Client
South Road Corporation Pty Ltd.

Date
19 March 2024

Transport Impact Assessment - Proposed Mixed-Use Development

360-372 South Road, Moorabbin

Planning
Transport
Urban Design
Waste Management

ratio:

ratio.com.au

Project
360-372 South Road, Moorabbin

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Version	Date	Issue	Prepared by	Checked by
F01	19/03/24	Final	[redacted]	

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1. Introduction

1.1. Introduction

Ratio Consultants was engaged by South Road Corporation Pty Ltd to undertake a transport assessment of the proposed mixed-use development on the site located at 360-372 South Road in Moorabbin.

The proposal comprises the construction of a 15-storey development comprising a mix of office, indoor recreation facilities and food and drink uses.

This report has been prepared to address the transport engineering matters of the proposed development, including consideration to:

— car parking provision

— car parking layout and design

— vehicle, pedestrian and cyclist access arrangements and design

— bicycle parking provision and design

— loading and waste vehicle access arrangements

— traffic impacts of the development

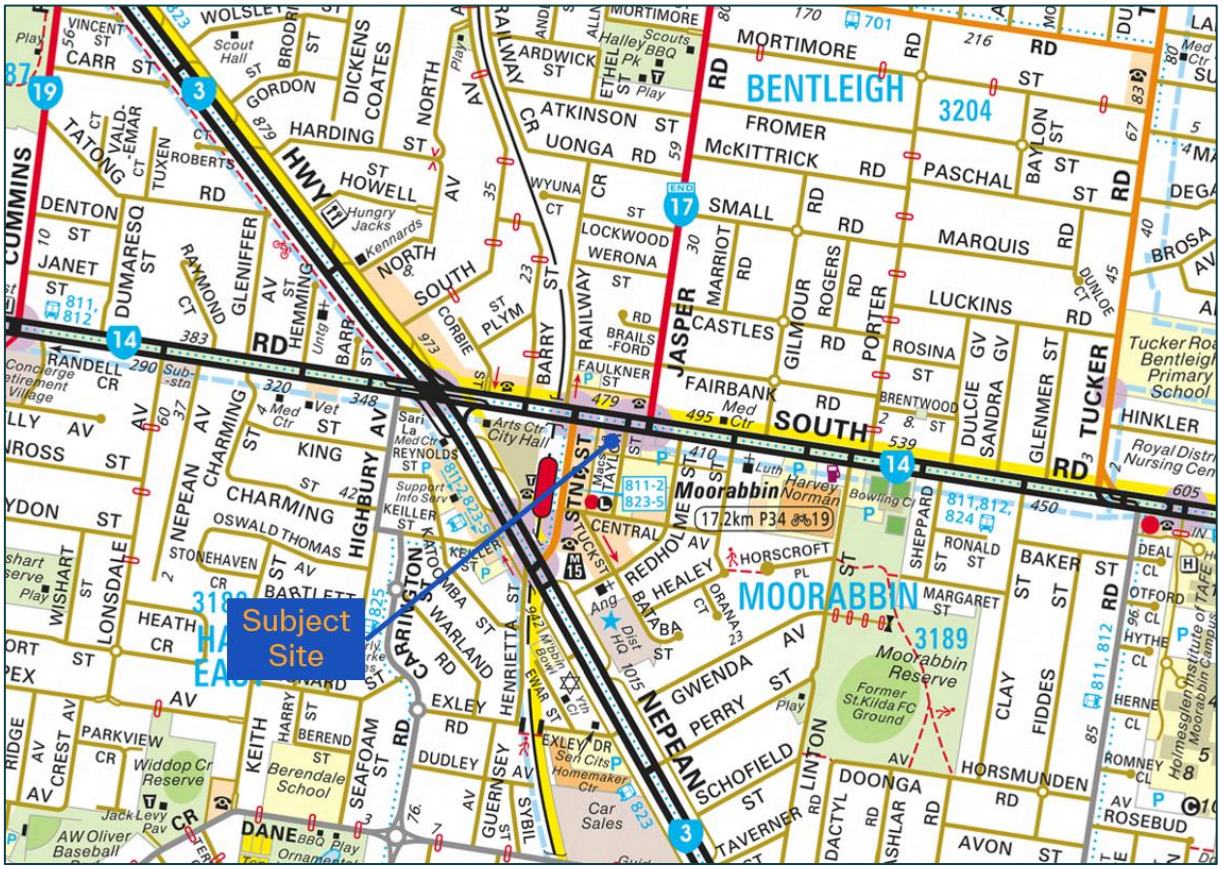
For reference, a copy of the plans used to prepare this report are provided in Appendix A.

2. Existing Conditions

2.1. Location and Environment

The subject site is located on the southwestern corner of the intersection of South Road and Taylor Street in Moorabbin. The site's location relative to the surrounding road network is shown in Figure 2-1.

Figure 2-1: Site Location



Source: www.melways.com.au

The site is rectangular in shape with a frontage to South Road of approximately 41 metres and a frontage to Carlisle Street of approximately 40 metres, for an overall site area of approximately 1,625 square metres.

The site is currently occupied by six commercial buildings. Vehicle access to these buildings is currently provided via the rear Right-of-Way (RoW) accessed from Taylors Street. The site is located within an Activity Centre Zone – Schedule 3 (ACZ3) and is not subject to any Planning Scheme Overlays.

Surrounding land use is a mixture of residential, and a variety of retail and commercial uses within the local activity centre surrounding the site and Moorabbin train station. Some other notable non-residential land uses include:

— Moorabbin General Practice located approximately 150 metres southeast of the site.

— SuperValue Chemist Moorabbin located approximately 180 metres southeast of the site.

— Australia Post – Moorabbin LPO located approximately 120 metres southwest of the site.

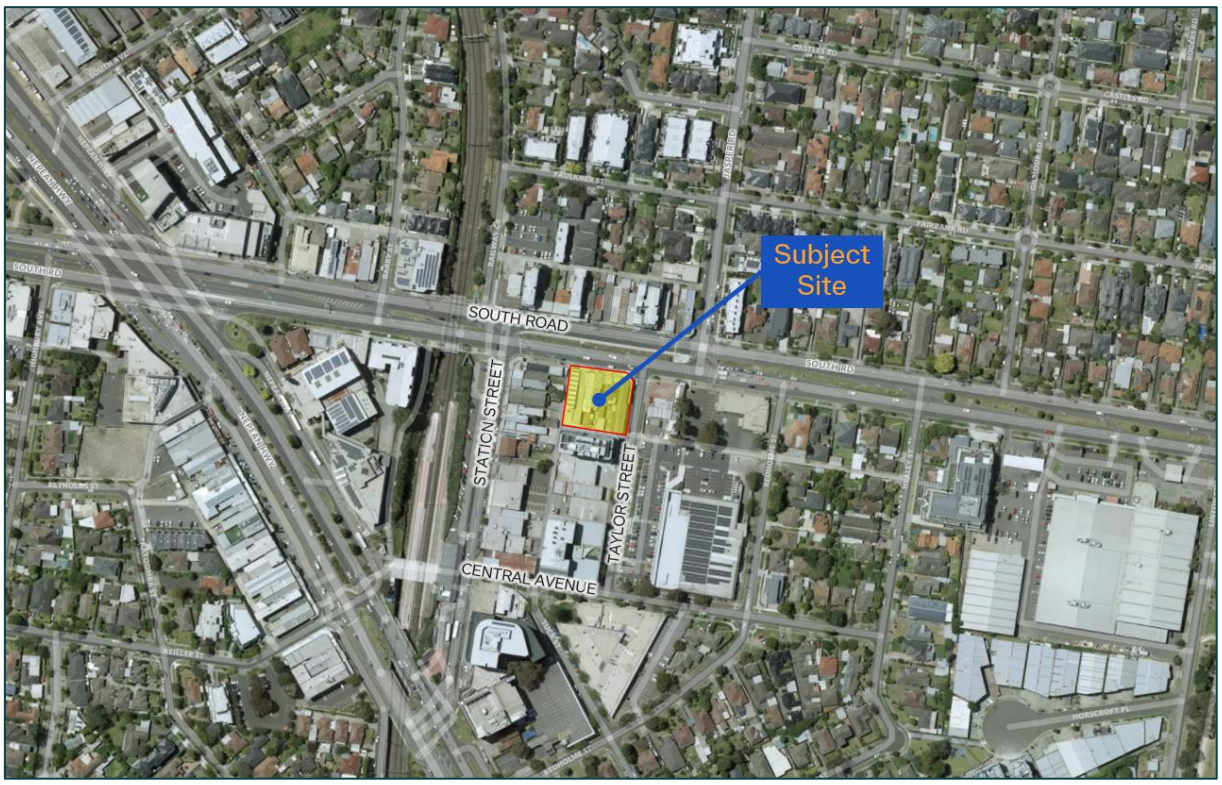
— Woolworths Moorabbin located approximately 130 metres southeast of the site.

— St James Moorabbin Lutheran Church of Australia located approximately 280 metres southeast of the site.

— Kingston City Hall located approximately 180 metres west of the site.

Figure 2-2 shows an aerial photograph of the subject site relative to its surroundings.

Figure 2-2: Aerial view of Subject Site and Surroundings



Source: maps.nearmap.com.au

2.2. Road Network

South Road is a Primary Arterial Road under the care and management of the Department of Transport & Planning (DTP) that runs in an east-west alignment. In the vicinity of the subject site, South Road has a wide carriageway width of approximately 28.0 metre and comprises of two lanes of traffic in each direction and a kerbside parallel parking lane on both sides of the road, separated by a central median.

The kerbside parallel parking in both directions (in the vicinity of the site) primarily consists of 1/4P and 1P parking with varying day and time restrictions fronting the subject site. South Road has a posted speed limit of 70 km/hr and has pedestrian footpaths in both directions.

