845 Pacific Highway, Chatswood

Planning Proposal
Transport Impact Assessment

Prepared by: Stantec Australia Pty Ltd for HYG
on 08/09/2021
Reference: N191340
Issue #: B

GTAconsultants now Stantec

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Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	02/09/2020	Final	Sherry Merson	Mackenzie Brinums	Rhys Hazell	Rhys Hazell
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1. INTRODUCTION

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1.1. Background

A Planning Proposal is to be lodged with Willoughby City Council (Council) for a proposed 36-level commercial office tower on land at 845 Pacific Highway, Chatswood. The proposal incorporates around 41,330 square metres Gross Floor Area (GFA) of commercial office area and ancillary ground level retail/ café uses. The podium is proposed to be recessed into the site to encourage activation and improve the public domain.

HYG engaged GTA, now Stantec to provide a transport assessment to support the Planning Proposal for the site.

1.2. Purpose of this Report

This report sets out an assessment of the anticipated transport implications of the proposed development, including consideration of the following:

- existing traffic and parking conditions surrounding the site
- suitability of the proposed parking in terms of supply (quantum) and layout
- service vehicle requirements
- pedestrian and bicycle requirements
- the traffic generating characteristics of the proposed development
- suitability of the proposed access arrangements for the site
- the transport impact of the development proposal on the surrounding road network.

1.3. References

In preparing this report, reference has been made to the following:

- an inspection of the site and its surrounds
- Willoughby Development Control Plan 2006 (WDCP)
- Willoughby Local Environmental Plan (LEP) 2012
- Australian Standard/ New Zealand Standard, Parking Facilities, Part 1: Off-Street Car Parking AS/NZS 2890.1:2004
- Australian Standard, Parking Facilities, Part 2: Off-Street Commercial Vehicle Facilities AS 2890.2:2018
- Australian Standard / New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with Disabilities AS/NZS 2890.6:2009
- plans for the proposed development prepared by PTW, dated July 2021
- Willoughby City Council, Chatswood CBD Planning and Urban Design Strategy to 2036, dated January 2018
- other documents and data as referenced in this report.

2. STRATEGIC CONTEXT

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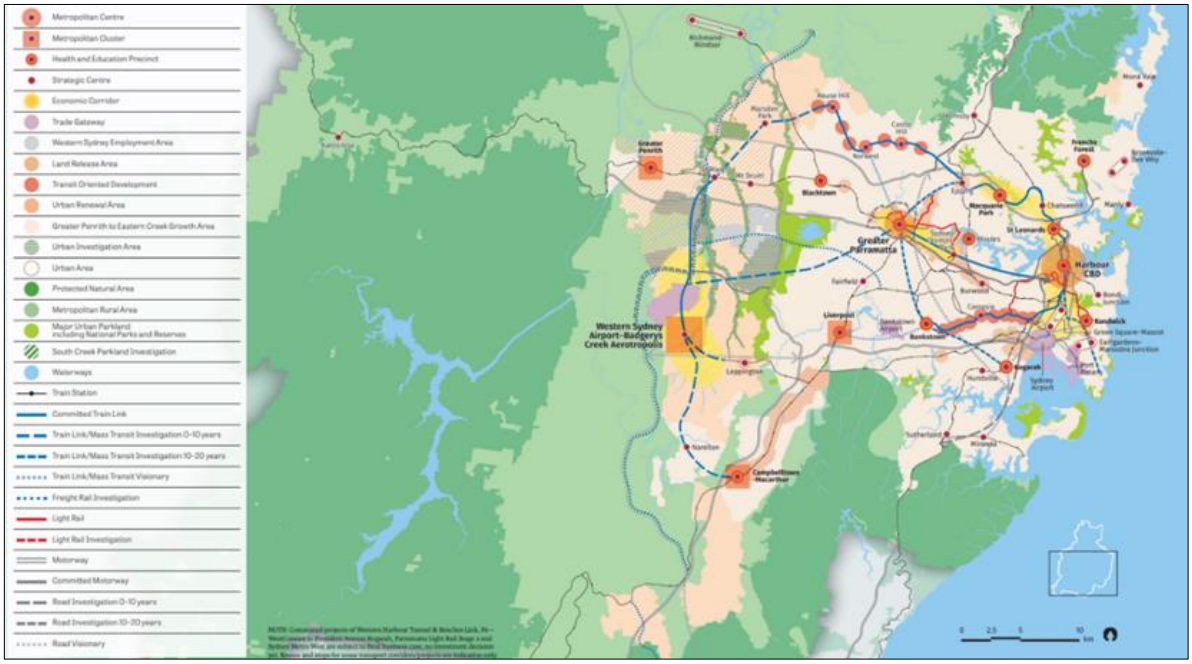
2.1. The Greater Sydney Region Plan 2018

The Greater Sydney Commission (GSC) is an independent organisation that leads metropolitan planning for Greater Sydney. It has prepared the Greater Sydney Region Plan which outlines how Greater Sydney will manage growth and guide infrastructure delivery. The plan has been prepared in conjunction with the NSW Government's Future Transport 2056 Strategy and informs Infrastructure NSW's State Infrastructure Strategy.

The GSC's vision is to create three connected cities; a Western Parkland City west of the M7, a Central River City with Greater Parramatta at its heart and an Eastern Harbour City. By integrating land use, transport links and infrastructure across the three cities, more people will have access within 30-minutes to jobs, schools, hospitals and services.

The Greater Sydney Region Plan is a 20-year plan with a 40-year vision and has four key focuses; infrastructure and collaboration, liveability, productivity and sustainability. The vision of the three cities from The Greater Sydney Structure Plan 2056 is shown in Figure 2.1.

Figure 2.1: Greater Sydney Structure Plan 2056 – The Three Cities



Source: Greater Sydney Commission

2.2. North District Plan

The North District covers Hornsby, Hunter's Hill, Ku-ring-gai, Lane Cove, Mosman, North Sydney, Northern Beaches, Ryde and Willoughby local government areas.

This North District Plan is a 20-year plan to manage growth in the context of economic, social and environmental matters to achieve the 40-year vision for Greater Sydney. It is a guide for implementing the Greater Sydney Region Plan, A Metropolis of Three Cities, at a district level and is a bridge between regional and local planning.

The District Plan informs local strategic planning statements and local environmental plans, the assessment of planning proposals as well as community strategic plans and policies. The District Plan also assists councils to plan for and support growth and change, and align their local planning strategies to place-based outcomes.

The vision of the North District will be achieved by:

- Supporting jobs growth in strategic centres.
- Sustaining local centres to provide jobs, services and amenity.
- Providing fast and efficient transport connections to achieve a 30-minute city.
- Creating and renewing great places while protecting heritage and local character and improving places for people.
- Improving walking and safe cycling ways.
- Enhancing the quality and improving access to open space.

2.3. Future Transport 2056

Future Transport 2056 provides a 40-year strategy for how transport will be planned, amended and forecasted within NSW, both regional and metropolitan, for the expected 12 million residents. Future Transport 2056 follows from the 2012 Long Term Transport Master Plan which listed over 700 transport projects, the majority of which are completed or in progress. It also ties in with Greater Sydney Region Plan and the subsequent district plans to support the three cities metropolis vision.

Future Transport 2056 is supported by two key documents, Greater Sydney Services and Infrastructure Plan and Regional NSW Services and Infrastructure Plan, which provide guidance and planning for these areas.

From a metropolitan view, Future Transport 2056 and associated plans include the 30-minute city where jobs and services are within 30 minutes of residents with Greater Sydney. Strategic transport corridors to move people and goods are outlined between metropolitan and strategic centres, clusters and surrounds. The Movement and Place framework is also emphasised to support liveability, productivity and sustainability.

2.4. Chatswood CBD Planning and Urban Design Strategy to 2036

The Chatswood CBD Strategy aims to establish a strong framework to guide future private and public development as the CBD continues to grow over the next 20 years. It aims to provide capacity for future growth, achieve exceptional design and realise a distinctive, resilient and vibrant CBD. The Strategy will inform changes to Willoughby LEP and DCP.

A draft Strategy was endorsed by Council for community and stakeholder engagement between January and March 2017. Following exhibition and consideration of feedback Council endorsed the Strategy on 26 June 2017 with the consideration of the sun access issue endorsed in October 2017.

The Strategy aims to achieve:

- A reinvigorated commercial core area and economically buoyant CBD, to provide for future employment.
- A sustainable balance between commercial, retail, residential, education, cultural and other uses to ensure on-going vibrancy.
- A compact, walkable CBD.
- A city form and scale to accommodate future growth and change.

- A CBD of exceptional urban design, easy pedestrian linkages and good public domain, where local character and heritage are embraced, and the greening of the centre is achieved.
- Simplified controls for the LEP and DCP in relation to the CBD.

Key to the site, the strategy has developed the following principles to achieve the desired outcome for the broader Chatswood CBD:

1. Promoting office growth - The office market in Chatswood will continue to improve and it is vital that the centre accommodates this.
2. Providing great public places - Key new spaces and links as well as improvements to existing will provide a variety of high quality, interesting spaces for Chatswood into the future.
3. Addressing transport issues - A balanced approach is required to address future transport needs to ensure sustainable outcomes for Chatswood.

The strategy also makes recommendations in terms of maximum height limits and FSR to achieve the vision for Chatswood CBD. Figure 2.2 and Figure 2.3 indicate that the site has a recommended maximum height limit up to the airspace limits (Pans Ops Plane) and no maximum FSR for commercial uses.

Figure 2.2: Recommended maximum height limits

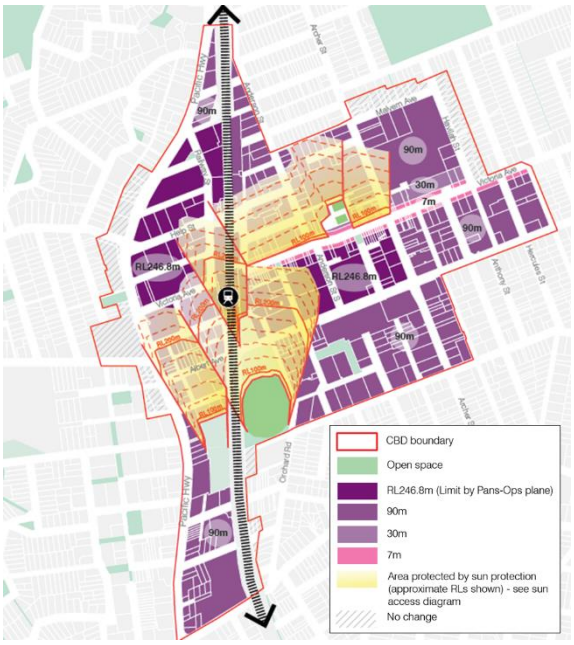
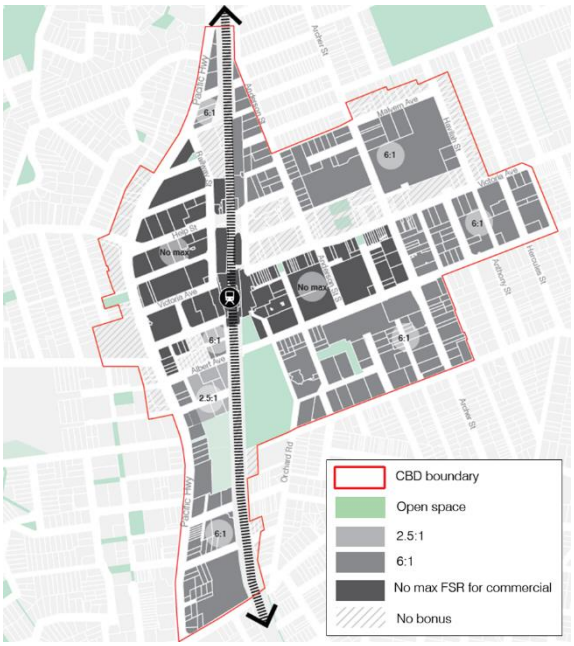


Figure 2.3: Recommended maximum FSR



The Strategy also stresses the importance of Travel Demand Management for the future of Chatswood CBD. This would be done to modify travel decisions so that more desirable transport, social, economic and/ or environmental objectives can be achieved, and the adverse impacts of travel can be reduced. The purpose of travel demand management is to reduce the total amount of travel, minimise the need to expand road systems, reduce the incidents of vehicle crashes, prevent further congestion, reduce air pollution, conserve scarce resources and increase the share of non-car based transport. Increasing the supply of parking can induce a greater number of vehicular trips which increases congestion, impacting negatively on the city environment.

