Future transport context

4.0

4.0 Future transport context

4.1 Planned transport network upgrades

A number of road and rail projects that may affect transport conditions in the Arncliffe and Banksia Precincts are currently either under investigation, proposed, planned or nearing completion. They range from minor to major infrastructure projects and are mostly driven by policy and long-term network planning. A summary of projects relevant to the Arncliffe and Banksia Precincts are as follows.

4.1.1 Rail network planning

Transport for NSW is currently developing options to address rail capacity and congestion issues that currently exist south of the Sydney CBD, including on the T4 Illawarra Line. The options would provide adequate capacity for the proposed growth in the Arncliffe and Banksia precincts. This work will also consider the feasibility and funding arrangements of any rail improvements. There is currently no funding for rail network upgrades that would benefit the Arncliffe and Banksia precincts. Any upgrades would likely be delivered post 2031.

4.1.2 Arncliffe Station Upgrade

As part of its $770 million Transport Access Program (TAP), the NSW Government has commenced an easy access upgrade of Arncliffe Station. The Arncliffe Station Upgrade will include:

- Four new lifts (now open)
- New canopies and security screens on the pedestrian bridge and platforms
- New sheltered bus stops
- A taxi and kiss and ride area on Firth Street
- New accessible parking spaces
- New bicycle racks.

Construction of the upgrade has commenced and is scheduled for completion by the end of 2016.

4.1.3 Arncliffe Pedestrian Link

The Arncliffe Pedestrian Link is a 35 metre long pedestrian tunnel beneath the rail line (see Figure 21), which has recently seen construction completed. The Arncliffe Pedestrian Link will provide a direct connection between Arncliffe Street and Wollongong Road. The connection would provide a safer and more efficient pedestrian link than the current Allen Street bridge underpass, where pedestrians use a roadside southern footpath.

4.1.4 Suburban bus route: Bondi Junction to Miranda via Airport and Eastgardens

Sydney's Bus Future identifies 20 suburban routes across the city. Suburban routes are defined by the following criteria:

- A mix of 'turn up and go' and timetabled services with peak service headways of at least every ten minutes
- Stops every 400 metres
- Bus priority targeted at key pinch points to speed up services.

The document identifies a new suburban route through the Arncliffe and Banksia Precincts; Bondi Junction to Miranda via Sydney Airport. This route will service high customer demand for travel from the South subregion to/from Sydney Airport. The Integrated Public Transport Service Planning Guidelines – Sydney Metropolitan Area indicates that Suburban services would operate at 10 minute headways during peak periods and 15 to 30 minute headways during shoulder and inter peak periods. For residents of the Arncliffe and Banksia Precincts, the new route would improve public transport accessibility to the south, as well as to the Airport and areas further east.

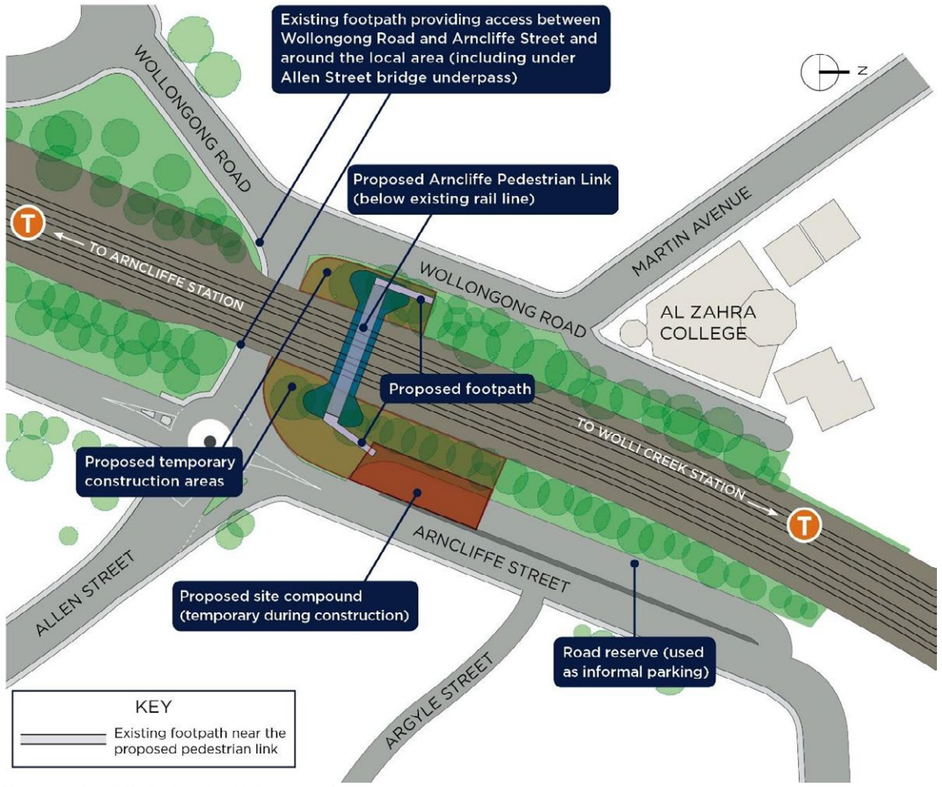

Figure 21 Arncliffe Pedestrian Link proposal
Source: Transport for NSW, 2015

4.1.5 WestConnex, the potential F6 Extension, and Pinch Point works

WestConnex is a 33 kilometre motorway project linking Sydney's west and south-west with the Sydney CBD, Sydney Airport and Port Botany. It is one of NSW Government's key infrastructure projects and the largest integrated transport and land use project in Australia. The project is to be released in three stages. The north eastern section (M4 Widening and M4 East tunnel) is to be constructed first, followed by the south eastern section (New M5), then lastly the tunnel connecting Stages 1 and 2 (M4-M5 link). Construction is to commence in 2015, with completion of all three stages programmed to be complete by 2023.

It is anticipated that completion of Stage 2 will have significant impacts on reducing current traffic volumes on the existing M5 (including its interchange at Marsh Street) and the Princes Highway. However it is anticipated that most of this benefit would be to areas north of the Arncliffe and Banksia Precincts around Sydenham and St Peters. Stage 2 has been accelerated following a loan agreement between the NSW Government and Federal Government and is forecast to be complete by 2019.

The NSW Government have also committed to enhancing connectivity to WestConnex with investigations into extensions at both the north and south to create a western diversion of the CBD. For the Arncliffe and Banksia Precincts, the potential southern extension would link WestConnex with the F6 corridor to the south via a tunnel connection at the New M5 Motorway, located approximately beneath Marsh Street. Preliminary Business Case work by WDA shows strong incremental traffic forecasts for the proposed extension, suggesting toll revenues could significantly reduce Government contributions towards the cost of delivery (SIS, 2014), and provide benefits in reducing traffic flows on the surface road network through the Arncliffe and Banksia Precincts.

In light of the existing road network constraints presented in section 3.4.4, it is considered that the ability for the road network to accommodate traffic growth as a result of Arncliffe and Banksia Precincts would be heavily dependent on an increase in road capacity provided by the potentional extension of the motorway network in to the F6 corridor.

For the purposes of this study, and in line with assumptions made on other Transport for NSW projects, it has been assumed that all three stages of WestConnex will be in operation by 2026. It has further been assumed that the southern extension to President Avenue (Kogarah) will be operational by 2036.

Figure 22 The WestConnex project and proposed extensions
Source: NSW Government, 2014

Figure 23 Potential F6 Extension
Source: Roads and Maritime (2016)

WestConnex enabling works: Airport West precinct

Roads and Maritime has begun construction works on the widening of Marsh Street to three lanes westbound in the vicinity of Kogarah Golf Club, to relieve congestion and improve traffic flow. The works supports the development of the WestConnex motorway and complements upgrades to Sydney Airport's internal road network. Key features of the proposal include (see Figure 24):

- Widening Marsh Street to three lanes from the Cooks River bridge to the M5 interchange
- Providing a new dedicated cycle path on the southern side of Marsh Street, connecting the Cooks River bridge with the Eve Street cycleway
- Providing a new pedestrian crossing at the Marsh Street's existing signalised intersection with Flora Street.

The project is funded by the NSW Government and is currently understood to be completed in 2017.

Gateway to the South Pinch Points Program

In R*ebuild NSW: State Infrastructure Strategy 2014 – Update* (Feb 2015), the NSW Government committed $300 million to create a 'Gateway to the South', including $45 million in 2015- 2016 to fix pinch points, which includes the Princes Highway intersections with Railway Road and Forest Road – two key pinch points in the local road network.

The proposed works are currently under investigation and no detail is yet available on the upgrades to these intersections, but any improvements are likely to lead to improved overall traffic performance.

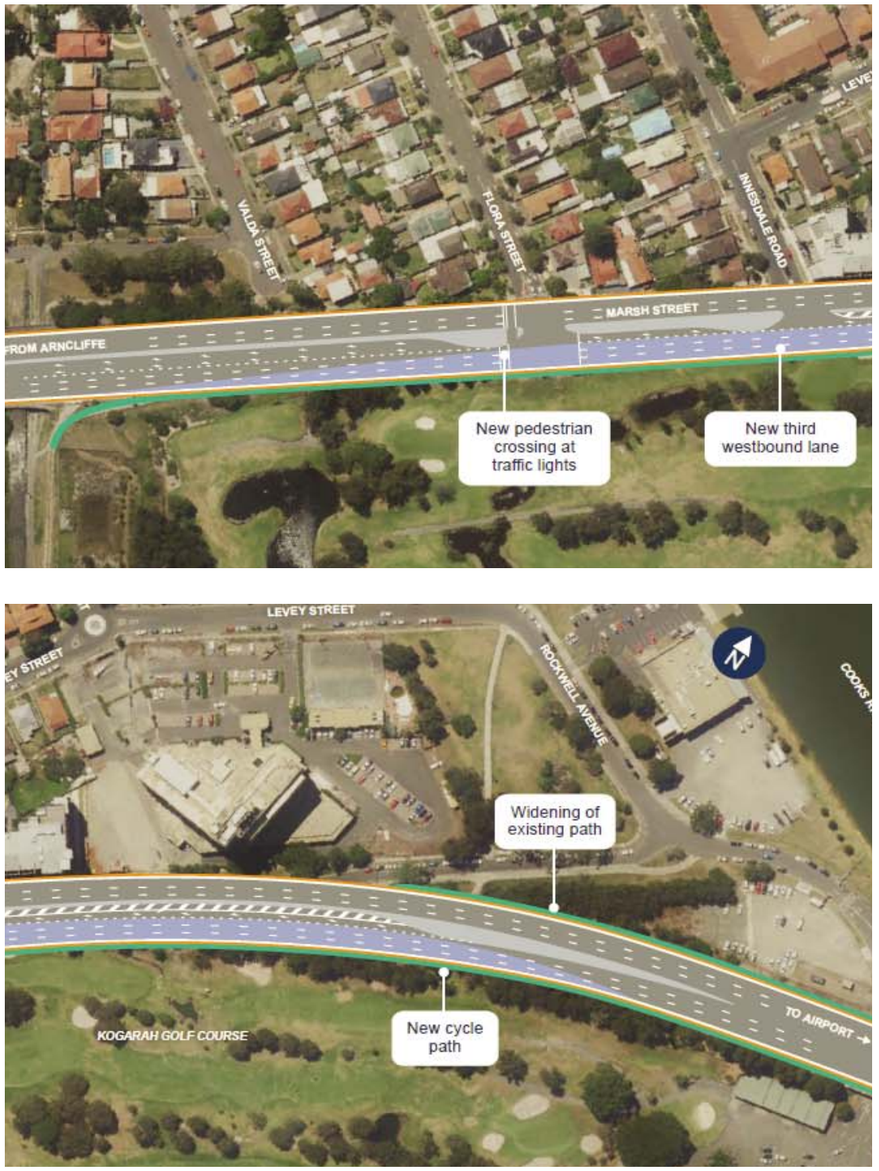

Figure 24 WestConnex enabling works: Airport West precinct
Source: NSW Government, 2014

4.1.6 Wolli Creek Redevelopment Area

Council's traffic study for the Wolli Creek Redevelopment Area identified a number of traffic elements and improvements that would be required to support growth in the area (see Figure 25). Some of these elements have already been delivered, and are funded through the s94 Contributions Plan.

