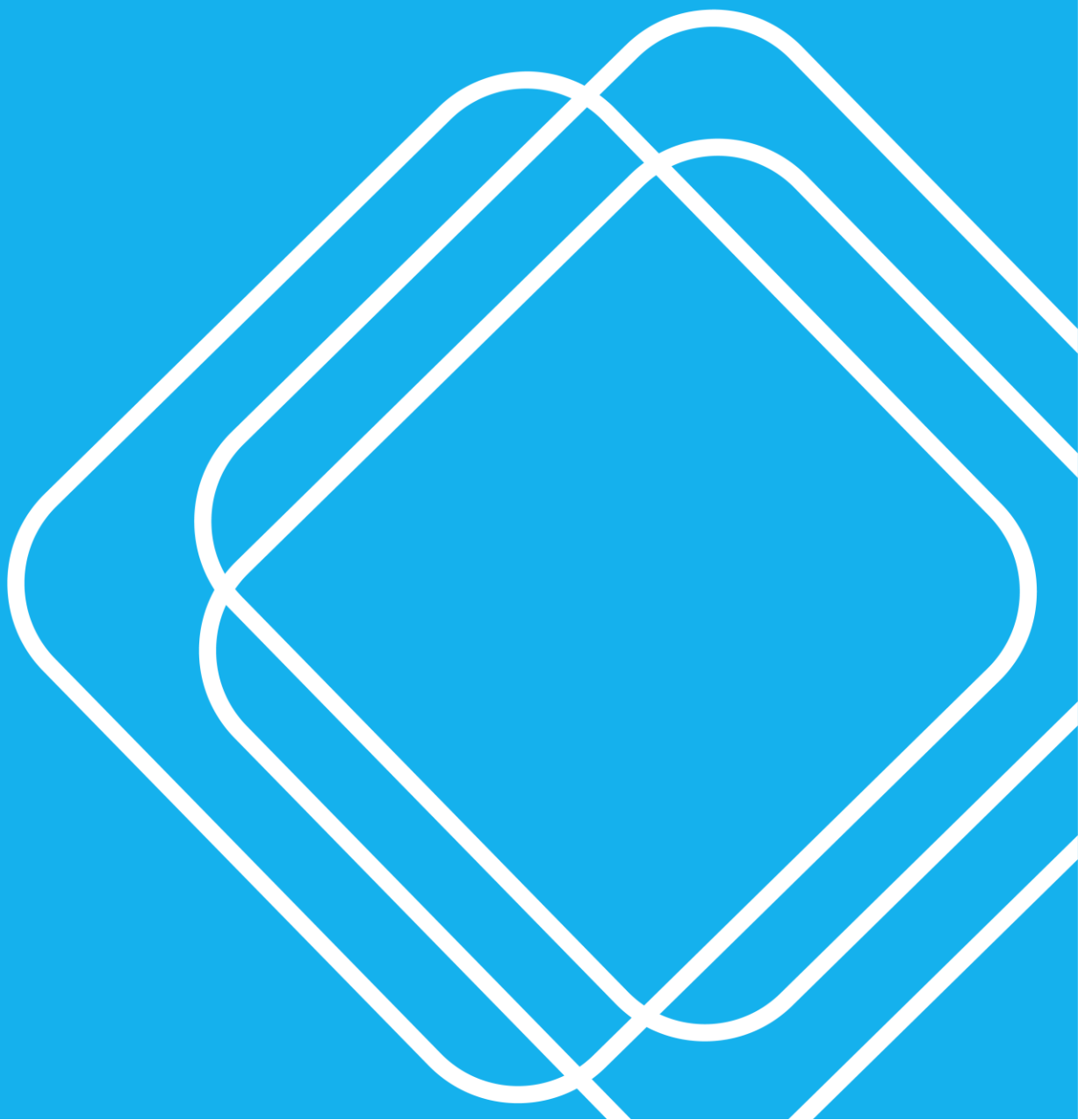
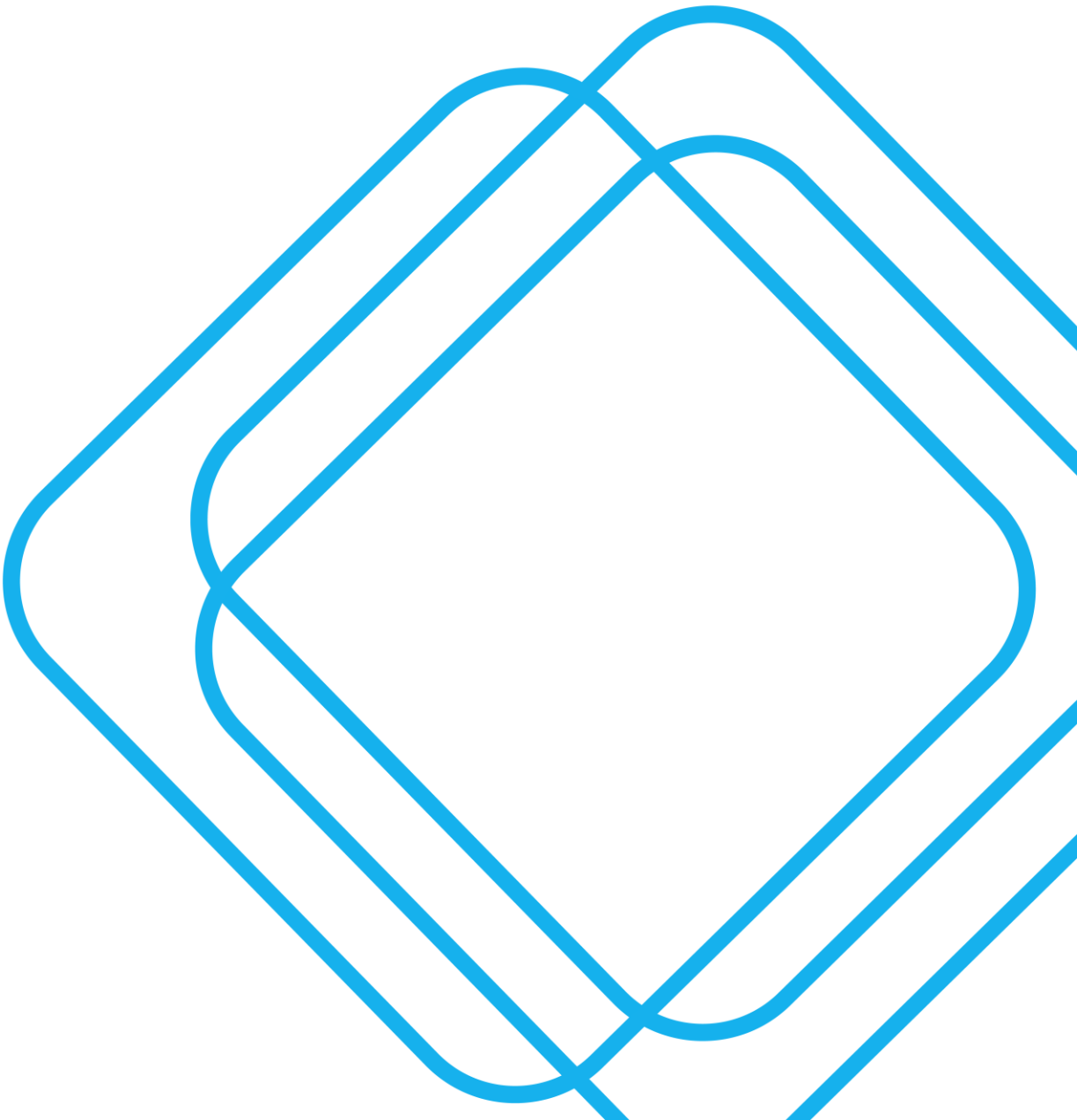
SCT Consulting

