Road West project). Details of the Mona Vale Road West upgrade are summarised in **Figure 2-14**.

Figure 2-14 Mona Vale Road West Planned Infrastructure Upgrades

Source: Mona Vale Road Upgrade Project Update (NSW Government, March 2018)

The key features of the Mona Vale Road West upgrade include:

- Widening Mona Vale Road between McCarrs Creek Road and Powderworks Road from two lanes to four lanes with a central concrete safety barrier
- Providing a new traffic signal intersection at Kimbriki Road and Mona Vale Road, including additional dedicated turning lanes and a truck climbing lane
- Relocating the intersection of Mona Vale Road and Tumburra Street to the west by about 40 metres and changing access to left turn in and left turn out only
- Closing the existing intersection at Mona Vale Road and Addison Road to general traffic and restricting access to emergency vehicles only
- Constructing a new local road connection between Bungendore Street and Powderworks Road, using the existing Harvey Road corridor, and extending the new local road east of Addison Road to meet the intersection of Mona Vale Road and Powderworks Road
- Removing bus stops near the intersection of Tumburra Street and re-directing bus services along the new local road connection and Tumburra Street to serve existing and future land uses
- Providing new and improved fauna connections including a 40 m wide fauna bridge over Mona Vale Road and two fauna underpasses
- Constructing a shared use path on the northern side of Mona Vale Road between McCarrs Creek Road and Addison Road
- Upgrading street lighting for the full length of the project
- Constructing retaining walls and/or sandstone cuttings at various locations along the alignment
- Landscaping over the length of the proposal.

The *Mona Vale Road West Upgrade REF – Transport and Traffic Assessment* (AECOM, 2017) was undertaken to understand the performance of the corridor before and after the proposed upgrades are undertaken. The assessment and traffic modelling took into account regional land use changes, including the full development of Ingleside Precinct that were considered to be about 3,500 residential dwellings at that stage. Intersection performance results of the two major access points to the Ingleside Precinct and other critical intersections along Mona Vale Road, assuming full upgrades of Mona Vale Road East and Mona Vale Road West, are summarised in **Table 2-1**.

Table 2-1 Mona Vale Road intersection performance

Intersection	Type	Peak	LoS	Average Delay (s)	95th Queue (m)
2021 Intersection Performance (with development)					
Mona Vale Road / Powderworks Road	Signal	AM	B	17.7	102 (E Leg)
		PM	A	14.3	142 (S Leg)
Mona Vale Road / Lane Cove Road / Manor Road	Signal	AM	A	9.9	66 (N Leg)
		PM	A	13.6	122 (E Leg)
Mona Vale Road / Pittwater Road	Signal	AM	B	19.1	163 (S Leg)
		PM	B	18.6	230 (S Leg)
2036 Intersection Performance (with development)					
Mona Vale Road / Powderworks Road	Signal	AM	F	88.5	494 (N Leg)
		PM	B	21.8	187 (S Leg)
Mona Vale Road / Lane Cove Road / Manor Road	Signal	AM	C	54.2	368 (N Leg)
		PM	B	23.7	145 (E Leg)
Mona Vale Road / Pittwater Road	Signal	AM	B	23.0	217 (S Leg)
		PM	D	43.8	446 (S Leg)

Source: Mona Vale Road West Upgrade REF – Transport and Traffic Assessment (AECOM, 2017)

Traffic modelling undertaken for the full upgrade of Mona Vale Road suggested that the upgraded intersections of Powderworks Road and Manor Road with Mona Vale Road will perform at an acceptable LoS during the peak hours in 2021 and 2036, with the exception of the Powderworks Road / Mona Vale Road intersection, which is forecast to perform unsatisfactorily during the 2036 AM peak hour, as a result of high development flows, particularly those left turning from Powderworks Road in conflict with the Mona Vale Road westbound movement.

The potential capacity constraint and conflict in movements at the intersection of Powderworks Road / Mona Vale Road is expected to be removed with the significantly reduced dwelling yield from the Ingleside Precinct.

Implication for the precinct: The Mona Vale Road full upgrade will provide sufficient capacity for the development of Ingleside Precinct as well as travel time reliability improvements for customers including future residents of Ingleside Precinct using this corridor to access other major centres and employment areas.

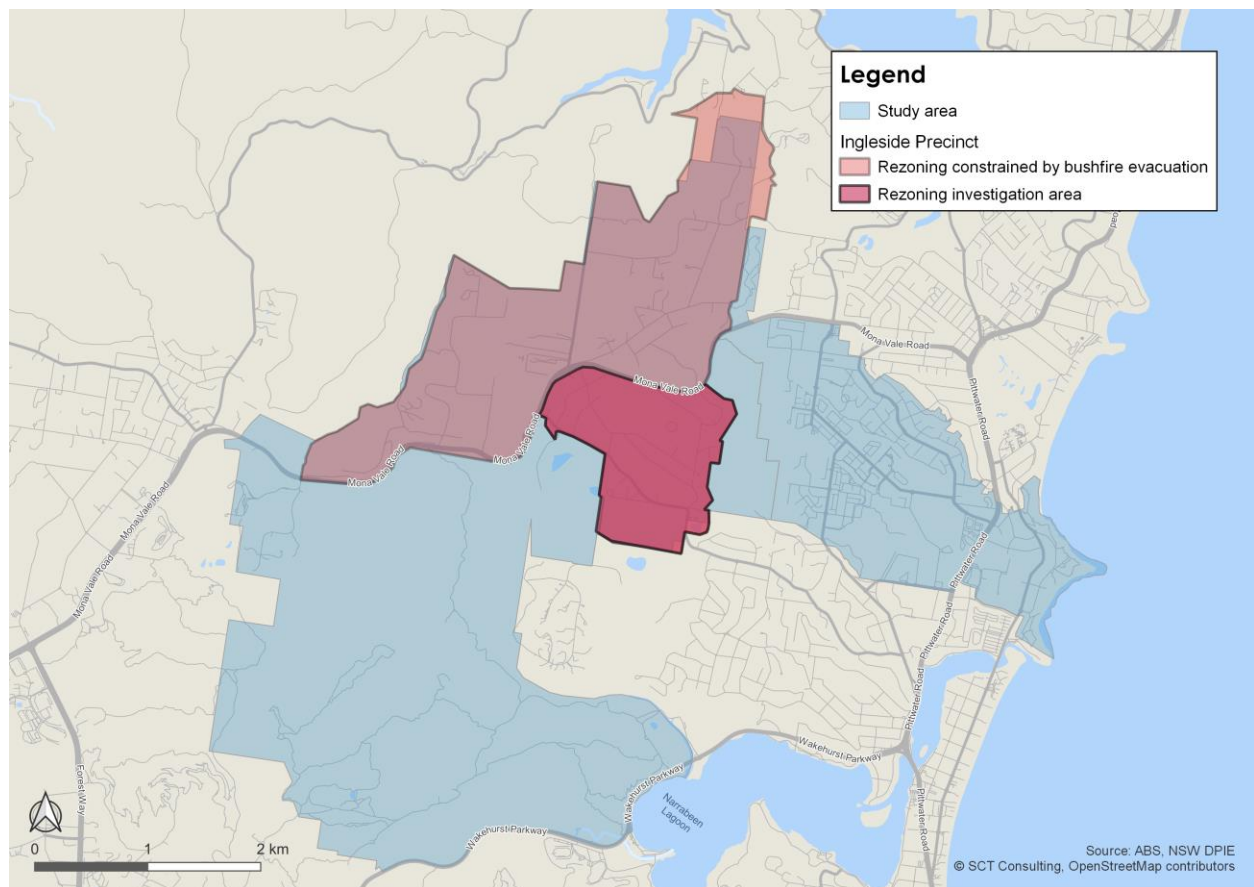
3.0 Existing Conditions

3.1 Travel behaviour

3.1.1 Method of travel to work data

The travel behaviour for the Ingleside Precinct was derived from the 'Warriewood-Ingleside' 2016 Method of travel to work data. **Figure 3-1** shows the spatial boundaries of both the study area (Warriewood-Ingleside suburb) and the Ingleside Precinct.

