

Five Dock Precinct

Traffic and Transport Study



City of Canada Bay

20th January 2026



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Document Issue History

Report File Name	Version	Document Control		Date	Issued to
P6700.001R Five Dock Traffic and Transport Study	001	Prepared:	A. Hu / J. Yang	27/10/2025	Anthony Wynn Anthony.Wynn@canadabay.nsw.gov.au
		Reviewed:	M. Kimmins		
		Issued:	J. Yang		
P6700.002R Five Dock Traffic and Transport Study	002	Prepared:	A. Hu	20/01/2026	Anthony Wynn Anthony.Wynn@canadabay.nsw.gov.au
		Reviewed:	J. Yang		
		Issued:	J. Yang		

CONTENTS

Page

1. INTRODUCTION	1
1.1 Background	1
1.2 Scope of Work	1
2. MASTERPLAN VISION AND OBJECTIVES	2
2.1 Objectives	2
2.2 Precinct Vision	2
3. LITERATURE REVIEW	3
3.1 Five Dock Masterplan	3
3.2 Transit Oriented Development (TOD) Program	4
3.3 Parramatta Road Corridor Urban Transformation Strategy (2016)	4
3.4 City of Canada Bay PAMP – Final (July 2021)	5
3.5 Strategic Review of the Canada Bay Bike Plan (April 2014)	5
3.6 Sydney Metro West EIS	6
4. FIVE DOCK PRECINCT EXISTING CONDITIONS	9
4.1 Land Zoning	9
4.2 Key Attractors and Generators	10
4.3 Crash History	11
4.4 Pedestrian Network	12
4.5 Local Movement Strategy	13
4.6 Cycling Network	13
4.6.1 Cycling Routes	13
4.6.2 Cycling Infrastructure	15
4.7 Public Transport	16
4.8 Parking	18
4.8.1 On-street Parking	18
4.8.2 Off-street Parking Facilities	19
4.8.3 DCP Parking Controls	19
4.9 Site Visit	20
4.10 2024 Base Case SIDRA Model	21
4.10.1 Background Traffic Survey	21
4.10.2 Model Development	22
4.10.3 Model Performance Indicators	22
4.10.4 Intersection Performance Summary	22
4.10.5 Network Maps	25
4.11 Temporary One-way Road Arrangements	28
4.12 Summary of Existing Issues	28
5. MOVEMENT AND PLACE VISION	30
5.1 Overview	30
5.2 Five Dock Road Network Categorisation	32
5.3 Existing Design Issues and Solutions	33
5.3.1 Destination High Street	33
5.3.2 Urban Centre Streets	34
5.3.3 Connector Streets	35
5.3.4 Neighbourhood Streets and Yield Streets	36

5.3.5	Residential Ways, Residential Lanes, and Service Lanes	37
5.3.6	Civic Lane and Civic High Street	38
6.	FUTURE MASTERPLAN MODELLING	39
6.1	Modelled Scenarios	39
6.2	Future Traffic Demand Development	39
6.2.1	Metro Construction and Background Growth	40
6.2.2	Travel Zone Disaggregation and Route Choice	41
6.3	Future Model Intersection Performance Summary	42
6.3.1	Network Overview	42
6.3.2	2046 Future Base Case Outcomes	43
6.3.3	2046 Future Project Case Outcomes	45
7.	NETWORK UPGRADES MODELLING	47
7.1	Overview	47
7.2	Traffic Network Performance Issues	47
7.3	Masterplan Traffic Redirection	47
7.3.1	Great North Road / Henry Street / Barnstaple Road Signalisation	47
7.3.2	One-Way Restrictions	48
7.3.3	Rodd Road Closure	49
7.3.4	Kings Road Right-Turn Restriction	50
7.3.5	Harris Road Right-Turn Restriction	50
7.4	Road Network Upgrades – Full Upgrade Scenario	51
7.5	Road Network Upgrades – Balanced Upgrade Scenario	52
7.5.1	Proposed Upgrades	52
7.5.2	Great North Road near Garfield Street and Ramsay Road	53
7.5.3	Great North Road / Queens Road / Fairlight Street	54
7.5.4	Great North Road / Henry Street / Barnstaple Street	55
7.5.5	Great North Road / Lyons Road / Lyons Road West	57
7.5.6	Queens Road / Harris Road	58
7.5.7	Lyons Road West / Harris Road	59
7.6	Road Network Upgrades Traffic Performance	61
8.	TRANSPORT PLANNING INITIATIVES	64
8.1	Overview	64
8.2	Future Transport Mode Share	65
8.2.1	STM Mode Share Projections	65
8.2.2	Census Journey to Work Data	66
8.2.3	Target Mode Shares	67
8.3	Public Transport Initiatives	68
8.4	Active Transport Initiatives	69
8.4.1	General	69
8.4.2	Cycling Network	70
8.4.3	Summary	70
8.5	Traffic Calming Devices	72
8.6	Parking Policies	74
8.6.1	Overview	74
8.6.2	Development Car Parking Controls	74
8.6.3	Benchmark Council Areas – Car Parking Controls	74
8.6.4	Proposed DCP Parking Controls	75
8.6.5	Development Bicycle Parking Controls	75
8.6.6	On-Street Parking	75

8.7	Integrated Transport Strategy Maps	76
9.	CONCLUSION	80
9.1	Summary	80
9.2	Action Plan	80

Tables

Table 4.1:	Public Bus Routes - Frequencies
Table 4.2:	DCP Parking Provision Requirements – Five Dock
Table 4.3:	Level of Service Delay Thresholds
Table 4.4:	Overall Intersection Level of Service and Delays Comparison
Table 5.1:	Destination High Street Issues and Treatments
Table 5.2:	Urban Centre Street Issues and Treatments
Table 5.3:	Connector Street Issues and Treatments
Table 5.4:	Neighbourhood and Yield Street Issues and Treatments
Table 5.5:	Residential Ways, Residential Lanes, and Service Lane Issues and Treatments
Table 5.6:	Civic Lane and High Street Issues and Treatments
Table 6.1:	Modelled Scenarios
Table 6.2:	Population Growth by Masterplan TZ
Table 6.3:	Future Scenario Traffic Volume Growth
Table 6.4:	Future Scenarios Intersection Level of Service Comparison
Table 6.5:	Future Scenarios Intersection Degree of Saturation Comparison
Table 7.1:	Future Project Upgrades Intersection Level of Service Comparison
Table 7.2:	Future Project Upgrades Intersection Degree of Saturation Comparison
Table 8.1:	Future Transport Mode Share
Table 8.2:	Mode Share from 2016 Census
Table 8.3:	Mode Share Targets
Table 8.4:	LATM Treatment Types
Table 8.5:	DCP Car Parking Controls Benchmarking Comparison
Table 8.6:	Minimum Bicycle Parking and Storage Provision
Table 9.1:	Five Dock Precinct Traffic and Transport Action Plan

Figures

Figure 1.1:	Study Area
Figure 3.1:	Proposed Public Domain Plan
Figure 3.2:	Main and Secondary Routes
Figure 3.3:	Sydney Metro West – Project Concept
Figure 3.4:	Sydney Metro West – Five Dock Station Indicative Layout
Figure 4.1:	Land Zoning in Canada Bay LGA
Figure 4.2:	Pedestrian Attractors and Generators
Figure 4.3:	Precinct Crash History
Figure 4.4:	Existing Footpath Network
Figure 4.5:	Existing Pedestrian Crossing Points
Figure 4.6:	Cycling Route Network
Figure 4.7:	Cycling Infrastructure
Figure 4.8:	Existing Public Transport Network

Figure 4.9: Bus Stop Coverage

Figure 4.10: Typical Parking Controls

Figure 4.11: Off-Street Car Parks – Five Dock Precinct

Figure 4.12: Site Visit Photos

Figure 4.13: Key Intersections for Traffic Surveys

Figure 4.14: Network Performance Indicator Map - AM Peak

Figure 4.15: Network Performance Indicator Map - PM Peak

Figure 4.16: Network Performance Indicator Map - Weekend Peak

Figure 4.17: Existing Traffic and Transport Precinct Issues

Figure 5.1: Movement and Place Chart

Figure 5.2: Five Dock Design of Roads and Streets Categorisation

Figure 6.1: STFM Network

Figure 6.2: Travel Zones and Sections within Five Dock Precinct

Figure 6.3: Future Base Case – AM Peak: Approach Performance

Figure 6.4: Future Base Case – PM Peak: Approach Performance

Figure 6.5: Future Project Case – AM Peak: Approach Performance

Figure 6.6: Future Project Case – PM Peak: Approach Performance

Figure 7.1: Traffic Congestion and Pinch Points – 2046 Future Project Case

Figure 7.2: FDPS One-Way Traffic Redistribution

Figure 7.3: Rodd Road Closure Traffic Redistribution

Figure 7.4: Kings Road Right-Turn Restriction Traffic Redistribution

Figure 7.5: Recommended Full Road Upgrades and Changes

Figure 7.6: Recommended Balanced Road Upgrades and Changes

Figure 7.7: Great North Road near Garfield Street and Ramsay Road Upgrades

Figure 7.8: Great North Road / Queens Road / Fairlight Street Upgrades

Figure 7.9: Great North Road / Henry Street / Barnstaple Road Signals Diagram

Figure 7.10: Great North Road / Henry Street / Barnstaple Road Upgrades – Option 1

Figure 7.11: Great North Road / Henry Street / Barnstaple Road Upgrades – Option 2

Figure 7.12: Great North Road / Lyons Road Upgrades

Figure 7.13: Queens Road / Harris Road Upgrades

Figure 7.14: Lyons Road West / Harris Road Signals Diagram

Figure 7.15: Lyons Road West / Harris Road Upgrades

Figure 7.16: Future Project Balanced Upgrades Approach Performance – AM Peak

Figure 7.17: Future Project Balanced Upgrades Approach Performance – PM Peak

Figure 8.1: Targeted Transport Strategy Outcomes

Figure 8.2: Future Transport Mode Share

Figure 8.3: Distance to Place of Work by Transport Mode

Figure 8.4: Five Dock Precinct Public Transport Coverage

Figure 8.5: Masterplan Walking and Cycling Links

Figure 8.6: Proposed Crossing Facilities and Traffic Calming Devices

Figure 8.7: Existing Traffic Facilities in the Five Dock Precinct

Figure 8.8: Proposed Masterplan Traffic Facilities in the Five Dock Precinct

Figure 8.9: Proposed & Existing Masterplan Traffic Facilities in the Five Dock Precinct

1. INTRODUCTION

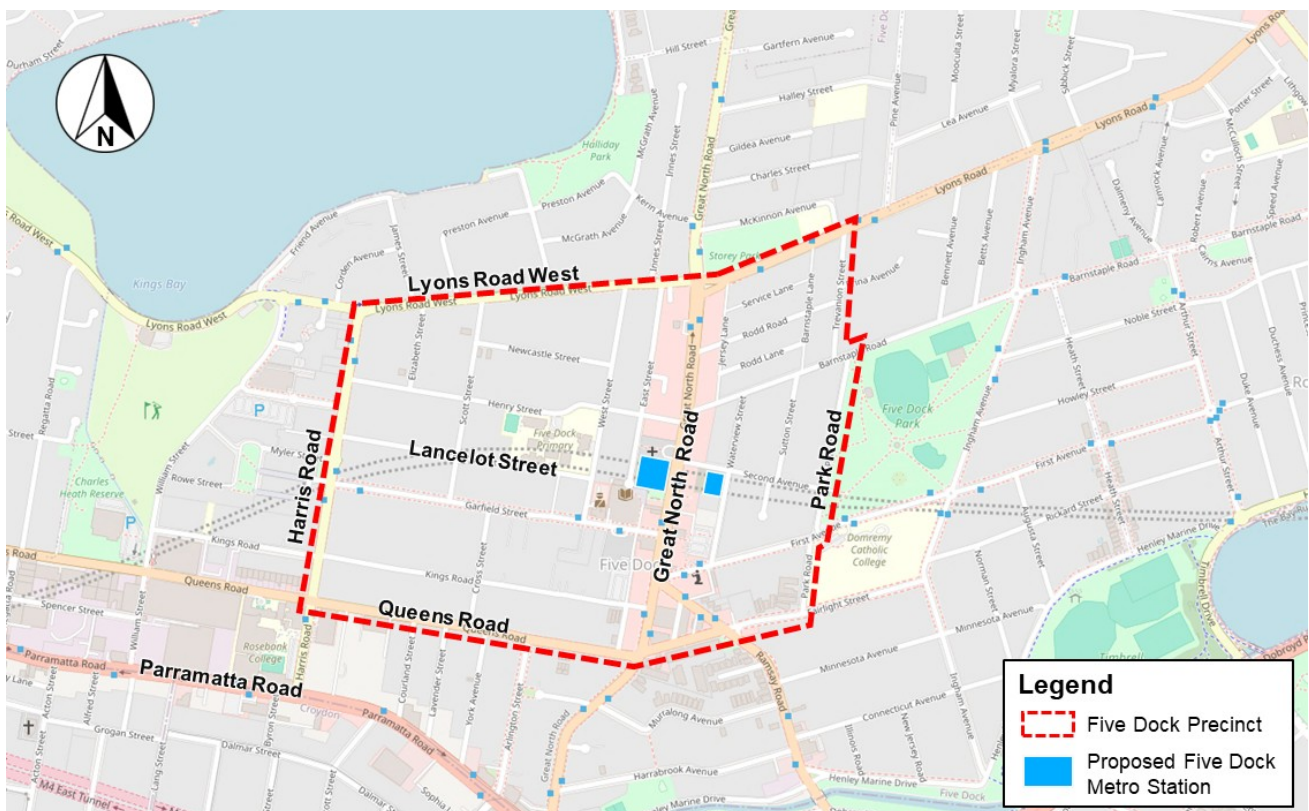
1.1 Background

The development of the Sydney Metro West line and subsequent construction of the Five Dock station has created new opportunities for the revitalisation of the nearby town centre and surrounding area. Specifically, this has brought increased support for medium to high density residential developments in vicinity of the new Metro station. The City of Canada Bay is currently developing the Five Dock Precinct Masterplan to define the urban densities and road hierarchies associated with the development areas of the precinct.

The Five Dock Precinct is defined as the region centred around the Five Dock town centre along Great North Road, bounded by Queens Road, Harris Road, Lyons Road, and Park Road.

City of Canada Bay Council (Council) has engaged Bitzios Consulting to undertake a Traffic and Transport Study (TTS) to understand the overall traffic and transport impacts due to associated increased development outlined within the Masterplan.

The extents of the study area are shown in Figure 1.1.



Adapted from OpenStreetMap

Figure 1.1: Study Area

1.2 Scope of Work

Our scope of work for this study has been split into 3 stages, including:

- Stage 1: Inception and Situational Assessment
- Stage 2: Traffic and Transport Scenarios Assessment
- Stage 3: Strategies Finalisation and Reporting.

2. MASTERPLAN VISION AND OBJECTIVES

2.1 Objectives

The primary aim of the Masterplan from a traffic and transport perspective is to support the introduction of the new Metro station through the provision of high-density residential development within the surrounding catchment. This principle is then further enhanced via improvements to active and public transport network connections to/from the transport hub, accentuated with road and public space upgrades to accommodate the changes to the Five Dock Precinct.

The TTS recognises the multi-faceted and developing nature of the transport context in the study area, with the significant growth in population associated with the Masterplan requiring commensurate improvements to public and active transport facilities to offset an over-reliance on private car usage. It aims to guide the expansion of the local transport network via new links to regional routes. At the same time, the confluence of increased car, cycling, and pedestrian activity will manifest new considerations for road and pedestrian safety, the impacts of which must be assessed and ameliorated.

2.2 Precinct Vision

The key elements of the Masterplan precinct vision relating to transport include:

- The establishment of a clear street hierarchy and improvements to the road network, including new laneways and enhancements to the active transport network connecting locally and to the regional cycling network
- The formation of new smaller street blocks within the precinct to improve local connectivity, particularly for better active transport access and movement
- The facilitation of new and improved footpaths, road and cycling infrastructure via the widening of key roadways to ensure the built form is capable of accommodating the future population growth
- The introduction of traffic calming measures to define and control slower moving local catchments as a means of enhancing active transport access along existing links and providing improved safety outcomes
- The widening of road reserves in key locations to provide sufficient width for traffic lanes, footpaths, street trees and where needed, cycleways and street parking to support the future population and increased pedestrian and traffic numbers
- The concentration of new population density within a close walking distance of the Metro station and town centre
- The expansion of Fred Kelly Place across Great North Road to provide a central public space for people.

3. LITERATURE REVIEW

3.1 Five Dock Masterplan

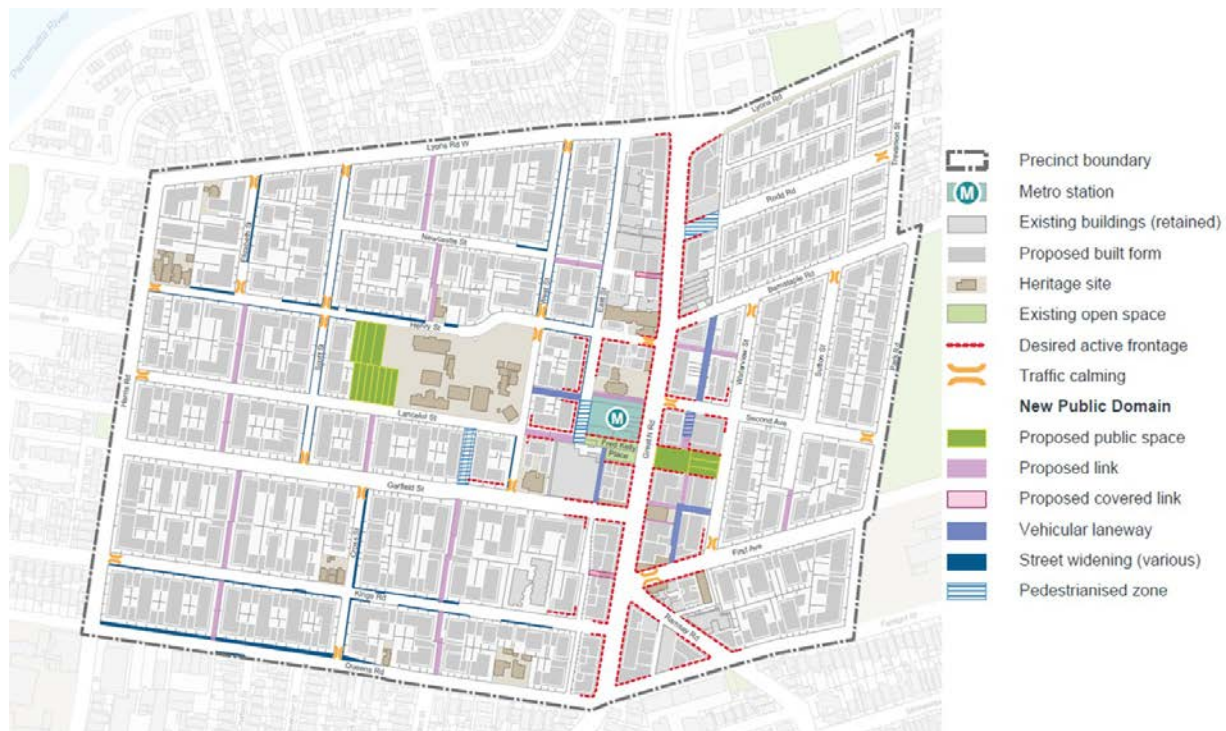
The Five Dock Masterplan was prepared for Council by Studio GL. The Masterplan is a continuation of Council's extensive planning work for exploring the delivery of additional housing and dwelling density in Five Dock, particularly in light of the recent State Government mechanisms to increase housing supply near major destinations. The Five Dock Metro Station is one such major destination, with an expected opening year of 2032.

The Masterplan builds upon the Council's previous planning studies to address the housing shortage crisis and provide better public amenities for future residents with improved urban design and public domain (e.g. improved connections and streetscapes, new links, new and expanded public spaces).

Key aspects of the future vision outlined in the Masterplan include the following:

- Providing a total 14,000 new dwellings and 31,000 population in the Precinct area
- Maintaining Great North Road as the high street and precinct spine, with mixed-use built form typically up to 12 storeys high
- Strengthening the Fred Kelly Place as the centre of the town centre by expanding it to the north and east across Great North Road
- Enhancing and providing active transport routes along Henry Street, Queens Road and Lancelot Street
- Exploring new laneways and pedestrian links across the Precinct to facilitate greater permeability for better access and connectivity
- Providing wider roads for improved usability and access for pedestrians and cyclists
- Implementing a traffic calming scheme across the local streets of the Precinct to produce a self-regulating slower speed environment.

An overall map of the public domain plan is shown in Figure 3.1.



Source: Draft Five Dock Masterplan

Figure 3.1: Proposed Public Domain Plan

3.2 Transit Oriented Development (TOD) Program

The Transit Oriented Development (TOD) Program is a recent land use planning approach which outlines the NSW State Government's plan to deliver more housing around 8 accelerated precincts and 31 additional precincts over the next 15 years. This program is a part of the NSW State Government's aim to address the housing crisis by delivering more high quality and well-located homes and ultimately increase access to transport, community services and open spaces. The program would help control urban growth by reducing urban sprawl and realise the potential of existing public transport infrastructure so that residents are closer to jobs and attractive places. The program comprises two parts, as summarised below.

Part 1 of the document came into effect in late November 2024 and acts to rezone areas within 1200m of the transport hubs for the 8 accelerated precincts. State Significant Developments (SSDs) submitted for housing development will be submitted via a new assessment pathway for faster approval. In support of this, NSW State Government has committed funding for improved infrastructure (road upgrades, links, spaces). It has the potential to realise the development of 47,800 new homes.

Part 2 of the program began in April 2024 and aims to enhance and supplement existing housing infrastructure located within 400m of the 37 stations. Part 2 is being implemented through a new State Environmental Planning Policy (SEPP) which will increase mid-rise housing and mixed-use land zones for affected areas.

The Five Dock Precinct was not targeted by either of the planning programs; however, it is noted to be in relative close proximity to the Homebush Accelerated Precinct and the North Strathfield Metro and Ashfield TOD areas. It is therefore important from a planning perspective to consider the potential implications of the TOD principles in application to the Five Dock Precinct.

3.3 Parramatta Road Corridor Urban Transformation Strategy (2016)

The Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) was prepared by UrbanGrowth NSW in 2016, outlining a vision to revitalise the Parramatta Road Corridor and bordering local communities over the next 30 years. The corridor stretches 20km along Parramatta Road from Granville to Camperdown.

The Strategy aims to support Sydney's growth by making the region along the corridor a more attractive place to live, work and visit. Specifically, the Strategy supports the additional 56,000 residents anticipated to live on the corridor with 27,000 homes and 50,000 jobs.

The long-term vision and framework outlines improved transport choices, better amenity and balanced growth of houses and jobs. For the purposes of assessment, the Corridor is divided into two sections, **West** and **East** sides, and further divided into 8 precincts identified as focus areas for renewal across 7 LGAs, as summarised below:

- **West (2):** Granville, Auburn
- **East (6):** Homebush, Burwood-Concord, Kings Bay, Taverners Hill, Leichhardt & Camperdown.

Additionally, frame areas have been identified as areas between the precinct areas. It should be noted that the strategy assesses the corridor with a holistic approach, where urban transformation is considered for the corridor as a whole (i.e. the precincts and frame areas combined).

As part of the strategy, the following 7 land-use and transport principles have been identified:

- Housing choice and affordability
- Diverse and resilient economy
- Accessible and connected
- Vibrant community spaces
- Green spaces and links
- Sustainability and resilience
- Delivery.

Furthermore, the following 4 key strategic actions were identified to assist with the delivery of the strategy:

- Land uses
- Placing making
- Transport and movement and open space
- Linkages and connections.

It should be noted that the transport-related actions aimed to reinforce key movement function of existing road corridors as well as capitalise on the existing reliability and frequency of public transport services. These actions also aimed to ultimately reduce car dependency with the delivery of better public and active transport infrastructure. As part of the implementation of strategy, the actions were divided into short-term (2016 to 2023), medium-term (2023-2036) and long-term (2036-2050).

3.4 City of Canada Bay PAMP – Final (July 2021)

A Pedestrian Access and Mobility Plan (PAMP) was prepared by GHD for Council in July 2021. The document aimed to review pedestrian needs and infrastructure to guide and improve pedestrian infrastructure for Council. The PAMP would also help to identify infrastructure works to improve safety, greater walking mode share and better local amenities.

The PAMP identified the most common issues to be poor quality or missing pedestrian infrastructure. Specifically, issues and constraints identified a total of 347 issues across the LGA with the majority of them related to narrow footpaths, kerb ramps, missing bus stop landing pad and missing links.

While the PAMP was an LGA-wide plan it excluded specific areas which were addressed as part of future plans, e.g. Rhodes, Parramatta Road and future proposed Sydney Metro West stations. Furthermore, it excluded an audit assessing footpath conditions, as that was conducted by Council.

Pedestrian routes were identified and scored based on pedestrian demand and proximity to key attractors and generators. Issues identified along these routes were analysed and addressed with the various upgrades. These works ranged from a list of 17 potential pedestrian infrastructure initiatives. The PAMP identified high, medium, and low priority works with high priority works including:

- Further investigation and concept planning: Concord Road / Mary Street car park intersection
- Footpath works for improved pedestrian safety with 31 missing links specifically identified
- Upgrades to provide for safer crossing opportunities.

The PAMP also recommended an audit of kerb ramps be conducted to identify missing and non-compliant kerb ramps to complement Council's footpath condition audit.

3.5 Strategic Review of the Canada Bay Bike Plan (April 2014)

A strategic review of the 2005 Bike City of Canada Bay Bike Plan was undertaken by Transport & Urban Planning in April 2014. The review rationalised the existing bike route network and developed a priority list of works to improve and expand the bike network. As part of the rationalisation, the previous 34 routes and 4 route types were simplified into 24 routes and 2 categories. As a result, the review identified 7 main routes and 17 secondary routes. Main routes were identified as routes connecting several destinations which spanned across the LGA. These routes were identified as the main source of funding allocation. Secondary routes were identified as generally short routes which provided connection between main routes and/or to single destinations.

The priority list categorised works into the following:

- Short-term (within 4 years): 10 routes (20 priority works)
- Medium-term (within 5-10 years): 9 routes (15 priority works and 8 minor works)
- Long-term (more than 10 years): 5 routes.

Other key findings of the review included that the analysis of the crash data revealed the need to improve cycling safety at roundabouts, as well as, that contemporary projects at the time of the report's development (e.g. the Westconnex and Homebush Bay Bridge) were identified as opportunities for new cycling facilities in response to consultation processes of those projects.

A map of the main and secondary routes is shown in Figure 3.2. Within the Five Dock Precinct, the identified routes include a main route along Queens Road and a secondary route along Henry Street and Barnstaple Road.



Source: Strategic Review of Canada Bay Bike Plan (GHD, 03/11/2014), Figure 3

Figure 3.2: Main and Secondary Routes

3.6 Sydney Metro West EIS

An Environmental Impact Statement (EIS) for the project concept of the Sydney Metro West was prepared by Arcadis in April 2020. The project proposes a new 24km-long metro line from Westmead to Sydney CBD and provide a fast and efficient services. It is anticipated that to provide better transport for the additional 420,000 new residents and 300,000 new workers forecasted along the corridor in the next 20 years.

The project is part of the integrated transport system for the wider Sydney Metro program:

- Sydney Metro North West – opened in 2019
- Sydney Metro City & Southwest – began in 2024
- Sydney Metro West – under construction
- Sydney Metro – Western Sydney Airport – under construction.

The stated objectives of the Sydney Metro West corridor include the following:

- Realising the vision of Metropolis of Three Cities including the 30-minute city
- Supporting additional housing supply and employment growth opportunities and urban renewal initiatives
- Achieve customer outcomes such as increasing rail capacity, shorter travel times, greater rail patronage, and relieving congestion on rail, bus and road corridors.

In addition to achieving shorter travel times, the project is expected to link new communities with rail services and support employment growth and housing supply. Effectively, it will be doubling rail capacity between Parramatta and the CBD.

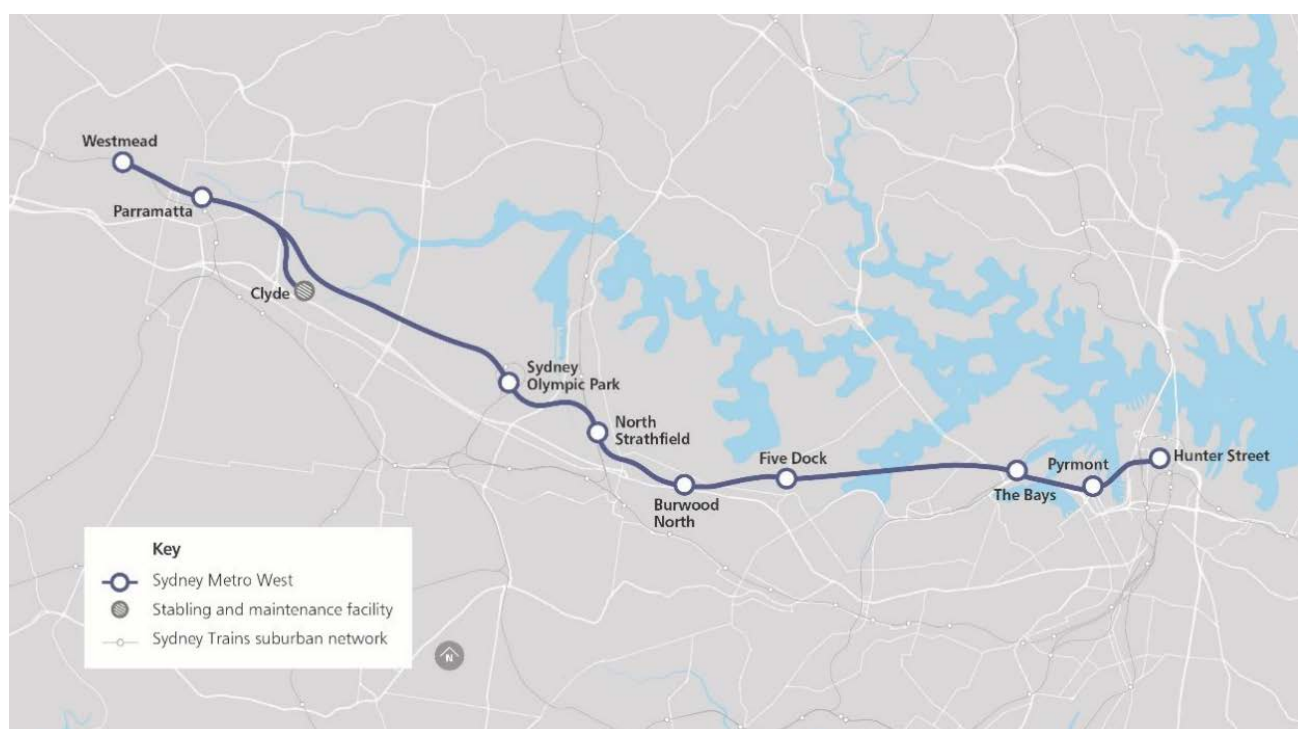
The Sydney Metro West includes the construction of new stations at 9 locations: Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays and Sydney CBD. The proposed alignment of the railway is shown in Figure 3.3.

The Five Dock Station design aims to support integrated multi-modal connectivity, providing convenient transitions between bus, cycling, and walking and reinforcing Council's vision to revitalise the Five Dock town centre. This would also support mode shift from private vehicles to public transport, reducing traffic volumes and parking demand while improving overall mobility and accessibility within the precinct.

The proposed station would consist of a single entrance fronting Fred Kelly Place, supported by bus stops on Great North Road, kiss-and-ride spaces on Second Avenue, Waterview Street, and Garfield Street. Accessible kiss-and-ride spaces would be provided on East Street.

The indicative site layout is shown in Figure 3.4.

The EIS forecasts around 2000 embarking and 520 disembarking passengers in the AM peak hour by 2036, with passengers accessing the station primarily through walking (42%) and bus (32%). Park-and-ride accounts for around 7% of the passenger projections.



Source: Sydney Metro West - Parramatta Over and Adjacent Station Development - Environmental Impact Statement | November 2022, Figure 1-1

Figure 3.3: Sydney Metro West – Project Concept

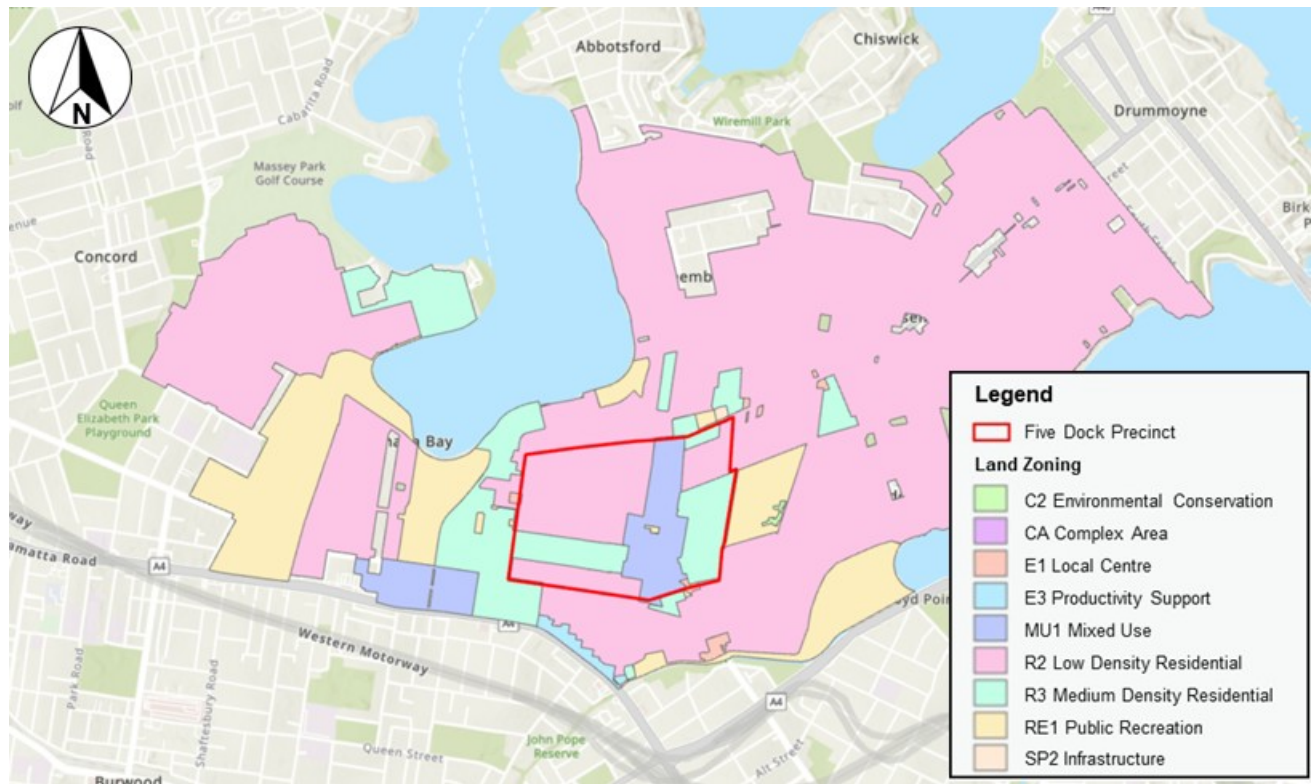


Source: Sydney Metro West Environmental Impact Statement | Rail infrastructure, stations, precincts and operations, Figure 12-5
Figure 3.4: Sydney Metro West – Five Dock Station Indicative Layout

4. FIVE DOCK PRECINCT EXISTING CONDITIONS

4.1 Land Zoning

A map of the current land zoning for the City of Canada Bay LGA is shown in Figure 4.1.