92-96 VICTORIA AVENUE CHATSWOOD PLANNING PROPOSAL

Traffic and Transport Study

23 AUGUST 2022





Quality Assurance

Project:	92-96 Victoria Avenue Chatswood planning proposal		
Project Number:	SCT_00194		
Client:	Tai Family Holdings Pty Limited	**ABN:**	64 750 013 516
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1.0	6 October 2020	Draft report
2.0	12 November 2020	Final report
3.0	11 August 2022	Updated final report
4.0	23 August 2022	Updated final report

Contents

1.0 Introduction

1.1 Background

SJB Planning, on behalf of Tai Family Holdings Pty Limited, is preparing a planning proposal for a 22-townhouse development at 92-96 Victoria Avenue, Chatswood. The site consolidates three properties on a total land area of about 2,500m^2.

The site is located adjacent to the North Willoughby Local Centre as identified in the Willoughby City Local Strategic Planning Statement (LSPS) and the East Chatswood Local Centre in the Local Centres Strategy 2036 (June 2020). Initially the scheme will be prepared for a Planning Proposal submission to Willoughby City Council, with a detailed Development Application (DA) to follow later.

Figure 1-1 An aerial view of the proposal looking from southeast

Source: CM+ (2020)

1.2 Purpose of report

A Traffic and Transport Study is required to support the planning proposal based on the design proposal set out by urban designers CM+. The report will:

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

1.3 Report structure

This report has been structured into the following sections:

- **Section 2** provides a summary of the review of all relevant background documents
- **Section 3** describes the existing transport conditions for all modes of transport
- **Section 4** describes the proposed development, its access strategy and a review of parking and access requirements
- **Section 5** outlines the traffic and transport appraisal which describes the likely trip generation, indicative impact of all transport modes as a result of the proposed development
- **Section 6** summarises the report content and presents the final conclusions.

2.0 Strategic Context

2.1 Site context

The site is a city block of 46m (in the east - west direction) by 55m (in the north - south direction) in the Willoughby City local government area (LGA), which is situated about 10 kilometres from the Sydney CBD and 1.5km to the east of Chatswood CBD. The site is currently occupied by three (3) detached dwelling houses, each being located on individual lots, at 92-96 Victoria Avenue.

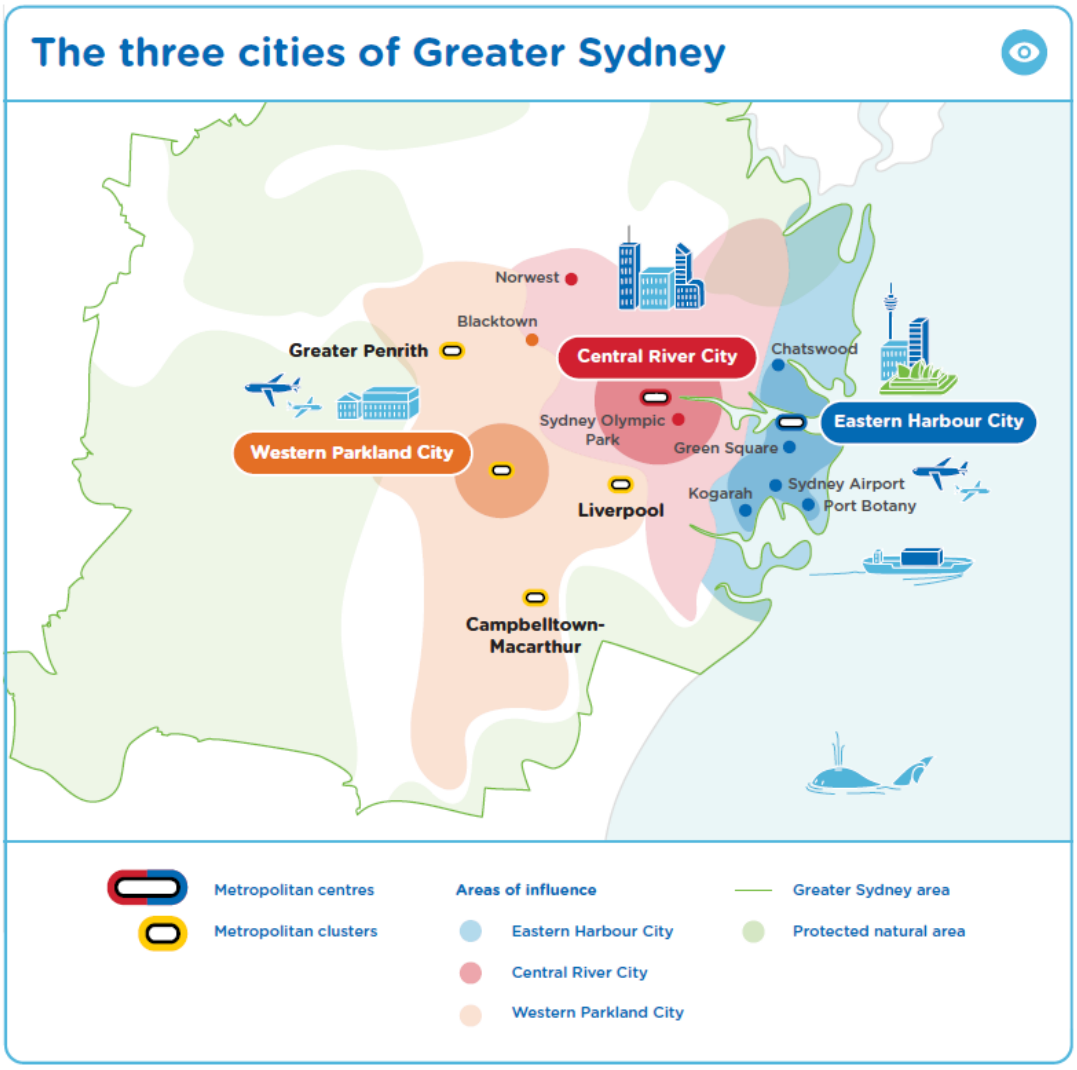
The site has frontages to Victoria Avenue to the north and George Brain Lane to the south and west. The site is zoned R2 Low Density residential. The site adjoins land zoned R2 Low Density Residential and B2 Local Centre.

Figure 2–1 Site context

2.2 Future Transport 2056 Strategy

The Future Transport Strategy 2056 (NSW Government, 2018) defines NSW Government's vision for how transport can support growth and the economy of New South Wales over the next 40 years. Similar to the Greater Sydney Region Plan, it sets out a vision of three cities to guide many of the planning, investment and customer outcomes including faster, convenient and reliable travel times to major centres, as shown in **Figure 2–2**. Chatswood is a strategic centre, as part of the Eastern Harbour City within Sydney's metropolis of three cities.

