

TRANSPORT AND TRAFFIC ASSESSMENT

9 -11 NELSON STREET, CHATSWOOD

P0026624
REVISION 01
PREPARED FOR STRATA GROUP

URBIS

disclaimer

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1. INTRODUCTION

OVERVIEW

Urbis has been engaged by the strata managers of 9-11 Nelson Street Chatswood to prepare a planning proposal for its landholding. The site currently contains a 3-storey residential flat building with 45 strata units. The site has an area of approximately 4, 219 sqm. The proposal will seek approval for a building which can accommodate 258 apartments with a mix of 1, 2 and 3-bedroom apartments, space for a gym, bulky goods retail and small retail.

This report documents the transport impact assessment that supports the planning proposal.

REPORT STRUCTURE

This report outlines the assessment of the potential transport impacts of the proposed development, including consideration of the following:

- Discussion of the existing conditions at the site (Chapter 2);
- An overview of the proposal for the site (Chapter 3); and
- The impact of the proposal on transport, including the traffic generating characteristics of the proposed development transport and traffic implications of the proposed development and mitigation measures required to support the redevelopment (Chapter 4).

2. EXISTING CONDITIONS

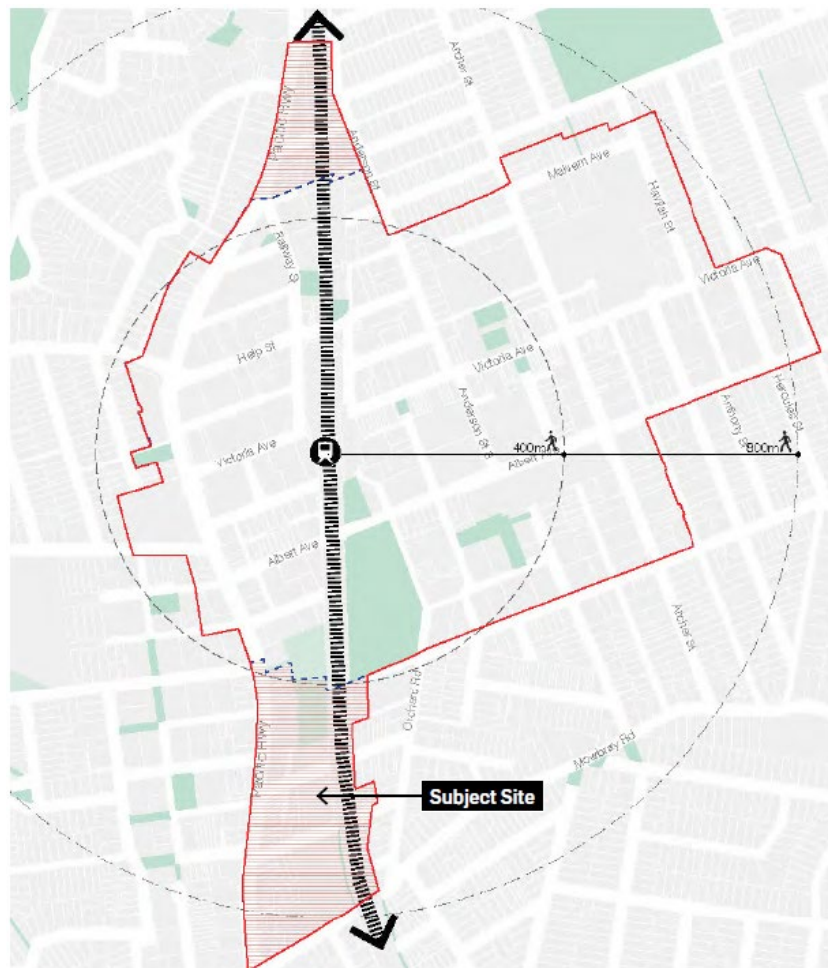
2.1. THE SITE

The site is located at 9-11 Nelson Street, Chatswood within the City of Willoughby Council (CoW) Local Government Area (LGA) (**Figure 1**). It is currently owned by Owners of Strata Plan SP65120.

The site has an area of 4,219 m² and currently comprises a three-storey residential complex with a singular vehicle access point on Nelson Street. The site is bounded by Gordon Avenue to the north-west, Nelson Street to the south-east, townhouses to the West and the T1 Northern rail line to the east.

It is approximately 100 metres east of the Pacific Highway, 550 metres south of Chatswood Railway Station and 830 metres north-west of Artarmon Railway Station.

Figure 1 – Subject Site Context



Source: Urbis

2.2. LAND USE PATTERNS

The site is generally surrounded by medium density residential land use and is adjacent to the North Shore and Sydney Metro rail corridors.

Land use patterns in the surrounding area create demand for travel (trips) to locations of non-residential land uses that attract visitors such as shopping malls, hospitals, employment hubs and other key services. Identification of trip attractors can indicate future travel movement behaviour of future residents of the site.

Within 400 metres of the site

The following trip attractors are located within a 400-metre radius of the site and are anticipated to be accessed by walking or cycling:

- Chatswood Park (north)
- Chatswood Bowling Club (north)
- Sutherland Park (west)
- Mowbray Family Practice (south-east)

Within 800 metres the site

The following trip attractors are located within an 800-metre radius of the site and are anticipated to be accessed by walking, cycling, bus or vehicle:

- Chatswood CBD (north)
- Westfield Chatswood(north)
- Chatswood Library (north)
- Mandarin Centre (north)
- Chatswood high school (north-west)
- The Concourse performing arts centre (north)
- Chatswood Railway Station (north)
- KU Chatswood West Pre School (west)
- Chatswood South Uniting Church (south)
- Artarmon Railways Station (south)
- Artarmon Town Centre (south)
- Helen Street Reserve (south-west)
- Windsor Gardens Retirement Village (East)

Greater than 800 metres

The following trip attractors are located 800 metres plus from the site and are connected by good road connections and bus services:

- Chatswood Chase (north)
- St Pius X College (north-east)
- Mercy Catholic College Chatswood (north-east)
- Beauchamp Park (north-east)
- Lance Cove National Park (north-west)
- Artarmon industrial precinct (south)
- Royal North Shore Hospital (south)

2.3. EXISTING TRANSPORT NETWORK

2.3.1. Road Hierarchy

Roads within NSW are categorised in the following two ways:

- By classification (ownership)
- By the function that they perform.

Road Classification

Roads are classified (as defined by the *Roads Act 1993*) based on their importance to the movement of people and goods within NSW (as a primary means of communication).

The classification of a road allows Transport for NSW (TfNSW) to exercise authority on all or part of the road. Classified roads include Main Roads, State Highways, Tourist Roads, Secondary Roads, Tollways, Freeways and Transitways.

For management purposes, TfNSW has three administrative classes of roads. These are:

- **State Roads** – Major arterial links through NSW and within major urban areas. They are the principal traffic carrying roads and fully controlled by TfNSW with maintenance fully funded by TfNSW. State Roads include all Tollways, Freeways and Transitways; and all or part of a Main Road, Tourist Road or State Highway.
- **Regional Roads** – Roads of secondary importance between State Roads and Local Roads which, with State Roads provide the main connections to and between smaller towns and perform a sub arterial function in major urban areas. Regional roads are the responsibility of councils for maintenance funding, though TfNSW funds some maintenance based on traffic and infrastructure. Traffic management on Regional Roads is controlled under the delegations to local government from TfNSW. Regional Roads may all or part of a Main Road, Secondary Road, Tourist Road or State Highway; or other roads as determined by TfNSW.
- **Local Roads** – The remainder of the council-controlled roads. Local Roads are the responsibility of councils for maintenance funding. TfNSW may fund some maintenance and improvements based on specific programs (e.g. urban bus routes, road safety programs). Traffic management on Local Roads is controlled under the delegations to local government from TfNSW.