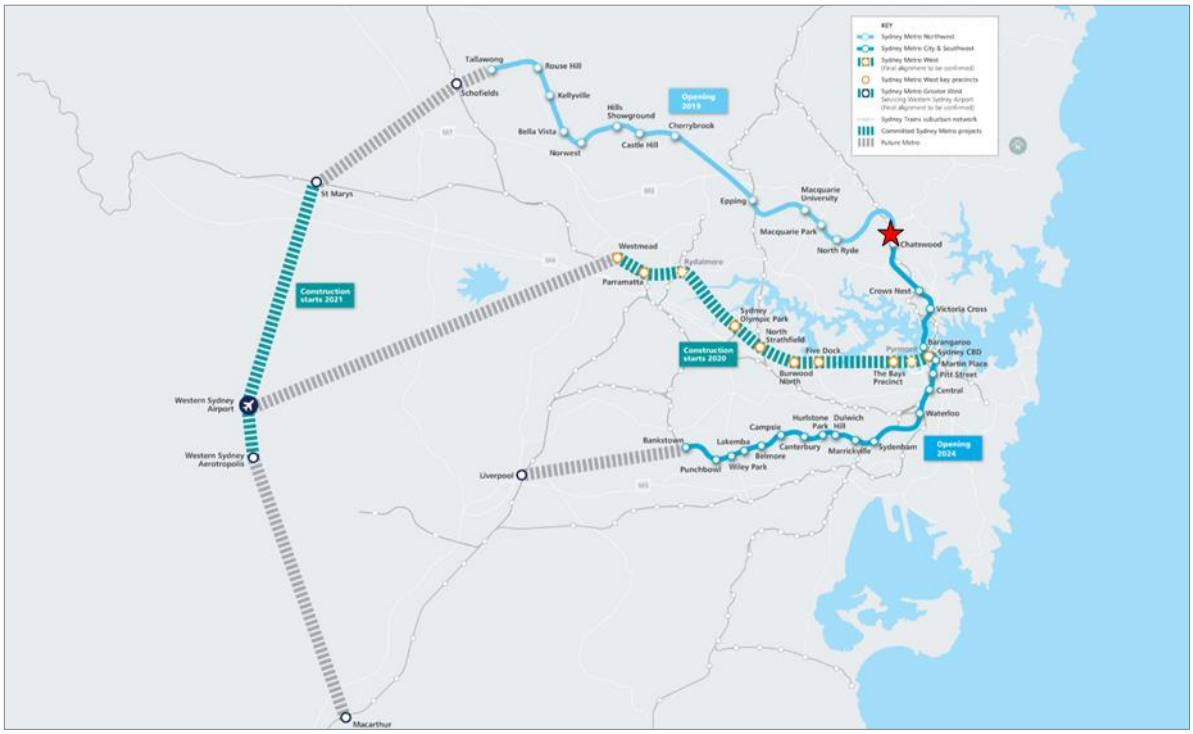
The Strategy indicates the desire for commercial car parking rates to be low to recognise the good accessibility to the surrounding public transport network, as well as to reduce travel demand on the surrounding road network.

2.5. Sydney Metro Northwest

A trigger for further growth in Chatswood has been the introduction of Sydney Metro, Australia's biggest public transport project that will operate as a standalone railway covering more than 66 kilometres with 31 new metro stations in its initial stages. Sydney Metro Northwest is the first stage of the project linking Schofields and Chatswood via Norwest, Castle Hill and Epping with services having commenced in May 2019. Sydney Metro will improve travel time, reliability and reduce costs compared with bus and private car travel to key employment areas including Macquarie Park, Chatswood, North Sydney and Sydney CBD.

Sydney Metro has and will continue to greatly expand to improve the 30-minute coverage for Chatswood with commuters travelling as far west as Schofields by public transport. The 30-minute coverage will also be expanded for areas to the north and south of the metro line including towards Hornsby and Rhodes via The Northern heavy rail line. The existing and future metro lines are shown in Figure 2.4.

Figure 2.4: Existing and future Sydney Metro



Source: https://www.sydneymetro.info

3. EXISTING CONDITIONS

03

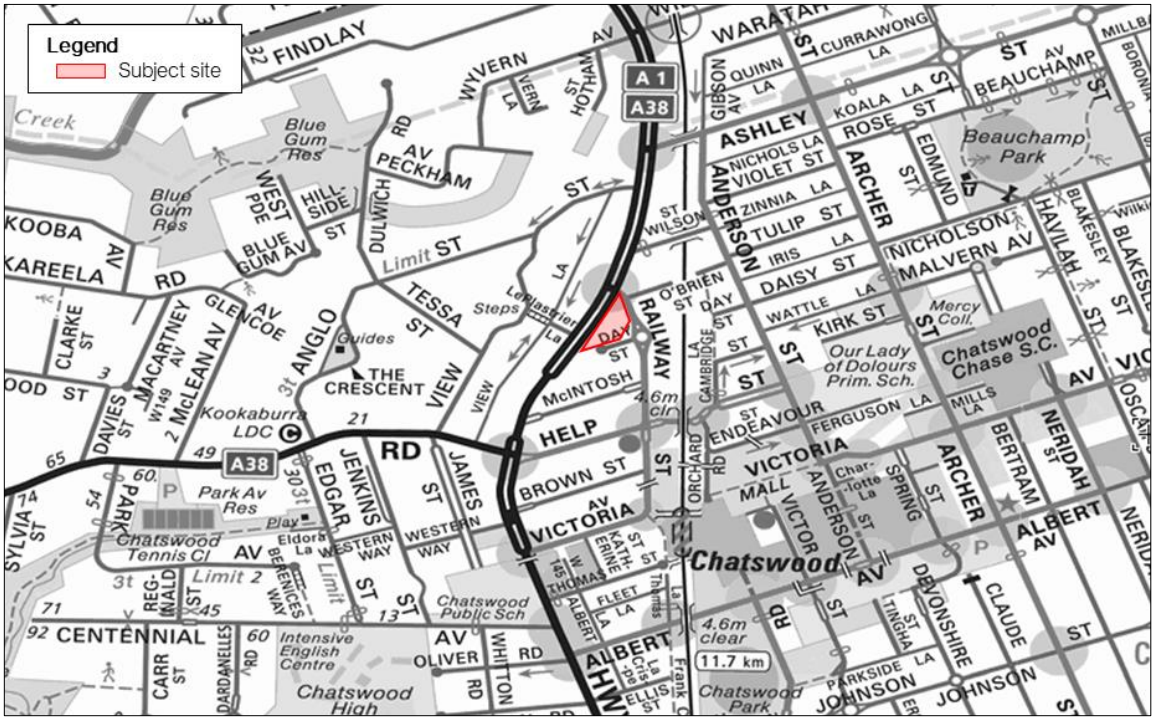
3.1. Location

The site is at 845 Pacific Highway, Chatswood and covers 2,038 square metres with frontages of 90 metres to Pacific Highway, 40 metres to Railway Street and 45 metres to Day Street. Vehicle access is via Day Street. A 'pocket park' under the ownership of Council is located in the south-east corner of the site.

The site has a land use classification as B3 – Commercial Core and is occupied by a commercial building and the surrounding properties mostly including a mix of residential towers, commercial buildings and low and medium residential dwellings surrounding the CBD. The Zenith Centre and Theatre is immediately to the south.

The location of the site and its surrounding environs is shown in Figure 3.1, with the LEP land use map shown in Figure 3.2.

Figure 3.1: Subject site and its environs



Base image source: Sydway

Figure 3.2: Land use map

Base image source: Willoughby LEP 2012

3.2. Transport Network

3.2.1. Road Hierarchy

Roads are classified according to the functions they perform. The main purpose of defining a road's functional class is to provide a basis for establishing the policies which guide the management of the road according to their intended service or qualities.

In terms of functional road classification, State roads are strategically important as they form the primary network used for the movement of people and goods between regions, and throughout the State. Transport for NSW (TfNSW) is responsible for funding, prioritising and carrying out works on State roads. State roads generally include roads classified as freeways, state highways, and main roads under the Roads Act 1993, and the regulation to manage the road system is stated in the Australian Road Rules, most recently amended on 19 March 2018.

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 – Controlled by TfNSW, typically no limit in flow and designed to carry vehicles long distance between regional centres.

Sub-Arterial Roads – Managed by either Council or TfNSW under a joint agreement. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their 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 sites and the sub-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.

3.2.2. Surrounding Road Network

Pacific Highway

The Pacific Highway is a State arterial road, functioning as the key north-south road between North Sydney and Hornsby. It is generally configured with two to three lanes in each direction near the site and set within an 18-metre-wide carriageway. The Pacific Highway has a posted speed limit of 60km/h.

Kerbside parking is generally not permitted on either side of the road in the vicinity of the site, with clearway restrictions between 6am and 7pm on weekdays and between 9am and 6pm on weekends.

Pacific Highway is shown in Figure 3.3 and Figure 3.4.

Figure 3.3: Pacific Highway (looking north)

Figure 3.4: Pacific Highway (looking south)

Railway Street

Railway Street functions as a local road facilitating access to commercial and residential properties on the western side of Chatswood CBD. It is aligned in a north-south direction with one traffic lane and one parking lane in each direction set within an approximate 13-metre-wide carriageway near the site. Railway Street has a posted speed limit of 40km/h and is shown in Figure 3.5.

Day Street

Day Street is a short cul-de-sac and provides access to the site at its western end. It is a two-way road aligned in an east-west direction with parking permitted on the southern side with a single loading space on the northern side. Day Street has a posted speed limit of 40 km/h and is shown in Figure 3.6.

Figure 3.5: Railway Street (looking south)

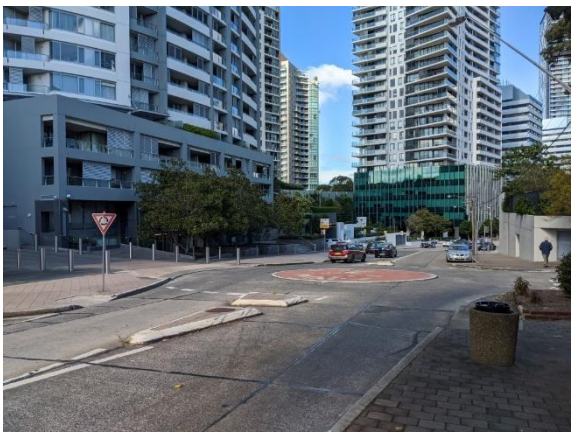


Figure 3.6: Day Street (looking west)

3.2.3. Surrounding Road Network and Access

The site is conveniently located adjacent to the Pacific Highway, allowing approaching vehicles to exit the arterial road network and immediately access the site without the need to traverse Chatswood CBD. In peak periods, the area experiences some level of congestion including along the Pacific Highway, with extensive queuing particularly present in the right turn lane from the Pacific Highway to Fullers Road which provides connection to North Ryde, Macquarie Park and M2. The Railway Street/ Help Street intersection generally operates well in peak periods, noting some constraints at the Pacific Highway intersections during weekday PM peaks.

Considering the existing configuration and operation of the surrounding road network particularly during road network peak periods, it is estimated that most vehicles approaching or departing the site to/ from the north or south would use the Pacific Highway and Railway Street, and those to/ from the west via Fullers Road would tend to use Railway Street and Help Street.

3.3. Traffic Volumes

Given ongoing global events related to COVID-19, it is acknowledged that current traffic conditions are not considered 'normal' and as such traffic surveys completed at this time would not be considered representative of typical conditions.

In light of this, GTA has obtained historical SCATS detector data from TfNSW for Thursday 7 November 2019 to better understand typical traffic volumes through the Pacific Highway/ Railway Street signalised intersection. Traffic surveys were also completed on Thursday 18 June 2020 in the AM and PM peak periods at the following intersections:

- Pacific Highway/ Railway Street
- Railway Street/ Day Street.

The peak hours were found to occur between 7:30am and 8:30am and between 4pm and 5pm. A comparison of the traffic survey data confirms that the 2020 traffic volumes were generally lower than that captured in the 2019 SCATS data, and as such the relevant turning movements and through movement on Railway Street at Day Street as captured in the traffic surveys have been increased accordingly. The relevant multiplier factors are shown in Figure 3.7 and Figure 3.8.. This approach was discussed and agreed with Council as part of the pre-lodgement meeting on 27 May 2020.