Source: ArcGIS

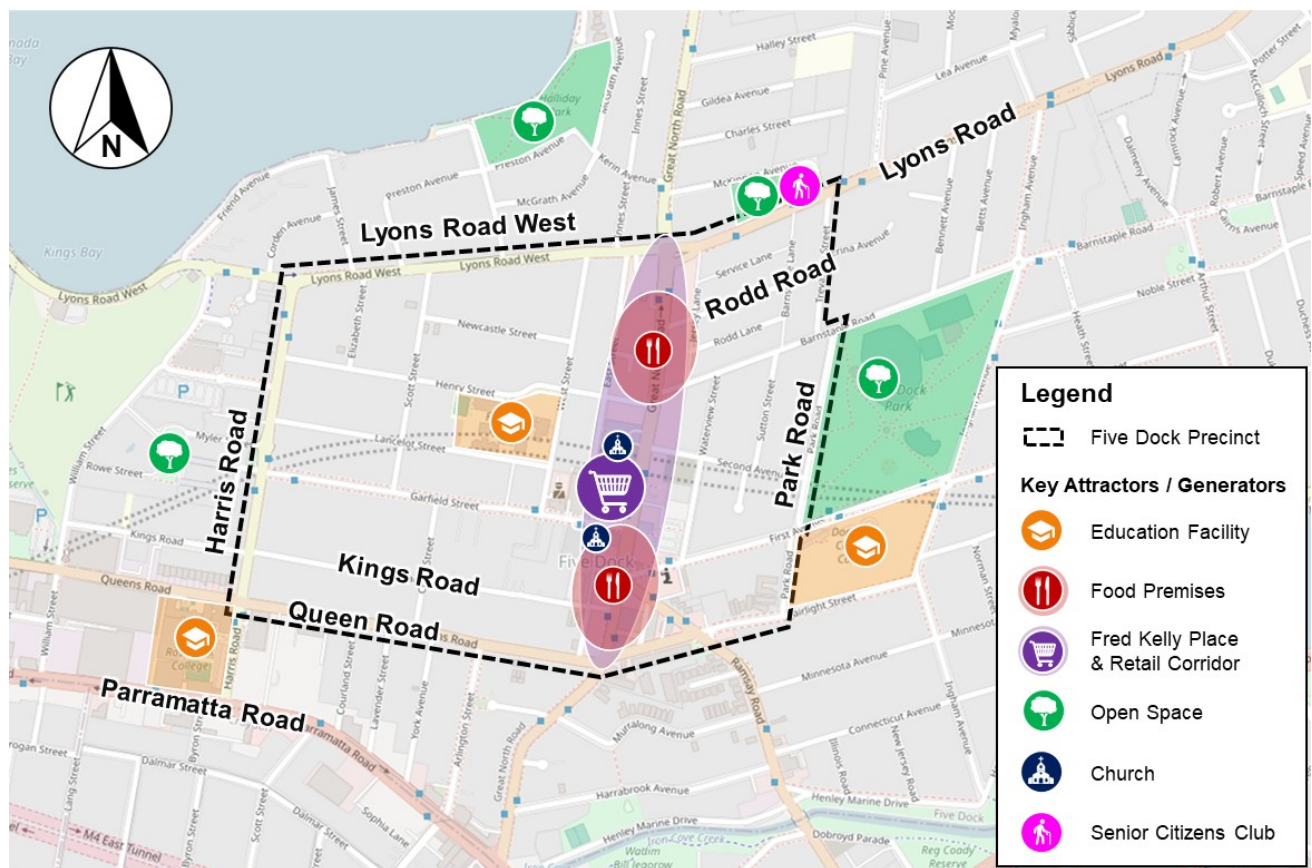
Figure 4.1: Land Zoning in Canada Bay LGA

The Five Dock Precinct is characterised by the key mixed-use corridor along Great North Road, which is surrounded by and services a large residential catchment to the north and east. It is noted that within the Canada Bay LGA, Five Dock is one of the only retail and commercial precincts, with only isolated pockets away from the main corridor (with the exception of Productivity Support land along Parramatta Road).

4.2 Key Attractors and Generators

Within the Five Dock Precinct, the services and facilities along Great North Road form the main attractions for local residents and visitors to the area. Along the Great North Road high street, there are food outlets (e.g. cafes, restaurants and bakeries) and retail/commercial services. These are concentrated in north and south sub-areas around the First Avenue intersection and Rodd Road intersection. There are also multiple schools and open spaces nearby, generally around the border of the Five Dock Precinct.

The key pedestrian generators and attractors at a more focused level within Five Dock are provided in Figure 4.2.



Adapted from OpenStreetMap

Figure 4.2: Pedestrian Attractors and Generators

4.3 Crash History

A map of the available crash data for the last 5-year period between 2019 and 2023 is shown in Figure 4.3.

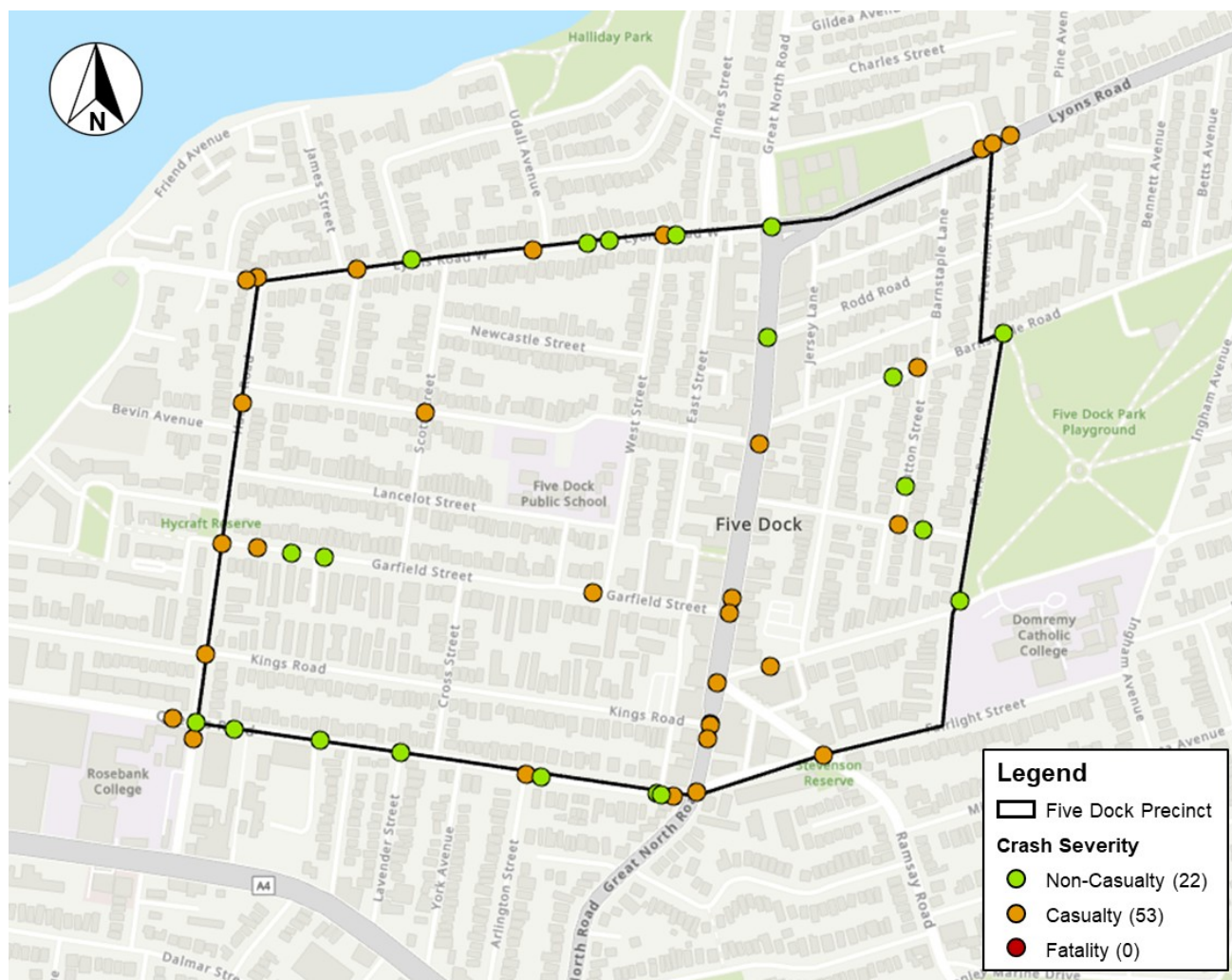


Figure 4.3: Precinct Crash History

The data shows a total of 75 crashes across the Precinct during this period, including:

- 22 non-casualty crashes (29%)
- 54 casualty crashes (71%)
- No fatalities.

Of these crashes, 22 crashes (29%) involved a vulnerable road user (pedestrians, cyclists and motorcyclists). It is noted that there is a higher frequency of vulnerable road user crashes on Great North Road near First Avenue and Garfield Street, as well as on the western end of Garfield Street near Harris Road and along Queens Road.

52 of the crashes occurred on the main roads through the Precinct, being the State and Regional roads of Harris Road, Queens Road, Lyons Road W and Great North Road.

It is noted that the casualty rate for crashes in this area is notably high, revealing an opportunity to improve overall road safety via the reduction of crash severity through measures like reduced speeds and new infrastructure.

4.4 Pedestrian Network

A cohesive footpath network is provided across Five Dock with footpaths provided on both sides of nearly all roads within the Precinct. A map of the existing footpath network is shown in Figure 4.4.

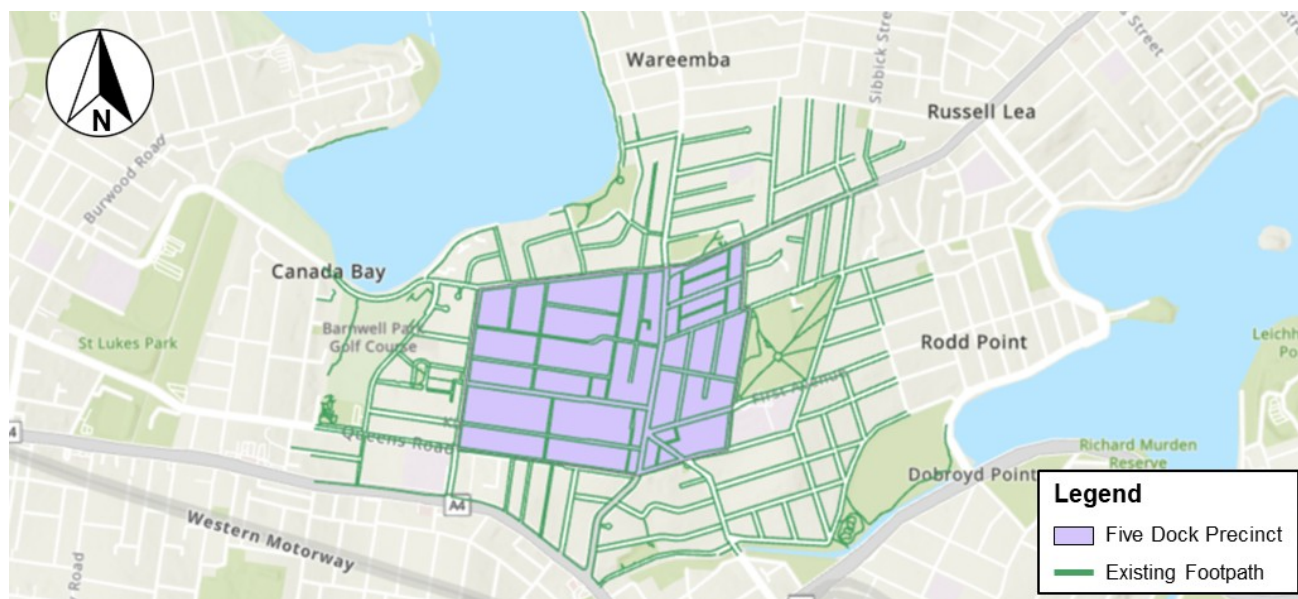


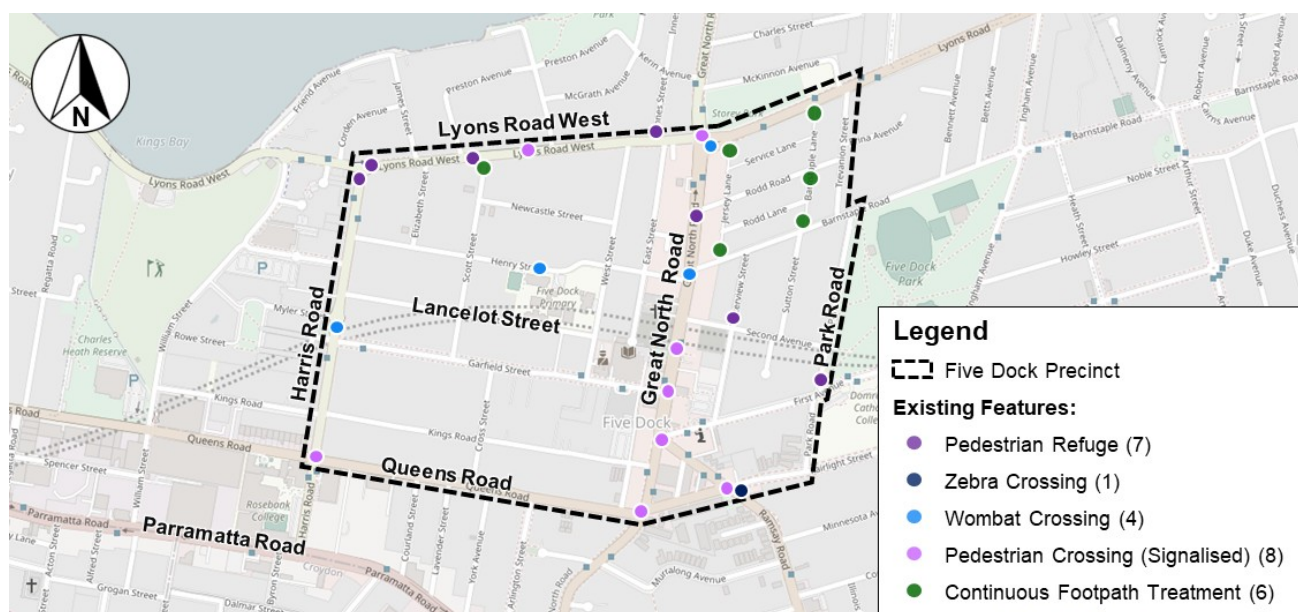
Figure 4.4: Existing Footpath Network

There are also a number of existing crossing facilities within the Five Dock Precinct. Dedicated pedestrian facilities are provided along major roads such as the Great North Road, Harris Road and Lyons Road West, ranging refuge islands to signalised crossings.

All major intersections generally feature crossing facilities on all approaches, except at the following locations:

- Lyons Road West / Harris Road roundabout: No refuge island on the west leg
- Great North Road / Fairlight Street signalised intersection: No crossing on the south leg.

A map of the existing crossing facilities within Five Dock Precinct is shown in Figure 4.5.



Adapted from OpenStreetMap

Figure 4.5: Existing Pedestrian Crossing Points

4.5 Local Movement Strategy

A Local Movement Strategy for Council was prepared by GTA Consultants in November 2019. The Strategy aimed to assist Council in developing a Local Strategic Planning Statement outlining a 20-year vision for the management of future land use changes. The local strategic planning statement outlined the following 9 key vision statements:

- Create great streets, places and buildings for people
- Plan for a diversity of housing types and affordability
- Protect and enhance local character
- Connect neighbourhoods and centres
- Align growth with the delivery of Infrastructure
- Ensure Sydney West Metro delivers “density done well”
- Improve access to the Parramatta River foreshore
- Facilitate sustainable development and renewal
- Increase biodiversity and the urban tree canopy.

As part of the development of the strategy, issues and opportunities for various travel modes were identified. The active transport network was identified as lacking key links and crossing opportunities. The safe movement of pedestrians and cyclists required infrastructure upgrades (i.e. sufficiently wide footpaths and separated facilities). Traffic congestion was highlighted as a key issue affecting bus and car modes with low travel speeds, bus travel time reliability and blocked road accesses. Other issues identified included inadequate infrastructure, resulting in poor access to bus stops, high on-street parking demand, and overcrowded train stations.

Actions were identified and prioritised into short-term (within 3 years), medium-term (within 5 years) and long-term to assist in addressing issues related to following

- Active transport
- Public transport
- Road, parking and freight
- Travel demand management
- Land use.

4.6 Cycling Network

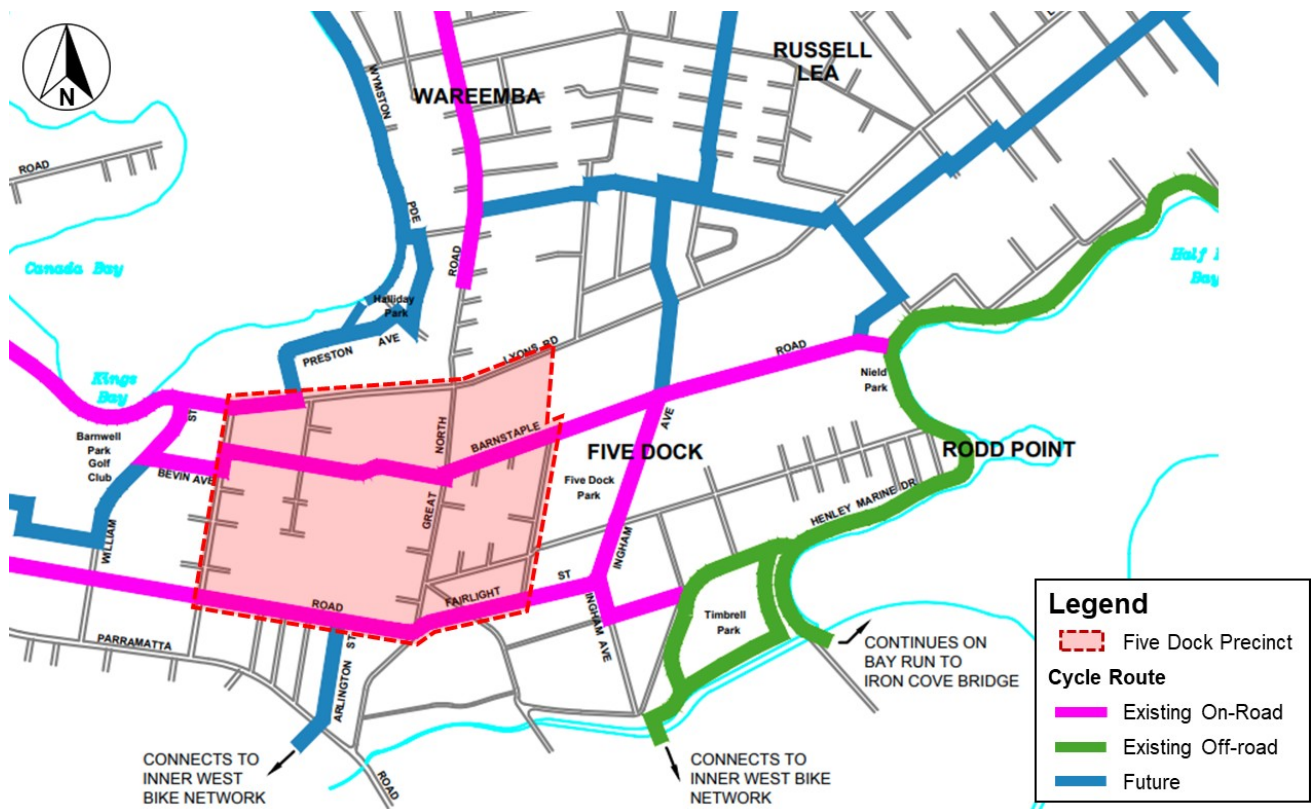
4.6.1 Cycling Routes

A summary of Canada Bay’s existing and future cycling routes across Five Dock is shown in Figure 4.6. Future routes were identified as part of the Strategic Review of the Canada Bay Bike Plan.

Within the Five Dock Precinct, cycling routes are noted to be primarily on-road routes in the east-west direction:

- *Meadowbank – Sydney Olympic Park* route
- *Kings Bay – The Bay Run* route
- The *River Run* route runs through the north-western corner of the precinct.

There is no north-south cycling connectivity through the Precinct.



Source: Interim Bike Network Map (City of Canada Bay, 08/01/2019)

Figure 4.6: Cycling Route Network

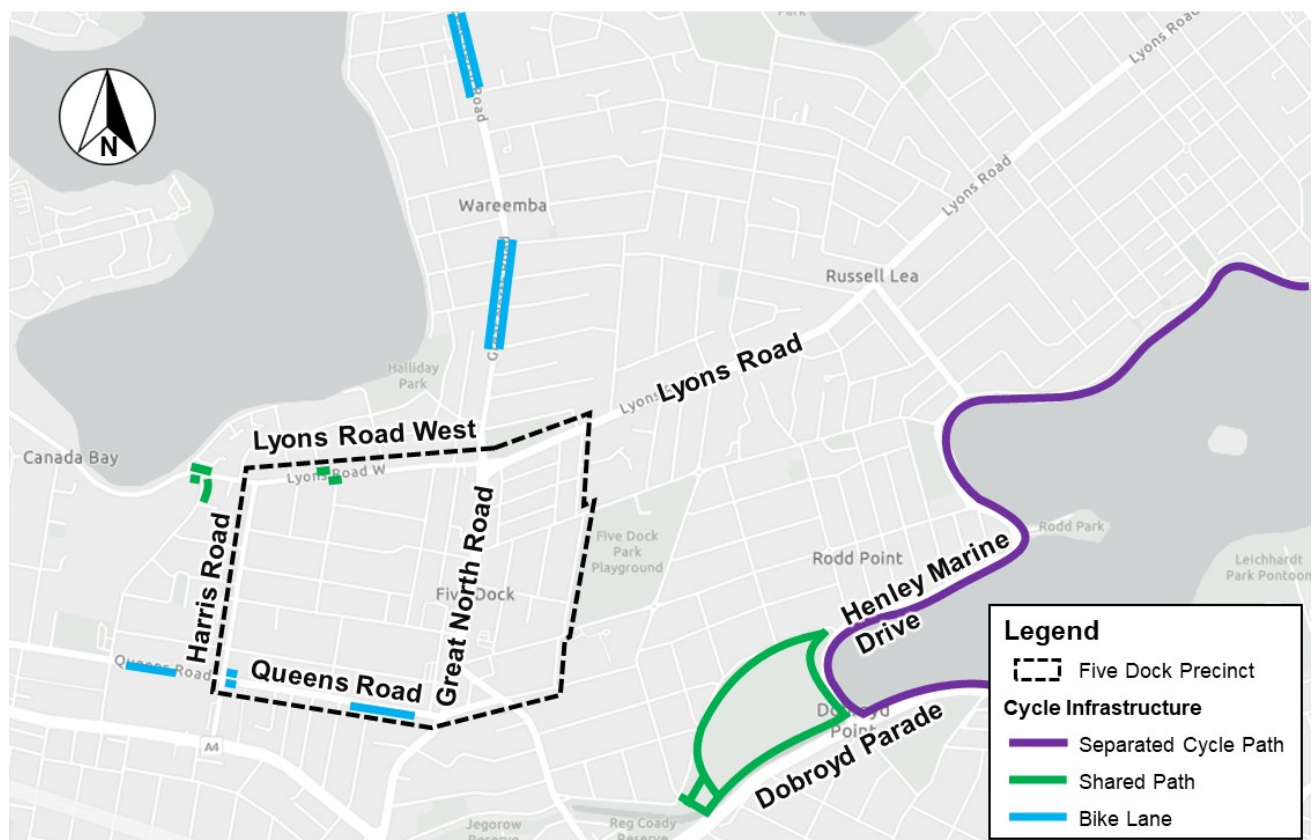
4.6.2 Cycling Infrastructure

Cycling infrastructure provided is limited across the Five Dock with on-road infrastructure mainly comprising of bicycle symbols on the road pavement. However, short sections of separated on-road bike lanes are provided along Queens Road and Great North Road. Additionally, there are short sections of shared path provided near the intersections of Lyons Road West with Scott Street and Preston Avenue.

Outside of the focus area, most of the existing cycling infrastructure is concentrated along Henley Marine Drive where an extensive separated off-street cycle path is provided.

The existing infrastructure is therefore noted to be sporadic and isolated in nature, with limited active transport connectivity through the Precinct.

A map of the cycling infrastructure within and surrounding the Precinct is shown in Figure 4.7.



Adapted from NSW Road Network Classifications Basemap

Figure 4.7: Cycling Infrastructure

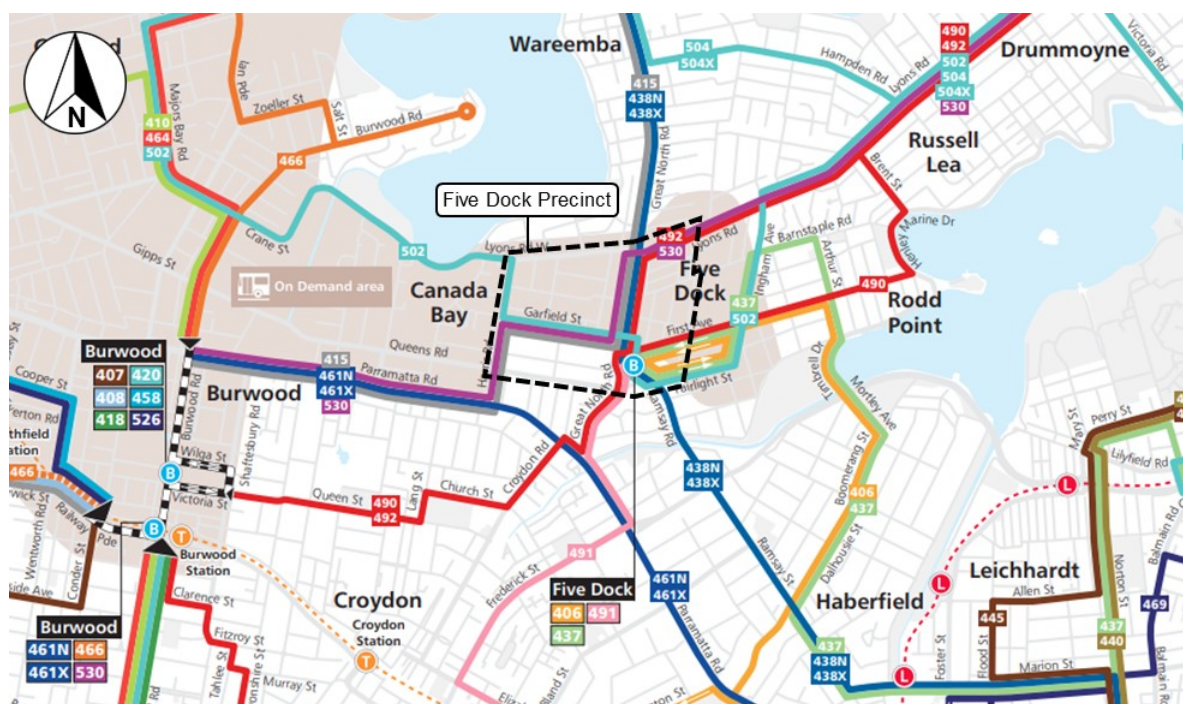
4.7 Public Transport

The existing public transport network within Five Dock is primarily limited to the public bus services. A summary of stop frequencies for each bus route across the Five Dock Precinct is outlined in Table 4.1. The public bus routes servicing the Five Dock Precinct generally have a frequency of up to 30 minutes during the weekdays.

Table 4.1: Public Bus Routes - Frequencies

Route No.	Description	Weekday Frequency	Weekend Frequency
406	Five Dock to Hurlstone Park	30 min	75 min
491	Hurstville to Five Dock	30 min 15-25 min (AM Peak)	30 min (Sat) 60 min (Sun, Public Holiday)
437	Five Dock to City QVB via City West Link	15 min 10 min (Peak)	20 min
438x	Abbotsford to City Martin Place (Express Service)	10 min 5-8min (PM Peak)	10 min
415	Campsie to Chiswick	30 min 15-20 min (Peak)	30 min (Sat) 60 min (Sun, Public holiday)
461x	Burwood to City Domain (Express Service)	15 min 10 min (Peak)	15 min
530	Burwood to Chatswood	30 min 20 min (Peak)	30 min
502	Cabarita Wharf to Drummoyne and City Town Hall	30 min 10-15 min (Peak)	30 min
492	Rockdale to Drummoyne	30 min 10-15 min (Peak)	30 min
490	Hurstville to Drummoyne	30 min	30 min (Sat) 60 min (Sun, Public Holiday)

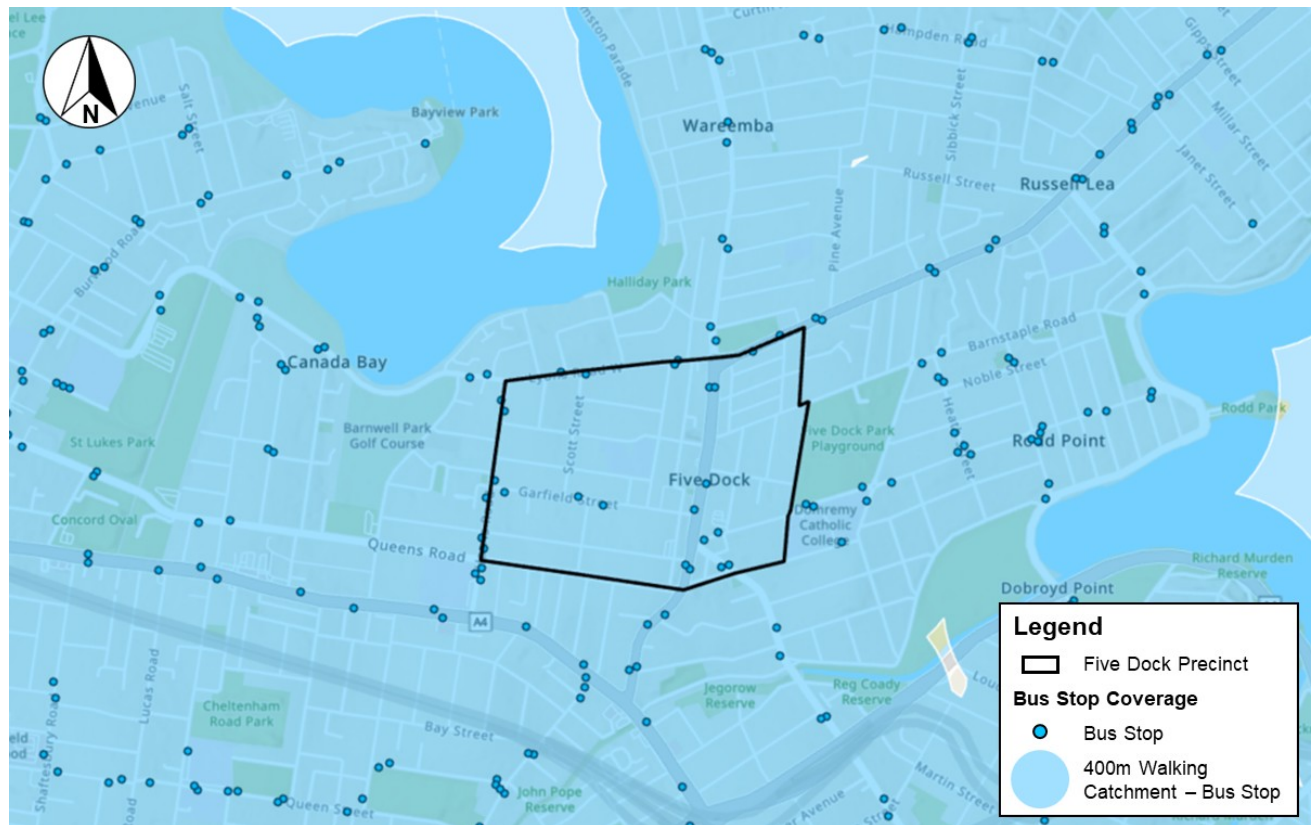
The bus route coverage across Five Dock is mapped in Figure 4.8.



Source: Inner West and Southern Region Network (Transport for NSW, 10 December 2023)

Figure 4.8: Existing Public Transport Network

The bus stop coverage for a 400m walking catchment area is shown in Figure 4.9. Generally, all of Canada Bay is well within the 400m walking distance (i.e. 5-minute walk) of a public bus stop, including the entirety of the Five Dock Precinct.



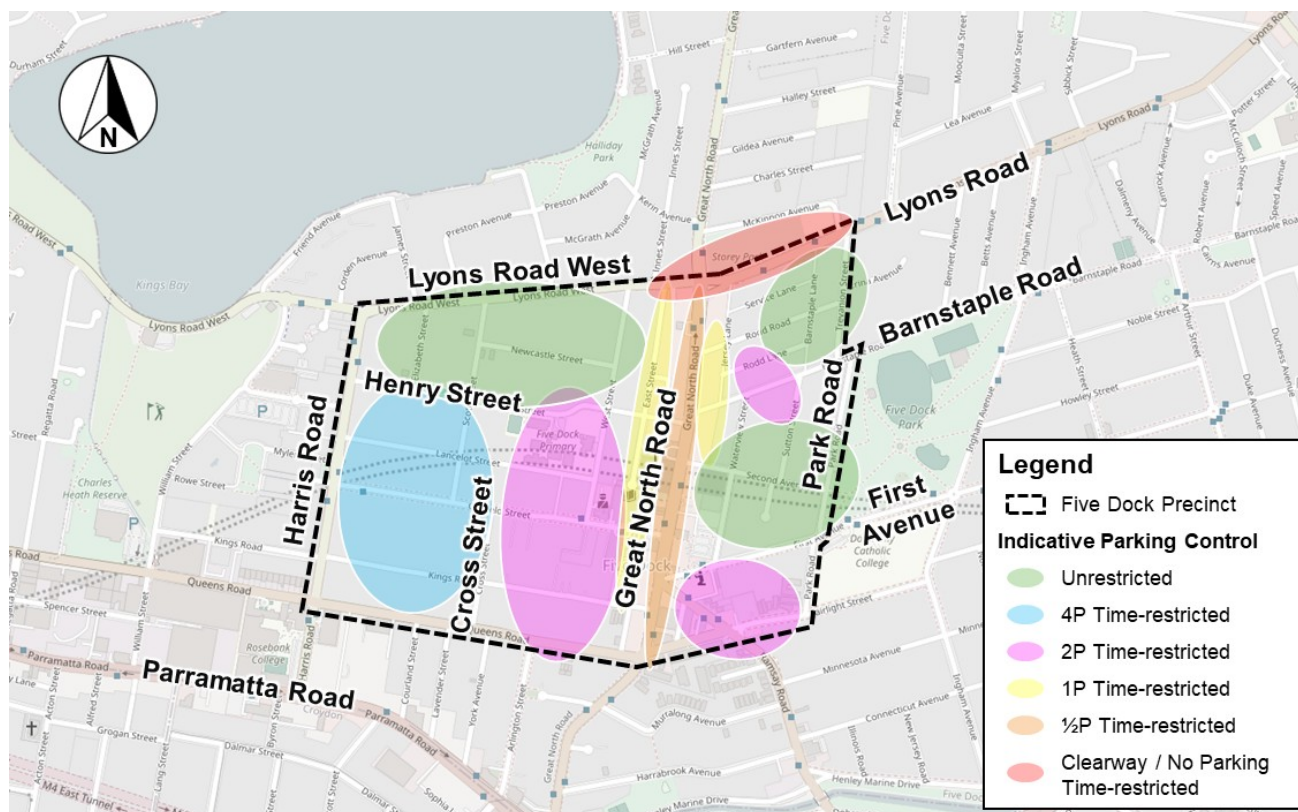
Created in ArcGIS

Figure 4.9: Bus Stop Coverage

4.8 Parking

4.8.1 On-street Parking

Public parking within the Five Dock Precinct mainly comprises of on-street kerbside parking with varying time restrictions as shown approximately in Figure 4.10.



Adapted from OpenStreetMap

Figure 4.10: Typical Parking Controls

On-street parking restrictions within the Five Dock Precinct can typically be categorised into 5 types of parking controls:

- ½ hour
- 1 hour
- 2 hours
- 4 hours
- Unrestricted.

It should be noted that the limited-hour parking controls (e.g. 1 hour, 2 hours, etc.) are usually restricted for the periods 8:30AM-6:00PM Monday to Friday and 8:30AM-12:30PM Saturday, with unrestricted parking outside of these hours.

Great North Road is typically controlled with ½ hour time-restricted parking, with the duration of the limited-hour parking control progressively increasing to 1 hour, 2 hours and then eventually 4 hours or unlimited hours further away from Great North Road.

