TRANSPORT IMPACT ASSESSMENT

3–5 Help Street, Chatswood

PREPARED FOR:
Loftex Chatswood Pty Ltd

REFERENCE:
0650r03v04

DATE:
9/09/2025

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ABN: 34 628 611 343

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1. Introduction

1.1. Overview

PDC Consultants has been commissioned by Loftex Chatswood Pty Ltd to undertake a transport impact assessment (TIA) of State Significant Development Application (SSDA) 76555711 relating to a proposed mixed-use development with infill affordable housing for the site at 3–5 Help Street, Chatswood. Specifically, the SSDA proposal consists of:

- 160 apartment units, including 20% affordable units (32 units).
- 1,959 m^2 of commercial gross floor area (GFA).
- 363 m^2 of retail GFA.
- Basement parking with a total of 165 car spaces.
- An 11-metre-wide combined entry and exit driveway onto Help Street.

The site is located in Willoughby City Council (Council) local government area (LGA) and has therefore been assessed in accordance with the Willoughby Development Control Plan (DCP) 2023 and Local Environmental Plan 2012. It has also been assessed in accordance with the State Environmental Planning Policy (Housing) 2021.

1.2. Planning Secretary's Environmental Assessment Requirements

This TIA has been prepared in accordance with the Planning Secretary's Environmental Assessment Requirements (SEARs) issued by the NSW Government on 8 October 2024. The key issue and assessment requirements for Traffic, Transport and Accessibility are set out in Part 10 the SEARs and are repeated below, for reference:

10. Traffic, Transport and Accessibility

- *Provide a transport and accessibility impact assessment, which includes:*
    - *an analysis of the existing transport network, including the road hierarchy and any pedestrian, bicycle or public transport infrastructure, current daily and peak hour vehicle movements, and existing performance levels of nearby intersections.*
    - *details of the proposed development, including pedestrian and vehicular access arrangements (including swept path analysis of the largest vehicle and height clearances), parking arrangements and rates (including bicycle and end-of-trip facilities), drop-off/pick-up-zone(s) and bus bays (if applicable), and provisions for servicing and loading/unloading.*
    - *analysis of the impacts of the proposed development during construction and operation (including justification for the methodology used), including predicted modal split, a forecast of additional daily and peak hour multimodal network flows as a result of the development (using industry standard modelling), identification of potential traffic impacts on road capacity, intersection performance and road safety (including pedestrian and cyclist conflict) and any cumulative impact from surrounding approved developments.*

- *measures to mitigate any traffic impacts, including details of any new or upgraded infrastructure to achieve acceptable performance and safety, and the timing, viability and mechanisms of delivery (including proposed arrangements with local councils or government agencies) of any infrastructure improvements in accordance with relevant standards.*
- *proposals to promote sustainable travel choices for employees, residents, guests and visitors, such as connections into existing walking and cycling networks, minimising car parking provision, encouraging car share and public transport, providing adequate bicycle parking and high quality end-of-trip facilities, and implementing a Green Travel Plan.*

The documentation requirements identified by the SEARs are for a Transport and Accessibility Impact Assessment (this document), a Construction Traffic Management Plan (CTMP), and a Green Travel Plan (GTP) or equivalent.

A Preliminary CTMP and a GTP have been prepared to accompany the SSD alongside this TIA and are provided as their own standalone reports as part of the SSD deliverables package.

1.3. Structure of this Report

This report documents the findings of our investigations in relation to the anticipated traffic and parking impacts of the proposed development and should be read in the context of the Environmental Impact Statement (EIS), prepared separately. The remainder of this report is structured as follows:

- Section 2: Describes the site and existing traffic and parking conditions in the locality.
- Section 3: Describes the proposed development.
- Section 4: Assesses the parking requirements of the development.
- Section 5: Assesses the traffic impacts of the development.
- Section 6: Discusses the proposed access and internal design arrangements.
- Section 7: Presents the overall study conclusions.

1.4. References

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

- Willoughby Local Environmental Plan 2012 (WLEP 2012).
- Willoughby Development Control Plan 2023 (WDCP 2023).
- Chatswood CBD Planning and Urban Design Strategy 2036 (Chatswood CBD Strategy 2036).
- State Environmental Planning Policy (Transport & Infrastructure) 2021 (SEPP T&I 2021).
- State Environmental Planning Policy (Housing) 2021 (SEPP Housing).

- State Environmental Planning Policy No 65 – Design Quality of Residential Apartment Development (SEPP 65).
- Transport for NSW Guide to Transport Impact Assessment 2024 (GTIA).
- NSW Apartment Design Guide (ADG).
- Integrated Public Transport Service Planning Guidelines, Sydney Metropolitan Area, 2013 (Integrated Public Transport Planning Guidelines 2013).
- Australian Standard AS 2890.1-2004, Part 1: Off-Street Car Parking (AS 2890.1).
- Australian Standard AS 2890.2-2018, Part 2: Off-Street Commercial Vehicle Facilities (AS 2890.2).
- Australian Standard AS 2890.3-2015, Part 3: Bicycle Parking (AS 2890.3).
- Australian Standard AS 2890.6-2022, Part 6: Off-Street Parking for People with Disabilities (AS 2890.6).

2. Existing Conditions

2.1. Location and Site

The site is located at 3–5 Help Street, Chatswood, being approximately 300 metres north of Chatswood Railway Station and 9 kilometres north-west of the Sydney CBD. More specifically, the site is located on the northern side of Help Street between its intersections with Cambridge Lane to the west and Anderson Street to the east.

The site is generally a trapezoidal in shape with a total area of approximately 2,290 m^2. **Table 1** provides an appreciation of the site's street frontages and neighbouring developments.

Table 1: Street Frontages & Neighbouring Developments

FRONTAGE	DESCRIPTION
North	Street frontage: McIntosh Street
South	Street frontage: Help Street
East	Borders neighbouring residential flat buildings
West	Street frontage: Cambridge Lane

The site currently accommodates two separate three-storey residential flat buildings, comprising a combined total of 57 residential units along with associated on-site car parking. Two separate driveways are currently provided for said residential flat buildings, onto Help Street and McIntosh Street respectively. Traffic generated by the existing development would therefore use both streets for access to and from the local road network.

Figure 1 and **Figure 2** provide an appreciation of the site's location in both a local and broad context respectively.

2.2. Road Network

The road hierarchy in the vicinity of the site is shown by **Figure 2**, with the following roads considered noteworthy:

- **Pacific Highway**: forms part of the TfNSW Highway, HW 10, that generally runs in a north–south alignment through the Sydney Metropolitan area. Near the site, it is subject to 60 km/h speed zoning restrictions and accommodates three lanes of traffic in each direction within a divided carriageway. 'No-stopping' restrictions apply to both kerbsides of Pacific Highway near the site.

- **Help Street**: a local road that runs in an east-west direction between Anderson Street at the east and Pacific Highway at the west. Near the site, it is subject to 40 km/h speed zoning restrictions and accommodates two lanes of traffic in each direction. A combination of time restricted parallel parking and 'No Stopping' parking restrictions apply near the site.

- **Anderson Street**: a local road that runs in a north-south direction, between its intersections with Ashley Street at the north and Victoria Avenue at the south. Near the site, Anderson Street is subject to 40 km/h speed

zoning restrictions and accommodates one to two lanes of traffic in each direction. A combination of time restricted parallel parking and 'No Stopping' parking restrictions apply near the site.

- Cambridge Lane: a local road that runs in a north-south direction between McIntosh Street at the north and Help Street at the south. Near the site, Cambridge Lane functions as a shared zone for cars, cyclists and pedestrians and is subject to 10 km/h speed zoning restrictions. Cambridge Lane is one-way northbound only and accommodates a single lane of traffic. Kerbside parking is permitted along the western kerbside subject to 10-minute time restriction between 7am and 6pm, Monday to Friday.

- McIntosh Street: a local road that runs in an east-west direction between Anderson Street at the east and Cambridge Lane at the west. Near the site, McIntosh Street is subject to 40 km/h speed zoning restrictions and accommodates a single lane of traffic, one-way eastbound only. Kerbside parking is permitted along the northern side of the street, subject to 1P time restriction between 8:30am and 6pm, Monday to Friday and 8:30am and 12pm on Saturday.

- Orchard Road: a local road that runs in a north-south direction between Help Street at the north and its termination in the south. Near the site, it is subject to 40 km/h speed zoning restrictions and accommodates a single lane of traffic in each direction. Kerbside parking is prohibited on both sides.

- Railway Street: a local road that runs in a north-south direction between Help Street at the north and its termination in the south. Near the site, it is subject to 40 km/h speed zoning restrictions and accommodates two lanes of traffic in each direction. A combination of time restricted parallel parking and 'No Stopping' parking restrictions operate near the site.

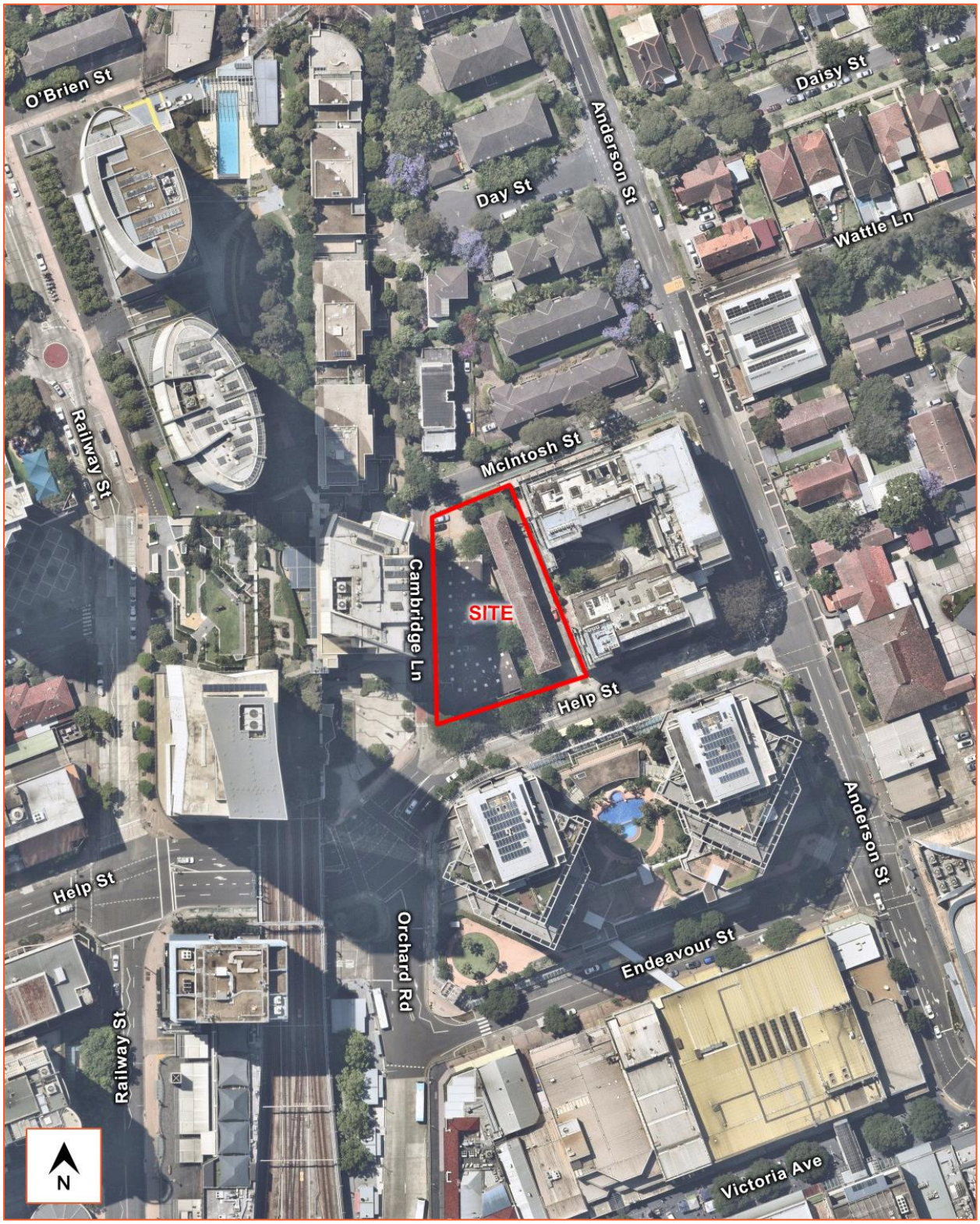


Figure 1: Site Plan

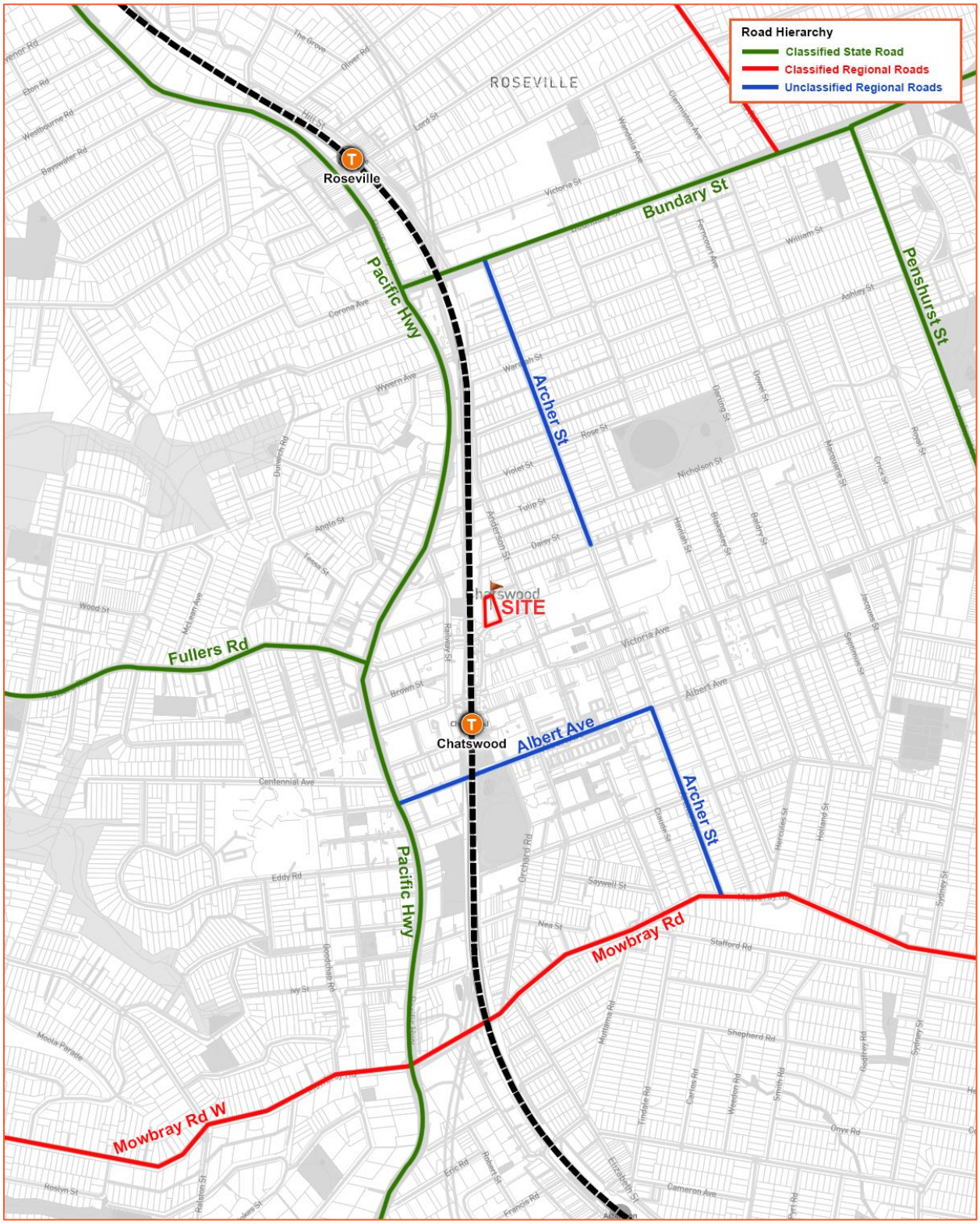


Figure 2: Location & Road Hierarchy Plan

2.3. Public Transport

2.3.1. Bus Services

The Integrated Public Transport Planning Guidelines 2013 states that the walking catchment for metropolitan bus services includes all areas within a 400-metre radius of a bus stop. As can be seen from **Figure 3**, the site is located within 400 metres of bus stops provided at the Chatswood interchange and on Anderson Street and hence falls well within the walking catchment area. Accordingly, residents, visitors and staff will have convenient access to public bus services for journeys to and from the site.