Roads and Maritime have worked with Council to ensure that the WestConnex enabling works at Marsh Street do not inhibit the proposed eastern extension of Gertrude Street to connect with Marsh Street.

Council's *Wolli Creek Traffic and Transport Study: Strategic Implementation Plan* also identifies an upgrade to the Wollongong Road / Firth Street roundabout to traffic signals in the medium-long term. This would also be delivered through the Contributions Plan.

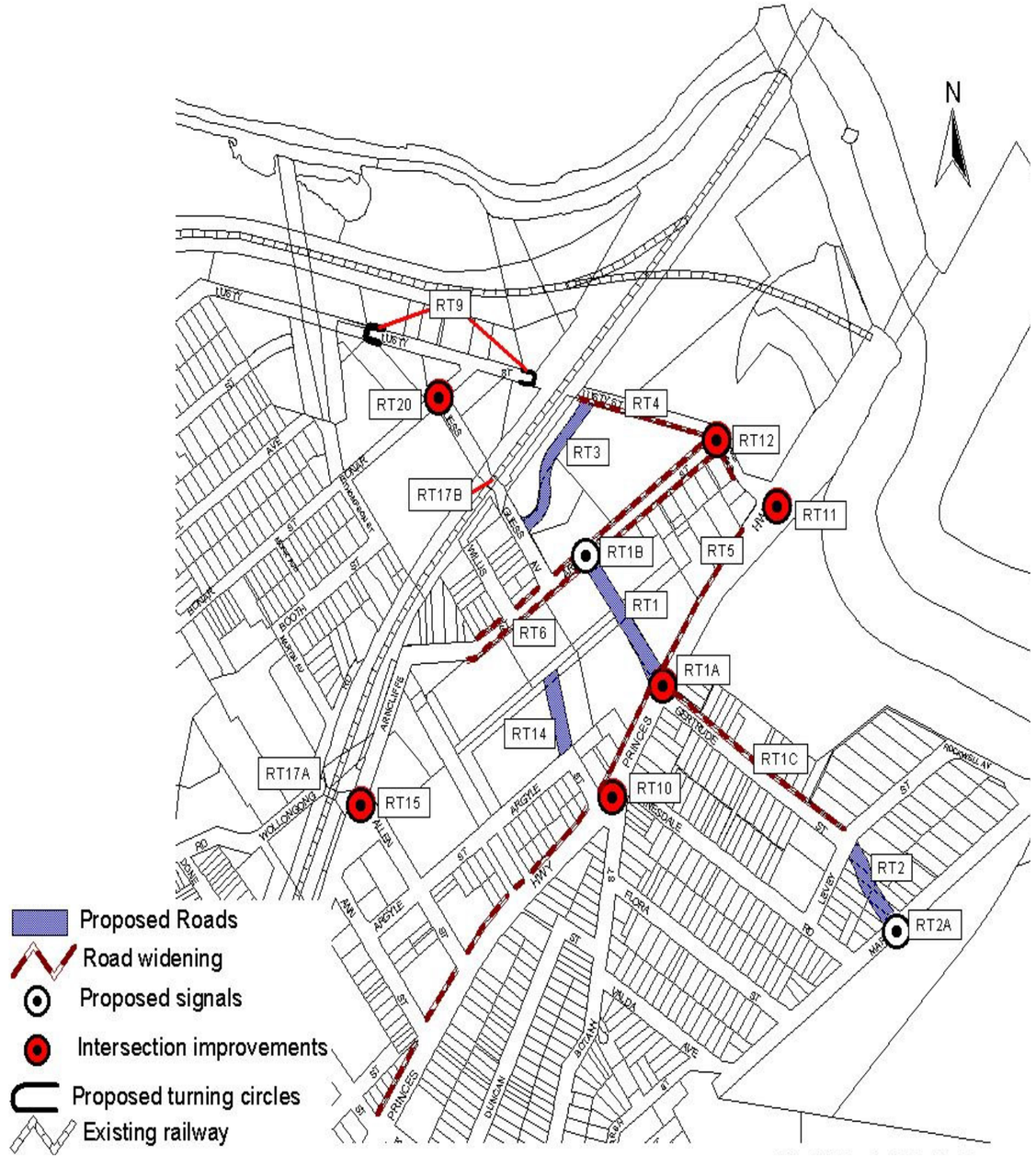

Figure 25 Wolli Creek Redevelopment Area: Proposed road works
Source: Bayside Council (formerly Rockdale City Council

Additional pedestrian and cycle facilities proposed in the development area include (see Figure 26):

- A footbridge over Princes Highway at Gertrude Street
- A pathway on top of the Southern and Western Suburbs Ocean Outfall Sewer (SWSOOS) between Arncliffe Street and Princes Highway
- Underpass beneath the SWSOOS between Thompson and Lusty Street
- Bridge over Wolli Creek to Waterworth Park
- Underpass beneath Princes Highway at Cooks River
- Pedestrian and cycle path along Cooks River foreshore and link path to Arncliffe Street.

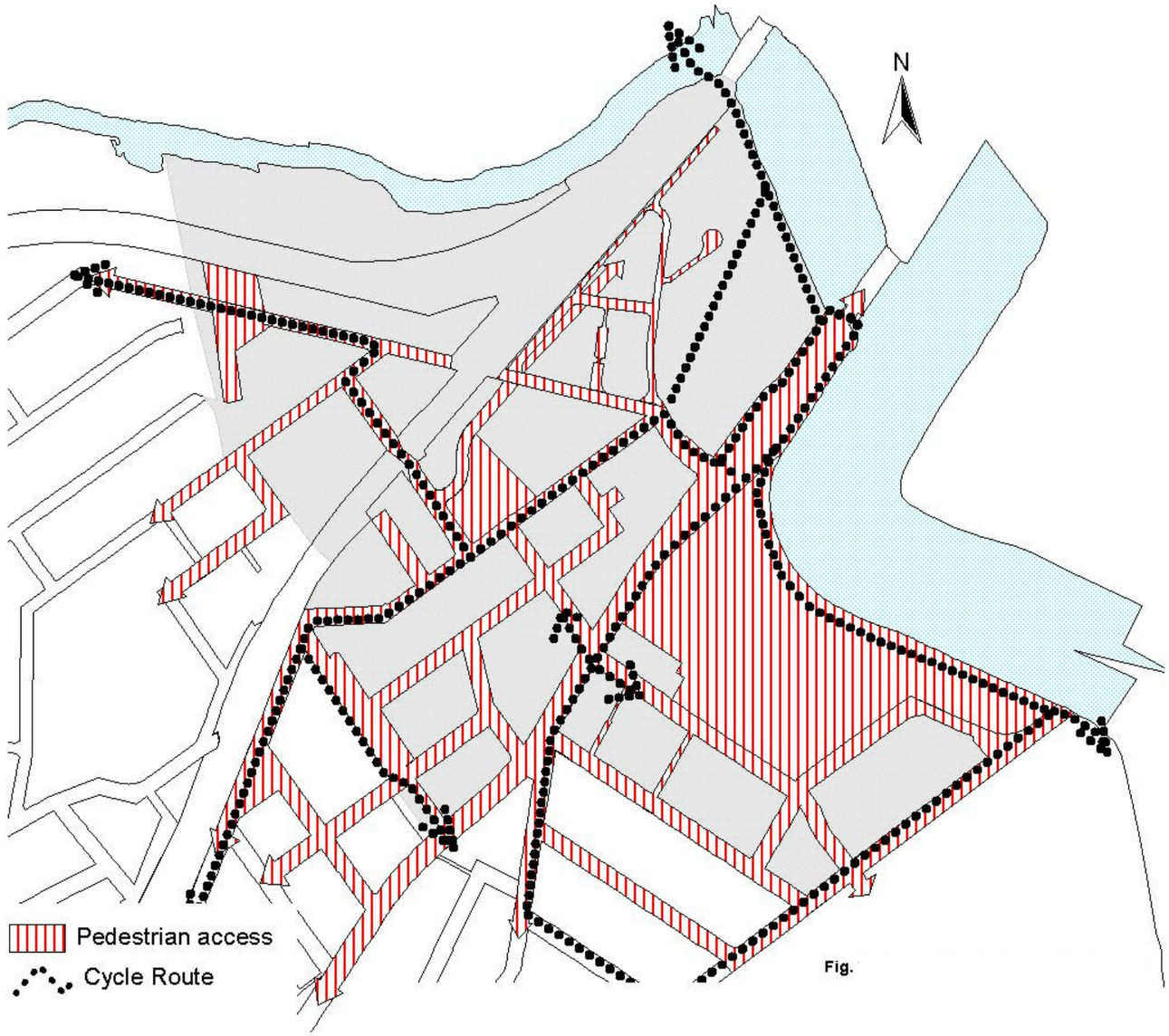

Figure 26 Wolli Creek Redevelopment Area: Proposed active transport network
Source: Bayside Council (foremerly Rockdale City Council)

Land use changes for Arncliffe and Banksia Precincts

5.0

5.0 Land use changes for Arncliffe and Banksia Precincts

5.1 The Draft Land Use and Infrastructure Strategy

The draft Land Use and Infrastructure Strategy (the draft Strategy), which includes the Arncliffe and Banksia Precincts, is shown at Figure 27. The Strategy shows:

- A predominant increase in medium and high density residential dwellings
- A focus of development to the east of Arncliffe Station
- Additional intensification in the western half of the Arncliffe Precinct along Wollongong Road and within the Banksia Precinct
- Mixed-use development within the Princes Highway Corridor.