Figure 3.7: AM traffic survey multiplier factors to pre COVID-19 levels

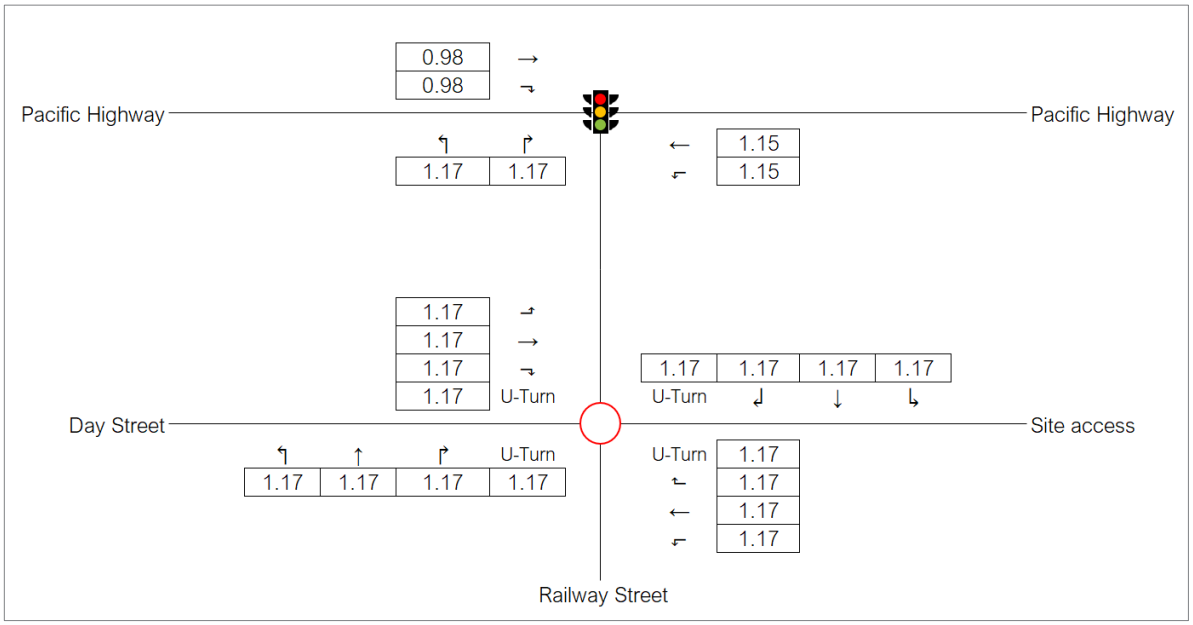


Figure 3.8: PM traffic survey multiplier factors to pre COVID-19 levels

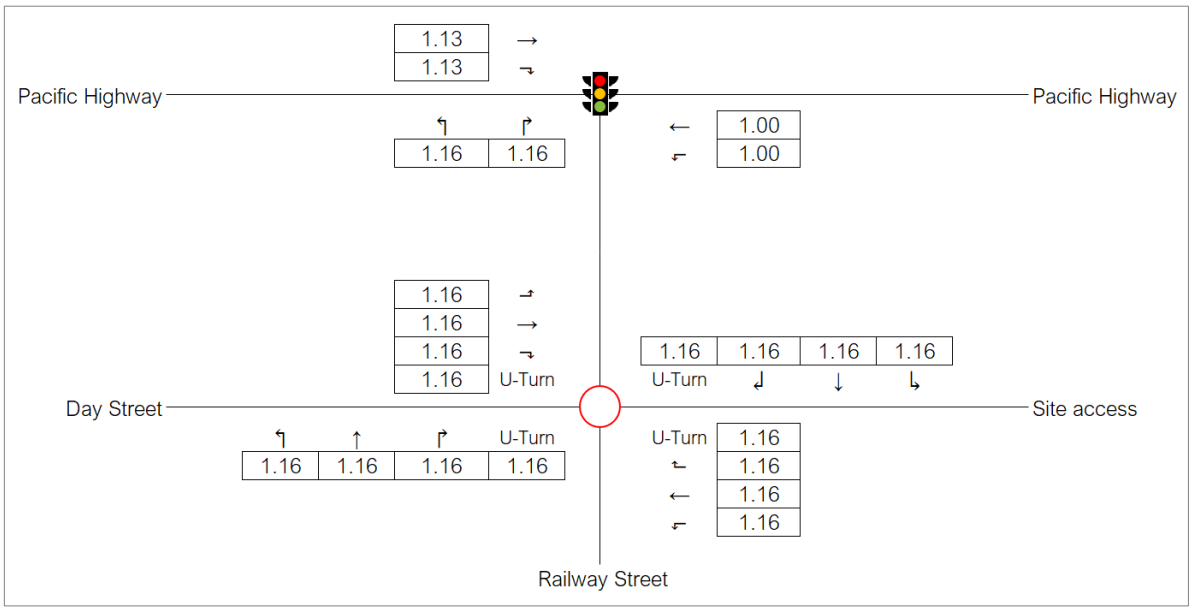


Figure 3.9 and Figure 3.10 set out the estimated weekday AM and PM peak hour traffic volumes at the key intersections near the site following application of the pre COVID-19 mutiplier factors.

Figure 3.9: Existing AM peak hour traffic volumes

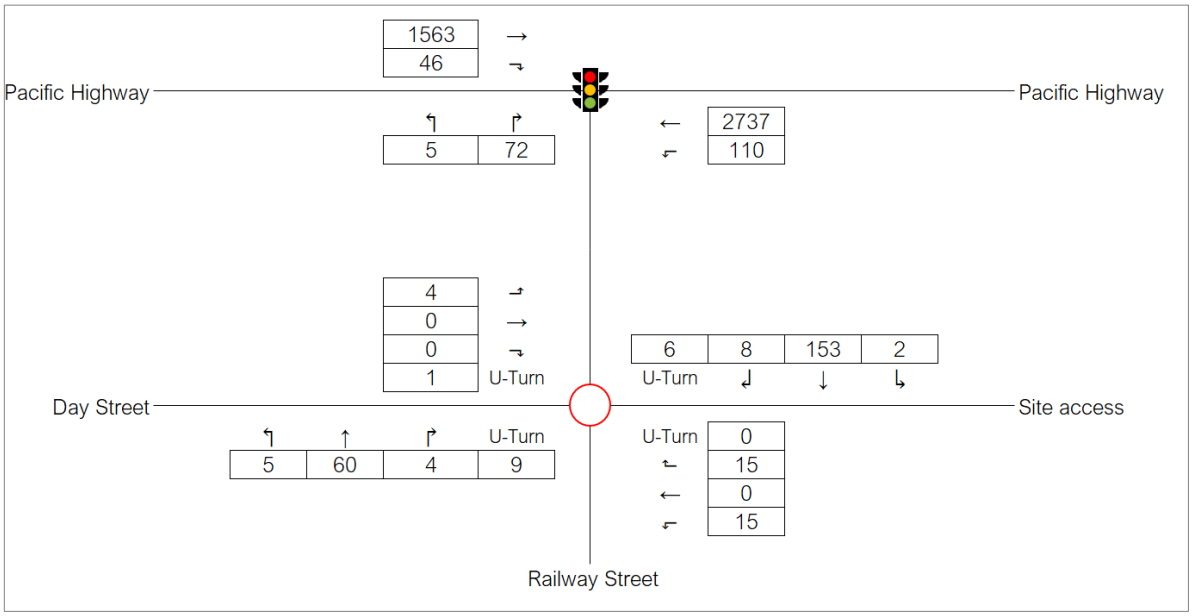
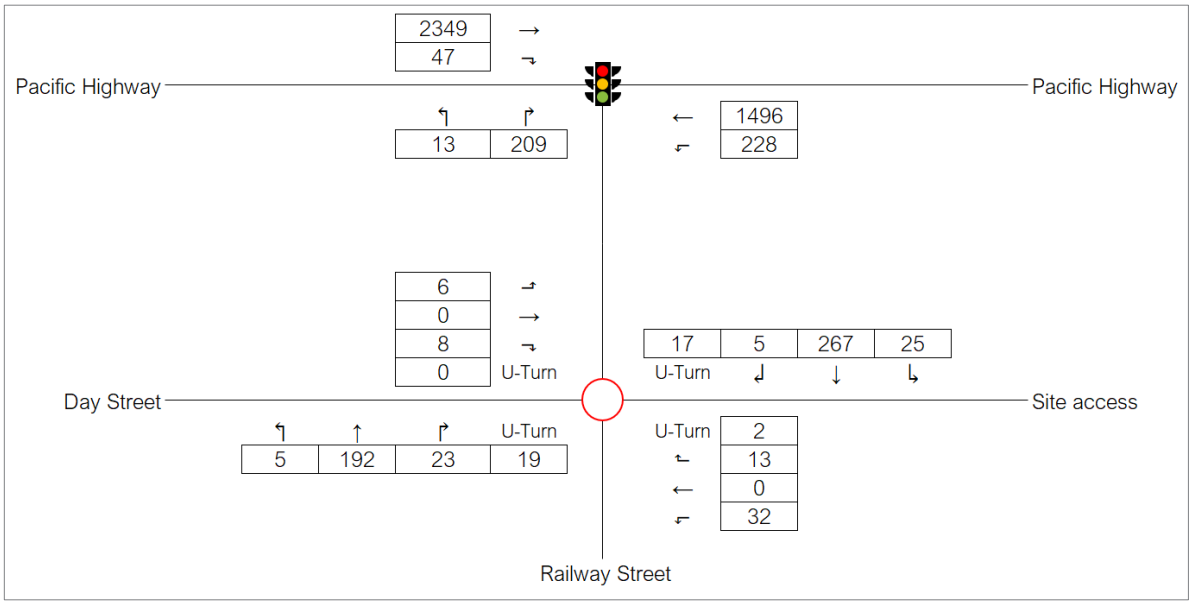


Figure 3.10:Existing PM peak hour traffic volumes



3.4. Intersection Operation

The operation of the key intersections within the study area have been assessed using SIDRA INTERSECTION[1] (SIDRA), a computer-based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by the TfNSW, is vehicle delay. SIDRA determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 3.1 shows the criteria that SIDRA adopts in assessing the level of service.

[1] Program used under license from Akcelik & Associates Pty Ltd.

Table 3.1: SIDRA level of service criteria

Level of service (LOS)	Average delay per vehicle (secs/veh)	Traffic signals, roundabout	Give way & stop sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Table 3.2 presents a summary of the existing operation of the intersection, with full results presented in Appendix B of this report. Traffic models were set up as a network in SIDRA, with models calibrated based on historical SCATS data provided by TfNSW and queues observed on-site.

Table 3.2: Existing intersection operation

Intersection	Peak	Leg	Degree of saturation (DOS)	Average delay (sec)	Average queue (m)	Level of service (LOS)
Pacific Highway/ Railway Street	AM	South	0.16	65	12	E
		Northeast	0.89	17	296	B
		Southwest	0.64	8	131	A
		Overall	**0.89**	**14**	**296**	**A**
	PM	South	0.50	70	36	E
		Northeast	0.49	7	83	A
		Southwest	0.92	13	322	A
		Overall	**0.92**	**14**	**322**	**A**
Railway Street/ Day Street	AM	South	0.06	8	1	A
		East	0.03	8	1	A
		North	0.13	7	2	A
		West	0.01	8	1	A
	PM	South	0.19	8	3	A
		East	0.05	9	1	A
		North	0.26	7	4	A
		West	0.02	9	1	A

Table 3.2 indicates that the key intersections currently operate well with the average delay over both intersections resulting in a level of service A in both peak hours. This is as a result of the majority of the green time at the Pacific Highway/ Railway Street intersection being allocated to the through movements which

carries significantly higher volumes than Railway Street. As such, Railway Street itself does experience some queuing and delay in peak periods, as is common for minor streets that intersect with the Pacific Highway and generally considered acceptable. The modelling results also confirm queuing on the Pacific Highway in the peak direction, consistent with site observations.

3.5. Public Transport

The site is serviced by a range of well-established and frequent public transport services. Chatswood Railway Station and the bus interchange is about 500 metres to the south and within a six-minute walk. It is serviced by the Northern, North Shore and Western Lines and the intercity Central Coast and Newcastle Line and provides high frequency services to most of the Sydney Trains network, including Sydney CBD and North Sydney. Sydney Metro Northwest services also start and end at Chatswood.

Chatswood Interchange functions as one of the main bus interchanges in the northern suburbs of Sydney with at least 20 separate bus routes serviced by State Transit and Transdev, servicing key destinations including Sydney CBD, Manly, Lane Cove, Bondi Junction and Macquarie Park.

Chatswood will also form a major node as part of the expanding Sydney Metro with further expansion to the existing services which currently link Chatswood with Schofields via four-minute turn up and go services. Services will extend south to North Sydney, Sydney CBD and through to Bankstown as part of Metro Stage 2 which is currently under construction.