Table 2 shows the notable town centres that are accessible via the abovementioned bus services and the average service headways during peak and off-peak periods.

Table 2: Bus Services

ROUTE NO.	ROUTE	ROUTE DESCRIPTION	AVERAGE HEADWAY
115	Chatswood to City Bridge St via North Sydney	Via North Willoughby, Willoughby, Crows Nest, North Sydney, Milsons Point, Millers Point	Weekdays: 10 – 15 minutes Weekends: 20 minutes
120	Chatswood to City QVB (Loop Service)	Via North Willoughby, Willoughby, Crows Nest, North Sydney, Milsons Point, Millers Point	Weekdays: 10 – 15 minutes Weekends: 10-15 minutes
255	Colwell Cres & Beaconsfield Rd to Chatswood	-	Weekdays: 8 Services only Weekends: 4 Services only on Saturday/ No Services on Sunday
256	Chatswood to Chatswood West (Loop Service)	-	Weekdays: 1 – 2 hours Weekends: 5 Services only on Saturday/ No Services on Sunday
267	Chatswood to Greenwich via Crows Nest	Via Willoughby, Cammeray, Crows Nest	Weekdays: 30 – 60 minutes Weekends: 1 hour
275	Castlecrag to Chatswood	Via Willoughby East, Middle Cove, North Willoughby	Weekdays: 4 Services Only Weekends: 4 Services Only on Saturdays / No Services on Sundays
277	Castle Cove to Chatswood	-	Weekdays: 1 hour Weekends: 6 Services only
278	Chatswood to Killarney Heights (Loop Service)	Via Roseville Chase, Forestville	Weekdays: 30 minutes Weekends: 20 – 30 minutes
279	Frenchs Forest to Chatswood	Via Forestville, Roseville Chase	Weekdays: 4 Services Only Weekends: No Services
280	Warringah Mall to Chatswood	Via North Manly, Frenchs Forest, Forestville, Roseville Chase	Weekdays: 30 minutes Weekends: 30 minutes
281	Davidson to Chatswood	Via Frenchs Forest, Forestville, Roseville Chase	Weekdays: 1 hour Weekends: 1 hour
283	Belrose to Chatswood	Via Frenchs Forest, Forestville, Roseville Chase	Weekdays: 1 hour Weekends: 1 hour
284	Duffys Forest to Terrey Hills & Chatswood	Via Terrey Hills, Belrose, Frenchs Forest, Forestville, Roseville Chase	Weekdays: 1 hour Weekends: 2 hour
516	Top Ryde City to Chatswood	Via North Ryde, Chatswood West	Weekdays: 30 minutes

ROUTE NO.	ROUTE	ROUTE DESCRIPTION	AVERAGE HEADWAY
			Weekends: 30 minutes
530	Burwood to Chatswood	Via Five Dock, Rusell Lea, Drummoyne, Huntleys Point, Hunters Hill, Linley Point, Lane Cove	Weekdays: 30 minutes Weekends: 30 minutes
558	Chatswood to Lindfield	Via Roseville	Weekdays: 1 hour Weekends: 5 Services Only on Saturdays / No Services on Sundays
565	Chatswood to Macquarie University	Via Lindfield	Weekdays: 30 minutes Weekends: 1 hour

2.3.2. Rail & Metro Services

The Integrated Public Transport Planning Guidelines 2013 states that the walking catchment for metropolitan railway stations includes all areas within an 800-metre radius of a station. It can be seen from **Figure 3** that Chatswood Railway Station is located approximately 300 metres south of the site and hence falls within the typical walking catchment area. Accordingly, residents, visitors and staff of the proposed development would be able to readily access the Sydney rail network.

Chatswood Railway Station is a major train and Metro station in the north of Sydney, serviced by two railway lines and two Metro lines, being the T1 North Shore and Western Line, T9 Northern Line, Metro North West Line and Metro City & Southwest Line.

Table 3 shows the notable town centres that are accessible along these lines and the average service headways during peak and off-peak periods.

Table 3: Rail & Metro Services

RAILWAY LINE	NOTABLE TOWN CENTRES ALONG LINE	AVERAGE HEADWAY
T1 North Shore and Western Line	Via Sydney CBD, Townhall, Wynyard, North Sydney, Chatswood, Lindfield, Gordon, Hornsby, Berowra	Weekdays: 5 - 15 minutes Weekends: 5 - 15 minutes
T9 Northern Line	Via Hornsby, Epping, Strathfield, Redfern & Sydney CBD	Weekdays: 5 - 15 minutes Weekends: 5 - 15 minutes
Metro North West & Bankstown Line	Via Rouse Hill, Kellyville, Bella Vista, Baulkham Hills, Castle Hill, Cherrybrook, Epping, Macquarie Park, North Ryde, Chatswood, Crows Nest, Victoria Cross, Barangaroo, Wynyard, Martin Place, Gadigal, Waterloo & Sydenham	Weekdays: 5 - 10 minutes Weekends: 10 minutes

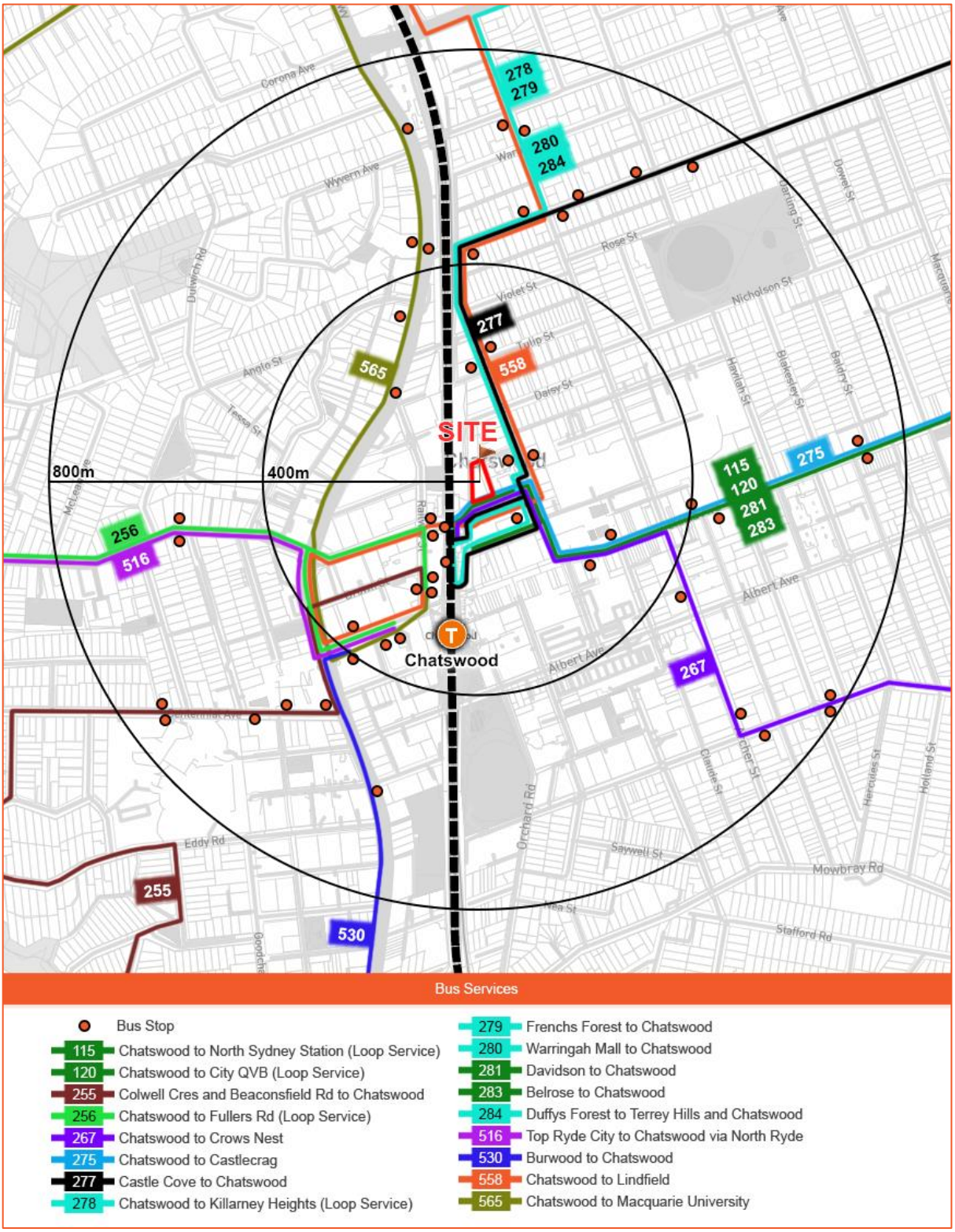


Figure 3: Public Transport Services

2.4. Active Transport

2.4.1. Cycle Network

Figure 4 illustrates the 10-minutes cycling catchment area and dedicated cycle routes near the site. It demonstrates that the site has excellent access to the local bicycle network, with on-road cycle paths provided along Cambridge Lane and McIntosh Street. These on-road cycle paths provide a connection to the wider cycle path network.

Several key destinations can be accessed from the proposed development on a bicycle, including but not limited to, large-scale supermarkets and shopping centres, bulky goods retail stores, food and beverage premises, public transport services, and a range of recreational and outdoor facilities.

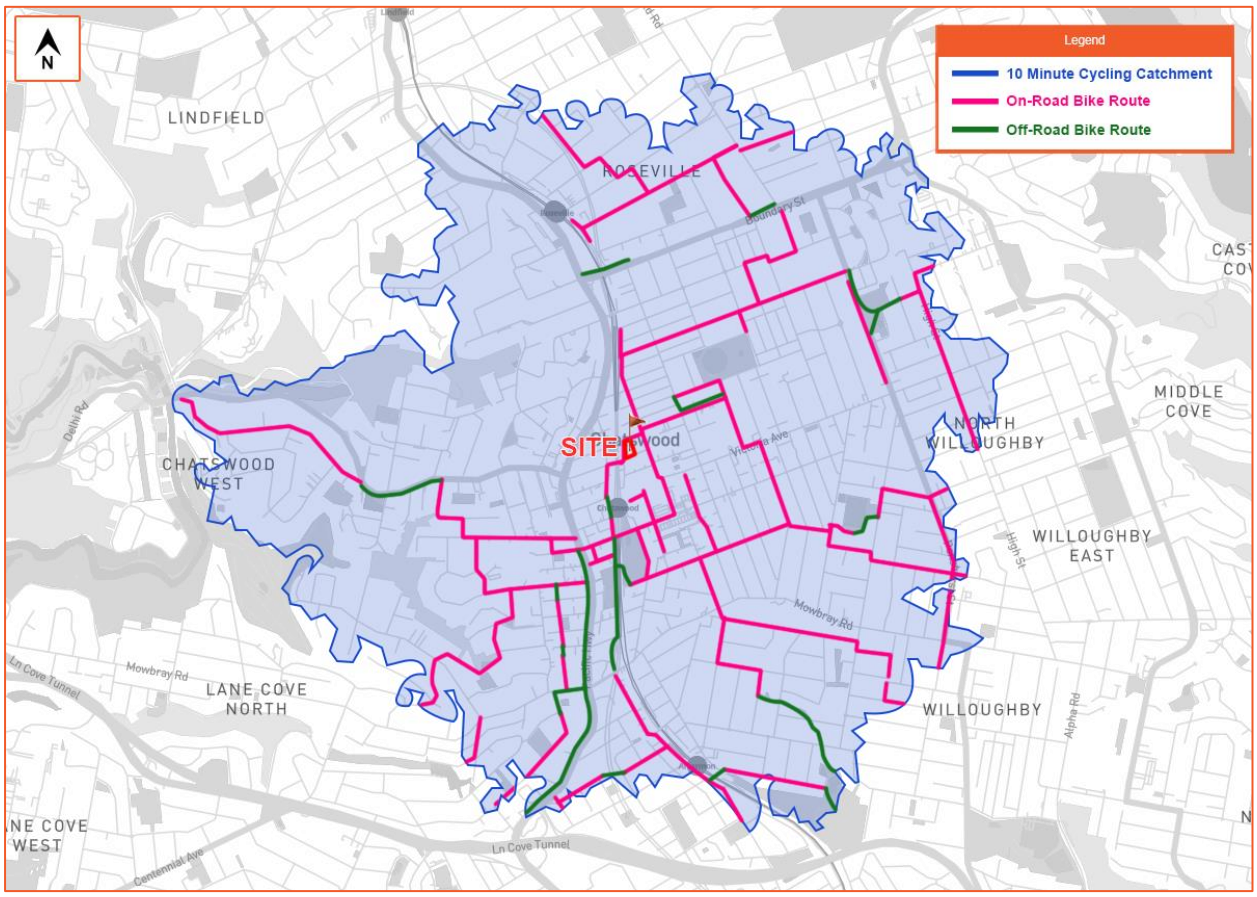


Figure 4: Cycle Path Network

2.4.2. Walking Network

Figure 5 illustrates the 15-minute walking catchment area. Occupants of the development have excellent access to a similar range of facilities to those available via bicycle, including large-scale supermarkets and shopping centres, food and beverage premises, public transport services, and recreational and outdoor facilities. The nearest bus stops to the site are within around 130 metres of the site.

Pedestrian facilities are good around the site. Help Street has footpaths along both sides, whilst McIntosh Street to the west of the site operates as a 10 km/h Shared Zone. McIntosh Street to the rear of the site has footpaths along both sides and is designated as a 40 km/h High Pedestrian Activity Area, giving motorists extra awareness of pedestrians. Anderson Street also has pedestrian footpaths along both sides.

Signalised pedestrian crossings near the site include those on all three legs of the Anderson Street / Help Street intersection around 60 metres to the east of the site, and on all three legs of the Orchard Road / Help Street intersection around 40 metres to the west of the site.

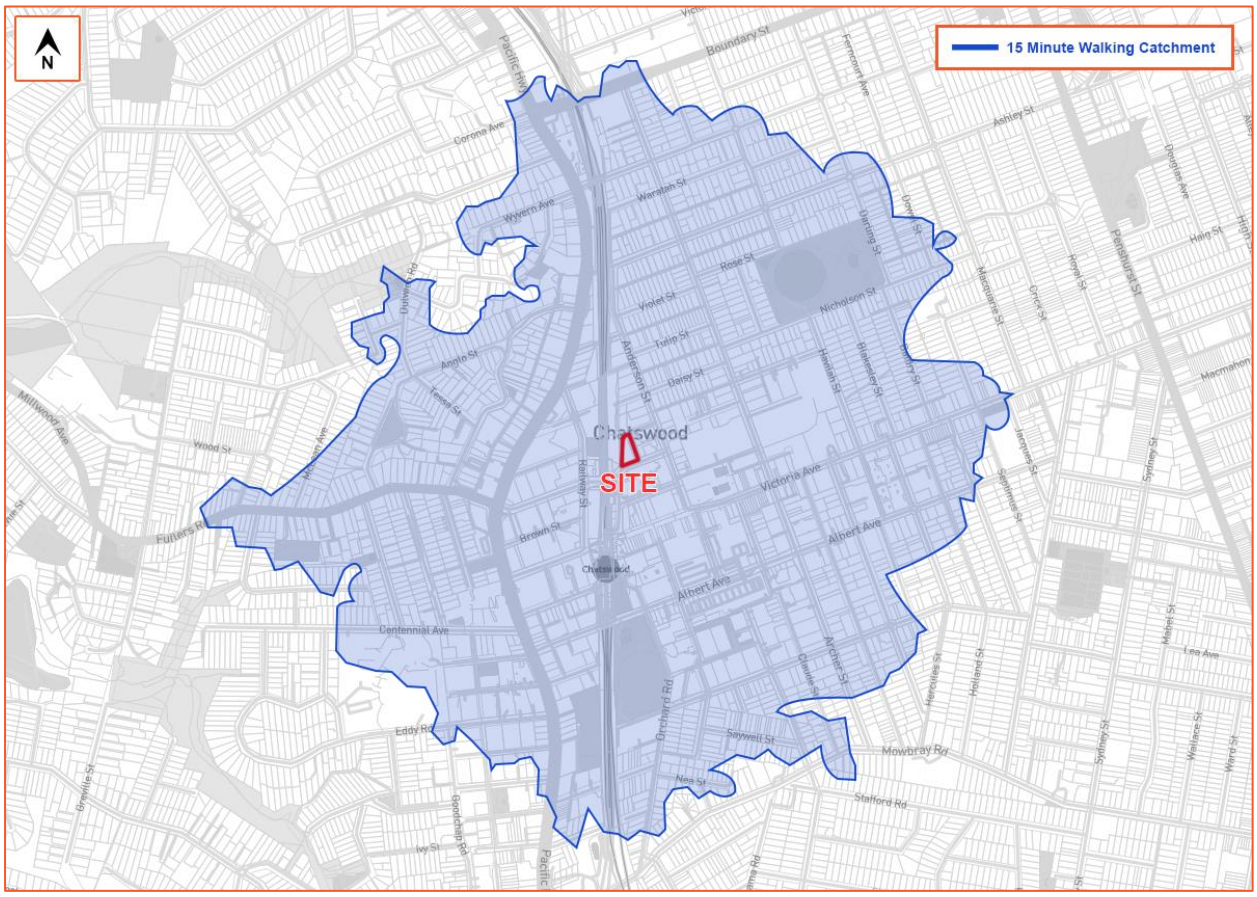


Figure 5: Walking Network

2.5. Crash History

An assessment of the crash history near the site has been conducted to identify any potential existing crash trends which might be affected by the proposed development. The analysis was conducted on data available from the NSW Centre for Road Safety for roads and intersections near the site. The details of reported crashes are available for the five-year period between 2019 to 2023. The information provided for each crash includes the crash type, location, year, conditions, and contributing factors.