Figure 3-1 Study area for the travel behaviour reference for method of travel to work analysis



Source: SCT Consulting, 2020

At the time of the JTW data being collected in 2016, about 4,225 trip samples were included in the survey for the area. The study area reported a high level of private car use, 71 per cent, in comparison to the 53 per cent for Greater Sydney. The combined public transport usage was about eight per cent compared to the Greater Sydney average of 22 per cent. The mode shares are a likely result of land use, distance to jobs, population income and inadequate public transport facilities. The walking and cycling level were 3.4 per cent, only slightly lower than the Greater Sydney average of 4.7 per cent. Around eight per cent of the sample were working at home or used other transport modes at the time of the census.

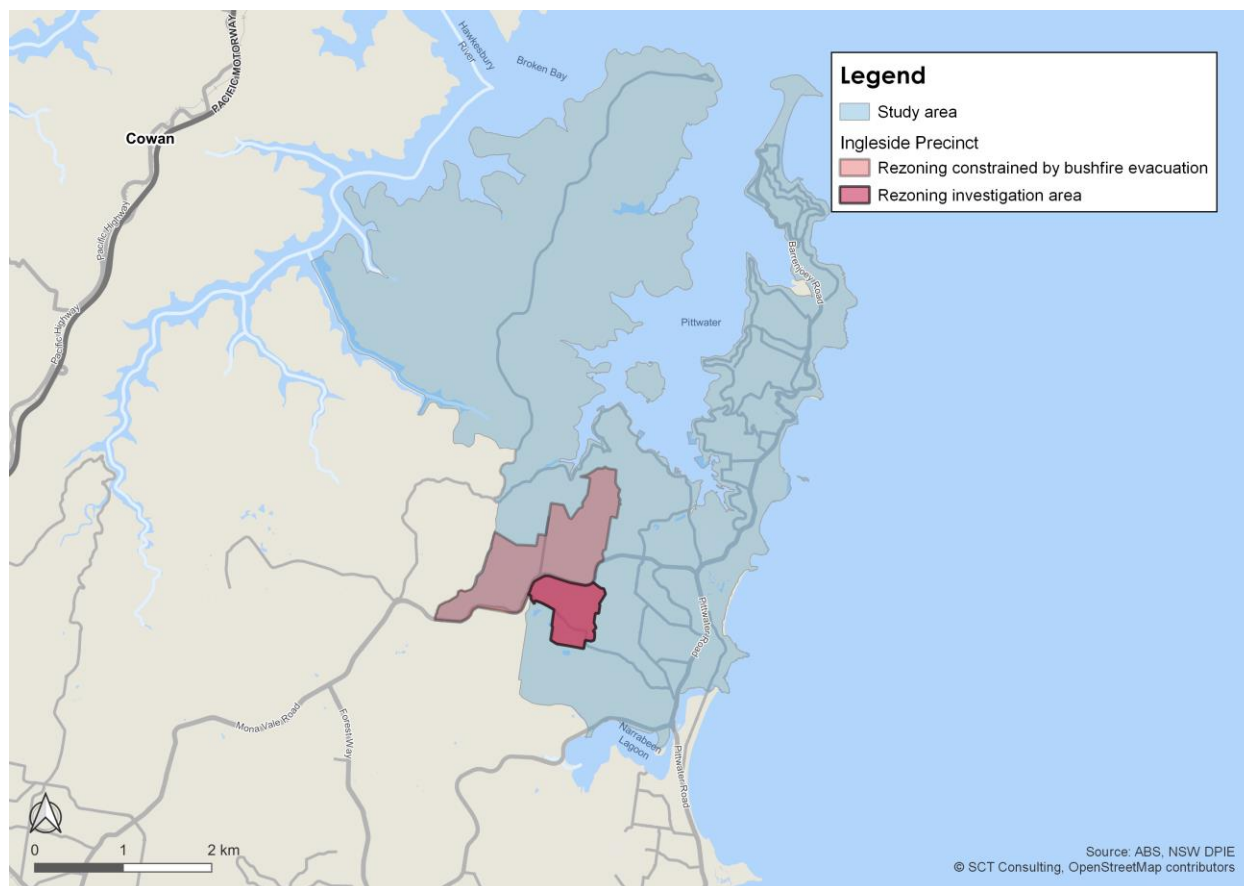
Of the 88,161 people who worked in the Northern Beaches Council area, 67,576 or 76.7 per cent also lived in the area. The areas of Ku-ring-gai (2.8 per cent), Hornsby (2.1 per cent), and North Sydney (1.5 per cent) formed the largest origin locations for people travelling to the Northern Beaches LGA to work. Other origins across the Greater Sydney region generated less than one per cent of work-related trips to the Northern Beaches.

Following the Northern Beaches LGA as the highest location for residents to work (52 per cent) were Sydney (18.2 per cent), North Sydney (5.2 per cent) and Willoughby (4.4 per cent). Other destinations for the purpose of work-related trips were all below five per cent. This demonstrates despite the high level of people living and working in the Northern Beaches LGA for which the car is still deemed the most attractive mode of transport.

3.1.2 Household Travel Survey

The proposed precinct sits within the SA3 statistical area “Pittwater” as defined by the Australian Bureau of Statistics as shown in **Figure 3-2**. TfNSW Household Travel Survey data for this SA3 has been analysed to determine mode shares and average trip lengths. Unlike the Census Journey to Work data, Household Travel Survey data covers all trip purposes, not just commuting trips. However, as the survey sample size is much smaller, Household Travel Survey data is only available at higher geographies such as SA3s.

Figure 3-2 Study area for the travel behaviour reference for household travel survey analysis



Source: SCT Consulting, 2020

Table 3-1 and **Table 3-2** provides a summary of the overall mode choice and purpose of travel by residents of Pittwater against the Sydney average. The average travel distance for each category were also listed.

Table 3-1 Household travel survey – residents within Pittwater, travel by mode

Mode of travel	Pittwater		Greater Sydney	
	Mode share %	Average distance	Mode share %	Average distance
Vehicle Driver	61%	9 km	48%	10 km
Vehicle Passenger	17%	6 km	21%	8 km
Train	1%	3 km	6%	17 km
Bus	5%	18 km	5%	7 km
Walk Only	15%	2 km	18%	1 km
Other	1%	1 km	2%	6 km
Total	100%	-	100%	-

Source: <https://www.transport.nsw.gov.au/data-and-research/passenger-travel/surveys/household-travel-survey-hts>, 2020

The study area had a higher rate of car usage (vehicle drivers and vehicle passengers) at 78 per cent compared to Greater Sydney's 69 per cent. The combined public transport usage (train and bus) was lower at six per cent compared to 11 per cent for Greater Sydney. The study area mode share was the same at five per cent, but the average distance travelled considerably longer. This demonstrates there is a high level of car dependency in the area which may in response to the unattractiveness of public transport.