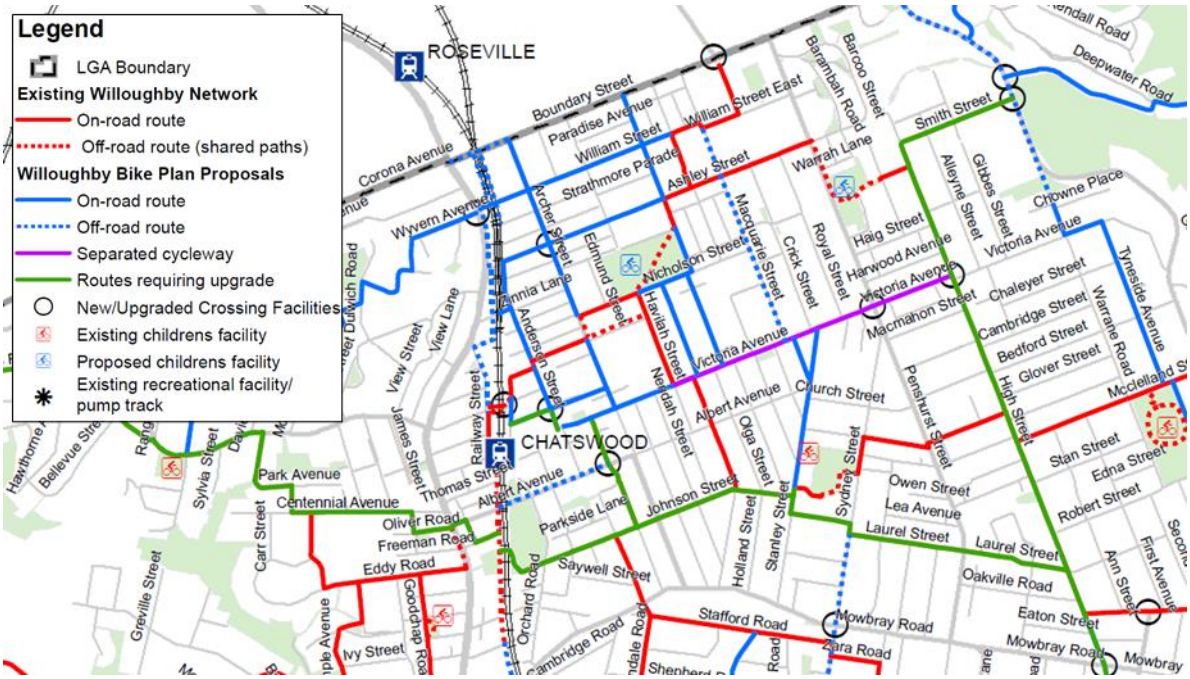
3.6. Walking and Cycling Infrastructure

Railway Street, Day Street and Pacific Highway provide a good level of pedestrian amenity, with provision for wide footpaths on Railway Street close to the site, consistent with pedestrian amenity throughout the commercial core. Pedestrian crossing points are provided at surrounding signalised intersections and ensure pedestrian paths of travel, especially between Chatswood Interchange and the commercial core are convenient and safe.

The site is relatively well serviced by surrounding cycling infrastructure. Railway Street has been marked as a potential road to be upgraded with an off-road cycle path likely in the form of a shared path. This would allow for connection to Frank Channon Walk to the south adjacent to the railway line, which connects with the broader cycling network through Willoughby and other surrounding suburbs. In the interim, the existing low speed environment characteristics of Railway Street are considered suitable for moderately experienced cyclists to connect with the existing surrounding cycling infrastructure network.

The existing and proposed cycling network from the Willoughby Bike Plan is shown in Figure 3.11.

Figure 3.11:Surrounding cycling network

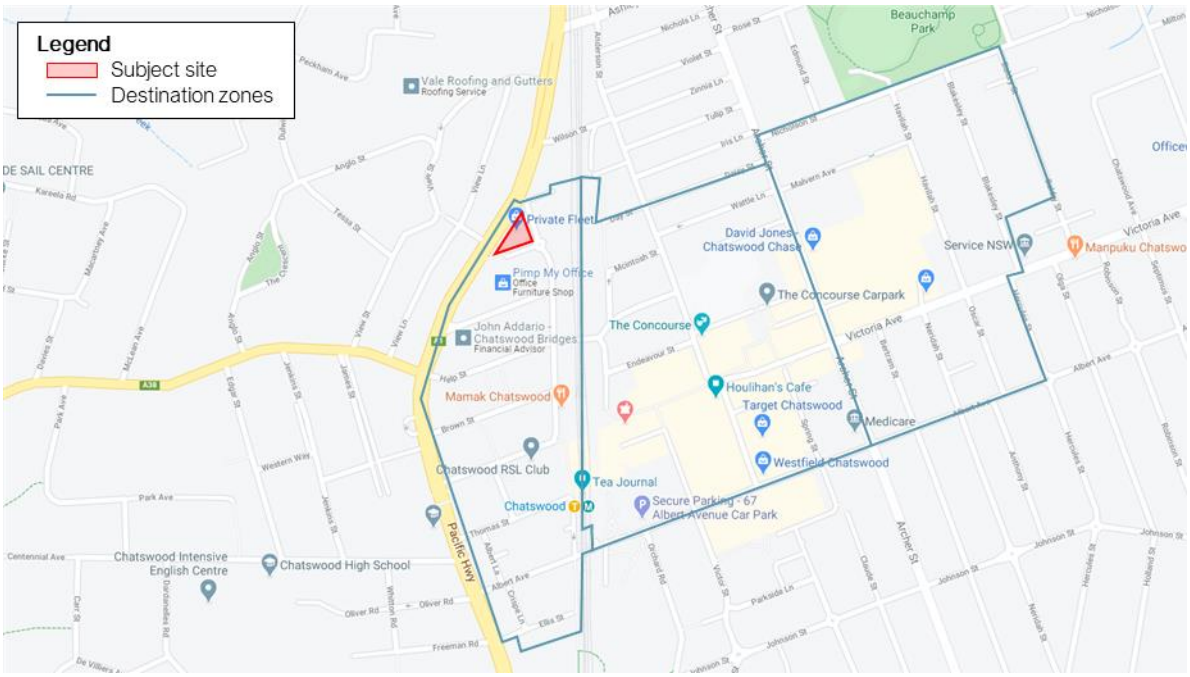


Source: www.willoughby.nsw.gov.au/your-neighbourhood, accessed April 2020

3.7. Existing Travel Behaviour

Journey to Work data has been sourced from the Australian Bureau of Statistics 2016 census and provides an indication of existing travel patterns from the local area. Figure 3.12 details the catchment of the census data analysed which corresponds to the Australian Bureau of Statistics 2016 Destination Zones (DZN).

Figure 3.12:2016 destination zones



Base image source: Google Maps

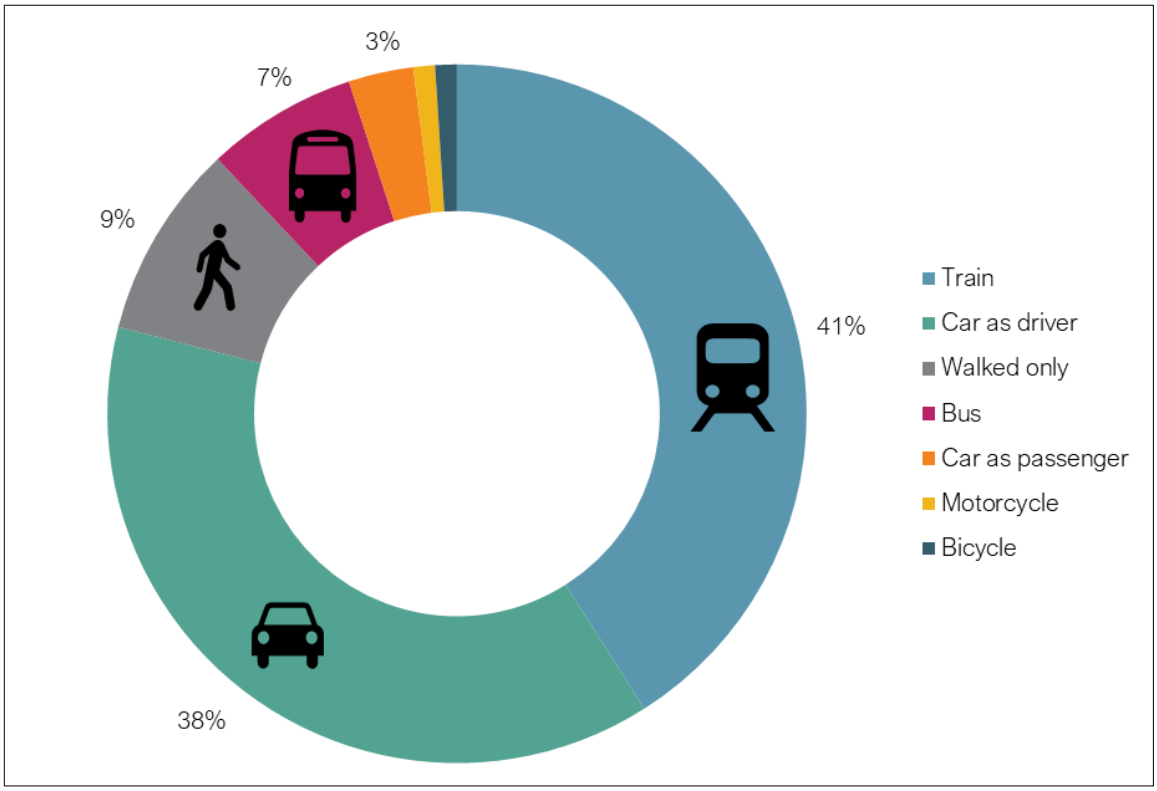
Table 3.3 and Figure 3.12 provide a summary of the existing modes of travel to work for the surrounding area. The results indicate that train travel and driving are the most common transport modes. Bus travel and active travel also feature.

Table 3.3: Existing primary mode of travel

Mode of Travel	Mode Share [1]
Train	41%
Car as driver	38%
Walked only	9%
Bus	7%
Car as passenger	3%
Motorcycle	1%
Bicycle	1%
Total	100%

[1] Does not include residents who worked at home or did not go to work.

Figure 3.13:Existing travel mode share

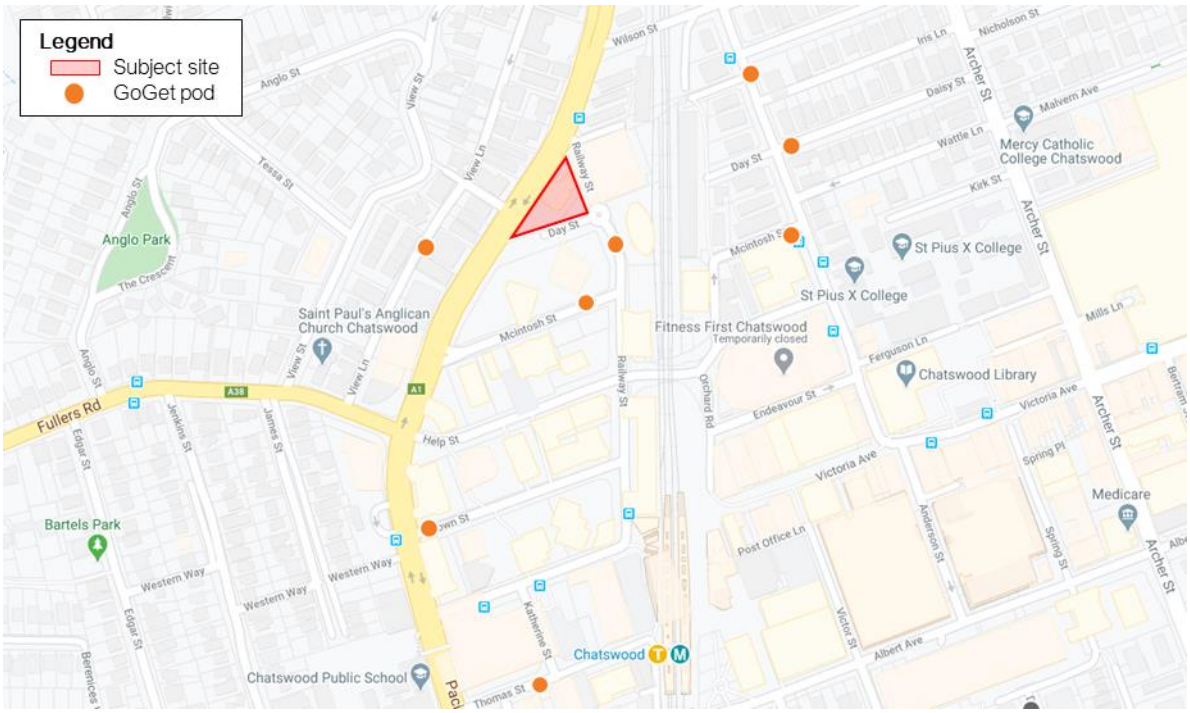


3.8. Local Car Share Initiatives

GoGet (along with other car share schemes) has become increasingly common throughout Sydney and is now recognised as a viable transport option for drivers throughout Sydney. They are now a well-utilised service especially in the inner suburbs due to limited parking availability and the expense involved in parking close to keys CBDs. GoGet offer a viable alternative to the private car for trips where distances are short and are likely to be used by future workers in the proposed commercial building.