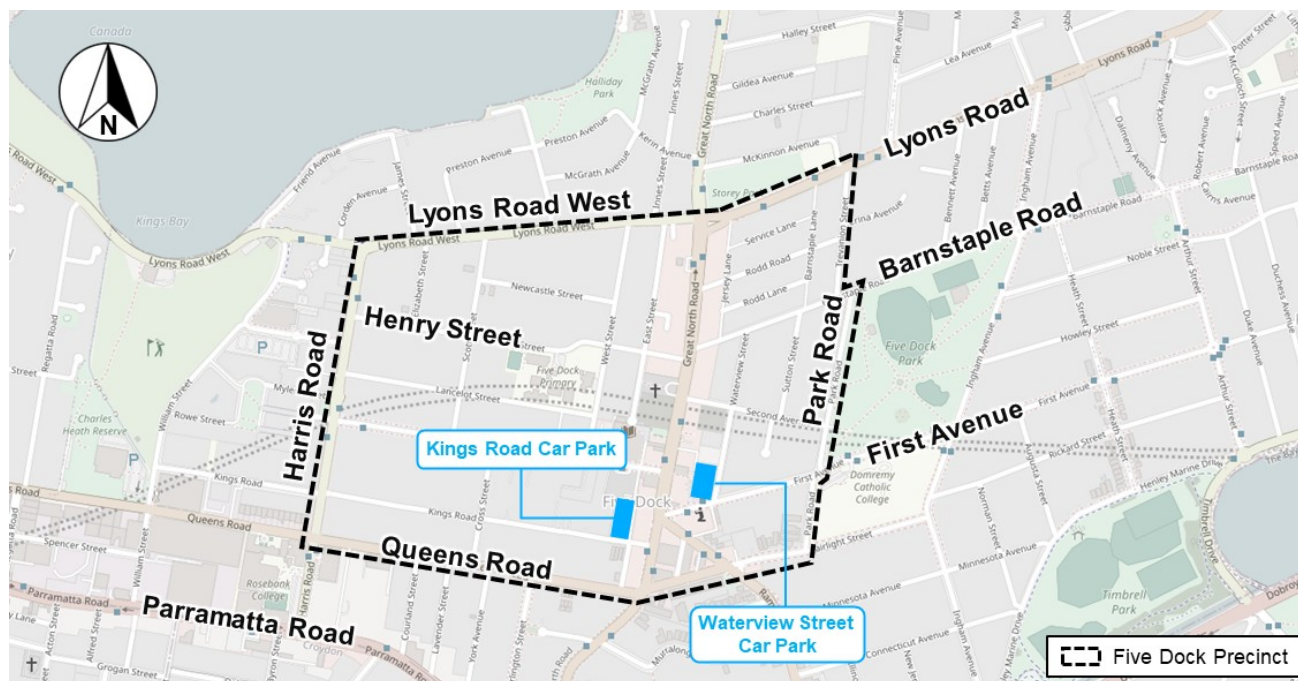
Furthermore, it should be noted that within the Precinct, peak hour clearways are in operation along Lyons Road from 6:00-10:00AM and 3:00-7:00PM.

4.8.2 Off-street Parking Facilities

There are 2 off-street parking facilities in the south of the precinct off Great North Road:

- Kings Road Car Park – 77 spaces
- Waterview Street Car Park – 88 spaces.

The locations of these two off-street car parks are shown in Figure 4.11.



Adapted from OpenStreetMap

Figure 4.11: Off-Street Car Parks – Five Dock Precinct

At these off-street car parks, free parking is restricted to 2 hours from 8:30AM-6:00PM Monday to Saturday.

4.8.3 DCP Parking Controls

The current DCP parking controls for off-street parking is provided in Table 4.2. These requirements are sourced from Table B-B to Table B-G from Council's *Development Control Plan (DCP) (Version 7, 29/08/2023)*.

Table 4.2: DCP Parking Provision Requirements – Five Dock

Land Use		Car Spaces	Bicycle Spaces	
			Resident/Staff	Bicycle Visitor
Residential	Low Density	1-2 per dwelling	2 per dwelling (min)	2 per 10 dwellings (min)
	Medium / High Density	Resident: 0.6-1.4 per dwelling (max) Visitor: 0-0.2 per dwelling (max)		
Office / Business		1 per 40m ² GFA (min)	2 per 150m ² GFA (min)	2 per 400m ² GFA (min)
Retail (Shops)		1 per 40m ² GFA (min)	2 per 250m ² GFA (min)	2 per unit + 2 per 100m ² GFA (min)
Industrial		1.5 per 100m ² total GLA	2 per 10 employees (min)	2 per unit + 2 per 100m ² GFA (min)

4.9 Site Visit

Site visits were undertaken on Wednesday 23rd October 2024 between 8:00 - 9:00 AM and 5:00 - 6:00 PM to record “drive-through” videos and to investigate on-site traffic and transport conditions.

During the site visits, the weather conditions were cloudy and dry. Key observations during the site visit included:

- Queues on Great North Road generally fluctuated during peak hours, with a notable worsening of conditions closer to 9:00 AM in the morning
- Queues often propagated through a number of upstream traffic signals on Great North Road due to the close spacing of intersections, particularly around Garfield Street and Ramsay Road
- Due to limited road lanes on Great North Road, right turn manoeuvres at priority intersections often blocked through traffic (e.g. right turn into Kings Road)
- Local streets were generally quiet and featured low traffic volumes, with the exception of school activity on Lancelot Street, Henry Street and Harris Road during school peaks
- The two ‘boundary’ traffic signals to the main town centre on Great North Road were both busy intersections (Lyons Road and Harris Road), featuring extensive queues on all approaches
- There were ongoing road works along Great North Road near the Metro site, as well as on Second Avenue and Waterview Street.

Photos from the site visit are provided in Figure 4.12.



Figure 4.12: Site Visit Photos

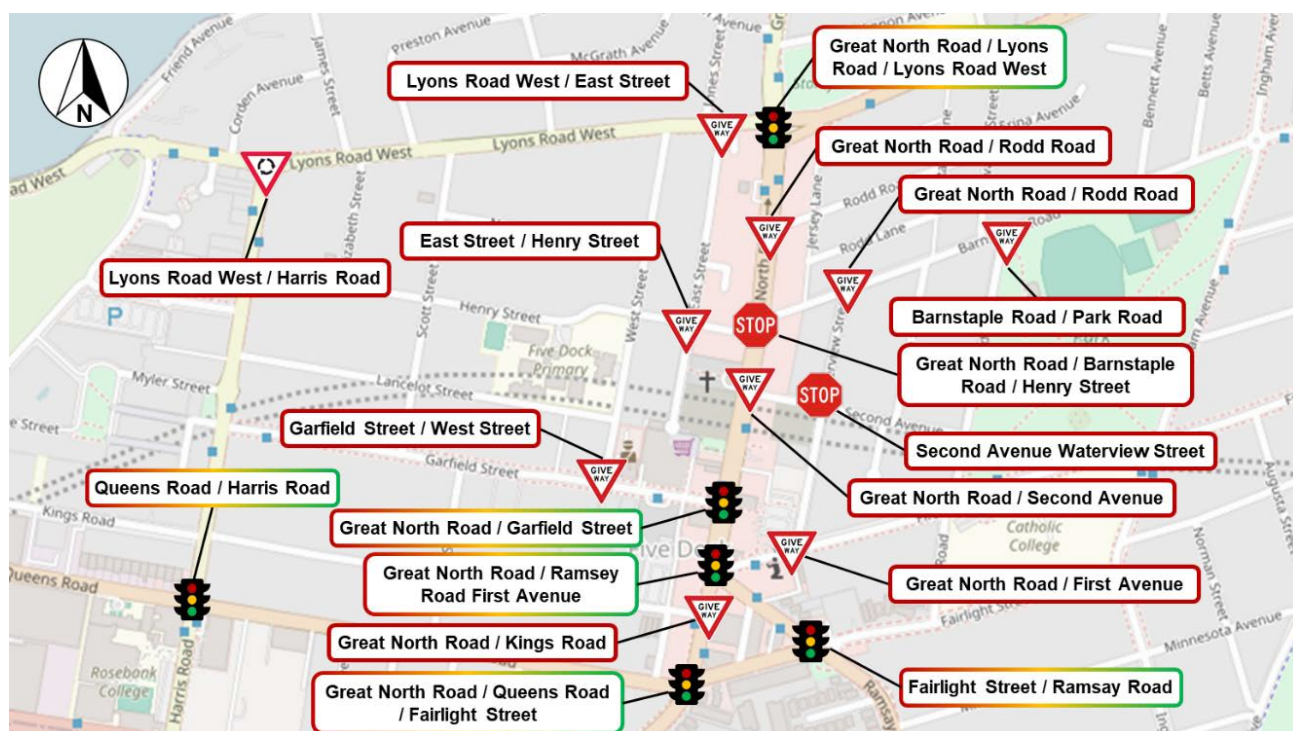
4.10 2024 Base Case SIDRA Model

4.10.1 Background Traffic Survey

Intersection traffic volume surveys were undertaken by Matrix Traffic and Transport Data on 21st September 2024, 25th September 2024 and 28th September 2024 (resurveyed for the intersection at Garfield Street / West Street) at 18 key intersections in the study area. This data forms the basis of the traffic analysis undertaken as a part of this study. The key intersections include:

- Site 1 - Great North Road / Queens Road / Fairlight Street
- Site 2 - Great North Road / Kings Road
- Site 3 - Great North Road / Ramsay Road / First Avenue
- Site 4 - Great North Road / Garfield Street
- Site 5 - Great North Road / Second Avenue
- Site 6 - Second Avenue / Waterview Street
- Site 7 - Great North Road / Barnstaple Road / Henry Street
- Site 8 - Great North Road / Rodd Road
- Site 9 - Great North Road / Lyons Road / Lyons Road West
- Site 10 - Lyons Road West / East Street
- Site 11 - Lyons Road West / Harris Road
- Site 12 - Queens Road / Harris Road
- Site 13 - Garfield Street / West Street
- Site 14 - East Street / Henry Street
- Site 15 - Fairlight Street / Ramsay Road
- Site 16 - First Avenue / Waterview Street
- Site 17 - Barnstaple Road / Waterview Street
- Site 18 - Barnstaple Road / Park Road.

These intersections are shown in Figure 4.13.



Adapted from OpenStreetMap

Figure 4.13: Key Intersections for Traffic Surveys

From the recorded traffic data, the peak hour periods identified were:

- AM Peak Period: 8:00 - 9:00 AM
- PM Peak Period: 5:00 - 6:00 PM
- Weekend Peak Period: 11:30 AM - 12:30 PM.

4.10.2 Model Development

The SIDRA intersection model was developed based on latest site conditions and road geometry. Data inputs included peak hour turning counts and SCATS data (provided by TfNSW) for signal personalities. All 18 sites were networked together.

To ensure that the modelled network was reflective of actual conditions, operational parameters were calibrated to achieve validation targets for modelled network queues within approximately 2 vehicles of observed queues based on site observations.

4.10.3 Model Performance Indicators

The following key performance indicators are presented as part of the breakdown of intersection and network performance:

- Intersection Level of Service (LOS)
- Approach delays
- Degree of Saturation.

Degree of Saturation is a measure of input demand flows vs. approach lane capacity. Generally, the closer to 1.0, the closer the approach is to the operational capacity of the link. Sections over 1.0 are overcapacity, with expected impacts to delays and queue buildup over the peak period.

The control delay thresholds for LOS are summarised in Table 4.3. For traffic signals, the average movement delay and LOS for the overall intersection was adopted. For roundabouts and priority intersections, the worst movement was adopted.

Table 4.3: Level of Service Delay Thresholds

LOS	Average Delay per Vehicle
A	14 or below
B	15 to 28
C	29 to 42
D	43 to 56
E	57 to 70
F	70 or above

4.10.4 Intersection Performance Summary

Table 4.4 summarises the performance results for the existing case modelled intersections.

Table 4.4: Overall Intersection Level of Service and Delays Comparison

Intersection	Site no.	Control Type	Approach	Level of Service (Delay seconds)		
				AM	PM	Weekend
Great North Road / Queens Road / Fairlight Street	101		North	B (25.6s)	B (24.9s)	B (22.9s)
			East	B (28.3s)	B (20s)	B (23.2s)
			South	B (26.2s)	B (23.3s)	B (22.7s)
			West	B (26.6s)	B (23.2s)	B (26.6s)
			Overall	B (26.7s)	B (22.5s)	B (23.9s)
Great North Road / Kings Road	102		North	A (1.4s)	A (1.5s)	A (1.9s)
			South	A (0.5s)	A (0.6s)	A (0.7s)

Intersection	Site no.	Control Type	Approach	Level of Service (Delay seconds)		
				AM	PM	Weekend
			West	A (7s)	A (6.5s)	A (7.8s)
			Overall	A (7s)	A (6.5s)	A (7.8s)
Great North Road / Ramsay Road / First Avenue	103		North	B (18.8s)	B (21.4s)	B (22.9s)
			East	C (39.9s)	D (42.7s)	D (37.3s)
			South-East	D (54.1s)	E (70.2s)	D (44.1s)
			South	B (28.4s)	B (26.8s)	B (22.7s)
			Overall	B (27.9s)	C (33.9s)	B (27.2s)
Great North Road / Garfield Street	104		North	A (11.2s)	A (5.9s)	A (7.4s)
			South	A (2.3s)	A (12.5s)	A (2.8s)
			West	E (58.2s)	D (53.9s)	F (78.1s)
			Overall	B (17.1s)	B (16.7s)	B (15.9s)
Great North Road / Second Avenue	105		North	A (0s)	A (0s)	A (0s)
			East	A (9.7s)	A (10.4s)	A (8.8s)
			South	A (0s)	A (0s)	A (0s)
			Overall	A (9.7s)	A (10.4s)	A (8.8s)
Second Avenue / Waterview Street	106		North	A (7.7s)	A (7.6s)	A (7.5s)
			East	A (0.3s)	A (0.3s)	A (0.9s)
			South	A (8s)	A (7.6s)	A (7.4s)
			Overall	A (8s)	A (7.6s)	A (7.5s)
Great North Road / Barnstaple Road / Henry Street	107		North	A (2.9s)	A (2.4s)	A (2.1s)
			East	A (7.8s)	A (7s)	A (6.9s)
			South	A (1.2s)	A (1.1s)	A (1s)
			West	A (11s)	A (11.7s)	A (11.3s)
			Overall	A (11s)	A (11.7s)	A (11.3s)
Great North Road / Rodd Road	108		North	A (0.3s)	A (0.2s)	A (0.3s)
			East	A (10s)	A (10.7s)	A (9.6s)
			South	A (2s)	A (1.8s)	A (3.2s)
			Overall	A (10s)	A (10.7s)	A (9.6s)
Great North Road / Lyons Road / Lyons Road West	109		North	E (56.1s)	C (36.6s)	D (47.3s)
			East	B (17.7s)	A (11.1s)	A (16.2s)
			South	F (85s)	E (58.8s)	F (74.1s)
			West	C (41.6s)	C (39.9s)	C (31.5s)
			Overall	D (46.9s)	C (33.5s)	C (40.5s)
Lyons Road West / East Street	110		East	A (3.4s)	A (3.6s)	A (2.5s)
			South	A (5.5s)	A (5.5s)	A (5.3s)
			West	A (2.1s)	A (2.0s)	A (1.7s)
			Overall	A (5.5s)	A (5.5s)	A (5.3s)

Intersection	Site no.	Control Type	Approach	Level of Service (Delay seconds)		
				AM	PM	Weekend
Lyons Road West / Harris Road	111		East	A (5s)	A (5s)	A (4.5s)
			South	B (19.6s)	C (35s)	C (12.6s)
			West	A (8.8s)	A (7.8s)	A (7.3s)
			Overall	B (19.6s)	C (35s)	A (12.6s)
Queens Road / Harris Road	112		North	C (30.5s)	C (33.8s)	D (51.7s)
			East	B (18.5s)	B (18.4s)	B (18.6s)
			South	B (26.2s)	C (34.8s)	C (34.6s)
			West	A (11s)	B (18.5s)	B (24.5s)
			Overall	B (20.8s)	B (25.7s)	C (31.5s)
Garfield Street / West Street	113		North	A (6s)	A (5.7s)	A (5.5s)
			East	A (1.6s)	A (0.8s)	A (1.4s)
			West	A (0.6s)	A (0.6s)	A (0.6s)
			Overall	A (6s)	A (5.7s)	A (5.5s)
East Street / Henry Street	114		North	A (7.8s)	A (7.7s)	A (7.8s)
			East	A (2.4s)	A (2.9s)	A (2.4s)
			South	A (7.7s)	A (7.7s)	A (7.6s)
			West	A (0.8s)	A (1.6s)	A (1.8s)
			Overall	A (7.8s)	A (7.7s)	A (7.6s)
Fairlight Street / Ramsay Road	115		North	B (21.9s)	B (21.6s)	B (24.3s)
			East	C (31.9s)	C (29.7s)	C (33.9s)
			South	B (23.3s)	B (22.3s)	B (17.2s)
			West	C (33.7s)	B (22.3s)	D (46.5s)
			Overall	B (28.2)	B (23.8)	C (29.7)
First Avenue / Waterview Street	116		North	A (6.6s)	A (5.9s)	A (6s)
			East	A (2.1s)	A (2.1s)	A (2.8s)
			West	A (0.6s)	A (1.0s)	A (1.3s)
			Overall	A (6.6)	A (5.9s)	A (6s)
Barnstaple Road / Waterview Street	117		East	A (0.6s)	A (0.6s)	A (0.7s)
			South	A (5.1s)	A (4.9s)	A (4.8s)
			West	A (0.6s)	A (1s)	A (0.7s)
			Overall	A (5.1)	A (4.9s)	A (4.8s)
Barnstaple Road / Park Road	118		East	A (0.8s)	A (0.5s)	A (0.9s)
			South	A (5.7s)	A (5.7s)	A (5.4s)
			West	A (1.5s)	A (1.5s)	A (1.2s)
			Overall	A (5.7s)	A (5.7s)	A (5.4s)

4.10.5 Network Maps

4.10.5.1 2024 AM Peak

The Level of Service and Degree of Saturation network maps for the study area in the AM peak are shown in Figure 4.14.

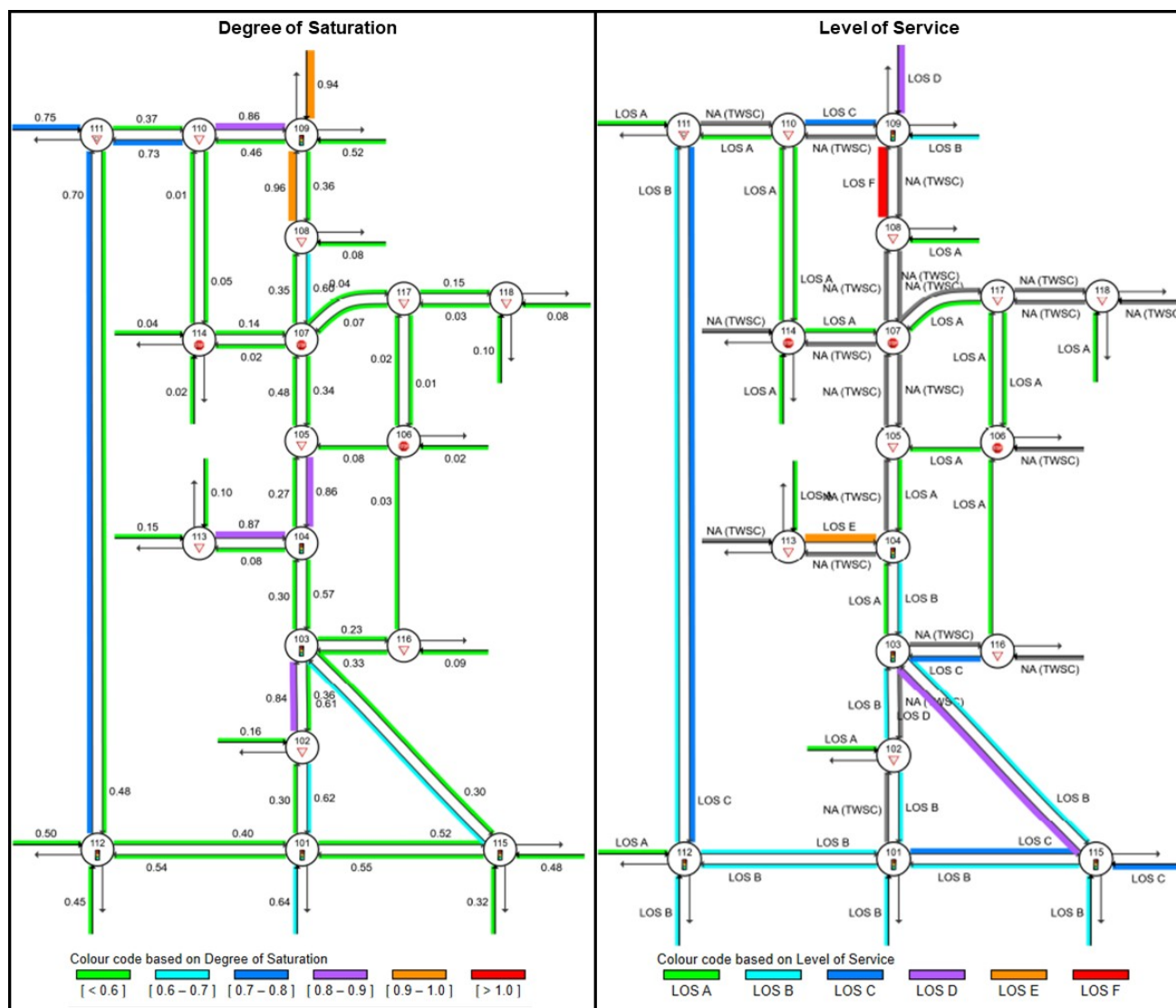


Figure 4.14: Network Performance Indicator Map - AM Peak

The key outcomes to note include:

- Network generally operating at LOS C or better with a DOS typically <0.8
- The intersection of Great North Road / Ramsay Road / First Avenue exhibits LOS D, with medium delays on the south-eastern approach
- The intersection of Great North Road / Garfield Street exhibits LOS E, with high delays on the western approach
- The intersection of Great North Road / Lyons Road / Lyons Road West exhibits LOS D & F, with high delays on the northern and southern approaches
- These 3 intersections are where the long queuing mainly occurs and have a high degree of saturation (DOS).

4.10.5.2 2024 PM Peak

The Level of Service and Degree of Saturation network maps for the study area in the PM peak are shown in Figure 4.15.

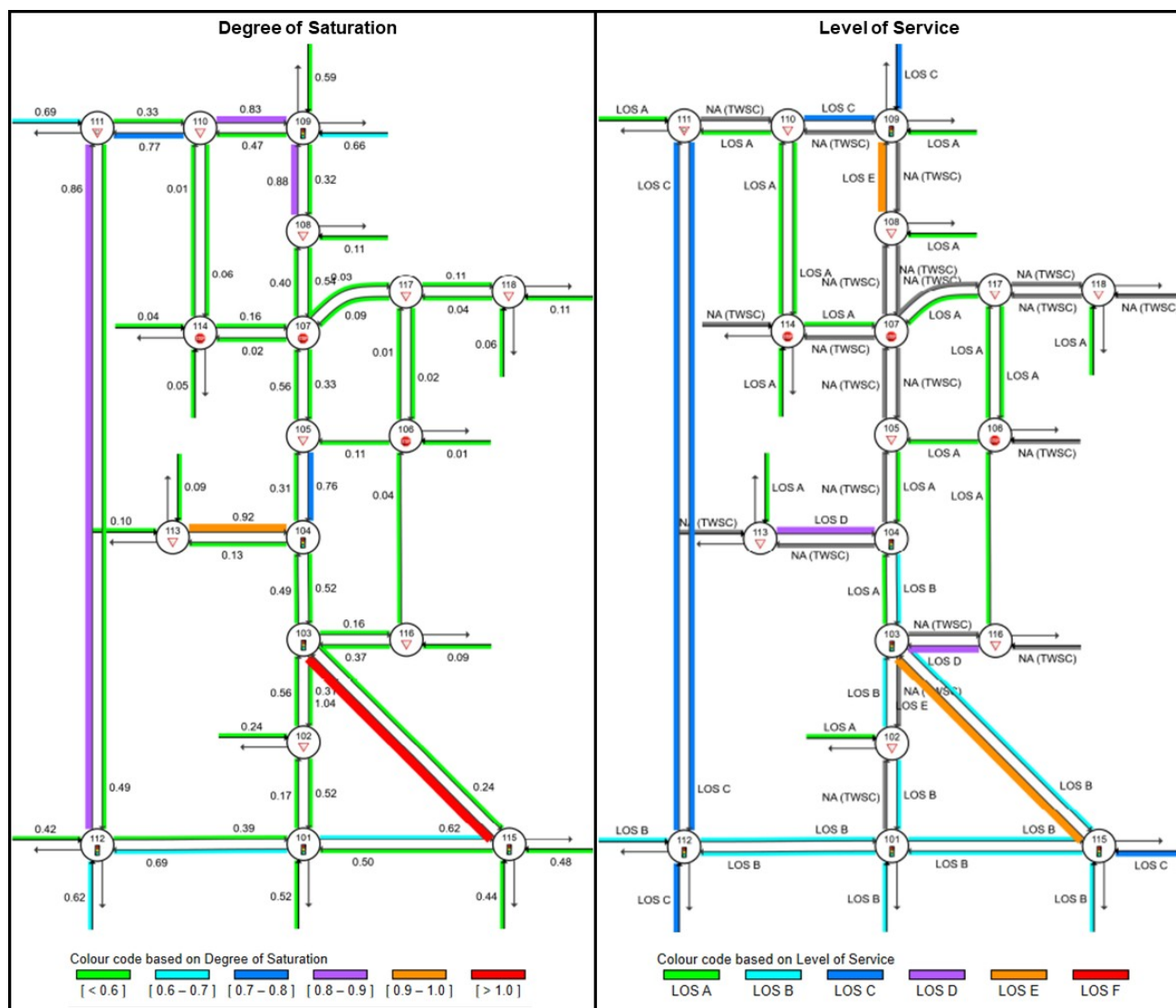


Figure 4.15: Network Performance Indicator Map - PM Peak

The key outcomes to note include:

- Network generally operating at LOS C or better with a DOS typically <0.8
- The intersection of Great North Road / First Avenue / Ramsay Road exhibits LOS D & E, with high delays on the eastern and south-eastern approaches respectively
- The intersection of Great North Road / Garfield Street exhibits LOS D, with high delays on the western approach
- The intersection of Great North Road / Lyons Road / Lyons Road West exhibits LOS E, with high delays on the southern approach.

4.10.5.3 2024 Weekend Peak

The Level of Service and Degree of Saturation network maps for the study area in the weekend peak are shown in Figure 4.16.

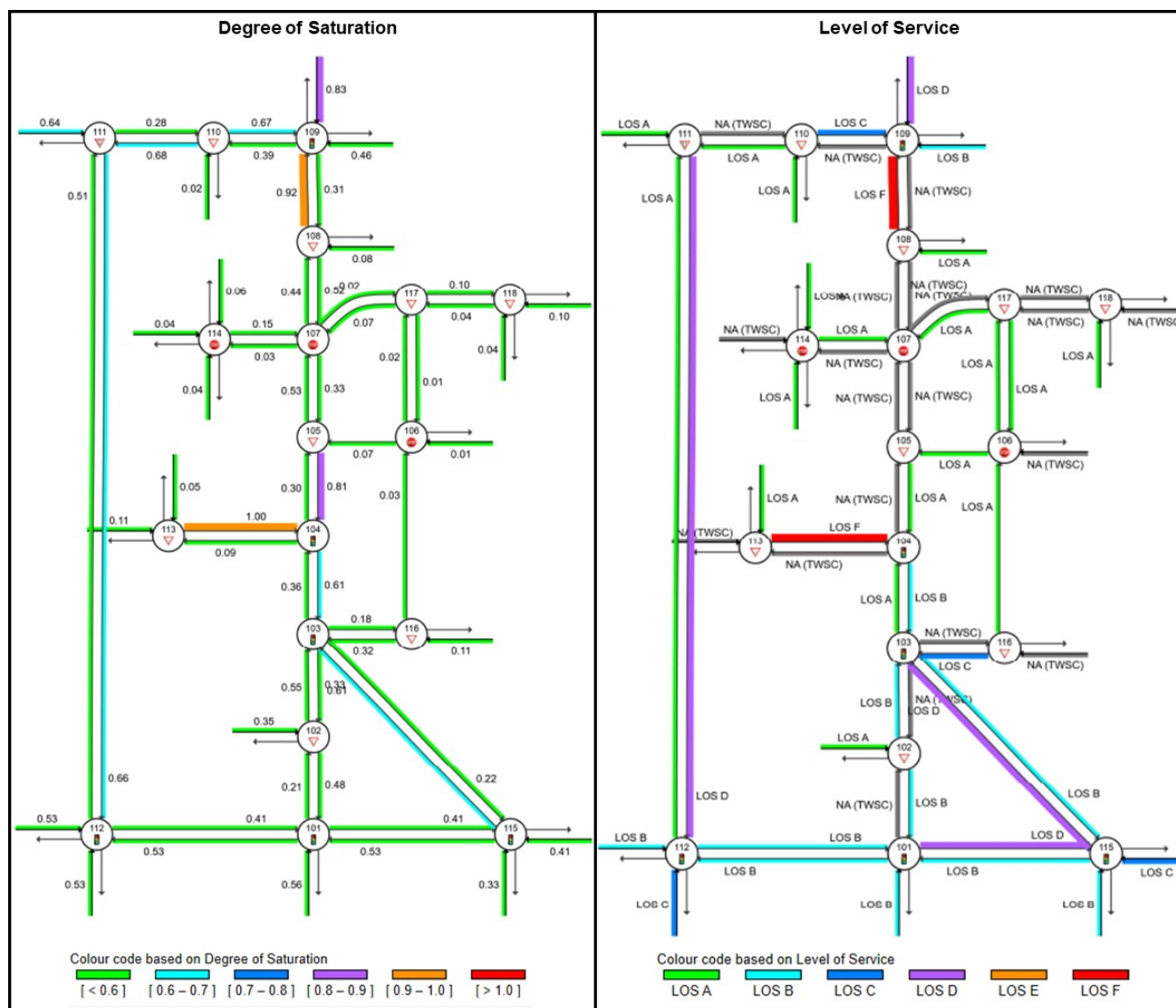


Figure 4.16: Network Performance Indicator Map - Weekend Peak

The key outcomes to note include:

- Network generally operating at LOS D or better with a DOS typically <0.7
- The intersection of Great North Road / First Avenue / Ramsay Road exhibits LOS D, with high delays on the eastern and south-eastern approaches
- The intersection of Great North Road / Garfield Street exhibits LOS F, with high delays on the western approach
- The intersection of Great North Road / Lyons Road / Lyons Road West exhibits LOS D & F, with high delays on the northern and southern approach respectively
- The intersection of Queens Road / Harris Road exhibits LOS D, with high delays on the northern approach
- The intersection of Fairlight Street / Ramsay Road exhibits LOS D, with high delays on the western approach.

4.11 Temporary One-way Road Arrangements

During the traffic survey and modelling period, a number of one-way arrangements were in place near the future Metro site due to ongoing construction works. This includes:

- One-way westbound on Second Avenue between Great North Road and Waterview Street
- One-way northbound on Waterview Street between First Avenue and Second Avenue.

These measures are present within the calibrated base case SIDRA model and were retained for future year scenarios. However, Council advises that there are currently no plans to make these restricted arrangements permanent. All modelling outcomes within this report should be interpreted with the understanding of potential routing changes associated with these temporary traffic arrangements (especially the right turn access into Second Avenue), subject to planning decisions around these streets next to the future Metro station.

4.12 Summary of Existing Issues

The key issues in the Five Dock Precinct from a traffic and transport perspective revolve primarily around existing connectivity and accessibility issues in the network. These can be summarised as:

- The adequacy of active transport (particularly cycling) infrastructure is limited within the study area, despite having two routes passing through the Precinct.
- Cycling routes rely heavily on mixed traffic or on-road conditions. Safety issues associated with this type of infrastructure dissuade individuals from active transport modes.
- The majority of the local streets in the precinct are very narrow, compromising vehicle safety with increased risks of collision and poor sight distances.
- Multiple two-way roads are only wide enough for one vehicle to travel. Oncoming vehicles must yield between parked vehicles or driveways to pass each other.
- A number of intersections show traffic capacity constraints, primarily on the major road boundaries and along the central spine of Great North Road.
- During peak periods, Great North Road exhibits capacity issues due to the single lane approaches at closely spaced traffic signals.
- Garfield Street services a disproportionate population catchment compared to its form, being one of the only right turns onto Great North Road from the local areas.
- Active transport access to the Metro station from the western residential catchment lacks a direct connection, requiring detour via East Street or Thompson Lane.

The primary traffic and transport issues are summarised in Figure 4.17.

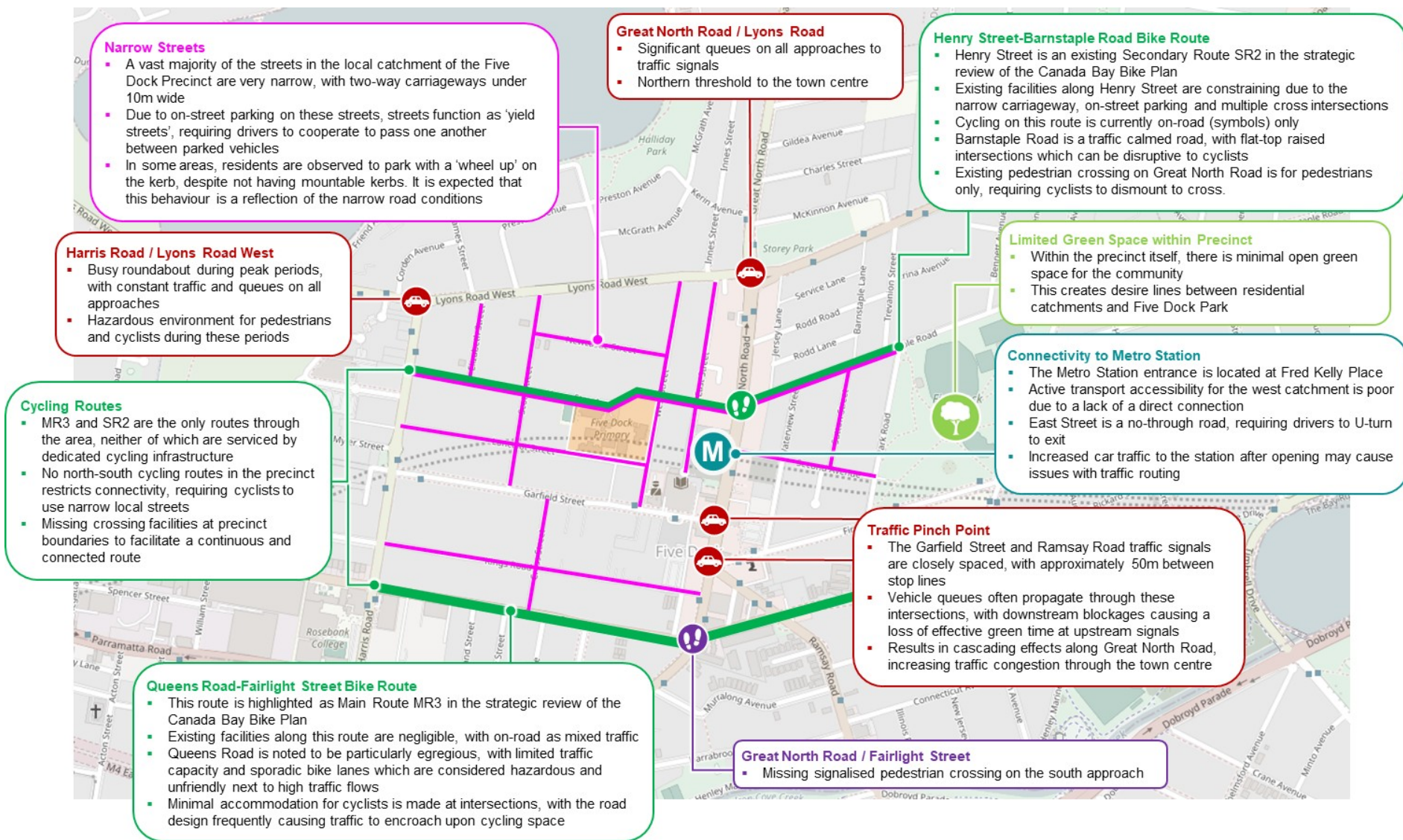


Figure 4.17: Existing Traffic and Transport Precinct Issues

5. MOVEMENT AND PLACE VISION

5.1 Overview

The Design of Roads and Streets (DORAS) is a guide which assists industry practitioners with defining the role that individual road links in a network should fulfill in accordance with its 'movement' or 'place' function. These concepts are defined as:

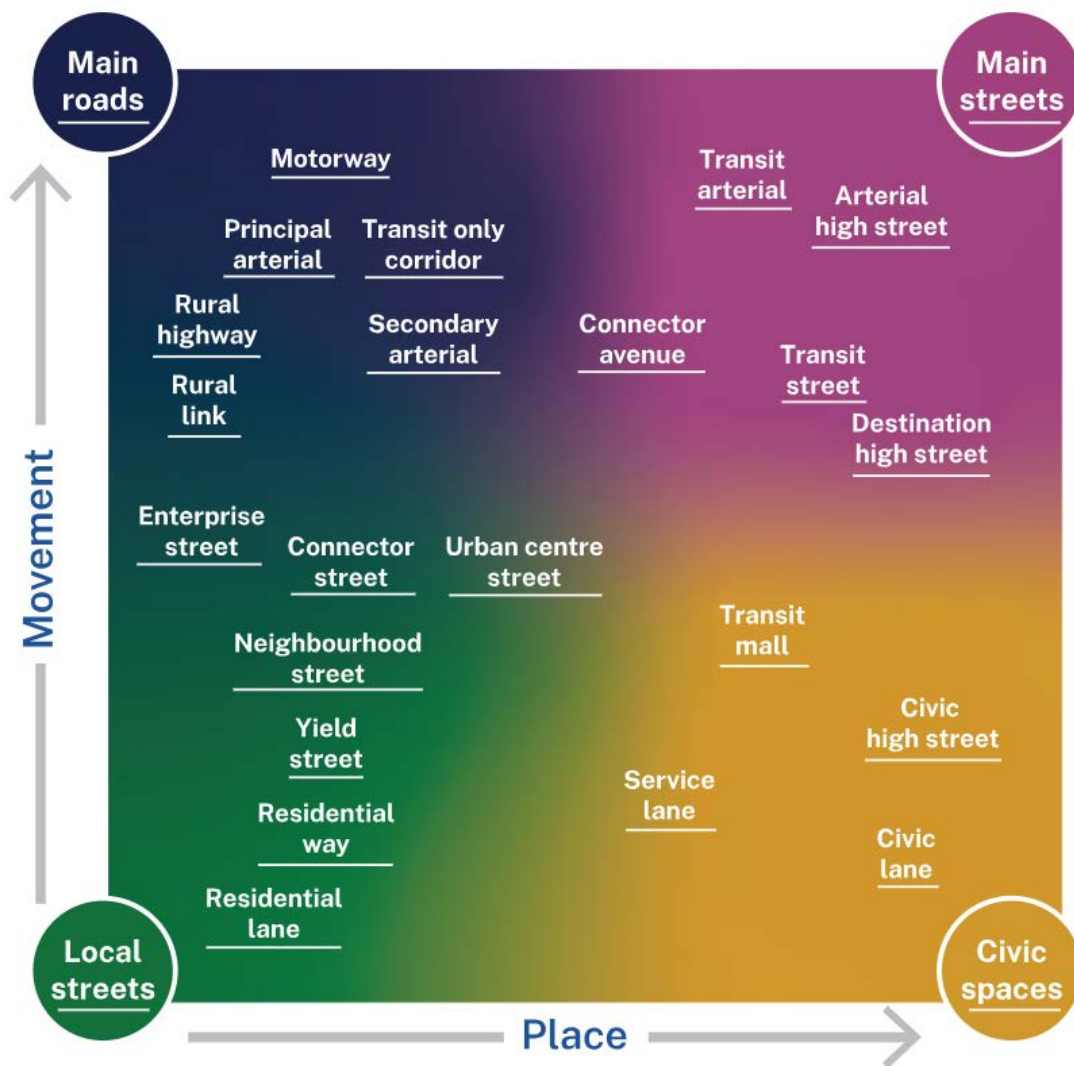
- **Movement:** Links facilitating the transport of people, goods, and services
- **Place:** Spaces attracting / generating trips for a variety of purposes e.g. recreation, employment, education, etc.