There was a total of three crashes recorded near the site for the most recent five-year period, averaging below one crash per year. Crash locations are illustrated by **Figure 6** and further information is provided by **Table 4**.

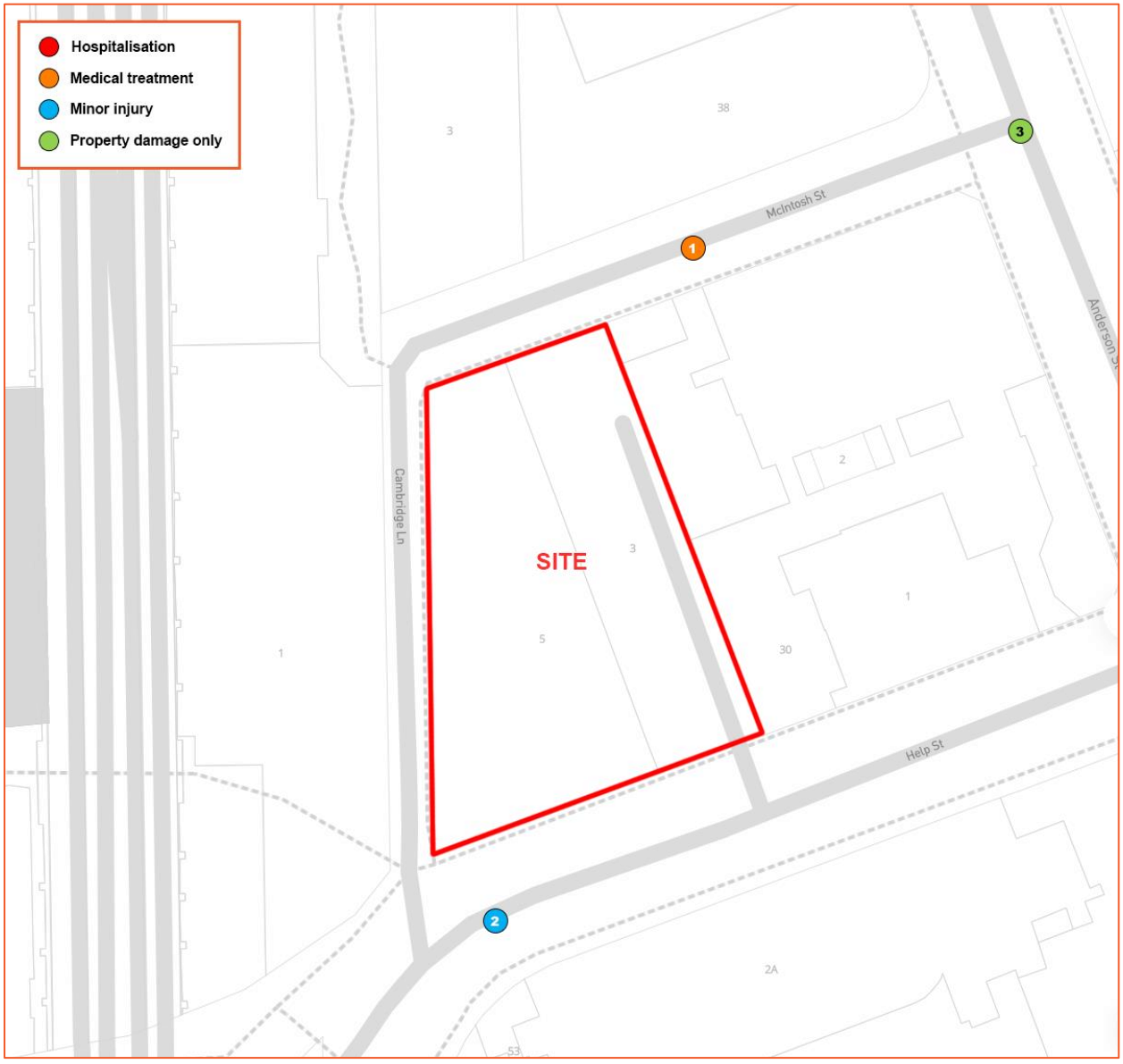


Figure 6: Crash Hotspot

Table 4: Crash Hotspots

NO.	YEAR	INJURY	ROAD USER MOVEMENT CODE	DCA DESCRIPTION	LIGHTING
1	2019	Medical treatment	71	Off rd left => obj	Darkness
2	2020	Minor injury	47	Emerging from drive	Daylight
3	2019	Property damage only	13	Right near	Daylight

Based on the analysis of recent accidents near the site, it has been observed that there have been three incidents in total over the most recent five-year period for which finalised data is available. One of the crashes involved a vehicle leaving McIntosh Street to the left and hitting an object during darkness. This crash resulted in medical treatment. One crash involved a vehicle emerging from the driveway of 2A Help Street on the opposite side of the road and central median to the subject site, causing minor injury. The final crash was a right-near collision at the intersection of Anderson Street / Help Street, causing property damage.

The number of crashes which have occurred in the immediate vicinity of the site is generally low and would not warrant the nearby roads or intersections qualifying for Black Spot funding eligibility from the Australian Government to improve safety. The low-speed environment of local streets likely reduces the potential for crashes and those which occurred are not thought to be directly related to the subject site.

2.6. Existing Traffic Generation

The site is currently occupied by two three-storey residential flat buildings comprising 57 residential units. The traffic generation of the existing residential flat buildings has been estimated using the 'high density' residential developments rates (with high public transport accessibility) specified in GTIA as follows:

- 0.19 trips / dwelling / hour during the AM peak period.
- 0.15 trips / dwelling / hour during the PM peak period.

A 20% inbound and 80% outbound split during the AM peak period is assumed, noting that most residents would leave for work in the weekday morning, and vice versa for the weekday PM peak period. The existing residential flat buildings would therefore be expected to generate the following number of trips:

- 11 trips / hour (2 in, 9 out) during the AM peak period.
- 9 trips / hour (7 in, 2 out) during the PM peak period.

These existing trips would travel to and from the site via both Help Street and McIntosh Street. The existing development at 5 Help Street does not have a vehicle connection to Help Street, with all vehicle access from Mcintosh Street. The existing traffic generation from Help Street (associated with 18 units at 3 Help Street) is 3 trips in the weekday AM and PM peaks.

Notwithstanding, the most relevant use of existing traffic generation is to calculate the net difference resulting from the DA, which is discussed further in Section 5.

2.7. Existing Intersection Performance

Intersection turn count and queue length surveys were undertaken of the nearby intersection of Anderson Street / Help Street on Thursday 23 March 2023 at 6:30–9:30am and 3:30–6:30pm, with these periods generally coinciding with the expected peak periods of the proposed development. The raw survey data is included in **Appendix A** for reference.

The results of the surveys were used to develop existing (base case) models of the above intersection for the weekday morning and evening peak periods. The software used was SIDRA Intersection, the most prevalent and widely recognised traffic modelling software used for traffic assessment in NSW.

The base models were validated against intersection queue lengths which was undertaken at the same time of turn count surveys and cross referenced against observations made during separate site inspections undertaken on a typical weekday morning and evening.

SIDRA modelling outputs a range of performance measures, in particular:

- Degree of Saturation (DOS) – The DOS is used to measure the performance of intersections, where a value of 1.0 represents an intersection at theoretical capacity. As the performance of an intersection approaches DOS of 1.0, queue lengths and delays increase rapidly. It is usual to attempt to keep DOS to less than 0.9, with satisfactory intersection operation generally achieved with a DOS below 0.8.
- Average Vehicle Delay (AVD) – The AVD (or average delay per vehicle in seconds) for intersections also provides a measure of the operational performance of an intersection and is used to determine an intersection's Level of Service (see below). For signalised intersections, the AVD reported relates to the average of all vehicle movements through the intersection.
- Level of Service (LOS) – This is a comparative measure that provides an indication of the operating performance, based on AVD.

Table 5 provides a recommended baseline for assessment of intersection performance as per the GTIA.

Table 5: Intersection Performance Criteria

LOS	AVD	TRAFFIC SIGNALS
A	Less than 14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity, incidents will cause excessive delays.
F	More than 70	Unsatisfactory and requires additional capacity

A summary of the modelling results for the existing (base-case) models is provided in **Table 6**. Reference should also be made to the detailed SIDRA outputs provided in **Appendix B** which give additional information regarding intersection performance.

Table 6: Summary of SIDRA Modelling Results - Existing

INTERSECTION	SCENARIO	PERIOD	DOS	AVD	LOS
Anderson Street / Help Street	Existing	AM	0.772	29.5 s	C
		PM	0.589	27.4 s	B

From **Table 6**, it is evident that the intersection operates satisfactorily with LOS B – C during the AM and PM peak periods. In this regard, the modelling results suggest that the intersection is operating under capacity and would be able to readily accommodate additional vehicles movements.

3. Development Proposal

A detailed description of the proposed mixed-use development for which approval is now sought, is outlined in the EIS prepared separately. Specifically, the SSDA proposal consists of:

- 160 apartment units, including 20% affordable units (32 units).
- 1,959 m^2 of commercial GFA.
- 363 m^2 of retail GFA.
- Basement parking with a total of 165 car spaces, inclusive of visitor parking.
- An 11-metre-wide combined entry and exit driveway onto Help Street.

The parking and traffic implications arising from the proposed development are discussed in Sections 4 and 5, respectively. A copy of the relevant architectural drawings, prepared by EMBECE, are included in **Appendix C**.

4. Parking Requirements

4.1. Car Parking

4.1.1. Residential

Given the SSDA proposes mixed-use with infill affordable housing, SEPP Housing forms the relevant car parking planning control for the residential component of the proposed development.

The proposed mixed-use development is planning to apply for a floor space ratio (FSR) bonus, it therefore contains at least 15% of in-fill affordable housing. SEPP Housing will be used as a reference to determine the carparking requirements, in particular Clauses 19(e) and 19(f) of Part 2 Division 1, which are repeated below:

(e) the following number of parking spaces for dwellings used for affordable housing—

(i) for each dwelling containing 1 bedroom—at least 0.4 parking spaces,

(ii) for each dwelling containing 2 bedrooms—at least 0.5 parking spaces,

(iii) for each dwelling containing at least 3 bedrooms— at least 1 parking space,

(f) the following number of parking spaces for dwellings not used for affordable housing—

(i) for each dwelling containing 1 bedroom—at least 0.5 parking spaces,

(ii) for each dwelling containing 2 bedrooms—at least 1 parking space,

(iii) for each dwelling containing at least 3 bedrooms—at least 1.5 parking spaces,

Table 7 shows the minimum residential car parking requirement for the development under SEPP Housing.

Table 7: Residential Car Parking Requirements and Provision

TYPE	NO.	SEPP HOUSING RATE	SEPP HOUSING REQUIREMENT	PROPOSED PROVISION
AFFORDABLE				
1 bedroom	18	0.4 space / 1 dwelling	7.2	15
2 bedrooms	14	0.5 space / 1 dwelling	7	
3 bedrooms	0	1 space / 1 dwelling	0	
REGULAR				
1 bedroom	37	0.5 space / 1 dwelling	18.5	118
2 bedrooms	75	1 space / 1 dwelling	75	
3 bedrooms	16	1.5 space / 1 dwelling	24	
		TOTAL	***131.7***	***133***

It is evident from **Table 7** that the development requires a minimum of 132 residential car parking spaces under SEPP Housing. In response, the development provides a total of 133 car spaces and therefore satisfies SEPP Housing by providing car parking which meets the minimum requirements.

SEPP Housing does not give a rate for visitor parking and so reference has been made to WDCP 2023 which advises a rate of 1 visitor space per 7 dwellings. Application of this rate to the proposed 160 units would suggest that 23 visitor spaces form a suitable provision and that is made at the proposed development.

The additional car spaces above the minimum required for residents will be used as visitor car spaces. The proposed residential car parking provision is therefore considered acceptable.

4.1.2. Non-Residential

WDCP 2023 forms the relevant planning control for assessment of the car parking requirements of the non-residential components of the development. It stipulates minimum and maximum car parking rates for commercial and retail developments within the Chatswood CBD, and notes that any calculations resulting in fractions shall be rounded down.

Table 8 shows the car parking requirements under application of WDCP 2023 and the proposed provision in response.

Table 8: Commercial Car Parking Requirements & Provision

TYPE	GFA	WDCP 2023 MIN RATE	WDCP 2023 MAX RATE	MIN REQUIRED	MAX PERMITTED	PROPOSED PROVISION
Commercial	1,959 m^2	1.0 space / 670 m^2 GFA	1.0 space / 400 m^2 GFA	2.9	4.9	9
Retail	363 m^2	1.0 space / 200 m^2 GFA	1.0 space / 70 m^2 GFA	1.8	5.2	
			TOTAL	***3***	***9***	***9***

It is evident from **Table 8** that the non-residential component of the development requires a minimum of three and a maximum of nine non-residential car parking spaces under WDCP 2023. In response, the development provides a total of nine non-residential car spaces, which includes seven normal car spaces plus two accessible car spaces.

The proposed non-residential car parking provision is therefore considered acceptable and will ensure that all non-residential car parking demands are accommodated on-site, with no reliance on on-street parking.

4.2. Accessible Car Parking

Accessible parking is provided and included within the relevant car parking calculations identified by **Table 7** and **Table 8**, to the satisfaction of WDCP 2023 and the Applicant's Access Consultant. A total of 32 residential accessible car parking spaces are provided, and additional two for residential visitors. One further accessible car space is provided for commercial use, and an additional shared accessible car space is provided for commercial visitors.

4.3. Motorcycle Parking

Table *9* shows the motorcycle parking requirement for the development under application of the respective motorcycle parking rates and controls in the WDCP 2023 and the proposed provision in response. It is noted that irrespective of the WDCP 2023 rates identified by **Table *9*,** WDCP 2023 does separately state an absolute minimum requirement of one resident motorcycle space, one resident visitor motorcycle space, one employee motorcycle space, and one commercial visitor motorcycle space. Where the minimum requirement as calculated by the WDCP 2023 rate is rounded down to zero, the overriding minimum of one space is adopted instead. All calculations not resulting in a whole number are rounded down in accordance with WDCP 2023.

Table 9: Motorcycle Parking Requirements & Provision

LAND USE	NO.	WDCP 2023 RATE	MINIMUM REQUIREMENT	PROPOSED PROVISION
Residents	156 resident car spaces	1 space per 20 car spaces	7	10
Residential visitors	7 resident motorcycle spaces	1 space per 10 resident motorcycle spaces	1[1]	
Business zones	9 business car spaces	1 space per 20 car spaces	1[1]	
Business zones visitors	1 business motorcycle space	1 space per 10 resident motorcycle spaces	1[1]	
		TOTAL	***10***	***10***

[1] *Requirement to the respective rate would round down to zero and so the overriding minimum requirement for one space is adopted instead.*

Table *9* shows that the development requires a minimum of 10 motorcycle parking spaces under the WDCP 2023. In response, the development provides 10 motorcycle spaces and therefore complies with WDCP 2023.