The site frontage to South Road is shown in Figure 2-3, with views of South Road adjacent to the subject site shown in Source: *google.com/maps (dated October 2022)*

Figure 2-4 and Source: *google.com/maps (dated June 2023)*

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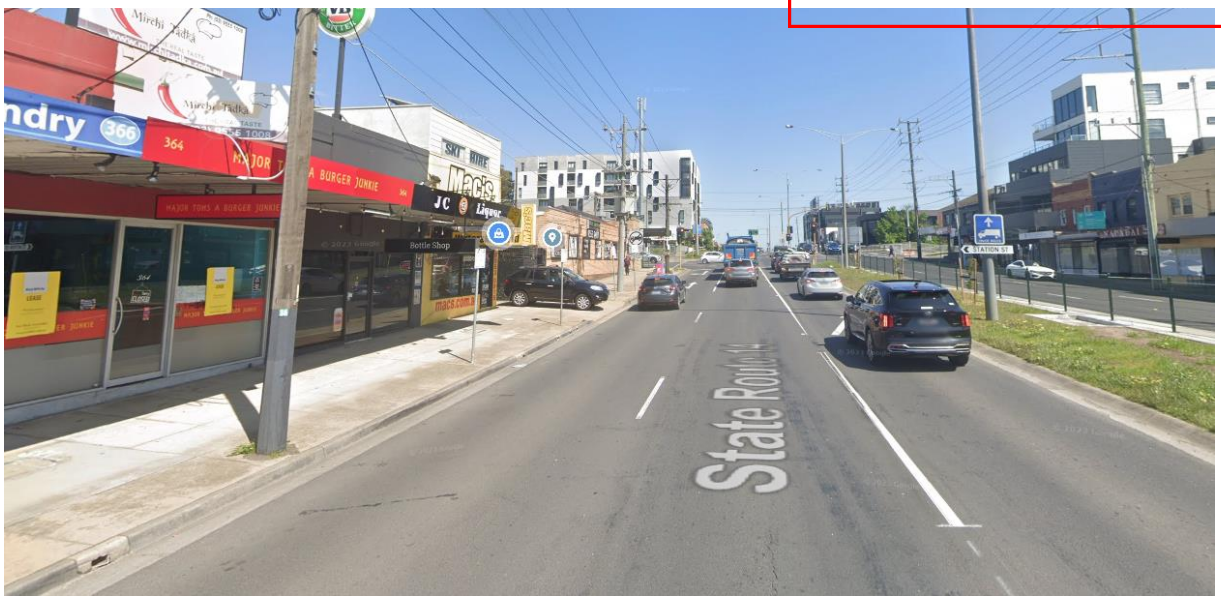
Figure 2-3: View of South Road, near the subject site facing west



Source: google.com/maps (dated October 2022)

Figure 2-4: View of South Road, near the subject site facing east

Source: google.com/maps (dated June 2023)

Taylor Street is a Local Access Street under the care and management of Local Council that runs in a north-south alignment terminating at South Road in the north and Central Avenue in the south.

In the vicinity of the subject site, Taylor Street has an approximate carriageway width of 8.8 metres accommodating for one lane of traffic in each direction with 1/4P kerbside parallel parking in the northbound direction and 'No Standing' restrictions in the southbound direction (in the vicinity of the site). Taylor Street has a 'Keep Clear' zone across the northbound

carriageway at the intersection with the rear laneway to the south of the site. At the approach towards South Road, Taylor Street splits into one left and one right turning lanes.

Taylor Street has a default speed limit of 50km/hr characteristic of built-up areas and has pedestrian footpaths in each direction.

Views of Taylor Street adjacent to the subject site are shown in Figure 2-5 and Figure 2-6.

Figure 2-5: View of Taylor Street, near the subject site facing south

Source: google.com/maps (dated October 2019)

Figure 2-6: View of Taylor Street, near the subject site facing north

Source: google.com/maps (dated October 2019)

Macs Lane is a laneway under the care and management of Local Council that runs in a north-south alignment along the western boundary of the site, terminating at South Road in the north and Central Avenue in the south. Macs Lane has an approximate laneway width of 3.0 metres with a concrete sealed surface. Macs Lane predominately provides rear vehicle access to the

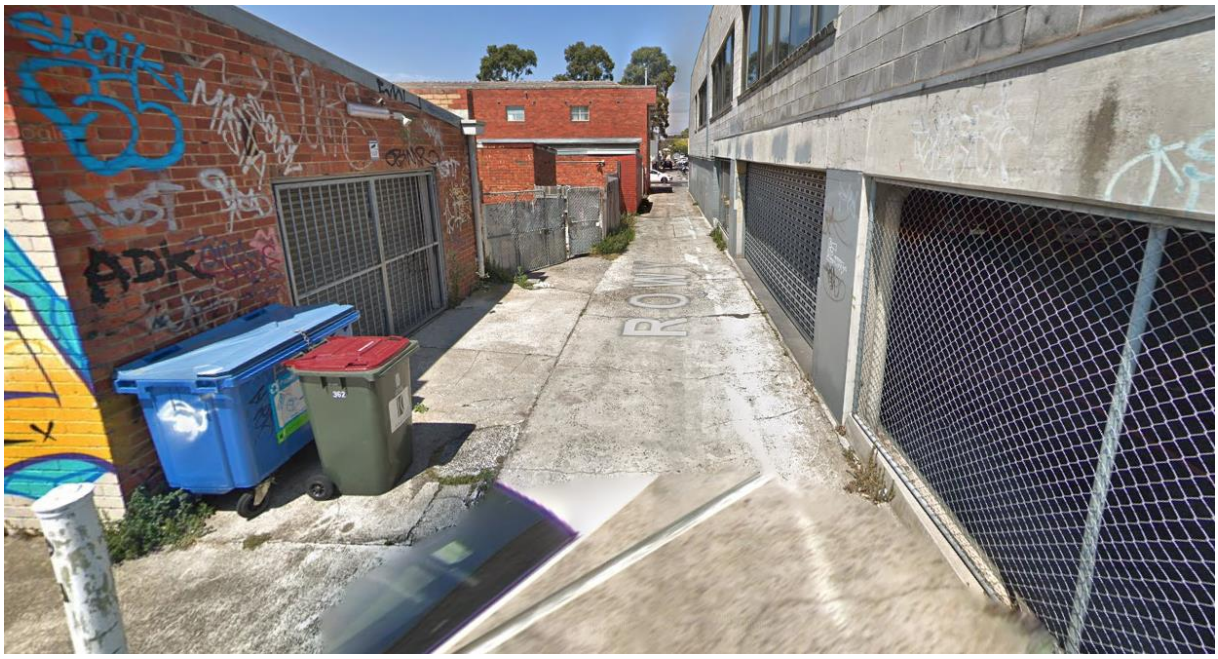
retail and commercial tenancies fronting Station Street. A view of Macs Lane adjacent to the subject site are shown in Figure 2-7.

Figure 2-7: View of Macs Lane facing north

Source: google.com/maps (dated January 2019)

An **unnamed ROW** at the southern boundary of the subject site is a laneway under the care and management of Local Council that runs in an east-west alignment terminating at Macs Lane in the west and Taylors Street in the east. The laneway has an approximate laneway width of 3.0 metres and has a concrete sealed surface. It predominately provides rear vehicle access to the existing retail and commercial tenancies on the subject site, which front South Road. It also provides vehicle access to the recently constructed development to the immediate south of the subject site. A view of the ROW adjacent to the subject site are shown in Figure 2-8.

Figure 2-8: View of the unnamed ROW facing east



2.3. Traffic Conditions

Ratio consultants commissioned a turning movement survey at the following intersections on Wednesday 16 August 2023 between 7:00am to 10:00am and 3:00pm to 6:00pm:

— South Road / Station Street

— South Road / Taylor Street

— South Road / Jaspers Road

The peak hour results are shown in Figure 2-9**Error! Reference source not found.** and Figure 2-10.

Figure 2-9: Existing AM Peak Hour Traffic Volumes - South Road / Taylor Street / Jasper Road

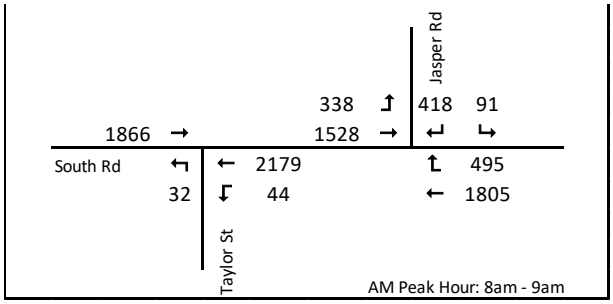
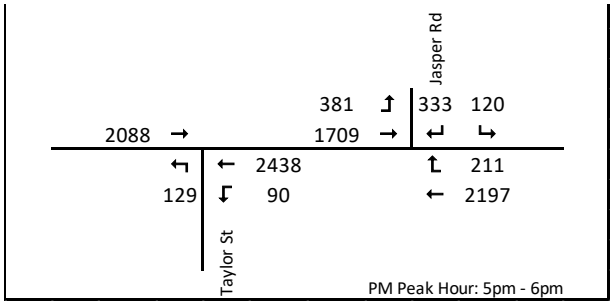


Figure 2-10: Existing PM Peak Hour Traffic Volumes - South Road / Taylor Street / Jasper Road

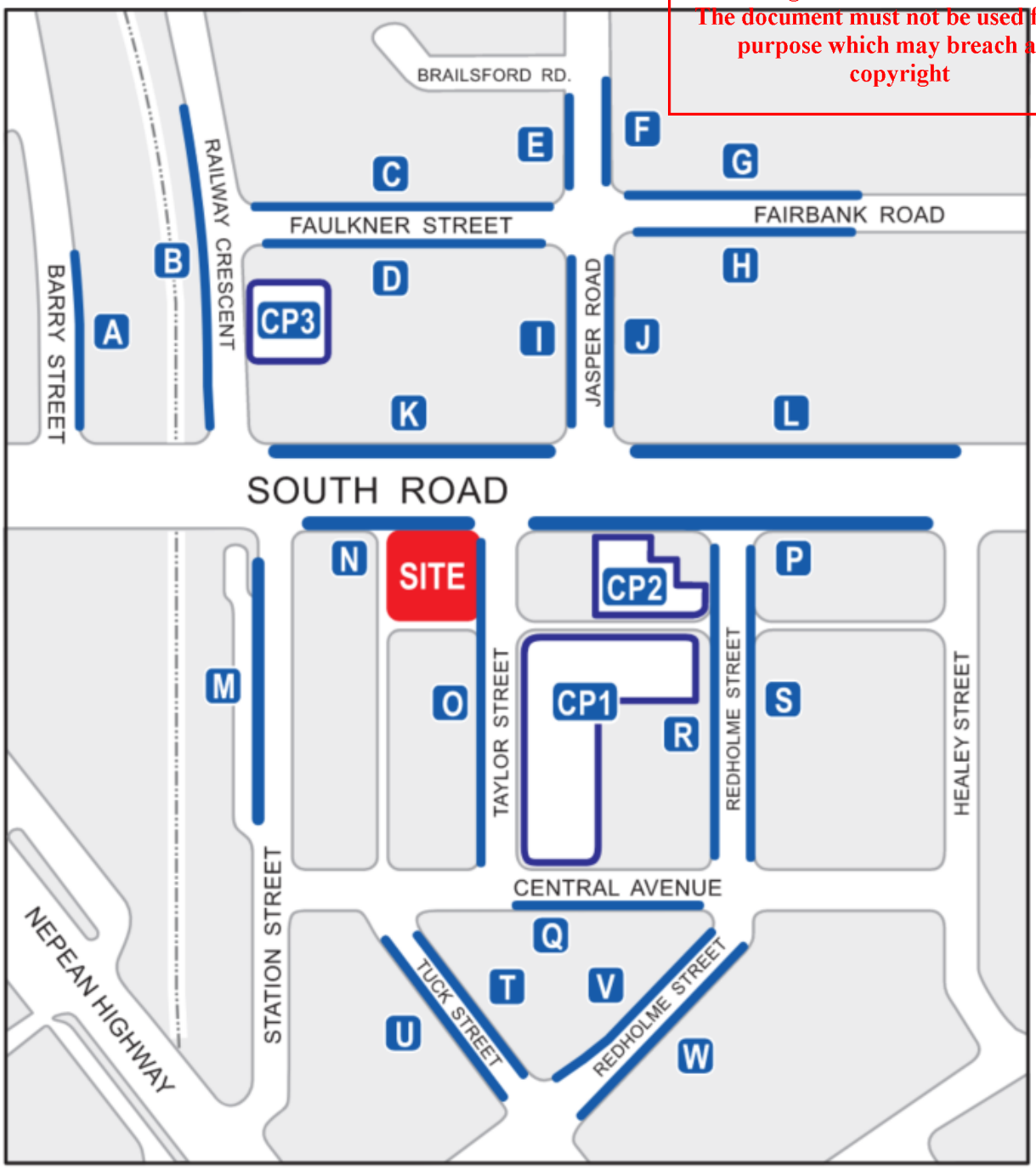


A review of the most recent DTP data for Annual Average Daily Traffic Total (AADT) of indicates a total of 40,000vpd using this section of South Road.