Figure 2–2 A future metropolis of three cities



Source: NSW Government (2018), Future Transport Strategy

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

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

– 30-minute access for customers to their nearest Centre by public transport 7-days a week

– Fast and convenient interchanging with walking times no longer than five minutes between services

– Walking or cycling is the most convenient option for short trips around centres and local areas, supported by a safe road environment and attractive paths

– Fully accessible transport for all customers.

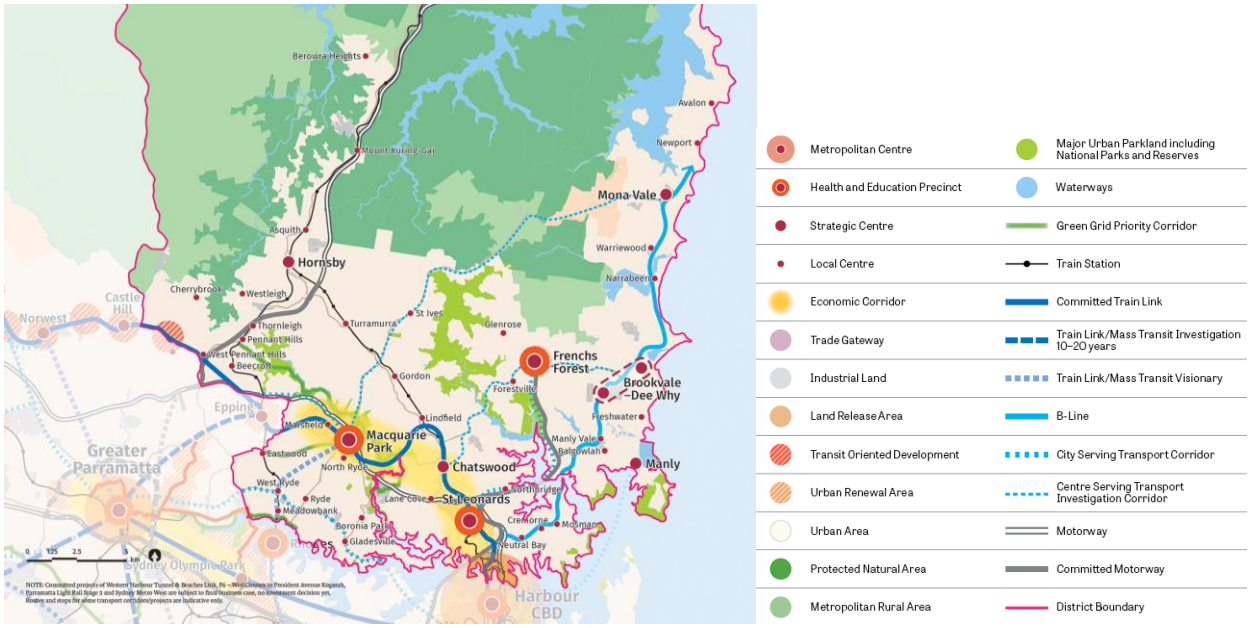
Implications for the site: Chatswood is identified as a key area for infrastructure investment within the Eastern Harbour City. Future transport initiatives aimed to connect residents to centres will increase permeability of public transport networks throughout residential areas. This benefits the site through improved accessibility to jobs in the region and to other city centres. Specific provision for pedestrian and cyclist activity and efficient interchanging contributes to a safe and comfortable walking environment, promoting public transport mode share.

2.3 North District Plan

The Greater Sydney Commission's North District Plan[1] is a 20-year plan to manage growth in Sydney's North District, supporting the long-term vision for Sydney as a metropolis of three cities. The District Plan assists councils to plan for and support growth and change and align their local planning strategies to place-based outcomes. It guides the decisions of State agencies and informs the private sector and the wider community of approaches to manage growth and change.

The vision for the North District is to enhance the Eastern Economic Corridor (which Chatswood is part of), supporting population growth in strategic centres and creating and renewing great places (**Figure 2–3**).

Figure 2–3 Future of the North District



Source: Greater Sydney Commission (2018), Our Greater Sydney 2056: North District Plan

The plan sets out the target for housing supply, choice and affordability with access to jobs, services and public transport to demonstrate capacity for a steady increase of 92,000 home by 2036. Chatswood strategic centre is also expected to see a minimum target of 31,000 jobs by 2036 given the major employment hub which comprises a mix of retail, office as well as community and health.

Council would be also responsible to provide fine grain urban form, diverse land use mix, high amenity and walkability in and within 10-minute of centres together with other planning authorities. It is also needed to delivery great places by recognizing and balancing dual function of streets as places for people and movement.

In particular, the North District Plan directs Chatswood to:

– protect and grow the commercial core

– maximise the land use opportunities provided by Sydney Metro

– enhance the role of the centre as a destination for cultural and leisure activities

– promote and encourage connectivity, and upgrade and increase public open spaces.

Implications for the site: The proposed residential density increase is supported by the North District Plan. In particular, its location near vibrant streets such as Victoria Avenue provides the site with opportunity to public transport, great places and people-friendly public realm.

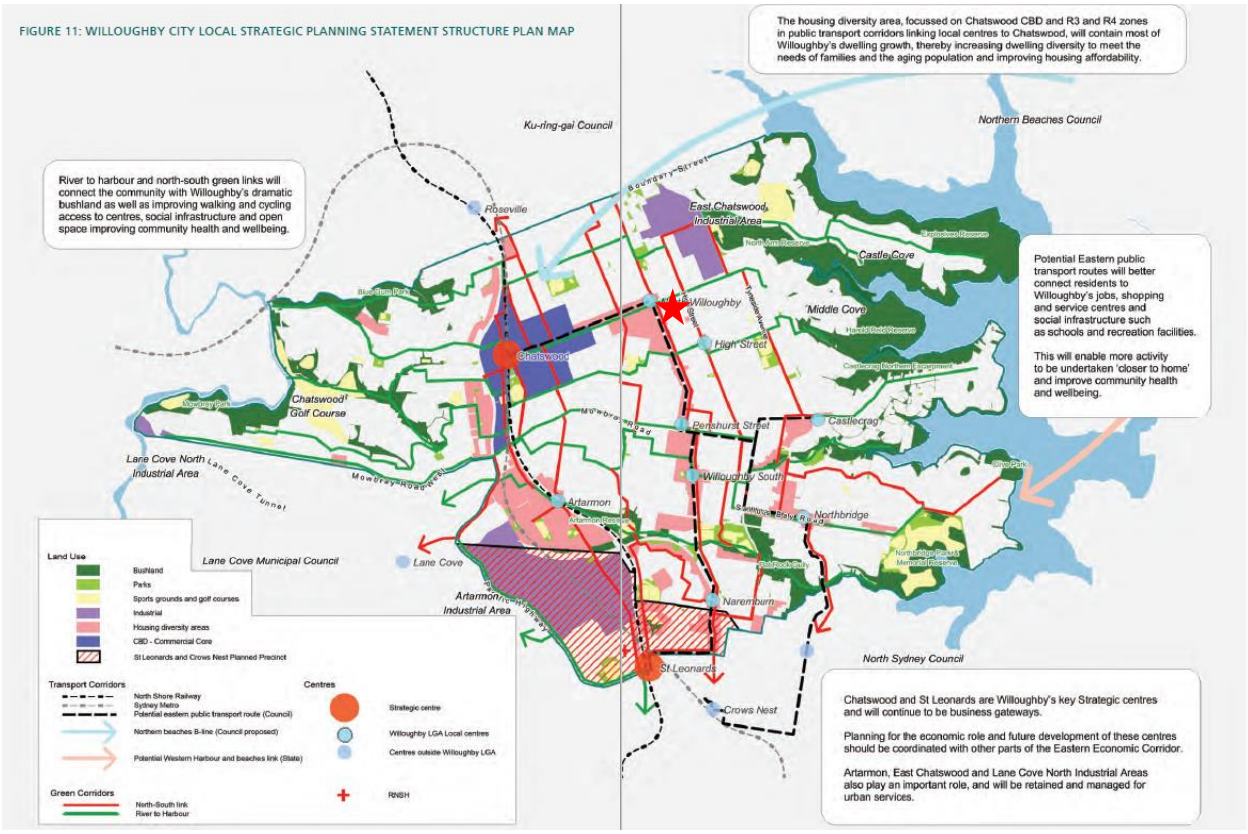
[1] Greater Sydney Commission (2018), Our Greater Sydney 2056: North District Plan.