4.4. Bicycle Parking

Table 10 shows the bicycle parking requirement for the development under application of the respective bicycle parking rate in the WDCP 2023 and the proposed provision in response.

Table 10: Bicycle Parking Requirements & Provision

LAND USE	NO.	WDCP 2023 RATE	MINIMUM REQUIREMENT	PROPOSED PROVISION
Residents	160 units	1 space per 10 units	16	16
Residential visitors	160 units	1 space per 10 units	16	16
Business zones	9 business car spaces	1 space per 10 car spaces	1	1
Business zones visitors	1 business bicycle space	1 space per 10 bicycle spaces (minimum 1 space)	1	1
		TOTAL	***34***	***34***

It is evident from **Table 10** that the development requires a minimum of 34 bicycle parking spaces under the WDCP 2023. In response, the development provides 34 bicycle spaces, of which 17 are provided in a secure storage room on Basement 01 for residents and business employees, and a further 17 are provided in the form of readily accessible bicycle racks at Lower Ground level for residential and business use visitors.

4.5. Service Vehicle Parking & Waste Collection

4.5.1. Loading Bay Arrangements

WDCP 2023 requires that "*All new major commercial, retail and industrial developments, and developments that involve substantial redevelopment with a floor area in excess of 500m^2 for commercial/retail developments and 1,000m^2 for industrial developments, must make adequate provision for off street loading and unloading facilities.*"; however, no rate for the provision of loading bays is given.

A loading area is provided on the Lower Ground Level which accommodates one 10.5-metre-long heavy rigid vehicle (HRV) loading bay (which is capable of also accommodating Council's waste truck) and one 6.4-metre-long small rigid vehicle (SRV) loading bay. This is considered an adequate level of provision for the site and will ensure that the servicing demands of the building are accommodated on-site.

4.5.2. Waste Collection

Waste collection of the development shall be undertaken within the designated on-site loading bay, using Council's 10.5-metre-long waste collection truck. The waste truck will enter the loading area from Help Street in a forward direction and reverse into the loading bay. Council's waste contractor will then proceed to service waste between the truck and waste collection room. After collection, the waste truck will exit the site in a forward direction. This arrangement is considered acceptable and will ensure that waste can be collected safely and efficiently.

The proposed waste collection and service vehicle parking arrangements are therefore considered to be acceptable and will ensure that waste can be collected safely and efficiently, whilst also being consistent with comparable developments in the area.

5. Traffic Impacts

5.1. Traffic Generation Rates

5.1.1. Residential

As discussed in Section 2.6, the GTIA recommends the following traffic generation rates for high density residential developments:

- 0.19 trips / dwelling / hour during the AM peak period.
- 0.15 trips / dwelling / hour during the PM peak period.

A 20% inbound and 80% outbound split during the AM peak period is assumed, noting that most residents would leave for work in the weekday morning, and vice versa for the weekday PM peak period.

5.1.2. Non-Residential

The GTIA recommends application of the following traffic generation rates for commercial development (office blocks):

- 1.69 trips / 100 m^2 GFA / hour during the AM peak period.
- 1.20 trips / 100 m^2 GFA / hour during the PM peak period.

The GTIA recommends several different rates for different types of retail land uses. That for speciality shops have been adopted for the proposal, which recommends a weekday PM peak rate of 3.2 trips / 100 m^2 GLFA. It is noted that the AM peak hour for retail is different to other land uses. Some retail may not open until 11am, and as such a factor of 50% has been applied to the above rate to determine the AM peak trip rate of 1.6 trips / 100 m^2 GLFA.

An 80% inbound and 20% outbound split during the AM peak period is assumed for the commercial component, noting that most employees would arrive for work in the weekday morning, and vice versa for the weekday PM peak period. A 50% inbound and 50% outbound split is applied to the retail land uses during weekday AM and PM peaks, reflecting the short-term nature of trips to and from retail premises.

5.2. Traffic Generation of the Proposed Development

Table 11 shows the expected traffic generation of the proposed development under application of the traffic generation rates outlined in Section 5.1.

Table 11: Total Traffic Generation of Development

PERIOD	LAND USE	NO. / GFA	TRAFFIC GENERATION	TOTAL TRAFFIC GENERATION
AM	Residential	160	30	67 (34 in, 33 out)
	Commercial	1,959 m^2	33	
	Retail	363 m^2	4	
PM	Residential	160	24	57 (29 in, 28 out)
	Commercial	1,959 m^2	24	
	Retail	363 m^2	9	

The above is not a net increase in traffic generation, as it does not take into consideration the generation of the existing residential dwelling. In this regard, the net increase in traffic generation resulting from the proposed development is expected to be as follows:

- 56 vehicle trips / hour (32 in, 24 out), during the AM peak period.
- 48 vehicle trips / hour (22 in, 26 out), during the PM peak period.

This net increase in trips reflects that of the entire development on the local road network, not that on any one street. For example, there will be a net reduction in trips on McIntosh Street given the existing site provides vehicular access directly to it, but the proposed development does not. The net increase onto Help Street would be slightly higher than the above numbers.

5.3. Traffic Distribution & Impacts

Given the site access must operate as left-in / left-out only due to the median on Help Street, all inbound trips will arrive from the west and all outbound trips will depart to the east. As such, no inbound development trips would pass through the intersection of Anderson Street / Help Street.

Of the outbound trips which would pass through this intersection, an assumed split of 80% left (to Princes Highway via Wilson Street or Ashley Street) and 20% right (towards Willoughby Road) has been adopted in assessing the 'with development' scenario.

A summary of the modelling results is presented in **Table 12**, with the detailed SIDRA outputs provided in **Appendix B.** **Table 12** also provides a comparison against the existing intersection performances which have been extracted from **Table 6**.

Table 12: Summary of SIDRA Modelling Results – Existing plus Development

INTERSECTION	SCENARIO	PERIOD	DOS	AVD	LOS
Anderson Street / Help Street	Existing	AM	0.772	29.5 s	C
		PM	0.589	27.4 s	B
	Existing + Development	AM	0.772	29.0 s	C
		PM	0.589	27.1 s	B

Table 12 highlights the proposed development traffic will have minimal impacts on the performance of the intersection. The average delay experienced by vehicles passing through the intersection reduces because a majority of the added vehicles under the 'existing + development' scenario are added to a movement with low delays, being the Help Street left turn. Having more vehicles on a movement with a lower-than-average delay lowers the weighting of the overall average to render the average delay experienced by vehicles on average passing through the intersection as lower than the existing scenario.

This is under the conservative methodology of applying gross trip generation of the proposal development as a net increase, thereby doubling up counting by modelling both traffic generated by the existing development and that generated by the proposed development.

It is evident that given the impact on this nearby intersection is so low, the effects of trip distribution and dispersion would mean traffic impacts at intersections further afield are lower and lower the further away from the site vehicles travel, and thus detailed assessment of traffic impacts of the broader network is not considered necessary.

5.4. Future Year Traffic Distribution & Impacts

To consider the cumulative traffic impacts of future developments in the area, a future year assessment has been undertaken. As demonstrated at the subject site and documented under Section 5.2, high density developments generate a relatively low number of vehicle trips per hour when compared to lower density developments, and nearby sites also benefit from good proximity to public and active transport options across the Chatswood CBD.

Accordingly, a conservative growth rate of 2% per annum has been adopted to forecast traffic growth at the Anderson Street / Help Street intersection to a 2035 future year. The results of this assessment for a future base and future development case scenario are presented in Table *13*.

Table 13: Summary of SIDRA Modelling Results – Future plus Development

INTERSECTION	SCENARIO	PERIOD	DOS	AVD	LOS
Anderson Street / Help Street	Future Base	AM	0.847	31.8 s	C
		PM	0.749	30.0 s	C
	Future Base + Development	AM	0.847	31.3 s	C
		PM	0.749	29.6 s	C

In comparing the future base case performance of **Table *13*** to the current base case of **Table 6**, it is evident that growth of 2% per annum for 12 years has only a very modest impact on overall intersection performance, with average vehicle delay during AM and PM peaks increasing by around 2—3 seconds. This is immaterial and demonstrates that the intersection has ample spare capacity.

In then adding the anticipated increase in traffic generated by the subject development, the overall intersection average delay again reduces slightly for the same reasons as explained in Section 5.3, being that most of the additional trips undertake a movement with very low average delay and so the overall weighted average for the intersection reduces.

The increase in traffic generation resulting from the proposed development will therefore be accommodated by the existing road network, with no external improvements required. This finding holds when considering a scenario 12 years into the future to reflect the cumulative impacts of other nearby developments. The traffic impacts of the proposed development are therefore considered acceptable.

6. Design Aspects

6.1. Access

The proposed access driveway onto Help Street services the loading area on Lower Ground Level and the car parking areas on the basement levels.

With 165 car parking spaces of User Class 1A and a frontage to a local road, the proposed development requires a Category 2 Driveway under Table 3.1 of AS 2890.1, being a combined entry and exit driveway of width 6.0 to 9.0 metres. In response, the development proposes a combined entry and exit driveway of width 11 metres onto Help Street and therefore satisfies the requirements of AS 2890.1.

The proposed arrangements have also been assessed using swept path analysis which confirms compliance with AS 2890.1 and AS 2890.2, and that the proposed access arrangements will operate safely and efficiently. The results of this analysis are included in **Appendix D** for reference.

6.2. Internal Design

The proposed internal traffic circulation and parking arrangements comply with the relevant requirements of AS 2890, including the proposed:

- Parking space dimensions, grades, aisle widths, and blind aisle extensions, in accordance with Clause 2.4 of AS 2890.1.
- Internal roadway widths and grades, in accordance with Clause 2.5 of AS 2890.1.
- Design vehicle envelope required for clearance to columns, walls, and obstructions, in accordance with Clause 5.2 of AS 2890.1.
- Headroom and ground clearances, in accordance with Clause 5.3 of AS 2890.1 and Clause 4.2 of AS 2890.2.
- Loading bay dimensions, in accordance with Clause 4.2 of AS 2890.2.
- Bicycle parking arrangements, in accordance with AS 2890.3.

Critical movements, including those of the proposed loading dock, have been assessed by swept path analysis where necessary, and the parking and circulation areas of the proposed development are considered satisfactory.

Any minor amendments considered necessary (if any) can be dealt with prior to the release of a Construction Certificate.

7. Conclusions

In summary:

- PDC Consultants has been commissioned by Loftex Chatswood Pty Ltd to undertake a TIA of an SSDA relating to a proposed mixed-use development with infill affordable housing for the site at 3–5 Help Street, Chatswood. Specifically, the proposal consists of:
  - 160 apartment units, including 20% affordable units (32 units).
  - 1,959 m^2 of commercial GFA.
  - 363 m^2 of retail GFA.
  - Basement parking with a total of 165 car spaces, inclusive of visitor parking.
  - An 11-metre-wide combined entry and exit driveway onto Help Street.
- The traffic generation assessment confirms that the development will generate a net increase of 56 vehicle trips / hour during the AM peak period and 48 vehicle trips / hour during the PM peak period once the generation of the existing development is considered.
- The SIDRA modelling results confirm that the proposed traffic generation will have a negligible impact on the performance of the nearby key intersection of Anderson Street / Help Street during both the AM and PM peak periods. The traffic impacts of the development are therefore considered acceptable.
- The development is required to provide a minimum of 140 car spaces under SEPP Housing and WDCP 2023. In response, 165 car parking spaces are provided. The proposed car parking provision is therefore considered acceptable.
- The proposed internal parking arrangements generally comply with the relevant requirements of AS 2890.1, AS 2890.2, AS 2890.3 and AS 2890.6. Any minor amendments considered necessary (if any) can be dealt with prior to the release of a Construction Certificate.

It is therefore concluded that the proposed development is supportable on traffic planning grounds.

Appendix A

Traffic Information Specialist

Location	Anderson Street	Duration	6:30 - 9:30
	-		15:30 - 18:30
	Anderson Street		-
	Help Street	Day/Date	Tuesday, 21 March 2023
Suburb	CHATSWOOD	Weather	-

All Vehicles Time Per 15 Mins	NORTH Anderson Street											EAST -										
	L			T			R					L			T			R				
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	PEDS	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	PEDS	TOTAL LIGHT	TOTAL HEAVY	TOTAL
6:30 - 6:45				3	0	3	3	3	6	9	1												86	12	98
6:45 - 7:00				3	0	3	10	3	13	16	3												79	15	94
7:00 - 7:15				11	0	11	30	3	33	44	4												137	17	154
7:15 - 7:30				16	0	16	24	6	30	46	12												142	21	163
7:30 - 7:45				12	0	12	34	5	39	51	6												178	22	200
7:45 - 8:00				17	0	17	63	3	66	83	13												210	19	229
8:00 - 8:15				24	0	24	69	3	72	96	11												234	14	248
8:15 - 8:30				28	1	29	71	4	75	104	28												249	15	264
8:30 - 8:45				35	0	35	67	4	71	106	25												234	16	250
8:45 - 9:00				32	0	32	78	4	82	114	13												236	20	256
9:00 - 9:15				33	1	34	63	5	68	102	8												230	23	253
9:15 - 9:30				48	0	48	39	4	43	91	8												215	16	231
Period End				262	2	264	551	47	598	862	132												2230	210	2440
15:30 - 15:45				15	0	15	54	5	59	74	5												203	18	221
15:45 - 16:00				21	0	21	49	7	56	77	4												194	24	218
16:00 - 16:15				21	0	21	53	4	57	78	9												212	17	229
16:15 - 16:30				21	0	21	56	7	63	84	5												218	27	245
16:30 - 16:45				23	0	23	56	7	63	86	5												219	16	235
16:45 - 17:00				20	0	20	52	3	55	75	4												217	19	236
17:00 - 17:15				22	0	22	53	5	58	80	14												244	15	259
17:15 - 17:30				20	0	20	54	7	61	81	11												217	17	234
17:30 - 17:45				28	1	29	42	0	42	71	9												236	14	250
17:45 - 18:00				23	0	23	40	5	45	68	11												215	16	231
18:00 - 18:15				24	0	24	44	4	48	72	11												215	18	233
18:15 - 18:30				18	0	18	43	4	47	65	7												217	15	232
Period End				256	1	257	596	58	654	911	95												2607	216	2823

All Vehicles Time Per 15 Mins	SOUTH Anderson Street											WEST Help Street													
	L			T			R					L			T			R							
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	PEDS	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	PEDS	TOTAL LIGHT	TOTAL HEAVY	TOTAL
6:30 - 6:45	13	5	18	3	3	6				24	0	24	1	25				40	0	40	65	3	86	12	98
6:45 - 7:00	7	4	11	6	1	7				18	0	23	3	26				30	4	34	60	8	79	15	94
7:00 - 7:15	19	9	28	9	3	12				40	0	30	0	30				38	2	40	70	3	137	17	154
7:15 - 7:30	25	7	32	9	3	12				44	8	35	2	37				33	3	36	73	4	142	21	163
7:30 - 7:45	37	8	45	11	5	16				61	3	38	1	39				46	3	49	88	4	178	22	200
7:45 - 8:00	34	5	39	13	7	20				59	13	28	2	30				55	2	57	87	8	210	19	229
8:00 - 8:15	34	6	40	15	2	17				57	28	32	2	34				60	1	61	95	11	234	14	248
8:15 - 8:30	36	5	41	18	2	20				61	32	35	1	36				61	2	63	99	9	249	15	264
8:30 - 8:45	28	6	34	14	2	16				50	24	22	2	24				68	2	70	94	9	234	16	250
8:45 - 9:00	40	8	48	14	2	16				64	4	14	2	16				58	4	62	78	9	236	20	256
9:00 - 9:15	41	11	52	13	4	17				69	2	27	1	28				53	1	54	82	17	230	23	253
9:15 - 9:30	46	5	51	13	1	14				65	14	25	1	26				44	5	49	75	9	215	16	231
Period End	360	79	439	138	35	173				612	128	333	18	351				586	29	615	966	94	2230	210	2440
15:30 - 15:45	46	9	55	24	3	27				82	7	20	1	21				44	0	44	65	19	203	18	221
15:45 - 16:00	44	7	51	17	3	20				71	8	19	4	23				44	3	47	70	19	194	24	218
16:00 - 16:15	50	7	57	16	3	19				76	2	29	1	30				43	2	45	75	19	212	17	229
16:15 - 16:30	45	13	58	19	3	22				80	5	35	1	36				42	3	45	81	18	218	27	245
16:30 - 16:45	48	4	52	21	2	23				75	10	26	1	27				45	2	47	74	20	219	16	235
16:45 - 17:00	64	7	71	15	2	17				88	5	20	3	23				46	4	50	73	29	217	19	236
17:00 - 17:15	62	5	67	28	2	30				97	8	26	1	27				53	2	55	82	41	244	15	259
17:15 - 17:30	49	6	55	8	0	8				63	8	41	1	42				45	3	48	90	23	217	17	234
17:30 - 17:45	84	7	91	18	2	20				111	11	26	3	29				38	1	39	68	22	236	14	250
17:45 - 18:00	55	7	62	22	2	24				86	7	24	0	24				51	2	53	77	30	215	16	231
18:00 - 18:15	53	10	63	18	1	19				82	6	28	1	29				48	2	50	79	33	215	18	233
18:15 - 18:30	64	6	70	21	2	23				93	8	23	2	25				48	1	49	74	28	217	15	232
Period End	664	88	752	227	25	252				1004	85	317	19	336				547	25	572	908	301	2607	216	2823