The Strategy aims to maintain the potential of employment areas in the Arncliffe and Banksia Precincts. These include the B6 zones along the Princes Highway that provide job opportunities related to automotive, construction and large scale retail business, and the town centres around the stations that will provide for businesses and jobs that service the increased residential population.

5.2 Forecast changes in population and employment

To determine the scale of development that may occur in the Arncliffe and Banksia Precincts, the Department has undertaken a market analysis for these areas. The analysis included a review of the historical and current supply of residential, retail, industrial and commercial floor space and comparisons of the take up of dwellings and employment floor space in similar areas. The market analysis indicates that the assumed growth resulting from future development at Arncliffe and Banksia is expected to be up to 3,000 additional dwellings to 2036.

In order to account for market variation this Transport Plan has assumed a higher dwelling scenario of 5,100 dwellings. It has also assumed the creation of an additional 1,840 jobs. Should higher development yields, within these areas be realised then further analysis would be required to understand the impacts on the transport network.

Note that future planning controls proposed within the precincts may allow for greater employment and residential yields to be delivered (when compared to the forecasts stipulated above). Any development beyond the assumed yield would require further assessment to augment the transport response. As proposed development proceeds, Transport for NSW and Roads and Maritime Services would continue to monitor the performance of the transport network and the timing of initiatives proposed in this report.

5.3 Impacts on travel demand

To gain a high level understanding of the implications of the proposed population growth on travel demand, first principles calculations were undertaken to determine approximate AM peak hour trip increases for each main transport mode: car, train and bus.

For the purpose of this exercise, it was assumed that all new dwellings proposed within Arncliffe and Banksia Precincts would be high-density in nature. An AM peak hour trip generation rate of 0.74 person trips per unit[9] was also assumed.

[9] Based on data presented in the Roads and Maritime Services Guide to Traffic Generating Developments: Updated traffic surveys

The above assumptions have been applied to generate indicative travel demand ranges only, for the purposes of guiding the development of a transport network response. A more comprehensive trip generation and distribution process is carried out as part of the strategic transport modelling task (carried out by Transport for NSW).

Estimated increase in travel demand within the precincts (compared to existing) based on the above are summarised in Table 10. The figures below are based on current JTW mode shares and relate to forecast increases in residential-based travel demand within the precincts only. They do not account for growth external to the precincts.

Table 10: Arncliffe and Banksia Precincts AM peak hour additional trip generation

Mode	Additional peak hour person trip increases (existing to 2036)
Car	2,310
Bus	80
Train	1,170
TOTAL	3,560

Based on current JTW data (see Table 4), the 2,310 person trips by car would equate to approximately 2,100 additional cars on the network during the peak hour. The forecast number of trips made by train during the peak hour (1,170) is approximately equivalent to one at-capacity eight-car train. The above figures suggest a significant increase in travel demand on the local transport network during peak periods as a result of increased development within Arncliffe and Banksia Precincts.

Discussion on preliminary investigations as to how the transport network may respond to future increases in travel demand is in Section 7.0

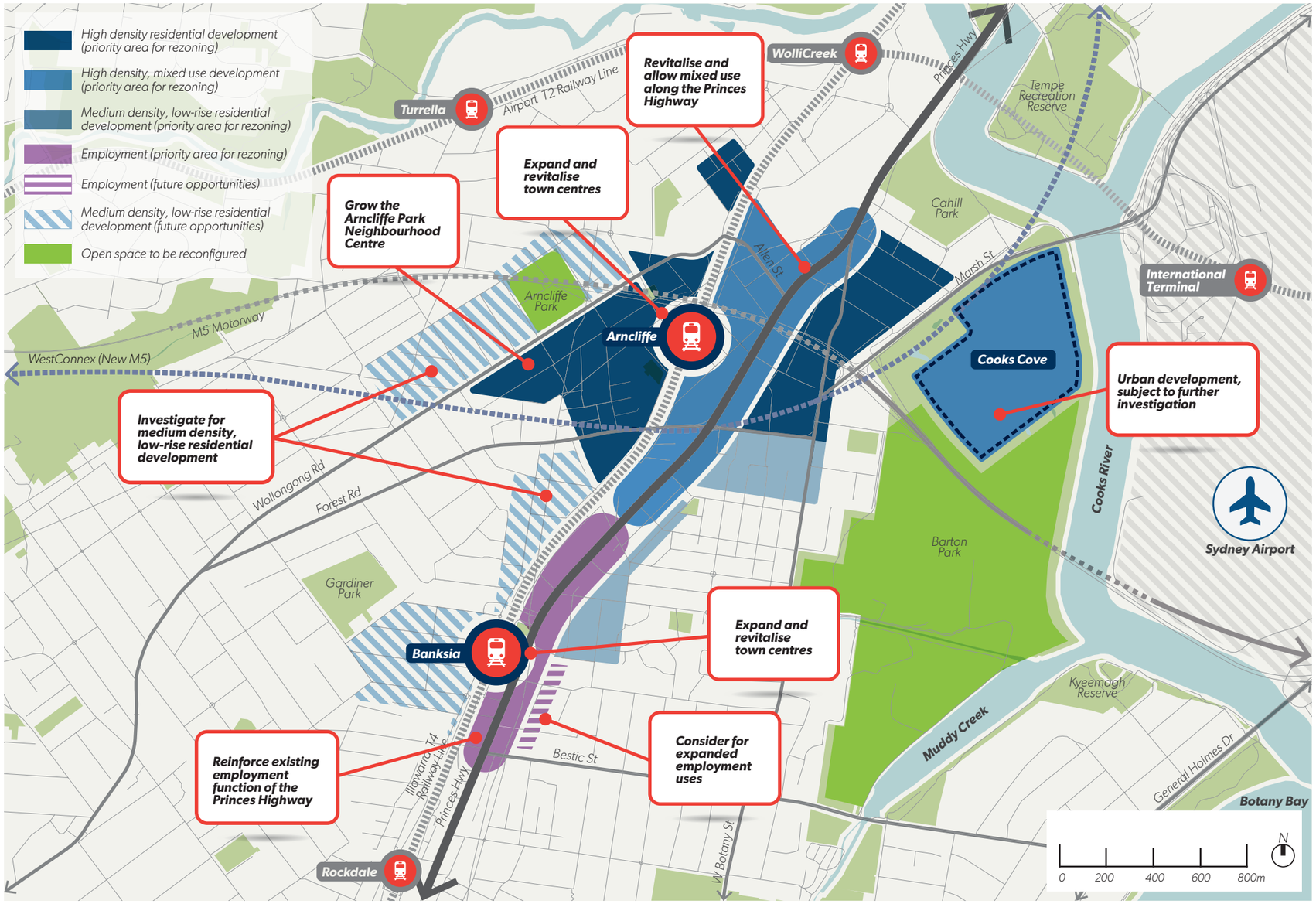

Figure 27 Proposed Arncliffe and Banksia Precincts
Source: Department of Planning & Environment, 2015

Transport objectives and measures

6.0

6.0 Transport objectives and measures

6.1 Overview

Arncliffe and Banksia Precincts are located in proximity to a suburban rail corridor, and within a constrained road network. The main transport objectives are therefore to minimise car use to and from the precinct, promote use of rail and active transport modes, and deliver a bus service that provides suitable access to other major centres not serviced by rail.

To ensure planning and investment for the transport network to support Arncliffe and Banksia Precincts is targeted, addresses the areas of highest priority and addresses the current and future transport demands, a set of strategic transport objectives has been developed and is presented in the following.

The purpose of developing strategic transport objectives is to:

- Define what success looks like for the precincts from a transport perspective
- Define a bespoke set of principles that align to transport policy, including targets for mode share
- Provide a framework for the planning process.

Objectives generally state the desired outcome of a plan, that is, what we want to achieve. Goals state what the results of the improvement will be, and indicators provide a supplementary mechanism for measuring the improvement.

6.2 Integrated Service Planning Guidelines

The *Integrated Public Transport Service Planning Guidelines* provide guidance for service planning activities to support the implementation of the LTTMP. The Guidelines' objectives are to:

- Support a transparent, evidence based and multi-disciplinary approach to service planning
- Provide guidance to transport planners and practitioners on service planning considerations using a consistent approach across public transport modes
- Align service planning outcomes with strategic transport directions outlined in the Master Plan.

The LTTMP identifies 46 demand corridors, two of which pass through Arncliffe and Banksia Precincts; Cronulla to Sydney Airport via Hurstville and Kogarah and Miranda to Sydney Airport. The latter is identified in *Sydney's Bus Future* as a new suburban bus route, linking Miranda with Sydney Airport, Randwick and Bondi Junction.

6.3 International benchmarks

Six national and international urban renewal precinct case studies could be used to benchmark Arncliffe and Banksia Precincts against. We have tried to identify the transport principles, objectives, strategies and targets of these 'best practice' urban renewal precincts.

6.3.1 Wolli Creek (Sydney, Australia)

Wolli Creek, shown in Figure 28, is a 70 hectare site being developed in stages. At the 2011 Census, Wolli Creek had 2,830 residents. Upon full completion, it will house 6,500 residents and 7,000 workers. The urban renewal area is located on former industrial land within an 800 metre walk of two stations on the Sydney Trains network; Arncliffe (serviced by trains on the T4 Illawarra Line) and Wolli Creek (T2 Airport & East Hills and T4 Illawarra Lines). The T4 Illawarra Line provides a direct rail connection to the Sydney CBD, Hurstville and Kogarah and the T2 Airport & East Hills Line provides direct connections to the Sydney CBD, Sydney Airport and Green Square.

6.3.2 Rhodes (Sydney, Australia)

Half of the 100 hectare Rhodes site has been developed. At the 2011 Census, Rhodes had approximately 6,000 residents. When Rhodes, shown in Figure 29, is completely built out, it is expected to have 12,000 residents and 14,000 workers. Most of the development site is made up of old industrial land within an 800 metre walk of Rhodes Station, which is serviced by trains on the T1 Northern Line and some trains on the Intercity Newcastle and Central Coast Line. Both provide direct rail connections to the Sydney CBD, Burwood and Hornsby.

6.3.3 Northshore Hamilton (Brisbane, Australia)

Northshore Hamilton is a 304 hectare site with plans for 15,000 new residents and 15,000 new jobs. The urban renewal site, shown in Figure 30, is currently in the early stages of delivery with 2,250 residents. Most of the site has an industrial past, and parts of it are located within walking distance of two railway stations (Doomben and abandoned Eagle Farm) on the Doomben Line, providing a direct rail connection to the Brisbane CBD. Northshore Hamilton is also serviced by buses on Kingsford Smith Drive and two ferry wharves on the CityCat network.