Table 3-2 Household travel survey – residents within Pittwater, travel by purpose

Trip purpose	Pittwater		Greater Sydney	
	Per centage of total trips	Average distance	Per centage of total trips	Average distance
Commute	12%	17 km	17%	15 km
Work related business	8%	11 km	7%	16 km
Education/childcare	7%	10 km	10%	6 km
Shopping	14%	4 km	15%	6 km
Personal business	9%	5 km	5%	7 km
Social/recreation	31%	6 km	25%	9 km
Serve passenger	19%	6 km	19%	6 km
Other	2%	10 km	2%	4 km
Total	100%	-	100%	-

Source: <https://www.transport.nsw.gov.au/data-and-research/passenger-travel/surveys/household-travel-survey-hts>, 2020

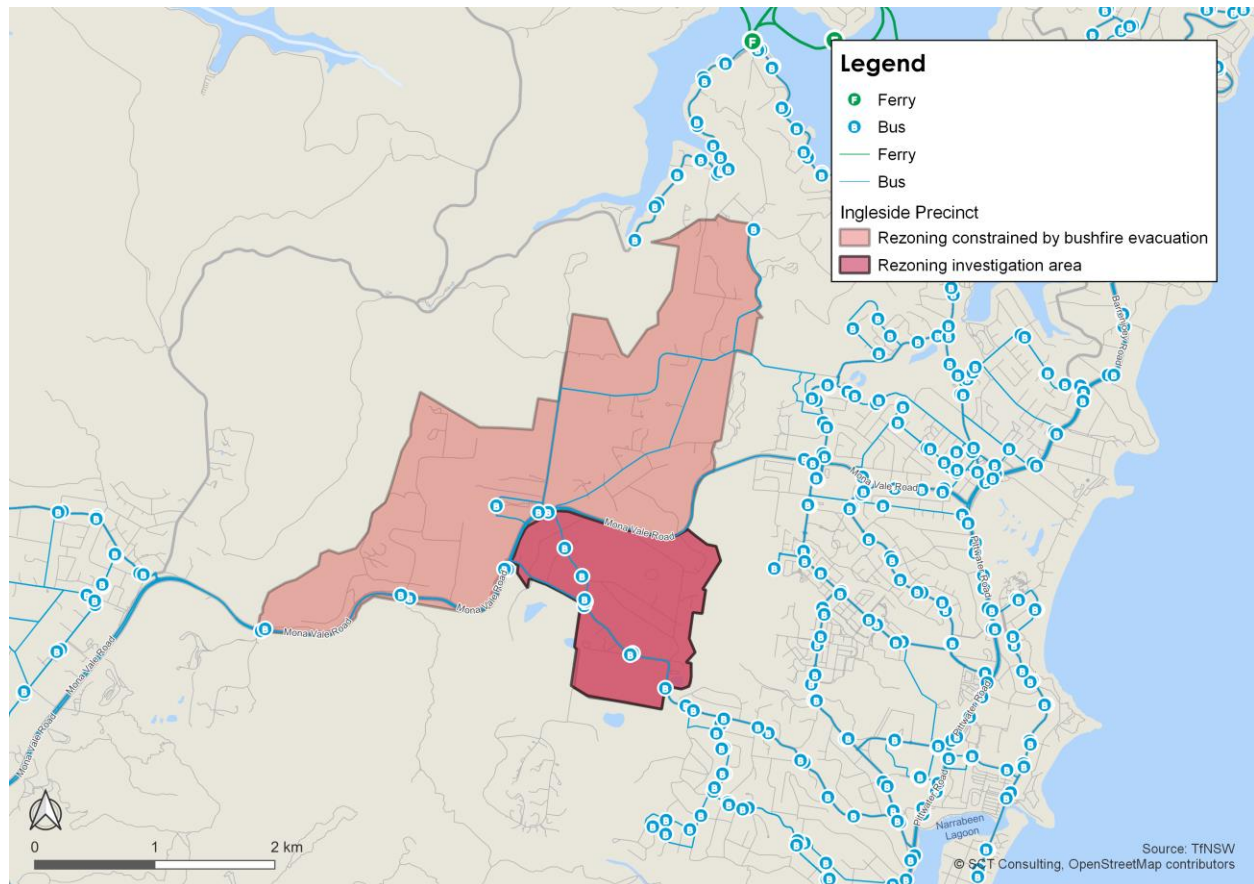
The average distance travelled by all modes of transport and by trip purposes were about eight kilometres, about 20 per cent less than the Greater Sydney average (10 kilometres). This can be partly attributed to the high level of Pittwater residents who live and work within the Northern Beaches LGA.

The high rate of car usage, both as driver and passenger, and relatively low public transport users means trips will be more efficient in their directiveness than can be possible on bus or train. The high average distance of bus users in Pittwater compared to the other modes demonstrates why car use may be preferable.

3.2 Public transport network

As highlighted in **Section 3.1**, currently public transport usage by residents in the area is very low, most likely due to the lack of public transport services and low population density of the area of investigation. Bus routes and stops around the precinct are shown in **Figure 3-3**. There is no train or metro station in proximity to the precinct, and the ferry services to the north of the precinct are primarily for local access and day trippers / tourists.

Figure 3-3 Public transport around the precinct



Source: SCT Consulting, 2020

Bus is the main public transport provision for the Ingleside Precinct with bus usage in the Pittwater study area the same as the Greater Sydney average (5 per cent). Two bus services (196 and 197) operate along Mona Vale Road providing access to Mona Vale, Gordon and Macquarie Park. Route 196 provides limited weekday peak hour and weekend services between Gordon Station and Mona Vale, while Route 197 provides typical 30-minute frequency services between Mona Vale and Macquarie University Station, with more frequent services provided during the weekday peak periods. Route 197 operates as an hourly bus service in each direction on the weekend.

Powderworks Road, south of the precinct, and Kalang Road is served by two bus services (182 and 183X). Route 182 provides bus connections between Narrabeen and Mona Vale via Elanora Heights with hourly services provided on weekdays and weekends. Route 183X provides bus connections between Narrabeen and the City via Elanora Heights, with nine citybound services provided in the morning peak between 5-9am and nine inbound services from the City to Narrabeen provided in the afternoon peak between 3-8pm.

High frequency and limited stop bus services are provided by the B-Line (Route B1) that operates along Pittwater Road between Sydney CBD and Mona Vale via Warriewood. It operates between 5.30am and 1am, 7 days a week.

Based on the travel behaviour analysis of the study area identified in **Section 3.1**, it can be observed that public transport is not an attractive option to the existing residents within the Ingleside Precinct. Development close to Mona Vale Road has the potential to make bus a more attractive option if taken in conjunction with higher frequencies and new destinations.