2.4 Willoughby Local Strategic Planning Statement (LSPS)

The Willoughby City Local Strategic Planning Statement (LSPS) has been developed to set Council's strategic planning vision for the next 20 years. By 2036, Willoughby City will provide a diversity of housing which caters to a range of households, allowing residents to stay in their communities. Centres in Willoughby will be vibrant and lively and provide for people's everyday needs. All residents can access the Chatswood CBD, local centres, parks, schools and community facilities within 20 minutes by public transport or high-quality walking and cycling paths. This provides transport choices and facilitates sustainable transport and promotes health and wellbeing. Congestion around Chatswood is expected to be managed to improve accessibility for all modes of travel.

According to the structure plan, the site is adjacent to North Willoughby Centre. Victoria Avenue and Penshurst Street will both become part of the green corridor network within Willoughby LGA while eastern public transport route will connect Chatswood and the CBD via Victoria Avenue and Penshurst Street (**Figure 2–4**).

Figure 2–4 Willoughby LSPS structure plan (red line has highlighted the site location)



Source: Greater Sydney Commission (2018), Our Greater Sydney 2056: North District Plan

A few priorities and actions were further specified in the LSPS:

– Increase housing diversity to cater to families, the aging population, diverse household types and key workers

– Enhance walking and cycling connections to Willoughby's urban areas, local centres and landscape features where Victoria Avenue will be proposed as local cycling connector to link with inter-reginal connector to the east of the site (High Street)

– Develop Willoughby City LGA transport system and Chatswood's role as a true transport hub for Willoughby City and the North Shore

– Investigation of a frequent and rapid public transport service between Chatswood and Crow Nest Metro Station via Penshurst Street / Victoria Avenue.

Implications for the site: The proposed site is located close to the future public transport corridor and upgraded active transport facility, which facilitates the residents to use sustainable transport mode for both short and long-distance trips.

2.5 Our Future Willoughby 2028

Our Future Willoughby 2028 is a document authored by Willoughby City Council outlining the visions and priorities for the Local Government Area. The vision document has five outcomes focusing on sustainability, inclusivity, liveability, vibrancy, and accountability. Each outcome has a list of priorities to track progress.

From a transport perspective the outcomes and priorities are overlapping but the most pertinent are the priorities which focus on enhancing transport choices and reducing parking and traffic congestion. The council aims to deliver on these priorities by extending its cycle path development, capitalising on the planned Sydney Metro connection between Chatswood and Sydney CBD and reviewing traffic and parking strategies.

2.6 Willoughby Housing Strategy 2036 (May 2020)

The Willoughby Housing Strategy sets directions for accommodating future housing to 2036. In doing so, the strategy guides the direction on quantity, location, and type of future residential development within the Willoughby LGA.

The Strategy concluded that an additional 6,700 dwellings will be required to meet population growth to 2036 which can be accommodated within three (3) focus areas.

– Focus area 1 to be on existing medium and high-density zones, (R3 and R4) that have not as yet been developed to the full potential of the zone.

– Focus area 2 to be on the proposed B4 Mixed Use zone which surround the B3 Commercial Core of the Central Business District as identified in The Chatswood CBD Planning and Urban Design Strategy to 2036.

– Focus area 3 in the local centres identified in Draft Local Centres Strategy as per the zoning changes proposed for:

  - Artarmon
  - Northbridge
  - East Chatswood (North Willoughby)
  - Penshurst Street
  - High Street
  - Castlecrag
  - Naremburn
  - Willoughby South.

While the proposal does not necessarily align with these three focus areas, it attempts to focus the intensification of housing in a location that responds appropriately to the following principles:

– Near local centres, schools, open space and community facilities

– Free from the natural hazards of bushfire and flooding

– Within walking distance of high-quality and frequent public transport

– Outside of heritage areas / Environmental Living (E4) areas and areas with a uniform and highly valued suburban character

– Highly walkable, with high amenity walking and cycling routes nearby.

2.7 Willoughby Local Centres Strategy 2036 (June 2020)

The North Willoughby local centre is located at the intersection of Penshurst Street and Victoria Avenue. East Chatswood is situated on the fringe of the Chatswood CBD approximately 1.5km walking distance from the station. There is a range of businesses including medical suites, real estate agents, bakery, café and restaurants.

The Strategy identifies North Willoughby to be a thriving, pleasant, accessible place that has a leafy streetscape and attractive communal open spaces. It remains a distinct local centre separate from the Chatswood CBD, with a lower scale of development compared to the major commercial and shopping buildings of the CBD.

The Local Centres Strategy is supported by a Traffic and Transport Plan prepared by Cardno for Willoughby City Council, dated 2020. The Traffic and Transport Plan was undertaken to assess the existing and future transport networks of each local centre identified for future development within the strategy, and demonstrate how residential and employment growth can be accommodated by the transport networks.

2.8 Willoughby Local Centres Traffic and Transport Plan (January 2020)

The *Willoughby Local Centres Traffic and Transport Plan* (Cardno, January 2020) was prepared to support the *Willoughby Local Centres Strategy*. The study includes a high level review of the pedestrian, cycling, public transport and private vehicle networks in the immediate vicinity of each centre, accompanied by SIDRA intersection modelling of the road network. Issues, gaps and deficiencies of the networks are identified and a range of options to address these are considered.

The transport vision for the local centres is to provide walkable, well-connected local centres with high quality active and public transport links to encourage high density development within each centre and accommodate the forecast residential and employment growth. The aim is to facilitate successful people and place experiences within each centre, encouraging active and sustainable transport and improving priority and safety for pedestrians and cyclists in alignment with the *Local Centres Strategy*.

The assessment for the North Willoughby local centre has assessed three critical intersections in the North Willoughby local centre including Victoria Avenue / Royal Street / Kooringa Road, Victoria Avenue / Penshurst Street and Penshurst Street / Macmahon Street. The SIDRA intersection assessment stated that the intersection of Victoria Avenue / Penshurst Street was performing at LoS C and D during the AM and PM peak periods respectively and may experience congestion due to the demand approaching the capacity with Degree of Saturation over 0.9.

The priority intersection of Victoria Avenue / George Brain Lane was not assessed as part of the Traffic and Transport Plan. Given its proximity to the intersection of Victoria Avenue and Penshurst Street, it is observed that queueing from the traffic signals extends past the priority intersection. However, traffic is still able to enter and leave George Brian Lane using the keep clear zone.