Figure 28 Wolli Creek render
Source: JBA, 2015

Figure 29 Rhodes render
Source: City of Canada Bay, 2015

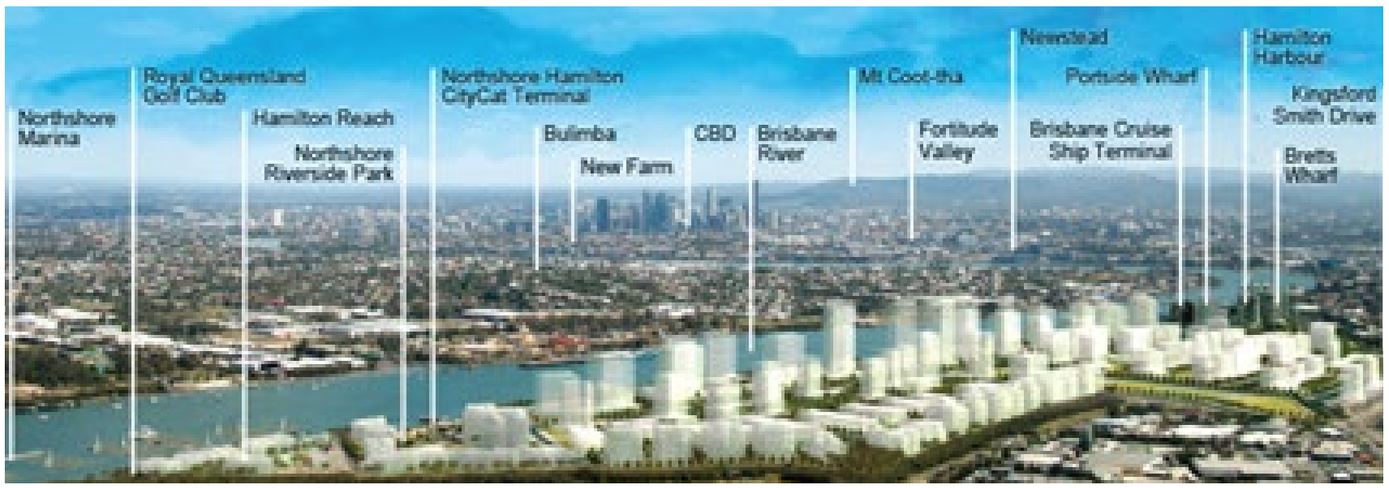

Figure 30 Northshore Hamilton render
Source: Hamilton Harbour, 2015

Figure 31 Tamaki master plan
Source: Urban Implus, 2015

6.3.4 Tamaki (Auckland, New Zealand)

Development of the 400 hectare site has not yet commenced, however there are plans for 17,000 new residents and 10,000 new jobs. Previous land uses on the site include industrial, public housing and low density residential. Parts of Tamaki are located within walking distance of two railway stations (Glen Innes and Panmure) on Eastern Line, which provides a direct rail connection to the Auckland CBD. The Tamaki master plan is shown in Figure 31.

6.3.5 Contra Costa Centre (San Francisco Bay Area, United States)

The Contra Costa Centre, shown in Figure 32, is a 57 hectare site being developed in stages for 6,700 new residents and 7,000 new jobs. Contra Costa Centre is 90 percent complete. The site was previously characterised by low density residential and semi-rural uses. It is located within walking distance of the Pleasant Hill Station on San Francisco's Bay Area Rapid Transit (BART) system, providing direct connections to Downtown Oakland, Downtown San Francisco and San Francisco International Airport on the Pittsburg/Bay Point-SFO/Millbrae Line.

6.3.6 Dublin Transit Village and Dublin Crossing (San Francisco Bay Area, United States)

These two separate developments comprise 113 hectares and will eventually be developed into 3,800 dwellings and 209,000 square metres of commercial and retail floor space. A quarter of Dublin Transit Village and Dublin Crossing (shown in Figure 33) has been built. The sites were previously used by the U.S. Military and had some low density residential and semi-rural characteristics. The developments are located within walking distance of the West Dublin/Pleasanton Station on BART's Dublin/Pleasanton-Daly City Line. This line provides direct connections to Downtown San Francisco.

Lessons for the Arncliffe and Banksia Precincts are that local, national and international examples of major urban renewal and large mixed-use employment precincts have set and delivered sustainable transport targets, supported by transport infrastructure and travel demand management, such as:

- High quality walking and cycling networks that become people's preferred and logical way of moving around.
- Seamless access to public transport to ensure an attractive and competitive alternative to the car.
- Policies that reduce vehicle dependence and maximise accessibility to key activity, employment and service nodes.
- Targeted road system enhancements that address congestion hot spots, improve travel times on key routes and utilise existing infrastructure in the most efficient manner possible.
- A range of land uses, including residential, commercial, retail, community and educational development, high quality public open space and a variety of mobility options, to encourage containment.
- Comprehensive travel plans to support and maximise infrastructure investment.

Figure 32 Contra Costa Centre aerial
Source: Contra Costa Centre, 2013

Figure 33 Dublin Crossing master plan
Source: Dublin Crossing, 2015

6.4 Strategic transport objectives

The strategic transport objectives for Arncliffe and Banksia Precincts focus on connectivity, accessibility and active transport. Using the case studies and the strategic transport objectives developed through the LTTMP, a draft set of strategic transport objectives for Arncliffe and Banksia Precincts has been prepared and are presented in Table 11. Their strongest links to the LTTMP and Priority Precincts criteria are also shown.

Table 11: Draft strategic transport objectives

Strategic transport objectives	Priority Precinct criteria	Link to LTTMP objectives
1. An attractive place to travel to, through and from.	- Aligns with urban renewal strategies - Environmentally, socially and economically sustainable and viable	- Improve liveability
2. A healthy and active lifestyle through safe, direct and legible infrastructure for walking and cycling.	- Aligns with urban renewal strategies - Maximise existing and planned infrastructure	- Improve liveability
3. Fully accessible transport infrastructure for all customers.	- Aligns with urban renewal strategies - Maximise existing and planned infrastructure	- Reduce social disadvantage
4. A street network with defined function, hierarchy and modal priority.	- Maximise existing and planned infrastructure	- Improve liveability - Reduce social disadvantage
5. Destinations have a convenient, accessible, secure and safe public transport option.	- Aligns with urban renewal strategies - Maximise existing and planned infrastructure	- Improve liveability - Reduce social disadvantage
6. Complementary land uses integrated to increase trip containment, improve liveability and stimulate social/economic activity.	- Aligns with State, regional or local strategies - Maximise existing and planned infrastructure	- Improve liveability - Improve sustainability - Support economic growth & productivity
7. Consistent and effective way finding and legible public transport access.	- Environmentally, socially and economically sustainable and viable	- Improve quality of service
8. Seamless interchange between transport modes.	- Environmentally, socially and economically sustainable and viable - Maximise existing and planned infrastructure	- Improve quality of service - Improve sustainability
9. Prioritised public and active transport modes.	- Environmentally, socially and economically sustainable and viable - Maximise existing and planned infrastructure	- Improve quality of service - Improve sustainability
10. Reduced traffic congestion through provision of convenient transport alternatives to private vehicles.	- Maximise existing and planned infrastructure - Financially and commercially viable	- Support economic growth & productivity - Improve sustainability
11.Appropriate parking supply to manage demand.	- Maximise existing and planned infrastructure - Financially and commercially viable	- Support economic growth & productivity
12 Efficient operation of freight.	- Maximise existing and planned infrastructure	- Support economic growth & productivity

Proposed transport network

7.0

7.0 Proposed transport network

A preliminary transport framework has been developed for initial assessment and consultation purposes. Inputs to the development of the transport framework included:

- Acknowledgement of the constraints and opportunities in the existing transport network
- Transport projects already under construction, or included within current Government planning documents
- The draft Land Use and Infrastructure Strategy
- The strategic transport planning objectives and principles identified in section 6.0
- Engagement with Transport for NSW internal stakeholders and Bayside Council (formerly Rockdale City Council)
- Outputs from the Sydney Strategic Travel Model (STM).

7.1 Active transport network

7.1.1 Pedestrian network

All proposed and redeveloped roads throughout the precinct would have dedicated pedestrian footpaths to create a comprehensive network following proposed and modified road alignments.

The road grid network combined with proposed through-site links would work to facilitate pedestrian permeability and be conducive to encouraging walking trips. The precinct has been designed around a linear grid structure with similar block sizes and regular cross streets with pedestrian footpaths to encourage pedestrian activity and achieve a high level of permeability.

Key to ensuring a robust and effective pedestrian network would be the facilitation of pedestrian movements to and from Arncliffe and Banksia Stations, ensuring that these routes are safe, well-lit and served by pedestrian crossing facilities at key locations.

There is also an opportunity to improve footpath connections to recreational areas located on the fringe of the precinct to encourage leisure walking.

Figure 34 shows the indicative pedestrian improvements as part of the active transport network. This network addresses the opportunities and constraints outlined above including the investigation of:

- Additional pedestrian crossings at key locations throughout the precinct:
  - Adjacent to parks and open spaces
  - Across major road corridors, including Forest Road, Princes Highway and West Botany Street
  - In the vicinity of rail line crossing points.
- Pedestrian streetscape improvements along:
  - Wollongong Road
  - Princes Highway
  - Routes that connect to Arncliffe and Banksia rail stations.

7.1.2 Cycle network

A comprehensive cycle network is proposed for the precinct which would link the rail stations, schools, and residential neighbourhoods with key strategic routes and onward destinations. The proposed cycle network addresses existing network constraints and will assist in increasing cycle mode-share in the area.

The proposed cycle network is shown in Figure 35 and has been based on the enhancement of existing informal or well utilised corridors. These routes already experience demand from cyclists who are utilising these routes despite no formal cycle infrastructure provision (see Section 3.2.3). The network has also been designed to address existing gaps in the cycle network (as identified in Section 3.2.4) to link the existing cycle network together, with a focus on connections to Arncliffe and Banksia Stations.

The proposed cycle network will include a mixture of dedicated bicycle facilities which will take the form of off-road (shared path, separated or exclusive, depending on user demand) and on-road (cycle lane). Cycle routes are provided to take advantage of rail crossings and signalised intersections of major roads in order to facilitate the crossing of these barriers. This is particularly evident in Arncliffe which requires the majority of cycle infrastructure to effectively access cycle routes to the east. In the Banksia precinct, the Spring Street - Wolli Creek Road route provides good connectivity between major cycling routes as well as destinations along the corridor.