2.4. Parking Conditions

Ratio Consultants commissioned surveys of the on-street parking supply and demand on Wednesday 16 August 2023 between 8:00am and 6:00pm. The extent of the survey area is presented in Figure 2-11, followed by a summary of the results.

Figure 2-11: Parking Survey Area



Wednesday 16 August 2023

— There was observed to be a supply of 323 to 332 publicly available car parking spaces within the survey area, dependent on the time of day. The parking spaces within vicinity of the site are predominately subject to unrestricted and 2P parking restrictions depending on time of day with some 1P parking restrictions.

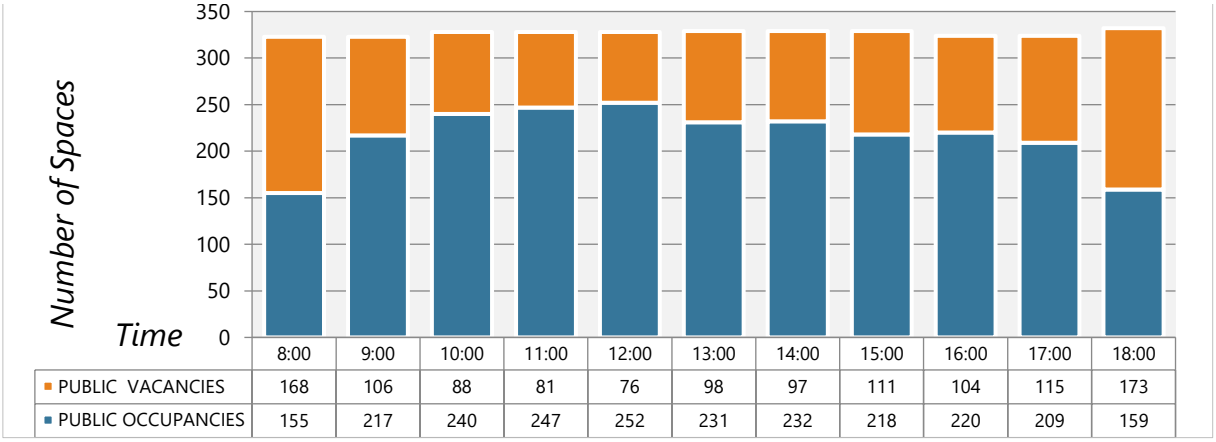
— The demand for parking varied from moderate to reasonably strong during the Wednesday surveyed hours, ranging between 48% to 77% occupancy.

— The peak hour period occurred at 12:00pm when a total of 252 parking spaces were recorded as occupied out of a total parking supply of 328 spaces, representing an 77% occupancy. There was a minimum of 76 vacant car parking spaces during this time.

— The demand for car parking gradually declined throughout the afternoon, creating ample spare availability during the late afternoon and evening period.

Figure 2-12 provides a graphical representation of the temporal profile of the Wednesday parking demands.

Figure 2-12: Wednesday 16 August 2023 Temporal Profile of Parking Demand



Time	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
PUBLIC VACANCIES	168	106	88	81	76	98	97	111	104	115	173
PUBLIC OCCUPANCIES	155	217	240	247	252	231	232	218	220	209	159

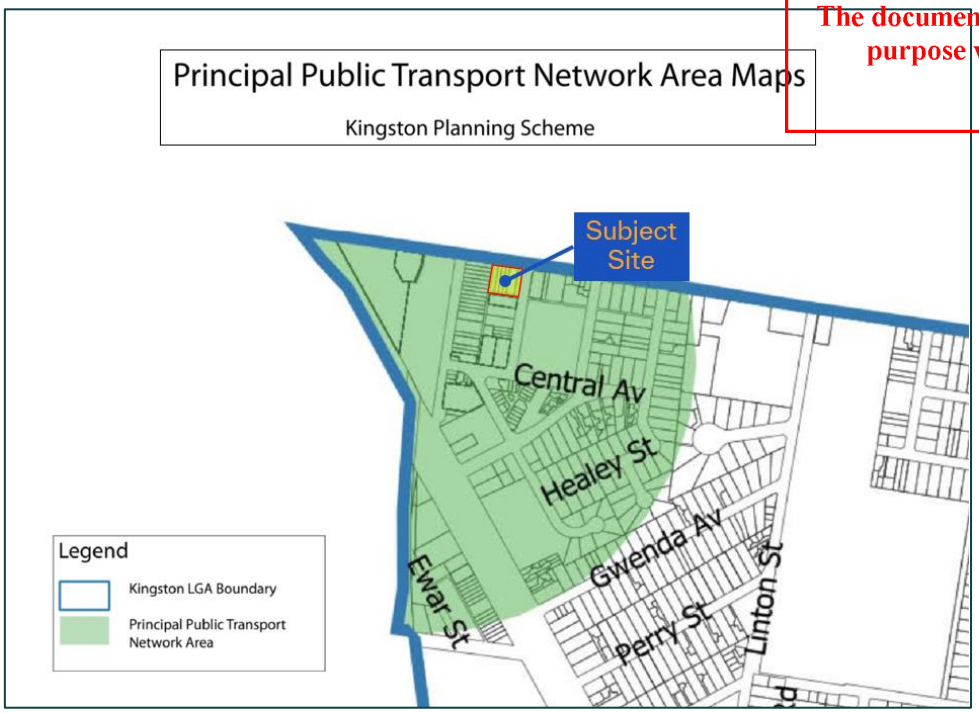
2.5. Sustainable Transport

Public Transport

The subject site is located within the Principal Public Transport Network (PPTN) area as shown on the PPTN Maps of the State Government of Victoria (August 2018) in Figure 2-13.

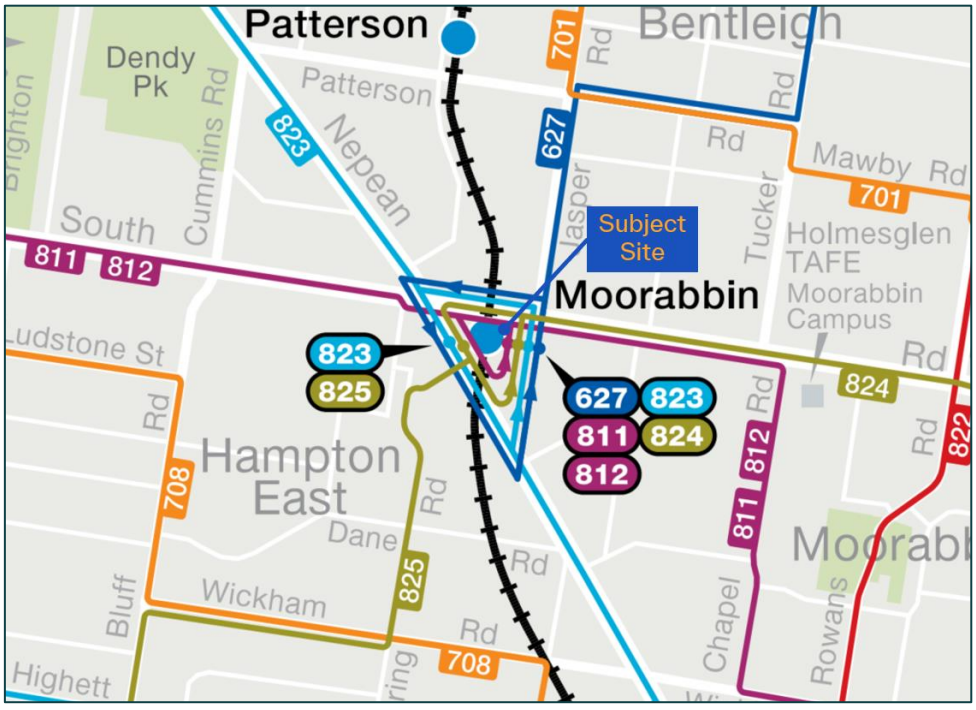
The site has excellent access to the public transport network with Moorabbin Railway Station and numerous bus services operating within close proximity to the subject site. The public transport services in the vicinity of the site are shown graphically in Figure 2-14 and summarized in Table 2.1.

Figure 2-13: Subject Site with Respect to the Kingston PPTN Area



Source: planning.vic.gov.au

Figure 2-14: Public Transport Services Operating within the Vicinity of the Site



Source: www.ptv.vic.gov.au

Table 2.1: Public Transport Services

Service	Route Number	Route Description	Nearest Stop	Walking Distance
Bus	811	Dandenong – Brighton	Jasper Road/South Road (Bentleigh)	160 metres ~ 2 minutes
	812	Dandenong – Brighton		
	824	Moorabbin - Keysborough		
	823	North Brighton – Southland SC	Moorabbin Station/ Nepean Highway	290 metres ~ 4 minutes
	627	Southland SC – Waverley Gardens SC		
	825	Moorabbin – Southland SC		
Train	Frankston Line		Moorabbin Railway Station	250 metres ~ 3 minutes