By better understanding the role and context of individual road links, we are able to ensure better alignment of road design with the intended function of the street. This facilitates a more consistent and cohesive relationship between built form and road network.

The Movement and Place framework defines 4 categories in which links may be classified:

- **Main Streets:** Links where major movement and place function coincide. These are often located within town centres where many businesses, schools, and recreation facilities are located. The balance of movement and place is a major design challenge for this category.
- **Main Roads:** Links with high movement function but low place function, primarily being major connections between regional centres. Improving safety along these links and minimising the impacts of traffic on surrounding land uses are key design considerations.
- **Civic Spaces:** These have high place function and low movement function, forming the “heart of our communities.” Pedestrian activity and other forms of active transport are of high priority, with design elements enhancing its place value.
- **Local Streets:** Links of low movement or place function but form the majority of the road network. These serve as the direct access from main roads to residences and businesses. Design principles prioritise safety improvements and reducing the impacts of traffic on surrounding land uses.

These main roads and street categories can be further sub-divided into one of 22 types based on its specific function with distinct design solutions. These DORAS categories as shown in Figure 5.1.



Source: NSW Gov Movement and Place Framework - Design of Roads and Streets

Figure 5.1: Movement and Place Chart

The DORAS manual is intended to be used in 5 major steps. These are as follows:

- Identify the street type and context
- Identify existing issues on the road or street
- Identify opportunities for improvement
- Identify the appropriate design solutions
- Design parameters.

The following section establishes the road network hierarchy by categorising the study area road network into the DORAS classifications.

5.2 Five Dock Road Network Categorisation

The envisioned Movement and Place categorisation for the Five Dock Precinct is shown in Figure 5.2.



Source: Adapted from Google Maps

Figure 5.2: Five Dock Design of Roads and Streets Categorisation

Main Streets

The key main street within the network is Great North Road, being a destination high street carrying significant volumes of vehicle and pedestrian traffic with storefronts lining its length within the precinct. Garfield Street near Great North Road is considered an urban centre street as it serves as a transition towards a lower place-function area.

Main Roads

No links within the Five Dock Precinct can be considered as purely of a high movement function as the majority of the roads and streets (excluding Great North Road) retain a suburban character. The links forming the precinct boundary (excluding the less-defined eastern border) are identified as connector streets, serving as sub-arterials or accesses to Parramatta Road.

Civic Spaces

Fred Kelly Place and its expansion are considered to be civic high streets. Other locations of high place function such as the proposed open space on Rodd Road, and links surrounding the Metro Station are considered to be civic lanes as these may provide alternative calmer areas away from the bustle of Great North Road.

Local Streets

Streets connecting the residential areas within the Five Dock Precinct are categorised as local streets, largely carrying traffic to and from the local neighbourhood catchments.

Specific categorisation was determined based upon the position, width, and the available alternatives for access to main roads from each street.

- Notably, Garfield Street, Barnstaple Road, First Avenue, and Cross Street, and Park Road are considered to have higher movement functions.
- Lower vehicle movement function streets running in parallel to these such as Henry Street will serve as high movement corridors for cyclists and pedestrians. Despite their higher movement function both locally and regionally, these streets retain a character similar to local streets.

5.3 Existing Design Issues and Solutions

5.3.1 Destination High Street

Destination high streets like Great North Road can generally be described as vibrant streets with a strong sense of Place surrounding a multi-modal Movement corridor. They are intended to be attractive public gathering spaces, populated with retail and commercial activity and all associated traffic movements.

The main conflict for these types of streets is the contrast between the higher movement function and the intensity of roadside pedestrian activity, necessitating a careful balance between all road users.

Common road design issues for destination high streets are summarised in Table 5.1.

Table 5.1: Destination High Street Issues and Treatments

Issue	Treatment(s)
Insufficient pedestrian crossing points across busy roads	▪ Pedestrian-priority mid-block crossings along key desire lines ▪ Lower speed limits to better reflect the pedestrian activity levels ▪ Low verge buffer planting to discourage crossings at unintended locations.
High activity levels on kerbside due to pedestrian activity, al fresco dining and active shop fronts limits the available footpath space	▪ Low verge buffer planting to improve perceived separation of pedestrians from vehicle traffic ▪ Wider kerbside areas via property setbacks and/or kerb build-outs.
Competing demands between slow-moving destination traffic and faster regional through traffic.	▪ Vegetated median islands and kerbside extensions to support the public domain and narrow the roadway for cars. ▪ Lower speed limits to discourage regional traffic.
Car parking needs of the surrounding community, including freight and servicing needs of the surrounding retail and commercial facilities	▪ Timed peak hour parking restrictions to balance community and capacity needs ▪ Short-term last mile freight and servicing access.

5.3.2 Urban Centre Streets

Urban centre streets are usually secondary streets near the main high street, featuring active commercial and retail frontages. They hold a higher movement function over other local roads due to their function in connecting busy town centres to residential catchments, as is the case with Garfield Street and First Avenue near Great North Road. The primary issues along these types of streets stem from its function as a transition between the high-activity high streets and the quieter local roads, with frequent 'overflow' of roadside infrastructure which can narrow footpaths and constrain crossing opportunities.

Some of the issues commonly found on urban centre streets are shown in Table 5.2.

Table 5.2: Urban Centre Street Issues and Treatments

Issue	Treatment(s)
Pedestrian safety issues caused by lack of pedestrian crossing infrastructure and wide crossing distances	▪ Pedestrian refuges with associated kerb build-outs to connect active transport links ▪ Vegetated kerbside extensions and medians to narrow the pedestrian crossing points.
Wide traffic lanes encouraging high vehicle speeds	▪ Providing line markings for travel and parking lanes ▪ Narrowing the road via landscaping, kerb blisters, kerb extensions ▪ Speed cushions, slowing traffic whilst allowing buses to pass without disruption ▪ Tree and shrub planting on verge and median to reduce perceived width of road.
High vehicle entry speeds into intersecting local streets	▪ Continuous footpath treatment parallel to the urban centre street ▪ Painted thresholds on intersecting lower-movement function streets ▪ Kerb extensions and blisters to reduce turn radii and discourage high manoeuvring speeds.
Lack of public transport infrastructure like bus stop seating and shelters	▪ Improved bus stop facilities.
Lack of vegetation (near Great North Road)	▪ Tree and shrub planting on verge and median.

5.3.3 Connector Streets

Urban connector streets are higher movement-function streets with a largely residential character. These surround most of the study area, including Queens Road, Harris Road, Lyons Road West and Lyons Road. The main challenges for this type of street include the road carriageway width, higher vehicle speeds, and vehicle volumes. The dwelling houses that typically line these streets may only be accessed at these roads, causing disruptions to traffic flow. The frequent driveways occupy parts of the road reserve that may otherwise be used to improve public domain.

Some of the common issues for connector streets and the appropriate treatments are shown in Table 5.3.

Table 5.3: Connector Street Issues and Treatments

Issue	Treatment(s)
Pedestrian safety issues caused by lack of pedestrian crossing infrastructure and wide crossing distances	▪ Pedestrian refuges with associated kerb build-outs across the connector street ▪ Pedestrian crossings parallel to the connector street (across intersecting roads) ▪ Continuous footpath treatment parallel to the connector street.
Large turn radii at intersecting roads encouraging higher manoeuvring speeds	▪ Reduction of turn radii to discourage high manoeuvring speeds ▪ Continuous footpath treatment parallel to the connector street.
Wide traffic and parking lanes	▪ Lane narrowing to encourage lower speeds ▪ Tree and shrub planting on verge to reduce perceived width of lanes.
Lack of safe cycling infrastructure	▪ Separated cycling lanes ▪ Integrated pedestrian and cyclist crossings.
Minimal vegetation (excluding Lyons Road West and Lyons Road).	▪ Tree and shrub planting on verge.

5.3.4 Neighbourhood Streets and Yield Streets

Neighbourhood streets and yield streets make up the majority of the residential areas within the Five Dock Precinct. In contrast to Garfield Street, these carry less vehicle volumes and are significantly narrower, generally requiring vehicles to slow or yield to pass each other.

Active transport users will often prefer these links as a safer and more quieter alternatives to the higher movement function roads. However, the narrower carriageways can sometimes lead to challenges when trying to implement improvements to road infrastructure, dictating the need to explore widening or other options as part of the Masterplan development.

Some of the common issues and treatments for these types of local streets are shown in Table 5.4.

Table 5.4: Neighbourhood and Yield Street Issues and Treatments

Issue	Treatment(s)
Lack of pedestrian crossings	▪ Raised 'zebra' pedestrian crossings can provide priority crossing points and slow traffic down as traffic calming devices ▪ Continuous footpath treatments at intersections to higher movement function roads.
Narrow footpaths	▪ Parking and one-way restrictions enabling the reallocation of the limited road reserve ▪ Footpath widening.
Poor sightlines from intersecting roads and driveways	▪ Increased property frontage setback, further increased at intersections ▪ Footpath widening to increase distance between obstructions to vision and the roadway.
Straight alignments and gradients encouraging high speeds, particularly on Barnstaple Road.	▪ Posted speed limit reduction (local traffic area) ▪ Vertical deflection devices such as raised safety platforms, speed humps or speed cushions every 80-150 metres to reduce vehicle speeds where appropriate ▪ Raised 'zebra' pedestrian crossings may be used to substitute these devices.
Limited indicators of transitions from connector roads	▪ Painted thresholds or continuous footpath treatments at intersections to higher movement function roads ▪ Posted speed limit reduction (local traffic area).
Lack of safe cycling infrastructure	▪ Parking and one-way restrictions enabling the reallocation of the limited road reserve ▪ Separated cycling lanes.
Limited vegetation	▪ Trees planted in the verge.

5.3.5 Residential Ways, Residential Lanes, and Service Lanes

Residential ways, residential lanes and service lanes are low volume links with secondary accesses to residences and businesses, often used for refuse collection and last-mile freight services. Within the Precinct, these include a number of narrow streets near the town centre such as Jersey Lane and Smiths Lane. Active transport users may incorporate these lanes into their routes, whilst vehicles may use these to bypass congested intersections.

Common issues and treatments for these types of streets are shown in Table 5.5.

Table 5.5: Residential Ways, Residential Lanes, and Service Lane Issues and Treatments

Issue	Treatment(s)
Lack of pedestrian crossings at intersections	▪ Raised 'zebra' pedestrian crossings can provide priority crossing points and slow traffic down as traffic calming devices ▪ Continuous footpath treatment (e.g. existing facilities at Barnstaple Lane and Jersey Lane but poorly indicated due to continuity of asphalt)
Narrow and cluttered footpaths	▪ Parking and one-way restrictions to reallocate road reserve ▪ Footpath widening
Lack of passive surveillance Poor natural and artificial lighting with increased building heights and narrow roads across precinct	▪ Street lights ▪ Building height restrictions
High vehicle speeds due to limited vehicle and active transport volumes	▪ Speed limit reduction ▪ Speed cushions
Poor sightlines at intersections.	▪ Increased property frontage setbacks at intersections
Conflicting delivery trucks and active transport on service lanes	▪ Shared zones for service lanes near Fred Kelly Place

5.3.6 Civic Lane and Civic High Street

Civic spaces comprise the hearts of heart of town centres, being destinations for place activities over movement function. Within the Five Dock Precinct, high place function links near as Fred Kelly Place and East Street near the Metro Station focus on connecting transport to food, retail and recreation. Activity levels in this environment necessitate consideration of the speed differential between pedestrians, cyclists and vehicles, emphasising the need for safety measures to minimise conflicts with placemaking functions.

Common issues and treatments for these types of streets are shown in Table 5.6.

Table 5.6: Civic Lane and High Street Issues and Treatments

Issue	Treatment(s)
Conflicts between transport modes, particularly trucks and walking/cycling	- Shared zones - Timed vehicle access
Lack of passive surveillance, especially during nighttime	- Street lighting - Places to stop and rest can mitigate 'laneway' feel by creating organic gathering areas
Unclear boundaries between footpaths and travel lanes	- Shared zones - Shoreline demarcation of boundaries via a consistent alignment of roadside furniture
Business loading access requirements in retail/commercial areas	- Last-mile freight and other vehicle service accesses - Timed vehicle access

As part of the Masterplan, the civic spaces near the new Metro station are augmented and enhanced with new connections. One new lane connects East Street and West Street, providing a connection to the northern side of the station. South of this new laneway, East Street is planned to be pedestrianised, with a separate pedestrian laneway also connecting to West Street.

To address conflicts between vehicles and active transport movements in this area, some options include:

- Bollards at the entrances to Fred Kelly Place and pedestrianised areas
- Line marking and signage to direct cyclists to end-of-trip facilities at the Metro station
- Enhanced active transport facilities along East Street such as:
 - Providing a bidirectional separated cycleway on East Street south of Henry Street
 - Providing a shared path / footpath widening on East Street south of Henry Street to provide off-road facilities for cyclists
- Parking restrictions along the west side of the East Street
- Enforcing a clockwise one-way restriction for cars along East Street and the new laneway (southbound and westbound respectively).

6. FUTURE MASTERPLAN MODELLING

6.1 Modelled Scenarios

Table 6.1 lists the scenarios which were modelled as part of this study, including 4 future year 2046 scenarios. The following sections describe the development and outcomes from these modelling scenarios.

Table 6.1: Modelled Scenarios

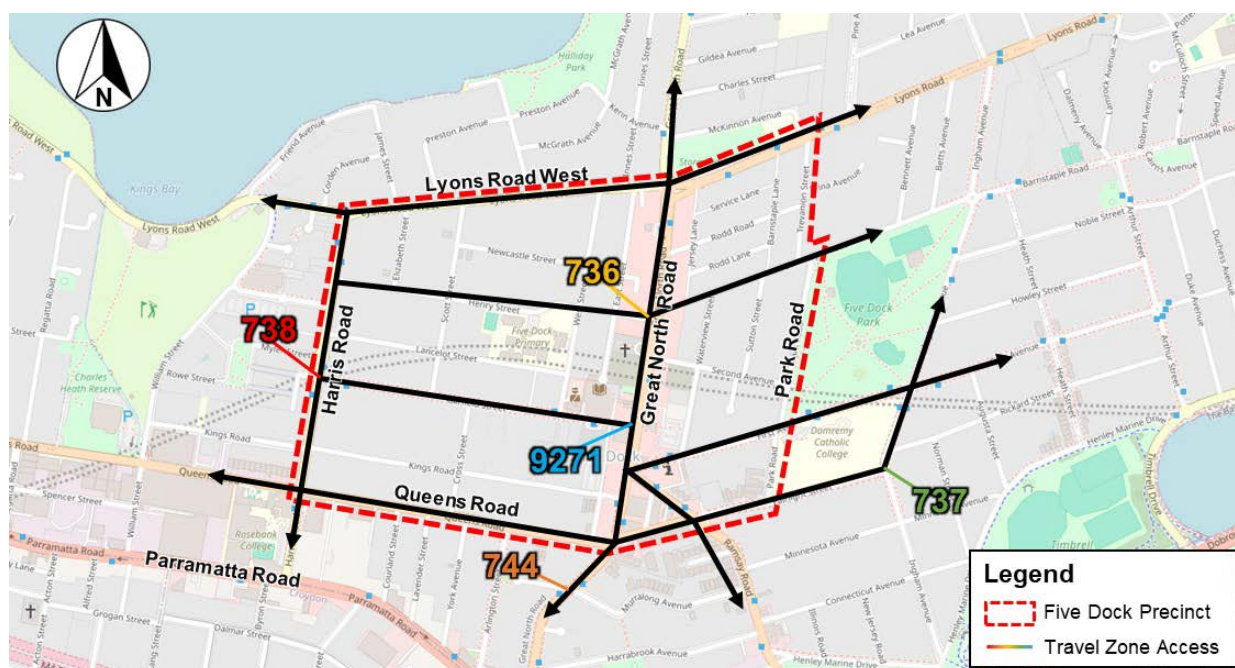
Scenario	Year	Description
Base Case	2024	Existing network based on recorded traffic surveys
Future Base Case	2046	Future network with baseline traffic growth projections in the precinct (i.e. no Masterplan development)
Future Project Case	2046	Future network with Masterplan development, including population increases and traffic redistribution(s) due to urban design changes
Future Project Case (Full Upgrades)	2046	Future Project Case + identified road network upgrade scheme to mitigate development traffic impacts
Future Project Case (Balanced)	2046	Future Project Case + traffic discounts + moderated road network upgrade scheme

6.2 Future Traffic Demand Development

Population and employment growth within the precinct was estimated with data provided by TfNSW via the Strategic Traffic Forecasting Model (STFM).

This model provides strategic traffic volume projections across Greater Sydney up to a resolution of major collector roads. Traffic is generated from 'travel zones' (TZ) based on input population and employment demographic estimates. For the purpose of this modelling assessment, the baseline Travel Zone Projections 2024 (TZP24) land use scenario was modified to include adjusted demographic totals for the zones which cover the Five Dock Precinct.

The STFM network is shown in Figure 6.1 with key TZ within the study area are highlighted for clarity. TZ 9271 is noted to be a new zone recently added to the network (presumably reflective of the new Metro station site).



Source: Adapted from OpenStreetMap

Figure 6.1: STFM Network

The overall masterplan population increases were divided between each TZ as summarised in Table 6.2. Employment estimates adopted default (business-as-usual) TZP24 growth estimates.

Table 6.2: Population Growth by Masterplan TZ

Travel Zone	TZP22 Population	Additional Masterplan Growth	Total Population by 2046
744	1129	+7,513	8642
738	1385	+11,115	12500
736	168	+1,521	1689
737	943	+7,459	8402
TOTAL	3625 persons	+27,608 persons	31,233 persons

Data was collected for AM and PM 2-hour peaks for 5 scenarios, including:

- **Existing Base Case:** 2021 (existing baseline)
- (Not assessed): 2046 without Metro and without Masterplan Uplift
- (Not assessed): 2046 without Metro and with Masterplan Uplift
- **Future Base Case:** 2046 with Metro and without Masterplan Uplift
- **Future Project Case:** 2046 with Metro and with Masterplan Uplift.

Two scenarios without the Metro were used for comparison purposes for mode share analysis.

A comparison of total network traffic volumes between each assessed scenario is shown in Table 6.3. A 2.4% reduction to vehicle traffic growth was applied to reflect adjustments to the latest masterplan scenario that reduced population estimates to 30,484 persons by 2046.

Table 6.3: Future Scenario Traffic Volume Growth

Scenario	Total Network Volume (veh)	Difference from 2021 (veh)	% Change
AM Peak			
2021 (Base Case)	22,805	-	-
2046 (Future Base Case)	23,706	+901	+4.0%
2046 (Future Project Case)	33,857	+11,052	+48.5%
PM Peak			
2021 (Base Case)	22,542	-	-
2046 (Future Base Case)	23,906	+1,364	+6.1%
2046 (Future Project Case)	34,227	+11,685	+51.8%

6.2.1 Metro Construction and Background Growth

For the purposes of our assessment, data from the Future Base Case and Future Project Case were analysed as part of the SIDRA modelling.

Linear background growth was calculated as the proportional change in the total number of vehicles approaching an intersection between 2021 and 2046 (25 years). For intersections without a direct analogue in the STFM road network (as the STFM network excludes minor local streets), the average of the nearest adjacent intersections was used instead. Growth proportions were interpolated to 22 years to account for the growth between the base model year (2024) and 2046 and added to surveyed volumes to produce 2046 demand scenarios.

Traffic volumes in the 2046 Future Base Case (i.e. with the Metro station but without the growth associated with the Masterplan) were observed to **increase by approximately 4.0% during the AM peak** and **6.1% in the PM peak** compared to existing 2024 volumes.

This result demonstrates that the baseline growth in the study area by 2046 is projected to outpace the travel mode shift caused by the Sydney Metro West.

6.2.1.1 Uplift Traffic Growth

Traffic volumes across the study area in the Masterplan scenario were calculated from a comparison between Future Base Case and Future Project Case scenarios. These results showed that traffic volumes were projected to **increase by approximately 48.5% during the AM peak** and **51.8% in the PM peak** compared to existing 2024 volumes.

Considering the existing traffic congestion within and surrounding the Five Dock precinct, this magnitude of growth is expected to exceed the operational capacity of a number of key locations in the road network.

6.2.2 Travel Zone Disaggregation and Route Choice

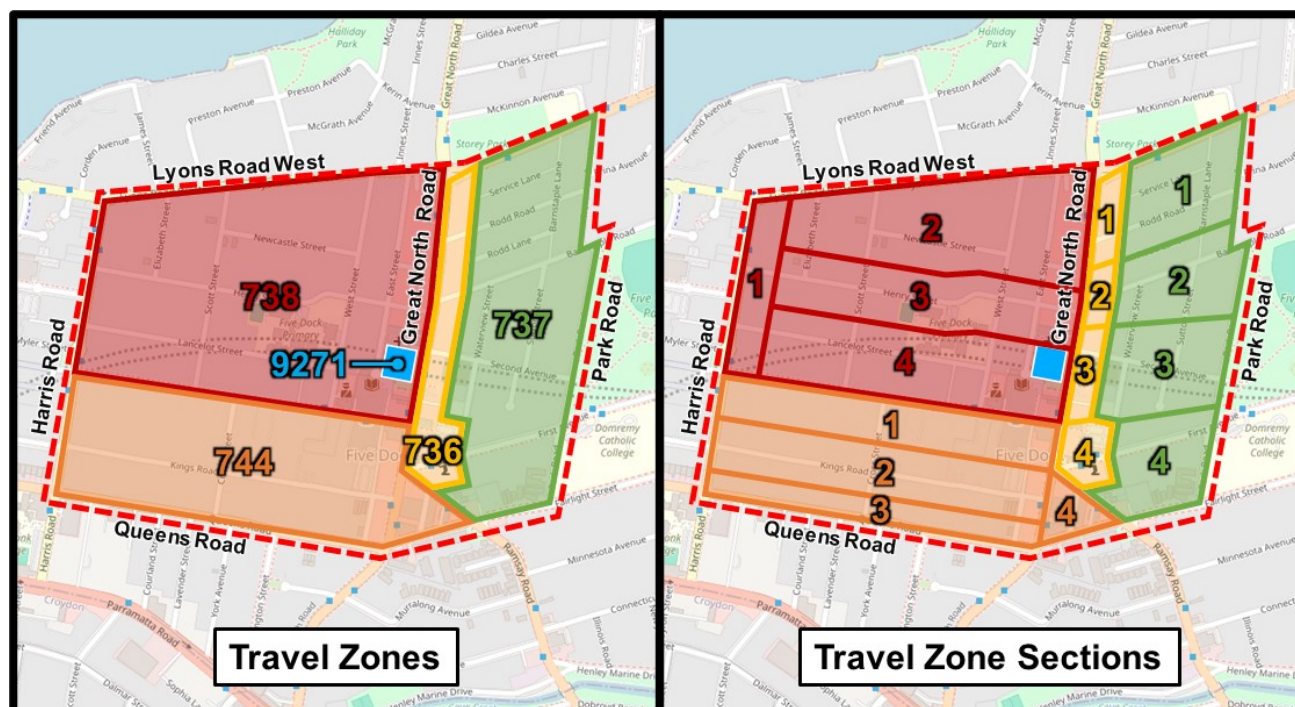
Due to the size and coverage of the Precinct TZs, upon review of the data it was determined to be necessary to subdivide each TZ to achieve a finer level of detail in line with what is required for this assessment.

Masterplan uplift trip generation was calculated as the difference in total trips in / out of each of the internal TZs when comparing the Future Base Case and Future Project Case STFM outputs. Any external-to-external trip growth (vehicle trips with an origin and destination both outside of the cordon area) was considered to not be associated with the Masterplan.

The internal TZs were each split into sub-sections based on their nearest collector (or similar) road as shown in Figure 6.2. Traffic generated by each TZ is split onto each catchment proportional to its area.

By adopting this approach, we were able to generate a finer and more accurate distribution of the traffic growth into the modelled SIDRA network. Trips from each TZ sub-section were assigned a route based on the best travel time on Google Maps to and from the approximate centre of the sub-section.

Manual re-assignment of trips was applied to a number of zones to refine entry/exit points into the road network at a more detailed level than that estimated by the STFM.



Source: Adapted from OpenStreetMap

Figure 6.2: Travel Zones and Sections within Five Dock Precinct

6.3 Future Model Intersection Performance Summary

6.3.1 Network Overview

A comparison of intersection performances across each network is shown in Table 6.4 and Table 6.5.

Table 6.4: Future Scenarios Intersection Level of Service Comparison

Intersection	AM Peak - Level of Service			PM Peak - Level of Service		
	Base	Future Base	Future Project	Base	Future Base	Future Project
101 - GNR / Queens Rd / Fairlight St	LOS B	LOS B	LOS F	LOS B	LOS B	LOS F
102 - GNR / Kings Rd	LOS A	LOS A	LOS B	LOS A	LOS A	LOS A
103 - GNR / Ramsay Rd / First Ave	LOS B	LOS B	LOS F	LOS C	LOS F	LOS F
104 - GNR / Garfield St	LOS B	LOS B	LOS F	LOS B	LOS B	LOS F
105 - GNR / Second Ave	LOS A	LOS A	LOS B	LOS A	LOS A	LOS F
106 - Second Ave / Waterview St	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
107 - GNR / Barnstaple Rd / Henry St	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
108 - GNR / Rodd Rd	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
109 - GNR / Lyons Rd / Lyons Rd West	LOS D	LOS D	LOS F	LOS C	LOS C	LOS F
110 - Lyons Rd West / East St	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
111 - Lyons Rd West / Harris Rd	LOS B	LOS B	LOS F	LOS C	LOS F	LOS F
112 - Queens Rd / Harris Rd	LOS B	LOS B	LOS F	LOS B	LOS C	LOS F
113 - Garfield St / West St	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
114 - Henry St / East St	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
115 - Ramsay Rd / Fairlight St	LOS B	LOS C	LOS C	LOS B	LOS C	LOS F
116 - First Ave / Waterview St	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
117 - Barnstaple Rd / Waterview St	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
118 - Barnstaple Rd / Park Rd	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A

Table 6.5: Future Scenarios Intersection Degree of Saturation Comparison

Intersection	AM Peak - Degree of Saturation			PM Peak - Degree of Saturation		
	Base	Future Base	Future Project	Base	Future Base	Future Project
101 - GNR / Queens Rd / Fairlight St	0.637	0.696	2.192	0.52	0.592	2.674
102 - GNR / Kings Rd	0.363	0.388	0.676	0.31	0.333	0.699
103 - GNR / Ramsay Rd / First Ave	0.838	0.622	1.351	1.043	1.35	1.459
104 - GNR / Garfield St	0.867	0.883	2.469	0.915	0.937	2.211
105 - GNR / Second Ave	0.34	0.342	0.651	0.332	0.336	1.247
106 - Second Ave / Waterview St	0.034	0.034	0.135	0.04	0.04	0.209
107 - GNR / Barnstaple Rd / Henry St	0.605	0.602	0.805	0.555	0.542	0.614
108 - GNR / Rodd Rd	0.361	0.361	0.45	0.404	0.383	0.497
109 - GNR / Lyons Rd / Lyons Rd West	0.956	0.963	1.395	0.884	0.832	1.317
110 - Lyons Rd West / East St	0.457	0.472	0.69	0.47	0.49	0.804
111 - Lyons Rd West / Harris Rd	0.75	0.824	1.359	0.863	1.092	1.188
112 - Queens Rd / Harris Rd	0.539	0.609	1.765	0.687	0.815	2.312
113 - Garfield St / West St	0.104	0.116	0.603	0.125	0.127	0.438
114 - Henry St / East St	0.047	0.051	0.095	0.057	0.061	0.098
115 - Ramsay Rd / Fairlight St	0.518	0.568	0.905	0.616	0.793	1.153
116 - First Ave / Waterview St	0.234	0.236	0.414	0.155	0.16	0.334
117 - Barnstaple Rd / Waterview St	0.038	0.038	0.153	0.045	0.046	0.127
118 - Barnstaple Rd / Park Rd	0.15	0.15	0.283	0.114	0.115	0.227

*GNR refers to Great North Road

6.3.2 2046 Future Base Case Outcomes

The network DOS and LOS are shown in Figure 6.3 and Figure 6.4 respectively.

A number of issues arise in the 2046 Future Base Case scenario. This is an expected outcome considering the congestion within the existing network and the increase in traffic volumes in the 2046 Future Base Case scenario.

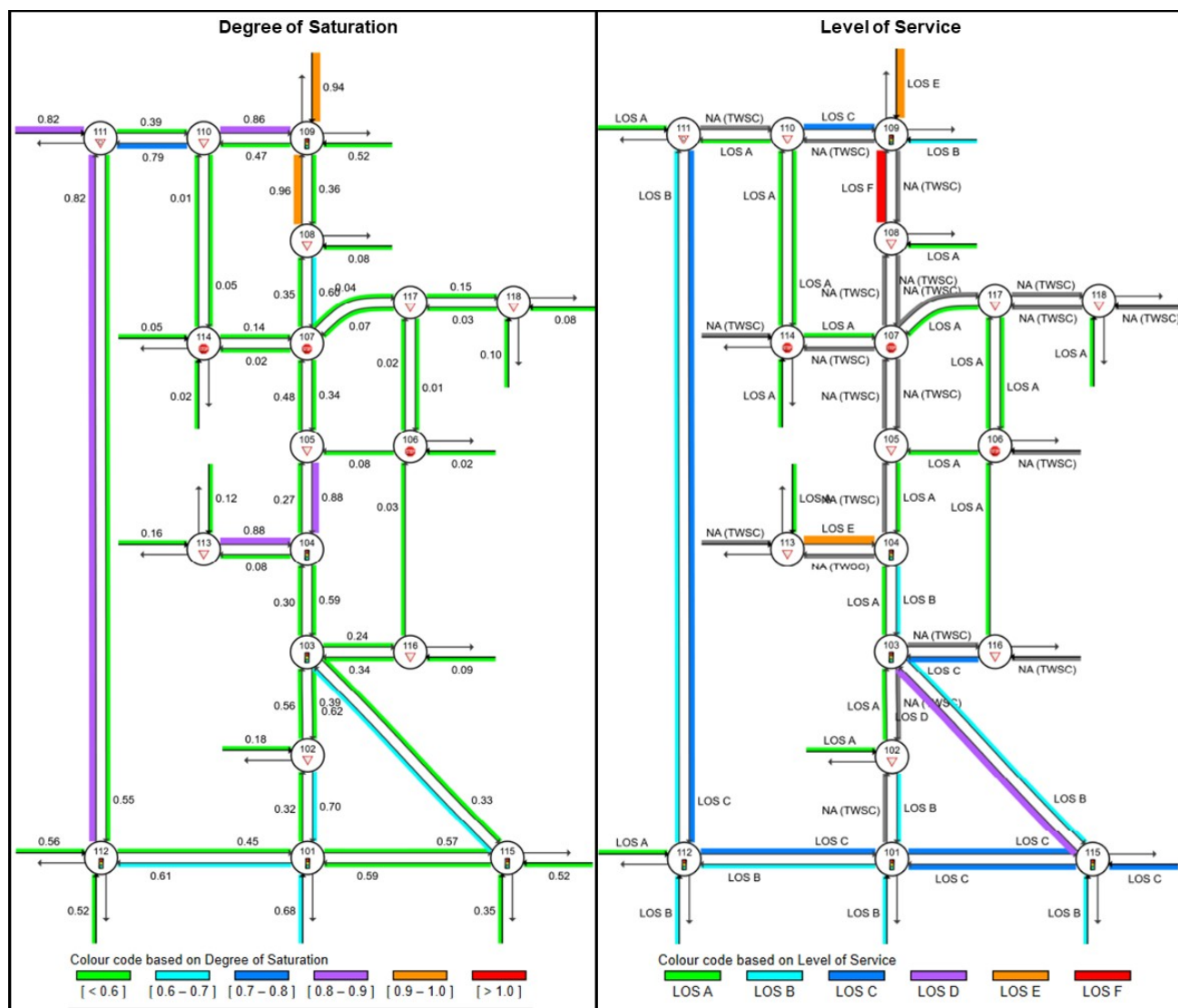


Figure 6.3: Future Base Case – AM Peak: Approach Performance

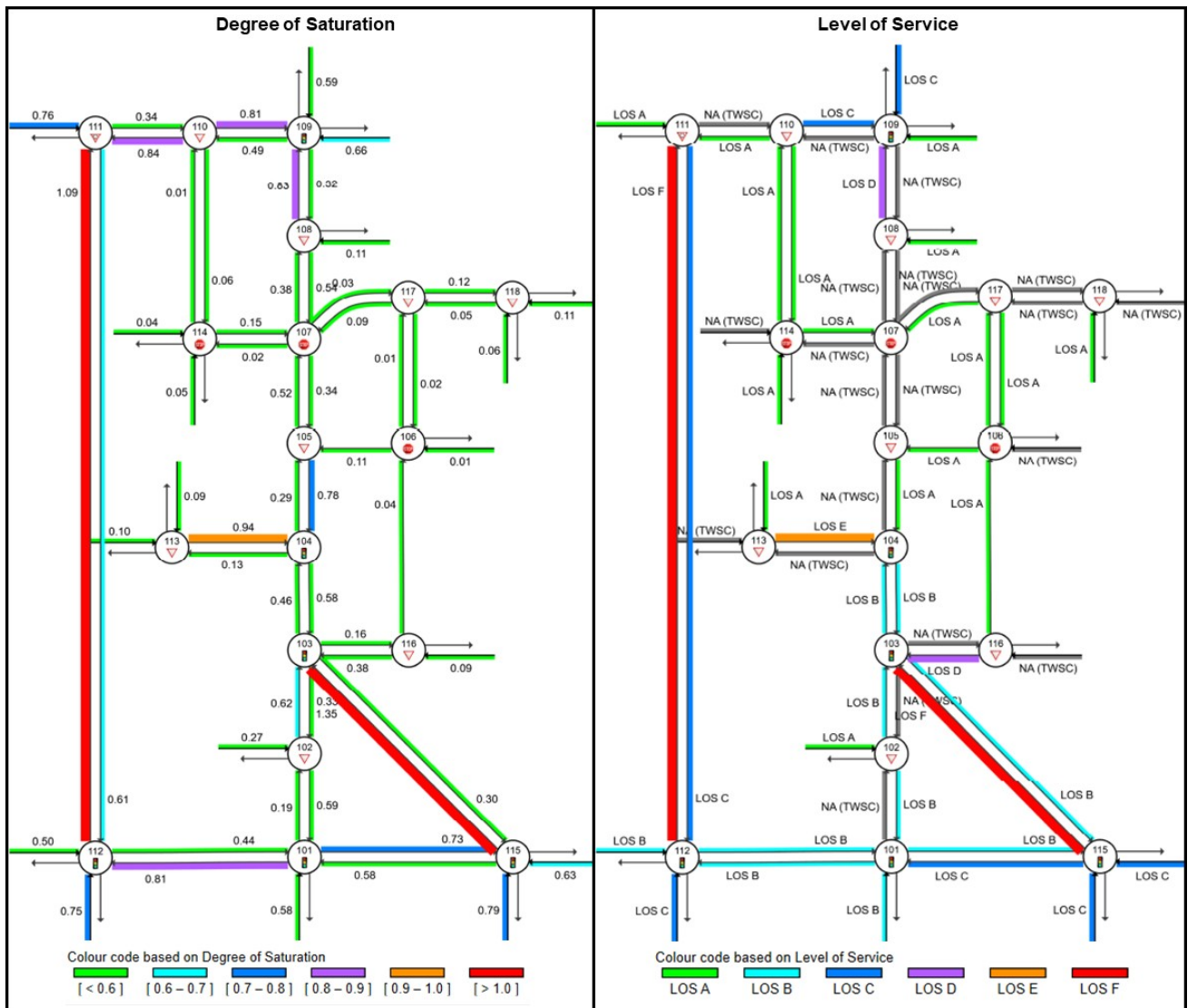


Figure 6.4: Future Base Case – PM Peak: Approach Performance

6.3.3 2046 Future Project Case Outcomes

The LOS and DOS of each approach is shown in Figure 6.5 and Figure 6.6.