Table 13: Proposed pedestrian network upgrades / investigation areas

Figure No.	Potential Improvements	Purpose	Indicative Timing
Pedestrian Crossings			
1	Traffic signals with formal pedestrian crossings	Connect Bonar Street Precinct and Turrella to the Arncliffe precinct	Short
2	Traffic signals with formal pedestrian crossings	Connect Wolli Creek Precinct and new Arncliffe Pedestrian Link to the Arncliffe precinct	Short
3	Zebra crossing of Burrows Street	Improve access to Arncliffe Station	Short
4	Traffic signals with formal pedestrian crossings across the Princes Highway	To improve the limited existing access across the Highway and connect the core of the proposed development area to the east, including connection to item 14	Medium
5	Pedestrian crossing at southern leg of Burrows Street / Princes Highway	Improve access to Arncliffe Station	Short
6	A signalised pedestrian crossing of Forest Way at Eden Street / Wardell Street	To ensure the key rail line crossing point for cyclists is safer and more effective	Medium
7	A signalised pedestrian crossing of Forest Road	To address the lack of Forest Road pedestrian crossing opportunities	Medium
8	Zebra crossing of Godfrey Street	To improve pedestrian access to Banksia Station	Short
9	Zebra crossing of Gardiner Avenue	To improve pedestrian access between Gardiner Park and Banksia Station	Short
10	Zebra crossing of Godfrey Street	To improve pedestrian access to Banksia Station	Short
11	A signalised crossing of the Princes Highway	To improve connectivity between Banksia Station and dwellings / businesses to the east.	Short
Pedestrian Connections			
12	A signalised crossing of West Botany Street	To connect Banksia with open space and trunk active transport infrastructure	Medium
13	Potential shared path on the SWSOOS	Provide an active transport link between Arncliffe Street and the Princes Highway	Medium
14	Shared path from Eve Street Cycleway to Princes Highway near Allen Street, inlcuding crossings of West Botany Street and Duncan Street.	Facilitate east-west movement between Arncliffe Precinct and trunk active transport infrastructure and open spaces.	Medium
15	Queen Street	Facilitate east-west movement and access to Arncliffe Station and Arncliffe Park	Medium
16	Eden Street	Improve east-west movement and connectivity between Arncliffe Station and Princes Highway corridor	Medium
17	Gardiners Park	To improve pedestrian access between Gardiner Park and Banksia Station	Medium
18	Hattersley Street north	Link Eden St to Princes Highway	Medium
19	Hattersley Street south	Combine with signalised crossing to improve east-west access to Banksia Station.	Medium

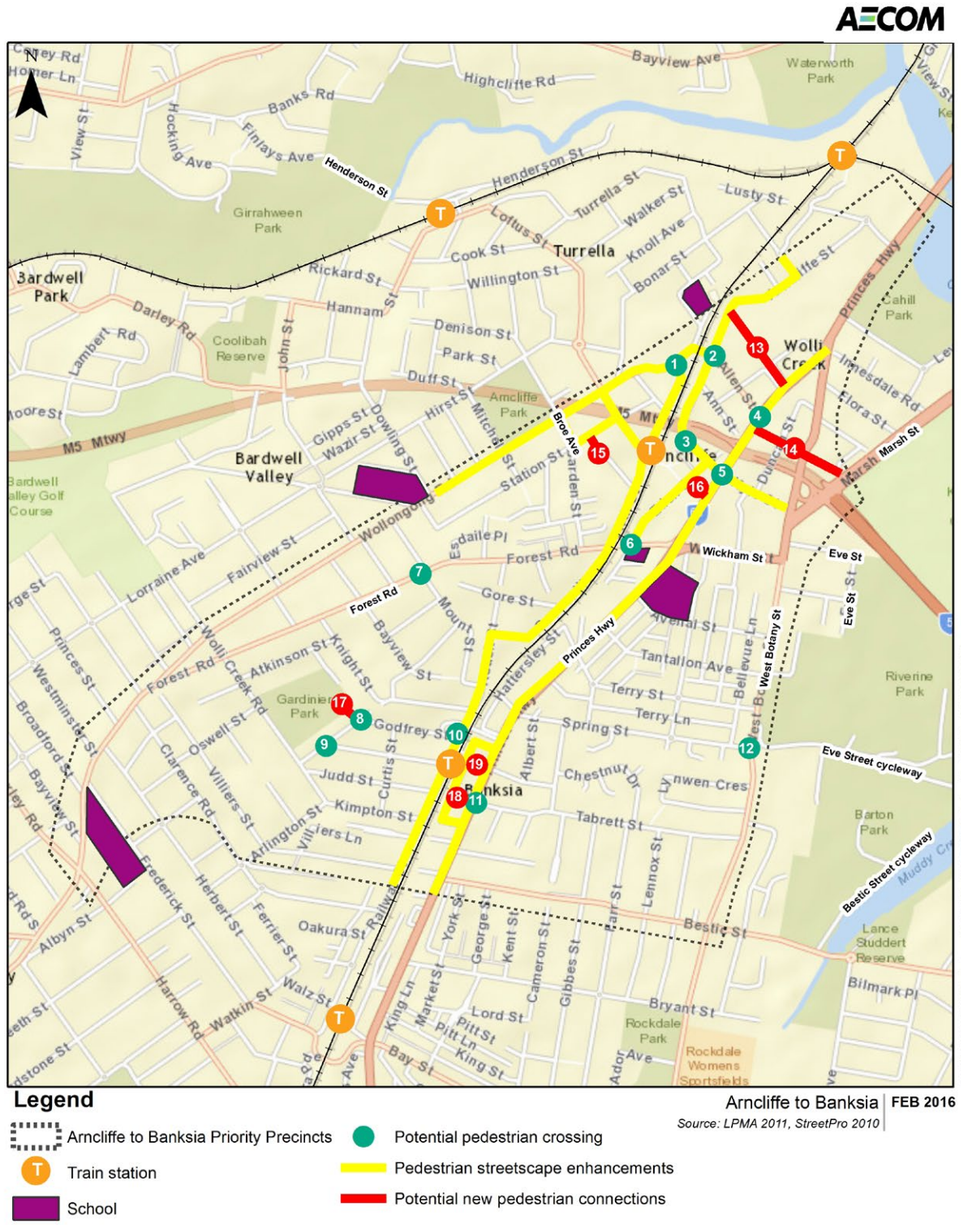

Figure 34 Pedestrian network upgrades for consideration

Source: AECOM, 2015

Table 14: Proposed cycle network upgrades / investigation areas

Figure No.	Potential Improvements	Purpose	Indicative Timing
Improvements to existing routes / facilities			
1	Railway, Roach and Somerville Streets marked on-road cycle lanes and wayfinding	To improve north-south route between Arncliffe & Banksia Stations	Short
2	Arncliffe, Burrows & Eden Streets marked on-road cycle lanes and wayfinding	To improve north-south connection between Wolli Creek and Arncliffe Precincts	Short
3 & 4	Station end of trip facilities / increased cycle parking provision	To encourage commuting by cycle and rail	Short
5	Improvements to the existing crossing facility at Forest Road	To provide a safer and more navigable crossing point for cyclists at a key location for cycle movements	Short
Proposed off-road routes			
6	Provide appropriate active transport facilities as part of proposed Gertrude Street extensions	To connect Wolli Creek with the existing Marsh Street shared path & Eve Street Cycleway and to separate cyclists from traffic.	Medium
7	Princes Highway shared path between Spring Street & Subway Road	A short shared path to facilitate the crossing of Princes Highway in order to connect Banksia Station to proposed Spring Street cycleway	Medium
8	Already-proposed route along Princes Highway to Valda Avenue and Eve Street Cycleway, as planned by Council.	Providing a more direct connection from the Princes Highway at the Cooks River to the Eve Street Cycleway, and improving connections to Cahill Park.	Short
9	Utilisation of potential SWSOOS shared path, as alternative east-west link to Items 7 & 9.	To connect with Item 8 and existing routes provide a cross-precint cycle route.	Medium
Proposed on-road routes			
10	Shared path from Eve Street Cycleway to Princes Highway near Allen Street, inlcuding crossings of West Botany Street and Duncan Street.	To provide access from the Arncliffe Precinct core to the Eve Street Cycleway & to improve access across West Botany Street	Medium
11	Provision of a cycle lanes along Duncan Street and Kyle Street	To connect Arncliffe Station to Eve Street Cycleway.	Medium
12	Wollongong Road and Allen Street cycle lanes	To connect Item 10 and existing routes at the west to provide a cross-precint cycle route.	Medium
13	Spring Street separated Cycleway	To connect Banksia Precinct to the Eve St Cycleway	Medium
14	Wolli Creek Road - Gardiner Avenue - Godfrey Street cycle lanes	Connect Banksia Precinct suburbs and cycle routes to the west	Medium

AECOM

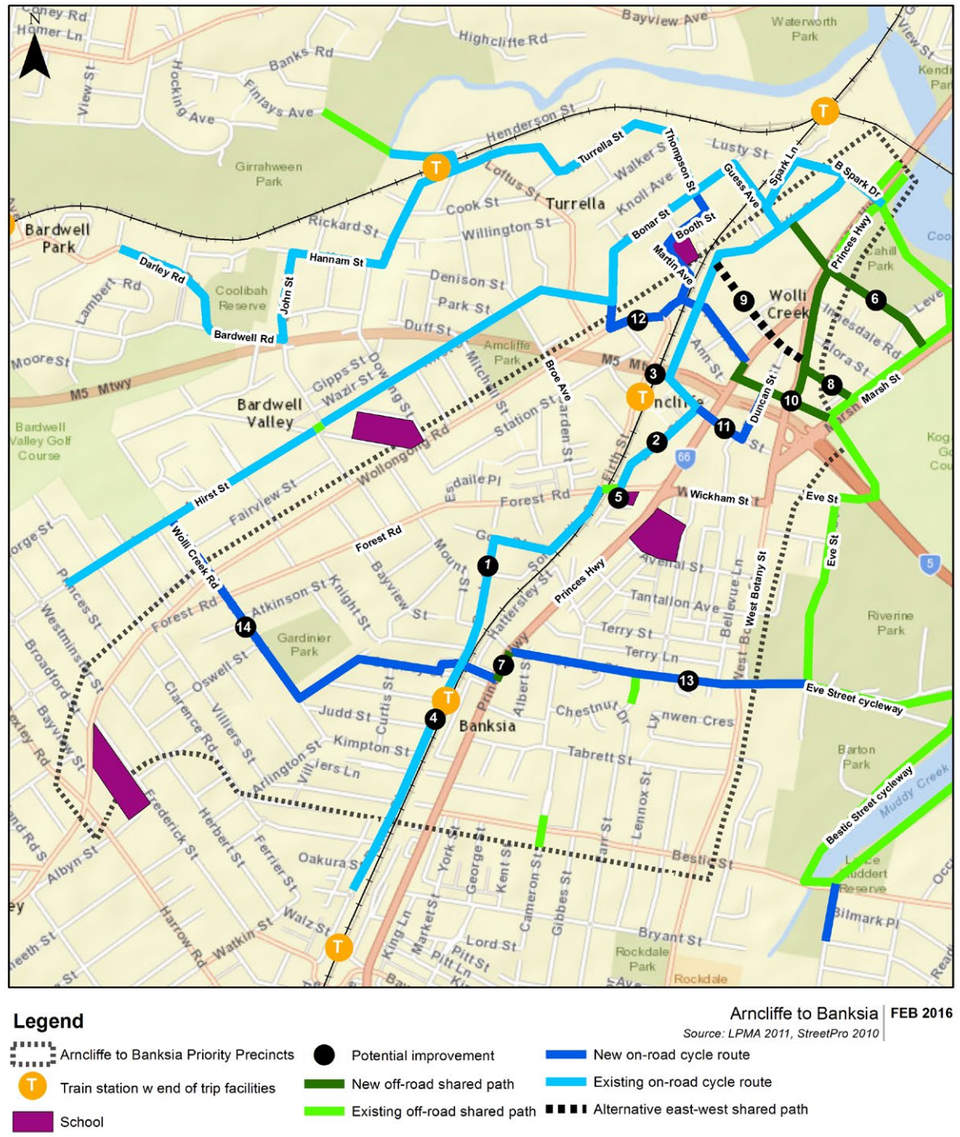

Figure 35 Proposed cycle network
Source: AECOM, 2015

7.2 Rail services

As identified in Section 3, patronage demand analysis indicates that nominal seating and standing capacities on the T4 Illawarra and South Coast lines are already being reached. As identified in APGS, the NSW Government intends to work with Councils in the South Subregion to identify suitable locations to increase housing and accommodate population and employment growth. With the T4 Illawarra Line forming the spine of the public transport network in the South Subregion, it is anticipated that this action will lead to increased forecasts in patronage for the line.