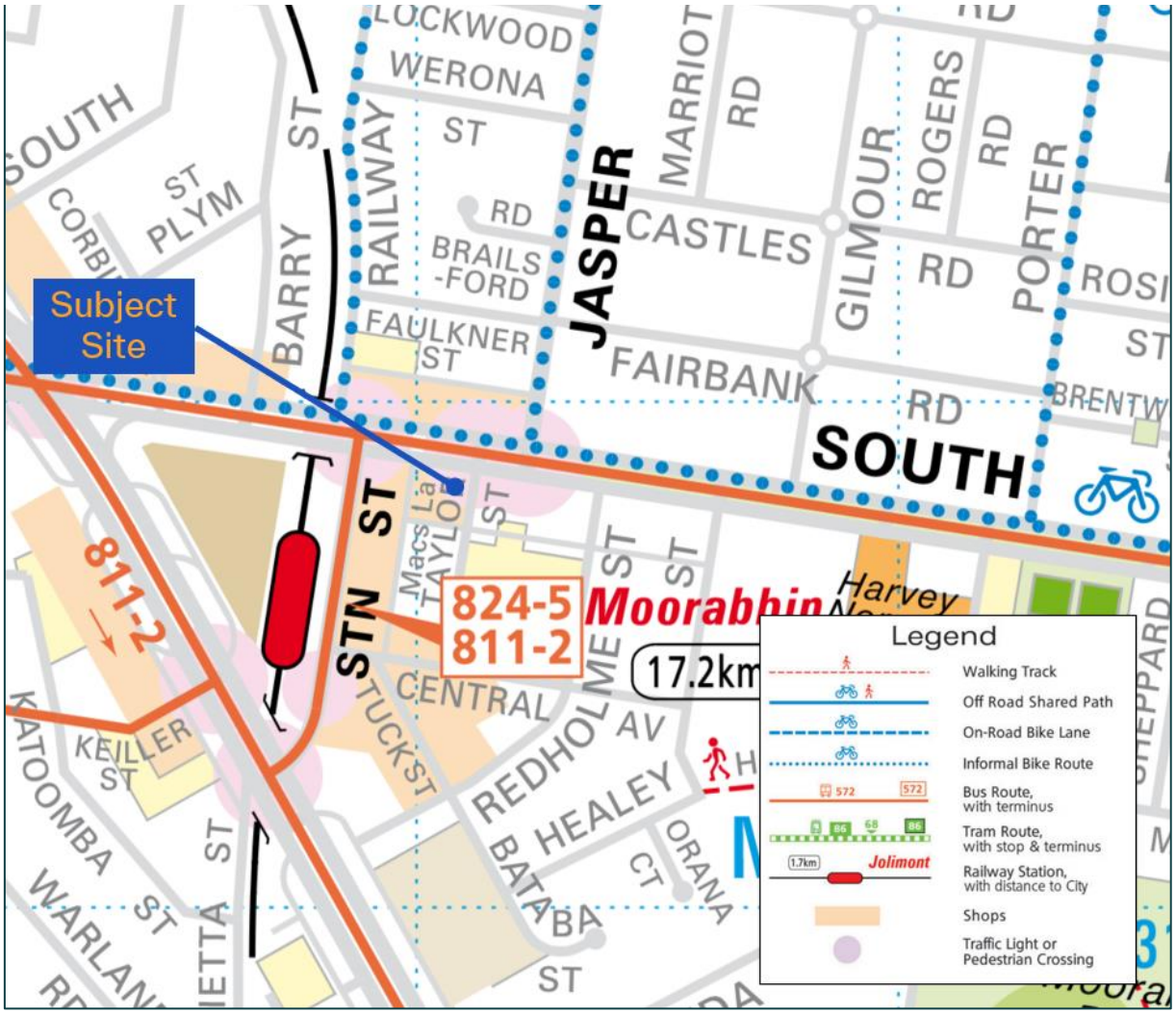
Bicycle Facilities

The site has good access to the surrounding bicycle network, including:

— Informal bicycle route along South Road, Jasper Road, Porter Road and Railway Crescent.

The sustainable transport facilities within proximity to the site including the bicycle network, are presented in Figure 2-15.

Figure 2-15: Sustainable Transport Facilities within the Vicinity of the Site



Source: www.ptv.vic.gov.au

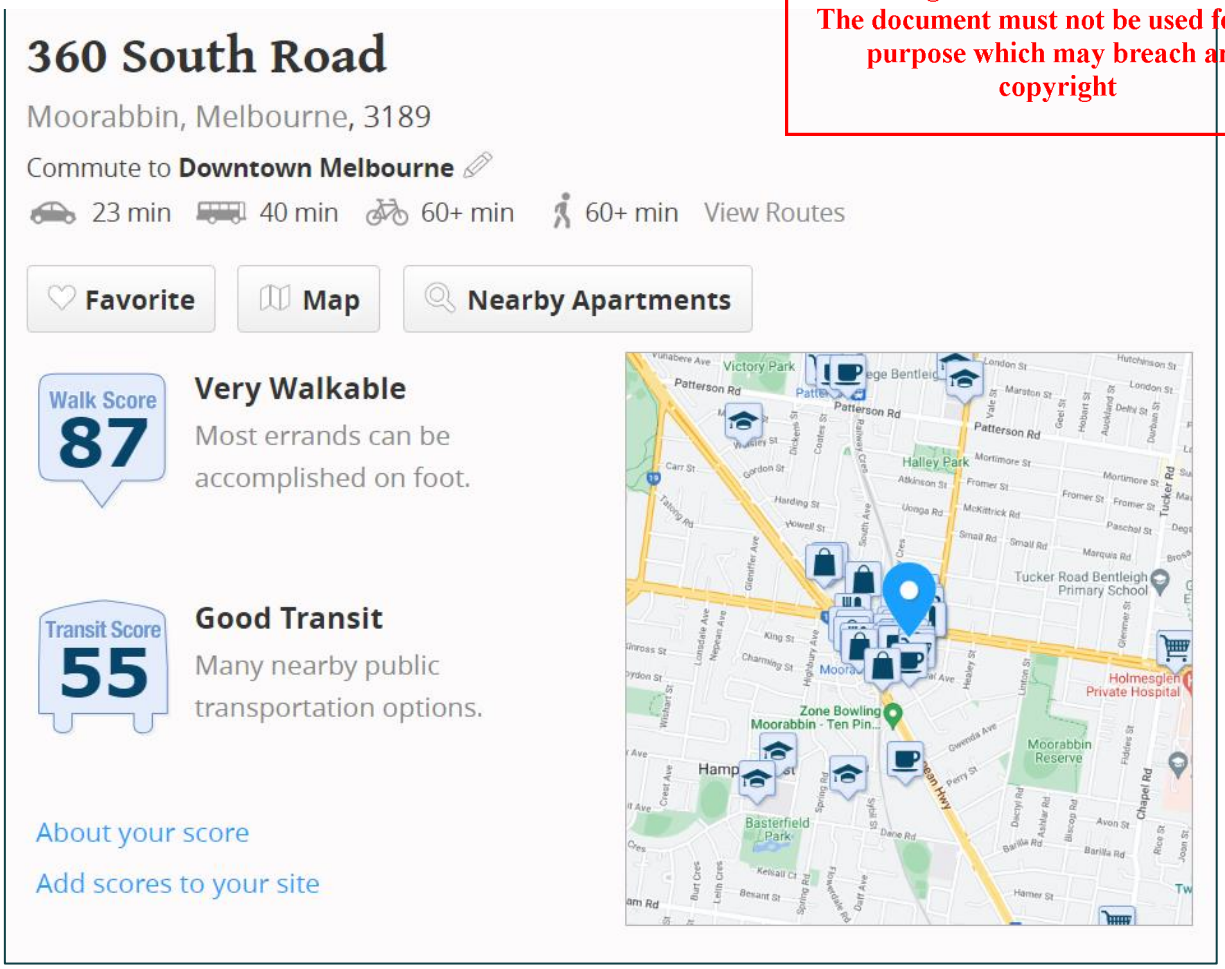
Pedestrian Facilities

Pedestrian footpaths are provided along both sides of South Road and Taylor Street

The site achieves a 'Walk Score' of 87 points (out of a possible 100) and is described as a 'Very Walkable" on WalkScore.com, noting that most errands can be accomplished on foot. A site's walk score is calculated based on the walking distance to local amenities, such as supermarkets, schools, parks, public transport, etc. Walkscore.com utilises data sources such as Google and road network data to calculate a 'Walk Score'.

The convenient everyday services are illustrated on a map in Figure 2-16.

Figure 2-16: Walkable Services from the Subject Site



Source: www.walkscore.com

2.6. Local Planning Policy

City of Kingston Planning Scheme

There is significant support within the Kingston Planning Scheme and various Council strategies for new developments which encourage the use of sustainable transport alternatives from the private motor vehicle, including those listed and discussed below:

Clause 18 –Transport

Clause 18 of the Kingston Planning Scheme is the State Planning Policy on Transport.

Clause 18.01-3S – Sustainable and safe transport

Clause 18.01-3S is in relation to facilitating an environmentally sustainable and safe transport system that supports health and wellbeing.

It "supports forms of transport and energy use that have the greatest benefit for, and least negative impact on, health and wellbeing."

In relation to development, it states:

Design development to promote walking, cycling and the use of public transport, in that order, and minimise car dependency.

Clause 18.02-1S – Walking

The objective of this policy is to "facilitate an efficient and safe walking network and increase the proportion of trips made by walking."

The strategy to meet this objective includes:

— Provide pedestrian routes that are safe, direct and comfortable to use.

— Enable walking as a part of everyday life.

— Enable people to meet more of their needs locally and rely less on their cars.

— Be accessible to vehicles that use footpaths, including wheelchairs, prams and scooters.

— Accommodate emerging forms of low-emission, low-speed personal transport.

Clause 18.02-2S – Cycling

The objective of this policy is to "facilitate an efficient and safe bicycle network and increase the proportion of trips made by cycling."

The strategy to meet this objective includes:

— Provide routes that are safe, comfortable, low-stress and well connected.

— Enable cycling as a part of everyday life.

— Enable people to meet more of their needs locally by cycling and to rely less on their cars.

— Accommodate emerging forms of low emission, low and moderate speed personal transport.

Protect and develop the Principal Bicycle Network to provide high-quality cycling routes that are direct and connected, to and between key destinations including activity centres, public transport interchanges, employment areas, urban renewal precincts and major attractions.

Clause 18.02-3S – Public Transport

The objective of this policy is to "facilitate an efficient and safe public transport network and increase the proportion of trips."

made by public transport.

The strategy to meet this objective includes planning and developing public transport to:

— Enable people to not have to rely on cars for personal transport.

Clause 18.02-3R – Principal Public Transport Network

The site is within the Principal Public Transport Network (PPTN) Area. This policy, amongst other things seeks to "Maximise the use of existing infrastructure and increase the diversity and density of development along the Principal Public Transport Network, particularly at interchanges, activity centres and where principal public transport routes intersect."

KEEPING KINGSTON MOVING – INTEGRATED TRANSPORT STRATEGY AUGUST 2020

Kingston Council adopted Move, Connect, Live in August 2020. The Kingston Integrated Transport Strategy (KITS) sets out a vision for a connected, integrated and sustainable transport network that is safe, healthy, accessible, reliable and efficient. The objectives to achieve this include the following:

— Walking and Cycling – to make walking and cycling the preferred transport choice, particularly for short local trips.

— Mobility – to provide a transport network that allows people of all abilities to travel.

— Land-use and development – to promote land-use and transport choices that are sustainable and reduce journey times and distance by concentrating development in activity and neighbourhood centres close to public transport routes.

— Better public transport – advocate to state government for improved public transport that is reliable, frequent, safe, and connected people and goods to where they want to go.

— The road network – to manage our road networks so that it is safe, promotes sustainable transport, and reduces congestion.

These objectives seek to "promote convenient access to key destinations and reduce the need to travel by car" via delivering a range of way people and goods can reach their destination.

The above local policies and strategies support the use and integration of sustainable transport options and the shift towards having car share as a reliable alternative source of transportation. This supports the reduction in car parking provision for the development as the City of Kingston recognises the challenges of increased congestion and encourages the use of alternative transport modes.

3. Proposal

3.1. Proposed Development

It is proposed to demolish the existing buildings and construct a 15-storey mixed-use development at 360-372 South Road, in Moorabbin. More specifically, the proposed development comprises the following:

- 14,818 sqm office (split across 14 commercial tenancies)
- 368 sqm indoor recreation facilities (2 tenancies)
- 227 sqm food and drink (1 tenancy)
- An ancillary gym (201 sqm) for use by staff working within the building (i.e. not for public access)
- 209 car parking spaces
- 10 motorcycle spaces
- 110 bicycle parking spaces
- Vehicle access to the on-site car park is proposed via a new connection to the laneway along the southern boundary of the site. This southern laneway is also proposed to be widened into the site boundary in order to create a double width connection to allow for two-way vehicle movement.
- Primary pedestrian access to the development is provided via an entrance and lobby on ground floor connecting to/from South Road. Each of the tenancies located on the ground floor will also have their own respective external entrances and there is a rear laneway cyclist access point to the end of trip facilities on ground level.
- Loading and unloading activities will be accommodated within a dedicated on-site loading bay located at the southern boundary of the site on the ground floor.
- Waste will be stored along the southern boundary of the site on the ground floor and collected by a private contractor from the loading bay area.