The increased residential density associated with the Masterplan growth results in a notable deterioration of the traffic network with issues developing along Great North Road and Harris Road.

Particular emphasis is placed on pinch points at the following near-capacity or over-capacity intersections:

- Great North Road / Queens Road / Fairlight Street
- Great North Road / First Avenue / Ramsay Road
- Great North Road / Garfield Street
- Great North Road / Lyons Road
- Harris Road / Lyons Road West
- Harris Road / Queens Road.

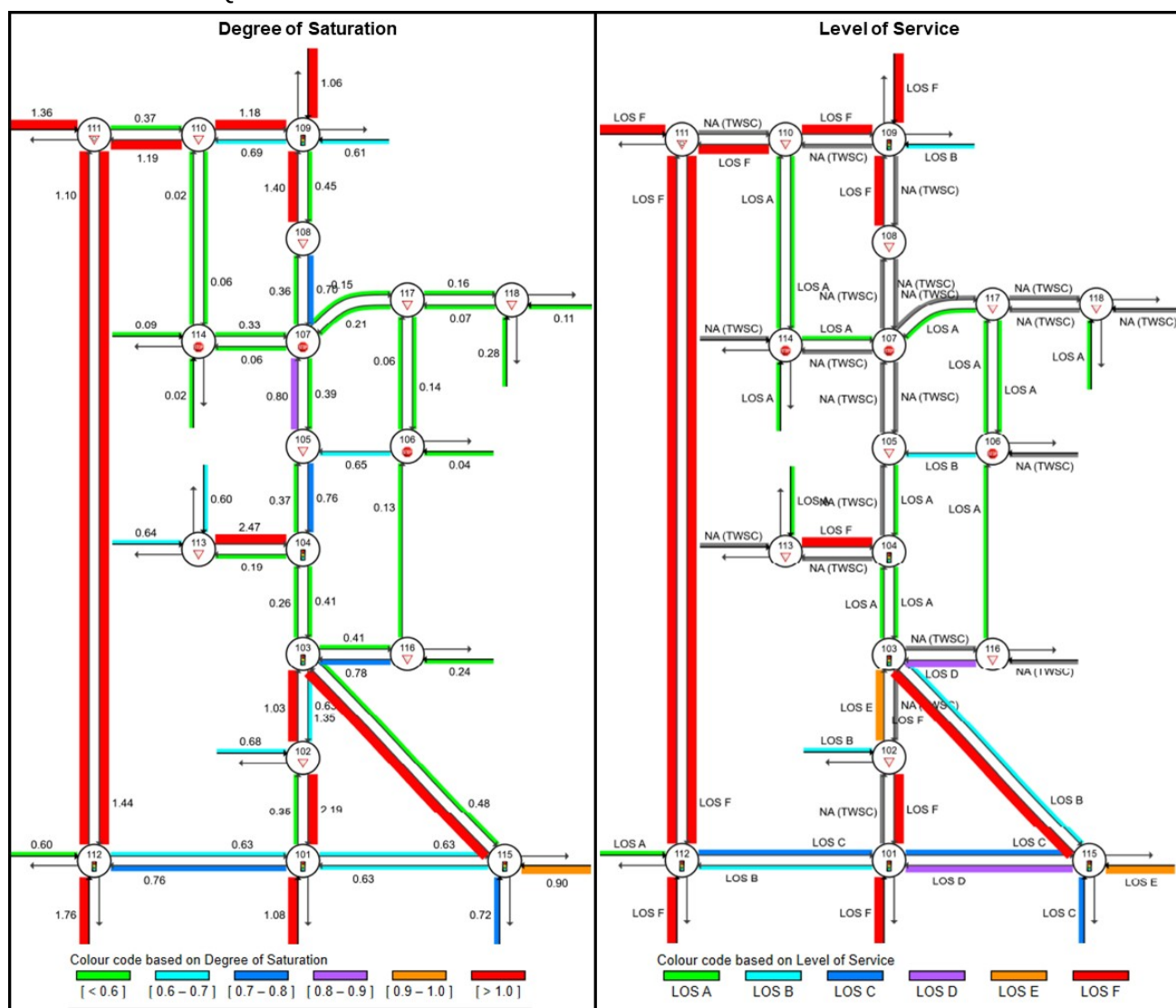


Figure 6.5: Future Project Case – AM Peak: Approach Performance

A further 2 intersections exceed delay performance thresholds in the PM peak:

- Great North Road / Second Avenue
- Ramsay Road / Fairlight Street.

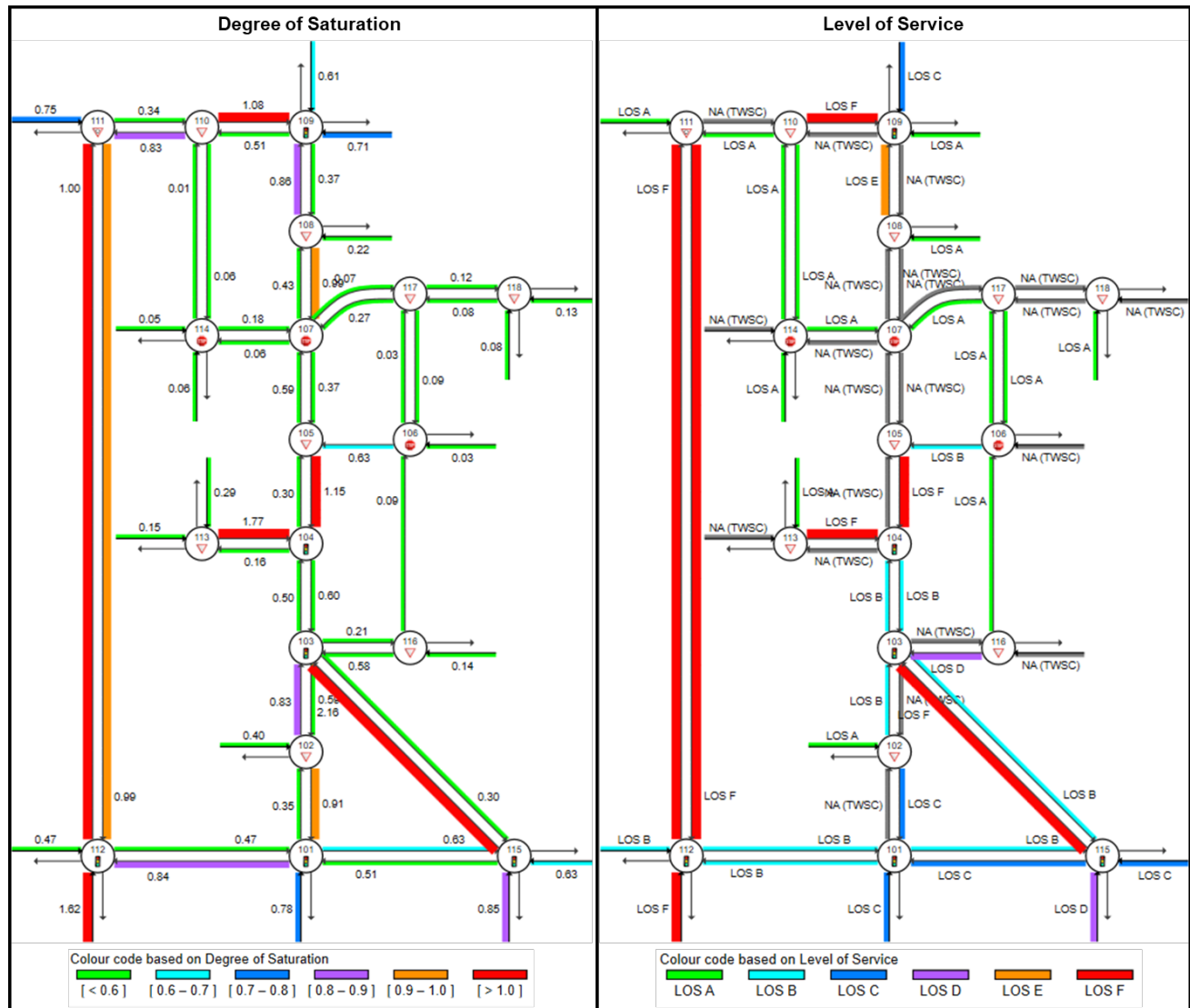


Figure 6.6: Future Project Case – PM Peak: Approach Performance

The network therefore experiences a number of major issues in the Project Case scenario when no mitigating measures are undertaken. Several links operate significantly over their operational capacity, revealing critical pinch points at Garfield Street, Ramsay Road and the southern section of Great North Road.

7. NETWORK UPGRADES MODELLING

7.1 Overview

To ensure that an adequate level of traffic performance can be achieved, road network upgrades are required as part of the Masterplan uplift. For the purpose of this assessment, an ideal intersection performance target of **LOS D or better** was adopted.

It is noted that the vision, objectives and planning principles for the Five Dock Precinct Masterplan aim foremost to deliver a transport solution that integrates public domain, built form and sustainable transport options. With this in mind, any improvements to vehicular traffic performance should aim to not come at the cost of significant compromise or sacrifice to public amenity, safety or security.

7.2 Traffic Network Performance Issues

Figure 7.1 summarises the traffic network issues caused by the introduction of the Five Dock Precinct uplift and Five Dock Metro Station as modelled in the 2046 Future Project Case.

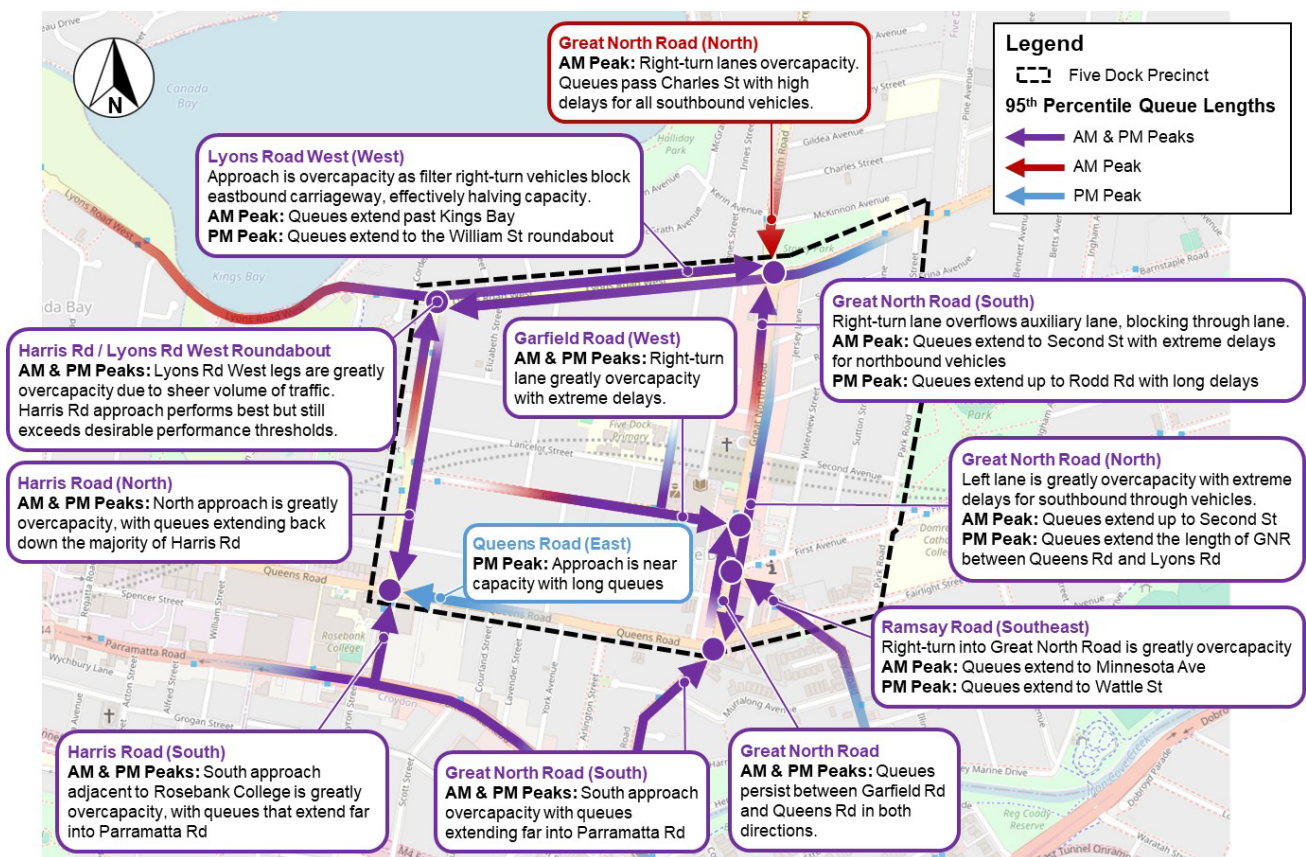


Figure 7.1: Traffic Congestion and Pinch Points – 2046 Future Project Case

The results of the Project Case scenario indicate that the projected population and employment uplift associated with the Five Dock Precinct Masterplan will result in a severe exacerbation of traffic congestion issues within the study area. Queues within the precinct will overflow back onto upstream roads, most notably spilling back onto Parramatta Road via Great North Road and Harris Road.

7.3 Masterplan Traffic Redirection

7.3.1 Great North Road / Henry Street / Barnstaple Road Signalisation

Right-turn opportunities from the residential catchments east and west of Great North Road are limited to two key intersections – Garfield Street and Second Avenue. Notably, Garfield Street is assessed to be significantly overcapacity with the full Project Case traffic loads. Without extensive upgrades to the intersection, morning residential traffic demands will struggle to exit the residential catchment west of Great North Road.

Second Avenue also approaches capacity, impacting vehicles heading northbound along Great North Road. Noting that this intersection is also located adjacent to the Five Dock Metro Station, high delays may result in problematic driver behaviour that impacts pedestrian safety.

It was therefore determined that providing an alternative right-turn opportunity onto Great North Road would be the most optimal solution. The nominated location is the signalisation of the Great North Road / Henry Street / Barnstaple Road intersection to allow right turn egress movements from the side streets (Great North Road right turns are still prohibited for performance and carriageway width optimisation).

As part of the upgraded scenarios, traffic was redistributed through the network to utilise the new right-turn and through movements available at Henry Street and Barnstaple Street.

7.3.2 One-Way Restrictions

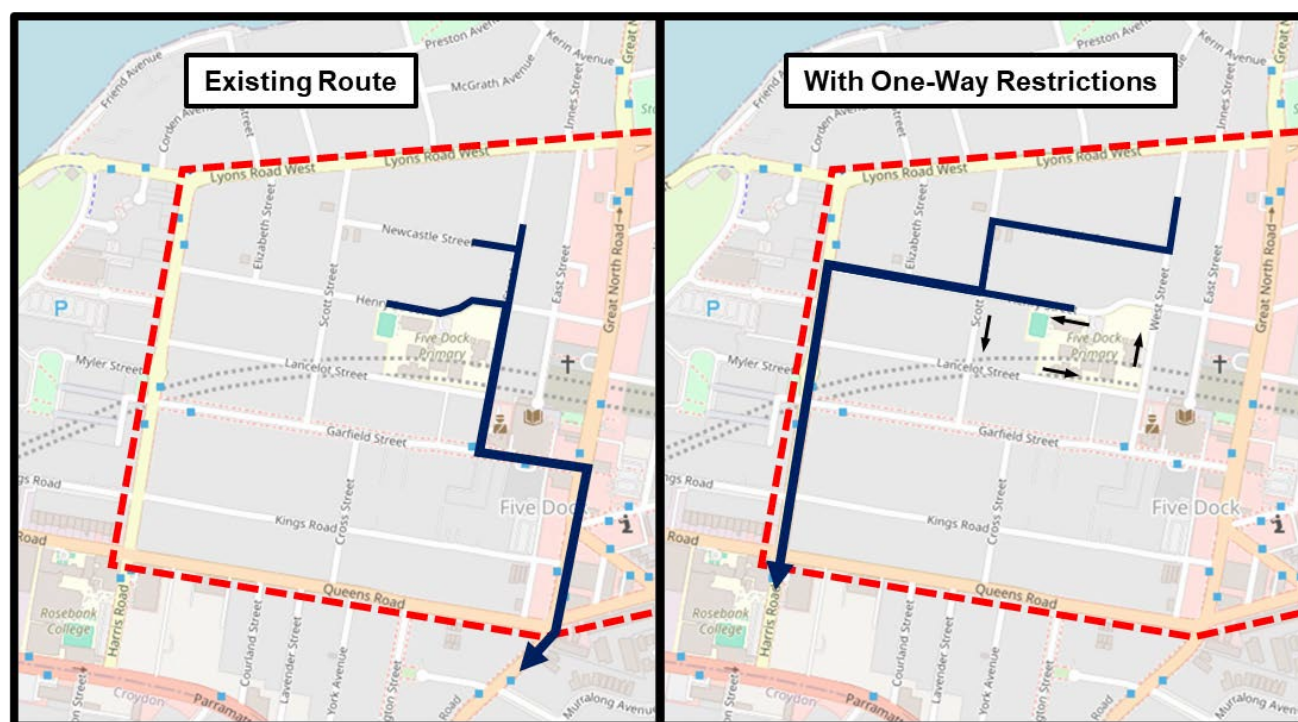
One of the key constraints with the roads in the local network of the Five Dock Precinct is the limited width of the road reserve. Narrow footpaths, kerbside parking and shallow property offsets result in tight, constrained streets with compromised sight distances.

A number of one-way restrictions are proposed as a means of controlling vehicle routes through the local catchments. Road space requirements are also reduced by limiting roads to one direction of traffic. The 'freed up' road reserve creates valuable opportunities for improved active transport infrastructure, allowing for improved road safety whilst retaining on-street parking spaces.

The proposed restrictions are concentrated in an anticlockwise one-way circulation around the Five Dock Public School. The proposed directions of travel around the neighbourhood block are:

- Westbound along Henry Street
- Northbound along West Street
- Eastbound along Lancelot Street
- Southbound along Scott Street.

This change requires a redistribution of the STFM traffic distribution assumptions from the north side of TZ 744. Trips from this area that currently travel southbound via Great North Road by using West Street to access Garfield Street no longer have a convenient route. They are instead assumed to travel southbound along Harris Road. This rerouting is shown in Figure 7.2.



Source: Adapted from OpenStreetMap

Figure 7.2: FDPS One-Way Traffic Redistribution

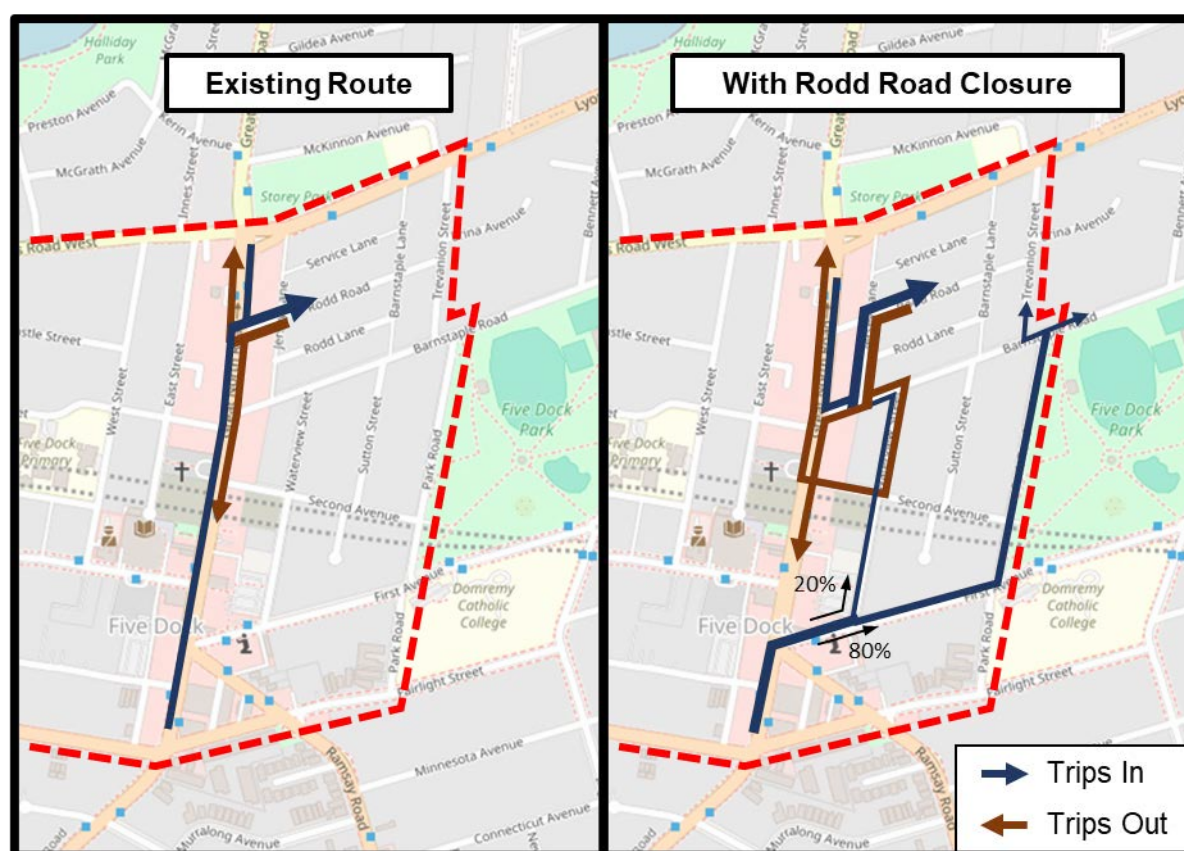
7.3.3 Rodd Road Closure

The section of Rodd Road between Great North Road and Jersey Lane is proposed to be closed to vehicle traffic. The space will be repurposed to improve the limited public domain on the northern side of the Five Dock Precinct.

Rodd Road is currently one of the few right-turn opportunities across Great North Road to and from the eastern residential catchment. Although it is observed that the recorded traffic volumes are low for the egress movement (around 10-20 vph during peaks), the ingress movement (i.e. turns from Great North Road into Rodd Road) are around 100 vph during peaks.

With the closure of Rodd Road these trips will need to be redistributed within the road network. It was assumed that the majority of redistributed trips from the south will utilise First Avenue, being one of the few remaining right turn opportunities across Great North Road to the eastern catchment. While volumes are anticipated to be low, any drivers seeking to access Rodd Road itself are likely to use nearby laneways like Jersey Lane.

The assumed redistributed routes are shown in Figure 7.3.



Source: Adapted from OpenStreetMap

Figure 7.3: Rodd Road Closure Traffic Redistribution

7.3.4 Kings Road Right-Turn Restriction

The right turn from Great North Road into Kings Road is a priority-controlled movement, with the existing operations resulting in the right turn movement frequently blocking through traffic. Network upgrades traffic modelling investigates the benefits of restricting this turn.

As this right-turn is one of the few right-turn opportunities across Great North Road into the western residential catchment, the closure of the movement is assumed to redistribute traffic primarily to Garfield Street (90%) and a minor volume at Queens Road (10%). This redistribution is shown in Figure 7.4.

While this may place additional traffic pressure on the signalised intersections, it is considered a beneficial outcome in terms of alleviating road safety risks associated with the priority-controlled right turn. This is particularly important in the face of increasing traffic volumes in future.



Source: Adapted from OpenStreetMap

Figure 7.4: Kings Road Right-Turn Restriction Traffic Redistribution

7.3.5 Harris Road Right-Turn Restriction

Congestion at the Queens Road / Harris Road intersection has significant implications for the traffic network, with queues at the south approach potentially extending onto Parramatta Road. To alleviate pressures at the constrained traffic signals, consideration should be given to relocating the northbound right turn movement by:

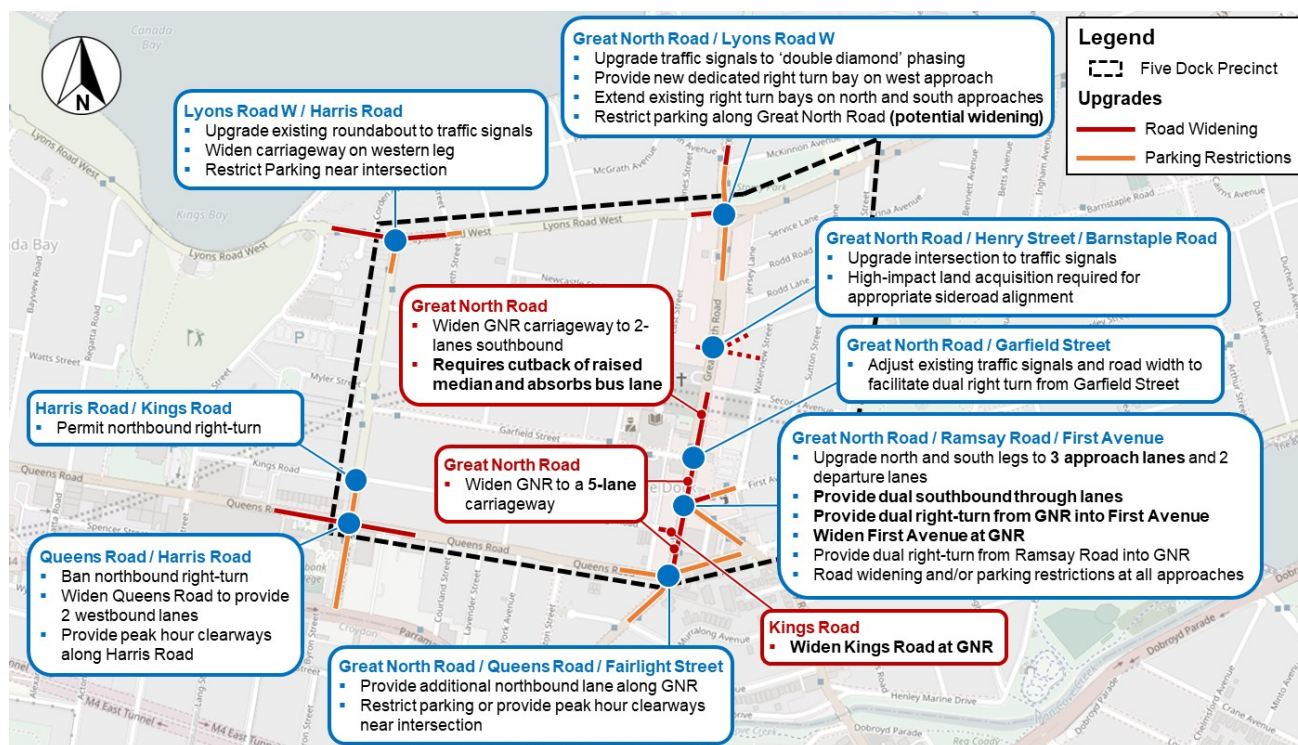
- Banning the northbound right-turn from Harris Road into Queens Road
- Lifting the existing right-turn ban from Harris Road to Kings Road.

In effect, the model will assume all right-turning traffic will be diverted northbound along Harris Road to turn right at a later opportunity (Kings Road, Garfield Street, etc.). An interrogation of strategic modelling outputs indicated that the subject increased right turns from Harris Road onto Queens Road are mostly associated with the Precinct's masterplan uplift – that is, residents in the new high-density dwellings along streets like Kings Road. This change mitigates the impact of this uplift on the boundary intersection, and instead distributes the movements to local intersections as a more direct access to the residential property driveways.

This right-turn restriction should be reinforced by prohibiting new driveway accesses onto Queens Road for masterplan properties located on the north side of Queens Road. This will have the added benefit of preventing right-turning vehicles travelling westbound along Queens Road from impeding westbound traffic flow.

7.4 Road Network Upgrades – Full Upgrade Scenario

The proposed upgrades shown in Figure 7.5 are required to maintain mostly adequate performance in 2046 with the masterplan. It is noted that these works are very extensive, with the key feature being a major widening to Great North Road at the expense of bus lanes, on-street parking and kerb build-outs. Traffic signal timing optimisation at intersections along state roads like Queens Road may result in significant differences to existing signal operations (more time given to ‘side road’ phases to flush masterplan traffic), which will require consultation with TfNSW.



Differences to the Balanced Road Upgrades are shown in **bold**.

Figure 7.5: Recommended Full Road Upgrades and Changes

It is acknowledged that the ‘Full Upgrade’ scenario represents a traffic-oriented masterplan scheme that necessitates a compromise of public domain for road capacity. This is not an unexpected result, given the significant level of traffic growth associated with the full masterplan yields. However, it is observed that this is not necessarily an ideal outcome for a multi-modal precinct with high levels of public transport accessibility.

Therefore, further investigation was undertaken to identify a ‘Balanced Upgrade’ scenario – a refined set of upgrades accompanied by reduced traffic demands due to trip generation discounts associated with aspirational mode share targets.

7.5 Road Network Upgrades – Balanced Upgrade Scenario

7.5.1 Proposed Upgrades

The 'Balanced Upgrade' scenario adopts an approximate 20% discount in masterplan site trip generation compared to the 'Full Upgrade' scenario, based on aspirational mode share targets outlined in Section 8.2. These vehicle trips are assumed to redistribute to active and public transport options.

The proposed road network upgrade scheme for the 'Balanced Upgrade' scenario achieves reduced impact on the village feel and public domain of the Five Dock Precinct, most notably with reduced road widening on the Great North Road corridor.

The proposed 'Balanced Upgrade' scenario upgrades are shown in Figure 7.6.

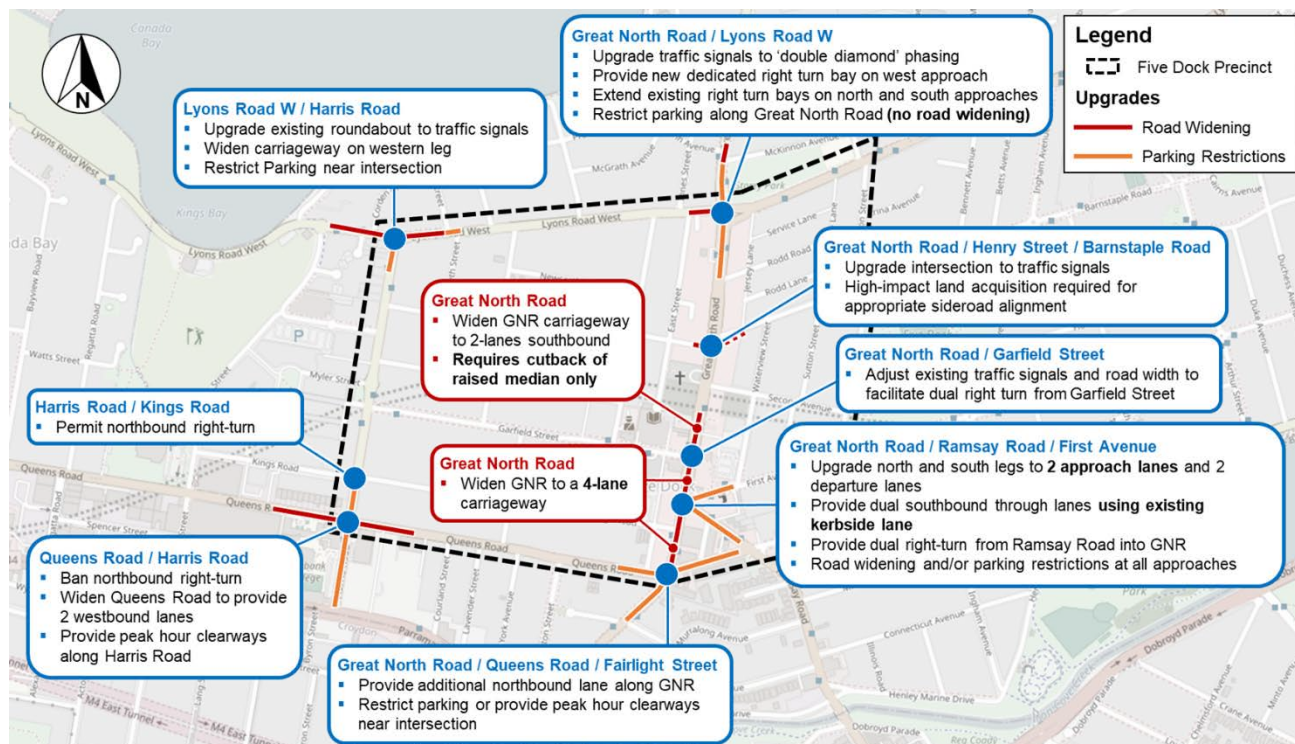


Figure 7.6: Recommended Balanced Road Upgrades and Changes

Differences to the Full Road Upgrades are shown in bold.

From a traffic and transport perspective, this scenario is considered to be strongly preferred in comparison to the 'Full Upgrades' scenario. It achieves a balance between 'harder' road infrastructure works and 'softer' travel demand management measures, which is at the core of multimodal precinct planning.

It is noted that any proposed upgrade along state-controlled roads will require coordination and approval from TfNSW.

A full breakdown of the recommended road network action items is listed in Section 9.2. The following sections detail specifics at each of the key upgrade locations.