2.9 Willoughby Integrated Transport Strategy 2036

The Willoughby Integrated Transport Strategy 2036, published in August 2020 by Willoughby City Council, builds on the outcomes stipulated in Our Future Willoughby 2028.The strategy details how Willoughby City Council in collaboration with the NSW Government aims to plan and operate the transport system into the future. The directions stated in the strategy focus on increasing cycling and walking, improving accessibility and connectivity, improving the relationship between movement and place, and creating an efficient road system.

The major actions as a consequence of the strategy in different focus areas are shown in **Table 2-1**.

Table 2-1 Main transport actions defined in the Transport Strategy 2036

Focus area	Actions
Sustainability	Develop and implement enhanced safe pedestrian network plan that encourages district / regional walking trips.
	Work with TfNSW to incorporate upgraded traffic control sensor systems and pedestrian countdown timers on all traffic signals installed within Willoughby LGA.
	Encourage district / regional cycling trips through the implementation of priority actions for enhanced safe bike network and facilities as outlined in Council's Bike Plan where Victoria Avenue (between Havilah Street and High Street) will be investigated for potential separated cycleway in the short term.
Public transport and connectivity	Work with TfNSW for improved public transport infrastructure including: – The B-Line bus rapid transit link connecting Chatswood to Dee Why via Frenchs Forest – Encouraging increased district / regional bus trips through the provision of enhanced safe bus network and facilities.
Vibrant and liveable places	Develop Vibrant Street Corridor Plans for Willoughby Road, Penshurst Street and Sailors Bay Road incorporating the movement and place framework, balancing the amenity of the street with the need for traffic movement.

Source: Willoughby Council (2020), Willoughby Integrated Transport Strategy 2036

Implications for the site: The Strategy 2036 intends to improve the public transport network and roads and services in Willoughby. The site will benefit from improved public transport, pedestrian and cycle network. With the development of adjacent to vibrant street and employment hub come the opportunities for more short trips to be conducted by bike and on foot while more car trips are expected to shift to bus given the enhanced bus network.

3.0 Existing Conditions

3.1 Travel behaviour

3.1.1 Method of travel to work data

2016 Census Journey to Work data for the Statistical Area level 1 (SA1) was analysed to determine travel behaviour of the existing residents, as shown in **Figure 3–1**.

Figure 3–1 Study area for Method of travel to work

At the time of the JTW data being collected in 2016, 270 employed persons were included in the survey for the area. According to the Australian Bureau of Statistics, a person in employment are those of working age who, during a short reference period, were engaged in any activity to produce goods or provide services for pay or profit.

The study area reported a high level of public transport use, 34 per cent, in comparison to the 22 per cent for Greater Sydney. The walking and cycling mode share were six and two per cent respectively, which are combined higher than the Greater Sydney average of 4.7 per cent for active transport modes. Around 40 per cent of the employer drove to work at the time of the census, lower than Sydney average level by 13 per cent. The mode shares are a likely result of land use, relatively short distance to jobs, population and income and good accessibility to public transport.

Of the 59,396 people who worked in the Willoughby area, 16.5 per cent also lived in the area. The LGA of Northern Beaches (10%), Ku-ring-gai (9%), Hornsby (6%) and Ryde (5%) formed other major origin locations for people travelling to the Willoughby LGA to work. Other origins across the Greater Sydney region generated less than five per cent of work-related trips.

Sydney contributed the largest employment destination for residents in Willoughby at 32 per cent and followed by the Willoughby itself (27%), North Sydney (10%) and Ryde (5%). Other destinations for the purpose of work-related trips were all below five per cent and fragmented across the Sydney Metropolitan Area. This tallies with the fact that public transport and active transport mode share were attractive modes of transport for the residents in Willoughby given well developed train and bus network and relatively short distance to jobs.

3.1.2 Household Travel Survey

The proposed site sits within the Statistical Area level 3 (SA3) "Chatswood-Lane Cove" as defined by the Australian Bureau of Statistics. TfNSW Household Travel Survey data for this SA3 has been analysed to determine mode shares and average trip lengths. Unlike the Census Journey to Work data, Household Travel Survey data covers all trip purposes, not just commuting trips. However, as the survey sample size is much smaller, Household Travel Survey data is only available at higher geographies such as SA3s.

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

Table 3-1 Household travel survey – residents within Chatswood-Lane Cove, travel by mode

Mode of travel	Chatswood-Lane Cove		Greater Sydney	
	% of mode share	Average distance	% of mode share	Average distance
Vehicle Driver	42%	6 km	48%	10 km
Vehicle Passenger	16%	4 km	21%	8 km
Train	6%	14 km	6%	17 km
Bus	9%	6 km	5%	7 km
Walk Only	25%	1 km	18%	1 km
Other	2%	6 km	2%	6 km
Total	**100%**	**-**	**100%**	**-**

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

The study area had a lower rate of car usage (vehicle drivers and vehicle passengers) at 58 per cent compared to Greater Sydney's 69 per cent. The combined public transport usage (train and bus) was high at 15 per cent compared to 11 per cent for Greater Sydney while a quarter of the total trips were walk only trips, 40 per cent more than Sydney average. The study area showed an average trip distance of only five kilometres, reflecting very high density and urbanisation level such that there is good opportunity to promote public transport and active transport in the area.

Table 3-2 Household travel survey – residents within Chatswood-Lane Cove, travel by purpose

Trip purpose	Chatswood-Lane Cove		Greater Sydney	
	% of total trips	Average distance	% of total trips	Average distance
Commute	16%	10 km	17%	15 km
Work related business	2%	5 km	7%	16 km
Education/childcare	12%	5 km	10%	6 km
Shopping	14%	3 km	15%	6 km
Personal business	5%	7 km	5%	7 km
Social/recreation	28%	5 km	25%	9 km
Serve passenger	20%	5 km	19%	6 km
Other	3%	5 km	2%	4 km
Total	**100%**	**-**	**100%**	**-**

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

The trip purposes for the study area indicated very similar distribution to Greater Sydney, except five per cent less work-related business trips and three per cent more social / recreation trips. This can be partly attributed to activity and diversity of the area. The average distance travelled by trip purposes were also five kilometres where average

travel distance for commuting, business, shopping and recreational trips were all much shorter than Sydney. This supports that transport modes such as bus and active transport play an important role in the area.

3.2 Road network and classification

The area surrounding the site has a mixture of state roads managed by TfNSW, and lower hierarchy roads managed by Council. The road network surrounding the site is shown in **Figure 3-2**.

Figure 3-2 Road network around the site

Source: SCT Consulting, 2020

The characteristics of the key road network near the site are:

– **Penshurst Street** is an arterial road, managed by TfNSW, which forms a north-south corridor between Boundary Street to the north and Mowbray Road to the south. The lane configuration is mainly four lanes in two directions to the south of Victoria Avenue where clearway is implemented in southbound and northbound direction from 6:00 to 10:00am and from 3:00 to 7:00pm, respectively. Right turn from Penshurst Street is prohibited during clearway hours. Time restricted parking is allowed outside clearway hours on both sides of the road together with the provision of mail zones and bus zones. Speed limit is 60km/h and wide footpath is provided on both sides to service the shops and services.