For reference, a copy of the plans used to prepare this report are provided in Appendix A.

4. Car Parking Assessment

4.1. Statutory Car Parking Requirements

Car parking requirements for a range of developments are set out under Clause 52.06 of the Kingston Planning Scheme. The number of car parking spaces required for the specified uses is listed under Table 1 of Clause 52.06-5. Table 1 includes two sets of parking rates listed as Column A and Column B. Column A rates are to apply unless the Column B rates are applicable. Column B rates are to be used under the following circumstances:

— Any part of the land is identified as being within the Principal Public Transport Network Area as shown on the *Principal Public Transport Network Area Maps* (State Government of Victoria, 2018); or

— A Schedule to the Parking Overlay on another provision of the planning scheme specifies that Column B applies.

The subject site is located within the Principal Public Transport Network (PPTN) as outlined in Section 2.3 and therefore Column B rates are applicable to the proposed development, as shown in Table 4.1.

It is noted again that the gymnasium area on basement level 1 is proposed to be ancillary to the other proposed land uses, only for use by staff of the building, and therefore excluded from the following assessments.

Table 4.1: Clause 52.06 Planning Scheme Assessment

Use	Number/Size	Statutory Parking Rate	Statutory Requirement
Office	14,818 sqm	3.0 spaces to each 100sqm of NFA	444 spaces
Indoor Recreation Facilities	368 sqm	None [1]	-
Food & Drink	227 sqm	3.5 spaces to each 100sqm of LFA	7 spaces
Total			**451 spaces**

[1] Indoor Recreation Facility land use and the land uses it is nested under do not have a car parking rate specified in Clause 52.06. Therefore car parking is to be provided to the satisfaction of the responsible authority.

On the basis of the above, the development has a statutory requirement to provide 451 car plus car parking to the satisfaction of the responsible authority for the indoor recreation facilities.

The development proposes to provide a total of 209 on-site car spaces within the 5 basement levels. This includes a total of 100 car spaces provided as tandem parking (i.e. 50 tandem pairs) and will be allocated to staff of the same commercial tenancies.

Accordingly, the proposed development seeks a reduction against the statutory requirements of the Kingston Planning Scheme.

Under the provisions of Clause 52.06, the Responsible Authority is able to reduce the car parking requirements (including reduced to zero), provided the applicant satisfies the responsible authority that the provision of car parking is justified on the basis of:

— The car parking demand likely to be generated by the use.

— Whether it is appropriate to allow fewer spaces to be provided than the number likely to be generated by the use.

An assessment of the expected parking demand and the appropriateness of allowing a reduction of on-site parking for the proposed development is discussed in the following section.

4.2. Car Parking Demand Assessment

Clause 52.06-7 states that an application to reduce the number of car parking spaces required under Clause 52.06-5 must be accompanied by a Car Parking Demand Assessment which must address the following matters (where relevant):

— The likelihood of multi-purpose trips within the locality which are likely to be combined with a trip to the land in connection with the proposed use.

— The variation of car parking demand likely to be generated by the proposed use over time.

— The short-stay and long-stay car parking demand likely to be generated by the proposed use.

— The availability of public transport in the locality of the land.

— The convenience of pedestrian and cyclist access to the land.

— The provision of bicycle parking and end of trip facilities for cyclists in the locality of the land.

— The anticipated car ownership rates of likely or proposed visitors or occupants (residents or employees) of the land.

— Any empirical assessment or case study.

The relevant Car Parking Demand Assessment criteria are discussed as follows:

The Likelihood of Multi-Purpose Trips

The food and drink and indoor recreation facility tenancies at ground floor are expected to draw most of their trade from walk-up customers from nearby residents and staff of the surrounding businesses, with the staff working within the proposed building itself expected to be their main source of business.

Therefore, the demand for parking associated with these tenancies is anticipated to be significantly reduced as a result of multipurpose trips, from visitors who are otherwise already in the area and do not require additional car parking at the site.

Short and Long Stay Parking Demands

Visitors of the development will likely generate short-term parking demands.

Otherwise, staff of the office and ground floor tenancy uses will make up the majority of on-site parking demands and these will mostly be long-term parking for the duration of business hours.

For the food and drink and indoor recreation facility uses, staff parking typically makes up approximately 20% of the total demands, while for the office land use staff typically make up approximately 90% of the total demands.

The Availability of Public Transport

As discussed in Section 2.5, the site has excellent access to a range of public transport services with the Moorabbin train station on the site's doorstep approximately 150-200m away, as well as multiple bus routes operating near the site along South Road and the Nepean Highway Service Road. Accordingly, the range of public transport opportunities are expected to be utilised by many staff and visitors of the development and will significantly reduce the demand for car parking.

The Convenience of Pedestrian and Cyclist Access

Pedestrian footpaths are provided on both sides of South Road and Taylor Street and the majority of roads in the vicinity of the site. This provides a convenient connections between the site and the surrounding public transport network, residential areas and local shops and services within the surrounding Activity Zone.

The site achieves a 'Walk Score' of 87 points (out of a possible 100) and is described as a 'Very Walkable" on WalkScore.com, noting that most errands can be accomplished on foot. The high 'Walk Score' is reflective of the ability to travel to/from the area without relying on a private motor vehicle.

The site also has access to the surrounding bicycle network, with informal bicycle routes along South Road, Jasper Road, Porter Road, and Railway Crescent, providing a viable alternative vehicle travel mode. These facilities are expected to provide a viable means of alternative active transport that will further reduce reliance on private motor vehicles for staff and visitors of the proposed development.

The Provision of Bicycle Parking and End of Trip Facilities for Cyclists

The proposal includes a very generous provision of 110 bicycle parking spaces located within a secure bicycle parking room on the ground floor, with top quality end of trip facilities for use by staff. The generous provision of bicycle parking facilities will encourage cycling as a mode of transport to and from the site and reduce the reliance on the private motor vehicle.

Empirical Assessment or Case Study

Office

Having regard to the various car parking demand factors and criteria discussed in the above sections, reference has been made to empirical case study data collected from various other equivalent land uses in similar contexts to the subject site, as well as approved car parking rates for office buildings in similar contexts to that of the subject site. This includes sites in areas such as Box Hill, Frankston, Burwood, Hawthorn, etc, with surrounding activity centre and generally with access to heavy rail or other public transport options.

On this basis, the average peak car parking demand rate expected to be generated by the office component of the proposal is 1.72 spaces/100sqm. This equates to an estimated peak demand of 255 spaces.

Food & Drink

For the food and drink use, the statutory rate has been adopted in the case for car parking demand assessment purposes. This equates to a demand of 7 spaces.

Indoor Recreation Facilities

Based on information provided by the Applicant (and noted on plans), the two indoor recreation facility tenancies are expected to operate as a yoga studio and a float/wellness

centre. In terms of operational characteristics and parking demands, these two types of businesses are considered to be comparable to a gymnasium. There are also similarities to a medical centre in that there will be appointment based sessions to perform a service with longer appointment times (similar to a physio or chiro for example).

In this regard, reference is made to the RTA Guide to Traffic Generating Developments, which is one of the most comprehensive case study collections in Australia to date, and a generally industry accepted reference document. The RTA Guide indicates a demand for 3 spaces/100sqm for a gymnasium use.

With respect to the medical centre similarities, Clause 52.06 would require a rate of 3.5 spaces/100sqm for Column B sites such as this.

On this basis, for assessment of the indoor recreation facilities, a rate of 3 spaces/100sqm has been adopted, which equates to a total peak demand for 11 spaces.

Empirical Assessment Summary

Factoring in the typical mix of staff and visitor demands within these total anticipated demands for each use (refer to comments under short and long term stay parking demands), the site is expected to generate the following car parking demands as summarised in Table 4.2.

Table 4.2: Anticipated Empirical Car Parking Demands

Land Use	Staff Car Parking Demand	Visitor / Customer Car Parking Demand	Total Car Parking Demands
Office	230 spaces	25 spaces	255 spaces
Food & Drink	2 spaces	5 spaces	7 spaces
Indoor Recreation Facilities	2 spaces	9 spaces	11 spaces
Totals	**234 spaces**	**39 spaces**	**273 spaces**

As the proposal includes a total of 209 spaces on-site, a permit is being sought to provide less car parking than anticipated by the car parking demand assessment. This is addressed in the following sections.

4.3. Car Parking Reduction Considerations

Clause 52.06-7 sets out a range of factors to be considered when determining the appropriateness of allowing reduced car parking supply to be provided. Some of the relevant factors in this case are discussed in the following sections and how they relate to the proposal.

Local Planning Policy

As discussed in Section 2, there is significant support within the Kingston Planning Scheme, the Kingston Integrated Transport Strategy (2020) and other Council strategies and policies for developments which encourage and prioritise the use of sustainable transport alternatives over private motor vehicle use. From a transport perspective, the various policies and strategies generally identify a common goal/objective to increase the utilisation of sustainable transport and restrict/reduce use of private motor vehicles.

In this regard, a heavily reduced parking rate for a predominantly office development, in a location such as the subject site's with excellent public transport access and within an activity

centre, is considered to be a prime opportunity to help realise these policy and strategy objectives.

Availability of Car Parking

The on-street parking supply within immediate vicinity of the subject site is well restricted, particularly along the site frontage of South Road and Taylor Street with standard 1/4P and 1P parking areas. Other local roads in the vicinity of the site have similar 1P and 2P parking restrictions during work hours on weekdays.

The time restricted parking will be suitable to accommodate any short-term car parking demand generated by visitors of the development. The restricted nature of the surrounding on-street parking supply will also make it impractical for future staff of the building to use for long term parking during the work day. Instead the heavily restricted surrounding parking will encourage any staff who are not allocated on-site parking to utilise the excellent range of options for alternative transport modes afforded to the subject site.

With respect to accommodating the visitor and customer parking demands of the proposal, as outlined in the car parking demand assessment, the combined visitor parking demands of the office, food and drink and indoor recreation facilities are expected to peak at up to 39 spaces. This estimate of visitor parking is also considered to be conservative on the high side, as there is no factoring for the majority of the food and drink and indoor recreation facilities visitors expected to be walk up trade from staff working within the proposed new building and the surrounding other businesses and residential areas, which will therefore not generate parking at the full empirical rates.

Due to the impracticality of providing publicly accessible car parking on-site within a private secure basement car park, it is not proposed to provide any visitor parking on-site.

The car parking demand surveys of the area indicate that there are a minimum of 76 vacancies in the on-street parking supply within walking distance of the site, with notably more parking available either side of the peak in the middle of the workday. These vacancies will be able to comfortably cater for the peak visitor/customer parking demands of the proposal. It is also considered to be entirely appropriate for the visitor parking demands to be accommodated by a centre-based approach given the context of the site within a surrounding activity centre and public transport hub.