7.5.2 Great North Road near Garfield Street and Ramsay Road

One of the key constraints within the network is the pinch point on Great North Road between Garfield Street and Ramsay Road. Significant traffic congestion is present on the west approach to the Great North Road / Garfield Street intersection and as well as high delays at the Great North Road / Ramsay Road / First Avenue intersection. To address this, it is recommended that the southbound carriageway of Great North Road south of Garfield Street be widened to 2 travel lanes to help 'flush' traffic out of the Five Dock Precinct. This would involve the following modifications at each intersection:

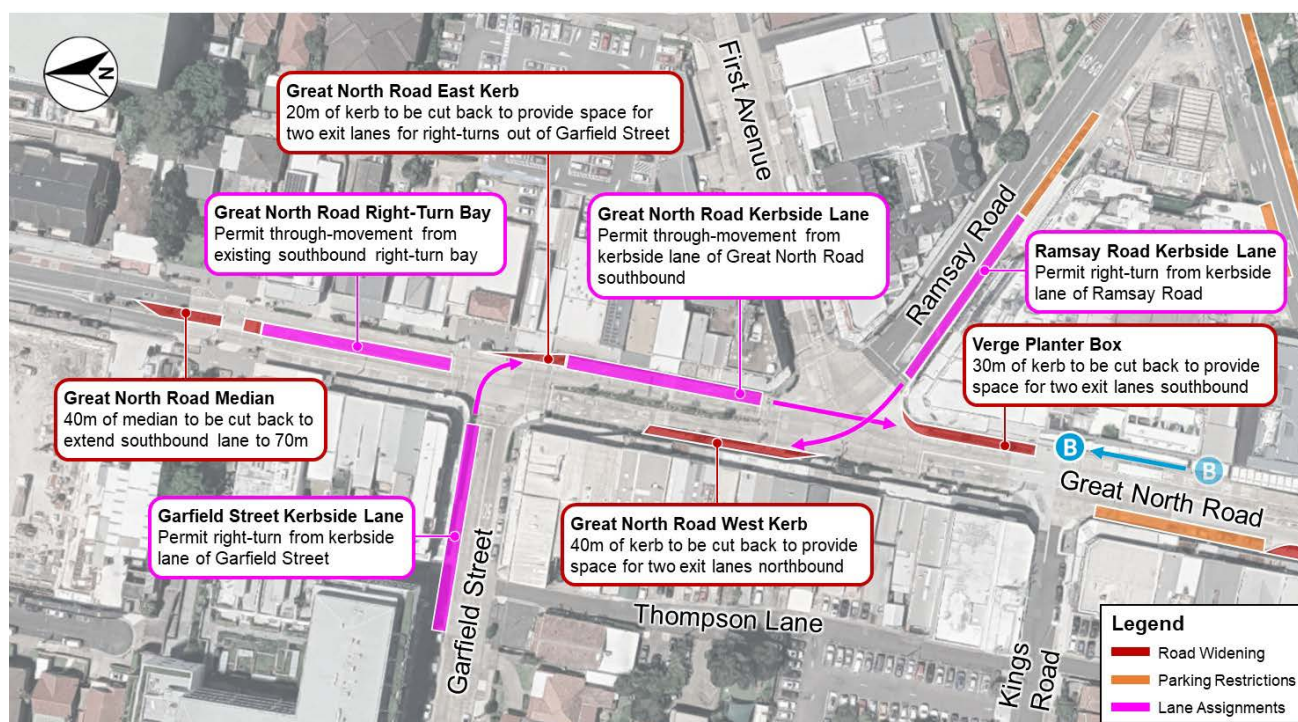
■ Great North Road / Garfield Street

- Modify the lane allocations on Garfield Street to also allow right-turns from Lane 1 (shared left-right)
- Widen the intersection via a kerb cutback on the east side of the intersection to provide sufficient space for 2 southbound exit lanes. The new exit-lane will be an extension of the existing left-turn short lane at the north approach of the Great North Road / Ramsay Road / First Avenue intersection.
- Adjust the existing signalised pedestrian crossing at the traffic signals – this is necessary due to safety risks caused by the new dual right turn movement from Garfield Street. Options include the provision of flashing yellow warning lights or the full removal of the signalised crossing from the TCS.

■ Great North Road / Ramsay Road / First Avenue

- Modify the lane allocations on Great North Road (N) to also allow through movements from Lane 1.
- Widen the intersection via the removal of the existing kerb build-out on the southbound carriageway to provide sufficient space for two (2) southbound exit lanes on Great North Road
- Relocate "Club Five Dock RSL, Great North Road" bus stop to the north (approximately opposite Kings Road) to minimise influences at downstream traffic signals
- Provide peak hour clearway / parking restrictions along the southern side of Ramsay Road.

These upgrades are shown in Figure 7.7.



Adapted from Google Maps

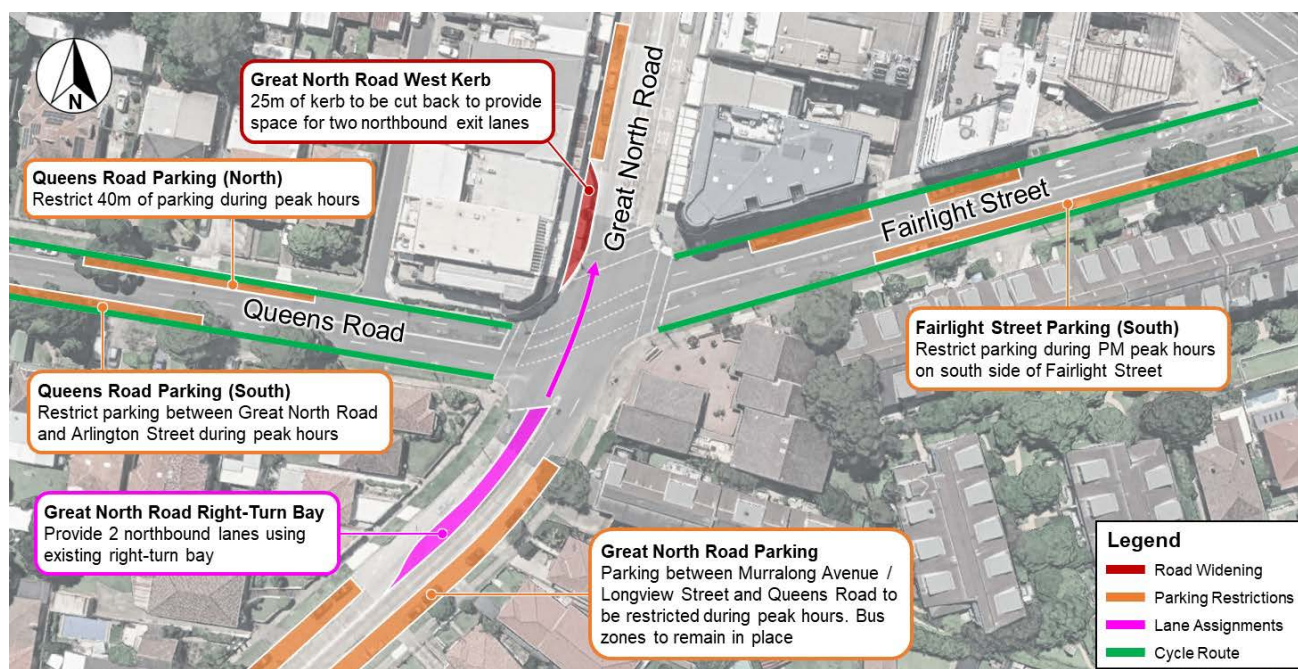
Figure 7.7: Great North Road near Garfield Street and Ramsay Road Upgrades

7.5.3 Great North Road / Queens Road / Fairlight Street

The intersection of Great North Road / Queens Road / Fairlight Street provides one of two opportunities for both northbound and southbound vehicles to turn right across Great North Road. The capacity of the intersection is greatly limited by vehicles waiting to turn right, as through traffic is effectively restricted to 1-lane. For performance at this intersection to be maintained the following upgrades are required:

- Provide 2 northbound through lanes by absorbing the existing right-turn bay. Lane 2 will become a shared through / right turn lane. The departure side will require kerb cutbacks to the northwestern corner of the intersection to facilitate dual exit lanes.
- Provide peak hour parking restriction or on all legs to improve intersection efficiency and merge distance. Restrictions on Great North Road should extend between Longview Street and Kings Road. Parking restrictions on the south side of Fairlight Street may operate during PM peak only.
- Adjust signal timing to provide more green time for travel along Great North Road
- Provide an additional signal phase for all southbound movements. This will flush out right-turning vehicles, reducing the frequency at which southbound through vehicles are blocked.

These upgrades are shown in Figure 7.8.



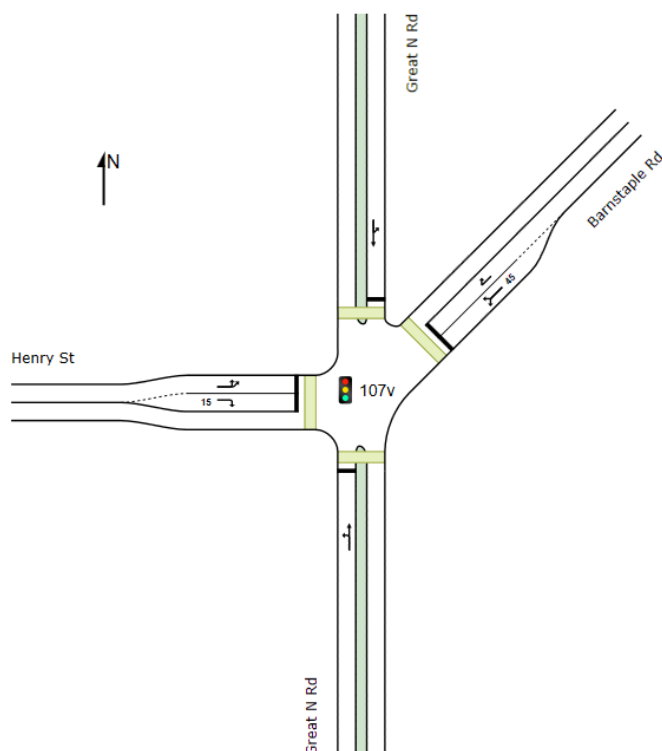
Adapted from Google Maps

Figure 7.8: Great North Road / Queens Road / Fairlight Street Upgrades

7.5.4 Great North Road / Henry Street / Barnstaple Street

The limited right-turn opportunities out of the residential catchments east and west of Great North Road causes critical links like Garfield Street to rapidly exceed its operational capacity.

A new signalised intersection at Henry Street / Barnstaple Road presents the most optimal solution for the inclusion of a new route onto Great North Road. An indicative intersection layout is shown in Figure 7.9.



Source: SIDRA

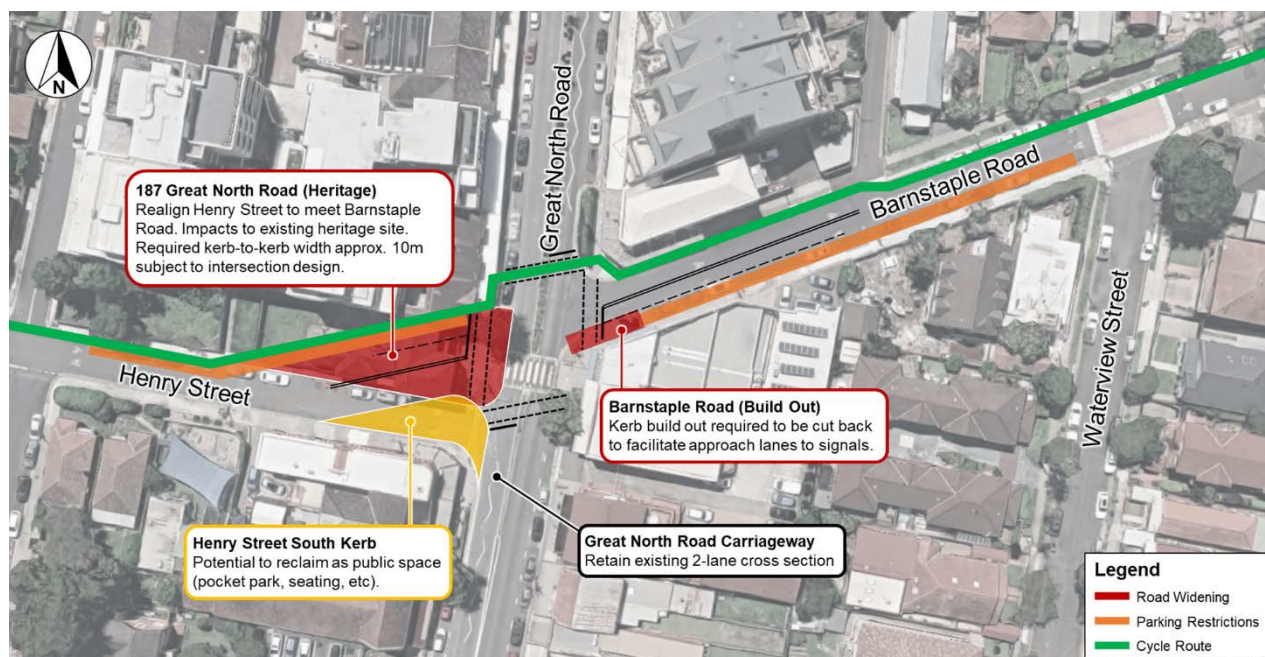
Figure 7.9: Great North Road / Henry Street / Barnstaple Road Signals Diagram

The introduction of this new signalised intersection is expected to alleviate the congestion on Garfield Street, improving its delay from LOS F to LOS D. Henry Street itself will perform at LOS E after its signalisation.

Due to the existing staggered side road nature of the Henry Street and Barnstaple Road intersection, the signalisation of this intersection requires major re-alignment of one of the roads, either:

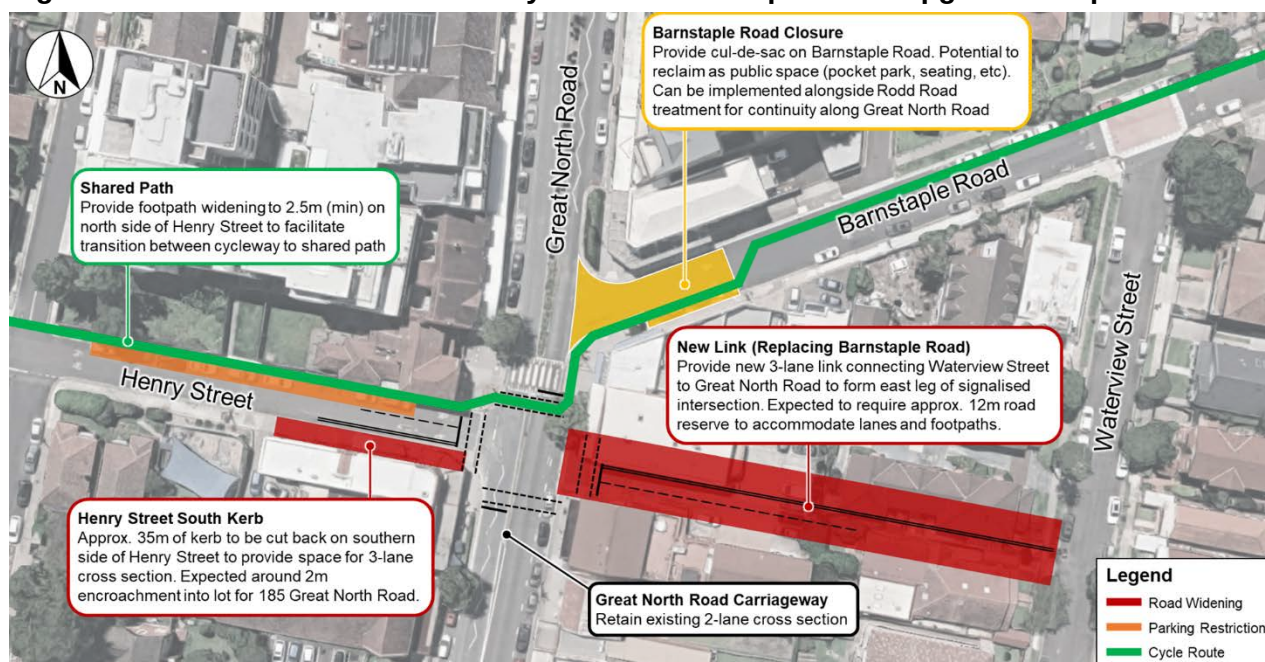
- Option 1: Realign Henry Street north-east to join Barnstaple Road at a cross intersection
 - Requires removal of existing kerb build-out on Barnstaple Road
 - Requires restriction of parking on Barnstaple Road near the intersection
 - This will maintain the current alignment of Barnstaple Road and have lesser impacts on the size of affected lots
 - However, this may have impacts to existing heritage property on the north side of Henry Street (187 Great North Road).
- Option 2: Create a new 12m wide road link between Great North Road and Waterview Street in alignment with Henry Street.
 - Requires widening of Henry Street for around 35m on the southern side by approximately 2m to accommodate three-lane approach with adequate footpath space
 - Requires restriction of parking on the north side of Henry Street east of East Street
 - Opportunity of road closure of Barnstaple Street at Great North Road, with potential to utilise as public space (e.g. a pocket park with integration into the cycling corridor) similar to proposed treatment at Rodd Road
 - Regional cycle route can transition to shared path to cross Great North Road into Barnstaple Road public space (designed around this integration) to continue along existing alignment
 - Dimensions subject to intersection design and turning path assessments.

The options are shown in Figure 7.10 and Figure 7.11.



Adapted from Google Maps

Figure 7.10: Great North Road / Henry Street / Barnstaple Road Upgrades – Option 1



Adapted from Google Maps

Figure 7.11: Great North Road / Henry Street / Barnstaple Road Upgrades – Option 2

From a road design perspective, Option 1 is preferred for the simplified arrangement, requiring only a re-alignment of Henry Street and maintaining Barnstaple Road at its existing alignment. This reinforces Barnstaple Road as a higher movement local street. 'Rat-running' through Henry Street will be minimised through the one-way restriction around Five Dock Public School. The realignment of Henry Street also provides opportunity to improve pedestrian infrastructure at this location.

Option 2 avoids impacts to heritage at the cost of increased works and less direct routing. Utilising a new link between Great North Road and Waterview Street creates a 'dog-leg' movement for east-west travel via Waterview Street. Delineation along Waterview Street and changes to intersection priorities are recommended to improve vehicle movement by prioritising the subject route. Option 2 also facilitates a more standard 4-way orthogonal intersection with typical sightlines.

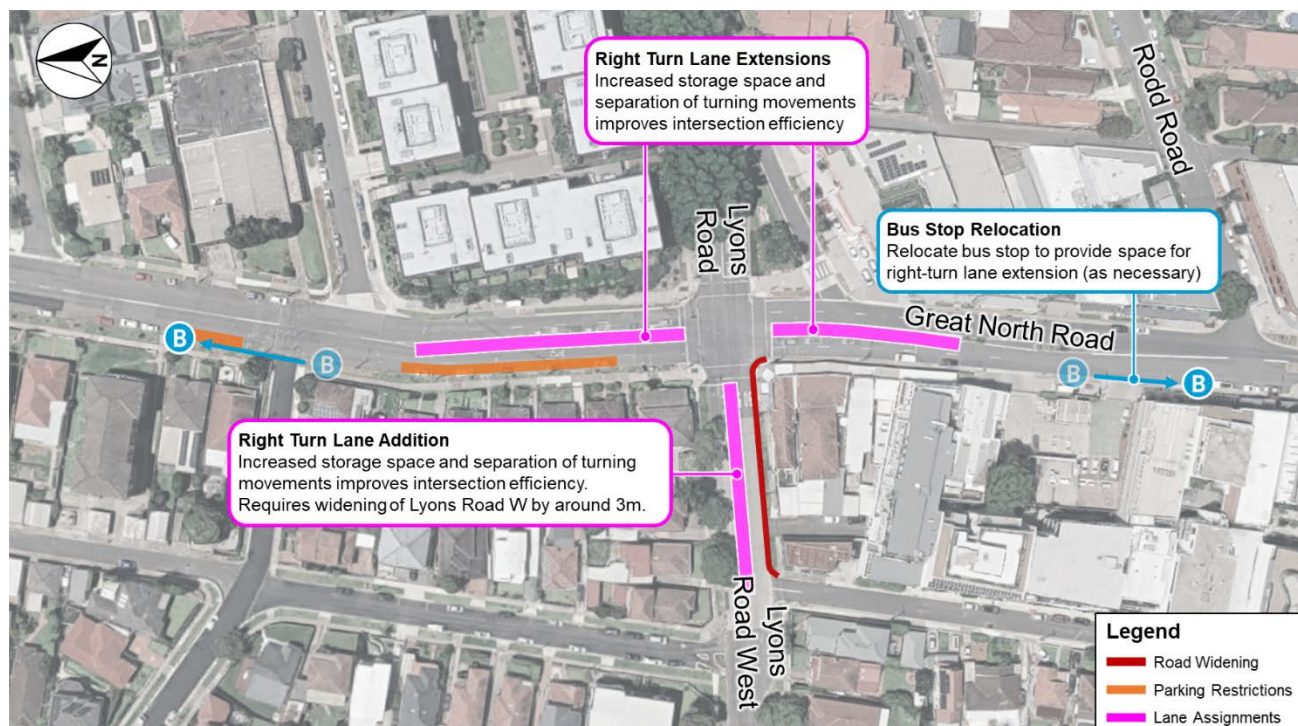
7.5.5 Great North Road / Lyons Road / Lyons Road West

This intersection operates poorly in the Masterplan scenarios, with extremely high delays and long queues on the north, south and west approaches (especially the latter). The existing traffic signals at this site operate as 'split side roads', where the north and south approaches on Great North Road run sequentially (as opposed to at the same time). It is proposed to upgrade this intersection to a contemporary 'double diamond' phase sequence, where the right turns operate at the same time in a dedicated phase and also filter during the main phase. This would involve the following modifications to this intersection:

- Construct a dedicated right turn bay on the west approach to reduce delays and queues caused by friction with the filter right turn on this approach. This item will require some land acquisition on the south side of Lyons Road West between East Street and Great North Road (approx. 3m additional width). Impacts on alignment for eastbound and westbound lanes with their respective exit lanes must be considered alongside the cost of post and utilities relocation.
- Convert Lane 2 of the north approach to through movements only (i.e. no more shared right turn lane) due to constrained intersection geometry and diamond phasing requirements for simultaneous right turn movements.
- Extend existing right turn bay on the north approach to around 70m (currently 45m). This may require some impacts to kerbside parking and/or bus stops at this location subject to intersection design.
- Extend existing right turn bay on the south approach to 50m (currently around 30m). This may require some impacts to kerbside parking and/or bus stops at this location subject to intersection design.
- Dimensions subject to intersection design and turning path assessments.

These upgrades are shown in Figure 7.12.

Alternative options include the banning of the right turn from Lyons Road West, which is one of the most critical movements at the intersection. Despite its effectiveness in improving intersection performance, the high volume of impacted traffic, the loss of connectivity into Great North Road and the resulting forced 'rat-running' is expected to have unacceptable implications for the nearby local streets.



Adapted from Google Maps

Figure 7.12: Great North Road / Lyons Road Upgrades

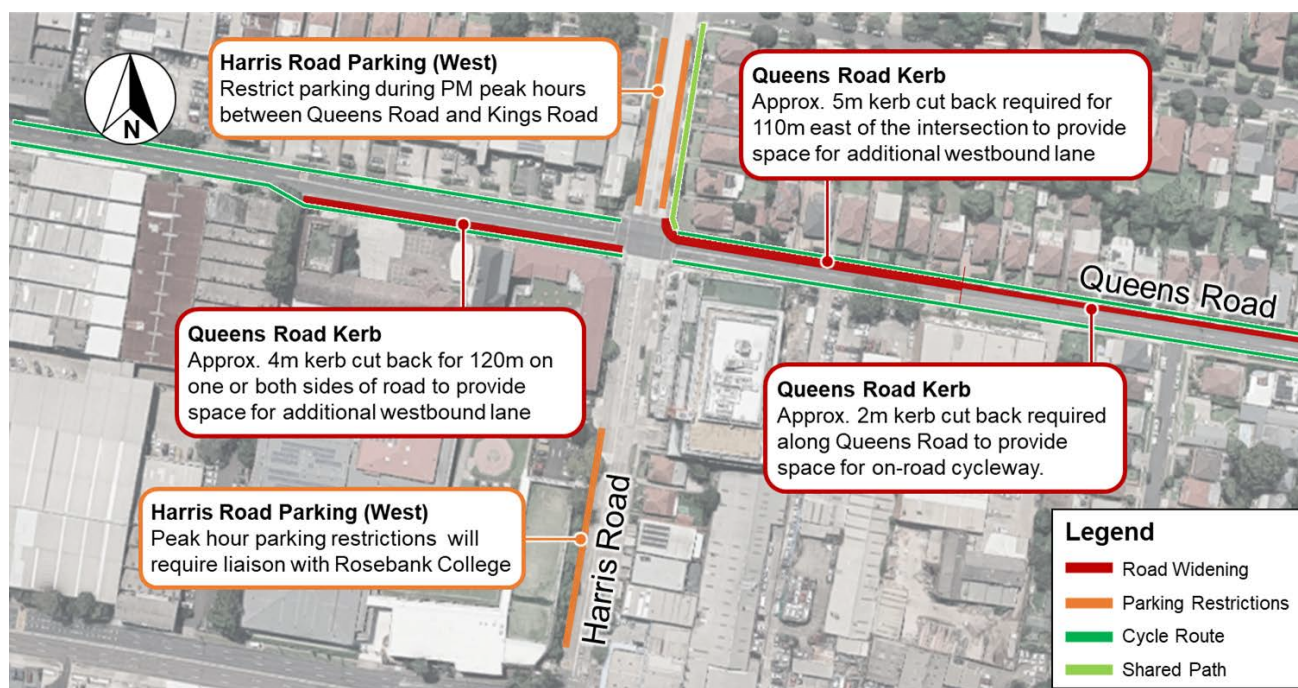
7.5.6 Queens Road / Harris Road

This is an existing signalised intersection with heavily constrained geometry. Despite the high Movement function of Queens Road, it only has single through movement approaches. To compensate, the intersection demands a high proportion of signal green time for the Queens Road movement to provide for the traffic demands. A consequence of the prioritisation of Queens Road is that the Harris Road approaches show a rapid deterioration of performance as trips to and from the Five Dock Precinct catchment increase in the future.

The recommended upgrades to this intersection are as follows:

- Provide 2 westbound lanes on Queens Road
 - The existing filter right turn movement may block westbound through traffic and/or require hazardous vehicle movements to navigate around waiting vehicles due to the narrow intersection footprint
 - Whilst relatively in low volume (<50 vph), minimising friction on this approach is key to improving overall intersection efficiency
 - The provision of dedicated turning infrastructure will also improve traffic safety at this intersection
 - Requires land acquisition approx. 4-5m kerb cut back along Queens Road, subject to intersection design.
- Provide peak hour clearway / parking restrictions along the western side of Harris Road (between Queens Road and Parramatta Road)
 - Requires relocation of pick-up and drop-off zone for Rosebank College
 - Potential for this to be serviced via a future link on western side of Rosebank College)
- Provide peak hour clearway / parking restrictions along Harris Road between Queens Road and Kings Road
- Optimise traffic signal phase timing
 - As a part of intersection upgrades, signal phase timing can be rebalanced to reflect the increase in traffic volumes along Harris Road.

It is noted that this intersection is at the boundary of the study area, and is further influenced by regional strategic planning and projects. Queens Road serves as a supplementary corridor running parallel to Parramatta Road. Future changes to Parramatta Road (as parts of PRCUTS or similar) and/or development of Metro stations further upstream may affect route choice along Queens Road.



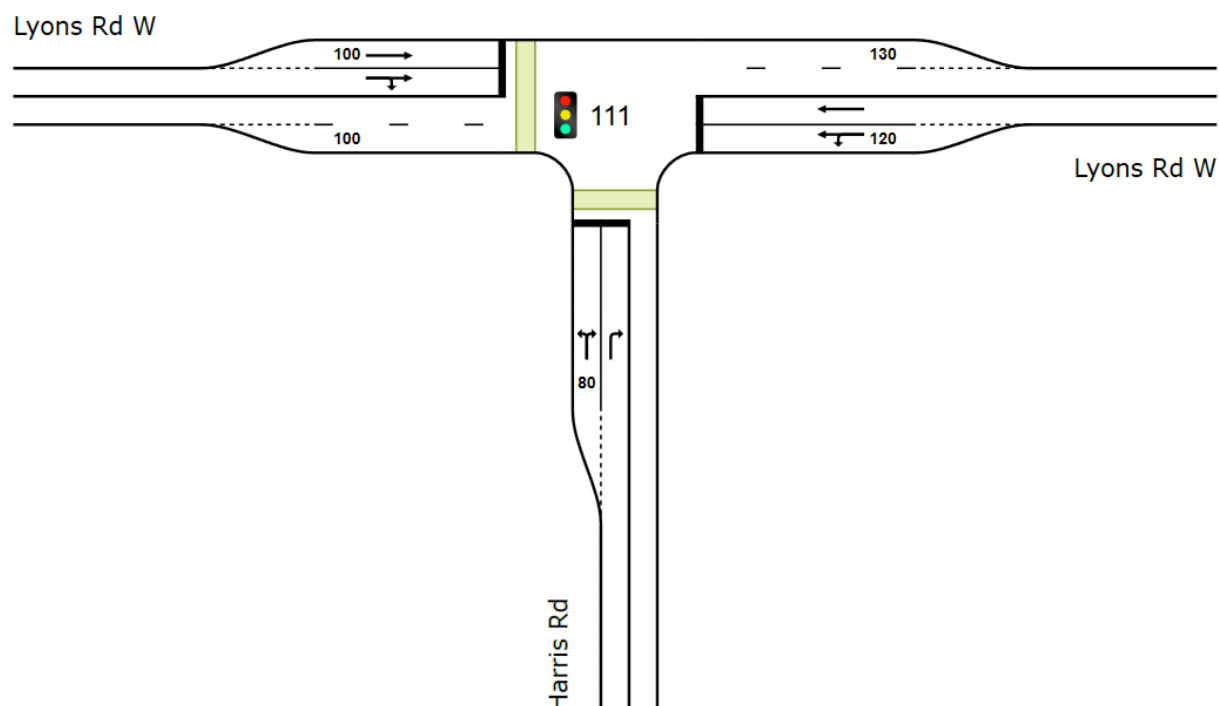
Adapted from Google Maps

Figure 7.13: Queens Road / Harris Road Upgrades

7.5.7 Lyons Road West / Harris Road

This intersection is currently a frequently utilised roundabout with approximately 1,000 vph on Lyons Road in each direction projected by 2046. This increase in traffic volumes heavily strains the capacity of the roundabout, particularly on the southern approach (which is opposed by high westbound flows). The right turn from Harris Road onto Lyons Road is in high demand with over 300 vph in both peak periods. As the roundabout is no longer capable of accommodating the projected volumes, it is proposed that the intersection be upgraded to traffic signals.

An indicative intersection layout is shown in Figure 7.14.



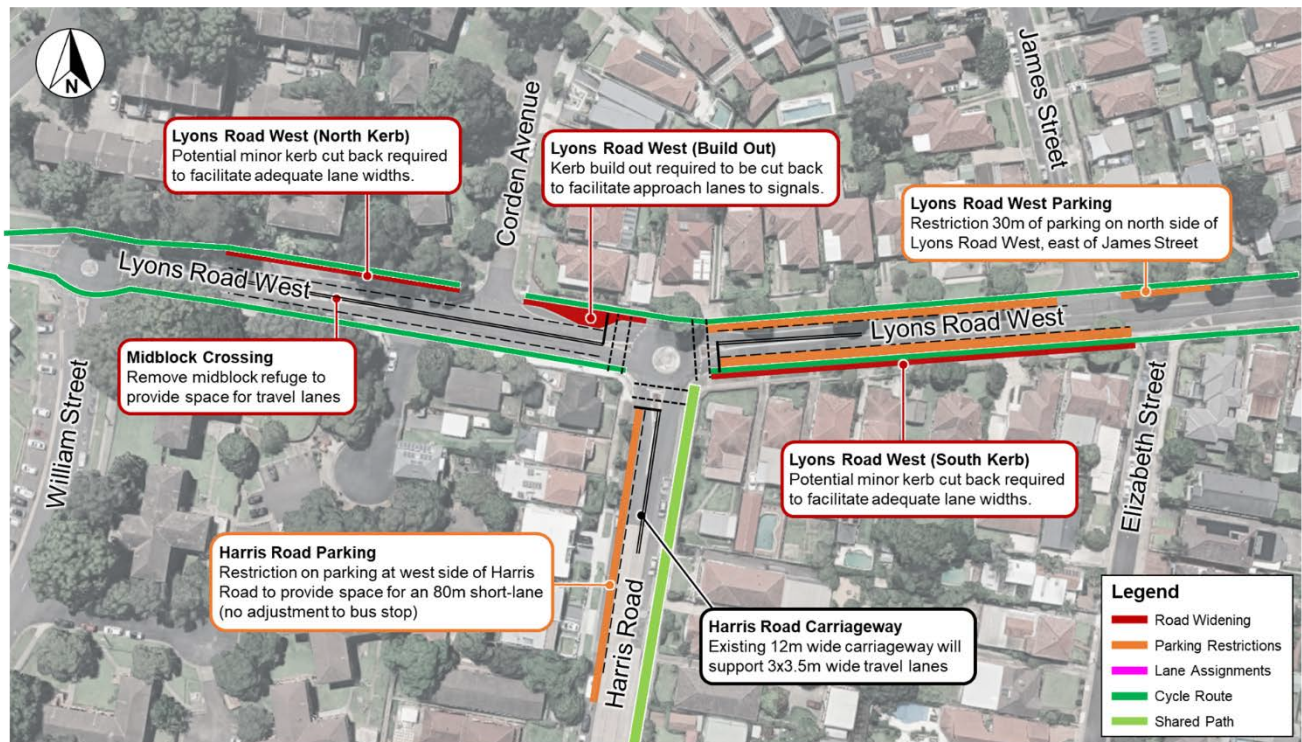
Source: SIDRA

Figure 7.14: Lyons Road West / Harris Road Signals Diagram

The following impacts, considerations or challenges should be noted:

- Loss of parking on Lyons Road West between Harris Road and Elizabeth Street (opportunities for timed peak hour clearways instead to minimise parking impacts)
- Loss of parking on Lyons Road West between Harris Road and Maida Street
- Cut-back of the kerb build-out on north side of Lyons Road West between Corden Avenue and Harris Road will be required to facilitate two approach lanes
- The design will likely require special exemption from TfNSW to not include a signalised pedestrian crossing on the east approach of the intersection
 - Pedestrian protection requirements would offset any performance benefits from the proposed signalised arrangements
 - This is considered to be mitigated through existing and proposed pedestrian infrastructure along Lyons Road West (see Section 8.4)
 - B Phase: All movements from Harris Road. West leg pedestrian crossing green time.
- The presence of driveways within the intersection extents on the north side of Lyons Road West will need to be accounted for during TCS design stages.

The minimum required modifications to achieve this intersection layout are shown in Figure 7.15. However, it is noted that the existing lane widths along Great North Road are below the minimum recommended for roads on bus routes as outlined in TfNSW *Guidelines for Public Transport Capable Infrastructure in Greenfield Sites 2018*. This specifies a width of 3.2m for travel lanes, and 3.5m for kerbside travel lanes. As such, further widening along Lyons Road West may be required to achieve these lane widths.



Adapted from Google Maps

Figure 7.15: Lyons Road West / Harris Road Upgrades

The modelling results show that the average delay with this intersection layout measures around LOS B during the AM peak and LOS C during the PM peak (from LOS F with the existing roundabout). Although significantly improved, the Harris Road approach will average LOS D during both peaks and queues may extend to Henry Street.

Another benefit of this upgrade is a moderate improvement to pedestrian safety, as they will gain priority at the intersection and drivers will have better awareness of pedestrians on the road. While the existing splitter islands may function also as refuge islands, the signalised crossings will be safer for all road users.

7.6 Road Network Upgrades Traffic Performance

The results comparison of the pre-upgrades and post-upgrades scenarios are shown in Table 7.1 and Table 7.2.