– **Victoria Avenue** is a distributor road starting from Chatswood CBD to the west and ends with Eastern Valley Way to the east. The road is managed by Council, which provides an east-west connection in the northern Willoughby. The road has one travel lane in each direction with the speed limit of 50 km/h. Time restricted parking is allowed on both sides of the road. Keep clear zones are provided at the two T-intersections with George Brain Lane. Continuous footpaths are provided on both sides of the road.

– **High Street** is a north-south running distributor road, parallel to Penshurst Street to the east. It starts from Mowbray Road to the south and terminates at Scotts Creek in the north. It has one traveling lane in each direction with unrestricted parking on both sides. A dedicated cycle lane is reserved between the parking lane and traveling lane in both directions with footpath on both sides.

– **Sydney Street** forms a left in / left out intersection with Penshurst Street to the southwest of the site and extends to Artarmon Road to the south. This distributor road is about 8m wide without clear line marking, which generally allows one lane in each direction with restricted and unrestricted parking on both sides of the road. The speed limit is 50km/hr and reduces to 25km/hr where the road width narrows down to one lane only.

– **George Brain Lane** is classified as a service lane to the south of Victoria Avenue that mainly serves and provides vehicular access to the local residential premises at No. 3 to 41 of Macmahon Street, No. 68 to 96 Victoria Avenue, as well as local business premises at No. 319 to 343 at Penshurst Street. The road width is about 6m and parking is allowed only on one side of the two north-south segments whereas the east-west segment does not allow parking. It is accessed via Victoria Avenue at two priority intersections, with keep clear zones marked on Victoria Avenue to allow traffic to get in and out of the service lane if traffic is queueing on Victoria Avenue from the traffic signals at Penshurst Street. A vertex mirror is installed at the western intersection of George Brain Lane and Victoria Avenue, which improves sight line for traffic coming out from the side road and ensures pedestrian safety.

In the vicinity of the site, there are other local roads including Macmahon Street to the south, Harwood Avenue to the north that mainly service the local residential development.

The *Willoughby Local Centres Traffic and Transport Plan* (completed in January 2020) stated that the intersection of Victoria Avenue / Penshurst Street was performing at LoS C and D during the AM and PM peak periods respectively and may experience congestion due to the demand approaching the capacity with Degree of Saturation over 0.9.

3.3 Public transport network

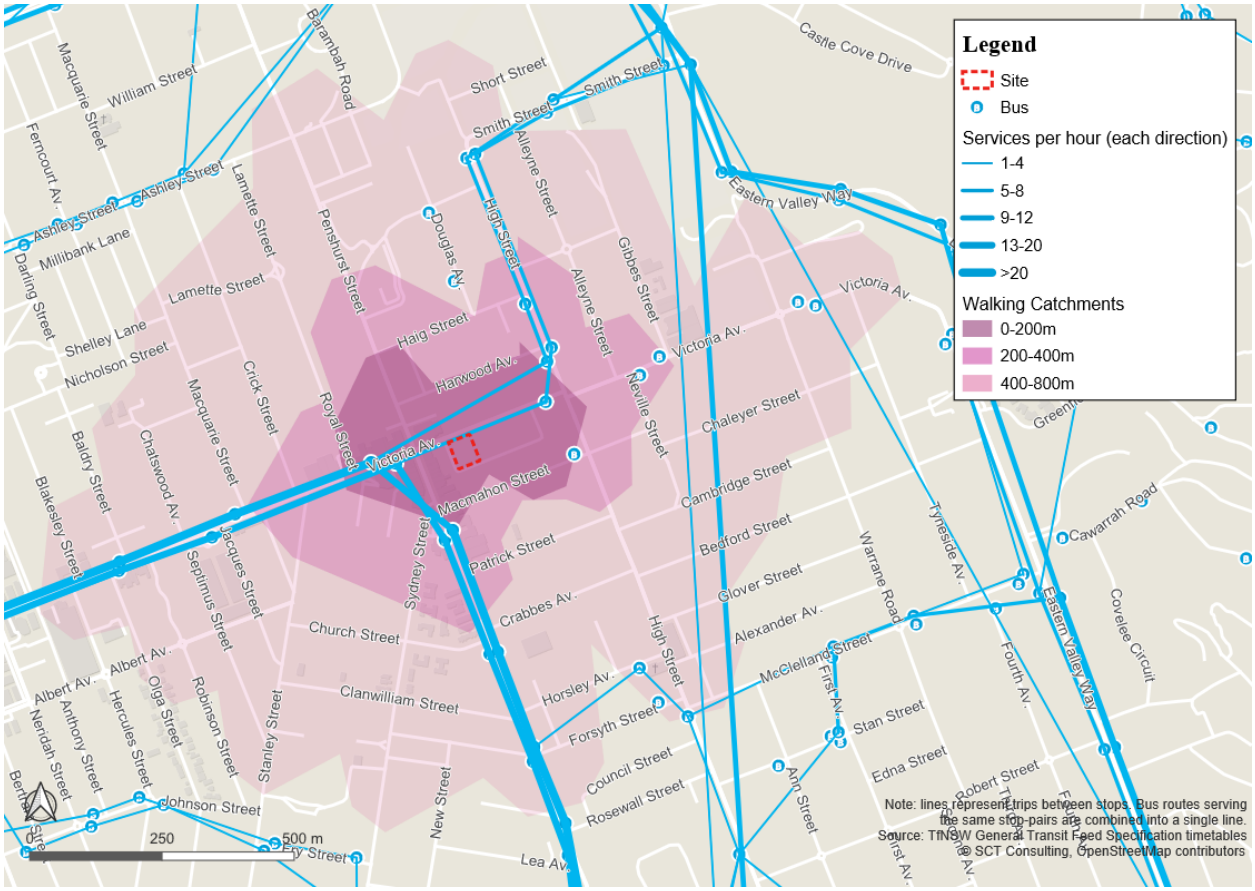
As stated in **Section 3.1**, public transport mode share is above the Greater Sydney average in the local area.

Chatswood station provides access to the city's rail network including T1, T9 and Sydney Metro Northwest line with a peak frequency of 50 services in both directions. These train and metro lines provide an extensive coverage of destinations including Hornsby, Sydney CBD, Rouse Hill, Liverpool, Parramatta and Blacktown. The access time between the site and Chatswood station would be 20 minutes on foot or within five minutes by bus.

There are very frequent bus services in proximity to the site on Penshurst Street and Victoria Avenue. A pair of bus stops are located on Victoria Avenue and Penshurst Street, respectively which are available within 200m walking distance to / from the site.

Walking catchments and bus routes frequency map around the site is shown in **Figure 3-3**.

Figure 3-3 Public transport around the site



Source: SCT Consulting, 2020

There are over 20 services per hour on Penshurst Street and Victoria Avenue during a typical weekday peak hour per directions. The six bus routes travelling in the vicinity of the site all start from Chatswood bus interchange and cover a wide range of destinations including Manly, Balmoral Beach, Castlecrag, Bondi Junction and Kingsford (**Table 3-3**).

Table 3-3 Bus routes details for the site

Route	Terminals	Average number of services in both directions^		
		Weekday AM	Weekday PM	Weekend peak
136	Chatswood - Manly	23	25	16
137	Chatswood - Bantry Bay	1	1	0
257	Chatswood - Balmoral	9	11	8
275	Chatswood - Castlecrag	0	0	2
340	Chatswood - Bondi Junction	22	22	15
343	Chatswood - Kingsford	25	26	15
Total	**-**	**80**	**85**	**56**

Source: TfNSW (2020), https://transportnsw.info/documents/timetables/

^Weekday AM = 7am to 9am, weekday PM = 4pm to 6pm; Weekend = 11am to 1pm

The result showed that the site is well serviced by buses during peak hours for both weekends and weekdays with an average interval of three minutes.