Detailed patronage analysis undertaken by Transport for NSW has yielded the following relevant outcomes for the T4 Illawarra Line:

- The critical section in the future is anticipated to be the Arncliffe to Wolli Creek section
- Line loads from Arncliffe to Wolli Creek (northbound) are forecast to be approximately 32,200 in the 2036 AM peak hour. This is significantly higher than the current load limit of the line of 24,740pph.

Based on high-level assumptions[10], it is anticipated that the Arncliffe and Banksia Precincts would generate in the order of 730 northbound rail trips in the 2036 AM peak hour, in addition to current 'business as usual' forecasts. In relative terms this is a minor increase, and it is not anticipated there would be significant issues in accommodating these increases station-side. However, increasing forecast patronage at Arncliffe and Banksia Stations would intensify an already approaching rail line capacity issue.

Line loads and average train loads based on the strategic assumptions are shown in Table 12 and illustrated in Figure 36. This information is targeted on the six AM peak hour trains that currently service the Arncliffe and Banksia Stations. Note that the Base Case includes business as usual growth in the Arncliffe and Banksia Precincts.

Based on the forecasts it is anticipated that the existing services will reach load limits by approximately 2024. This indicates that there is limited capacity within the existing services to support long term growth along the line without sacrificing quality of service during peak periods. As demand approaches the line load limit, passengers will experience significant increases in delays and travel time variability, as trains become too full to accept new passengers.

Table 12: Forecast AM peak hour passenger forecasts for trains servicing Arncliffe and Banksia

Scenario	Line loads (pph)*		Average train loads (ppt)^	
	2014	2036	2014	2036
Base case	6,700	10,570	1,120	1,760
With Arncliffe and Banksia Precincts		11,310		1,890

*** Existing load limit of 8,240pph, for the six AM peak hour Hurstville All-Stops services.**
^ Acceptable limit is 1,375ppt. Based on 6 trains per hour, assuming equal growth across T4 Illawarra services.
Source: Transport for NSW, 2015

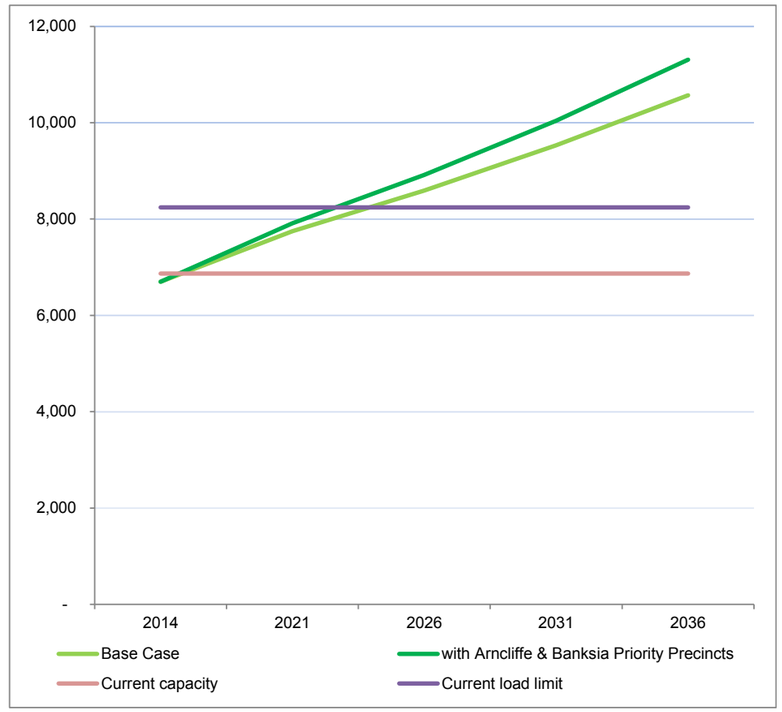

Figure 36 Forecast AM peak hour passenger forecasts for trains servicing Arncliffe and Banksia

Source: AECOM, 2015 (based on information provided by Transport for NSW)

[10] 28 per cent mode share to train, 90 per cent trips assigned to the north, 1 AM peak person trip per dwelling, population uplift of 5,400 to 2036 already included in *BUREAU OF STATISTICS AND ANALYTICS14* series for local travel zones.

7.2.1 Increased rail capacity along the corridor

Transport for NSW is currently developing options to address rail capacity and congestion issues that currently exist south of the Sydney CBD, including on the T4 Illawarra Line. The options would provide adequate capacity for the proposed growth in the Arncliffe and Banksia precincts, and consider each the short, medium and long term needs of the corridor. This work will also consider the feasibility and funding arrangements of any rail improvements; there is currently no funding for rail network upgrades that would benefit the Arncliffe and Banksia precincts. Any major upgrades would likely be delivered post 2031.

7.2.2 Implications for the Arncliffe and Banksia Precincts proposal

The findings outlined have significant implications for the Arncliffe and Banksia Precincts proposal. The forecast patronage growth from the precincts alone is relatively modest in the context of the overall forecast growth for the T4 Illawarra Line. However, as this is a proposal founded on train station precincts, the forecast lack of available capacity on the T4 Illawarra and South Coast Lines in the long term presents a significant barrier to being able support additional growth within Arncliffe and Banksia Precincts from a transport perspective, without bringing forward the need for significant rail investment.

For the purposes of progressing with transport network development and assessment the following recommendations have been made:

1. For the purposes of the strategic modelling task being undertaken to assess the impacts of Arncliffe and Banksia Precincts, existing services along the T4 Illawarra and South Coast lines will be assumed through to 2036. This is due to the lack of commitment or funding for any rail capacity enhancements, and this assumption also generates a more conservative assessment of the road network to 2036.
2. The recommendations from this study and the transport modelling task will inform rail network planning and help determine appropriate actions going forward to accommodate proposed growth south of the Sydney CBD.

7.2.3 Implications for freight operations

As identified in Section 3.6, rail freight currently has restricted operations during the day with passenger services consuming all available commuter peak period capacity, resulting in some freight movements occurring at night. It is anticipated that this would continue to occur until additional rail capacity is provided along the corridor. This creates additional pressure to investigate options to provide additional capacity along the corridor.

Until additional capacity is delivered, current peak period constraints will likely remain. It is also likely that the potential smaller-scale operations-based improvements identified may not provide sufficient capacity to accommodate both peak period freight and passenger rail operations. This would depend on the timing of the upgrade, and amount of additional capacity provided.

It is recommended that the freight needs along the Illawarra rail corridor be consiered in conjunction with passenger needs such that an integrated rail solution can be formulated for the long term.

7.3 Bus network and services

Bus routes within the vicinity of precincts will ultimately seek to expand and build upon existing routes and services in response to demonstrated demand. The following key considerations have been taken into account in developing an understanding of future bus service requirements:

- Current JJTW analysis suggests low mode share to bus (~3 per cent)
- Built and natural constraints to bus movement in the west of the precinct
- Rail crossings in the study area are capable of accommodating bus movements
- With rail providing access to the key employment centres to the north and south / southeast, the perceived main role for bus will be in connectivity to the east and west – particularly to the Airport and Randwick areas
- The proposed Suburban route from Bondi Junction to Miranda proposed within *Sydney's Bus Future* will provide an attractive new service providing access to the east and south. This will also augment the existing 400, and 410 services. The nett result will be a significant increase in services through Arncliffe and Banksia Precincts, particularly to the east
- It has been identified in the medium to long term, existing rail services may experience very high train loads. This may result in some demand shift to parallel bus services (e.g. the 422 service) until additional rail capacity is provided.

7.3.1 Future bus network route considerations

In addition to the planned new Bondi Junction to Miranda suburban route, there is potential for other bus route modifications to be considered in response to demonstrated increases in bus patronage. The following strategic proposals have been given consideration as part of this study:

422 – Only approximately a half of the current services operate to Arncliffe and Banksia, with the remainder only operating between Tempe and the City. Increased demand may result in the need to operate all services to Kogarah (current terminus). Consideration could also be given to locally shifting the route from West Botany Street to Wollongong Road. This would provide the benefit of bringing the city bus service into the core of the Arncliffe Precinct and could act as an enabler for an extension to the 425 route and simplification of the 473 route (both discussed below).

425 – The existing bus service could extend further south using the existing 422 route along West Botany Road. This would provide access to the north-west for locals (not currently provided), increase the patronage catchment of the currently short route and could be slightly augmented to provide an interchange opportunity with the Inner West Light Rail line.

473 – This route could be shortened so that it terminates at Arncliffe. It currently operates along a circuitous route that duplicates the 400 bus route. The area no longer serviced by this route could potentially be serviced by a realigned 422 as discussed above.

7.3.2 Service frequency improvements

In conjunction with the new Bondi Junction to Miranda route, the existing 400 / 410 bus routes are proposed to have increased service provision in future. Potential increases in bus service frequencies for local bus services are shown in Table 12. These improvements would increase serviceability to Arncliffe and Banksia residents along bus corridors.

Table 15: Potential modifications to bus service frequencies

Route No.	Direction	Existing AM/IP/PM frequency (minutes)	Proposed AM/IP/PM frequency (minutes)
Existing routes			
400	Northbound	20/20/20	10/10/10
	Southbound	20/20/20	
410	Northbound	30/NIS/20	
	Southbound	80/NIS/20	
422	Northbound	30/30/30	15/30/15
	Southbound	30/30/30	15/30/15
473	Northbound	30/60/30	15/30/15
	Southbound	30/60/30	15/30/15
New routes			
Bondi Junction - Miranda	Northbound	N/A	10/15/10
	Southbound	N/A	

Bus priority will also be considered at locations where it could provide travel time savings or reliability improvements to services.