Functional Hierarchy

Functional road classification involves the relative balance of mobility and access functions. TfNSW defines four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility to high accessibility and low mobility. These road classes are:

- **Arterial Roads** – generally controlled by TfNSW, typically no flow limit and are designed to carry vehicles long distance between regional centres.
- **Sub-Arterial Roads** – can be managed by either TfNSW or local council. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day. The aim is to carry through traffic between specific areas in a sub-region or provide connectivity from arterial road routes (regional links).
- **Collector Roads** – provide connectivity between local roads and the arterial road network and typically carry between 2,000 and 10,000 vehicles per day.
- **Local Roads** – provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

2.3.2. Surrounding Roads

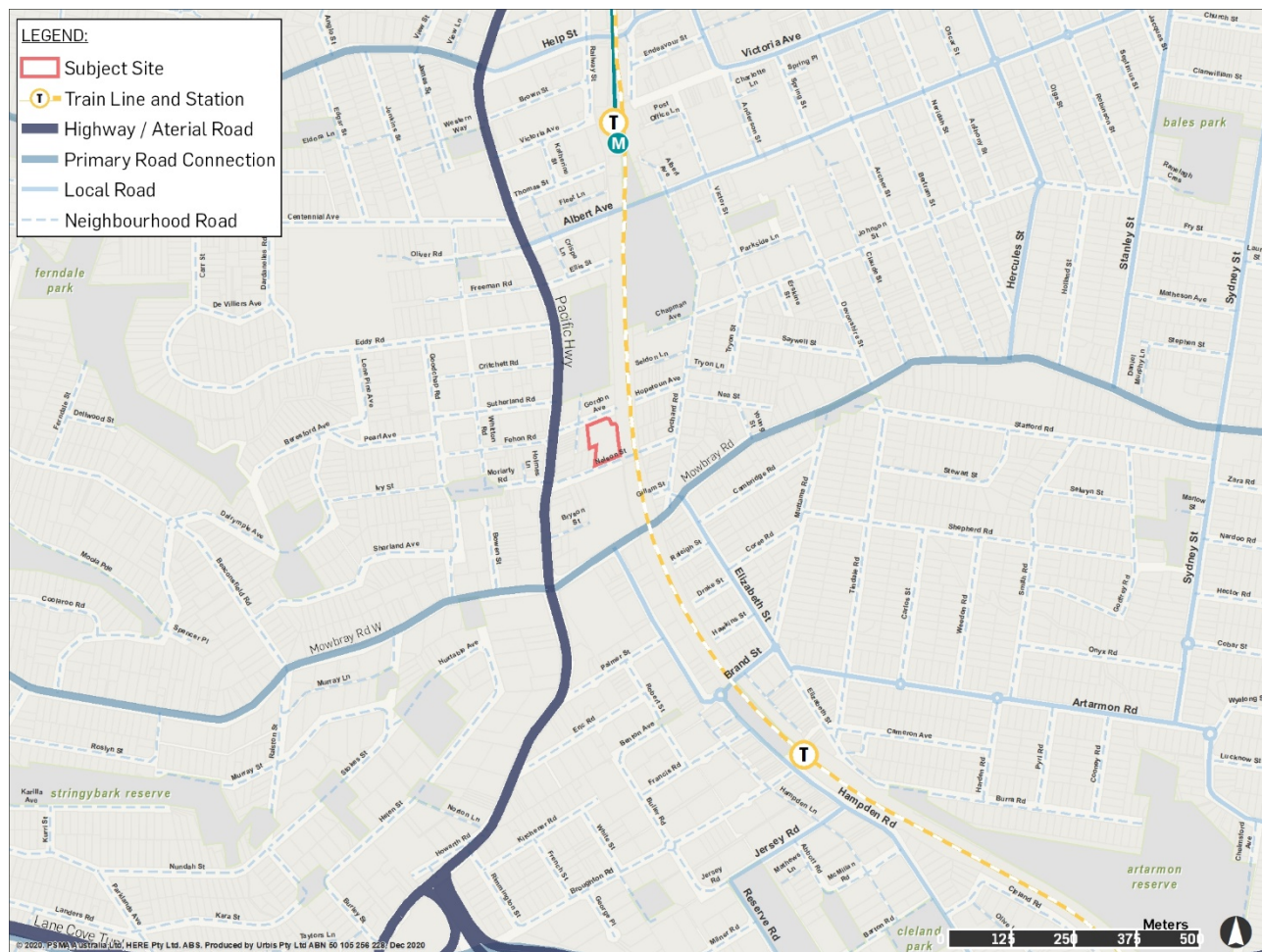
The characteristics of the surrounding road network are detailed in **Table 1** and illustrated in **Figure 2** and **Figure 3**.

Table 1 – Characteristics of Surrounding Roads

Road	Nelson Street	Gordon Avenue	Pacific Highway	Hammond Lane
Classification	Local	Local	State	Local
Functional hierarchy	Local	Local	Arterial	Access way
Sealed (yes / no)	Yes	Yes	Yes	Yes
Movement lanes	One lane in each direction.	One lane in each direction.	Three lanes in each direction.	South of Gordon Ave: One lane in both direction. North of Gordon Ave: One lane

Road	Nelson Street	Gordon Avenue	Pacific Highway	Hammond Lane
				one way northbound.
Parking lanes	The westbound direction has partially unmarked parking and partially indented parking bay. The eastbound direction has a "No Parking 8:30 AM-6 PM Mon-Fri" restriction.	Unmarked parking on both sides.	None.	South of Gordon Ave: Eastern side signposted as no parking. The western side has unmarked parking. North of Gordon Ave None.
Carriageway width (approx.)	10 metres	10 metres	18 Metres	7 Metres
Signposted speed	50 km/h	50 km/h.	60 km/h.	50 km/h
Line marking / divided lanes	Unmarked.	Unmarked.	Divided with traffic islands.	Unmarked.
Pedestrian pathways	Northern and southern sides: approx. 1.2 m wide.	Northern and southern sides: approx. 1.2 m wide.	Eastern and Western sides: Both approx. 2 m wide.	None.
Bus stops	None.	None.	Yes, on both eastern and western sides.	None.
Other features	N/A	N/A	N/A	N/A

Figure 2 – Existing Road Network



2.3.3. Surrounding Intersections

The intersections controlling access in the vicinity of the site are shown in **Figure 4**. They include:

- Give way controlled: Pacific Highway / Nelson Street;
- Default priority: Pacific Highway / Gordon Avenue;
- Default priority: Hammond Lane / Gordon Avenue (north-west corner).

Since 3 November 2018, Nelson Avenue has been permanently closed at the North Shore railway boundary for construction of Sydney Metro City and Southwest, resulting in no access to Orchard Road.

Figure 3 – Surrounding Intersections – allowed movements.



2.3.4. Traffic Volumes

Due to the effects of COVID-19 on traffic volumes, traffic movement volumes were synthesised on key roads around the vicinity of the site at peak times using a combination of the Traffic Volume Viewer website (<https://www.rms.nsw.gov.au/about/corporate-publications/statistics/traffic-volumes/aadt-map/index.html>) and TfNSW Guide to Traffic Generating Developments for the land uses adjacent to the site.