3.2.1 On-demand public transport services

On-demand bus services for the Northern Beaches region are operated by Keolis Downer. Keoride services run from Palm Beach, south to North Narrabeen and west to Chiltern Road to nearby transport hubs, including Avalon bus stop, and Warriewood, Mona Vale and Narrabeen B-Line stops. The service began in November 2017. **Figure 3-4** shows the extent of the service.

Figure 3-4 On Demand public transport zone map



Source: TfNSW, 2020

The service operates 7 days a week on:

- Monday to Wednesday: 6am to 10pm
- Thursday and Friday: 6am to 11.30pm
- Saturday: 7am to 11.30pm
- Sunday and public holidays: 7am to 9pm.

3.3 Active transport

Given the rural nature and lack of urban development in the vicinity of the precinct, there is limited to no pedestrian or cycling activities in the surrounding areas to Ingleside. The topography of the area may also pose as a constraint, with incline and gradient increasing from the direction of Narrabeen and Belrose towards Ingleside. The cycling snapshot¹ presented in the Northern Beaches Bike Plan also suggested the Ingleside area is not a popular cycling area, which does not have major attractors.

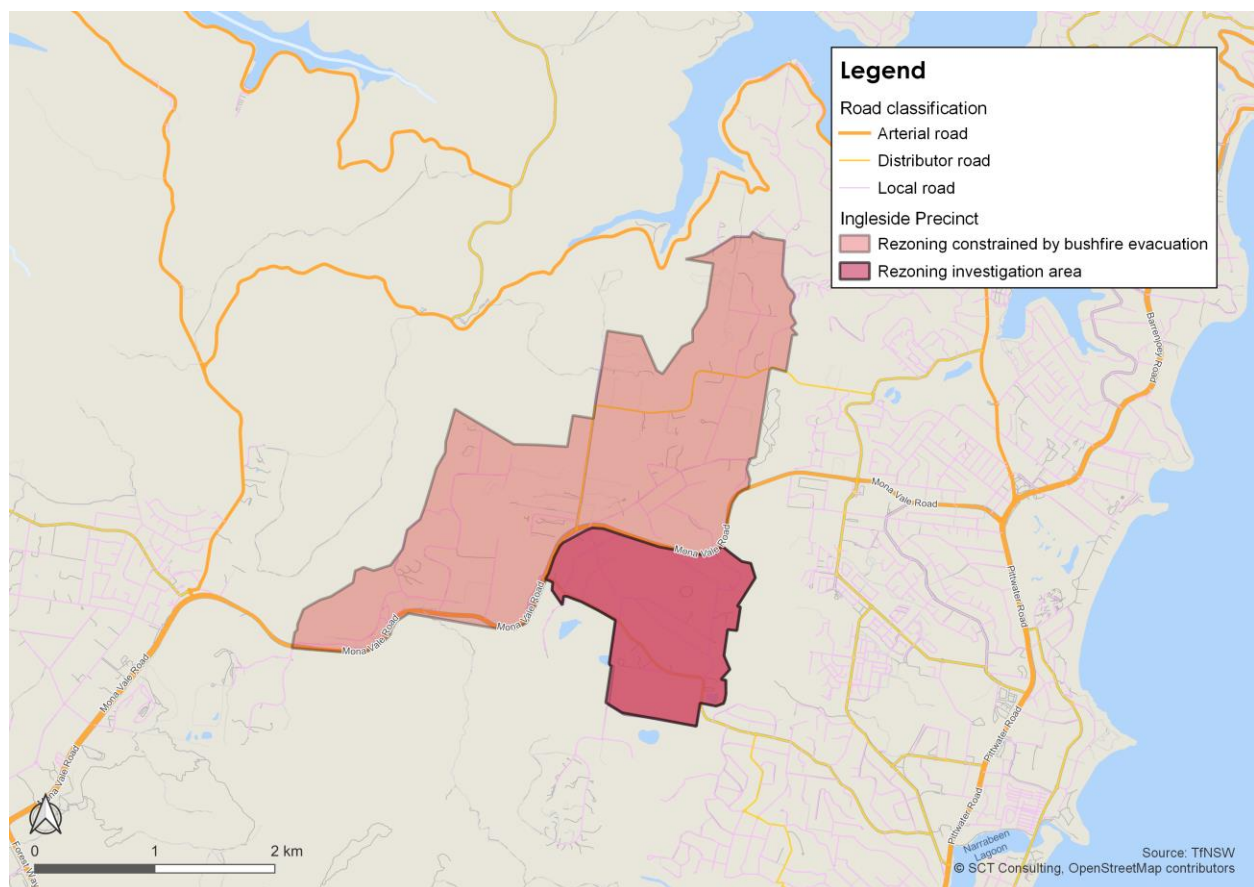
Footpaths are not present on most the roads within the precinct, with pedestrians forced to walk on either the road or grass verge. This would pose a safety risk due to the winding nature of the road configurations. There is no dedicated cycling infrastructure in the vicinity of the Ingleside Precinct.

However, we should note the intent for the Northern Beaches Council to provide Safe Cycling Network along Mona Vale Road and Powderworks Road to improve connectivity and enhance accessibility for future residents, especially for shorter trips to be undertaken by cycling to connect with key centres, transport hubs, schools, local employment opportunities and surrounding residential areas, reducing the community's reliance on cars resulting in a less congested road network.

3.4 Road network and classification

The area surrounding the proposed Ingleside Precinct has a mixture of state roads managed by TfNSW, and regional or local roads managed by Council. The state roads are Mona Vale Road, Pittwater Road, Barrenjoey Road and McCarrs Creek Road. The road network surrounding the Ingleside Precinct is shown in **Figure 3-5**.

Figure 3-5 Road network around the precinct



Source: SCT Consulting, 2020

¹ Based on community engagement, strava heat mapping and the Local Government Cycling Participation Study 2018

The characteristics of the key road network in proximity to the Ingleside Precinct are:

- **Mona Vale Road** is an arterial road, managed by TfNSW, which forms an east-west corridor between the strategic centre of Mona Vale and the Pacific Highway at Pymble. The road passes through the proposed Ingleside Precinct, the local centre of Gordon and serves as a key corridor to St Ives and Frenchs Forest.

The lane configuration varies along the length of the road from two lanes to four lanes. Adjacent to the Ingleside Precinct accesses, Mona Vale Road is four lanes wide. It narrows to become two lanes east of Manor Road through the steep terrain of the Ingleside Chase Reserve and between Powderworks Road and Terrey Hills.

Speed limits vary between 60 km/h and 90 km/h, with no stopping in place along the boundary of the Ingleside Precinct. Mona Vale Road currently provides the main access to the Ingleside Precinct via the intersections of Powderworks Road and Manor Road / Lane Cove Road.

- **Powderworks Road** is a local distributor road managed by Council, which provides a connection between Mona Vale Road and Pittwater Road through the suburbs of Ingleside / Elanora Heights.

The road has a two-lane configuration with the speed limit varying between 50 km/h and 60 km/h, east and west of Wilga Street respectively. Powderworks Road can operate as an alternative parallel route to Mona Vale Road accommodating a volume of through traffic, towards Narrabeen, and Elanora Heights.

The corridor is constrained by topography, a high number of property accesses, as well as traffic calming and pedestrian islands. Sydney bus routes 183 and E83 use Powderworks Road (east of Kalang Road) but these services do not extend into Ingleside. Powderworks Road also accommodates a school bus route.