Table 7.1: Future Project Upgrades Intersection Level of Service Comparison

Intersection	AM Peak - Level of Service			PM Peak - Level of Service		
	Future Project	Future Project (Full Upgrades)	Future Project (Balanced Upgrades)	Future Project	Future Project (Full Upgrades)	Future Project (Balanced Upgrades)
101 - GNR / Queens Rd / Fairlight St	LOS F	LOS C	LOS B	LOS F	LOS C	LOS B
102 - GNR / Kings Rd	LOS B	LOS E	LOS B	LOS A	LOS F	LOS B
103 - GNR / Ramsay Rd / First Ave	LOS F	LOS C	LOS C	LOS F	LOS C	LOS B
104 - GNR / Garfield St	LOS F	LOS C	LOS B	LOS F	LOS A	LOS B
105 - GNR / Second Ave	LOS B	LOS B	LOS B	LOS F	LOS C	LOS B
106 - Second Ave / Waterview St	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
107 - GNR / Barnstable Rd / Henry St	LOS A	LOS B	LOS B	LOS A	LOS B	LOS B
108 - GNR / Rodd Rd	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
109 - GNR / Lyons Rd / Lyons Rd West	LOS F	LOS D	LOS C	LOS F	LOS C	LOS C
110 - Lyons Rd West / East St	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
111 - Lyons Rd West / Harris Rd	LOS F	LOS C	LOS B	LOS F	LOS C	LOS C
112 - Queens Rd / Harris Rd	LOS F	LOS C	LOS B	LOS F	LOS D	LOS C
113 - Garfield St / West St	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
114 - Henry St / East St	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
115 - Ramsay Rd / Fairlight St	LOS C	LOS C	LOS C	LOS F	LOS C	LOS C
116 - First Ave / Waterview St	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
117 - Barnstable Rd / Waterview St	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A
118 - Barnstable Rd / Park Rd	LOS A	LOS A	LOS A	LOS A	LOS A	LOS A

*GNR refers to Great North Road

Table 7.2: Future Project Upgrades Intersection Degree of Saturation Comparison

Intersection	AM Peak - Degree of Saturation			PM Peak - Degree of Saturation		
	Future Project	Future Project (Full Upgrades)	Future Project (Balanced Upgrades)	Future Project	Future Project (Full Upgrades)	Future Project (Balanced Upgrades)
101 - GNR / Queens Rd / Fairlight St	2.192	0.902	0.653	2.674	1.081	0.716
102 - GNR / Kings Rd	0.676	0.835	0.674	0.699	1.05	0.703
103 - GNR / Ramsay Rd / First Ave	1.351	0.775	0.998	1.459	0.911	0.832
104 - GNR / Garfield St	2.469	0.927	0.919	2.211	0.815	0.904
105 - GNR / Second Ave	0.651	0.871	0.677	1.247	0.875	0.692
106 - Second Ave / Waterview St	0.135	0.152	0.131	0.209	0.148	0.128
107 - GNR / Barnstable Rd / Henry St	0.805	0.836	0.738	0.614	0.682	0.634
108 - GNR / Rodd Rd	0.45	0.979	0.812	0.497	0.565	0.453
109 - GNR / Lyons Rd / Lyons Rd West	1.395	1.016	1.003	1.317	1.005	0.952
110 - Lyons Rd West / East St	0.69	0.537	0.525	0.804	0.597	0.577
111 - Lyons Rd West / Harris Rd	1.359	0.998	0.962	1.188	0.958	0.918
112 - Queens Rd / Harris Rd	1.765	0.866	0.794	2.312	0.942	0.945
113 - Garfield St / West St	0.603	0.325	0.292	0.438	0.298	0.273
114 - Henry St / East St	0.095	0.18	0.152	0.098	0.14	0.115
115 - Ramsay Rd / Fairlight St	0.905	0.714	0.676	1.153	0.813	0.786
116 - First Ave / Waterview St	0.414	0.378	0.428	0.334	0.316	0.323
117 - Barnstable Rd / Waterview St	0.153	0.165	0.139	0.127	0.13	0.11
118 - Barnstable Rd / Park Rd	0.283	0.266	0.242	0.227	0.204	0.186

*GNR refers to Great North Road

Both 'Upgrade' scenarios show significant improvements compared to the pre-upgrade scenario. Of the 6 intersections which were operating at LOS F during the AM peak, all 6 have improved to LOS D or better. The only exception in the Full Upgrades scenario is the Kings Road intersection, which operates at LOS E. A similar pattern occurs during the PM peak, where all 8 intersections performing at LOS F improve to LOS D or better in both 'Upgrade' scenarios, however Kings Road degrades to LOS F.

The 'Balanced Upgrades' scenario generally achieves better intersection performance; however, a number of intersections are still operating near capacity. While significantly improved, this scenario still exhibits some level of traffic congestion within the Five Dock town centre. This is highlighted in the network plots shown in Figure 7.16 and Figure 7.17.

It is therefore recommended that the 'Balanced Upgrades' scenario be adopted as part of the masterplan development, with requisite property setbacks and land acquisition needs implanted into the relevant mechanisms. Regardless, its implementation will require a strong reinforcement of sustainable transport options to achieve the mode shift required for these upgrades to be sufficient.

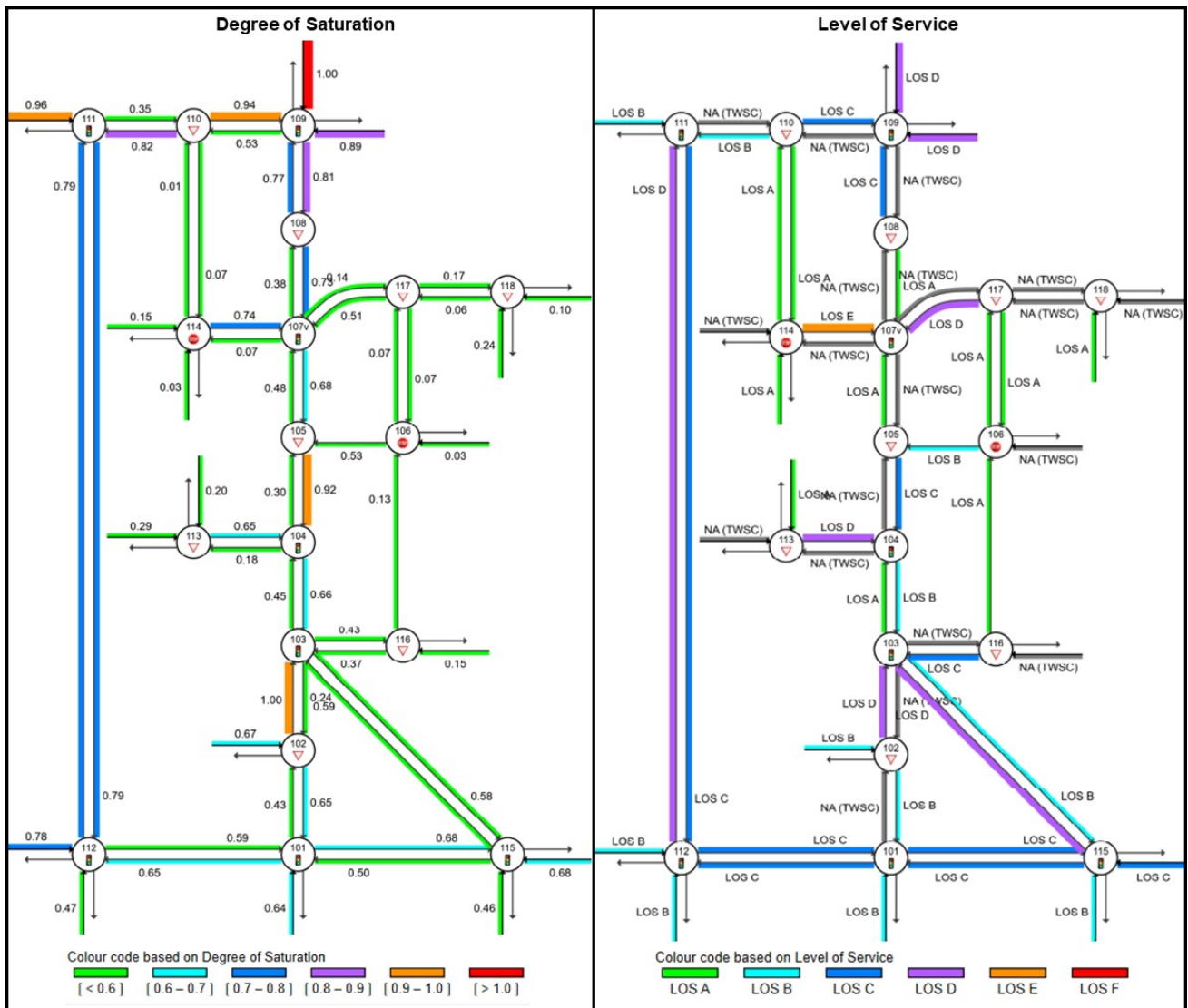


Figure 7.16: Future Project Balanced Upgrades Approach Performance – AM Peak

In the AM peak, Henry Street alone shows LOS E on the west approach. It's likely that vehicles will naturally redistribute to Garfield Street, which remains well under capacity in this scenario.

The north leg of Great North Road at Lyons Road West exhibits a DOS >1. This is primarily caused by a congested southbound right-turn. As this intersection remains near capacity, concessions from other approaches cannot be made. However, the overall approach delay remains at an acceptable level and no further upgrades are recommended to be made to the intersection.

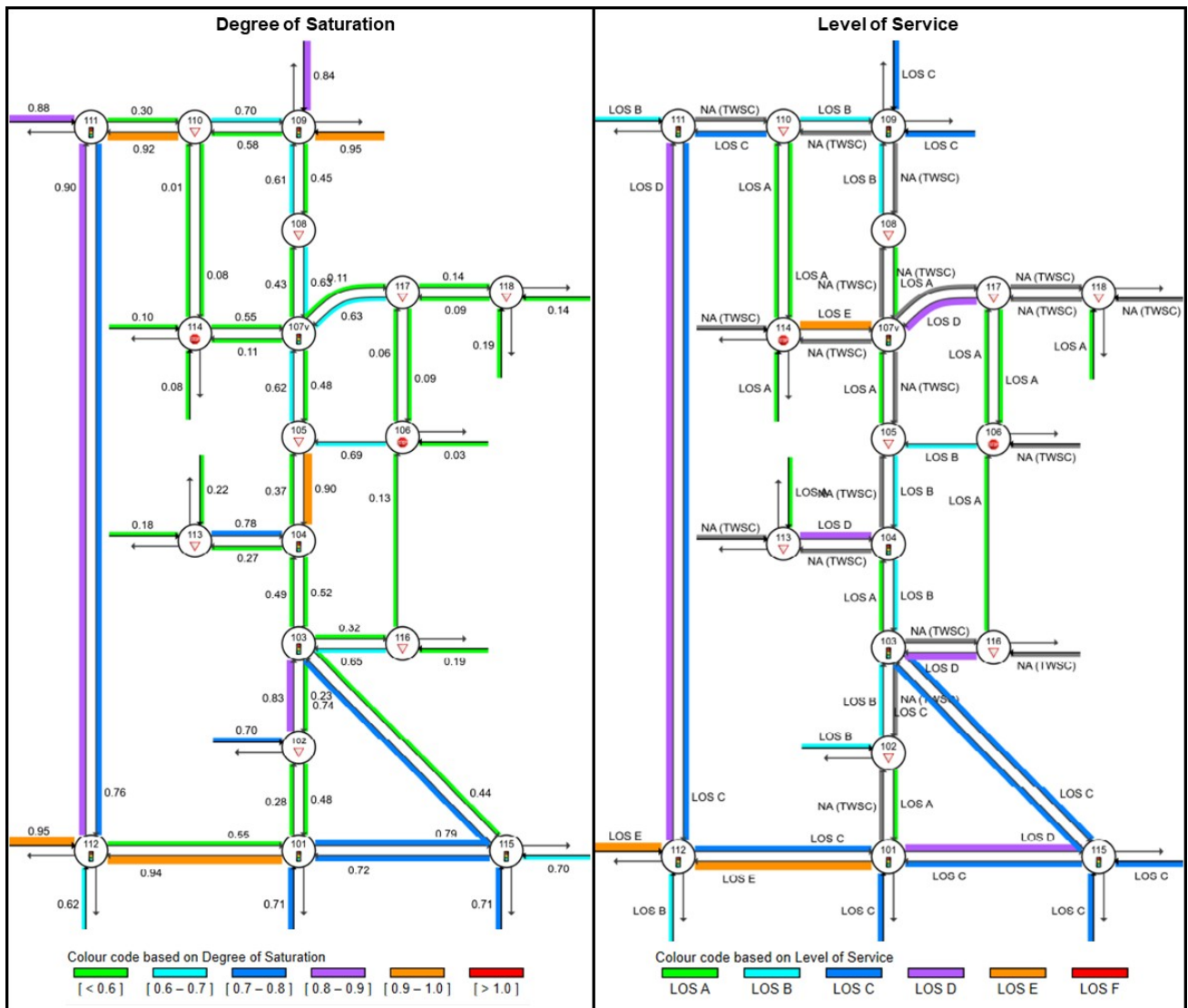


Figure 7.17: Future Project Balanced Upgrades Approach Performance – PM Peak

The key constraint in the PM peak is at the Queens Road / Harris Road intersection. The traffic signals must balance between keeping the northbound queue away from Parramatta Road, while maintaining performance on Queens Road. Despite the south approach performing the best at this intersection, queues are measured to be 140m, nearing Parramatta Road. Traffic performance on Queens Road may not be improved without further widening (e.g. providing additional eastbound lane, westbound right-turn bay, southbound right-turn bay).

8. TRANSPORT PLANNING INITIATIVES

8.1 Overview

One of the key challenges in achieving the urban design vision for the Five Dock Precinct is ensuring that the transport strategy is in alignment. The significant uplift in population across the study area drives a sharp increase in transport demand, highlighting the need for improved infrastructure to cater for new traffic pressures.

However, the transport planning for the precinct should also adopt an integrated multi-modal approach that balances the Movement and Place classifications with the future traffic and transport needs of the road users. While Section 7 in this report explored traffic infrastructure upgrades across the network, this is underpinned by the transport demand management solutions identified in this section, as means of achieving the outcomes summarised in Figure 8.1 below.

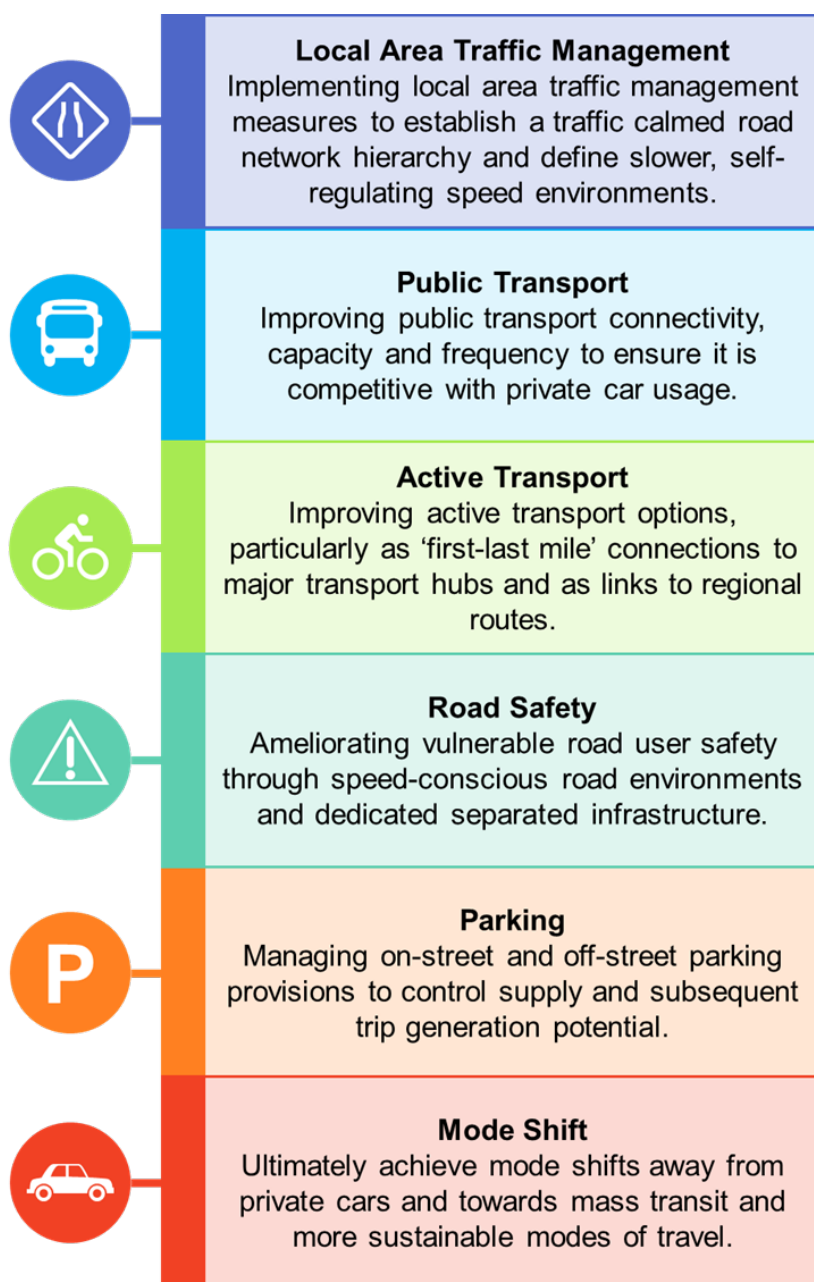


Figure 8.1: Targeted Transport Strategy Outcomes

The following sections detail these considerations and how they guided the development of the transport strategy.

8.2 Future Transport Mode Share

8.2.1 STM Mode Share Projections

The projected transport mode share at an origin-destination level was extracted from TfNSW's Strategic Travel Model (STM) for all the modelling scenarios. This data was analysed to determine the expected splits between private vs. public vehicular travel, and how the pattern is expected to shift as population and employment within the precinct grows. Most critically, the scenarios were evaluated to understand the influence of the incoming Metro station and how travel modes change as a result of the significant improvement in public transport options.

It is noted that this data explores only vehicular travel, and other modes like walking and cycling are not included in these results.

The mode share analysis considered trips to/from the travel zones which encompass the Five Dock Precinct, as well as some surrounding suburbs like Wareemba that rely heavily on key parts of the study area network like Lyons Road and Great North Road.

The mode shares for each scenario are shown in Table 8.1 and Figure 8.2.

Table 8.1: Future Transport Mode Share

Mode	Existing (2021)	No Metro No Masterplan (2046)	No Metro With Masterplan (2046)	With Metro No Masterplan (2046)	With Metro With Masterplan (2046)
Car	81.3%	81.6%	79.0%	71.4%	67.6%
Other PT	9.4%	8.9%	10.2%	22.8%	26.1%
Bus	9.4%	9.5%	10.8%	5.8%	6.3%

STM Mode Share Projections for Five Dock Precinct

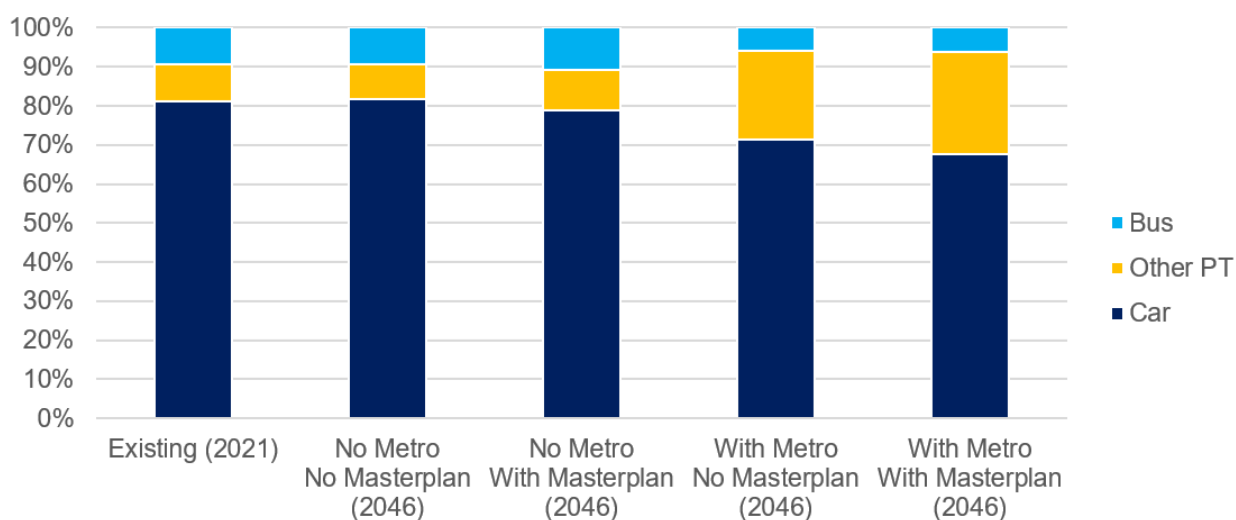


Figure 8.2: Future Transport Mode Share

The 'Other PT' category from the STM is representative of non-bus public transport options. In the 'No Metro' scenarios, this is expected to be comprised of existing chain trips to the heavy rail lines (T1, T2, T3 or T7 services) at nearby stations like Croydon and Ashfield.

The strategic modelling data shows the following:

- There is a negligible change in future travel patterns in all 'No Metro' scenarios; that is, without the influence of a significant public transport infrastructure, travel patterns are expected to remain similar
- There is a **14-16% increase** in public transport usage in 'With Metro' scenarios, indicating that the introduction of the Metro service (which catering for trips to the Sydney CBD, Parramatta

CBD and Burwood) is expected to be an attractive travel option in both baseline and masterplan scenarios

- The trip generation associated with the masterplan uplift is weighted more towards public transport in comparison to the baseline; this is likely due to the close proximity of housing density to the major transport hub
- There is a **10-11% decrease** in car usage in favour of public transport. However, despite this shift, private cars remain the dominant form of transport, encompassing 68% of trips taken in the Future Project scenario (with metro, with masterplan).
- There is a **4% decrease** in bus usage in favour of 'Other PT', almost halving its mode share. This indicates that the Metro (by virtue of servicing a similar catchment and destinations) absorbs some of the existing market for buses.

It is noted that the above assessment is undertaken using STM data, which projects travel patterns at a high level. There are other considerations which aren't necessarily assessable using this modelling package. These include:

- Increased attractivity of active transport as a result of enhanced regional connectivity and infrastructure as part of the masterplan
- Demographic changes associated with new housing uplift and new parking caps
- Recent societal movements towards greater working from home adoption in the wake of the COVID-19 pandemic.

8.2.2 Census Journey to Work Data

To supplement the STM data, ABS census data was used to derive further detail in travel patterns. Due to the effects of COVID-19 on travel patterns during the 2021 census, 2016 census data was used (the former showed a very significant WFH proportion due to the census timing and movement restrictions in NSW at the time).

The recorded 2016 mode share is summarised in Table 8.2.

Table 8.2: Mode Share from 2016 Census

Mode	Percentage
Public transport	15.5%
Vehicle	64.8%
Active transport	4.6%
Worked at home or Did not go to work	15.1%
Total	100%

The distribution of each transport mode by distance to place of work for residents of Five Dock is shown in Figure 8.3. It is observed that there is a high percentage of public transport users that work between 5-10km from Five Dock, aligning with the Sydney CBD. As this function overlaps with the Sydney Metro West route, it is highly likely that this is the population market that will have transport needs directly addressed via the new Metro service.

Furthermore, active transport dominates trips within 1km of destination, with almost 50% of the residents choosing to walk or cycle to work. This highlights an encouraging propensity towards active transport for close distance trips, including to the future Metro station (which will be within 800m of any masterplan site). This reinforces the importance of providing a permeable road network to minimise detours and to cut down on walking/cycling distance via more direct and accessible links.

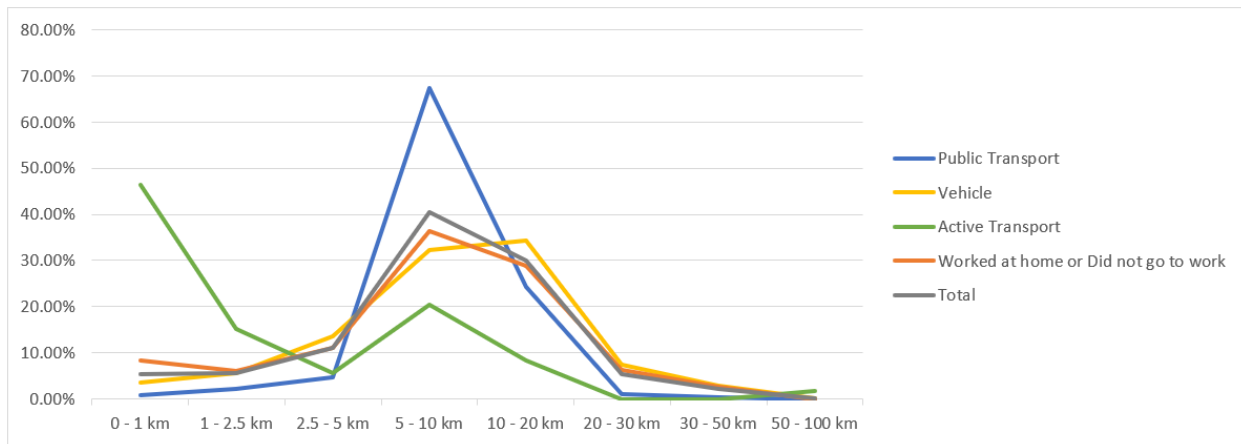


Figure 8.3: Distance to Place of Work by Transport Mode

Trips towards other places of high employment such as Lane Cove, Leichhardt and Auburn are not covered by the Metro, and travel times are likely more efficient by car compared to bus. Trips to Chatswood are also likely faster by car compared to Metro. There is room for further reinforcement of public transport links towards these areas via new express bus services to further shift mode share away from cars.

8.2.3 Target Mode Shares

The target future masterplan scenario mode shares have therefore been identified on the basis that:

- The STM predicts a significant shift away from private cars towards public transport as a result of the Metro station
- Train travel is expected to absorb part of the existing bus mode share due to overlap / supplanting of existing bus services
- Existing travel patterns show a significant proportion of short-distance trips being undertaken via active transport
- The masterplan proposes significant improvements in public and active transport infrastructure, with specific travel initiatives outlined and recommended in following sections
- The masterplan proposes stricter DCP parking controls for new sites in recognition of their high transport option environment
- Without intervention, the future road network is identified to likely be overcapacity at key pinch point locations, highlighting the need for travel demand management measures to distribute and discount traffic generation from masterplan developments.

The target future mode share for masterplan traffic is therefore shown in Table 8.3.

Table 8.3: Mode Share Targets

Mode	2016 Existing	2046 STM w/ Metro	2046 Target	Change from 2016
Public transport – train	15.5%	20.9%	22.0%	+16.5%
Public transport – bus		5.0%	10.0%	
Vehicle	64.8%	54.1%	45.0%	-19.8%
Active transport	4.6%	4.6% ¹	8.0%	+3.4%
Worked at home / Did not go	15.1%	15.1% ¹	15.0%	-0.1%
Total	100%	100%	100%	100%

1. Retained from 2016 existing as STM did not include these modes

8.3 Public Transport Initiatives

After the introduction of the Five Dock Metro Station, the entirety of the Five Dock Precinct will be within walking distance (800m) of the station. The Sydney Metro West provides a high-volume public transport option, expected to primarily service movements to and from Sydney and Parramatta CBDs.

The existing bus network has good coverage as shown in Figure 4.9 and Figure 8.4, with all areas in the Precinct within 400m walking distance of a bus stop.

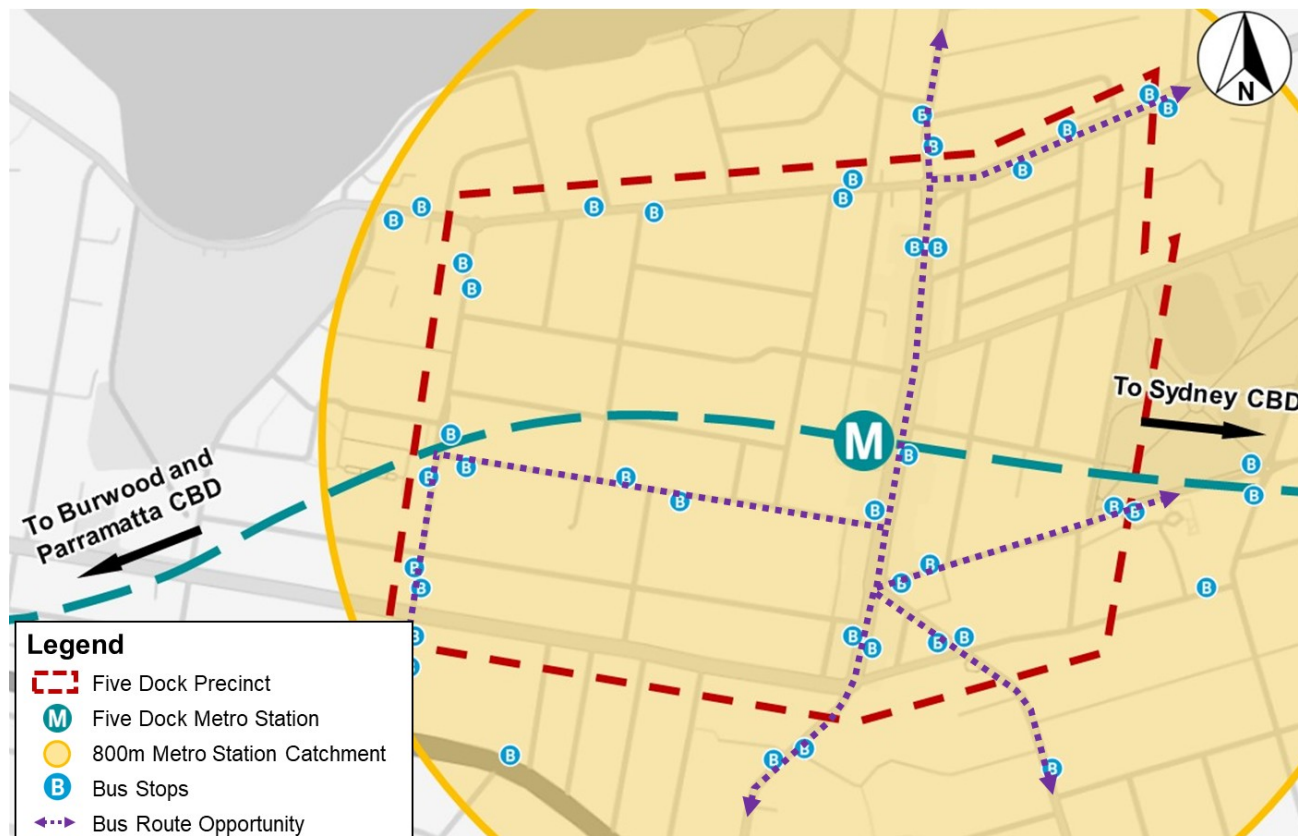


Figure 8.4: Five Dock Precinct Public Transport Coverage

The introduction of Sydney Metro West will supplement (and in some areas completely replace) the function of the existing bus network through Five Dock, particularly as a means of travelling to the Sydney CBD, Parramatta CBD, and other key centres such as Burwood and Sydney Olympic Park.

The focus of the bus network should therefore shift to:

- Performing a 'feeder bus' role by distributing riders between the Five Dock Metro Station and the surrounding suburbs
 - Increase service frequency and stops on north-south routes like 415, 438 and 530 to link nearby catchments to the Metro station
 - Also facilitates links from the PRCUTS Kings Bay precinct to the Metro station, noting that it is outside of the 800m catchment of the new station
 - In doing so, this targets a population market that can alleviate traffic pressures on key constrained corridors like Great North Road, Harris Road and Lyons Road.
- Filling in gaps in the Metro and Sydney Trains network with new and enhanced bus services
 - As the Metro provides a strong east-west transport solution, target catchments for new services represent areas mostly to the north and south
 - This includes origins/destinations like Ryde, Macquarie Park, Hurstville, Bankstown, and Chatswood, which all show existing public transport travel times over double that of private cars
 - Existing routes include the 490, 491, 492 and 530
 - Upgrades to these routes with more frequent or peak hour express services can mitigate existing lengthy travel times.

Active transport is noted to be an alternative distributive feeder travel mode that integrates well with rail networks. It is important to provide the necessary infrastructure to facilitate active transport modes. Active transport links towards the Five Dock Metro Station and end-of-trip facilities at the Metro Station should be provided. These facilities include sheltered bike storage, air pumps, drinking fountains, and showers.

Actionable items to improve the future Five Dock public transport network include:

- Introduction of new routes or increases in bus frequency towards Macquarie Park, Hurstville, Bankstown, and Chatswood with express services during peak hours
- Introduction of shorter routes or increases in bus frequency towards Chiswick, Abbotsford, Drummoyne, Rodd Point, and other nearby suburbs
- Opportunity to reallocate resources for bus service frequency towards the Sydney CBD (replaced by new Metro route)
- Construct high quality end-of-trip facilities for active transport users at the Metro Station in line with CPTED principles.

8.4 Active Transport Initiatives

8.4.1 General

A comprehensive active transport network is key to achieving a strong vision for the Masterplan, with the built form supporting resident and visitor engagement to the civic spaces. The focus should be on prioritising links and infrastructure which show strong community benefits for walking and cycling. The significant increase in density and the resulting increase in conflicting activity levels highlights the importance of reinforcing the network with dedicated infrastructure for safer road user outcomes.

The key existing issues for pedestrians and cyclists within the Five Dock Precinct include:

- The narrowness of roads and footpaths
- Poor sightlines due to tight geometry and on-street parking
- Lack of dedicated infrastructure (particularly for cyclists).

The proposed active transport initiatives to address this include the following:

- Provision of new through site links to improve block permeability and network connectivity, especially in the north-south direction
- Widening of existing narrow roads to strengthen and support active transport on local streets
- Highlight new key active transport corridors on Lancelot Street and Henry Street
- The provision of dedicated cycling infrastructure along key corridors like Henry Street, Queens Road and Harris Road, with a focus on connections to external regional routes and the new transport hub
- The provision of dedicated pedestrian crossing infrastructure like pedestrian refuge islands, crossings and shared zones to highlight safer opportunities for vulnerable road users
- Traffic calming measures to reduce vehicle speeds in local catchments
- Recommendation for the consideration of a new 40km/h High Pedestrian Activity Area along the Great North Road High Street (between Queens Road and Lyons Road).

The proposed new features support the implementation of the Masterplan, with new crossing facilities to support through site links where they interface with the existing road network. Raised pedestrian crossings (also known as 'wombat crossings') were adopted in the recommendations due to their dual function as a physical traffic-calming device and as pedestrian-priority infrastructure. Refuge islands were recommended in areas where vertical deflection was considered to be undesirable, and interruptions to vehicle flow may result in traffic issues.

8.4.2 Cycling Network

The Five Dock Precinct is located at the confluence of various regional cycling routes, providing a strong opportunity for improvements to existing links or further connection between these routes. The key considerations for determining the location of each link are as follows:

- Connection to regional cycling routes
- Separation from heavily trafficked roads, where practical
- Ready access to Five Dock Metro Station.

The primary proposed links are as follows:

- **R01 Queens Road-Fairlight Street:** Upgrade existing cycle route with dedicated separated cycleway and road widening. Includes upgrades to signalised intersections along Queens Road to support cycling movements on-road or as part of shared path transitions.
- **R02 Henry Street-Barnstaple Road:** Upgrade existing cycle route with dedicated separated cycleway and road widening. Includes improvements to existing pedestrian crossing across Great North Road to accommodate cyclists, as well as transitory shared paths on Henry Street and Barnstaple Road near new proposed traffic signals.
- **R03 New east-west secondary local route via Lancelot Street and Second Avenue:** Provide new shared path and off-road facilities for walking and cycling via new through site links. Supports new Metro station and interfaces with Fred Kelly Place upgrades.
- **R04 New north-south secondary local route between Arlington Street and Udall Avenue:** Provide new off-road facilities for walking and cycling via new through site links. Supported by new crossing infrastructure at intersecting east-west roads. Supports trips to/from the local catchment around Five Dock Public School whilst providing regional connections.
- **R05 Harris Road:** Provide new cycle link along Harris Road between Queens Road and Lyons Road West. Due to conflicts with vehicle volumes, provide as off-road shared path to support and enhance cycling network (including existing William Street-Bevin Avenue regional route).

Pedestrian links are intended to primarily serve slower speed local traffic trips as opposed to higher speed regional trips on active transport links. To improve the safety of pedestrians within these links, it is recommended that the connection be designed to reflect this, including appropriate signage and line marking, slow points and entry/exit maze gates.

8.4.3 Summary

The proposed pedestrian and cyclist network is shown in Figure 8.5, with additional facilities shown in Figure 8.6.