It is reinforced that the potential modifications highlighted above are for consideration only. Other than the planned new suburban service and associated augmentation to the 400 / 410 services, the existing bus network will continue to operate while further work is completed on any additional bus services, and changes to existing services, that may be needed to address network constraints. This process would include fine-grained patronage demand and bus travel time modelling.

7.4 Road network

7.4.1 Access to Precincts

A review of the level of road network accessibility available to critical sub-precincts within the study area has been undertaken. The objective of this review was to identify areas of the road network that will likely require reconfiguration or upgrading to support growth within Arncliffe and Banksia Precincts in the future. These upgrades have been assessed using mesoscopic (AIMSUN) traffic modelling as discussed in the following section. The review is founded on key findings identified in previous sections of this report including:

- The level of accessibility to the trunk road network is generally currently quite low in the study area, to preserve the high level function and efficiency of the State roads.
- WestConnex will be operational by 2026, improving traffic conditions on the Princes Highway, providing the opportunity to investigate improving local access.
- First principle estimates indicate an increase in local traffic trips in the order of 2,310 during the AM peak hour based on current travel patterns. The forecast local increase of 1,500 jobs would also have an impact on local traffic demands.

Note that the modelling exercise, and following access review, were undertaken upon the assumption that the WestConnex Southern Extension would be constructed within the 20 year planning horizon. However, a 'without Southern Extension' scenario was also undertaken as part of the modelling exercise as a sensitivity test.

The review has focussed on the most dense and hence highest traffic-generating sub-precincts of the proposal around Arncliffe Station. As this study is predominantly concerned with the trunk road network, the review has focussed on likely impacts to State and Regional roads in this area.

It has been assumed that lots fronting the Princes Highway would continue to rely on existing access driveways. These are mostly left-in / left-out type arrangements, physically limited by concrete medians. These lots predominantly accommodate large-floor retail and this is not proposed to change as part of the proposed Strategy.

The outcomes of the review are summarised as follows. The consolidated set of subsequent areas for investigation are illustrated in Figure 37.

1. Accessibility to Southeast Arncliffe sub-precinct (SEA)

   - The role of Bellevue Street and Segenhoe Street will be reviewed, particularly their access to Wickham Street. Avenal Street should serve as the main access provider for this area as it has all-movements access at West Botany Street and the Princes Highway.

2. Accessibility to Northeast Arncliffe sub-precinct (NEA 2)

   - Accessibility into this precinct needs to account for:
     i) The higher-order function of the surrounding roads of Princes Highway, West Botany Street and Wickham Street
     ii) Of these, the section that has the lowest order function and the most available capacity is West Botany Street between Princes Highway and Marsh Street
     iii) Duncan Street has a constraint in the form of a narrow divided section, providing access to lots 1 to 9 Duncan Street.

   - Accessibility may be enhanced by:
     iv) Should demand require it, upgrading the Charles Street / Wickham Street intersection to provide a right turn into Charles Street. This is in order to provide access from Marsh Street and areas further east into this precinct
     v) Providing a left turn out from Kyle Street to West Botany Street. The option to provide direct connection from Marsh Street to Kyle Street was also considered, however it is anticipated that associated reconfiguration works at this intersection would be extensive.
     vi) Should demand require it, providing all movements out from Kyle Street to Princes Highway and Burrows Street, through upgrades to the existing intersection
     vii) Reviewing the Duncan Street / West Botany Street intersection to determine an appropriate configuration
     viii) Consideration could also given to realigning Charles Street, through lots 2A Charles Street and 17 Kyle Street, to create an internal north-south connection with Duncan Street – with improved potential to shift local traffic off parallel trunk roads.

3. Access to north-east part of the Arncliffe Priority Precinct from the north and south (NEA 1)

   - Flora Street will serve as the main access to this precinct, with all movements intersections at each end – at Marsh Street and West Botany Street
   - Valda Avenue is also accessible via an all movements intersection with West Botany Street
   - The above accessibility provisions are considered adequate in light of the required function of the surrounding road network.

4. Improve accessibility to central and western parts of the Arncliffe Priority Precinct (CA 1, CA 2, and APIA):

   - Traffic demands generated in illustrated areas CA 1, CA 2 and APIA are anticipated to require improved accessibility to the Princes Highway. Accessibility to these areas is limited between Brodie Spark Drive and Forest Road (i.e. generally no right turn in or out at intersections). Instead, these pockets of land currently use Brodie Spark Drive and Arncliffe Street
   - It is suggested that Brodie Spark be retained as the key access point for Wolli Creek, and Allen Street be used as a new access point for central and the western Arncliffe areas. This proposal would:
     i) Require augmentation / upgrading of the Allen Street / Princes Highway intersection, and assessment of any impact on the operation of the M5 off ramp intersection to the south
     ii) Need to consider the constraints of the rail underpass at Wollongong Road.

5. Wollongong Road:

   - It is considered that uplift along the corridor can be supported by the existing trunk infrastructure along Wollongong Road – predominantly priority controlled intersections with the exception of one signalised intersection at Kelsey Street. Traffic along this corridor would generally be local-catchment driven. The appropriateness of intersection treatment types, particularly at Dowling Street, Kimpton Street and Fripp Street, will be investigated given their local collector role
   - Appropriateness of pedestrian crossing treatments along this corridor will be investigated to balance vehicular needs (including bus) with pedestrian amenity / safety (e.g. traffic calming) for locals accessing Arncliffe Park and the proposed neighbourhood centre opposite.

6. Forest Road:

   - It is anticipated that the increased development proposed in Central Arncliffe will generate additional demand at Forest Road's intersections with both Firth Street and Eden Street
   - These intersections are very constrained due to the rail overpass bridge immediately adjacent. The functionality of these intersections in terms of permissible movements and traffic operation will need to be reviewed to ensure the function of Forest Road is not significantly impacted.

In terms of the Banksia Precinct, traffic will be heavily reliant upon Railway Street and the Subway Road link beneath the rail line – which may impact on operation at its intersection with the Princes Highway. Development to the east of the Princes Highway in this area may also trigger the need for localised upgrades, though this is considered unlikely in light of the lower density development proposed. This has been assessed as part of the traffic modelling undertaken.

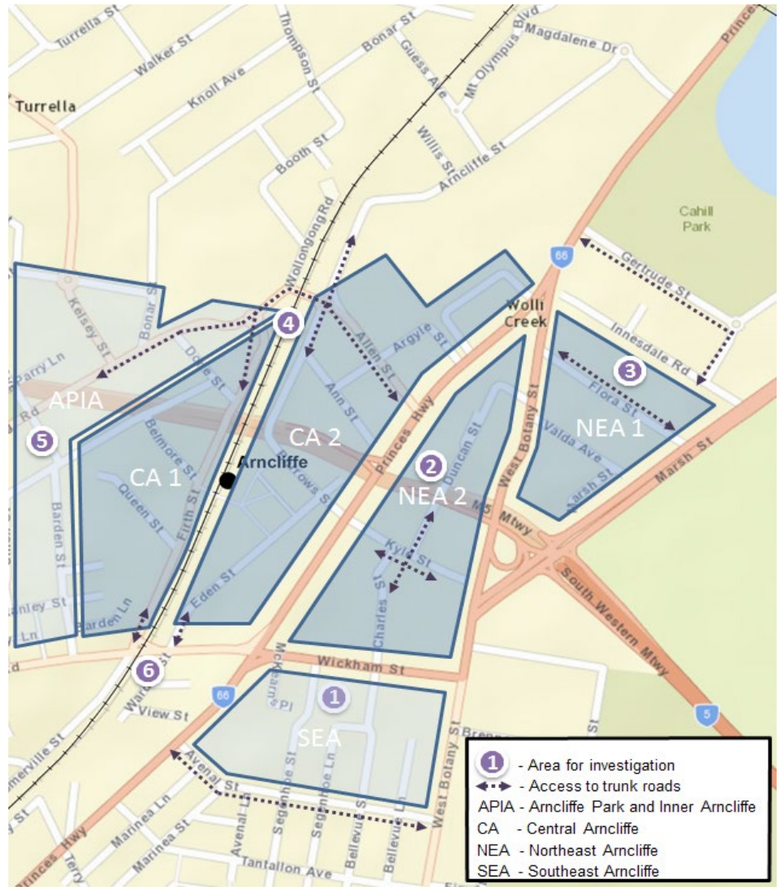

Figure 37 Road network accessibility review
Source: AECOM, 2015

7.4.2 Traffic modelling

A mesoscopic (AIMSUN) traffic model was developed to provide an initial assessment of the future traffic conditions, as well as investigate potential road infrastructure requirements in support of the proposal.

AIMSUN mesoscopic modelling provides an adequate level of detail for the planning study, including the capability to forecast the traffic response to congested conditions and delays at intersections. In addition, traffic operation of critical locations were further interrogated with the aid of visualisation at the microscopic level, through the introduction of 'Hybrid' modelling. An overview of the modelling process is shown in Figure 38.

It is important to note that, as is typical practice, the development of the AIMSUN model for both the morning and evening peaks (i.e. 7-9am and 4-6pm), entails certain limitations and assumptions. It is critical that these limitations are highlighted and considered in conjunction with the modelling outcomes:

- Limited capacity constraints in the travel demand model used to estimate future traffic loads (STM) may result in overestimation of future through-traffic on the local road network
- Potential spreading of traffic demands from the 'core' to 'shoulder' peak periods as a result of highly congested traffic conditions is conservatively not considered in this modelling process.

It is important to recognise that under existing conditions, key road corridors such as the Princes Highway, Forest Road, Wickham Street and West Botany Street are already operating at or near capacity during the peak periods. In addition, the developed urban environment also presents various constraints for realistic provisioning of additional major road infrastructure.

As such, a pragmatic three-step modelling approach was undertaken to assess a number of plausible traffic management measures and the identified local upgrades:

Step 1: Initial modelling of the 2036 future conditions with the Arncliffe and Banksia proposed development. This allows identification of 'pinch point' areas within the network with anticipated deficiencies.

Step 2: Rationalisation of traffic management measures and local upgrades targeting the identified areas of deficiencies.

Step 3: Incremental modelling of the likely beneficial upgrades, coupling with iterative refinements to validate the merits of the improvements.