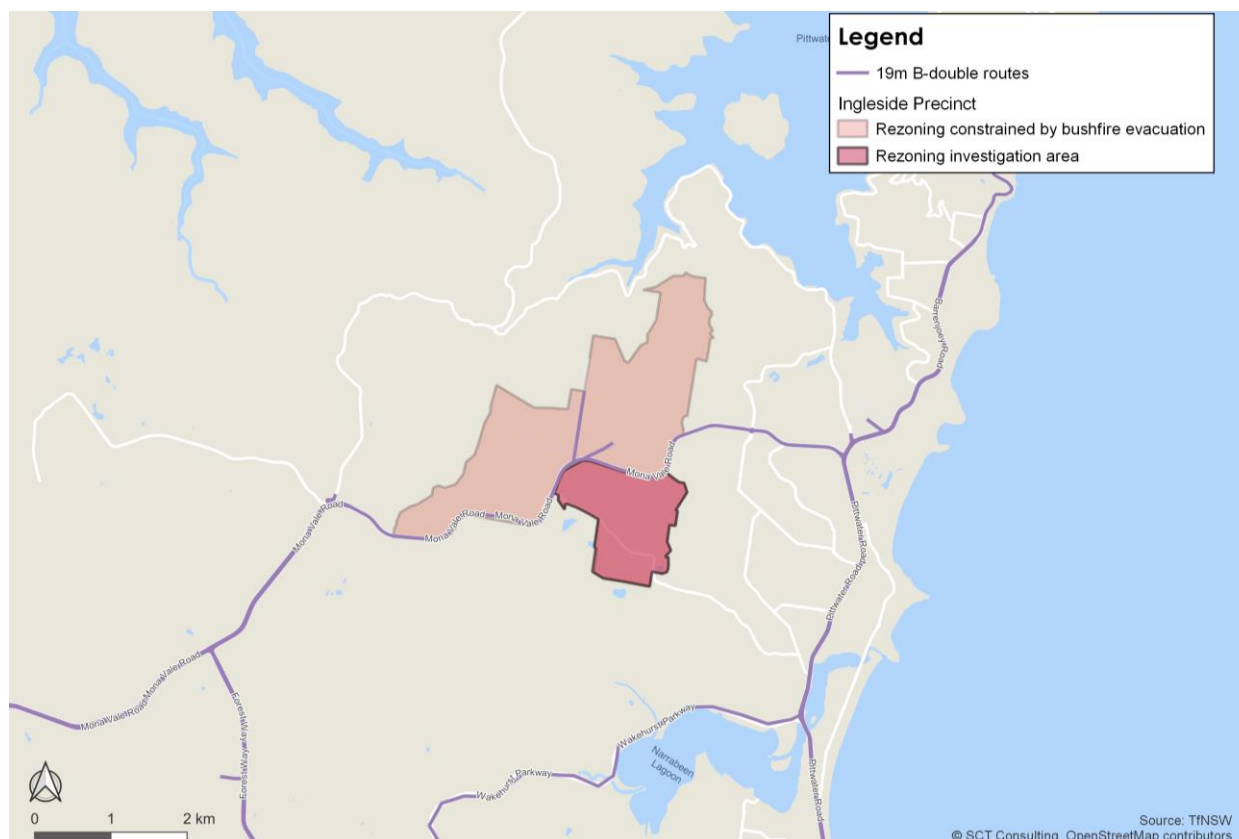
- The local roads within the Ingleside Precinct serve primarily residential premises and several commercial, industrial, and agricultural businesses. The predominate mode of travel is car, a result of its low-density land use, limited bus coverage and no pedestrian and cyclist facilities.

3.5 Heavy goods vehicle network

Mona Vale Road is classified as a tertiary freight route and B-double route, as indicated in **Figure 3-6**, providing access to Belrose Super Centre, Warriewood Business Park and other centres at Terrey Hills, St Ives and Mona Vale.

As a B-double route, large heavy good vehicles are permitted to use it, allowing it to be the primary east-west corridor between the Northern Beaches and Greater Sydney. Other B-doubles routes in the vicinity of the Ingleside Precinct are Pittwater Road, Barrenjoey Road, Forest Way and the Pacific Highway. The local roads of Chiltern Road and Lane Cove are also B-double routes.

Figure 3-6 B-double routes



Source: Transport for NSW, SCT Consulting, 2020

3.6 Existing traffic conditions

Mona Vale Road is a high movement corridor with limited destinations along the corridor. Cars are the predominate form of traffic with freight composing around five to seven per cent of the overall traffic volume. Along the section of Mona Vale Road which passes through the Ingleside Precinct there is nothing which would consider serving a Place function and as a result there are limited opportunities for conflict between motorised modes and more vulnerable modes (pedestrians, cyclists). Along the length of Mona Vale Road, between 2013-2019 there were eight fatal crashes recorded.

Pittwater Road is another important movement corridor forming a north / south connection between Mona Vale in the north and Manly in the south. The corridor serves a variety of customers, with general car traffic the predominate mode. The corridor serves several strategic centres at Manly, Brookvale, Dee Why and Mona vale, and a variety of local centres. As result the corridor has a greater balance between movement and place than Mona Vale Road but presents a higher opportunity for conflict to occur between different modes. Between 2013-2017 there were two fatal crashes recorded.

Due to current COVID-19 conditions, no recent traffic data has been collected. Recent (pre-COVID in 2019) traffic data has been analysed from TfNSW Permanent Station 57.024, located at 90m east of Addison Road (just to the east of Ingleside Precinct). A comparison of 2019 and 2013 data was undertaken and summarised in **Table 3-3**.

Table 3-3 Mona Vale Road traffic volume comparison

Year	Weekday AM Peak (8-9am)	Weekday PM peak (4-5pm)	Average weekday (daily)
2013	2,591	2,708	32,967
2019	2,765	2,848	34,948
Change	+1.1% p.a.	+0.8% p.a.	+1.0% p.a.

Source: Transport for NSW, 2020

The comparison has shown that traffic volumes have been increasing at around one per cent per annum for the last six years. This level of increase is considered appropriate as there are no major land use changes in this part of the Northern Beaches area. This level of increase – within 10 per cent – is also considered to be within traffic volumes that are experienced on a different day even within the same year, hence the traffic volumes along this corridor have been stable.

3.6.1 Intersection level of service

Intersection Level of Service (LoS) is a typical design tool used by traffic engineers to identify when roads are congested and require upgrade. The Level of Service as defined in the Traffic Modelling Guidelines is provided in **Table 3-4**.

Table 3-4 Level of Service definitions

Level of Service	Average Delay per Vehicles (sec/h)	Performance explanation
A	Less than 14.5	Good operation
B	14.5 to 28.4	Good with acceptable delays and spare capacity
C	28.5 to 42.4	Satisfactory
D	42.5 to 56.4	Operating near capacity
E	56.5 to 70.4	At capacity, at signals incidents will cause excessive delays.
F	70.5 or greater	Roundabouts require other control method.

Source: Roads and Maritime Services, 2002

Analysis of existing traffic performance was conducted as part of the *Ingleside Precinct Transport and Traffic Assessment* (AECOM, 2016) to understand the existing traffic conditions in proximity to the precinct, using 2013 peak hour data collected along critical intersections of Mona Vale Road, Powderworks Road and Pittwater Road.