Local Traffic Management in the Locality of the Land

The reduction of on-site car parking for the development will help to force mode-shift and result in a reduced level of traffic generation from the site, compared to what would be generated if on-site car parking was less restricted. This will result in a improved local traffic conditions along South Road, Taylor Street as well as the surrounding road network relative to a higher parking supply scenario.

Access to or Provision of Alternative Transport Modes to and from the Land

As discussed throughout the report, the subject site has excellent access to multiple alternative transport modes which enables staff and visitors of the site to access the site without relying on a private motor vehicle. This includes the almost direct access to Moorabbin train station, six different bus routes and multiple informal cyclist routes through the surrounding area. Additionally, the generous on-site bicycle parking supply of 110 spaces and top quality end of trip facilities will help to encourage those staff without on-site car parking to take up cycling to work.

Opportunity for Car Share Vehicles

The proposed development represents an opportunity to provide a carshare vehicle/s on-site to help further reduce the staff demands to bring their own vehicles to work. Being a

predominantly office based development, the ability to use a carshare vehicle for occasional site visits or meetings can help cater for the trip demands of multiple users within the building each day, further reducing the private vehicle parking demands.

Provision of carshare vehicles is subject to interest from a carshare provider and generally the vehicle needs to be made publicly accessible from within the private and secure basement car park, to also service users within the surrounding area. It is recommended that at least one carshare vehicle be explored on-site, subject to interest and agreement from a carshare provider.

Impacts of a Restricted Car Parking Supply

For a predominantly office land use project, any future prospective tenants for the building will automatically be provided with upfront information as part of their lease agreement regarding their allocation of car parking for staff. Should this supply of parking be inadequate for their staff's demands, then the heavily restricted parking in the area means that there are no alternatives, and these particular tenants are therefore unlikely to lease in the building. Instead, only tenants which can work with the reduced parking allocations will opt to lease these tenancies.

Furthermore, restricting car parking supply for employee use, in an area that makes on-street parking impractical as an alternative, is one of the most effective ways to force transport mode shift to sustainable modes. In an unconstrained parking supply scenario, a reasonably high proportion of staff within the building would likely opt to drive to work. However by restricting car parking supply below what empirical data would suggest is required, this creates change in how people travel to work that would otherwise not happen with a higher supply of parking.

4.4. Adequacy of Proposed Car Parking Supply

It is proposed to provide a total of 209 on-site car parking spaces, including two disabled parking spaces, plus a further 10 on-site motorcycle parking spaces. While not specified on plans, it is recommended for the following allocation of car parking to be applied to this proposed supply:

— 4 spaces for use by staff of the food and drink and indoor recreation facility tenancies

— 204 spaces for use by staff of the office tenancies (noting that all tandem space pairs are required to be allocated to a single tenancy)

— At least 1 space allocated for a car share vehicle (subject to interest and agreement from a suitable carshare provider – otherwise this space would default to office parking).

Having regard to the car parking demand assessment and discussions outlined in the previous sections, the proposed car parking supply and reduction from statutory requirements is considered to be acceptable in this instance, noting the following key factors:

— The site's excellent access to public transport options, including immediate access to the Moorabbin train station and six nearby bus route options.

— The generous provision of 110 bicycle parking spaces and end of trip facilities to encourage staff of the development to cycle to and from work.

— On-street parking in the vicinity of the is either restricted or subject to a high car parking demand. This will restrict the ability for any staff who are not allocated parking on-site to park off-site for a full workday, forcing staff to utilise alternate modes of transport.

— The short-term parking available within walking distance of the site has sufficient capacity to accommodate the visitor parking demands of the proposed land uses, without the need to provide public access to a secure basement car park. It is noted that this is based on a conservative estimate of visitor parking demands, without factoring down in response to the

majority of the ground floor tenancy visitors being from the proposed new building or surrounding businesses and residents.

- The City of Kingston has local planning policies and strategies in place that prioritise active and sustainable transport modes over the use of private vehicle travel. As above, one of the most effective ways to force transport mode shift away from private vehicle is to heavily restrict car parking supply, particularly in contexts such as the subject site where parking is well restricted in the surrounding area and with excellent public transport access. This is directly supportive of these various Council policy and strategy objectives.
- The suppressed provision of car parking will reduce motor vehicle travel to and from the site, resulting in a lessened impact to traffic congestion and pedestrian amenity in the vicinity of the site than what would otherwise be incurred were more on-site parking proposed.
- Office land uses are a perfect opportunity to heavily reduce car parking and force mode shift when in suitable locations such as the subject site, as tenants are always provided with up front information about their allocation of car parking. If the proposed allocation does not meet their staff requirements, then there is no obligation to lease a tenancy and only tenants that will be satisfied with their allocation will occupy the building.

5. Car Parking Layout and Access

5.1. Clause 52.06-9 Design Standard Requirement

The proposed vehicle access arrangements and car parking layout have been designed in accordance with the objectives and design requirements of Clause 52.06-9 of the Kingston Planning scheme and with the relevant sections of AS/NZS 2890.1:2004. An assessment against the relevant design standards of the Planning Scheme is provided below.

Design Standard 1 – Accessways

Vehicle access to the on-site car parking is proposed via a new crossover located at the southwest corner of the site connecting to the rear laneway.

The plans demonstrate the proposed widening of the laneway connection along the southern frontage to provide a minimum width of 6.34m between the buildings, sufficient to cater for simultaneous two-way vehicle movement. The widening of the laneway sits inside the site boundary, but the intention is for any vehicle using this laneway to be able to utilise the full increased width.

It is noted that there is a bicycle lane marked within this laneway width for access to the end of trip facilities, which vehicles will need to manoeuvre over in the event of two vehicles passing in the laneway. The bicycle lane is intended to identify and highlight cyclist users within the laneway, and also assist with wayfinding to the end of trip facilities.

From the increased laneway, there is a 6.27m wall-to-wall double width ramp heading down into the basement. Swept path assessment has been completed demonstrating simultaneous two-way movement between a 99th and 85th percentile vehicle (B99 & B85) along the widened laneway and in/out of the site access point (Refer to Appendix B). It is noted that this depends on the use of the splay area on the eastern side at the top of the ramp. It is recommended for the ramping design to be modified to allow for a smooth transition on this inside corner when turning left out of the site to the laneway (currently plans show a transition than cuts off at the edge of two ramped sections which run in different directions).

Following the main access double width ramp from ground to basement 1, the basement design transitions to a split-level arrangement with circulation ramps at either end of the basement levels. These ramps between the split levels from B1 down to B5 are all designed as at 4.8m wide wall-to-wall, which allows for single width movement. Given that there are dome mirrors provided at the top and bottom of each ramp for visibility and that for staff parking the movements within the basement a predominantly all in the same direction during peak periods (meaning minimal two-way movement conflict), the single width ramps within the internal basement levels are deemed to be acceptable. Further swept path assessment has been completed demonstrating how vehicles will prop within the aisle on each parking level in the event that another vehicle is already using the single width ramps (refer to Appendix B).

Convex/dome mirrors are shown on plans at the top and bottom of all ramps to provide sightlines to any vehicles already using the ramp. The blind corners (north-east and north-west corners) on basement level 1 are also recommended to include convex/dome mirrors to provide sightlines around the corners.

Noting the above summary, Design Standard 1 of Clause 52.06-9 relates to the design of accessways, which are assessed against the proposal in Table 5.1.

Table 5.1: Design Standard 1 Assessment – Accessways

Requirement	Comments
Must be at least 3m wide.	Satisfied: As noted above, the widened laneway up to the site access point is 6.34m wide and the main basement access ramp from ground to basement 1 is 6.27m wide.
Have an internal radius of at least 4m at changes of direction or intersection or be at least 4.2m wide.	Satisfied: The on-site accessway has a width in excess of 4.2 metres at the change of direction.
Allow vehicles parked in the last space of a dead-end accessway in public car parks to exit in a forward direction with one manoeuvre.	N/A: Car park is private, but the space at the end of the last basement level of parking can exit in a forward direction appropriately for a private car park.
Provide at least 2.1m headroom beneath overhead obstructions, calculated for a vehicle with a wheelbase of 2.8m.	Satisfied: A minimum headroom clearance of 2.1m or more is provided throughout the car park, noting that 2.5m is required above the disabled parking bays themselves and 2.2m throughout the basement 1 level where the disabled bays are located.
If the accessway serves four or more car spaces or connects to a road in a Transport Zone 2 or Transport Zone 3, the accessway must be designed so that cars can exit in a forward direction.	Satisfied: While the access does not connect directly to a Transport Zone, all vehicles can exit in a forward direction.
Provide a passing area at the entrance at least 6.1 metres wide and 7 metres long if the accessway serves ten or more car parking spaces and is either more than 50 metres long or connects to a road in a Transport Zone 2 or Transport Zone 3.	N/A: The site access is double width and allows simultaneous two-way movement.
Have a corner splay or area at least 50% clear of visual obstructions extending at least 2m along the frontage road from the edge of an exit lane and 2.5m along the exit lane from the frontage, to provide a clear view of pedestrians on the footpath of the frontage road. The area clear of visual obstructions may include an adjacent entry or exit lane where more than one lane is provided, or adjacent landscaped areas, provided the landscaping in those areas is less than 900mm in height.	Satisfied: Pedestrian sight splay triangles with dimensions of 2.0 metres x 2.5 metres are provided at the site access to the laneway. In order to improve sightlines at the laneway intersection to Taylor Street, a pedestrian visibility splay has also been provided on the departure lane from the laneway. It is noted that in both cases the sight splay is provided in the inbound lane of the double width connections.
If an accessway to four or more car parking spaces is from land in a Transport Zone 2 or Transport Zone 3,	N/A: The accessway is not directly to a Transport Zone. Nevertheless, access to the car spaces is in excess of 6 metres from the road carriageway.

the access to the car spaces must be at least 6 metres from the road carriageway.	

Design Standard 2 – Car Parking Spaces

Design Standard 2 of Clause 52.06-9 relates to the design of car parking spaces. The requirements of Design Standard 2 are assessed against the proposal in Table 5.2.