GoGet car share pods located close to the site are shown in Figure 3.14, with the closest pods on Railway Street and Macintosh Street, as well as many in the Zenith Centre. These pods primarily serve the surround employment catchment area and encourage use for a variety of purposes.

Figure 3.14:Surrounding GoGet pod locations

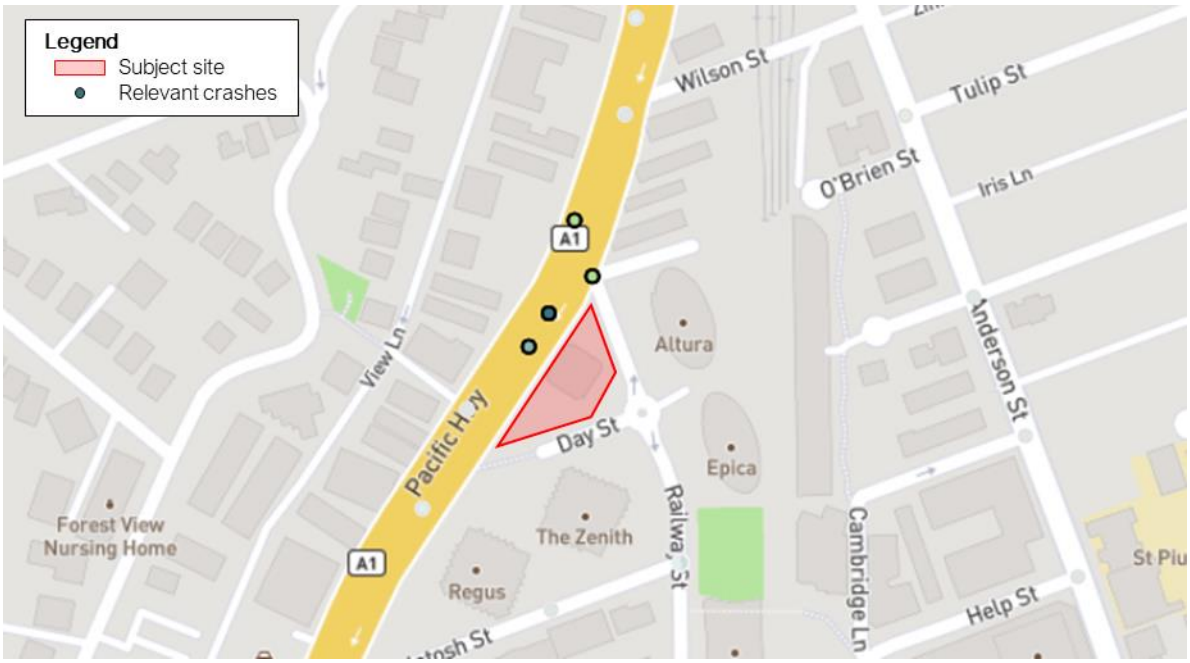


Base image source: GoGet, accessed April 2020

3.9. Crash History

An analysis the most recent five-year period of available crash data between 2014 and 2018 has been undertaken based on crash data obtained from the TfNSW Centre for Road Safety for the roads surrounding the site. The locations and severity of the crash data for the five-year period is shown in Figure 3.15.

Figure 3.15:TfNSW Centre for Road Safety historical crash data



A total of four crashes were recorded on the Pacific Highway close to Railway Street, including two non-casualty (tow-away) crashes, one moderate injury crash and one serious injury crash.

The above crashes are considered typical for high speed urban environments and considering the low frequency of crashes in the study area, the available crash data near the site does not indicate that there is an existing road safety issue in the area.

4. PLANNING PROPOSAL

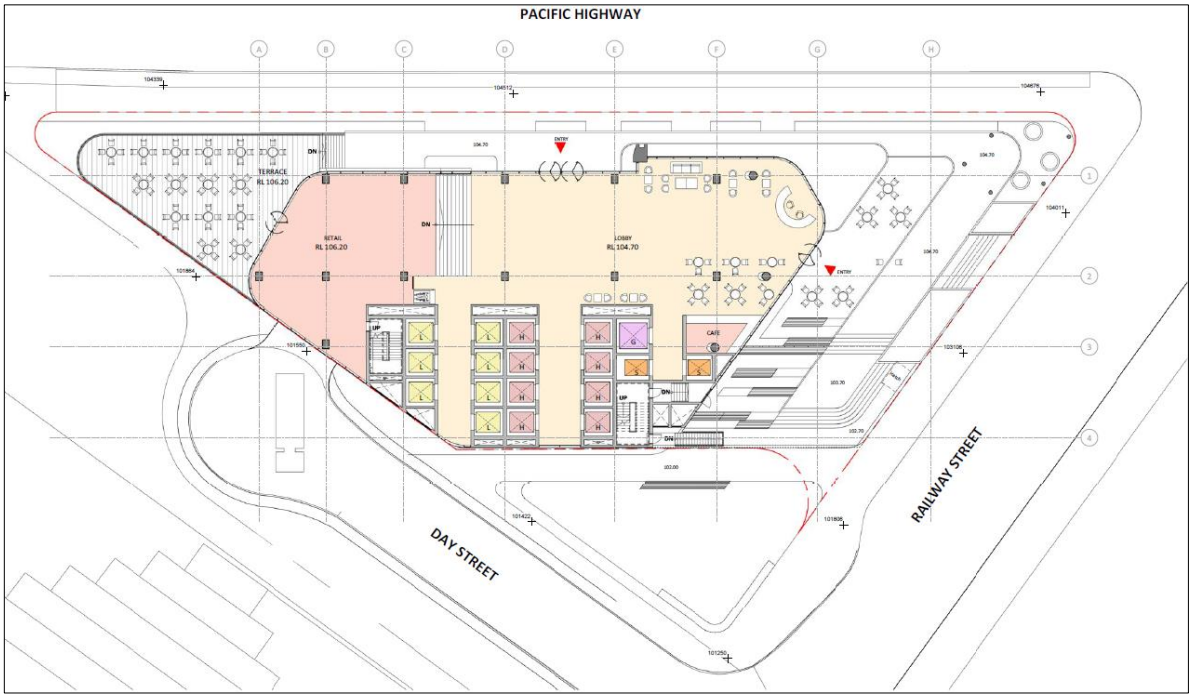
04

4.1. Overview

The planning proposal includes a commercial building covering around 41,330 square metres GFA over 37-levels. This includes around 39,940 square metres of commercial space and 480 square metres of ground level retail space, plus lobby area. The proposal seeks to expand on Council's vision to provide, maintain and improve the natural reserve on the north-western corner of the Railway Street/ Day Street intersection, with the podium set back from the road along the eastern boundary to enhance the public domain along Railway Street.

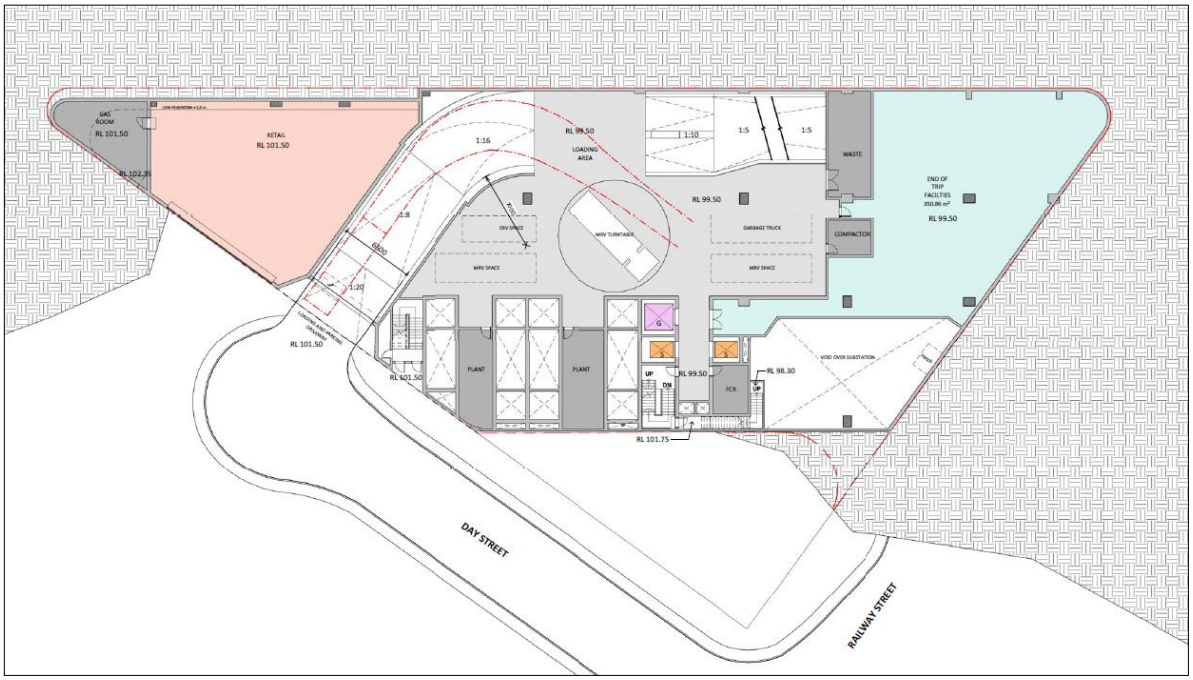
The indicative ground floor and basement 1 layouts are shown in Figure 4.1 and Figure 4.2 respectively.

Figure 4.1: Ground floor layout



Source: PTW, Drawing Number DA-10-1000, dated July 2021

Figure 4.2: Basement 1 layout



Source: PTW, Drawing Number DA-10-0900, dated July 2021

Vehicle access will be retained on Day Street via a two-way vehicular crossover located in a similar location to the existing site access driveway. Nine basement levels will be provided, with loading and end of trip facilities to be located on the upper level and the remaining basement levels accommodating around 260 car parking spaces. The loading area will be designed to allow for vehicles up to 8.8 metre medium rigid vehicles, with a turntable proposed to ensure all vehicles enter and exit the site in a forward direction. The combined site access reduces the Day Street crossovers from existing and ensures the desired public domain outcomes can be delivered in an area that will increasingly better cater for pedestrians.

Pedestrian access to the retail and lobby area is proposed on level one with primary frontages to Railway Street and Pacific Highway.

5. PARKING ASSESSMENT

05

5.1. Car Parking

The car parking requirements for different development types are set out in Willoughby Development Control Plan (WDCP). The subject site is within the Railway Precinct as it is located within 500 metres of Chatswood Station, as shown in Figure 5.1.

Figure 5.1: Chatswood Railway Precinct Map

Base image source: WDCP Attachment 7, accessed 30 April 2020

Part C.4 of WDCP specifies that office/ commercial uses within the Railway Precinct are required to provide off-street parking at a rate of one space per 110 square metres GFA. Based on the proposed 39,940 square metres GFA of commercial area, this results in a parking requirement of 363 spaces. The retail space is ancillary to the commercial building with no on-site public parking proposed.

The 363 space requirement is considered excessive given the proximity to frequent public transport services through Chatswood Interchange. Further, it is noted that WDCP provides a reduced rate of one space per 200 square metres GFA for sites located on land zoned as B3 under WLEP 2012, similar to the subject site, however where access is only available from Pacific Highway, Albert Avenue, Victoria Avenue, Help Street or Railway Street.

A review of the commercial/ office rates applicable for other employment centres in similar centres across Sydney has been completed and shown in Table 5.1.

Table 5.1: Comparison of relevant commercial/ office parking requirements

Location	Commercial office rate
Ryde (Macquarie Park Corridor)	1 space per 100m^2 (max.)
Parramatta CBD (incl. Parramatta Square)	1 space per 100m^2 (max.) [1]
Rhodes revised Draft Precinct Plan	1 space per 150m^2 (max.)
North Sydney CBD	1 space per 400m^2 (max.)
St Leonards (Zone B3 and B4)	1 space per 400m^2 (max.)
Sydney CBD (based on proposed FSR for the site)	1 space per 1,200m^2 (max.)

[1] Parramatta LEP also understood to be in the process of being revised to include a calculated rate, the same as City of Sydney for sites with an FSR greater than 3.5:1. For sites less than that, the applicable rate is one space per 175m^2.

Table 5.1 shows that the key employment centres across Sydney with similar characteristics to Chatswood apply maximum parking rates. These maximum parking rates generally range between one space per 100 square metres GFA to 400 square metres GFA. It is also understood that Council is aiming to adopt more aggressive parking rates for the Chatswood CBD B3 commercial core. For office uses, it is understood this could be a maximum of one space per 400 square metres GFA.