Since there is no major change in the level of traffic volumes between 2013 and 2019, intersection performance reported in the *Ingleside Precinct Transport and Traffic Assessment* is replicated in **Table 3-5** and provides an indication of how these intersections perform under current conditions. All intersections are considered to be performing at a satisfactory level of service during the peak hours.

Table 3-5 Existing intersection performance

Intersection	AM peak		PM peak	
	Delay (s)	LoS	Delay (s)	LoS
Mona Vale Road Powderworks Road Baha'i Temple Way	20.0	B	15.2	B
Mona Vale Road Lane Cove Road Manor Road	16.2	B	10.4	A
Mona Vale Road Pittwater Road	22.6	B	40.1	C
Powderworks Road Garden Street	17.1	B	22.5	B
Pittwater Road Garden Street	19.1	B	21.7	B

Source: AECOM, 2016

4.0 Ingleside Precinct Rezoning

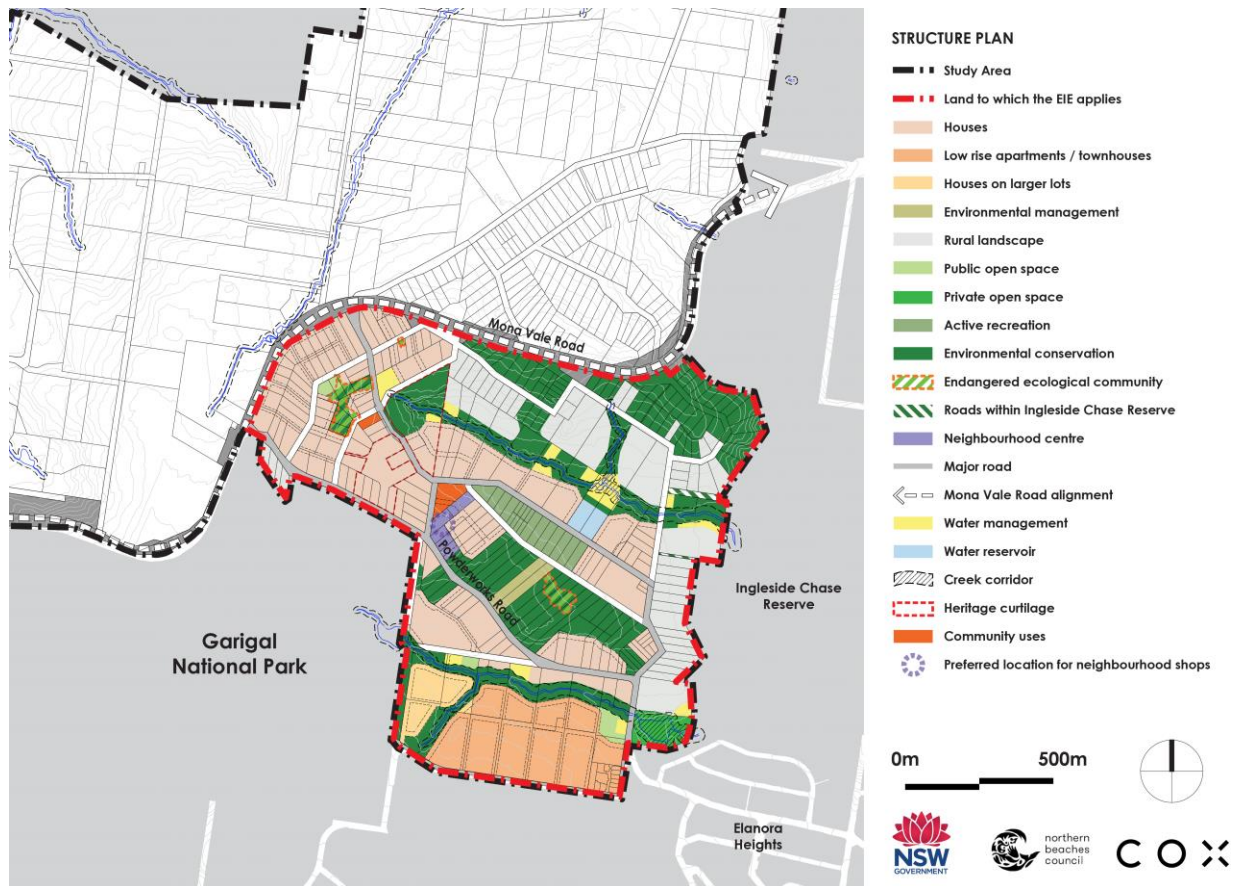
4.1 Structure Plan

An updated Structure Plan has been developed to enable development of appropriate controls such as zoning, FSR, and a Development Control Plan as well as to provide a richer picture of how the precinct is proposed to be laid out.

The Structure Plan for the Ingleside Precinct is provided in **Figure 4–1**. The proposed development is predominantly low and medium density residential dwellings, with a neighbourhood centre, a school and community facilities to serve local residents. Current projections estimate that about 980 new dwellings will be provided as part of the proposed development.

The new school will be located between Powderworks Road and Manor Road. The school is positioned at or near key public transport corridors and would be accessed via local roads where appropriate. The neighbourhood centre and the community uses are also located in the centre of the revised Rezoning Investigation Area (south of Mona Vale Road) for ease of access by all future residents.

Figure 4–1 Revised Ingleside Precinct Structure Plan



Source: Cox, 2021

4.2 Proposed transport network

The proposed transport network needs to cater for the travel characteristics of the proposed land uses and support the precinct's integration with the surrounding network. The proposed transport network for the Rezoning Investigation Area, i.e. the precinct south of Mona Vale Road, remains the same as what was proposed in the 2016 Draft Structure Plan.

4.2.1 Road network and hierarchy

Access to the wider Sydney region is provided by Mona Vale Road with intersections at Powderworks Road and Manor Road. Access to the south is also provided by Powderworks Road.

Mona Vale Road remains as the high order urban arterial and Powderworks Road is the urban distributor / sub-arterial. Manor Road and Wattle Road are the major local roads / collectors, linking Mona Vale Road and Powderworks Road, and are supported by the other minor local roads that provide local access.

4.2.2 Public transport network

Transport for NSW is improving bus stop infrastructure as part of the Mona Vale Road upgrades and the intent of improved service provision between Mona Vale and Macquarie Park that provides interchange with the B-Line and metro services respectively.

Apart from Mona Vale Road, Powderworks Road, Manor Road and Wattle Road will be required to accommodate buses to provide improved public transport accessibility to the precinct. Roads serving bus routes should have two lanes in each direction or one lane in each direction with a parking lane that could accommodate a bus stop. Lane widths need to be a minimum of 3.5 metres.

The revised Rezoning Investigation Area (south of Mona Vale Road) is still within the service area of on-demand bus services operated by Keolis Downer. Keoride services run from Palm Beach, south to North Narrabeen and west to Chiltern Road to nearby transport hubs, including Avalon bus stop, and Warriewood, Mona Vale and Narrabeen B-Line stops.

Depending on the size and catchment of the proposed school, local bus services could be established to provide connection between the school and major transport nodes as well as the developed residential areas within the precincts. A dedicated school bus service could be introduced or extended as appropriate to serve the proposed school located within the precinct, however, in general students would be encouraged to travel on scheduled public transport routes. The proposed school is located on roads that are capable of accommodating bus routes to allow flexibility of buses arriving and departing from all directions.