Traffic Information Specialist

Location	Anderson Street	Duration	6:30 - 9:30
	-		15:30 - 18:30
	Anderson Street		
	Help Street	Day/Date	Tuesday, 21 March 2023
Suburb	CHATSWOOD	Weather	-

All Vehicles Time Per Hour	NORTH *Anderson Street*											EAST -										
	L			T			R					L			T			R				
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	PEDS	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	PEDS	TOTAL LIGHT	TOTAL HEAVY	TOTAL
6:30 - 7:30				33	0	33	67	15	82	115	20												444	65	509
6:45 - 7:45				42	0	42	98	17	115	157	25												536	75	611
7:00 - 8:00				56	0	56	151	17	168	224	35												667	79	746
7:15 - 8:15				69	0	69	190	17	207	276	42												764	76	840
7:30 - 8:30				81	1	82	237	15	252	334	58												871	70	941
7:45 - 8:45				104	1	105	270	14	284	389	77												927	64	991
8:00 - 9:00				119	1	120	285	15	300	420	77												953	65	1018
8:15 - 9:15				128	2	130	279	17	296	426	74												949	74	1023
8:30 - 9:30				148	1	149	247	17	264	413	54												915	75	990
15:30 - 16:30				78	0	78	212	23	235	313	23												827	86	913
15:45 - 16:45				86	0	86	214	25	239	325	23												843	84	927
16:00 - 17:00				85	0	85	217	21	238	323	23												866	79	945
16:15 - 17:15				86	0	86	217	22	239	325	28												898	77	975
16:30 - 17:30				85	0	85	215	22	237	322	34												897	67	964
16:45 - 17:45				90	1	91	201	15	216	307	38												914	65	979
17:00 - 18:00				93	1	94	189	17	206	300	45												912	62	974
17:15 - 18:15				95	1	96	180	16	196	292	42												883	65	948
17:30 - 18:30				93	1	94	169	13	182	276	38												883	63	946
Period End																									

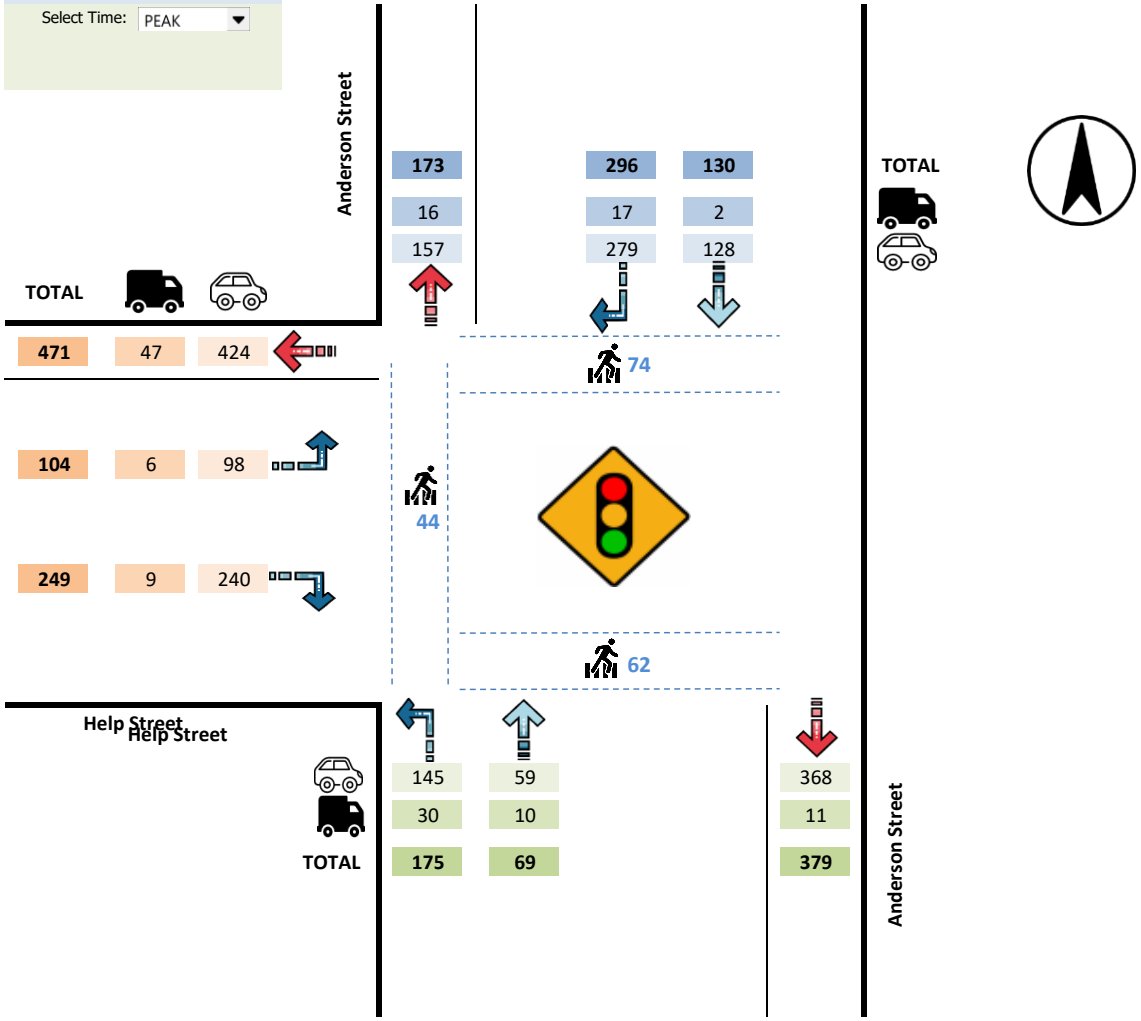
All Vehicles Time Per Hour	SOUTH *Anderson Street*											WEST *Help Street*													
	L			T			R					L			T			R							
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	PEDS	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	PEDS	TOTAL LIGHT	TOTAL HEAVY	TOTAL
6:30 - 7:30	64	25	89	27	10	37				126	8	112	6	118				141	9	150	268	18	444	65	509
6:45 - 7:45	88	28	116	35	12	47				163	11	126	6	132				147	12	159	291	19	536	75	611
7:00 - 8:00	115	29	144	42	18	60				204	24	131	5	136				172	10	182	318	19	667	79	746
7:15 - 8:15	130	26	156	48	17	65				221	52	133	7	140				194	9	203	343	27	764	76	840
7:30 - 8:30	141	24	165	57	16	73				238	76	133	6	139				222	8	230	369	32	871	70	941
7:45 - 8:45	132	22	154	60	13	73				227	97	117	7	124				244	7	251	375	37	927	64	991
8:00 - 9:00	138	25	163	61	8	69				232	88	103	7	110				247	9	256	366	38	953	65	1018
8:15 - 9:15	145	30	175	59	10	69				244	62	98	6	104				240	9	249	353	44	949	74	1023
8:30 - 9:30	155	30	185	54	9	63				248	44	88	6	94				223	12	235	329	44	915	75	990
Period End																									
15:30 - 16:30	185	36	221	76	12	88				309	22	103	7	110				173	8	181	291	75	827	86	913
15:45 - 16:45	187	31	218	73	11	84				302	25	109	7	116				174	10	184	300	76	843	84	927
16:00 - 17:00	207	31	238	71	10	81				319	22	110	6	116				176	11	187	303	86	866	79	945
16:15 - 17:15	219	29	248	83	9	92				340	28	107	6	113				186	11	197	310	108	898	77	975
16:30 - 17:30	223	22	245	72	6	78				323	31	113	6	119				189	11	200	319	113	897	67	964
16:45 - 17:45	259	25	284	69	6	75				359	32	113	8	121				182	10	192	313	115	914	65	979
17:00 - 18:00	250	25	275	76	6	82				357	34	117	5	122				187	8	195	317	116	912	62	974
17:15 - 18:15	241	30	271	66	5	71				342	32	119	5	124				182	8	190	314	108	883	65	948
17:30 - 18:30	256	30	286	79	7	86				372	32	101	6	107				185	6	191	298	113	883	63	946
Period End																									

Location	Anderson Street	Duration	6:30 - 9:30
	-		15:30 - 18:30
	Anderson Street		-
	Help Street	Day/Date	Tuesday, 21 March 2023
Suburb	CHATSWOOD	Weather	-

DATA SELECTION

Select Time: PEAK

TIME RANGE		
PEAK	-	AM
PEAK		
8:15	-	9:15



Traffic Information Specialist

ABN: 42 613 389 923

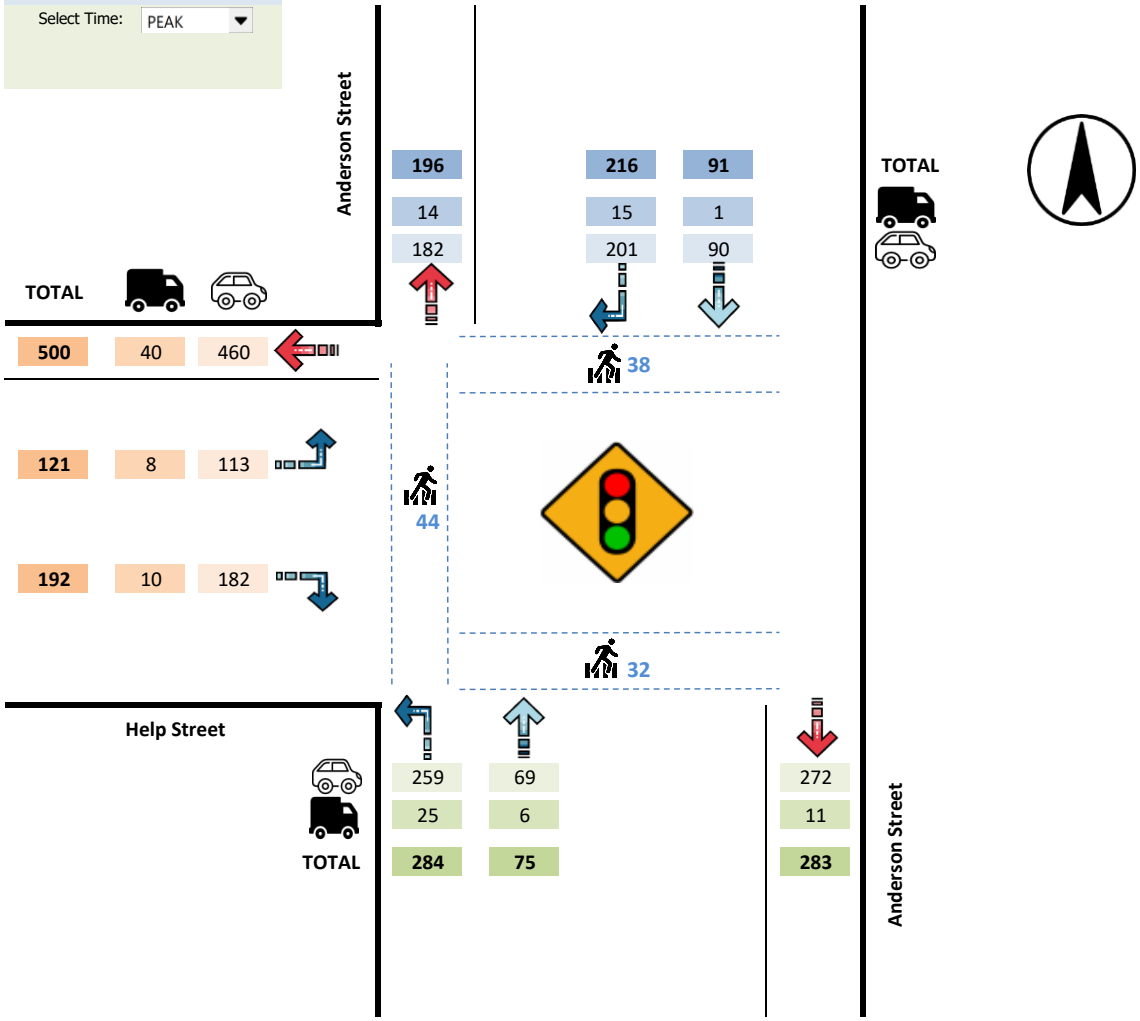
Email info@tistraffic.com.au

Location	Anderson Street	**Duration**	6:30 - 9:30
	-		15:30 - 18:30
	Anderson Street		-
	Help Street	**Day/Date**	Tuesday, 21 March 2023
Suburb	CHATSWOOD	**Weather**	-

DATA SELECTION

Select Time: PEAK

TIME RANGE		
PEAK	-	PM
PEAK		
16:45	-	17:45



Traffic Information Specialist

ABN: 42 613 389 923

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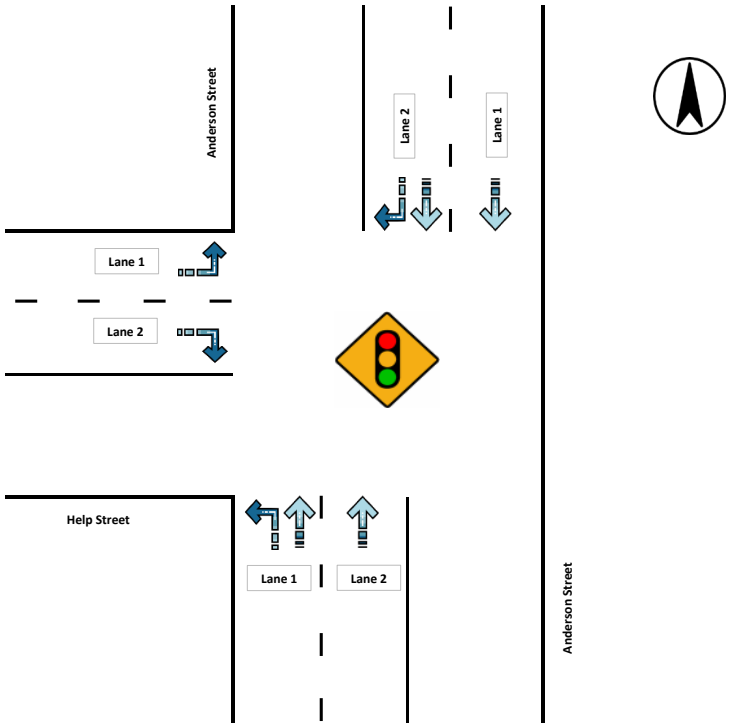
Location	Anderson Street	Duration	6:30 - 9:30
	-		15:30 - 18:30
	Anderson Street		-
	Help Street	Day/Date	Tuesday, 21 March 2023
Suburb	CHATSWOOD	Weather	-