Volumes were generated for the following roads and intersections:

- Pacific Highway Southbound (average of traffic counters located at Mowbray Road Pacific Highway intersection and Corona Avenue/ Pacific Highway intersection).
- The intersection of Gordon Avenue and Pacific Highway (based on adjacent land use generation rates).
- The intersection of Nelson Street and Pacific Highway (based on adjacent land use generation rates), noting Nelson Street is closed at the North Shore railway boundary.

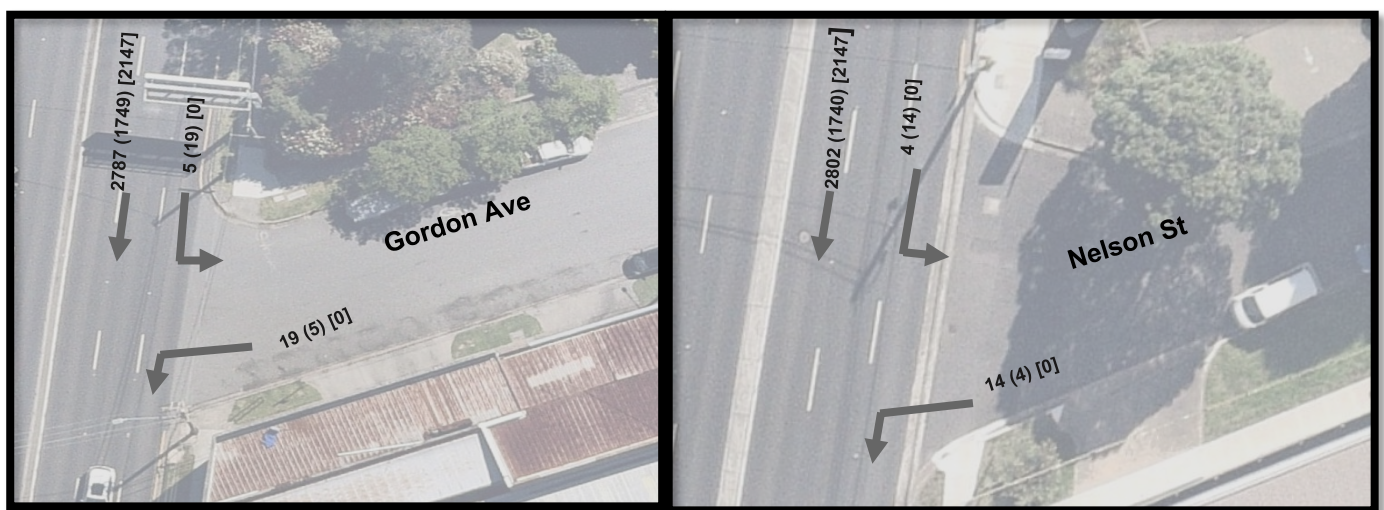
The following peak times were determined from the traffic counters on the Pacific Highway:

- Weekday
 - 7-8 AM
 - 5-6 PM
- Weekend
 - 11-12 AM

These roads have the following movements

- Pacific Highway
 - Straight
 - Left into Gordon Avenue
 - Left into Nelson Street
- Gordon Avenue
 - Left onto Pacific Highway
- Nelson Avenue
 - Left onto Pacific Highway

Figure 4 – Estimated existing peak hour traffic volumes AM/(PM)/[WE]



2.3.5. Crash History

Crash and casualty statistics from Transport for NSW's Centre for Road Safety were analysed for the surrounding road network. There were 6 incidents reported between 2014-18. The location of the incidents and the total number of incidents at that location within the five years are shown in **Figure 5**. The key findings of the analysis are as follows:

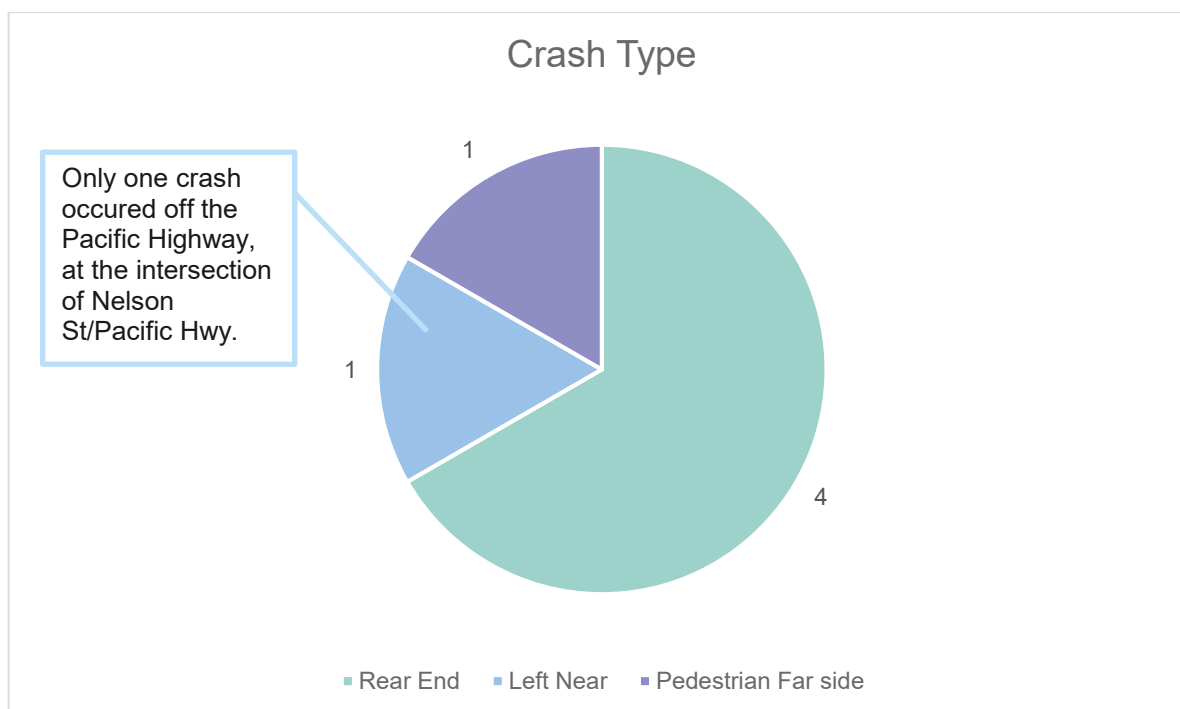
- There were no fatalities reported during the five years.
- The largest clusters of crashes were at the four intersections that turn onto the Pacific Highway, shown in Figure 5, which is generally expected due to conflicting vehicle movements.
- There was one pedestrian incident which resulted in serious injury in 2018. This was a pedestrian that appeared to be crossing from the southern corner of Gordon Avenue and the Pacific Highway to the western side of the Pacific Highway.
- All crashes occurred on the Pacific Highway.
- The most common types of crashes were multi-vehicle whereby vehicles rear end/ side swipes due to lane changes and/or turning at an intersection, suggesting that they were the result of reduced driver awareness rather than deficiencies in the design.