The architectural plans indicate that around 260 spaces could be provided across basement levels 2 to 9. This equates to a parking rate of around one space per 155 square metres GFA which is lower than the WDCP requirement currently applicable to the site and slightly higher than the WDCP requirement for sites located on land zoned as B3 with constrained access. Based on the above, the proposed parking provision is considered appropriate for a planning proposal in this location under the current controls and strikes a good balance between existing DCP rates and purposeful move towards more aggressive parking rates. Provision of on-site car share spaces and electric vehicle charging stations will also be assessed as part of any future development application.

A high level review of the car park layout against the requirements of the Australian Standard for Off Street Car Parking (AS/NZS2890.1:2004 and AS/NZS2890.6:2009) has been completed. Overall, the site access arrangements and car park layout (and vertical circulation) are expected to operate well. Pedestrian only areas are provided adjacent to stairwells with adequate sightlines to ensure appropriate use. The layout of the basement will be further developed as part of any future development application. A typical basement parking level is shown in Figure 5.2.

Figure 5.2: Typical basement car park layout

Source: PTW, Drawing Number DA-10-0600, dated July 2021

5.2. Motorcycle Parking

Motorcycle parking must be provided at a rate of one space per 25 car spaces. This would result in a requirement of 10 motorcycle spaces based on a parking provision of 260 spaces. The location of all motorcycle spaces will be detailed in any future development application.

5.3. Bicycle Parking

WDCP requires bicycle parking for commercial office uses be provided at a rate of one space per 600 square metres GFA for employees, and one space per 2,500 square metres GFA for visitors.

Based on the 39,940 square metres of commercial GFA, this equates to around 67 bicycle spaces for employees and 16 spaces for visitors. As discussed, the retail component of the site is considered ancillary to the commercial office space, however it is recommended that two staff bicycle spaces be provided in line with the WDCP rate of one space per 450 square metres for retail uses.

Employee bicycle parking would be in a secure end of trip facility in basement 1 with direct lift access to the ground level. Dedicated showers and lockers will be provided in accordance with relevant controls. Visitor bicycle parking would also be provided in the public domain space on ground level to encourage use. Appropriate bicycle parking provision will be agreed through consultation with Council and detailed in any future development application.

5.4. Loading and Servicing

WDCP requires all loading for commercial buildings to be on-site. For individual commercial tenancies, deliveries are typically by smaller service vehicles (including car, vans, utes etc.) except for tenancy turnover periods (move-in/ move-out activity) and delivery of large items. Deliveries are typically couriers, postal and day-to-day commercial business-related activity. All are generally infrequent. Based on similar developments, waste collection may be in the order of five trucks per week.

With consideration to the above, the development could generate up to five service vehicles per day that require access to the loading dock. Based on this, the proposed four loading bays would be sufficient to service the site. The proposed design allows for access for vehicles up to 8.8 metre medium rigid vehicles which is considered appropriate to account for removalist vehicles and private waste contractor vehicles, noting that it is expected that most deliveries would be via smaller service vehicles such as vans and utes.

As discussed, a single access driveway at the western end of Day Street is proposed to service both the loading dock and basement car park. This is considered acceptable and appropriate, noting the anticipated low frequency of deliveries throughout the day and the fact that most deliveries are expected to be by small trucks and vans/ utes. This is common for new developments in CBD locations across Sydney and supports the objectives outlined in WDCP to reduce driveway widths to improve public domain space and pedestrian amenity close to site accesses.

The proposed turntable internal to the loading dock would ensure that all service vehicles enter and exit the loading dock (and the site) in a forward direction. Other measures such as convex mirrors and flashing warning lights can also be implemented to support the operation of the loading dock and basement generally.

6. TRAFFIC IMPACT ASSESSMENT

06

6.1. Traffic Generation

6.1.1. Existing Uses

The site is currently occupied by a commercial building and separate car wash. The small basement car park with access via Day Street is in a similar location to the proposed driveway. A separate crossover to a garbage room is located east of this driveway. The car wash is afforded access via the Pacific Highway. It is estimated that the existing site generates up to 10 trips during weekday peak hours.

6.1.2. Proposed Uses

Traffic generation rates for the proposal have been sourced from the TfNSW Guide 2002 and TDT 2013/ 04a. Given the low parking provision, traffic generation is best linked to parking supply rather than GFA. A review of the traffic generation rates for commercial developments in Sydney referenced in the TDT 2013/ 04a indicates an average traffic generation rate of 0.49 and 0.33 trips per space during the AM and PM peak hours, respectively.

Considering the proposed 260 basement spaces, the proposal would generate around 130 trips in the AM peak hour and 85 trips in the PM peak hour.

With consideration to the existing traffic generation of the site, the proposal would generate a net increase of around 120 trips in the AM peak hour and 75 trips in the PM peak hour.

6.2. Traffic Distribution

The directional distribution and assignment of traffic generated by the proposed development will be influenced by a number of factors, including the:

- configuration of the arterial road network in the immediate vicinity of the site
- existing operation of intersections providing access between the local and arterial road network
- distribution of households in the vicinity of the site
- likely distribution of employee residences in relation to the site
- configuration of access points to the site.

Having consideration to the above, it is estimated that most of the traffic generated by the proposal would travel to/ from the north and south along the Pacific Highway, with a smaller proportion travelling to/ from the west via Fullers Road (to connect with M2) and the east (through Chatswood CBD).

As discussed, traffic suing the Pacific Highway would mostly use Railway Street to access the site, with those using Fullers Road expected to largely use Fullers Road, Help Street and Railway Street (and Pacific Highway/ Railway Street) to access the site.

Considering the above, Figure 6.1 and Figure 6.2 sets out the anticipated post development traffic volumes at the key survey intersections in the weekday AM and PM peak hours.

Figure 6.1: Future AM peak hour traffic volumes with development traffic

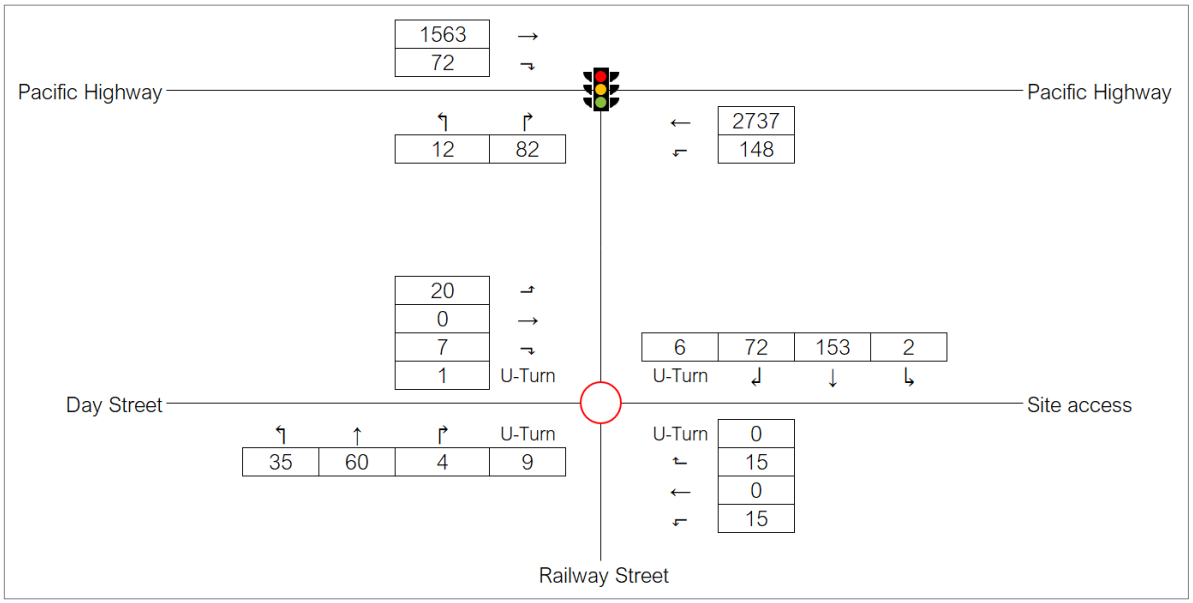
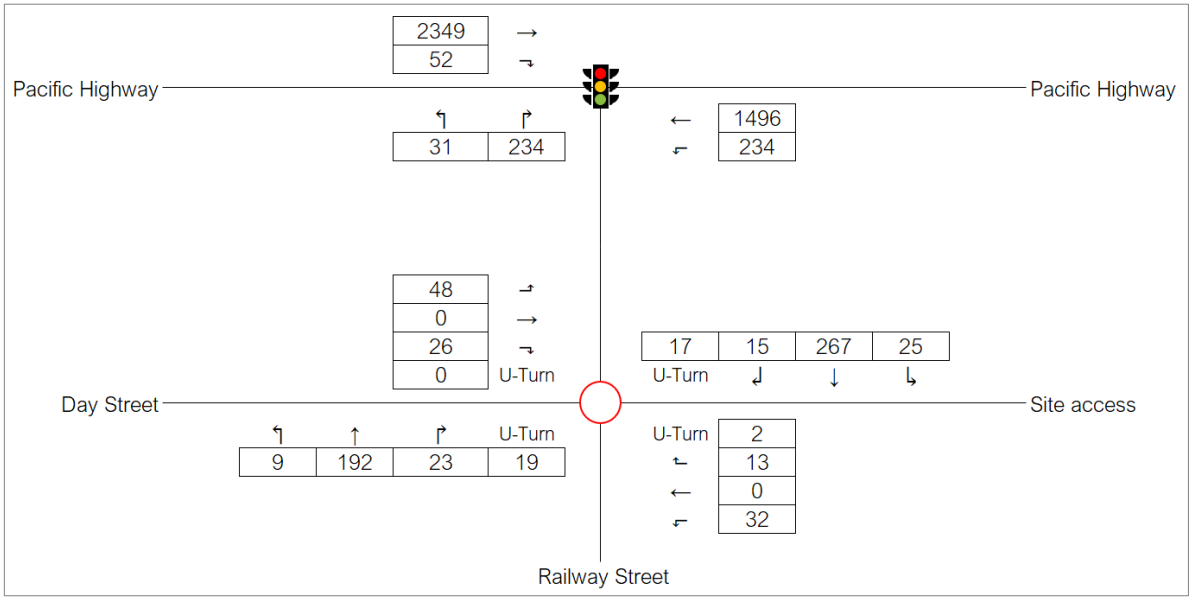


Figure 6.2: Future PM peak hour traffic volumes with development traffic



6.3. Traffic Impact

The key survey intersections have been assessed in SIDRA to include the additional traffic generated by the proposal, with a summary of the anticipated intersection operation included in Table 6.1.

Table 6.1: Post development intersection operation

Intersection	Peak	Leg	Degree of saturation (DOS)	Average delay (sec)	Average queue (m)	Level of service (LOS)
Pacific Highway/ Railway Street	AM	South	0.21	66	15	E
		Northeast	0.92	22	344	B
		Southwest	0.65	10	133	A
		Overall	**0.92**	**19**	**344**	**B**
	PM	South	0.57	70	44	E
		Northeast	0.50	7	85	A
		Southwest	0.93	18	361	B
		Overall	**0.93**	**17**	**361**	**B**
Railway Street/ Day Street	AM	South	0.10	8	1	A
		East	0.03	9	1	A
		North	0.18	7	3	A
		West	0.03	8	1	A
	PM	South	0.24	8	3	A
		East	0.05	10	1	A
		North	0.28	7	5	A
		West	0.09	9	1	A

Table 6.1 demonstrates both key intersections are expected to operate satisfactorily with the additional traffic generated by the proposal, with minor increases to average delay and queues at both intersections. The operation of the Pacific Highway/ Railway Street intersection could reduce slightly (from LOS A to LOS B), however this is mostly due to only a minor increase in delay, with the existing intersection already operating close to LOS B.

Traffic generated by the proposal could also have a minor impact on other key intersections in and around Chatswood CBD. This includes the Pacific Highway/ Victoria Avenue intersection where a slight increase in right turns (in the order of 10 in any peak hour) could eventuate.

While it is noted that there is an existing level of congestion throughout and around Chatswood CBD (as is common in key centres across Sydney), the above traffic assessment confirms that the potential net increase of between 75 and 120 trips in any peak hour is not expected to have a material impact on the surrounding road network. This particularly reflects the site location adjacent to the Pacific Highway which would allow for efficient access and limited impacts on Chatswood CBD generally. The proposed quantum of parking would also naturally limit the extent of traffic impact and promote the use of active travel and public transport.

Based on the above, the additional traffic generated by the proposal is expected to have a minor impact on the surrounding road network and can be supported from a traffic and transport perspective.

7. OVERVIEW GREEN TRAVEL PLAN

07

7.1. Introduction

7.1.1. Travel Plan Framework

Transport is a necessary part of life, but it has economic, public health and environmental consequences. The transport sector is one of the fastest growing emissions sectors in Australia, and therefore is one of the key opportunities for reducing greenhouse gases. As well as delivering better environmental outcomes, providing a range of travel choices with a focus on walking, cycling and public transport will have major public health benefits and ensure a strong and prosperous community.