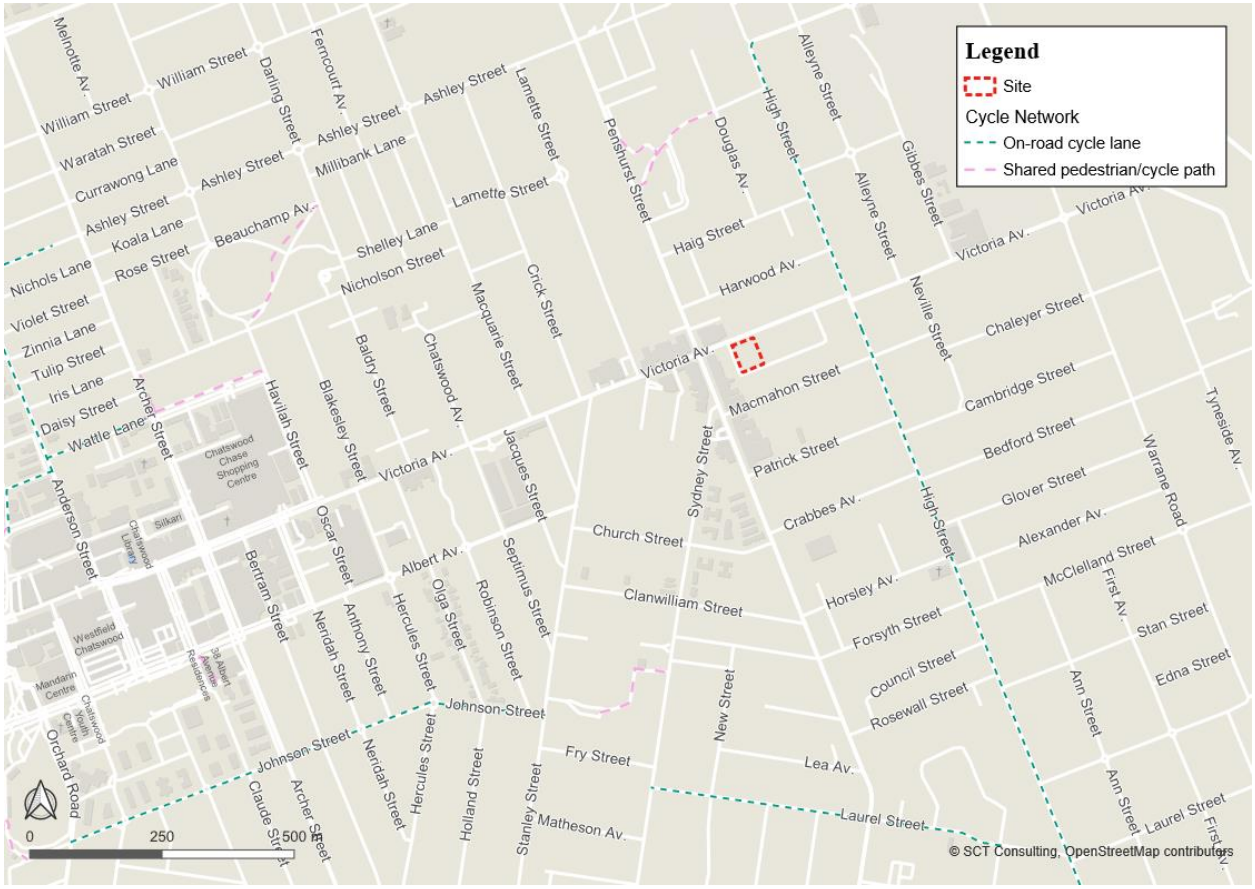
3.4 Walking and Cycling

Given the urban nature and high-density development in the vicinity of the site, there is well-provided footpath network in the area to service active shop frontages on Victoria Avenue and Penshurst Street, which provides safe and pleasant pedestrian environment around the site. Signalised pedestrian crossings are provided at the intersections of Victoria Avenue / Penshurst Street, Macmahon Street / Penshurst Street and Victoria Avenue / High Street in the vicinity of the site.

As shown in **Figure 3-3**, a 200m walking catchment area covers lots of speciality shops, eateries commercial premises and services in the Chatswood East local centre and High Street to the east. A 400m catchment area further expands to Muston Park to the north together with lots of residential development. An 800m catchment area covers Bales Park to the southwest and many wholesale stores and industrial area to the east at North Willoughby.

High Street to the east of the site provides on-road cycle lane while short sections of shared paths exist in the nearby open spaces such as Muston Park and Bales Park. However, being relatively poor in terms of connectivity and safety for on-road environment, the cycle system shows a difficulty and makes it unfriendly for the cyclists. This gap also implies the need for cycle infrastructural upgrades to connect a regional cycle network and attract more people to cycle (**Figure 3-4**).

Figure 3-4 Cycle network for the site



4.0 Proposed development

4.1 The design proposal

The proposed development includes four independent townhouse architectures in different dimensions. Each building structure would accommodate four to seven dwellings, totalling to 22 dwellings on this site block:

– Townhouse no. 1 to 9 faces Victoria Avenue to provide enhanced streetscape with a height from three to 3.5 storeys

– Townhouse no. 10 to 16 faces George Brain Lane to the west which could activate the laneway frontage and provide better interaction with the adjoining local centre

– Townhouse no. 17 to 22 faces the eastern aged care facility with lowest 2.5 storeys.

Each townhouse has a courtyard and a common open space is provided in the central spine of the development, which connects to the three pedestrian access points in the north, west and south via internal footpaths. As part of the planning proposal, the development will be set back from George Brain Lane as required by the LEP (**Figure 4-1**).

Figure 4-1 Proposed site plan

Source: CM+ (2020)

4.2 Development yield

The 22 townhouses will see a total Gross Floor Area (GFA) of 3,284m^2 with an area for each townhouse ranging from 115 to 178m^2.

4.3 Proposed transport access

The proposed transport access within the site needs to cater for the travel characteristics of the proposal as well as integrate appropriately with the surrounding road network.

4.3.1 Vehicular access

A vehicular access to the proposed development is provided on George Brain Lane at the southern side of the site to connect to the basement car park from street level. The development traffic can therefore access to / from the site via the two intersections of George Brain Lane / Victoria Avenue. The proposed vehicular access would consolidate the three existing driveway accesses to each of the individual properties at 92-96 Victoria Avenue.

4.3.2 Pedestrian access

Three pedestrian access points are proposed around the site in the north, west and south (next to the car access), to maximise site permeability and to align with the future through-site pedestrian link proposed in the town centre to the west that improves connectivity to Penshurst Street.

George Brain Lane is proposed to be widened by 2m by offsetting a strip of development land along the southern and western boundary of the site. This allows additional room for footpath to the south of the site such that the new through site pedestrian link (as proposed in the East Chatswood Master Plan[2]) can be extended from Penshurst Street.