Figure 5 – Crash History of the Surrounding Roads/Intersections



Source: Crash and Casualty Statistics, Centre for Road Safety TfNSW
Crash and Casualty Statistics, Centre for Road Safety TfNSW modified by Urbis

Figure 6 – Intersection Crash history 2014-18



Source: Crash and Casualty Statistics, Centre for Road Safety TfNSW Crash and Casualty Statistics, Centre for Road Safety TfNSW

2.3.6. Public transport

Rail Network

The site is approximately 550 metres south of Chatswood Railway Station and 800 metres north of Artarmon Railway Station. Both stations are served by the T1 North Shore and T9 Northern line which provide access to Hornsby, Berowra, the Sydney CBD and Epping. However, Chatswood station also has the M1 metro line which provides access to Macquarie Park, North West Business Park, Castle Hill and Rouse Hill. The opening of the Sydney Metro CBD and Sydney Metro South in 2023/24 will provide a further connection to Sydney's south-west as far as Bankstown.

It is not expected that residents within this development would need to use commuter car parking at either Chatswood or Artarmon Stations. There are established active transport connections between the site and the two stations, notably an off-road cycling route adjacent to the site that takes commuters directly to Chatswood Station. There is no established cycling route to Artarmon station at this stage, however, one is planned to utilise the continuation of the rail reserve currently used for pedestrians and cyclists to connect with Chatswood Station.

Table 2 – Rail Services from Chatswood Station

Line No.	Origin / Destination	Frequency of Services			
		Weekday Peak 7 AM-9 AM & 4 PM - 6 PM	Weekday Off peak 9 AM – 4 PM	Saturday	Sunday and Public Holidays
T1	Berowra to City via Gordon	4 minutes	30 minutes	30 minutes	30 minutes

T9	Hornsby to North Shore via City	15 minutes	15 minutes	30 minutes	30 minutes
M1	Chatswood to Tallawong	4 minutes	10 minutes	10 minutes	10 minutes

Source: Transport for NSW, Google Maps

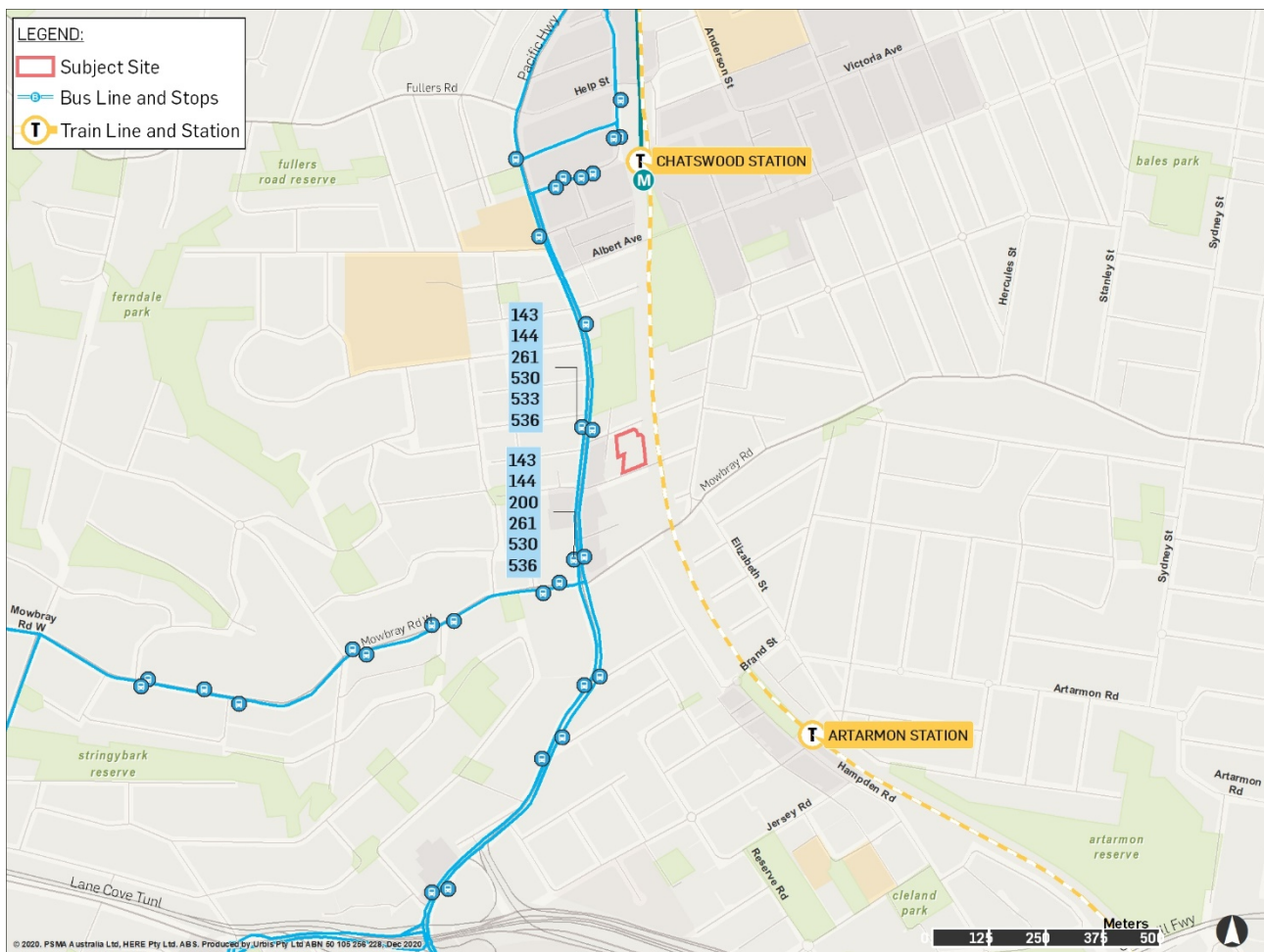
Bus Services

Located adjacent to the Pacific Highway, the site is well-served by buses that provide connections to the employment centres of Chatswood, Artarmon, North Sydney, and the Sydney CBD. The bus routes also connect the site with local retail, schools, industrial/employment areas, and community facilities.

Figure 7 shows the location of bus stops near the site and the direction of the bus routes. **Table 2** illustrates the frequencies of bus services between the site and major centres to the north, south and west. The site is currently well serviced by the bus network with up to twenty buses an hour to Sydney CBD, Chatswood CBD, North Sydney, and the Northern Beaches, enabling connectivity to Parramatta and Macquarie Park via train services.

TfNSW's Integrated Public Transport Service Planning Guidelines (December 2013) suggest a bus stop should be within 400-metres (as the crow flies) of 90% of households in the Sydney metropolitan area. In this case, there are three bus stops within a 400-metre radius of the site. **Table 2** provides a breakdown of buses routes serving the site, including frequencies and destinations.