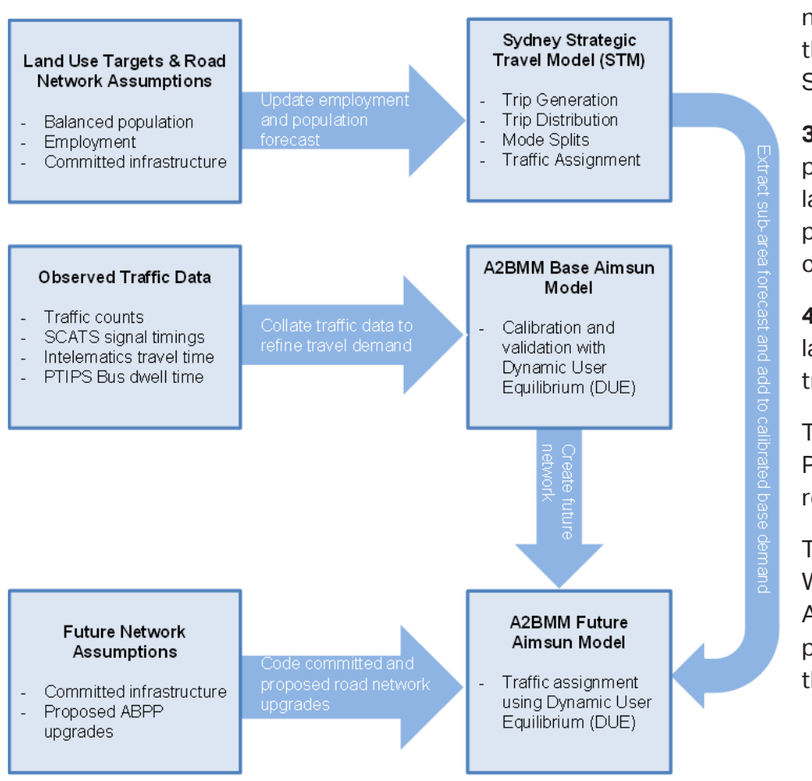

Figure 38 Arncliffe to Banksia Mesoscopic Modelling Overview

7.4.3 Intersection performance

As a result of the foregoing three-step modelling approach, a set of infrastructure upgrades were tested as listed below, and discussed over page (refer to Figure 39.

1. Princes Highway / Allen Street Intersection – conversion from a left-in / left-out arrangement to a signalised all-movement intersection, including a dedicated right turn lane into Allen Street. This upgrade is aimed to connect the Arncliffe Precinct with the State road network and reduce traffic demands through Wolli Creek.

2. Wollongong Road / Arncliffe Street / Allen Street Intersection – upgrade of the existing roundabout to a signalised intersection. This upgrade is required to manage localised increases in traffic demand as well as improving pedestrian accessibility. This upgrade would need to appropriately connect with the Arncliffe Pedestrian Link and the already-proposed signalisation of the Wollongong Road / Firth Street intersection (located on the opposite side of the rail line).

3. Princes Highway / Forest Road / Wickham Street Intersection – provision of additional capacity by introducing an additional right turn lane at both the northern and southern approaches. This is aimed at providing additional capacity at an intersection which is already at capacity.

4. Princes Highway / Subway Road Intersection – adding a left turn lane at the Subway Road approach, to accommodating increased traffic from the Banksia Precinct.

Traffic management measures including clearways on both sides of Princes Highway and West Botany Street in peak periods are also recommended to couple with the foregoing upgrades.

The above upgrades together with highlighted road projects including WestConnex and the F6 Extension, and an assumed uptake of the Arncliffe and Banksia Precincts by 2036, represent the focus of this preliminary assessment. Sensitivity tests were also undertaken for the interim year of 2026, with and without the potential F6 Extension.

In the focal 2036 scenario, the outcomes of the modelling indicates that a majority of the intersections within the study area will perform at an acceptable Level of Service. The sensitivity testing undertaken highlighted the significant benefits of the F6 Extension, as well as the proposed upgrades. However, as illustrated in Figure 39 a few key intersections are anticipated to be operating at capacity in 2036 peak periods with unsatisfactory Levels of Service, especially in the evening peak. These intersections are discussed below.

- The key east-west corridor of Marsh Street - Wickham Street - Forest Road includes three intersections which are likely to require upgrades. The traffic driving the need for these upgrades is predominantly regional in nature, however is slightly intensified by localised development uplift. While sensitivity tests have been undertaken as part of this exercise to improve operations, further investigation and consultation would need to be undertaken to determine an appropriate solution for this key corridor.
- The Princes Highway intersections with Brodie Spark Drive and Allen Street are also shown to be operating slightly over capacity in the 2036 PM peak. This is driven predominantly by forecast development uplift in a combination of the Wolli Creek, Arncliffe and Bonar Street Precincts. In the case of the Allen Street intersection in particular, this is also a result of congested conditions at the downstream Forest Road intersection. These may be resolved through a combination of Council's proposed western extension of Gertrude Street (to Arncliffe Street) and / or further improvements at the Forest Road intersection as highlighted above.

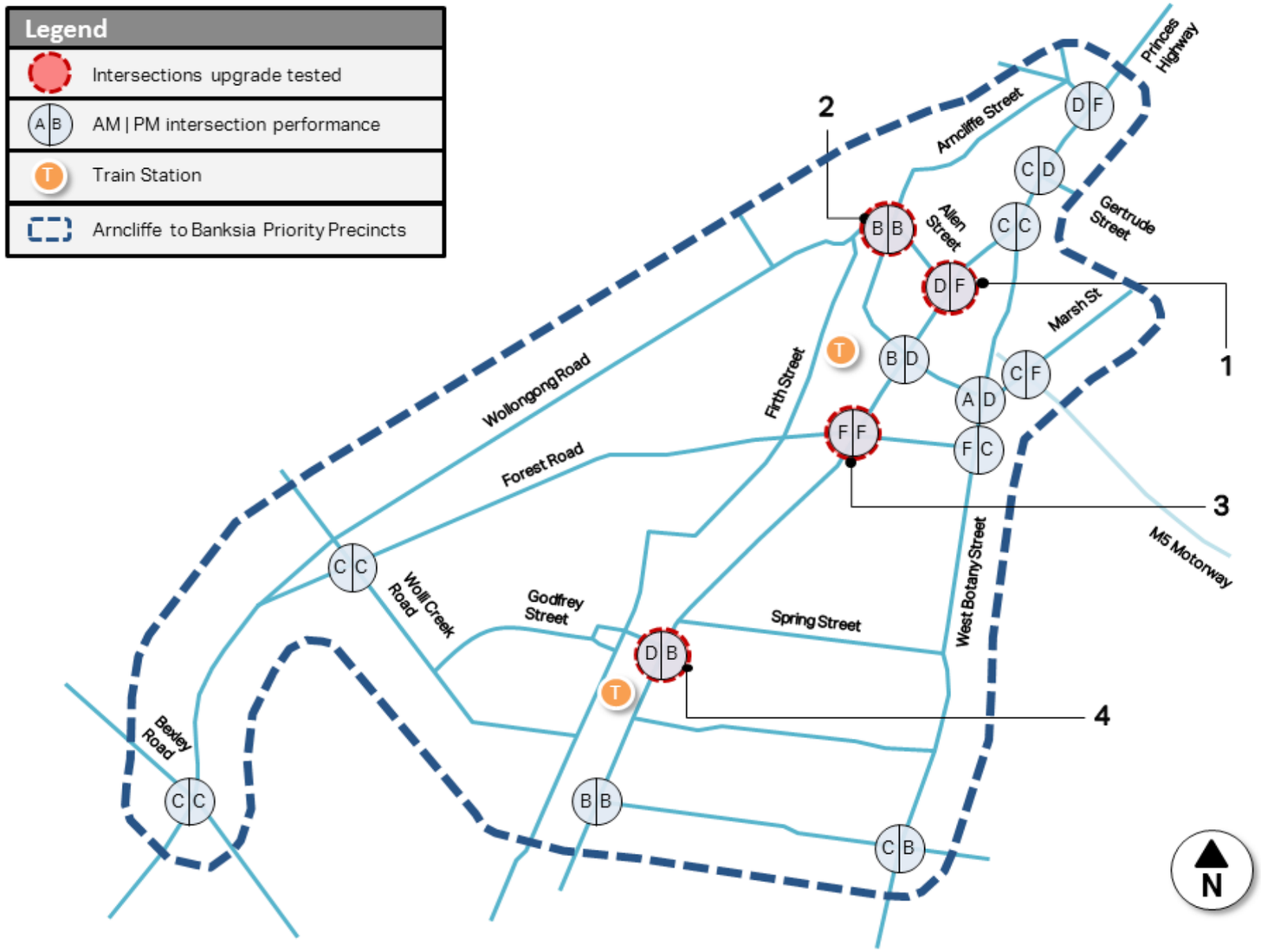

Figure 39 Intersection Upgrades and Performance - 2036 with WestConnex and F6 Extension to President Avenue (Kogarah)

8.0 Next steps

This report has outlined a preliminary transport framework taking into account:

- The constraints and opportunities in the existing transport network
- Transport projects already under construction, or included within current Government planning documents.
- The Arncliffe and Banksia Precincts structure plan
- Transport planning objectives and principles
- Internal Transport for NSW stakeholder engagement.

The preliminary transport framework includes the following actions and improvements.

- Rail:
  - Further investigation into potential improvements to rail services to get more people to and from the Sydney CBD and other key centres on the rail network
  - Transport for NSW are currently investigating opportunities to increase available rail capacity for southern Sydney, including for the Arncliffe and Banksia Stations; the increased capacity would help to accommodate increased travel demand resulting from the proposed growth.
- Bus:
  - A new Suburban bus route between Bondi Junction and Miranda via Arncliffe, Banksia and Rockdale, that will improve access for residents to primary employment areas such as the Sydney Airport
  - Potential improvements to bus services to enhance accessibility of the overall public transport network to residents. These would be implemented in response to demonstrated demand
  - Investigation into the need for any bus priority infrastructure.
- Roads:
  - The proposed WestConnex project and potential F6 Extension, anticipated to significantly reduce local traffic volumes on the Princes Highway
  - A set of localised intersection upgrades aimed to improve accessibility of the trunk network to proposed uplift areas, and preserve accessibility for the local freight task
  - Further investigation into upgrades that may be required along key State Road corridors to support the combination of both regional growth and the development uplift in the precincts.
- Active transport:
  - A series of road crossings and through-site links anticipated to improve connectivity to key generators and attractors including the Arncliffe and Banksia Train Stations, neighbourhood centres and open spaces
  - Implementation of new east-west active transport linkages, addressing current constraints in the network.

The Department will exhibit the draft Strategy and any subsequent rezoning proposals for the priority areas in Arncliffe and Banksia Precincts. Following exhibition, the Department will assess the matters raised in the submissions and where required, amendments to the exhibited material will be made. Once finalised, the final Strategy will be published and any rezoning proposal will be forwarded to the Minister for Planning for determination.

Approval and determination of a rezoning package for parts of the Precincts would enable the lodgement of development applications for development proposals with Bayside Council in those areas. During the development application process, when staging, delivery and detailed urban form are proposed, further detailed traffic modelling will be required to understand the impact and mitigation measures required on the local road network.

The planning controls proposed in the Strategy allow for greater yields to be delivered. Any development beyond the assumed yield will require further assessment to augment the transport response. As proposed development proceeds, Transport for NSW and Roads and Maritime Services will continue to monitor the performance of the transport network and the timing of initiatives proposed in this report.

Transport and traffic modelling has been undertaken to assess the transport network and proposed upgrades. Should any rezoning propsed be allowed, further investigations and stakeholder consultation will be undertaken to confirm the details and timing of required works.

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