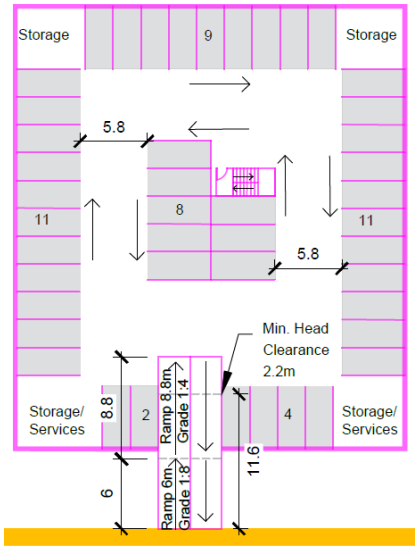
4.4 Parking

The proposed basement car park could accommodate a maximum of 45 car parking spaces (**Figure 4-2**), of which 40 spaces are allocated for residents and 5 spaces for visitors. This assumes 1.8 spaces / dwelling for residents and one space per four dwellings for visitors. It is noted the provision of the parking space in the current scheme adopts higher parking rates than DCP requirement for residents where multi dwelling housing for three bedrooms usually adopts 1.5 spaces per dwelling. The number of visitor parking space is compliant with DCP. This is to demonstrate that this level of parking is achievable from a design perspective.

The proposed development does not need to provide any accessible parking space according to the DCP and assuming this is a BCA Class 2 development, since the parking area has less than 50 spaces.

The details and number of parking spaces can be further refined at DA stage of the proposed development. The car park is currently designed generally in accordance with Council DCP and AS2890 requirements.

Figure 4-2 Proposed basement parking (indicative)



Source: CM+ (2020)

[2] https://www.haveyoursaywilloughby.com.au/east-chatswood-local-centre/widgets/231592/photos/57498

The provision of motorcycle parking and bicycle parking will be addressed in the DA stage. According to DCP requirements, 2 motorcycle spaces are required based on a rate of 1 space per 25 car spaces. The DCP also requires 1 bike lockers to be provided for every 10 units (for residents) plus 1 bicycle rail / rack per 12 units (for visitors), hence 3 secure bike lockers and 2 bicycle rail / rack should be provided for this proposed development.

It is understood off-street loading / unloading facility and accessible parking spaces are not mandated for a development of townhouse.

5.0 Traffic and Transport Impact Appraisal

5.1 Public transport impacts

The excellent access to public transport services (which provide frequent access to Sydney CBD, North Sydney, Chatswood and any other strategic centres) will facilitate public transport as the primary means of longer distance travel. As per the existing Method of Travel to Work data, residents in the surrounding area has a relatively high public transport mode share of 34 per cent. With further intent of enhancement of public transport infrastructure, services and policy along the Victoria Avenue / Penshurst Street corridor, the preference for public transport will continue to grow for all types of trips and could surpass the car mode share, which is rare in Sydney.

The through site link to the west of the site, when implemented, will shorten the walking distance from / to Penshurst Street such that the bus stops within 200m walking distance from the site will facilitate direct and convenient access to frequent bus services.

Given relative low trip generation of the site and very frequent bus services, there is no major capacity issue with the potential site in terms of public transport impacts.

5.2 Active transport impacts

Being situated in a high-density urban environment close to a variety of destinations, the active transport mode share in the local area is already double of the Greater Sydney. It is important to ensure a safe and well connected, high quality footpath and cycle path system around the site, to promote sustainable transport use especially for short distance trips. The site has proposed three access points for pedestrians and cyclist in the directions of employment, activities and services.

Given relatively small scale of the proposal, the number of person trips generated by the development during the peak periods is negligible.

5.3 Road network impacts

Trip rates for medium density residential usually adopts 0.65 vehicles / dwelling during a typical peak hour based on Guide to Traffic Generating Developments (2002). This results in a total of 14 vehicle trips during peak hour based on proposed 22 townhouses. Assuming the current three houses generate three vehicle trips during peak hour, the net increase of vehicular traffic associated with the development is estimated to be about 10 vehicles per hour which is insignificant in terms of the general traffic variance of the network.

This assessment also considered the cumulative impacts of this proposal together with the potential development that was considered by Council for the North Willoughby local centre, based on the modelling outputs from the *Willoughby Local Centres Traffic and Transport Plan*. The Council study showed that with the additional development traffic and background traffic growth by 2036, the intersection of Victoria Avenue / Penshurst St would exceed capacity (DoS>1.0) and expect to operate at LoS E (which is still consider acceptable in an urban town centre context).

As discussed above, the Planning Proposal would only expect to contribute a net increase of 10 vehicle trips during peak hour. Less than 10 vehicles per peak hour would then use the intersection of Victoria Avenue and Penshurst Street, hence the proposal would have negligible additional impacts to the performance of both intersections at Victoria Avenue / Penshurst Street and Victoria Avenue / George Brain Lane, when considered in cumulative with the traffic impacts as assessed for the North Willoughby local centre in the *Willoughby Local Centres Traffic and Transport Plan*.

The negligible increase in traffic volumes as a result of the proposed development will not significantly impact on access arrangement for vehicles turning into George Brain Lane from Victoria Avenue and any potential for significant increase delays to traffic at the intersection of Victoria Avenue / Penshurst Street.

6.0 Summary and conclusions

6.1 Summary

From a transport perspective, the proposal is consistent with strategic planning directions in terms of increasing land use density around public transport corridors and promotion of sustainable transport modes use.

The area that the site sits currently reflects higher public transport and active transport mode share than Sydney average level while it shows less car dependency for the local residents due to shorter than average travel distance and easy access to employment and activity by green transport methods. This trend would be further enhanced associated with further investment in public transport and cycle network upgrade in the vicinity of the site by state and local governments as discussed in the strategic plans.

The proposed townhouse development would contain 22 dwellings, replacing three existing dwelling houses. In summary:

– The proposed through site link to the southwest of the site shortens the walking distance to / from Penshurst Street, making it more accessible to the street activities and public transport on foot and by bike.

– The site's proximity to frequent bus services along Victoria Avenue / Penshurst Street corridor as well as Chatswood train and metro station will encourage future residents to connect to major / employment centres via public transport.

– The site's proximity to employment, activities and services will also encourage these local short trips to be made by walking and cycling.

– Vehicular access to the development is proposed via George Brain Lane, which consolidates the three existing driveway accesses to each of the individual properties at 92-96 Victoria Avenue.

– The future development trips will access Victoria Avenue and the wider network via George Brain Lane and then two priority intersections on Victoria Avenue.

– The proposed development is expected to generate around 10 additional vehicle trips during each of the peak hours, which is considered as negligible impacts to the surrounding road network including access arrangement for vehicles turning into George Brain Lane from Victoria Avenue and any potential for significant increase in delays to traffic the intersection of Victoria Avenue / Penshurst Street.

– The proposal would have negligible additional impacts to the performance of both intersections at Victoria Avenue / Penshurst Street and Victoria Avenue / George Brain Lane, when considered in cumulative with the traffic impacts as assessed for the North Willoughby local centre in the *Willoughby Local Centres Traffic and Transport Plan*.

– A basement car park is designed that could accommodate up to 45 parking spaces, slightly more than DCP requirements. The details and number of parking spaces can be further refined at DA stage of the proposed development.

6.2 Conclusions

The Traffic and Transport Study concluded that the impacts of the planning proposal are negligible and are at a level able to be accommodated by the existing and planned infrastructure.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