Figure 7 – Existing Public Transport Network



Source: Google Maps, Transport for NSW Bus Timetables

Table 3 – Bus Services adjacent to the Site

Route No.	Origin / Destination	Frequency of Services from the Site			
		Weekday peak 7 AM - 9 AM & 4 PM - 6 PM	Weekday Offpeak 9 AM - 4 PM	Saturday	Sunday and Public Holidays
143	Chatswood to Manly via Balgowlah and St Leonards	15-30 mins	N/A	N/A	N/A
144	Chatswood to Manly via Royal North Shore Hospital	15-30 mins	15 mins	15 mins	15 mins
200	Bondi Junction to Chatswood	15-20 mins	30 mins from 9:00-10:00 and 14:00-16:00. No services from 10:00-14:00.	N/A	N/A
258	Chatswood to Lane Cove West	To Lane Cove West, services at 6:30 and 8:00. To Chatswood, services at 16:10 and 17:05.	N/A	N/A	N/A
261	Lane Cove to City King Street Wharf via Longueville	One service in each peak hour on school days.	N/A	N/A	N/A
530	Chatswood to Burwood	20-30 mins	30 mins	30 mins	30 mins
533	Chatswood to Sydney Olympic Park via Rhodes & North Ryde	15 mins	30 mins	30 mins	30 mins
536	Chatswood to Gladesville via Hunters Hill	20 mins	N/A	N/A	N/A

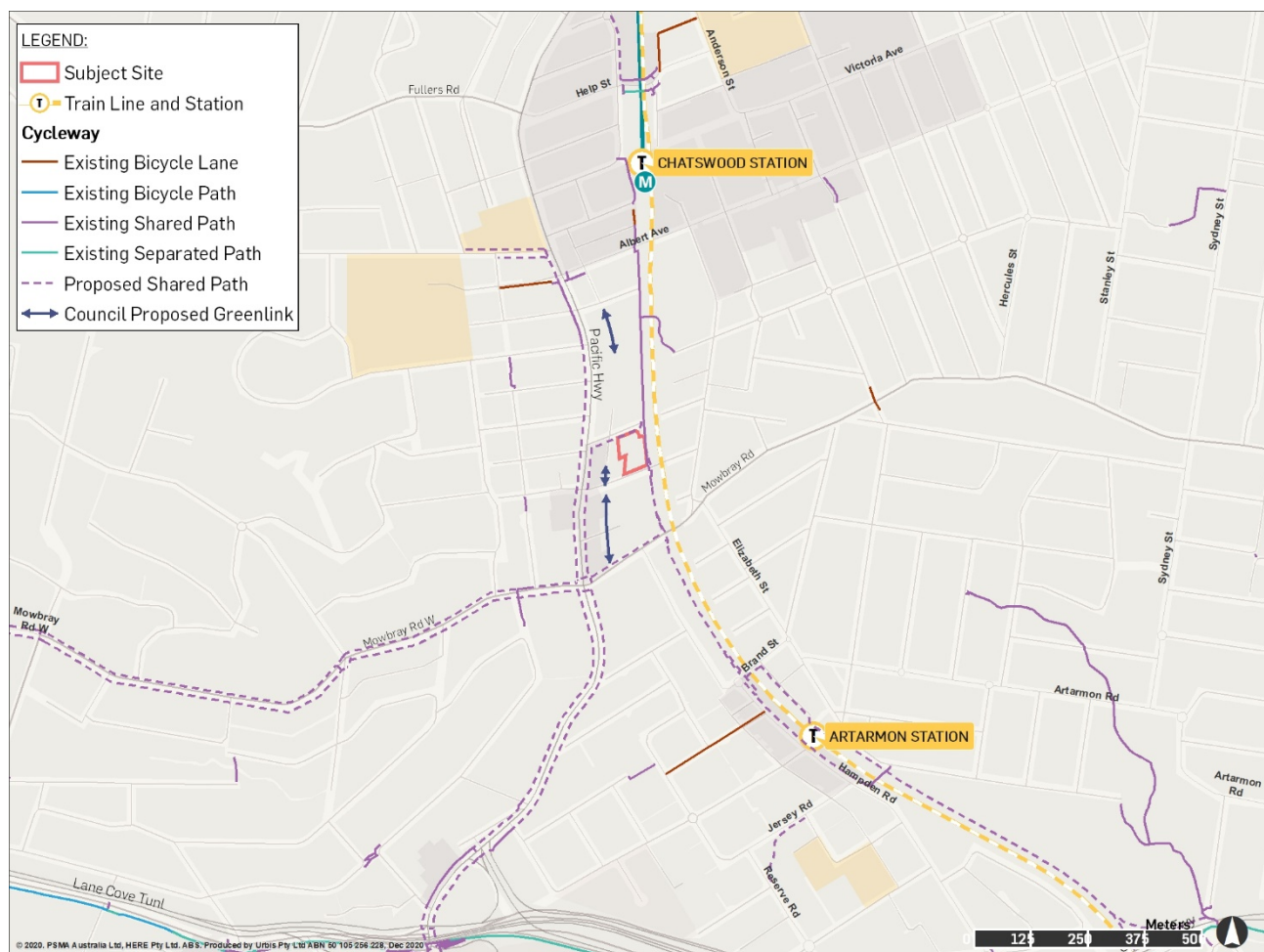
Source: Transport for NSW Bus Timetables

2.3.7. Walking and Cycling Network

Several active transport links connect the site to the surrounding area. Most notably adjacent to the site is an off-road cycle route that provides a direct connection between the site and Chatswood CBD. From Chatswood, there is access to the broader north shore cycling network which provides connections to the Sydney CBD, North Ryde, and Gordon. The key constraints that limit the delivery of attractive and effective active transport links include:

- Steep topography between the site and Artarmon Railway Station which makes a pedestrian/cycle link less desirable.
- Arterial roads such as the Pacific Highway and Mowbray Road which have limited pedestrian and cycling crossing opportunities.
- Fragmented walking and cycling network infrastructure, which, while upgrades are planned, does not yet provide direct and safe off-road active transport links which would attract a broad cross-section of users.

Figure 8 – Walking and Cycling Infrastructure



Source: RMS Cycleway Finder

3. DEVELOPMENT PROPOSAL

3.1. OVERVIEW

The planning proposal sets out a concept design for a multi-tower development situated atop a podium. The planning proposal sets out a vision for a high-quality mixed-use precinct that contributes vibrancy to the local area, solidifies green grid connectivity, provides local housing choice and diversity and provides local employment opportunities.

The Concept Plan of the site is illustrated in **Figure 9**.

Figure 9 – Concept Master Plan



Source: Urbis

3.2. LAND USES

The proposal seeks to deliver a mixed-use development incorporating a range of complementary land-uses that will cater to the various needs of the future residents and local community. As this TIA relates to a Planning Proposal, an indicative mix and scale of land use have been adopted for the purposes of this assessment as summarised in Table 4.

Table 2 – Development Yields

Use	Quantum/Detail
Residential/accommodation Uses	
Apartments	258
Total	258 dwellings

Use	Quantum/Detail
Mixed-use component	
Bulky goods	2,520 m ²
Retail specialties	450 m ²
Gym	1,665 m ²
Total	4,635 m ²

Source: Master Plan

3.3. VEHICLE ACCESS

The proposal includes two separate vehicle accesses, from Nelson Street and Gordon Street.

- Access 1 – Basement Car Park

Access to/from the basement car parking levels is proposed on the southern boundary, from Nelson Street. This provides access for commercial uses and apartments.