The physical infrastructure envisaged as part of the proposal is a significant positive though is only part of the solution. A green travel plan (GTP) will ensure that the transport infrastructure, services and policies both internal and external to the site are tailored to the users and co-ordinated to achieve the most sustainable outcome possible.

7.1.2. What is a GTP

A GTP is a package of measures aimed at promoting sustainable travel and reducing reliance on the private car. It is not designed to be 'anti-car' however will encourage and support people's aspirations for carrying out their daily business in a more sustainable way. Travel plans can provide both:

- measures which restrict car use (disincentives or 'sticks')
- measures which encourage or support sustainable travel, reduce the need to travel or make travelling more efficient (incentives or 'carrots').

The travel plan would promote the use of transport other than the private car, provide choice for staff to travel to and from the site, which is more sustainable and environmentally friendly.

Indeed, there are a range of 'non-car' transport options that are available at the site which have been described in this report. Given the proposal aims to reduce private car travel to the site, the implementation of a GTP would be beneficial.

7.2. Key Objectives

The aim of the GTP is to bring about better transport arrangements for working at the site. The key objectives of the travel plan are:

- to encourage walking
- to encourage cycling
- to encourage the use of public transport
- to reduce the use of private cars (particularly single car occupancy)
- where it is necessary to use the car, encourage more efficient use.

It is the intention therefore that the travel plan will deliver the following benefits:

- enable higher public and active travel mode share targets to be achieved
- contribute to greenhouse gas emission reductions and carbon footprint minimisation
- contribute to healthy living for all
- contribute to social equity and reduction in social exclusion
- improve knowledge and contribute to learning.

7.3. Site Specific Measures

The location of the site, in terms of its proximity to a wide range of sustainable transport options including Chatswood Interchange which provides frequent heavy rail, metro and bus services, is a key consideration for development in the precinct. A GTP will put in place measures to raise awareness and further influence the travel patterns of people travelling to/ from the site with a view to encouraging modal shift away from cars.

The following potential measures and initiatives could be implemented to encourage more sustainable travel modes:

- Limiting on-site parking provision.
- Provide a Travel Access Guide (TAG) which would be provided to all staff and publicly available to visitors. The document would be based on facilities available at the site and include detail on the surrounding public transport services and active transport initiatives. The TAG would be updated as the surrounding transport environment changes.
- Providing public transport information boards/ apps to inform staff and visitors of alternative transport options (the format of such information boards would be based upon the TAG).
- Providing on-site (or nearby) car sharing pods and promoting the availability of car sharing pods for trips that require the use of private vehicles.
- Providing bicycle facilities including secure bicycle parking for staff, bicycle racks/ rails for visitors and shower and change room facilities.
- Encouraging staff that drive to work and park on surrounding roads to carpool through creation of a carpooling club or registry/ forum.
- Regularly promoting ride/ walk to work days.
- Providing a regular (digital) newsletter to staff bringing the latest news on sustainable travel initiatives in the area.

7.3.1. Travel Access Guide

A TAG provides information to staff and visitors on how to travel to the site using sustainable transport modes such as walking and public transport. The information is presented visually in the format of a map (or app) showing the site location and nearby transport modes highlighting available pedestrian and cycle routes. The information is usually presented as a brochure (or app) to be included in a welcome pack or on the back of company stationery and business cards.

7.3.2. Information and Communication

Several opportunities exist to provide staff and visitors with information about nearby transport options. Connecting staff and visitors with information would help to facilitate journey planning and increase their awareness of convenient and inexpensive transport options which support change in travel behaviour. These include:

- Transport NSW provides bus, train and ferry routes, timetables and journey planning through their Transport Info website: http://www.transportnsw.info.
- Council provides a number of services and a range of information and events to encourage people of all levels of experience to travel by bicycle: http://www.willoughby.nsw.gov.au/your-neighbourhood/parking-roads--transport/cycling/.

In addition, connecting staff and visitors via social media may provide a platform to informally pilot new programs or create travel-buddy networks and communication.

7.3.3. Monitoring of the GTP

There is no standard methodology for monitoring the GTP, but it is suggested that it be monitored to ensure that it is achieving the desired benefits and modify it if required. It will not be possible at this stage to state what additional modifications might be made as this will be dependent upon the particular circumstances prevailing at that time.

The GTP should be monitored on a regular basis, e.g. yearly, by carrying out travel surveys. Travel surveys will allow the most effective initiatives of the GTP to be identified, and conversely less effective initiatives can be modified or replaced to ensure the best outcomes are achieved. It will clearly be important to understand people's reasons for travelling the way they do: - any barriers to changing their behaviour, and their propensity to change.

To ensure the successful implementation of the GTP, a Travel Plan Coordinator (TPC) should be appointed to ensure the successful implementation of the GTP. This could be the building manager.

7.4. Summary

The proposal would be able to develop and utilise a travel plan to actively promote increased use of sustainable transport modes. Although it is difficult to predict what measures might be achievable, the above measures provide a framework for the site and implementation of a future travel plan.

8. CONCLUSION

08

CONCLUSION

Based on the analysis and discussions presented within this report, the following conclusions are made:

1. A Planning Proposal is to be lodged for the site at 845 Pacific Highway, Chatswood for a commercial tower comprising around 41,330 square metres GFA over 36 levels. This includes 39,940 square metres of commercial space, 480 square metres of ancillary ground level retail space, plus lobby area.
2. The proposal seeks to expand on Council's vision to provide, maintain and improve the natural reserve on the north-western corner of the Railway Street/ Day Street intersection, with the podium set back from Railway Street along the eastern boundary to enhance the public domain (and tie in with the existing pocket park).
3. Current planning controls for the site result in a car parking requirement of around 363 spaces for the proposal. These applicable rates are considered high and do not take into consideration the significant improvements in public transport provision at Chatswood Interchange over many years.
4. The proposal seeks to reduce the on-site parking provision to be more aligned with the objectives of the Chatswood CBD Planning and Urban Design Strategy to 2036. In total, about 260 spaces are proposed in the basement car park.
5. The proposed parking provision equates to a parking rate of around one space per 155 square metres and considered appropriate given the level of public transport accessibility and commercial office parking rates in other relevant CBDs across Sydney.
6. The proposed parking layout is generally consistent with the dimensional requirements as set out in the Australian/New Zealand Standard for Off Street Car Parking (AS/NZS2890.1:2004 and AS/NZS2890.6:2009) and would be developed further as part of any future development application.
7. High quality end-of-trip facilities will be provided including secure bicycle parking for employees and visitors to encourage a mode shift towards more sustainable travel modes. Such details would be further developed as part of any future development application.
8. All loading and servicing would occur on-site and within the dedicated loading dock on basement 1. The site can support access by all vehicles up to 8.8 metre medium rigid vehicles with a turntable to ensure all vehicles enter and exit the site (and loading dock) in a forward direction.
9. The proposal is expected to generate a net increase of approximately 120 vehicle trips in the AM peak hour and 75 trips in the PM peak hour, with the proposed reduced parking provision from current planning controls to have a significant impact on reducing the net traffic generation of the site.
10. It is noted that there is an existing level of traffic congestion in the area, as is common for key strategic centres across Sydney, with the anticipated increase in traffic expected to have a minor impact on the surrounding road network.
11. The proposal is considered in-line with the objectives of the Chatswood CBD Planning and Urban Design Strategy and can be supported from a transport perspective.

A.SIDRA RESULTS

A

USER REPORT FOR NETWORK SITE

Project: 200622sid-N191340 Pacific Highway, Chatswood **Template: Movement Summary**

Site: 1 [1 Pacific Hwy/ Railway St AM Ex] Network: 6 [AM Existing]

Site Category: -
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway St														
1b	L3	5	0.0	5	0.0	0.168	66.8	LOS E	1.6	11.6	0.92	0.72	0.92	14.7
3a	R1	76	5.6	76	5.6	0.168	65.1	LOS E	1.7	12.2	0.92	0.72	0.92	13.2
Approach		81	5.2	81	5.2	0.168	65.2	LOS E	1.7	12.2	0.92	0.72	0.92	13.3
NorthEast: Pacific Hwy														
24a	L1	116	1.8	116	1.8	0.887	22.6	LOS B	39.9	285.7	0.83	0.80	0.83	28.1
8	T1	2881	2.9	2881	2.9	0.887	16.2	LOS B	41.3	295.9	0.77	0.73	0.77	40.4
Approach		2997	2.8	2997	2.8	0.887	16.5	LOS B	41.3	295.9	0.77	0.73	0.77	40.1
SouthWest: Pacific Hwy														
2	T1	1645	7.8	1645	7.8	0.639	6.6	LOS A	17.5	130.7	0.43	0.40	0.43	50.2
32b	R3	48	30.4	48	30.4	0.471	65.4	LOS E	2.2	19.8	0.99	0.83	0.99	13.7
Approach		1694	8.5	1694	8.5	0.639	8.3	LOS A	17.5	130.7	0.44	0.41	0.44	48.1
All Vehicles		4772	4.9	4772	4.9	0.887	14.4	LOS A	41.3	295.9	0.66	0.62	0.66	41.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site Category: -
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway St														
1	L2	5	0.0	5	0.0	0.066	3.3	LOS A	0.1	0.8	0.10	0.40	0.10	30.2
2	T1	63	6.7	63	6.7	0.066	2.5	LOS A	0.1	0.8	0.10	0.40	0.10	32.2
3	R2	4	0.0	4	0.0	0.066	7.9	LOS A	0.1	0.8	0.10	0.40	0.10	25.9
3u	U	9	0.0	9	0.0	0.066	6.9	LOS A	0.1	0.8	0.10	0.40	0.10	38.7
Approach		82	5.1	82	5.1	0.066	3.3	LOS A	0.1	0.8	0.10	0.40	0.10	32.7
East: Site access														
4	L2	16	0.0	16	0.0	0.028	2.6	LOS A	0.1	0.5	0.34	0.47	0.34	32.8
5	T1	1	0.0	1	0.0	0.028	2.8	LOS A	0.1	0.5	0.34	0.47	0.34	16.4
6	R2	16	0.0	16	0.0	0.028	6.1	LOS A	0.1	0.5	0.34	0.47	0.34	22.1
6u	U	1	0.0	1	0.0	0.028	8.4	LOS A	0.1	0.5	0.34	0.47	0.34	15.8
Approach		34	0.0	34	0.0	0.028	4.5	LOS A	0.1	0.5	0.34	0.47	0.34	28.2
North: Railway St														
7	L2	2	0.0	2	0.0	0.131	3.9	LOS A	0.3	1.9	0.07	0.31	0.07	21.3
8	T1	161	11.1	161	11.1	0.131	2.2	LOS A	0.3	1.9	0.07	0.31	0.07	37.9
9	R2	8	0.0	8	0.0	0.131	5.5	LOS A	0.3	1.9	0.07	0.31	0.07	21.1
9u	U	6	0.0	6	0.0	0.131	6.8	LOS A	0.3	1.9	0.07	0.31	0.07	29.4
Approach		178	10.1	178	10.1	0.131	2.5	LOS A	0.3	1.9	0.07	0.31	0.07	36.7
West: Day St														
10	L2	4	0.0	4	0.0	0.006	2.8	LOS A	0.0	0.1	0.24	0.46	0.24	23.6
11	T1	1	0.0	1	0.0	0.006	3.2	LOS A	0.0	0.1	0.24	0.46	0.24	18.9
12	R2	1	0.0	1	0.0	0.006	5.7	LOS A	0.0	0.1	0.24	0.46	0.24	35.9
12u	U	1	0.0	1	0.0	0.006	8.0	LOS A	0.0	0.1	0.24	0.46	0.24	23.4
Approach		7	0.0	7	0.0	0.006	4.0	LOS A	0.0	0.1	0.24	0.46	0.24	25.2
All Vehicles		301	7.3	301	7.3	0.131	3.0	LOS A	0.3	1.9	0.11	0.36	0.11	34.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

Project: 200622sid-N191340 Pacific Highway, Chatswood **Template: Movement Summary**