4.2.3 Active transport network

A comprehensive bicycle network is proposed for the precinct, which will link the neighbourhood centre, school, and residential neighbourhoods with key strategic routes and onward destinations. The proposed bicycle network will include a mixture of dedicated bicycle facilities, which will take the form of:

- Off-road (shared path)
- On-road (cycle lane)
- Off-road (shared path – green corridor).

Cyclists will have improved facilities as part of the Mona Vale Road upgrade, with a shared path provided along the full extent of the upgrade that will enable Mona Vale Road to fulfil its role as a regional cycle route.

An off-road shared path will be provided along Powderworks Road and all proposed major roads to facilitate safe and efficient travel by non-car modes throughout the precinct and connect to the wider bicycle and pedestrian networks. These connections will facilitate improved connectivity to neighbouring locations, including the small village centre at Elanora Heights as well as the regional shared path along Mona Vale Road.

All proposed roads in the precinct will have dedicated pedestrian footpaths to create a comprehensive network following proposed road alignments. There is also an opportunity to provide recreational paths on the riparian corridors adjacent to Mullet Creek to encourage leisure walking within the precinct.

It is also recommended that pedestrian refuges should be provided as a minimum along collector roads at key pedestrian generators such as schools, neighbourhood centre and community facilities to facilitate pedestrian / cyclist

safety and amenity and act as traffic calming. Zebra crossings or traffic signals should be considered if the crossing locations meets relevant warrants.

The new school would be located between Powderworks Road and Manor Road. It is important to provide high quality walking and cycling routes to the proposed school.

4.3 Travel Demand Management measures

Sustainable transport and Travel Demand Management (TDM) strategies involve the application of policies, objectives, measures and targets to influence travel behaviour, to encourage uptake of sustainable forms of transport, i.e. non-car modes, wherever possible. TDM measures have proven to reduce congestion created by growth within urban areas and unlock urban renewal opportunities. They result in travel behaviour that uses less road space than single occupant vehicle commuters and takes advantage of spare transport capacity outside the morning and afternoon peaks.

TDM strategies generally guide all relevant customers (residents, employees and visitors) in changing their travel behaviour in the following ways:

- Reduce travel
- Re-mode (consideration of travel via alternative modes)
- Re-time (consideration of travel at alternative times)
- Re-route.

For the higher density dwellings, a Travel Plan should be developed and monitored for the precinct to deliver best practice travel programs and initiatives to manage travel demand.

Key initiatives and measures could be developed to:

- Reduce the need to travel
- Re-think the mode of travel
 - Walking and cycling
 - Public transport
 - Parking measures as a mean to encourage alternative modes of travel:
- Re-time and re-route journeys:
 - Development of specific community app / community engagement program to enable changing travel behaviour
 - Real-time information embedded into developments and public transport stops
 - Employers to promote and encourage flexible working hours and arrangements.

While it is important to develop a Travel Plan that is aimed at managing travel demand and reducing reliance on car travel, it is more important to monitor and evaluate the effectiveness of individual measures and the need to adjust the measures. The planning and implementation of a targeted Travel Plan with the above green travel initiatives / principles for the Ingleside Precinct will provide significant opportunities for alternative travel options and reduce the need of car travel.

5.0 Traffic and Transport Impact Appraisal

5.1 Public transport impacts

At this time, the exact future public transport network is not known. Powderworks Road, Manor Road and Wattle Road in the precinct are proposed to be bus capable, enabling the entirety of the area including the school, the neighbourhood centre and the community facilities to be covered by bus services.

Recommendations with regard to public transport infrastructure / service improvements were made in the 2016 Transport and Traffic Assessment. With the dwellings now capped at about 980 new dwellings within the revised Rezoning Investigation Area, a review of the appropriateness of the recommendations is presented in **Table 5-1**.

Table 5-1 Review of proposed public transport provision

Infrastructure / service improvements	Responsibility	Review
Bus priority treatment at Mona Vale Road intersections with Samuel Street and Foley Street	TfNSW (as part of Mona Vale Road East upgrade)	Still valid and required
Enhanced bus services along Mona Vale Road	TfNSW	Still valid and required
Enhanced local services through Ingleside	TfNSW	Still valid and required
Improved bus stop facilities along Mona Vale Road	TfNSW (as part of Mona Vale Road East and West upgrades)	Still valid and required
New / upgraded bus stops on local roads	Developers / Council	Still valid and required

Source: Modified from AECOM, 2016

5.2 Active transport impacts

With footpaths proposed on both sides of all roads and a comprehensive bicycle network proposed, active transport can be one of the most convenient modes for short distance trips, especially those to the school, the neighbourhood centre and the community facilities.

Recommendations with regard to active transport infrastructure improvements were made in the 2016 Transport and Traffic Assessment. With the dwellings to be capped at about 980 new dwellings within the amended Rezoning Investigation Area, a review of the appropriateness of the recommendations is presented in **Table 5-2**.

Table 5-2 Review of proposed active transport provision

Infrastructure improvements	Responsibility	Review
Utility path alongside Mona Vale Road	TfNSW (as part of Mona Vale Road East and West upgrades)	Still valid and required
Off-road shared paths (collector roads)	Developers / Council	Still valid and required
Off-road shared paths (green corridors)	Developers / Council	Still valid and required

Source: Modified from AECOM, 2016

5.3 Road network impacts

Analysis of future year traffic performance with the 2016 Structure Plan – about 3,400 dwellings – was undertaken as part of the *Ingleside Precinct Transport and Traffic Assessment* (AECOM, 2016) and several recommendations made with regard to intersection upgrades to maintain satisfactory intersection performance.

With the dwellings to be capped at about 980 new dwellings within the revised Rezoning Investigation Area, a review of the recommendations was undertaken to confirm if they are still required. A summary is presented in **Table 5-3**. Upgrades at the following intersections are no longer considered to be required:

- Mona Vale Road | Chiltern Road: With the removal of any development north of Mona Vale Road, especially the neighbourhood centre that was planned at the Mona Vale Road | Chiltern Rd intersection, the upgrade of this intersection would no longer be required.
- Mona Vale Road | Lane Cove Road | Manor Road: Similarly, the realignment of Lane Cove Road was required to allow for the development of the neighbourhood centre north of Mona Vale Road, which is no longer proposed and so this upgrade is no longer required.
- Mona Vale Road | Pittwater Road: The traffic assessment for the Mona Vale Road West Upgrade project indicated that the Mona Vale Road / Pittwater Road intersection, under its current configuration, was forecast to operate with an acceptable LoS during the 2036 peak hours with a yield of about 3,500 dwellings in the Ingleside Precinct. The intersection should therefore operate even better with the significantly reduced yield in the Ingleside Precinct and the previous proposed upgrade would no longer be required.
- Chiltern Road | Neighbourhood Centre access road: The neighbourhood centre north of Mona Vale Road is no longer proposed and so this upgrade is no longer required.
- Lane Cove Road | Ingleside Road: With no development north of Mona Vale Road, this upgrade is not required.
- Lane Cove Road | View Road: With no development north of Mona Vale Road, this upgrade is not required.
- Cabbage Tree Road | Water Road: With no development north of Mona Vale Road, this upgrade is not required.
- Lane Cove Road | Neighbourhood Centre access road: The neighbourhood centre north of Mona Vale Road is no longer proposed and so this upgrade is no longer required.