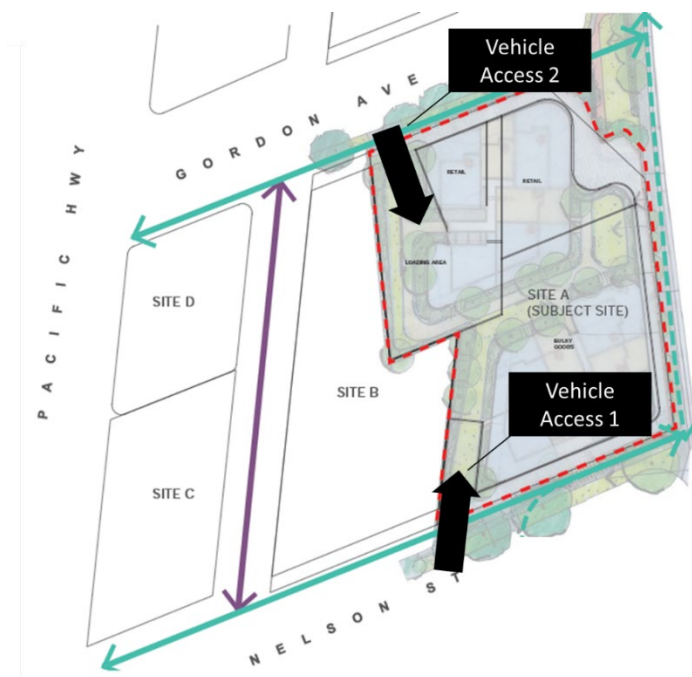
- Access 2 – Basement Loading and Servicing

Access to the basement loading dock and servicing area, along with additional vehicle parking is located via a driveway on the north-west corner of the development, from Gordon Avenue. The movement in and out at this location is for service vehicles accessing the retail component of the development and services such as rubbish collection. This access will be controlled.

As per recommended best practice for separating car parking access and service vehicle access, the access points have been located on different streets to minimise the visual impacts and ensure pedestrians only have to cross one driveway on their way to the development or Frank Channon Walk.

The two vehicle access points are shown in **Figure 10**.

Figure 10 – Proposed Vehicle Access Points



Source: Urbis

3.4. CAR PARKING

On-site basement car parking will be provided for the residential apartments, gym and retail component of the development. Approximately 551 car spaces will be provided within the basement levels with main access via Nelson Street.

The suitability of the car parking provision and layout is discussed in Section 4 of this report.

3.5. BICYCLE FACILITIES

The site will accommodate bicycle facilities. These facilities will include both bike lockers and bike racks. Approximately 75 bicycle parking facilities will be required. The exact quantum of bicycle spaces and any requisite end of trip facilities will be determined during detailed design in accordance with the Willoughby Council DCP (2006).

3.6. LOADING AREAS

The concept design includes loading dock access via Gordon Avenue on the northern boundary of the site. The basement level loading area would adequately accommodate all proposed on-site uses, including use by 12.5-metre-long HRV trucks that service the bulky goods component.

The suitability of the proposed loading arrangements is discussed in Section 4 of this report.

4. TRANSPORT IMPACT ASSESSMENT

This section includes the transport assessment of the proposed development. The additional traffic demands as a result of the proposal have been quantified and the impacts have been assessed.

4.1. PUBLIC AND ACTIVE TRANSPORT

4.1.1. Public Transport

The site is well served by public transport, providing frequent bus services to key centres such as Chatswood and North Sydney, Gladesville, Bondi Junction, Manly, North Ryde, Rhodes, Sydney Olympic Park and Burwood. Nearby rail services provide a direct connection to Hornsby, Sydney CBD, Macquarie Park, The Hills District and North Sydney. The current networks can accommodate the likely demand for public transport generated by the concept design.

This proposal will not initiate the need for any special planning outside of these regular processes.

4.1.2. Cycling

The site is connected by shared pathways that provide infrastructure for walking and cycling to Chatswood via the Frank Channon Walk that runs along the train to the immediate east of the site and Chatswood CBD. There are plans to extend Frank Channon Walk to St Leonard's. Infrastructure is gradually being added in the area by Willoughby Council to develop an extensive cycling network and encourage active travel.

The future layout of the site will connect into the existing network. The site will provide adequate end of trip facilities for cycling in line with the Willoughby Council DCP. This includes under covered bike parking facilities for staff and residents as well as bike parking for visitors in a location that is proximate to the proposed retail.

4.1.3. Pedestrian Movement

As previously discussed in Section 2, the streets surrounding the site have footpath provision consistent with the character of the area.

The proposed development will increase pedestrian movement on Gordon Avenue, Nelson Street and the Pacific Highway. Given there is existing pedestrian infrastructure connecting Chatswood Station and the site, it is anticipated that most pedestrian movements will be along this alignment.

The Chatswood CBD Strategy has identified a new pedestrian green link running parallel to the Pacific Highway and railway between Gordon Avenue and Mowbray Road. This link will provide a new north-south connection to the site that is away from the Pacific Highway, increasing pedestrian amenity and improving the connection between the site and bus stops at the Pacific Highway/Mowbray Road junction.

It is anticipated there will be high levels of pedestrian movement between the site and Chatswood Station along the active transport corridor that runs adjacent to the rail line. This corridor provides access to services and amenities as well as a gateway to employment for residents.

The closest southbound bus stop is approximately 100 metres away from the site on the Pacific Highway, just north of Gordon Avenue. The closest northbound stop is approximately 400 metres away (within the required service area) via the nearest signalised crossing of the Pacific Highway (Mowbray Road).

4.1.4. Access and Servicing

Proposed resident and retail staff/customer vehicle access is from Nelson Street into a basement car park. This would be designed under AS 2890.1 and relevant Transport for NSW and Willoughby Council guidelines. Proposed access for servicing and loading will be via Gordon Avenue into a basement carpark. The basement and basement entrance been designed to accommodate HRV trucks of 12.5 metres to carry out garbage disposal, loading and unloading of goods and other relevant servicing.

4.2. TRAFFIC

4.2.1. Traffic Generation

Traffic generation estimates for the proposal have generally been calculated based on the TfNSW *Guide to Traffic Generating Developments 2002* and *Technical Direction TDT 2013/ 04 Guide to Traffic Generating Developments Updated traffic surveys* (TDT 2013/ 04).

Estimates of weekday peak hour traffic volumes to and from the site resulting from the proposed development are set out in **Table 5**.

Table 3 – Estimated Traffic Generation of Proposed Development (Weekday)

Weekday			
Use	Quantum/Detail	Traffic Generation Rate	Total Peak Hour Traffic Generation Estimate
Residential/Accommodation Uses			
Apartments	258	0.14 per dwelling	36 trips
Total	258 dwellings	–	36 trips
Retail			
Bulky goods	2,520sqm	2.7 per 100 sqm	51 trips
Small Retail	450 sqm	20 per 1000 sqm	7 trips
Total	2,970 sqm	–	58 trips
Other Uses			
Gym	1,665 sqm	3 per 100 sqm	51 trips
Total	1,665 sqm	–	51 trips
Total (all uses)			145 trips

Source: (Former) RMS *Guide to Traffic Generating Developments*

**Note: A 25% reduction in retail trips has been applied to reflect trip containment, passing trips and linked trips as per the RMS Guide to Traffic Generating Developments.*

Estimates of Saturday peak hour traffic volumes to and from the site resulting from the proposed development are set out in **Table 6**.

Table 4 – Estimated Traffic Generation of Proposed Development (Weekend)

Weekend			
Use	Quantum/Detail	Traffic Generation Rate	Total Peak Hour Traffic Generation Estimate
Residential/Accommodation Uses			
Apartments	258	0.31 per dwelling	80 trips
Total	258 dwellings	–	80 trips
Neighbourhood-style mixed-use component			
Bulky goods	2,520sqm	3.9 per 100 sqm	74 trips
Small Retail	450 sqm	38 per 1000 sqm	13 trips
Total	2,970 sqm	–	87 trips
Other Uses			
Gym	1,665 sqm	NA	NA
Total	1,665 sqm	–	NA
Total (all uses)			167 trips

**Note: A 25% reduction in retail trips has been applied to reflect trip containment, passing trips and linked trips as per the RMS Guide to Traffic Generating Developments.*

4.2.2. Background Traffic Growth

Background traffic growth of through traffic movements along the Pacific Highway has been calculated based on historical traffic survey data obtained from TfNSW. This change could result from changes in origins and destinations of travel, mode share and the availability of other routes.