Site: 1 [1 Pacific Hwy/ Railway St PM Ex] **Network: 7 [PM Existing]**

Site Category: -
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway St														
1b	L3	14	0.0	14	0.0	0.496	71.1	LOS F	4.9	34.4	0.98	0.79	0.98	14.1
3a	R1	220	1.0	220	1.0	0.496	69.4	LOS E	5.1	35.8	0.98	0.79	0.98	12.7
Approach		234	0.9	234	0.9	0.496	69.5	LOS E	5.1	35.8	0.98	0.79	0.98	12.8
NorthEast: Pacific Hwy														
24a	L1	240	1.3	240	1.3	0.489	11.0	LOS A	11.1	78.9	0.38	0.47	0.38	40.4
8	T1	1575	2.5	1575	2.5	0.489	6.0	LOS A	11.5	82.5	0.37	0.37	0.37	50.3
Approach		1815	2.3	1815	2.3	0.489	6.7	LOS A	11.5	82.5	0.37	0.39	0.37	49.5
SouthWest: Pacific Hwy														
2	T1	2473	1.2	2473	1.2	0.917	13.1	LOS A	45.5	321.8	0.62	0.61	0.65	43.2
32b	R3	49	27.7	49	27.7	0.403	18.8	LOS B	1.1	9.5	0.52	0.74	0.52	30.6
Approach		2522	1.8	2522	1.8	0.917	13.2	LOS A	45.5	321.8	0.61	0.62	0.65	43.0
All Vehicles		4571	1.9	4571	1.9	0.917	13.5	LOS A	45.5	321.8	0.54	0.53	0.55	42.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site Category: -
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway St														
1	L2	5	0.0	5	0.0	0.191	3.3	LOS A	0.4	2.7	0.13	0.40	0.13	30.3
2	T1	202	1.0	202	1.0	0.191	2.5	LOS A	0.4	2.7	0.13	0.40	0.13	32.4
3	R2	24	0.0	24	0.0	0.191	7.9	LOS A	0.4	2.7	0.13	0.40	0.13	25.9
3u	U	20	0.0	20	0.0	0.191	7.0	LOS A	0.4	2.7	0.13	0.40	0.13	38.9
Approach		252	0.8	252	0.8	0.191	3.4	LOS A	0.4	2.7	0.13	0.40	0.13	32.2
East: Site access														
4	L2	34	0.0	34	0.0	0.047	3.5	LOS A	0.1	0.8	0.47	0.49	0.47	32.7
5	T1	1	0.0	1	0.0	0.047	3.6	LOS A	0.1	0.8	0.47	0.49	0.47	16.0
6	R2	14	0.0	14	0.0	0.047	7.0	LOS A	0.1	0.8	0.47	0.49	0.47	21.5
6u	U	2	0.0	2	0.0	0.047	9.3	LOS A	0.1	0.8	0.47	0.49	0.47	15.4
Approach		51	0.0	51	0.0	0.047	4.7	LOS A	0.1	0.8	0.47	0.49	0.47	29.7
North: Railway St														
7	L2	26	0.0	26	0.0	0.255	4.1	LOS A	0.6	4.2	0.16	0.34	0.16	20.9
8	T1	281	6.0	281	6.0	0.255	2.4	LOS A	0.6	4.2	0.16	0.34	0.16	37.3
9	R2	5	0.0	5	0.0	0.255	5.8	LOS A	0.6	4.2	0.16	0.34	0.16	20.7
9u	U	18	0.0	18	0.0	0.255	7.1	LOS A	0.6	4.2	0.16	0.34	0.16	28.3
Approach		331	5.1	331	5.1	0.255	2.8	LOS A	0.6	4.2	0.16	0.34	0.16	35.4
West: Day St														
10	L2	6	0.0	6	0.0	0.016	3.8	LOS A	0.0	0.3	0.42	0.51	0.42	20.7
11	T1	1	0.0	1	0.0	0.016	4.2	LOS A	0.0	0.3	0.42	0.51	0.42	17.8
12	R2	8	0.0	8	0.0	0.016	6.7	LOS A	0.0	0.3	0.42	0.51	0.42	33.3
12u	U	1	0.0	1	0.0	0.016	9.0	LOS A	0.0	0.3	0.42	0.51	0.42	21.6
Approach		17	0.0	17	0.0	0.016	5.6	LOS A	0.0	0.3	0.42	0.51	0.42	28.4
All Vehicles		649	2.9	649	2.9	0.255	3.3	LOS A	0.6	4.2	0.18	0.38	0.18	33.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

Project: 200622sid-N191340 Pacific Highway, Chatswood **Template: Movement Summary**

Site: 1 [1 Pacific Hwy/ Railway St AM Fut] Network: 8 [AM Future]

Site Category: -
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway St														
1b	L3	13	0.0	13	0.0	0.209	67.3	LOS E	1.9	13.9	0.93	0.74	0.93	14.7
3a	R1	86	4.9	86	4.9	0.209	65.5	LOS E	2.1	15.2	0.93	0.73	0.93	13.1
Approach		99	4.3	99	4.3	0.209	65.8	LOS E	2.1	15.2	0.93	0.73	0.93	13.3
NorthEast: Pacific Hwy														
24a	L1	156	1.4	156	1.4	0.916	29.7	LOS C	46.4	332.3	0.89	0.88	0.92	23.1
8	T1	2881	2.9	2881	2.9	0.916	22.0	LOS B	47.9	343.9	0.82	0.79	0.84	36.2
Approach		3037	2.8	3037	2.8	0.916	22.4	LOS B	47.9	343.9	0.82	0.80	0.85	35.7
SouthWest: Pacific Hwy														
2	T1	1645	7.8	1645	7.8	0.645	6.6	LOS A	17.8	132.8	0.43	0.40	0.43	50.2
32b	R3	76	19.4	76	19.4	0.597	76.3	LOS F	3.6	29.3	1.00	0.91	1.28	12.1
Approach		1721	8.3	1721	8.3	0.645	9.7	LOS A	17.8	132.8	0.46	0.42	0.47	46.5
All Vehicles		4857	4.8	4857	4.8	0.916	18.8	LOS B	47.9	343.9	0.69	0.66	0.71	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site Category: -
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway St														
1	L2	37	0.0	37	0.0	0.100	3.7	LOS A	0.2	1.4	0.19	0.42	0.19	29.5
2	T1	63	6.7	63	6.7	0.100	2.9	LOS A	0.2	1.4	0.19	0.42	0.19	31.3
3	R2	4	0.0	4	0.0	0.100	8.3	LOS A	0.2	1.4	0.19	0.42	0.19	25.3
3u	U	9	0.0	9	0.0	0.100	7.3	LOS A	0.2	1.4	0.19	0.42	0.19	38.1
Approach		114	3.7	114	3.7	0.100	3.7	LOS A	0.2	1.4	0.19	0.42	0.19	31.1
East: Site access														
4	L2	16	0.0	16	0.0	0.030	3.0	LOS A	0.1	0.5	0.41	0.49	0.41	32.3
5	T1	1	0.0	1	0.0	0.030	3.2	LOS A	0.1	0.5	0.41	0.49	0.41	16.2
6	R2	16	0.0	16	0.0	0.030	6.5	LOS A	0.1	0.5	0.41	0.49	0.41	21.5
6u	U	1	0.0	1	0.0	0.030	8.8	LOS A	0.1	0.5	0.41	0.49	0.41	15.6
Approach		34	0.0	34	0.0	0.030	4.8	LOS A	0.1	0.5	0.41	0.49	0.41	27.7
North: Railway St														
7	L2	2	0.0	2	0.0	0.179	3.9	LOS A	0.4	2.6	0.09	0.40	0.09	20.5
8	T1	161	11.1	161	11.1	0.179	2.2	LOS A	0.4	2.6	0.09	0.40	0.09	36.3
9	R2	76	0.0	76	0.0	0.179	5.6	LOS A	0.4	2.6	0.09	0.40	0.09	20.3
9u	U	6	0.0	6	0.0	0.179	6.9	LOS A	0.4	2.6	0.09	0.40	0.09	27.1
Approach		245	7.3	245	7.3	0.179	3.4	LOS A	0.4	2.6	0.09	0.40	0.09	31.0
West: Day St														
10	L2	21	0.0	21	0.0	0.026	2.8	LOS A	0.1	0.4	0.25	0.45	0.25	22.8
11	T1	1	0.0	1	0.0	0.026	3.3	LOS A	0.1	0.4	0.25	0.45	0.25	18.5
12	R2	7	0.0	7	0.0	0.026	5.7	LOS A	0.1	0.4	0.25	0.45	0.25	35.5
12u	U	1	0.0	1	0.0	0.026	8.0	LOS A	0.1	0.4	0.25	0.45	0.25	23.0
Approach		31	0.0	31	0.0	0.026	3.7	LOS A	0.1	0.4	0.25	0.45	0.25	27.5
All Vehicles		423	5.2	423	5.2	0.179	3.6	LOS A	0.4	2.6	0.15	0.42	0.15	30.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

Project: 200622sid-N191340 Pacific Highway, Chatswood **Template: Movement Summary**

Site: 1 [1 Pacific Hwy/ Railway St PM Fut] Network: 9 [PM Future]

Site Category: -
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway St														
1b	L3	33	0.0	33	0.0	0.573	71.1	LOS F	5.7	40.5	0.99	0.80	0.99	14.1
3a	R1	246	0.9	246	0.9	0.573	69.3	LOS E	6.2	43.8	0.99	0.80	0.99	12.7
Approach		279	0.8	279	0.8	0.573	69.5	LOS E	6.2	43.8	0.99	0.80	0.99	12.9
NorthEast: Pacific Hwy														
24a	L1	246	1.3	246	1.3	0.495	11.4	LOS A	11.5	81.8	0.39	0.48	0.39	39.7
8	T1	1575	2.5	1575	2.5	0.495	6.4	LOS A	11.9	85.4	0.38	0.38	0.38	49.9
Approach		1821	2.3	1821	2.3	0.495	7.1	LOS A	11.9	85.4	0.38	0.40	0.38	49.0
SouthWest: Pacific Hwy														
2	T1	2473	1.2	2473	1.2	0.933	18.1	LOS B	51.0	360.9	0.66	0.67	0.71	39.1
32b	R3	55	25.0	55	25.0	0.441	20.4	LOS B	1.3	11.1	0.56	0.75	0.56	29.4
Approach		2527	1.7	2527	1.7	0.933	18.1	LOS B	51.0	360.9	0.65	0.67	0.71	39.0
All Vehicles		4627	1.9	4627	1.9	0.933	16.9	LOS B	51.0	360.9	0.57	0.57	0.60	39.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site Category: -
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway St														
1	L2	9	0.0	9	0.0	0.236	3.4	LOS A	0.4	2.8	0.14	0.40	0.14	30.2
2	T1	202	1.0	202	1.0	0.236	2.6	LOS A	0.4	2.8	0.14	0.40	0.14	32.3
3	R2	24	0.0	24	0.0	0.236	8.0	LOS A	0.4	2.8	0.14	0.40	0.14	25.9
3u	U	20	0.0	20	0.0	0.236	7.0	LOS A	0.4	2.8	0.14	0.40	0.14	38.8
Approach		256	0.8	256	0.8	0.236	3.5	LOS A	0.4	2.8	0.14	0.40	0.14	32.0
East: Site access														
4	L2	34	0.0	34	0.0	0.051	3.6	LOS A	0.1	0.9	0.50	0.50	0.50	32.4
5	T1	1	0.0	1	0.0	0.051	3.8	LOS A	0.1	0.9	0.50	0.50	0.50	15.9
6	R2	14	0.0	14	0.0	0.051	7.2	LOS A	0.1	0.9	0.50	0.50	0.50	21.2
6u	U	2	0.0	2	0.0	0.051	9.5	LOS A	0.1	0.9	0.50	0.50	0.50	15.3
Approach		51	0.0	51	0.0	0.051	4.8	LOS A	0.1	0.9	0.50	0.50	0.50	29.4
North: Railway St														
7	L2	26	0.0	26	0.0	0.277	4.3	LOS A	0.6	4.5	0.19	0.36	0.19	20.6
8	T1	281	6.0	281	6.0	0.277	2.5	LOS A	0.6	4.5	0.19	0.36	0.19	36.8
9	R2	16	0.0	16	0.0	0.277	5.9	LOS A	0.6	4.5	0.19	0.36	0.19	20.4
9u	U	18	0.0	18	0.0	0.277	7.2	LOS A	0.6	4.5	0.19	0.36	0.19	27.7
Approach		341	4.9	341	4.9	0.277	3.1	LOS A	0.6	4.5	0.19	0.36	0.19	34.5
West: Day St														
10	L2	51	0.0	51	0.0	0.090	3.9	LOS A	0.2	1.3	0.44	0.52	0.44	20.6
11	T1	1	0.0	1	0.0	0.090	4.4	LOS A	0.2	1.3	0.44	0.52	0.44	17.6
12	R2	27	0.0	27	0.0	0.090	6.8	LOS A	0.2	1.3	0.44	0.52	0.44	33.8
12u	U	1	0.0	1	0.0	0.090	9.1	LOS A	0.2	1.3	0.44	0.52	0.44	21.6
Approach		80	0.0	80	0.0	0.090	5.0	LOS A	0.2	1.3	0.44	0.52	0.44	27.2
All Vehicles		727	2.6	727	2.6	0.277	3.5	LOS A	0.6	4.5	0.22	0.41	0.22	32.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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