Table 5-3 Review of proposed intersection upgrades

Intersection	Existing layout	Proposed upgrade	Review
Mona Vale Rd Powderworks Rd Baha'i Temple Way	4-arm signalised intersection	Realignment of Baha'i Temple Way to the 4-arm signalised intersection and upgrade of the Powderworks Road approach of the intersection	Still required and to be delivered under the Mona Vale Road West upgrade project (currently no funding and timing commitment by TfNSW)
Mona Vale Rd Chiltern Rd	3-arm seagull priority intersection	Right turn movements closed to form a 3-arm left in/ left out intersection	No longer required
Mona Vale Rd Lane Cove Rd Manor Rd	4-arm signalised intersection	Realignment of Lane Cove Road to the 4-arm signalised intersection	No longer required
Mona Vale Rd Pittwater Rd	3-arm signalised intersection	Extension of right turn bays on Pittwater Rd (150m) and Mona Vale Road (110m)	No longer required
Powderworks Rd Wattle Rd	4-arm priority intersection	Roundabout provided to facilitate access across Powderworks Road	Still valid and required
Powderworks Rd Wilson Ave	3-arm priority intersection	Roundabout provided to facilitate safer access to Wilga-Wilson	Still valid and required
Powderworks Rd Ingleside Rd	3-arm priority intersection	Roundabout provided to facilitate safer access to Ingleside Road	Still valid and required
Powderworks Rd Wilga St	3-arm priority intersection	Roundabout provided to facilitate safer access to Wilga-Wilson	Still valid and required
Powderworks Rd Garden St	3-arm signalised intersection	Extension/formalisation of left turn bays on Garden St and Powderworks Rd	Still valid and required

Intersection	Existing layout	Proposed upgrade	Review
Chiltern Rd Neighbourhood Centre access road	N/A	Roundabout provided to facilitate access to the proposed neighbourhood centre	No longer required
Lane Cove Rd Ingleside Rd	3-arm priority intersection	Roundabout provided to facilitate access across Lane Cove Road	No longer required
Lane Cove Rd View Rd	3-arm priority intersection	Roundabout provided to facilitate access across Lane Cove Road	No longer required
Cabbage Tree Rd Water Rd	4-arm priority intersection	Roundabout provided to facilitate safer access in all directions	No longer required
Lane Cove Rd Neighbourhood Centre access road	N/A	New intersection created because of the deviation of Lane Cove Road	No longer required

Source: Modified from AECOM, 2016

6.0 Summary and conclusions

6.1 Summary

Following an extensive review of the bushfire risk in the Ingleside Precinct, the 2016 Draft Structure Plan was significantly revised and the Rezoning Investigation Area is now focused on the area south of Mona Vale Road, with the area north of Mona Vale Road excluded from the investigation area. The Traffic and Transport Assessment to support the Rezoning Investigation Area has therefore been updated to reflect the reduced yield in the revised investigation area.

The proposed development in Ingleside Precinct is predominantly low and medium density residential dwellings, with a neighbourhood centre, a school and community facilities to serve local residents. Current projections estimate that about 980 new dwellings will be accommodated within the precinct.

The proposed transport network needs to cater for the travel characteristics of the proposed land uses and integrate appropriately with the surrounding network. The proposed transport network for the revised Rezoning Investigation Area, i.e. the precinct south of Mona Vale Road, remains the same as what was proposed in the 2016 Draft Structure Plan. The network aims to provide suitable facilities for people to walk, cycle, access public transport or use private cars, where appropriate. The following are the key features of the network to be provided:

- Access to the wider Sydney region is provided by Mona Vale Road with intersections at Powderworks Road and Manor Road, and access to the south is provided by Powderworks Road. Mona Vale Road remains as the high order urban arterial and Powderworks Road is the urban distributor / sub-arterial. Manor Road and Wattle Road are the major local roads / collectors, linking Mona Vale Road and Powderworks Road, and are supported by the other minor local roads that provide local access.
- Bus services along Mona Vale Road would be the main public transport provision to connect with Macquarie Park and Mona Vale that interchange with metro services and the B-Line respectively. Powderworks Road, Manor Road and Wattle Road will also be designed to accommodate buses to provide improved public transport accessibility to the precinct.
- A comprehensive walking and cycling network is proposed for the precinct, which will link the neighbourhood centre, school, and residential neighbourhoods with key strategic routes and onward destinations.

The 2016 Traffic and Transport Assessment proposed several transport responses and infrastructure upgrades, which, in conjunction with the Mona Vale Road upgrade project, would have accounted for the yield proposed in the 2016 Draft Structure Plan – about 3,400 dwellings – and so would more than accommodate for the currently proposed cap of about 980 new dwellings.

This updated Transport and Traffic Assessment has reviewed the validity of the proposed transport responses and infrastructure upgrades and recommended which responses are still required.

6.2 Conclusions

The significant reduction in the development yield and the extent of the revised Rezoning Investigation Area means there would be a reduced impact on the transport network and services compared to previously assessed.

The proposed transport network, along with the transport responses and infrastructure upgrades listed in **Table 6-1** and **Table 6-2**, would cater for the travel characteristics of the proposed precinct land uses and support integration with the surrounding network.

Table 6-1 Proposed transport infrastructure / service provisions

Mode	Infrastructure / service improvements	Responsibility
Public Transport	Bus priority treatment at Mona Vale Road intersections with Samuel Street and Foley Street	TfNSW (as part of Mona Vale Road East upgrade)
Public Transport	Enhanced bus services along Mona Vale Road	TfNSW
Public Transport	Enhanced local services through Ingleside	TfNSW
Public Transport	Improved bus stop facilities along Mona Vale Road	TfNSW (as part of Mona Vale Road East and West upgrades)

Mode	Infrastructure / service improvements	Responsibility
Public Transport	New / upgraded bus stops on local roads	Developers / Council
Active Transport	Utility path alongside Mona Vale Road	TfNSW (as part of Mona Vale Road East and West upgrades)
Active Transport	Off-road shared paths (collector roads)	Developers / Council
Active Transport	Off-road shared paths (green corridors)	Developers / Council

Table 6-2 Proposed intersection upgrades

Intersection	Existing layout	Proposed upgrade
Mona Vale Rd Powderworks Rd Baha'i Temple Way	4-arm signalised intersection	Realignment of Baha'i Temple Way to the 4-arm signalised intersection and upgrade of the Powderworks Road approach of the intersection to be delivered under the Mona Vale Road West upgrade project (currently no funding and timing commitment by TfNSW)
Powderworks Rd Wattle Rd	4-arm priority intersection	Roundabout provided to facilitate access across Powderworks Road
Powderworks Rd Wilson Ave	3-arm priority intersection	Roundabout provided to facilitate safer access to Wilga-Wilson
Powderworks Rd Ingleside Rd	3-arm priority intersection	Roundabout provided to facilitate safer access to Ingleside Road
Powderworks Rd Wilga St	3-arm priority intersection	Roundabout provided to facilitate safer access to Wilga-Wilson
Powderworks Rd Garden St	3-arm signalised intersection	Extension / formalisation of left turn bays on Garden St and Powderworks Road