Table 5 – Assumed Annual Growth Rates

Location	Growth Rate Per Annum	
	AM Peak	PM Peak
Pacific Highway (Southbound)	-1.46%	-1.89%

Source: TfNSW Traffic Volume Viewer

Although a negative traffic growth rate has been observed, as a conservative estimate we have applied a 1% per annum traffic growth rate to our forecast traffic volumes as a conservative assessment to demonstrate the lack potential impact over the 10 years following completion of the project.

4.2.3. Trip Distribution

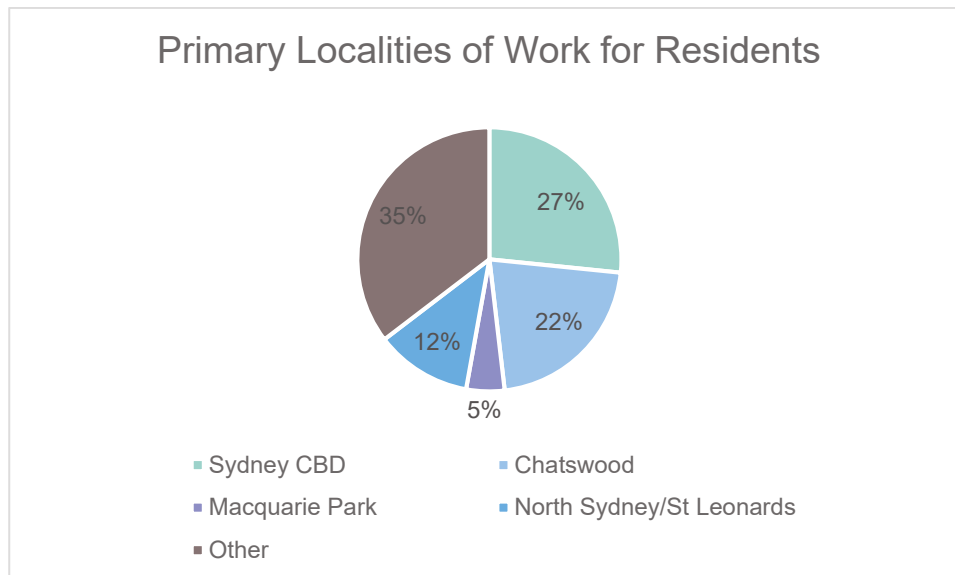
The directional distribution and assignment of the development traffic are based on a range of factors that differ for each land use activity. These include:

- Configuration of the road network in the immediate vicinity of the site.
- Location of employment and other trip attractors.
- Configuration and location of access points.

Analysis of Journey to Work data from the 2016 Census indicates that the dominant movement for work is to the north. This indicates that in the AM peak there is likely to be residents from the site wanting to :

- Walk and cycle to northern employment areas such as Chatswood;
- Walk and cycle to the train station at Chatswood for onward travel north;
- Use the bus to travel north (catching it from the Pacific Highway); and
- Right turn from Nelson Street to the Pacific Highway to travel north.

There are 4 main localities where residents travel for work are highlighted in **Figure 11**.



Source: ABS Table builder

For the purposes of this assessment the directional split is assumed as:

- Residential: AM 20% in; 80% out, PM 80% in; 20% out
- Non-residential: 50% in; 50% out
- Weekend: 50% in; 50% out

The assignment of development traffic is illustrated in **Figure 12** and **Figure 13**.

Note that as a result of the development, network peak times have shifted for the times in bold:

- AM Peak: 7-8 AM
- **PM Peak: 4-5 PM**
- **WE Peak: 12-1 PM**

Figure 12: Current plus development traffic volumes AM/(PM)/[WD]



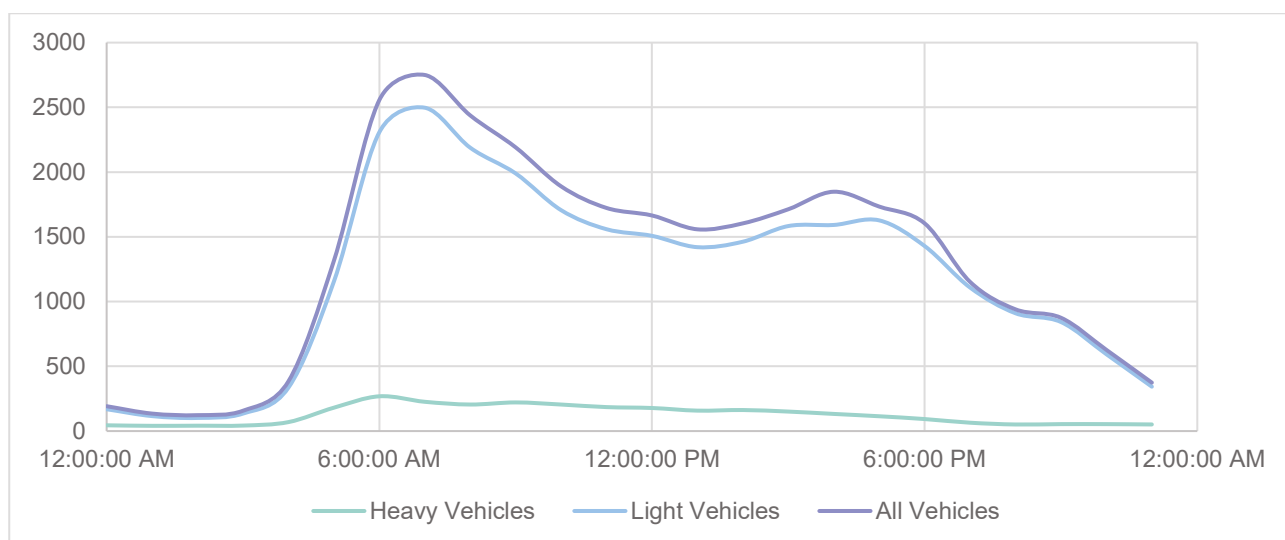
Figure 13: 2028 forecast plus development traffic volumes AM/(PM)/[WD]