Table 5.2: Design Standard 2 Assessment – Car Parking Spaces

Requirement	Comments
Car parking spaces and accessways must have the minimum dimensions as outlined in Table 2 of Design Standard 2.	Satisfied: The car parking spaces have standard dimensions of 2.6m in width by 4.9m in length accessed via a minimum 6.4m wide aisle. It is noted that one space in the south-west corner of each basement level have been noted as 'small car only', due to the wall chamfer in the corner. The chamfer protrudes 0.48m into the closed corner of the space.
A wall, fence, column, tree, tree guard or any other structure that abuts a car space must not encroach into the area marked 'clearance required' on Diagram 1 of Design Standard 2, other than: - A column, tree, or tree guard, which may project into a space if it is within the area marked 'tree or column permitted' on Diagram 1. - A structure, which may project into the space if it is at least 2.1m above the space.	Satisfied subject to recommendations: An additional clearance of at least 300mm has been provided for the majority of car spaces that do not satisfy the required clearance envelope. All columns adjacent to parking spaces are positioned 0.25-1.25m from the open end of the space. The only exceptions are space numbers 01, 44, 48 and 98. In all of these cases, minor adjustments to the positioning of the spaces will allow for compliant clearance envelopes.
Car spaces in garages or carports must be at least 6m long and 3.5m wide for a single space and 5.5m wide for a double space measured inside the garage or carport.	N/A: No garages or carports are proposed.
Where parking spaces are provided in tandem (one space behind the other) an additional 500mm in length must be provided between each space.	Satisfied: All tandem parking spaces have 5.4m long rear spaces. It is noted again that all tandem parking pairs must be allocated to a single tenancy as they are a dependent parking arrangement.
Where two or more car parking spaces are provided for a dwelling, at least one space must be under cover.	N/A: No dwellings proposed.
Disabled car parking spaces must be designed in accordance with Australian Standard AS2890.6-2009 (disabled) and the Building Code of Australia. Disabled car parking spaces may encroach into an accessway width specified in Table 2 of Design Standard 2 by 500mm.	Satisfied: The two disabled car parking spaces are at least 2.4m wide x 4.9m long with an adjacent shared zone of the same dimensions. As per Planning Scheme design specifications, 0.5m of the space length overhangs into the aisle, but for consistency with neighbouring bays the linemarking only extends to 4.9m long.

Design Standard 3 – Gradients

Design Standard 3 of Clause 52.06-9 relates to the design of gradients. The requirements of Design Standard 3 are assessed against the proposal in Table 5.3.

Table 5.3: Design Standard 3 Assessment - Gradients

Requirement	Comments
Accessway grades must not be steeper than 1:10 (10%) within 5m of the frontage to ensure safety for pedestrians and vehicles. The design must have regard to the wheelbase of the vehicle being designed for; pedestrian and vehicular traffic volumes; the nature of the car park; and the slope and configuration of the vehicle crossover at the site frontage. This does not apply to accessways serving three dwellings or less.	Satisfied: The main access ramp does not exceed 1:10 for the first 5m into the site.
Ramps (except within 5 metres of the frontage) must have the maximum grades as outlines in Table 3 of Design Standard 3 and be designed for vehicles travelling in a forward direction.	Satisfied: The main access ramp adopts gradients of 1:10 for the first 5m, 2m at 1:5, 9.5m at 1:4, 2.5m at 1:8 back to flat. These ramp gradients and transition sections are all compliant with the maximums for a private car park design. The ramps between basement split levels are 1:6 with 2m transitions of 1:8 at the top and bottom. The plans also depict very gentle slopes within the widened section of the laneway, which is intended to generally match in with the existing laneway gradients to form a seamless double width vehicle connection.
Where the difference in grade between two sections of ramp of floor is greater that 1:8 (12.5%) for a summit grade change; or greater than 1:6.7 (15%) for a sag grade change, the ramp must include a transition section of at least 2 metres to prevent vehicles scraping or bottoming. Plans must include an assessment of grade changes of greater that 1:5.6 (18%) or less than 3 metres apart for clearances, to the satisfaction of the responsible authority.	Satisfied: As noted above, appropriate transition sections have been included on all ramps.

5.2. Swept Path Assessment

A swept path assessment has been completed for critical vehicle movements through the site using the 'Autodesk Vehicle Tracking' software. This includes the following key movements through the site access arrangement and within the basement levels, all demonstrated to be undertaken with suitable clearances (refer to Appendix B for results):

— A B99 and B85 (99th and 85th percentile vehicles) are able to pass simultaneously along the length of the widened laneway and turning in/out of the main access point to the laneway. It is noted again that this movement is satisfactory, subject to a smooth transition being provided within the chamfer on the inside of the bend, between the two perpendicular slopes directions.

— A B99 turning through the split level basement ramps while another car is propped on the car park level waiting, demonstrating what would occur in the rare event of a two-way conflict to use the single width ramps between the split levels.

— A B85 manoeuvring in/out of a parking space directly opposite the bottom of a ramp section, demonstrating it is possible to reverse out of the space and travel back up the ramp in a single movement.

— A B85 manoeuvring into the end bay on basement 5 with a single manoeuvre, and exiting with a 3-point reverse manoeuvre, which is acceptable for private car parks. It is noted that this is a conservative assessment as the end bay is designated for small cars only and therefore would be more manoeuvrable than the B85 used for testing.

— 6.35m long mini rear loader waste collection vehicle accessing the ground level loading bay from the laneway, entering from Taylor Street in a forward direction, reverse entry movement into the loading bay and forwards exit back to Taylor Street (refer to Section 7 for further details on loading and waste collection).

6. Bicycle Parking

6.1. Clause 52.34 – Bicycle Parking Requirements

Clause 52.34 of the Kingston Planning Scheme outlines the requirements for bicycle parking for various uses. Application of the relevant rates is shown Table 6.1.

Table 6.1 – Bicycle Parking Statutory Requirements

Description	Use	No. / Size	Statutory Parking Rate		Statutory Requirement	
			Employees	Visitors	Employees	Visitors
Office	Office	14,818sqm	1 space per 300sqm	1 space per 1000sqm	49 spaces	15 spaces
Yoga Studio & City Cave	Indoor Recreation Facility [1]	368sqm	1 space per 4 employees	1 space per 200sqm	2 spaces	2 spaces
Cafe	Food & Drink	227 sqm	1 space per 300sqm	1 space per 500sqm	1 space	0 spaces
Total					52 spaces	17 spaces

[1] Indoor Recreation Facility is not listed in Clause 52.34. It is nested under Minor Sports & Recreation Facility in Clause 73.04, which is listed in Clause 52.34.

Accordingly, the proposal has a statutory requirement to provide a total of 69 bicycle parking spaces, including 52 employee spaces and 17 visitor spaces.

Additionally there is a statutory requirement to provide 5 changerooms/showers for employee end of trip facilities.

It is proposed to provide a total of 110 bicycle parking spaces within a secure bicycle storage room on ground level, with convenient access from the rear laneway. This significantly exceeds the statutory requirements. There are also a total of 9 showers/changerooms provided and a large supply of lockers, which also exceeds minimum requirements.

6.2. Bicycle Parking Design

The bicycle parking is accessed from the rear laneway, where a linemarked access route is provided to assist unfamiliar visitors on where to access the bicycle parking. Given the spatial constraints of the site with built form to the boundary on all frontages, it was impractical to integrate the 17 required visitor spaces near the building lobby entrance. Therefore visitor

parking demands will be accommodated within the secure storage room, with access to be granted by building management or the tenant that the cyclists are visiting. This will require clear wayfinding signage to direct unfamiliar users to the rear cyclist entrance.

There are some internal ramps to the storage room entrance that are 1:14 or less, in accordance with Australian Standards.

The bicycle parking is proposed as a double tier dynamic system, which has been designed in accordance with Australian Standards with bicycle parking envelopes 0.4m wide x 2.0m long, with an access aisle of 2.0m. It is noted that the dynamic nature of the system permits the spacing to be reduced from 0.5m to 0.4m.

Half of the 110 spaces are in a horizontal format (the bottom level of the double tier system), which exceeds the Australian Standard requirement for at least 20% of bicycle spaces being in a horizontal configuration.

Accordingly, the bicycle parking and facilities have been designed appropriately and in accordance with the relevant requirements of AS2890.3:2015 and the Kingston Planning Scheme.

7. Loading Arrangements

7.1. Loading

Clause 65.01 'Decision Guidelines' of the Kingston Planning Scheme outlines the provision of loading requirements, and states the following:

"Before deciding on an application or approval of a plan, the responsible authority must consider, as appropriate:

— The adequacy of loading and unloading facilities and any associated amenity, traffic flow and road safety impacts."

Loading and unloading activities associated with the proposal will primarily be the very rate loading of furniture and goods during the fit out of tenancies. The type of land uses proposed do not typically have any significant regular loading activities.

Notwithstanding, there is a service bay area provided on ground level and accessed from the laneway. This service bay area is primarily intended for waste collection (refer to following section), but also provides a connection through to the building lift core for loading and deliveries if necessary. The loading bay can cater for vehicles up to a 6.4m Small Rigid Vehicle (SRV) in size.

However, the loading area currently has a 2.0m ramp leading into it at a grade of 1:11. This part of the design will need to be modified so that there is a maximum ramp grade of 1:12 over a transition distance of at least 4m, in accordance with AS2890.2:2018. Additionally, the service bay where the trucks will be propped cannot have a gradient in any direction more than 1:25, which applies to a 3.5m wide x 6.4m long bay for the SRV it is intended to cater for. This may complicate how the initial ramp is designed and it may be more effective to slope at a continuous 1:25 from the boundary to reach the necessary level inside the site.

7.2. Waste Collection

A Waste Management Plan (WMP) has been prepared for the proposed development.

It is understood that waste and recyclables are proposed to be collected from the service bay area off the laneway by a private waste contractor, using a 6.35m long mini rear loader waste collection vehicle.

As previously noted, swept path assessment has been completed to confirm that the mini rear loader is able to enter the laneway in a forward direction, reverse into the service bay for loading and then exit the site and laneway in a forward direction back to Taylor Street.

Accordingly, the proposed waste collection arrangement is acceptable from a traffic engineering perspective.

8. Traffic Assessment

8.1. Traffic Generation

Office

Given the proposed significant reduction in car parking for the office land use, the traffic generation estimates will be more suitably calculated based on the number of spaces rather that the floor area.

In this regard, various empirical data captured from numerous office developments over time has indicated an average peak hour traffic generation of rate of 0.5 vehicle movements per space (or less in some cases). This traffic generation rate is generally industry accepted for an office land use when calculating based on the number of parking spaces.

An office land use will also have a typical inbound/outbound split of 90:10 and 10:90 in the AM and PM peak hours respectively.

Food & Drink & Indoor Recreation Facility

Given that only staff parking is proposed to be provided on-site, for assessment purposes the same peak hour rate of 0.5 vehicle movements per space has been applied for the staff of these other uses, as adopted for the office staff traffic generation.

This equates to 2 vehicle movements from the food & drink and indoor recreation facility uses in either peak hour. Consistent with the office staff, 90% of movements are inbound in the AM peak and outbound in the PM peak, which would equate to the full 2 movements in this case.

Traffic Generation Summary

Based on the above, the development's combined estimated traffic generation for typical weekday AM and PM peak hours is shown in Table 8.1.

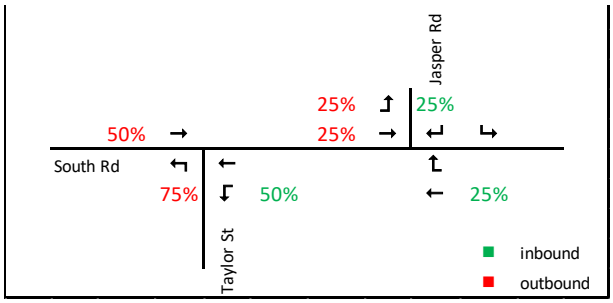
Table 8.1: Peak Hour Traffic Generation Summary

Land Use	AM Peak Hour		PM Peak Hour	
	Inbound (vph)	Outbound (vph)	Inbound (vph)	Outbound (vph)
Office	92	10	10	92
Food & Drink and Indoor Recreation Facility	2	0	0	2
Total Trips	**94**	**10**	**10**	**94**

8.2. Traffic Distribution

The site is located with residential catchment areas in all directions and therefore the site generated traffic is expected to have a relatively even 25% split of traffic travelling to/from the north, south, east and west. Having regard to the available turning movements in the road network around the site, the following estimated directional distribution in Figure 8-1 has been adopted for the site generated movements through the South Road / Taylor Street / Jasper Road intersection. It is noted that the figures do not add to 100% as a portion of the site traffic is expected to travel to/from the south as well, via Station Street and other local street connections.