Queue Length Maximum Queue (No. of Vehicle) Recorded

Time Per 15 Mins	North		South		West	
	Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 1
6:30 - 6:45	0	3	1	1	2	4
6:45 - 7:00	2	5	1	2	2	5
7:00 - 7:15	2	4	2	2	4	3
7:15 - 7:30	2	4	3	2	7	5
7:30 - 7:45	3	9	4	2	2	4
7:45 - 8:00	3	11	4	3	3	9
8:00 - 8:15	5	11+	5	3	5	5
8:15 - 8:30	5	11+	9	5	5	9+
8:30 - 8:45	5	11+	3	3	4	8
8:45 - 9:00	3	11+	4	3	2	5
9:00 - 9:15	3	8	9+	2	3	6
9:15 - 9:30	3	5	6	3	2	4
AM Period End						
15:30 - 15:45	2	11+	6	4	1	5
15:45 - 16:00	2	11+	7	5	1	7
16:00 - 16:15	2	11	4	4	3	7
16:15 - 16:30	1	7	4	4	4	6
16:30 - 16:45	3	6	6	6	1	7
16:45 - 17:00	2	7	9+	3	3	5
17:00 - 17:15	2	7	8	5	2	6
17:15 - 17:30	2	7	9+	7	4	5
17:30 - 17:45	3	7	7	5	2	7
17:45 - 18:00	3	8	7	4	2	5
18:00 - 18:15	5	8	8	7	3	7
18:15 - 18:30	4	5	6	4	2	7
PM Period End						

Appendix B

MOVEMENT SUMMARY

Site: [Anderson St / Help St AM (Site Folder: Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Anderson St / Help St
8:15-9:15 2023
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 90 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Anderson St															
1	L2	All MCs	184	17.1	184	17.1	*0.371	26.1	LOS B	5.8	46.8	0.91	0.79	0.91	16.9
2	T1	All MCs	73	14.5	73	14.5	*0.262	39.4	LOS C	3.0	23.9	0.96	0.74	0.96	23.4
Approach			257	16.4	257	16.4	0.371	29.9	LOS C	5.8	46.8	0.93	0.78	0.93	19.8
North: Anderson St															
8	T1	All MCs	137	1.5	137	1.5	0.188	20.1	LOS B	4.0	28.4	0.71	0.57	0.71	29.4
9	R2	All MCs	312	5.7	312	5.7	*0.772	41.9	LOS C	12.5	91.9	0.99	1.10	1.11	22.5
Approach			448	4.5	448	4.5	0.772	35.2	LOS C	12.5	91.9	0.91	0.94	0.99	24.3
West: Help St															
10	L2	All MCs	109	5.8	109	5.8	0.106	11.4	LOS A	2.2	16.0	0.67	0.60	0.67	32.7
12	R2	All MCs	262	3.6	262	3.6	0.343	26.9	LOS B	9.1	66.0	0.85	0.74	0.85	16.4
Approach			372	4.2	372	4.2	0.343	22.3	LOS B	9.1	66.0	0.80	0.70	0.80	22.5
All Vehicles			1077	7.2	1077	7.2	0.772	29.5	LOS C	12.5	91.9	0.87	0.82	0.91	22.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Anderson St												
P1	Full	62	65	33.9	LOS D	0.1	0.1	0.87	0.87	200.6	200.0	1.00
North: Anderson St												
P3	Full	74	78	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00
West: Help St												
P4	Full	44	46	33.9	LOS D	0.1	0.1	0.87	0.87	200.5	200.0	1.00
All Pedestrians		180	189	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: [Anderson St / Help St PM (Site Folder: Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Anderson St / Help St
4:45-5:45 2023
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 90 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Anderson St															
1	L2	All MCs	299	8.8	299	8.8	* 0.570	26.9	LOS B	9.9	74.5	0.96	0.83	0.96	16.4
2	T1	All MCs	79	8.0	79	8.0	* 0.274	39.4	LOS C	3.3	24.6	0.96	0.75	0.96	23.4
Approach			378	8.6	378	8.6	0.570	29.5	LOS C	9.9	74.5	0.96	0.81	0.96	18.8
North: Anderson St															
8	T1	All MCs	96	1.1	96	1.1	0.131	19.6	LOS B	2.7	19.3	0.69	0.55	0.69	29.6
9	R2	All MCs	227	6.9	227	6.9	* 0.589	37.4	LOS C	8.6	64.1	0.95	0.95	0.95	23.6
Approach			323	5.2	323	5.2	0.589	32.1	LOS C	8.6	64.1	0.87	0.83	0.87	25.1
West: Help St															
10	L2	All MCs	127	6.6	127	6.6	0.124	11.5	LOS A	2.6	19.0	0.68	0.60	0.68	32.7
12	R2	All MCs	202	5.2	202	5.2	0.267	26.0	LOS B	6.9	50.3	0.82	0.73	0.82	16.7
Approach			329	5.8	329	5.8	0.267	20.4	LOS B	6.9	50.3	0.77	0.68	0.77	24.4
All Vehicles			1031	6.6	1031	6.6	0.589	27.4	LOS B	9.9	74.5	0.87	0.77	0.87	22.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Anderson St												
P1	Full	62	65	33.9	LOS D	0.1	0.1	0.87	0.87	200.6	200.0	1.00
North: Anderson St												
P3	Full	74	78	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00
West: Help St												
P4	Full	44	46	33.9	LOS D	0.1	0.1	0.87	0.87	200.5	200.0	1.00
All Pedestrians		180	189	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: [Anderson St / Help St AM (Site Folder: Future Base (2035))]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Anderson St / Help St
8:15-9:15 2023
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 90 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 12 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Anderson St															
1	L2	All MCs	228	17.1	228	17.1	*0.518	29.4	LOS C	7.7	62.1	0.96	0.81	0.96	15.9
2	T1	All MCs	90	14.5	90	14.5	*0.325	39.9	LOS C	3.8	29.8	0.97	0.76	0.97	23.3
Approach			318	16.4	318	16.4	0.518	32.4	LOS C	7.7	62.1	0.96	0.80	0.96	19.1
North: Anderson St															
8	T1	All MCs	170	1.5	170	1.5	0.214	18.3	LOS B	4.8	33.9	0.68	0.56	0.68	30.1
9	R2	All MCs	386	5.7	386	5.7	*0.847	45.7	LOS D	16.0	117.7	1.00	1.19	1.21	21.7
Approach			556	4.5	556	4.5	0.847	37.3	LOS C	16.0	117.7	0.90	1.00	1.05	23.7
West: Help St															
10	L2	All MCs	136	5.8	136	5.8	0.132	11.5	LOS A	2.7	19.9	0.68	0.60	0.68	32.7
12	R2	All MCs	325	3.6	325	3.6	0.462	30.2	LOS C	12.1	87.0	0.90	0.79	0.90	15.3
Approach			461	4.2	461	4.2	0.462	24.7	LOS B	12.1	87.0	0.83	0.74	0.83	21.6
All Vehicles			1335	7.2	1335	7.2	0.847	31.8	LOS C	16.0	117.7	0.89	0.86	0.95	22.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Anderson St												
P1	Full	62	81	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00
North: Anderson St												
P3	Full	74	97	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00
West: Help St												
P4	Full	44	57	33.9	LOS D	0.1	0.1	0.87	0.87	200.5	200.0	1.00
All Pedestrians		180	235	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: [Anderson St / Help St PM (Site Folder: Future Base (2035))]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Anderson St / Help St
4:45-5:45 2023
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 90 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 12 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Anderson St															
1	L2	All MCs	371	8.8	371	8.8	*0.713	30.5	LOS C	13.0	97.5	0.99	0.87	1.02	15.7
2	T1	All MCs	98	8.0	98	8.0	*0.340	41.5	LOS C	4.1	30.8	0.97	0.76	0.97	23.3
Approach			469	8.6	469	8.6	0.713	32.8	LOS C	13.0	97.5	0.99	0.84	1.01	17.8
North: Anderson St															
8	T1	All MCs	119	1.1	119	1.1	0.162	19.9	LOS B	3.4	24.3	0.70	0.56	0.70	29.5
9	R2	All MCs	282	6.9	282	6.9	*0.749	42.7	LOS D	11.3	83.9	0.99	1.08	1.09	22.4
Approach			401	5.2	401	5.2	0.749	35.9	LOS C	11.3	83.9	0.90	0.93	0.97	24.1
West: Help St															
10	L2	All MCs	158	6.6	158	6.6	0.154	11.7	LOS A	3.2	23.9	0.69	0.60	0.69	32.6
12	R2	All MCs	251	5.2	251	5.2	0.331	26.8	LOS B	8.7	63.7	0.84	0.74	0.84	16.5
Approach			409	5.8	409	5.8	0.331	21.0	LOS B	8.7	63.7	0.78	0.69	0.78	24.1
All Vehicles			1278	6.6	1278	6.6	0.749	30.0	LOS C	13.0	97.5	0.90	0.82	0.93	22.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Anderson St												
P1	Full	62	81	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00
North: Anderson St												
P3	Full	74	97	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00
West: Help St												
P4	Full	44	57	33.9	LOS D	0.1	0.1	0.87	0.87	200.5	200.0	1.00
All Pedestrians		180	235	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: [Anderson St / Help St AM Dev (Site Folder: 2023 With Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Anderson St / Help St
8:15-9:15 2023 with Dev
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 90 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Anderson St															
1	L2	All MCs	184	17.1	184	17.1	*0.371	26.1	LOS B	5.8	46.8	0.91	0.79	0.91	16.9
2	T1	All MCs	73	14.5	73	14.5	*0.262	39.4	LOS C	3.0	23.9	0.96	0.74	0.96	23.4
Approach			257	16.4	257	16.4	0.371	29.9	LOS C	5.8	46.8	0.93	0.78	0.93	19.8
North: Anderson St															
8	T1	All MCs	137	1.5	137	1.5	0.188	20.1	LOS B	4.0	28.4	0.71	0.57	0.71	29.4
9	R2	All MCs	312	5.7	312	5.7	*0.772	41.9	LOS C	12.5	91.9	0.99	1.10	1.11	22.5
Approach			448	4.5	448	4.5	0.772	35.2	LOS C	12.5	91.9	0.91	0.94	0.99	24.3
West: Help St															
10	L2	All MCs	137	4.6	137	4.6	0.132	11.0	LOS A	2.6	18.9	0.64	0.62	0.64	32.9
12	R2	All MCs	269	3.5	269	3.5	0.352	26.9	LOS B	9.4	67.7	0.85	0.75	0.85	16.4
Approach			406	3.9	406	3.9	0.352	21.5	LOS B	9.4	67.7	0.78	0.71	0.78	23.3
All Vehicles			1112	7.0	1112	7.0	0.772	29.0	LOS C	12.5	91.9	0.86	0.82	0.90	23.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Anderson St												
P1	Full	62	65	33.9	LOS D	0.1	0.1	0.87	0.87	200.6	200.0	1.00
North: Anderson St												
P3	Full	74	78	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00
West: Help St												
P4	Full	44	46	33.9	LOS D	0.1	0.1	0.87	0.87	200.5	200.0	1.00
All Pedestrians		180	189	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: [Anderson St / Help St PM Dev (Site Folder: 2023 With Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Anderson St / Help St
4:45-5:45 2023 with Dev
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 90 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Anderson St															
1	L2	All MCs	299	8.8	299	8.8	*0.570	26.9	LOS B	9.9	74.5	0.96	0.83	0.96	16.4
2	T1	All MCs	79	8.0	79	8.0	*0.274	39.4	LOS C	3.3	24.6	0.96	0.75	0.96	23.4
Approach			378	8.6	378	8.6	0.570	29.5	LOS C	9.9	74.5	0.96	0.81	0.96	18.8
North: Anderson St															
8	T1	All MCs	96	1.1	96	1.1	0.131	19.6	LOS B	2.7	19.3	0.69	0.55	0.69	29.6
9	R2	All MCs	227	6.9	227	6.9	*0.589	37.4	LOS C	8.6	64.1	0.95	0.95	0.95	23.6
Approach			323	5.2	323	5.2	0.589	32.1	LOS C	8.6	64.1	0.87	0.83	0.87	25.1
West: Help St															
10	L2	All MCs	151	5.6	151	5.6	0.146	11.6	LOS A	2.9	21.4	0.66	0.63	0.66	34.5
12	R2	All MCs	208	5.1	208	5.1	0.275	26.1	LOS B	7.1	51.7	0.82	0.73	0.82	16.8
Approach			359	5.3	359	5.3	0.275	20.0	LOS B	7.1	51.7	0.75	0.69	0.75	25.7
All Vehicles			1060	6.5	1060	6.5	0.589	27.1	LOS B	9.9	74.5	0.86	0.77	0.86	23.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Anderson St												
P1	Full	62	65	33.9	LOS D	0.1	0.1	0.87	0.87	200.6	200.0	1.00
North: Anderson St												
P3	Full	74	78	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00
West: Help St												
P4	Full	44	46	33.9	LOS D	0.1	0.1	0.87	0.87	200.5	200.0	1.00
All Pedestrians		180	189	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: [Anderson St / Help St AM Dev (Site Folder: 2035 With Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Anderson St / Help St
8:15-9:15 2023 with Dev
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 90 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 12 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Anderson St															
1	L2	All MCs	228	17.1	228	17.1	*0.518	29.4	LOS C	7.7	62.1	0.96	0.81	0.96	15.9
2	T1	All MCs	90	14.5	90	14.5	*0.325	39.9	LOS C	3.8	29.8	0.97	0.76	0.97	23.3
Approach			318	16.4	318	16.4	0.518	32.4	LOS C	7.7	62.1	0.96	0.80	0.96	19.1
North: Anderson St															
8	T1	All MCs	170	1.5	170	1.5	0.214	18.3	LOS B	4.8	33.9	0.68	0.56	0.68	30.1
9	R2	All MCs	386	5.7	386	5.7	*0.847	45.7	LOS D	16.0	117.7	1.00	1.19	1.21	21.7
Approach			556	4.5	556	4.5	0.847	37.3	LOS C	16.0	117.7	0.90	1.00	1.05	23.7
West: Help St															
10	L2	All MCs	170	4.6	170	4.6	0.163	11.2	LOS A	3.2	23.6	0.65	0.62	0.65	32.8
12	R2	All MCs	334	3.5	334	3.5	0.474	30.3	LOS C	12.4	89.4	0.90	0.80	0.90	15.3
Approach			504	3.9	504	3.9	0.474	23.8	LOS B	12.4	89.4	0.82	0.74	0.82	22.4
All Vehicles			1378	7.0	1378	7.0	0.847	31.3	LOS C	16.0	117.7	0.88	0.86	0.94	22.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Anderson St												
P1	Full	62	81	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00
North: Anderson St												
P3	Full	74	97	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00
West: Help St												
P4	Full	44	57	33.9	LOS D	0.1	0.1	0.87	0.87	200.5	200.0	1.00
All Pedestrians		180	235	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: [Anderson St / Help St PM Dev (Site Folder: 2035 With Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Anderson St / Help St
4:45-5:45 2023 with Dev
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 90 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 12 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Anderson St															
1	L2	All MCs	371	8.8	371	8.8	*0.713	30.5	LOS C	13.0	97.5	0.99	0.87	1.02	15.7
2	T1	All MCs	98	8.0	98	8.0	*0.340	41.5	LOS C	4.1	30.8	0.97	0.76	0.97	23.3
Approach			469	8.6	469	8.6	0.713	32.8	LOS C	13.0	97.5	0.99	0.84	1.01	17.8
North: Anderson St															
8	T1	All MCs	119	1.1	119	1.1	0.162	19.9	LOS B	3.4	24.3	0.70	0.56	0.70	29.5
9	R2	All MCs	282	6.9	282	6.9	*0.749	42.7	LOS D	11.3	83.9	0.99	1.08	1.09	22.4
Approach			401	5.2	401	5.2	0.749	35.9	LOS C	11.3	83.9	0.90	0.93	0.97	24.1
West: Help St															
10	L2	All MCs	187	5.6	187	5.6	0.181	11.9	LOS A	3.7	27.1	0.67	0.63	0.67	34.4
12	R2	All MCs	258	5.1	258	5.1	0.341	26.8	LOS B	9.0	65.5	0.84	0.75	0.84	16.5
Approach			445	5.3	445	5.3	0.341	20.6	LOS B	9.0	65.5	0.77	0.70	0.77	25.4
All Vehicles			1314	6.5	1314	6.5	0.749	29.6	LOS C	13.0	97.5	0.89	0.82	0.92	22.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