4.2.4. Traffic impact

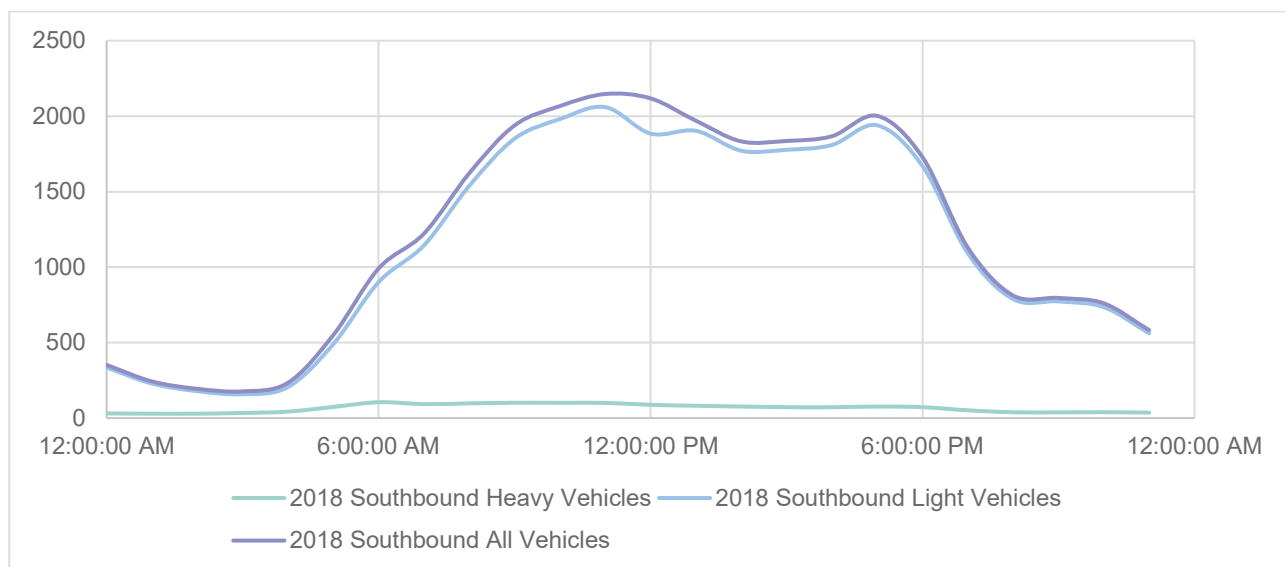
All traffic generated from the site will use the Pacific Highway. **Figure 14** shows that the AM peak is at 7 AM when almost 3,000 vehicles per hour pass the Gordon Avenue and Nelson Street Intersections. **Figure 15** Shows that the weekend peak is at 11 AM. Almost 2200 vehicles pass the Gordon Avenue and Nelson Street Intersection at this time. These figures were synthesised by averaging the 2018 southbound traffic counts of the Pacific Highway/ Mowbray Road traffic counter and the Pacific Highway Corona Avenue Traffic counter.

Figure 14 Existing Vehicle Counts, Pacific Highway, Southbound (weekday)



Source: Urbis analysis of RMS Traffic Counters, 2018

Figure 15 Existing Vehicle Counts, Pacific Highway, Southbound (weekend)



4.2.5. Development Impacts

Table 8 shows the synthesised traffic counts from 2018 on the Pacific Highway with the addition of our development, along with the change it will bring.

Table 6 Future Proposed Vehicle Counts (Current + Development), Pacific Highway, Southbound Past Nelson Street

AM Peak	PM Peak	Weekend
7AM-8AM	5PM-6PM	12PM-1PM
Current		
2816	1744	2147
Proposed (Current + Development)		
2866	1786	2284
Change		

50	42	137
Change %		
2%	2%	6%

Traffic Impacts of the development on the local road network will be negligible. Given that Nelson Street is now a permanent cul de sac, there will be limited traffic growth seen with only a 2% change to the current network during peak periods as a result of the development. This is also the case on Gordon Avenue. Weekends may see increased traffic generation due to the addition of bulky goods retail to the development's podium, however, this is only expected to see a 6% increase in the network volume at current levels.

Table 9 Future Proposed Vehicle Counts (2028 Projection + Development), Pacific Highway, Southbound Past Nelson Street

AM Peak	PM Peak	Weekend
7AM-8AM	5PM-6PM	12PM-1PM
Current		
2816	1744	2147
Proposed (2028 Projection + Development)		
3156	1933	2500
Change		
340	189	353
Change %		
1% p.a	1% p.a	1% p.a

Traffic along the Pacific Highway corridor between Corona Avenue and Mowbray Road has seen a negative growth rate over the past decade at both AM (-1.46%) and PM (-1.89%) peaks. This could be attributed to the introduction of a rail connection between Macquarie Park and Chatswood, reducing Traffic turning onto the Pacific Highway from Delhi Road, as well as the upgrade of that rail line to the metro. Further reductions could be observed once Sydney Metro CBD and Metro South are completed in 2023/24. Despite this, we have applied a 1% per annum growth rate to forecast traffic generation. Due to the nature of both Nelson Street and Gordon Avenue, there will be limited traffic growth generated from these streets onto the Pacific Highway in 2028. This will result in negligible increases in peak hour traffic volumes along the Pacific Highway in 2028.

Given the proximity of the proposed development to both existing and active corridors, it is anticipated that many residents would use those to access employment, amenities and services at Chatswood rather than drive.

4.3. PARKING PROVISION

The Willoughby Council (DCP) 2006 stipulates car parking rates for different land uses. These rates and calculation of total off-street parking requirements for the site are outlined in **Table 10**.

The proposed concept design can accommodate the off-street parking requirements on the site.

Table 11 highlights the Bicycle parking facilities required by the development as per the Willoughby DCP (2006).

Table 10 – Willoughby DCP 2006 Car Parking Rates

Use	Quantum/ Detail	Car Park Provision Rate	Maximum Car Park Requirement
Residential/Accommodation Uses			
Apartments	258	1 space/dwelling (other than studios)	258
Visitor Parking	N/A	Visitor spaces - 1 per 4 dwellings	65
Total	258 dwellings	–	323
Retail Uses			
Bulky Goods	2,520 m ²	1 space / 77 m ² factory space Ancillary office space - in accordance with office / commercial rates above 1 space / 300 m ² warehouse space (i.e. space not accessible to the public) 6 spaces / 100 m ² showroom space (i.e. space available to the public) <u>Loading bay dimensions:</u> Width – 3.5 m Length – 12.5 m Platform height – 1.10 m to 1.40 m Vertical Clearance – 5 m	150
Small Retail	450 m ²	1 space per 25 m ²	18
Other Uses			

Use	Quantum/ Detail	Car Park Provision Rate	Maximum Car Park Requirement
Gym	1,665 m ²	3 spaces per 85 m ² GFA	60
Total (all uses)			551

Source: Willoughby DCP (2006), AS 2890.2

Table 11 – Willoughby DCP 2006 Bicycle Parking Rates

Type	Quantum/Detail	Cycling Parking Provision Rate	Minimum Bicycle Park Requirement
Residential/Accommodation Uses			
Racks	258	1 per 12 units	22
Lockers	258	1 per 10 units	26
Total	258 dwellings	–	48
Retail Uses**			
Racks	2,970 m ²	1 per 150m ²	20

Type	Quantum/Detail	Cycling Parking Provision Rate	Minimum Bicycle Park Requirement
Lockers	2,970 m ²	1 per 450 m ²	7
Total (all uses)			75

5. CONCLUSION

This report provides a transport and traffic assessment of the proposed concept design of 9-11 Nelson Street Chatswood

The concept design is anticipated to have the following transport and traffic-related impacts:

- The current public transport networks can accommodate the likely demand for public transport generated by the concept design.
- Active travel will account for a large number of daily trips to access amenities and public transport due to the Frank Channon Walk shared path connecting the site directly to Chatswood CBD.
- The two access points to the development, one from Gordon Avenue and one from Nelson Street will have a negligible impact on the local road network
- The proposed land uses are estimated to generate 145 Weekday peak vehicle trips and 167-weekend peak vehicle trips.
- Traffic generation estimates derived from *RMS Guide To Traffic Generating Developments* showed that the development would cause a negligible increase to traffic on the road network.
 - The majority of vehicles will be accessing the development via Nelson avenue as that provides access to all parking. Gordon avenue will only accommodate vehicles providing loading and servicing to the development, these vehicles will be up to HRV size.
- The 551 on-site parking provision stipulated in the Willoughby DCP 2006 can be accommodated on the site.
- On-site bicycle parking provision stipulated in the Willoughby DCP 2006 can be accommodated on site.

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