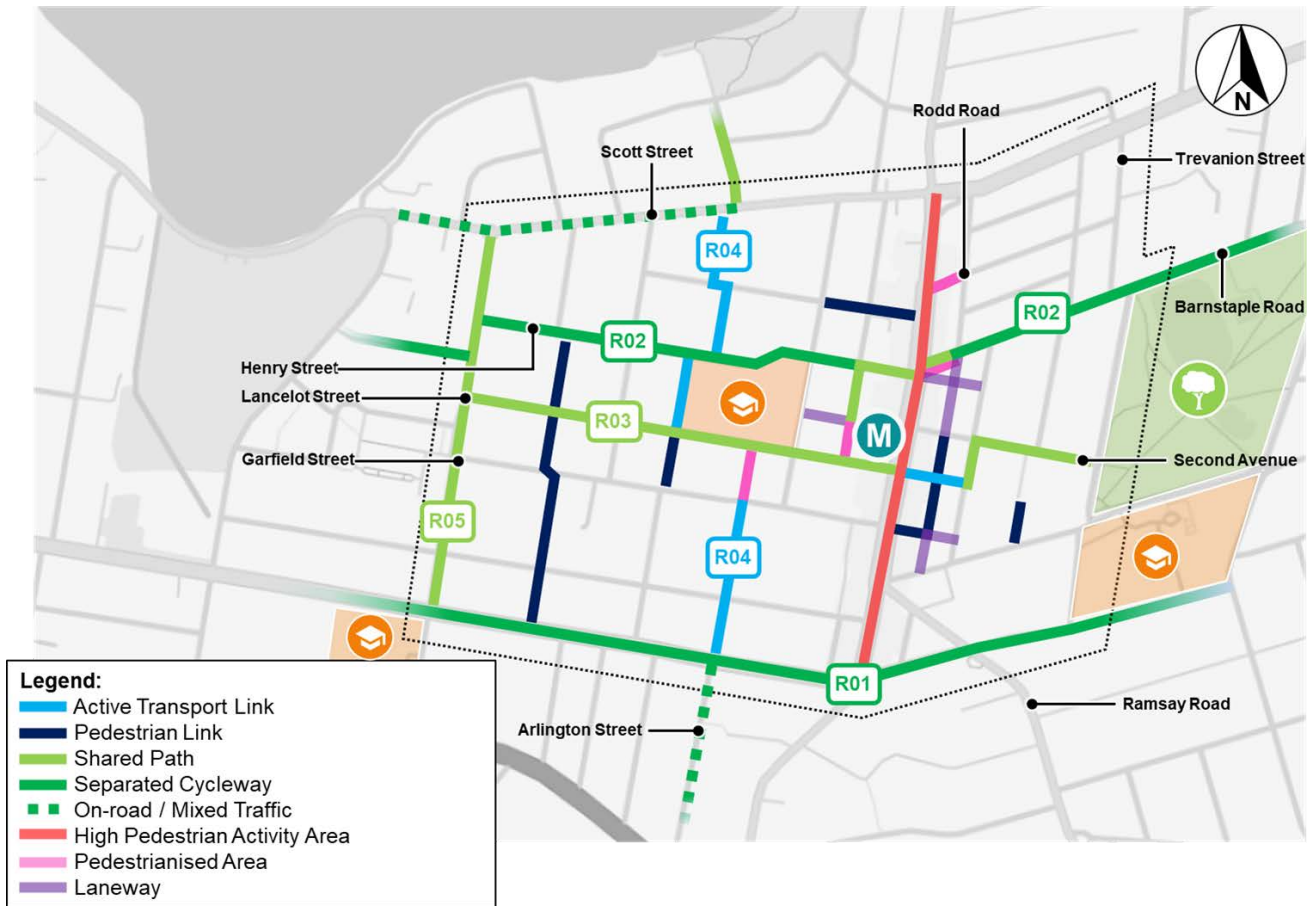


Figure 8.5: Masterplan Walking and Cycling Links

8.5 Traffic Calming Devices

To control traffic speed within the residential catchments of the precinct, an implementation of local traffic calming measures is recommended. LATM treatments in accordance with Austroads *Guide to Traffic Management Part 8: Local Street Management (GTTM Part 8)* were compared to identify the most suitable type for the study area.

Table 8.4 summarises the various types of treatments considered.

Table 8.4: LATM Treatment Types

Treatment Type	Description	Example Image
Vertical Deflection Device	Physical features on the roadway which <i>'force vertical changes in the ride alignment or travel path of a vehicle'</i> Examples: speed humps, speed cushions, flat-top road humps, raised crossings, continuous footpath treatments	
Horizontal Deflection Device	Physical features on the roadway which <i>'force horizontal changes in the ride alignment or travel path of a vehicle'</i> Examples: kerb extensions, median islands, slow points, roundabouts).	
Signage and Linemarking	Low-cost treatments which can inform, guide and regulate driver movements. Signage can help communicate, enforce and warn drivers of particular traffic conditions. Linemarking can assist in guiding traffic movements around key areas.	
Threshold Treatments	Low-cost treatments which can alert drivers upon entry into a different driving environment such as arterial roads into shared zones or reduced speed zones. These are typically implemented through the colouring or texturing of road surfaces to provide drivers with visual or tactile clues.	
Pedestrian Crossing Facilities	Dedicated pedestrian infrastructure to facilitate safer crossing movements at mid-block locations or intersections Examples: pedestrian refuges, pedestrian 'zebra' crossings, signalised marked foot crossings.	

Source: Austroads' *Guide to Traffic Management Part 8 (Edition 3, 2020)*, Chapter 8
Images on Right: Adapted from Google Street View and site photography

Four traffic-calmed blocks corresponding with different catchment areas within the precinct have been proposed. This aligns with the Movement and Place classifications, with Great North Road, Garfield Street, and Barnstaple Road 'dividing' the precinct into the four quadrants.

The blocks are identified with the following streets:

1. Lyons Road West / Harris Road / Garfield Street / Great North Road
2. Garfield Street / Harris Road / Queens Road / Great North Road
3. Lyons Road / Great North Road / Barnstaple Road / Trevanion Road
4. Barnstaple Road / Great North Road / Ramsay Road / Fairlight Street / Park Road.

It is recommended that a speed review be undertaken with the intention of establishing a Local Traffic Area for each of these catchments, with a corresponding speed limit of 40km/h. To ensure that each Local Traffic Area is a self-regulating speed environment, LATMs should be implemented with the appropriate spacing.

The proposed type and approximate location of LATM treatments are shown in Figure 8.6. The selection of type and location was based on the most appropriate adoption of DORAS recommendations (see Section 5.3) and Austroads *Guide to Traffic Management Part 8* guidelines with reference to the study area context and vision.

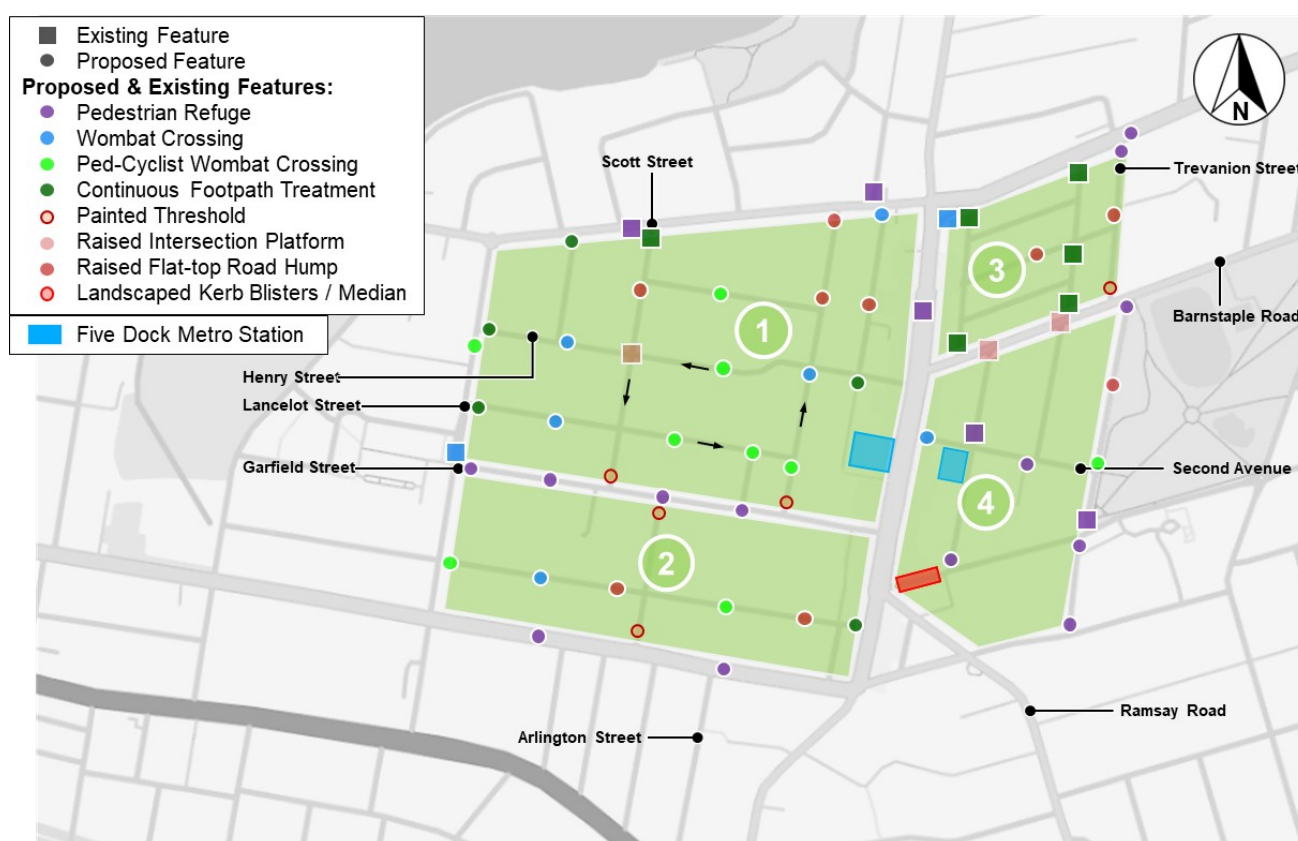


Figure 8.6: Proposed Crossing Facilities and Traffic Calming Devices

Further considerations and limitations to device type and placements are as follows:

- Continuous footpath treatments and/or road humps should be placed at the borders to and within areas of low desired speed. Spacing between humps and other vertical deflection devices should be between 80m and 150m where practical
- Road humps should not be placed to interfere with intersection turning movements along main roads. Storage space for 1-2 vehicles between the hump and the main road should be provided. Bus routes or cycling routes should also be avoided, if possible, due to rider discomforts.
- Painted thresholds should be placed where distance to downstream speed humps is too low or where bus routes enter a traffic calmed zone
- Pedestrian crossings should be raised where possible, and when installed interfacing with a cycling route, should have accommodations for shared pedestrian-cyclist movements
- Site specific conditions to be evaluated for each treatment to identify any constraints and factors that may influence treatment location and type (e.g. geotechnical, services, stormwater, etc).

8.6 Parking Policies

8.6.1 Overview

There is a strong opportunity as part of the Five Dock Precinct uplift to influence the travel behaviours and traffic demands of future demographics through parking policy controls. Noting the projected network congestion and requisite discounts to masterplan traffic generation, achieving a substantial mode share shift towards public and active transport is crucial. The proximity of the high-density residential developments to the future Metro station and bus links provides residents with a viable transport alternative, maximising the effect of this mode share shift.

A reduction in the off-street parking rates permitted for new developments will restrict the supply of parking spaces available for residents and visitors. This in combination with the reduction in on-street parking, will detract from car ownership and car use.

It is acknowledged that the optimal transport mode for many trips will utilise cars despite the public transport coverage. Car-share services can fulfill this function as an alternative to car ownership. The introduction of dedicated on-street car-share parking spaces will decrease the pressure on the supply of parking spaces, reducing the requirements for both on-street and off-street parking.

8.6.2 Development Car Parking Controls

The current car parking rates applicable to new low-density residential developments as outlined in the City of Canada Bay Development Control Plan (DCP) 2022 are summarised below:

- Dwelling house: 1 space per dwelling (max 2 spaces)
- Semi-detached dwelling: 1 space per dwelling (max 1 space)
- Dual occupancy: 1 space per dwelling (max 1 space)
- Secondary dwelling: 0 space per dwelling (max 0 spaces).

Any parking in excess of the above requirements will be counted as Gross Floor Area (GFA) (refer to definition in Canada Bay LEP).

8.6.3 Benchmark Council Areas – Car Parking Controls

To understand the quality of the existing Canada Bay DCP car parking controls, a comparison with other selected LGAs was undertaken. The selected LGAs include nearby suburbs or areas with similar land uses and accessibility to public transport as the Five Dock Precinct as shown in Table 8.5. The recommended parking spaces from the Guide to Traffic Generating Developments (GTTGD) is also included for comparison purposes.

The Canada Bay rates provided here are based on 'Category B' rates as identified in the DCP.

Table 8.5: DCP Car Parking Controls Benchmarking Comparison

Type	Canada Bay (Maximum)	Randwick City Council HIA (Minimum)	Randwick City Council (Minimum) ¹	City of Ryde (Minimum) ¹	Macquarie Park Corridor (Maximum)	PRCUTS ² (Maximum)	Strathfield (Minimum)	GTTGD ³ Metro CBD (Minimum)
Dwelling	2	-	1-2	Max 2	-	-	2	1-2
Studio	0.3	0.2	0.5	0.6-1	0.6	0-0.6	-	0.4
1 bed	0.5	0.6	1	0.6-1	0.6	0.3-0.9	1	0.4
2 beds	0.9	0.8	1.2	0.9-1.2	0.9	0.7-1.2	1.5	0.7
3+ beds	1.2	1.1	1.5	1.4-1.6	1.4	1-1.5	2	1.2
Visitors	0.1	0.20	0.25	0.20	0.10	0-0.20	0.2	0.14

1. Any spaces provided above the minimum rate will be included in the GFA calculations for building FSR

2. Parramatta Road Corridor Urban Transformation Study (UrbanGrowth NSW 2016)

3. Guide to Traffic Generating Developments (RTA 2002)

The existing rates for the City of Canada Bay are shown to already be comparatively low. This is in contrast with a high transport mode share for cars, suggesting a higher utilisation of on-street parking. The reduction of on-street parking will likely have a notable effect on achieving mode share shift.

8.6.4 Proposed DCP Parking Controls

To achieve a reduction in traffic generation potential of the masterplan sites, it is recommended that these rates are adjusted to reduce the **maximum** number of permissible parking spaces as follows:

- Dwelling house: 1 space per dwelling
- Studio: 0.2 space per dwelling
- 1 bed: 0.3 space per dwelling
- 2 beds: 0.6 space per dwelling
- 3+ beds: 1 space per dwelling.

These stricter rates should apply to all new masterplan development, as sites are located within 800m of the new Metro station and significant investment is proposed into supporting improved active transport infrastructure, public transport, and increases to car-share parking spaces.

8.6.5 Development Bicycle Parking Controls

The current bicycle parking rates applicable to new developments as outlined in the City of Canada Bay Development Control Plan for bicycles are summarised below:

Table 8.6: Minimum Bicycle Parking and Storage Provision

Land Use	Resident/Staff Bicycle Storage Facility	Visitor Bicycle Parking Facility
Residential	2 per dwelling	2 per 10 dwellings
Commercial	2 per 150m ² GFA	2 per 400m ² GFA
Retail	2 per 150m ² GFA	2 per unit + 2 per 100m ² GFA
Industrial	2 per 10 employees	2 per unit +2 per 100m ² GFA

The majority of the stipulated parking rates in the DCP are specified to be minimum rates with no constraints on maximum parking provision. These rates are considered satisfactory as these rates are expected to fulfill the demand induced by the projected uptake of cycling with improvements to the local network. However, the saturation of parking spaces at the station should be monitored to determine if additional spaces are required.

8.6.6 On-Street Parking

A detailed on-street parking assessment based on parking demand and supply survey data has not been undertaken as part of this study. Notwithstanding this, based on existing on-street parking controls, there are a number of unrestricted parking zones in the north-west and eastern areas of the Precinct. Consideration can be applied to homogenise on-street parking controls based on proximity from Great North Road (as the town centre high street) and the Metro station to minimise unrestricted on-street parking (which can offset benefits gained from stricter off-street parking controls).

However, it is noted that the Metro EIS analysis forecasts a relatively low proportion of park-and-ride trips associated with the Five Dock Metro Station (7%), citing better options through active and public transport from nearby housing density. At an estimated passenger demand of around 2,000 incoming during the morning peak, this will amount to a Park and Ride demand of around 140 spaces (this demand may be higher as a result of masterplan growth not accounted for at the time of EIS). The removal of off-street car parking facilities like the Kings Road and Waterview Street car parks will likely result in a deficit of longer-term parking demand, providing an opportunity as part of a precinct parking plan to transition the parking supply towards short-term and high-turnover on-street parking.

Transitory drop-off parking demand is mitigated through the conversion of around 10 existing parking spaces to Kiss and Ride spaces during the peak hour periods on Second Avenue, Waterview Street and Garfield Street.

8.7 Integrated Transport Strategy Maps

The integrated transport strategy maps summarising all existing and proposed links, pathways, cycle routes, crossing facilities and traffic calming devices are shown in Figure 8.7, Figure 8.8 and Figure 8.9.

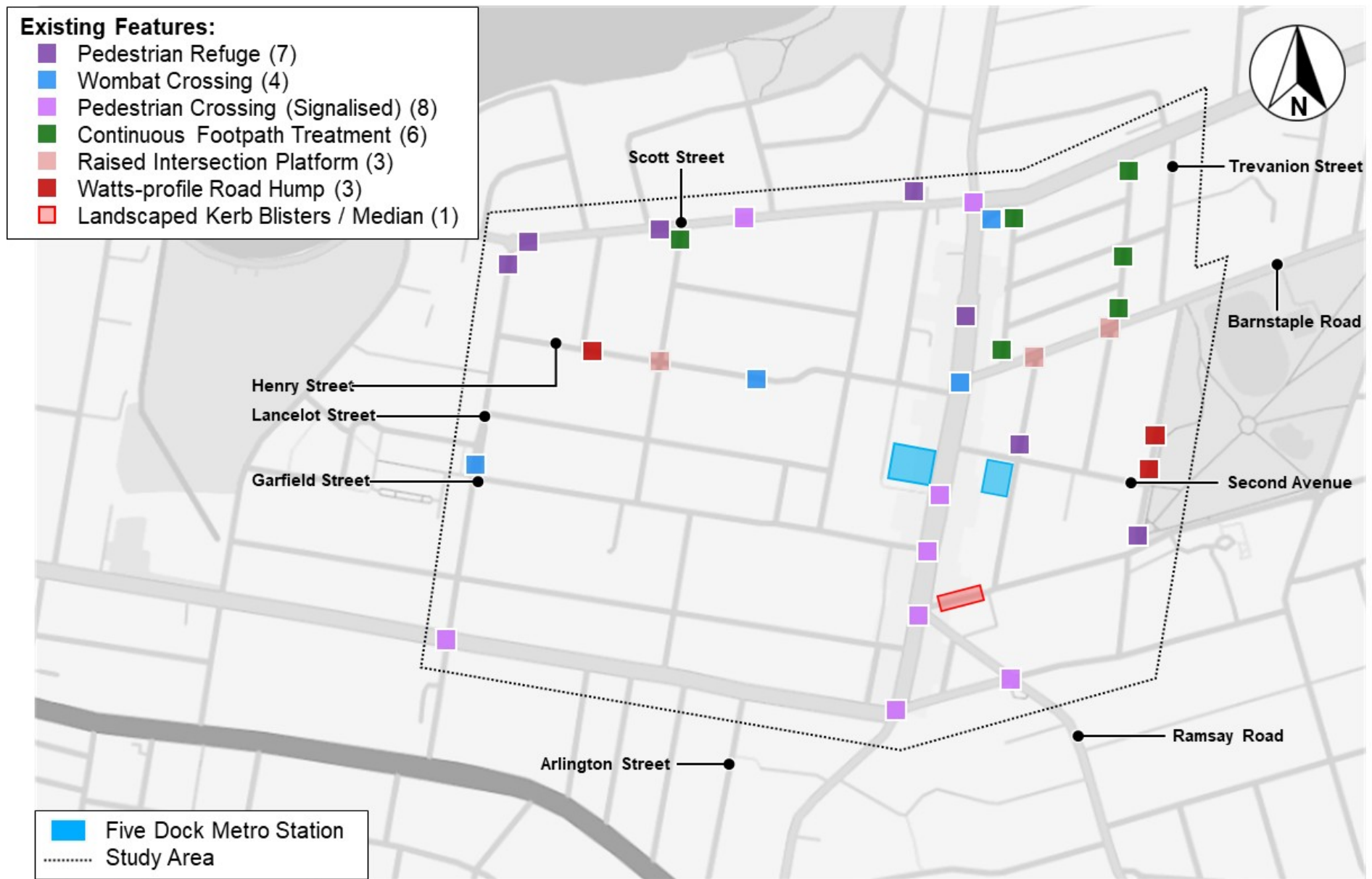


Figure 8.7: Existing Traffic Facilities in the Five Dock Precinct

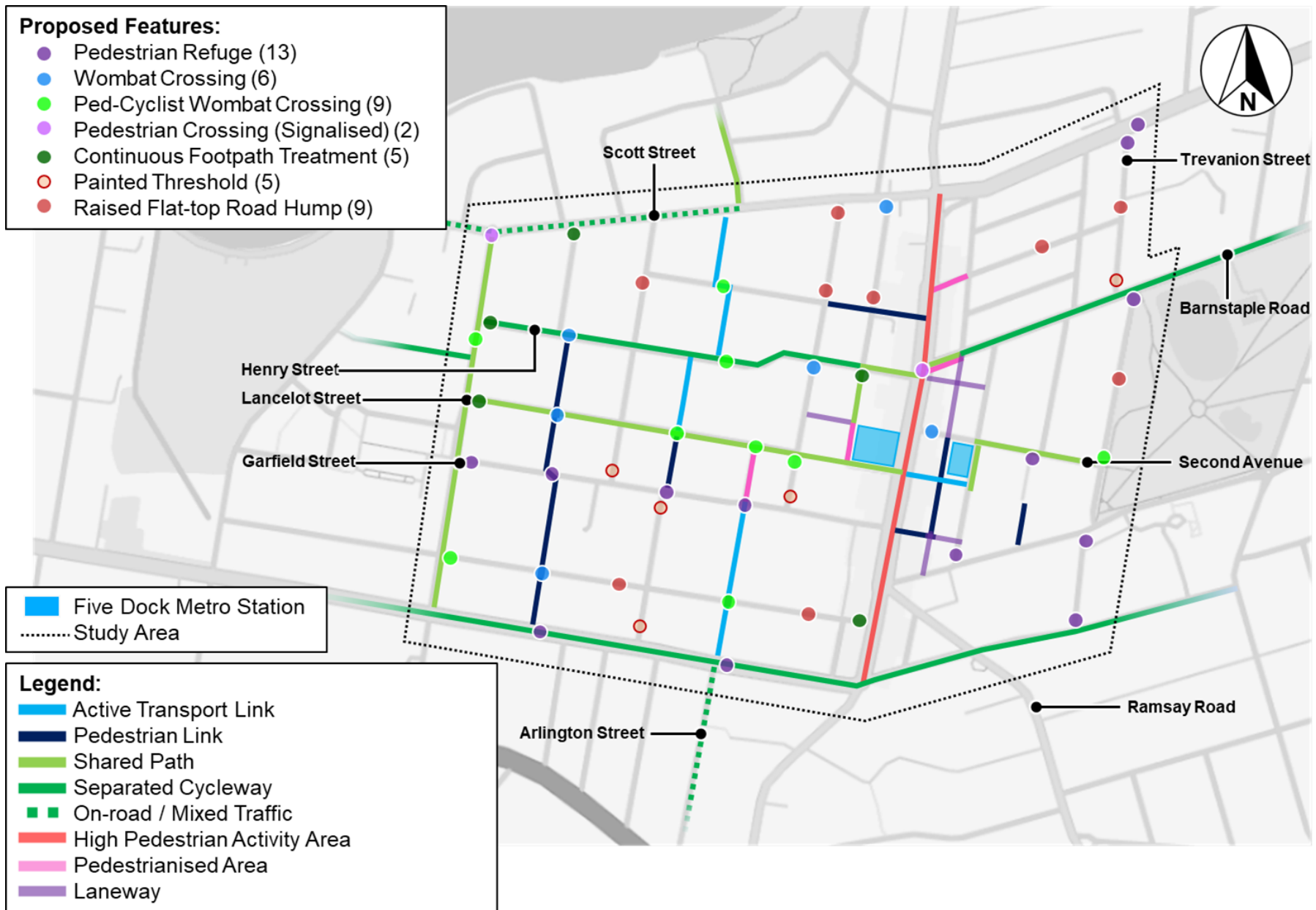


Figure 8.8: Proposed Masterplan Traffic Facilities in the Five Dock Precinct

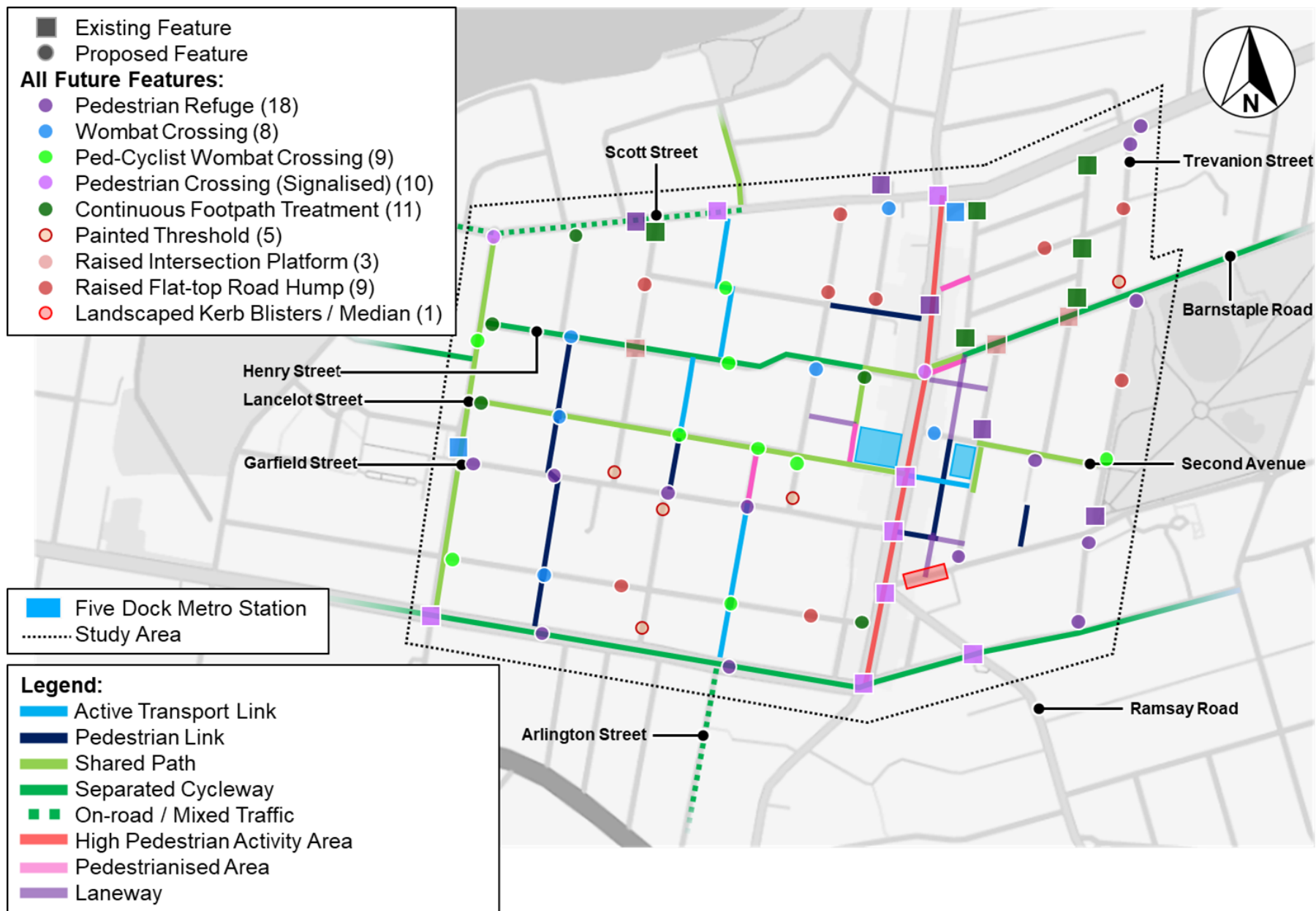


Figure 8.9: Proposed & Existing Masterplan Traffic Facilities in the Five Dock Precinct

9. CONCLUSION

9.1 Summary

The Five Dock Masterplan aims to deliver around 14,000 dwellings within the Precinct as high-density residential apartment and mixed-use buildings over the next 20 years. To do so, it seeks to leverage the traffic, transport and urban design opportunities introduced by the incoming Five Dock Metro station.

Strategic modelling indicates that the opening of the new Metro station will result in over 10% shift away from private vehicles towards public transport modes. Despite this, the projected traffic growth within the precinct outpaces this mode shift, with peak hour traffic volumes estimated to increase by around 50% by 2046.

SIDRA modelling results indicate that the Five Dock Masterplan growth will have significant performance impacts on the road network by 2046, particularly for intersections along Great North Road, Lyons Road West, and Harris Road.

As part of the traffic assessment, a scheme of road network upgrades was identified to achieve acceptable levels of traffic performance. However, the significant capacity constraints on the network entailed that the scale of proposed upgrades would likely detract from the Five Dock Precinct urban design masterplan, with the road capacity upgrades at odds with planned public domain improvements and new active transport infrastructure.

As such, a balanced traffic scenario was envisaged, featuring minor discounts to masterplan trip generations by encouraging further mode shifts towards more sustainable travel options in reflection of the precinct's new transit-oriented nature. These mode share targets are made feasible through significant investment in improvements to both public transport service connectivity and frequency, as well as active transport infrastructure.

The balanced scenario achieves a more acceptable level of performance with a reduced set of road network upgrades, and represents the ideal integrated transport solution for the Five Dock Precinct.

The full action plan is provided in Section 9.2 below.

9.2 Action Plan

This study has assessed and identified traffic and transport upgrades within the Five Dock Precinct required for the total future transport demands, including the effects of the Sydney Metro West, Five Dock Masterplan growth, and regional growth by 2046. The aggregation of all major traffic and transport recommendations for the 'Balanced' scenario is summarised in Table 9.1.

Several topics have been identified for further investigation to address key gaps in the scope of this study:

- Creating a list of priority upgrades and treatments to be delivered in tandem with the opening of the Sydney Metro West by 2036
- Investigating the impacts of the increased density within Five Dock upon the surrounding road network, noting the proximity and severity of impacts towards the suburb of Canada Bay.

Table 9.1: Five Dock Precinct Traffic and Transport Action Plan

Key ID	Location / Reference	Action
Public Transport		
PT-1	Example routes: 415, 438, 530	Coordinate with TfNSW / STA / bus providers to increase service frequency and stops on local 'feeder' routes in vicinity of the Five Dock Metro station from suburbs like Chiswick, Abbottsford, Drummoyne and Rodd Point
PT-2	Example routes: 490, 491, 492, 530	- Coordinate with TfNSW / STA / bus providers to improve regional bus route service frequency and options during peak periods towards suburbs like Macquarie Park, Hurstville, Bankstown and Chatswood - Consider new express services along existing routes during peak periods
PT-3	Example routes: 461, 438	Coordinate with TfNSW / STA / bus providers to explore opportunities to reallocate resources for existing bus routes replaced by new Metro service
PT-4	Metro Station	Construct high-quality end of trip facilities at the new Metro station in line with CPTED principles
Active Transport		
AT-1	R01 Queens Road and Fairlight Street	Upgrade existing cycle route with dedicated separated cycleway and road widening
AT-2	R02 Henry Street and Barnstaple Road	Upgrade existing cycle route with dedicated separated cycleway and road widening
AT-3	R03 Lancelot Street and Second Avenue	Provide new east-west shared path active transport corridor via new through links
AT-4	R04 Between Arlington Street and Udall Avenue	Provide new north-south off-road active transport facilities via new through links
AT-5	R05 Harris Road	Provide new north-south shared path between Queens Road and Lyons Road West
AT-6	Great North Road between Ramsay Road and Barnstaple Road	Undertake speed review for new 40km/h High Pedestrian Activity Area
AT-7	Study Area	- Implement a comprehensive upgrade to pedestrian facilities and LATM scheme across the Five Dock Precinct. - This includes the following treatments: 13 new pedestrian refuges 6 new or upgraded wombat crossings 9 new or upgraded shared pedestrian-cyclist wombat crossings 2 new signalised intersections (with signalised marked foot crossings) 5 new continuous footpath treatments 5 new painted thresholds 9 new raised flat-top road humps.

Key ID	Location / Reference	Action
Parking		
P-1	DCP	Amend DCP rates for masterplan sites to reflect reduced parking rates as per Section 8.6.4.
P-2	Five Dock Metro Station	Monitor bicycle parking conditions at the Five Dock Metro station post-opening and undertake parking capacity assessment
P-3	Study Area	Undertake a parking assessment informed by up-to-date survey data as part of a precinct-wide parking plan
P-4	Metro Vicinity	Evaluate parking supply in coordination with Sydney Metro post-opening to determine parking needs for pick-up and drop-off and Park and Ride demand
Road Network		
RN-1	Great North Road / Garfield Street	- Provide dual right-turn lanes on Garfield Street on approach to traffic signals - Provide dual southbound through-lanes – absorbing existing right-turn bay and bus lane - Requires kerb cut-back on eastern side of Great North Road to provide space for dual southbound exit lanes - Requires adjustment to the existing signalised pedestrian crossing – either remove or provide flashing yellow pedestrian protection. - Requires removal of raised median near Fred Kelly Place.
RN-2	Great North Road / First Avenue / Ramsay Road	- Widen Great North Road to 4 lanes at this location (2 approach lanes, 2 departure lanes on both legs) - Provide dual right-turn lanes on Ramsay Road - Provide peak hour clearway / parking restrictions on the south side of Ramsay Road - Requires cut-backs to footpath, kerb extensions, and planter boxes surrounding the intersection - Requires adjustments to intersection lane allocations - Relocate Five Dock Club bus stop to the north.
RN-3	Great North Road / Queens Road / Fairlight Street	- Provide 2 travel lanes on Great North Road in the northbound direction – absorbing the existing right-turn bay - Requires cut-backs to the kerb extension on the north leg - Provide peak hour clearway / parking restrictions along Queens Road, Fairlight Street, and Great North Road south leg - Restrict parking on Great North Road (between Queens Road and Kings Road)
RN-4	Great North Road / Henry Street / Barnstaple Road	- Upgrade existing priority-controlled intersection to traffic signals - Requires land acquisition to re-align Henry Street through existing 187 Great North Road lot to meet Barnstaple Road at 4-way cross intersection - Requires removal of kerb build-out on south side of Barnstaple Road - Provide 3 lanes at Henry Street and Barnstaple Road approaches (2 approach lanes, 1 departure lane on both legs) - Permit all turning movements from Henry Street and Barnstaple Road - Maintain right-turn restrictions from Great North Road - Restrict parking on north side of Henry Street (to East Street) and south side of Barnstaple Road (to Waterview Street)

Key ID	Location / Reference	Action
RN-5	Lyons Road West / Great North Road	- Upgrade traffic signals to 'double diamond' signal phasing - Provide new dedicated right-turn short lane on the west approach - Requires land acquisition on south side of Lyons Road W (approx. 3m) - Lengthen existing auxiliary right-turn lanes on north and south approaches - Requires removal of parking spaces on west side of Great North Road
RN-6	Lyons Road West / Harris Road	- Upgrade existing roundabout to traffic signals - Requires kerb cut-back on north side of Lyons Road West - Requires removal of parking spaces surrounding intersection - Requires removal of pedestrian refuge on Lyons Road West (between Harris Road and William Street).
RN-7	Harris Road / Kings Road	- Permit northbound right-turn (Harris Road to Kings Road) - Add Keep Clear pavement marking for the Kings Road intersection
RN-8	Queens Road / Harris Road	- Widen Queens Road to provide 2 westbound lanes - Requires road widening along Queens Road in vicinity of the intersection - Restrict northbound right-turn (Harris Road to Queens Road) - Restrict parking on Harris Road between Parramatta Road and Kings Road - Requires coordination with Rosebank College due to implications for Pick-up / Drop-off operations and bus lay-by.
RN-9	Great North Road / Kings Road	Restrict southbound right turn into Kings Road
RN-10	General	Optimise traffic signal phase timing at all signalised intersections to reflect future traffic demands.
Further Studies		
FS-1	Treatments Delivery Plan	- Investigate proposed treatments and identify priority list of critical works (including design and staging for individual treatments) - Prepare delivery plan for critical works to be actioned by opening of Metro West (current estimate 2032 to 2036)
FS-2	Network Impact Modelling and Assessment	- Undertake additional traffic investigations and studies for a wider area network to investigate traffic impacts associated with the Five Dock Precinct uplift - Studies to have a particular focus on the suburb of Canada Bay.

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