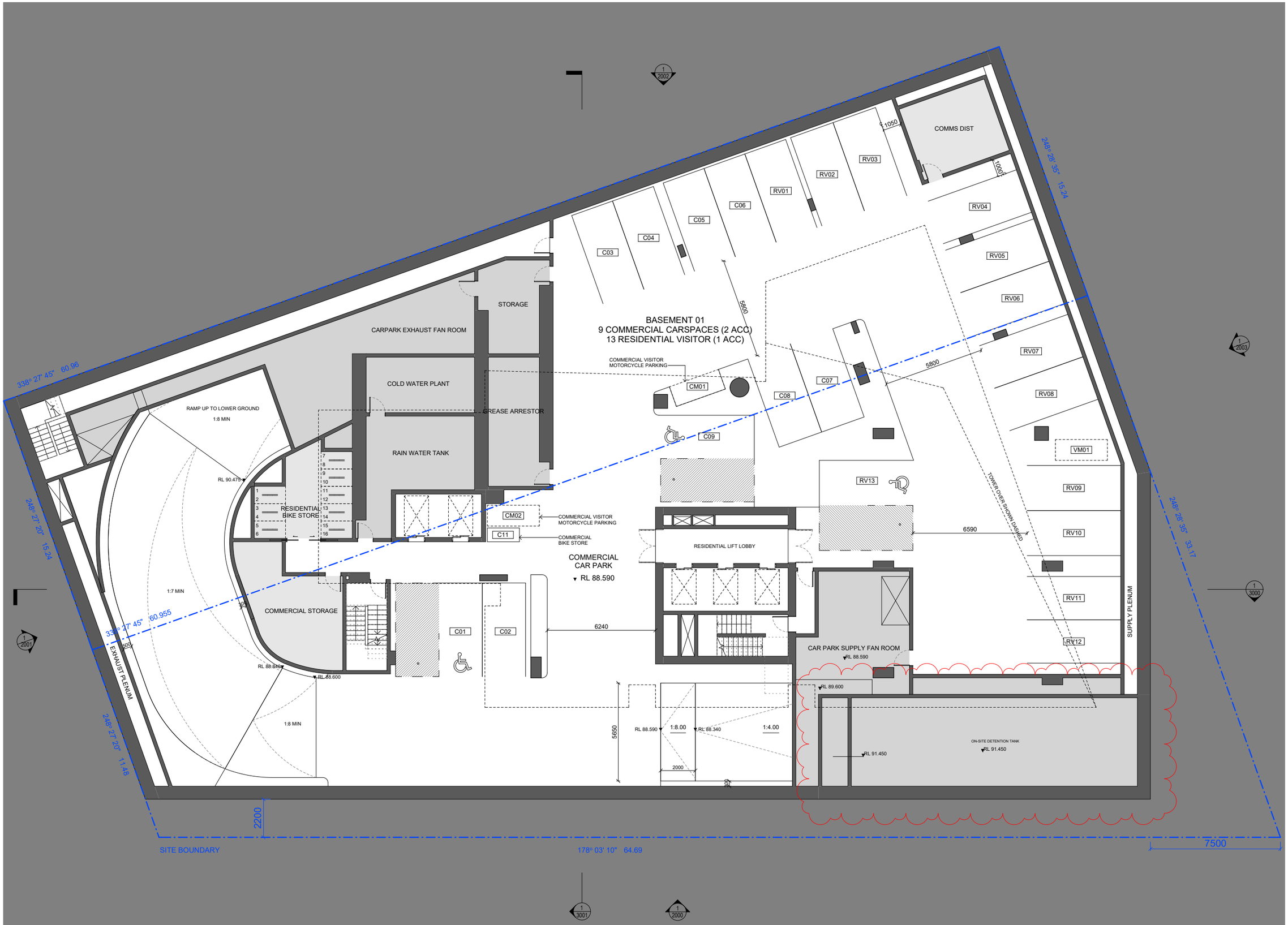
* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Anderson St												
P1	Full	62	81	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00
North: Anderson St												
P3	Full	74	97	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00
West: Help St												
P4	Full	44	57	33.9	LOS D	0.1	0.1	0.87	0.87	200.5	200.0	1.00
All Pedestrians		180	235	33.9	LOS D	0.2	0.2	0.87	0.87	200.6	200.0	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

Appendix C



Iss.	Date	For
-	20.12.2024	For SSDA
A	12.02.2025	For SSDA
B	02.09.2025	For SSDA

General Notes
Verify dimensions on site prior to commencement of work. Check existing RL's on site. Advise Architect of any discrepancies before commencement. Allow for adjustments to suit discrepancies. Comply with relevant authorities requirements. Comply with Building Code of Australia requirements. Comply with relevant Australian Standards for materials and construction practice. Comply with Basix Certificate. Do not scale from drawings.

Copyright

Acknowledgement of Country
This project is located on Cammeraygal Country.
We acknowledge the traditional custodians of Country, on this land called Australia. We respect their Elders, past, present and emerging.

Loftex Chatswood Pty. Ltd.
02 8920 0516

Mecone | Planner
Jordan Faeghi
0437 898 661

BG&E | Structure
Vince Betro
0414 814 862

Neuron | Services
Steve Cassells
0401 222 862

Common Grounds | Landscape
Alex Georgouras
0404 626 520

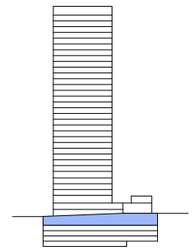
Walkerbai | ESD
Stewart Mann
0407 545 647

Stantec | Civil
Jackson Bramley
0421 193 028

PDC Consultants | Traffic
Ben Midgley
0413 167 797

Design Confidence | BCA / Access
Lindsay Beard
0407 870 612

Key Section



Project
Help Street Apartments

Project No.
22023

Address
3-5 Help Street Chatswood

Status
FOR SSDA

Drawn	Authorised	Date Issued
SY	MP	02.09.2025

Drawing
B01 Plan

Drawing No.
SSDA-1004

Scale
1 : 100 @ A1

Issue
B

North

0 1000 2000 3000 4000 5000
Scale 1:100 mm

EMBECE

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Nominated Architects
Mladen Prnjatovic 7468
Ben Green 7066
Chi Melhem 7754

Iss.	Date	For
-	20.12.2024	For SSDA
A	12.02.2025	For SSDA
B	29.04.2025	For SSDA
C	08.05.2025	For SSDA
D	02.09.2025	For SSDA

General Notes
Verify dimensions on site prior to commencement of work. Check existing RL's on site. Advise Architect of any discrepancies before commencement. Allow for adjustments to suit discrepancies. Comply with relevant authorities requirements. Comply with Building Code of Australia requirements. Comply with relevant Australian Standards for materials and construction practice. Comply with Basix Certificate. Do not scale from drawings.

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Loftex Chatswood Pty. Ltd.
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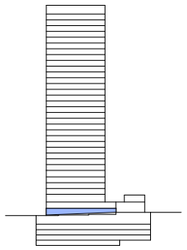
0407 870 612

Key Section



Project
Help Street Apartments

Project No.
22023

Address
3-5 Help Street Chatswood

Status
FOR SSDA

Drawn	Authorised	Date Issued
SY	MP	02.09.2025

Drawing
LG Plan

Drawing No.
SSDA-1010

Scale
1 : 100 @ A1

Issue
D

North

0 1000 2000 3000 4000 5000
Scale 1:100 mm

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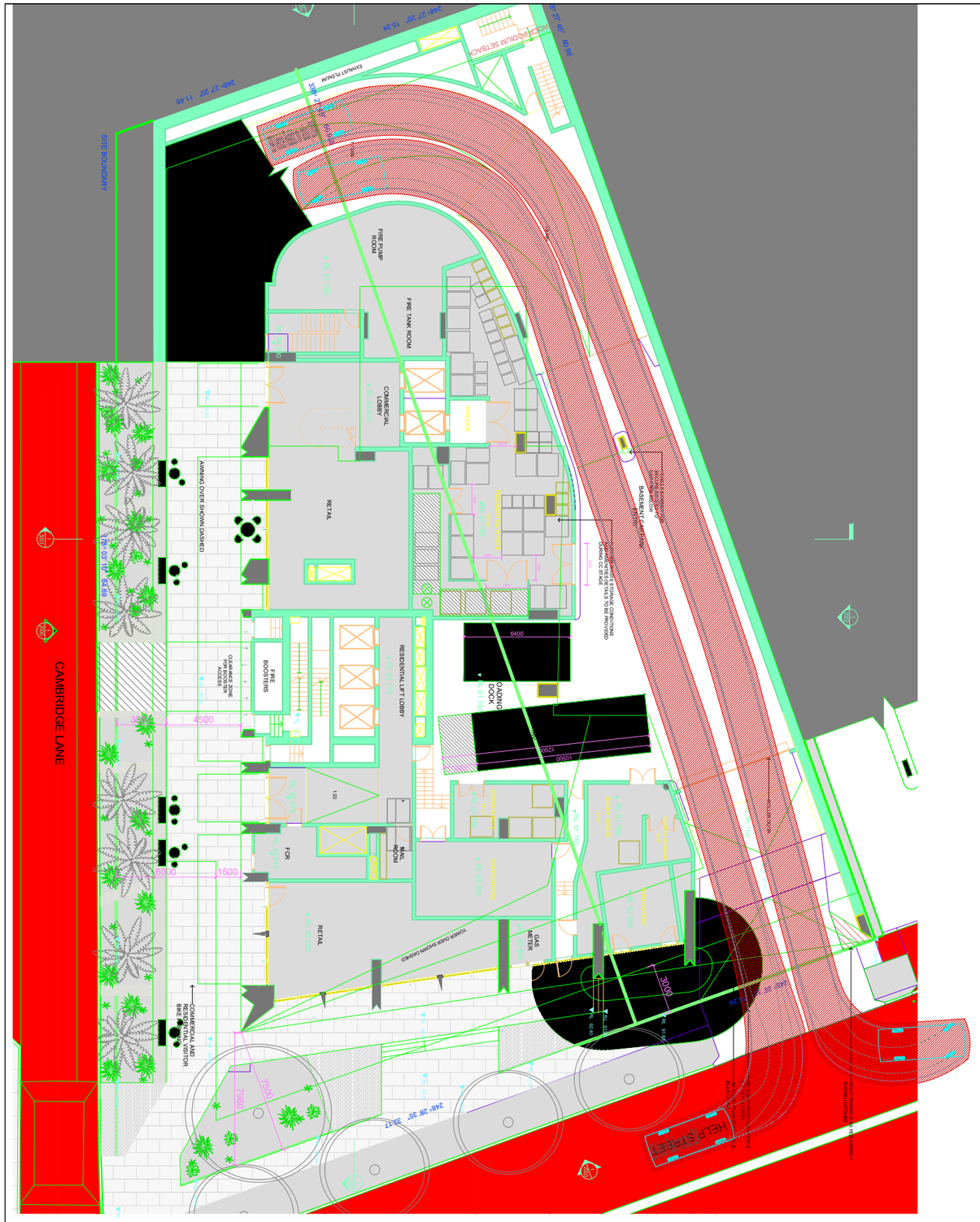
Nominated Architects
Mladen Prnjatovic 7468
Ben Green 7066
Chi Melhem 7754

Appendix D



BASEMENT 01
9 COMMERCIAL CARSPACES (2 ACC)
13 RESIDENTIAL VISITOR (1 ACC)

No.	Date	Description

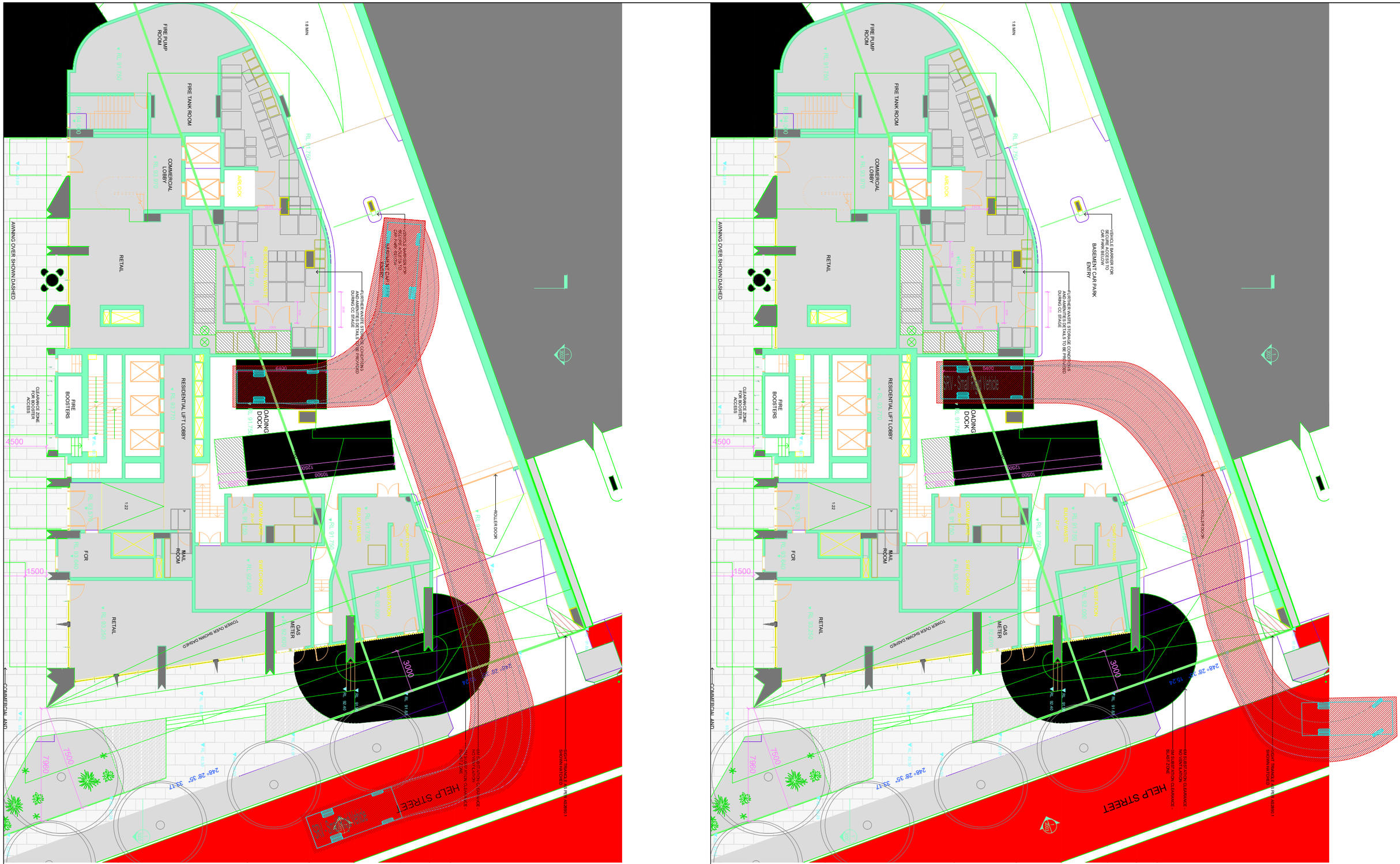
Swept Path Key
- Vehicle Wheel Path
- Vehicle Body Envelope
- 300mm Vehicle Clearance

North

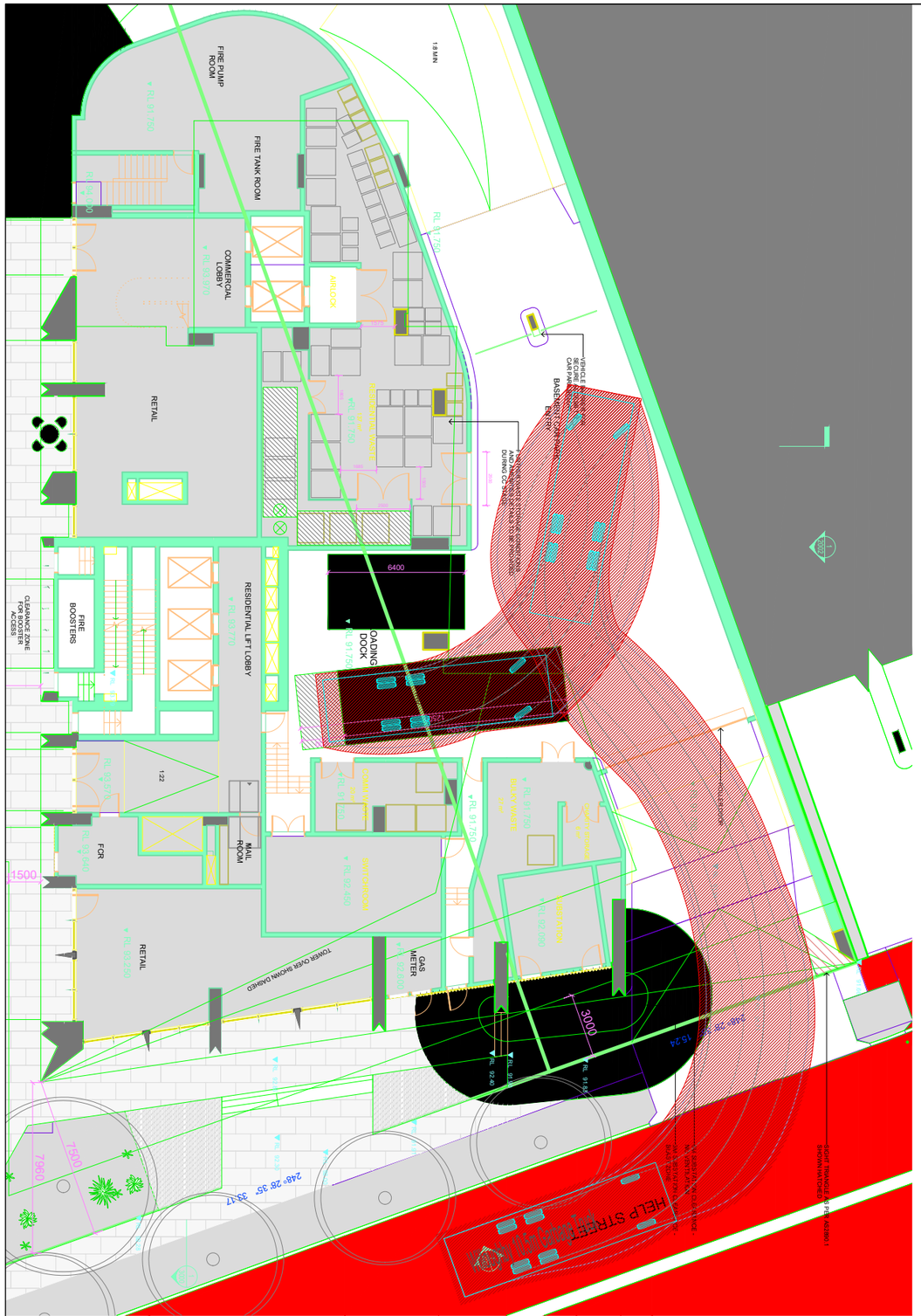
Drawing Prepared By

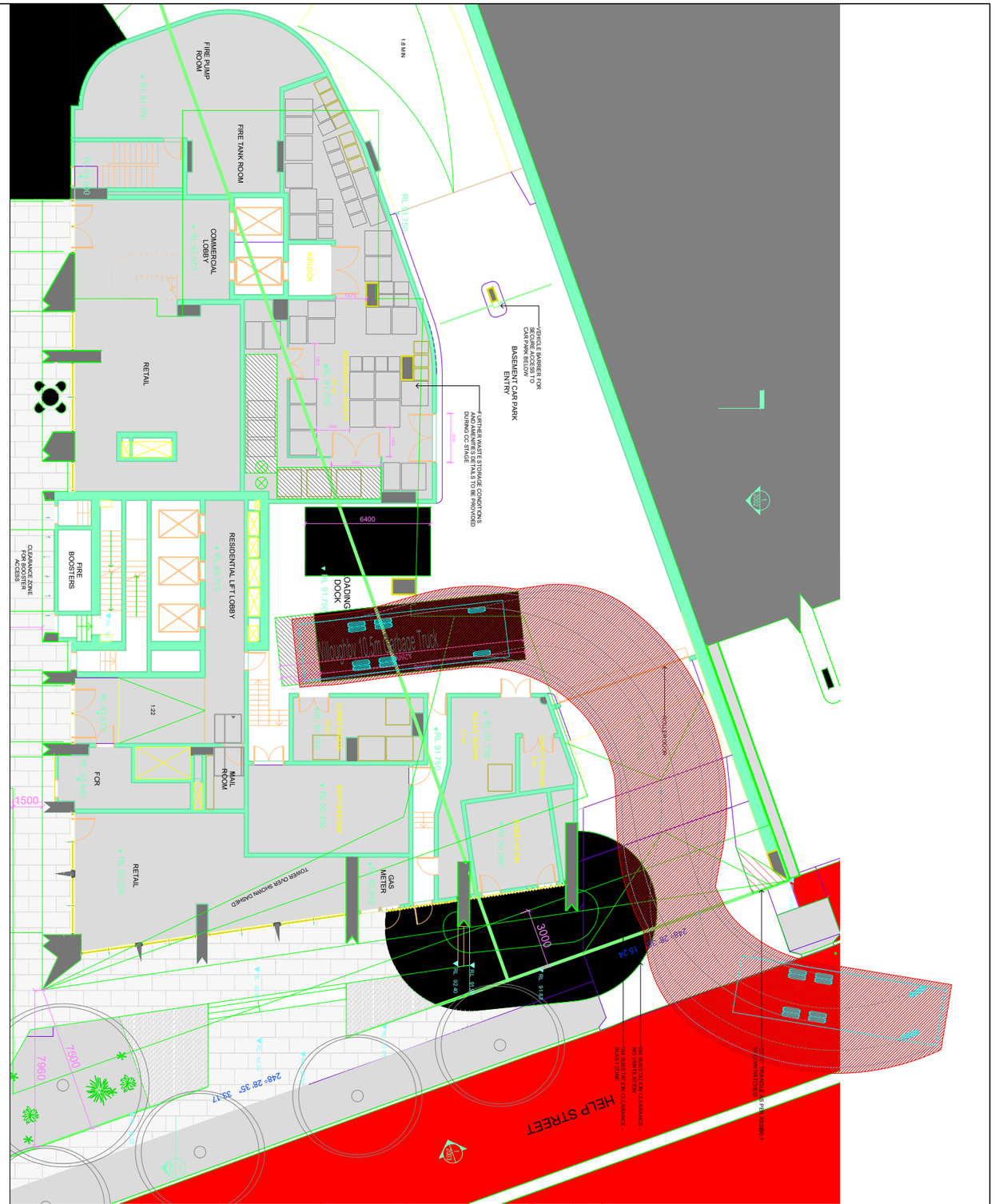
PDC Consultants
Level 14, 100 William Street
Woolloomooloo NSW 2011
t: +61 2 7900 6514
w: www.pdcconsultants.com.au
ABN: 70 615 064 670

Architect: EMBECE	Project: 3-5 Help Street, Chatswood	Drawing Title: Lower Ground Floor & Basement Level 1 B99 Design Vehicle Swept Path Analysis Site Entry / Exit & Circulation Movements	Drawing No.: 001	Revision No.: -
			Drawn By: BM	Date: 26/08/2025
Client: Loftex Chatswood Pty Ltd	Project No: 0650	Sheet Status: NOT FOR CONSTRUCTION	Scale: 1:300 @ A3	



No. Date Description	Swept Path Key Vehicle Wheel Path Vehicle Body Envelope 300mm Vehicle Clearance	North	Drawing Prepared By PDC Consultants Level 14, 100 William Street Woolloomooloo NSW 2011 t: +61 2 7900 6514 w: www.pdcconsultants.com.au ABN: 70 615 064 670	Architect EMBECE Client Loftex Chatswood Pty Ltd	Project 3-5 Help Street, Chatswood Project No 0650	Drawing Title Lower Ground Floor 1 Plan SRV Swept Path Analysis Loading Bay Entry & Exit Movements Sheet Status NOT FOR CONSTRUCTION	Drawing No. 002 Revision No. - Drawn By BM Date 26/08/2025 Scale 1:250 @ A3





No.	Date	Description

Swept Path Key
- Vehicle Wheel Path
- Vehicle Body Envelope
- 300mm Vehicle Clearance

North

Drawing Prepared By

PDC Consultants
Level 14, 100 William Street
Woolloomooloo NSW 2011
t: +61 2 7900 6514
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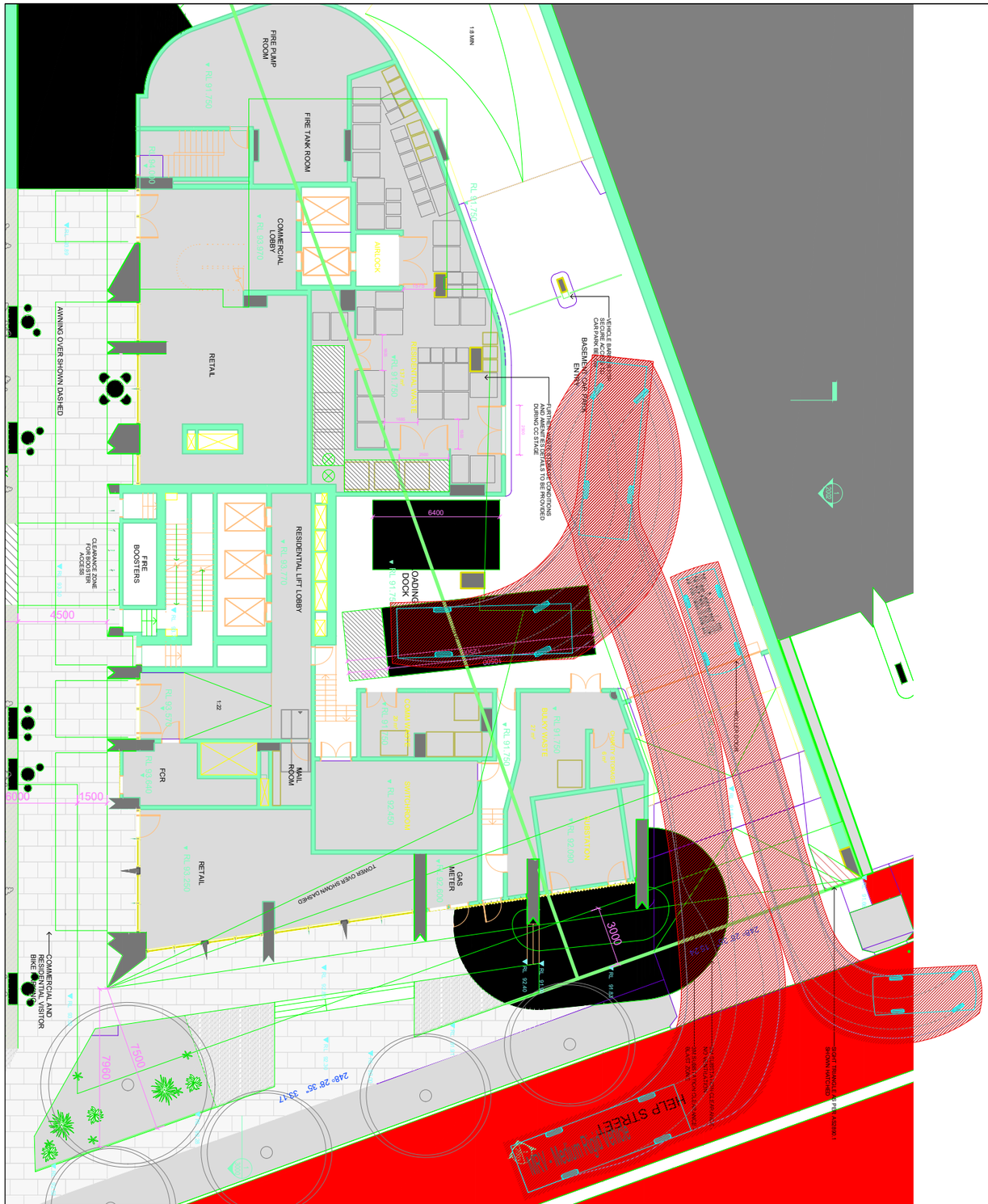
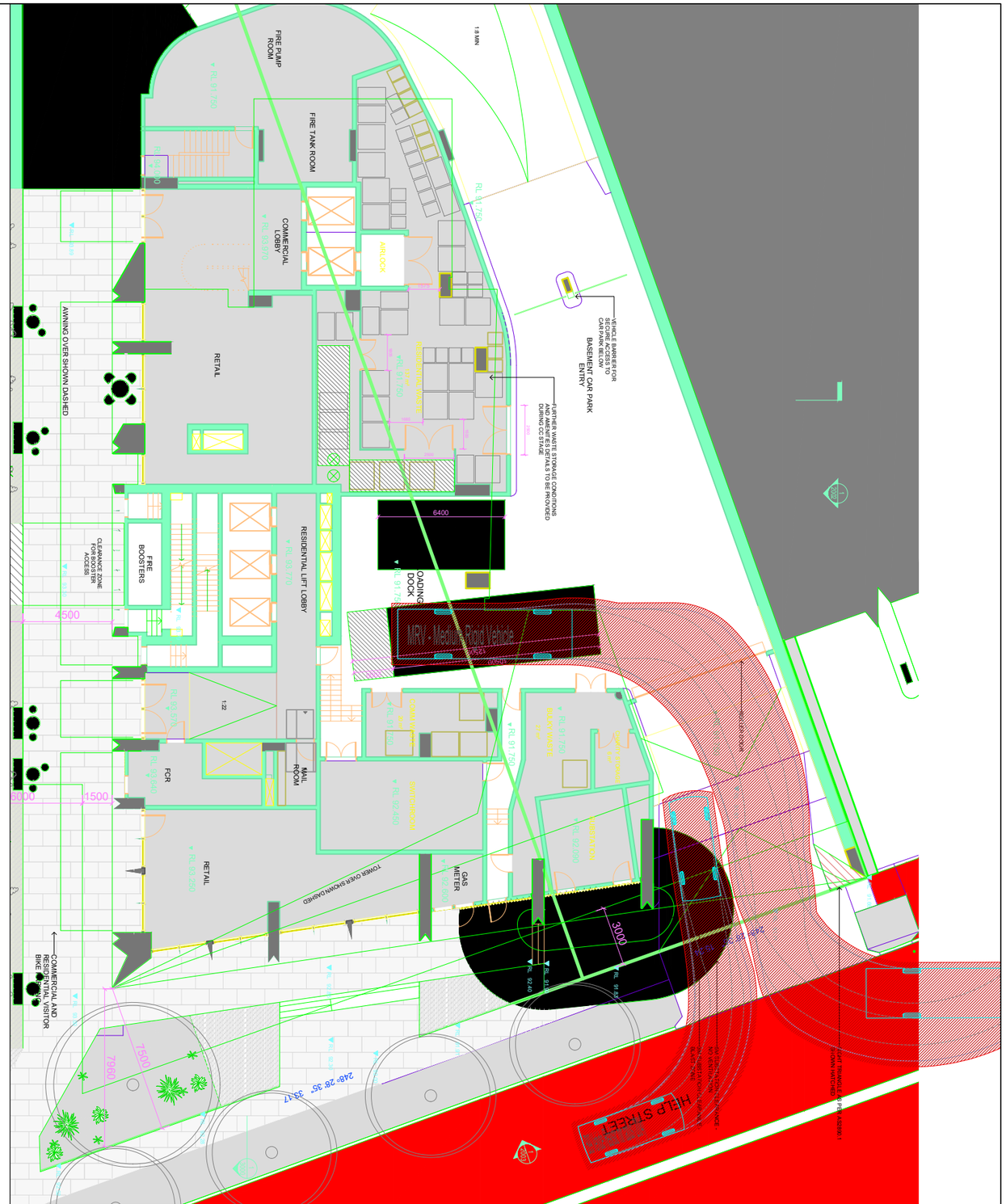
ABN: 70 615 064 670

Architect: EMBECE	Project: 3-5 Help Street, Chatswood	Drawing Title: Lower Ground Floor 1 Plan Council's Waste Truck Swept Path Analysis Loading Bay Entry & Exit Movements	Drawing No.: 003 / Revision No.: -
Client: Loftex Chatswood Pty Ltd	Project No: 0650	Sheet Status: NOT FOR CONSTRUCTION	Drawn By: BM / Date: 26/08/2025
			Scale: 1:250 @ A3





No.	Date	Description

Swept Path Key
- Vehicle Wheel Path
- Vehicle Body Envelope
- 300mm Vehicle Clearance

North

N

Drawing Prepared By

PDC Consultants
Level 14, 100 William Street
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Architect EMBECE	Project 3-5 Help Street, Chatswood	Drawing Title Lower Ground Floor 1 Plan Swept Path Analysis B99 Passing MRV	Drawing No. 004	Revision No. -
			Drawn By BM	Date 26/08/2025
Client Loftex Chatswood Pty Ltd	Project No 0650	Sheet Status NOT FOR CONSTRUCTION	Scale 1:250 @ A3	

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