Figure 8-1: Estimated Traffic Directional Distribution



Applying the above directional distribution to the estimated site generated traffic volumes, returns the following Figure 8-2 and Figure 8-3 turning movement diagram for the traffic generated by the proposal through the intersection.

Figure 8-2: Estimated AM Peak Hour Traffic Generation Volumes

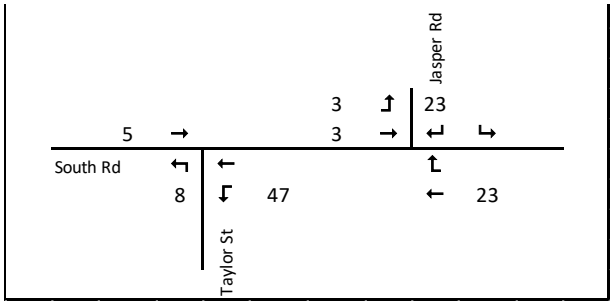
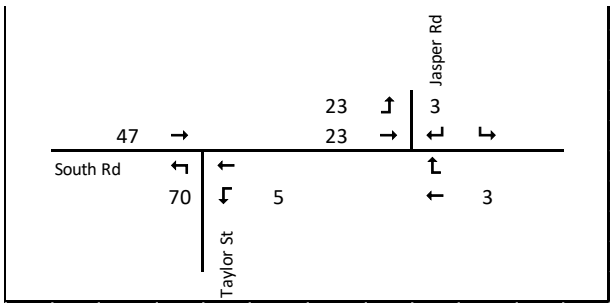


Figure 8-3: Estimated PM Peak Hour Traffic Generation Volumes



8.3. Traffic Impact

In order to assess the anticipated impacts of the site generated traffic on the surrounding road network, SIDRA Intersection modelling has been undertaken for the key intersection of South Road / Taylor Street / Jasper Road, which will act as the main connection for site generated traffic to the wider arterial road network.

The key parameters from SIDRA modelling used to determine the operational capacity of an intersection are queue length, average delay and degree of saturation (or volume to capacity ratio).

Degree of Saturation (DOS) is a ratio of arrival (or demand) flow to capacity. DOS above 1.0 represent oversaturated conditions and a DOS below 1.0 represent undersaturated conditions. The operational rating associated with the DOS is summarised below.

Table 8.2: Ratings of Degree of Saturation

Degree of Saturation (DoS)	Rating
Up to 0.6	Excellent
0.61 – 0.70	Very Good
0.71 – 0.80	Good
0.81 – 0.90	Fair
0.91 – 1.00	Poor
Greater than 1.00	Very Poor

Although operating conditions with a degree of saturation around 1.00 are undesirable, it is acknowledged that this level of congestion is typical of many metropolitan intersections during the AM and PM peaks.

The 95th percentile queue length is the value below which 95 percent of all observed cycle queue lengths fall, or 5 percent of all observed queue lengths exceed. Average Delay is the average time, in seconds, that all vehicles making a particular movement can expect to wait at an intersection.

Post Development Operating Conditions

In this instance, the existing intersection is carrying quite high volumes of traffic and modelling results would suggest the intersection is at its theoretical capacity under existing conditions. Therefore, in light of the relatively small increase in traffic volumes from the site compared with the volumes already using the intersection, in this case the existing conditions models have not been calibrated to observed conditions on site. Instead the focus of this assessment is on the relative impacts of the site generated traffic on these operating conditions.

As such, the net +/- changes in operating conditions of the intersection are presented in Table 8.3 and Table 8.4, with the detailed modelling results provided in Appendix C for reference.

Table 8.3: Post Development AM Peak Hour – SIDRA Results for Net Change in Operation – South Road / Jasper Road / Taylor Street

Approach	Movement	AM Peak Period (net +/- changes from existing conditions)		
		DoS	Average Delay	95th Percentile Queue Length
South Road (E)	Through	+ 0.03	+ 8 sec	+ 37 m
	Right	+ 0.01	+ 3 sec	+ 2 m
Jasper Road (N)	Left	+ 0.06	+ 50 sec	+ 21 m
	Right	+ 0.06	+ 50 sec	+ 21 m
South Road (W)	Left	+ 0.00	+ 4 sec	+ 5 m
	Through	+ 0.00	+ 3 sec	+ 6 m
Taylor Street (S)	Left	+ 0.03	+ 0 sec	+ 2 m

Table 8.4: Post Development PM Peak Hour – SIDRA Results for Net Change in Operation – South Road / Jasper Road / Taylor Street

Approach	Movement	PM Peak Period (net +/- changes from existing conditions)		
		DoS	Average Delay	95th Percentile Queue Length
South Road (E)	Through	+ 0.06	+ 40 sec	+ 75 m
	Right	+ 0.00	+ 3 sec	+ 0 m
Jasper Road (N)	Left	+ 0.04	+ 24 sec	+ 8 m
	Right	+ 0.04	+ 25 sec	+ 8 m
South Road (W)	Left	+ 0.01	+ 6 sec	+ 23 m
	Through	+ 0.01	+ 5 sec	+ 23 m
Taylor Street (S)	Left	+ 0.00	- 2 sec	+ 30 m

Traffic Impact Summary

Based on the results in Table 8.3 and Table 8.4, the impacts of the site generated traffic on the intersection of South Road / Taylor Street / Jasper Road are generally expected to be minor, with the following more notable exceptions:

— Increased delays for the Jasper Road approach in the AM peak hour

— Increased delays and queue length for the South Road east approach in the PM peak hour

While these movements have the more notable impacts from the additional site traffic, relative to their existing model results for queuing and delays, these net increases are relatively minor.

It should also be noted that the models have conservatively been run based on two continuous lanes in each direction on South Road, given that there are not currently clearway parking controls on the outside traffic lanes. Should clearway restrictions be added during the network peak hours (as is commonly done for high volume corridors in this type of setting), this would notably improve the operating conditions of the intersection and increase capacity for all approaches.

Having regard to the above assessments, the impacts on the intersection operation from the site generated traffic are considered to be relatively minor when compared to existing operating conditions and traffic volumes. Other than the option to introduce clearways on South Road to improve intersection capacity, the intersection is already built out as much as possible within the available road reserve and any further physical upgrade works to improve capacity would not be possible.

As with many congested corridors and intersections on the arterial road network that have no options to further increase capacity through upgrade works, commuters will respond to increased traffic growth by adjusting their travel patterns. This may include a mix choosing alternative transport modes, alternate travel routes, travelling outside of the peak periods which results in a spreading of the peak hour traffic, or utilising flexible work arrangements to reduce how often they travel to work. This is what is expected to occur as strategic high-density development continues to occur around the public transport and activity hub around Moorabbin Station.

On this basis, in the context of the surrounding road network and the strategic focused development around a transport and activity hub, the net traffic impacts of the development on the adjacent South Road / Jasper Road / Taylor Street intersection are considered to be acceptable.

9. Conclusion

It is proposed to demolish the existing buildings and construct a 15-storey mixed use development at 360-372 South Road, Moorabbin. The project is primarily office, with ground level food and drink and indoor recreation facility uses. It is also proposed to provide a total of 209 car parking spaces accessed via a widened rear laneway off Taylor Street, as well as 110 bicycle parking spaces with end of trip facilities.

Based on the assessments within the report, the proposal is considered to be satisfactory from a transport engineering perspective, noting the following key conclusions:

— the proposed car parking supply of 209 spaces and reduction from statutory requirements is considered to be acceptable in this instance, noting the following key factors:

- The site's excellent access to public transport options, including immediate access to the Moorabbin train station and six nearby bus route options.
- The generous provision of 110 bicycle parking spaces and end of trip facilities to encourage staff of the development to cycle to and from work.
- On-street parking in the vicinity of the is either restricted or subject to a high car parking demand. This will restrict the ability for any staff who are not allocated parking on-site to park off-site for a full workday, forcing staff to utilise alternate modes of transport.
- The short-term parking available within walking distance of the site has sufficient capacity to accommodate the visitor parking demands of the proposed land uses, without the need to provide public access to a secure basement car park. It is noted that this is based on a conservative estimate of visitor parking demands, without factoring down in response to the majority of the ground floor tenancy visitors being from the proposed new building or surrounding businesses and residents.
- The City of Kingston has local planning policies and strategies in place that prioritise active and sustainable transport modes over the use of private vehicle travel. As above, one of the most effective ways to force transport mode shift away from private vehicle is to heavily restrict car parking supply, particularly in contexts such as the subject site where parking is well restricted in the surrounding area and with excellent public transport access. This is directly supportive of these various Council policy and strategy objectives.
- The suppressed provision of car parking will reduce motor vehicle travel to and from the site, resulting in a lessened impact to traffic congestion and pedestrian amenity in the vicinity of the site than what would otherwise be incurred were more on-site parking proposed.
- Office land uses are a perfect opportunity to heavily reduce car parking and force mode shift when in suitable locations such as the subject site, as tenants are always provided with up front information about their allocation of car parking. If the proposed allocation does not meet their staff requirements, then there is no obligation to lease a tenancy and only tenants that will be satisfied with their allocation will occupy the building. The provision of bicycle parking greatly exceeds the statutory requirements of Clause 52.34 of the Kingston Planning Scheme and will encourage cycling as a mode of transport to and from the site.

— It is recommended that the car parking supply is allocated with 204 spaces for staff of the office use, 4 spaces for staff of the food and drink and indoor recreation facility uses and at

least 1 space for a potential car share vehicle (subject to interest and agreement with a car share provider).

— The car parking layout and access arrangements have been designed in accordance with the relevant Australian Standards and Planning Scheme requirements. The only recommended modifications are:

  - Modify the ramp design on the inside radius of the main site access to the laneway to provide a smooth transition for the inside turn. There are currently two ramps running in different directions that transition directly into this inside corner splay area.
  - Modify the positioning of car space numbers 01, 44, 48 and 98, to provide a compliant clearance envelope around the space relative to adjacent columns or walls.
  - Add some additional convex/dome mirrors in the north-east and north-west corners of basement 1, to provide sight lines around these blind corners.

— The proposed bicycle parking supply of 110 spaces and 9 changeroom/showers notably exceeds the minimum statutory requirements, in the interest of encouraging cycling as a mode of transport to the site.

— The design of the bicycle parking spaces complies with AS2890.3:2015 for a double tier dynamic parking system.

— Sufficient provision has been made for loading and unloading activities and waste collection, with a dedicated service bay provided off the rear laneway, which is designed to allow for access by vehicles up to a 6.4m SRV in size. This accommodates the mini rear-loader waste collection vehicle that is intended to service the building. However, there are some modifications required to the ramping arrangement into the service bay area, to comply with Australian Standards (refer to Section 7).

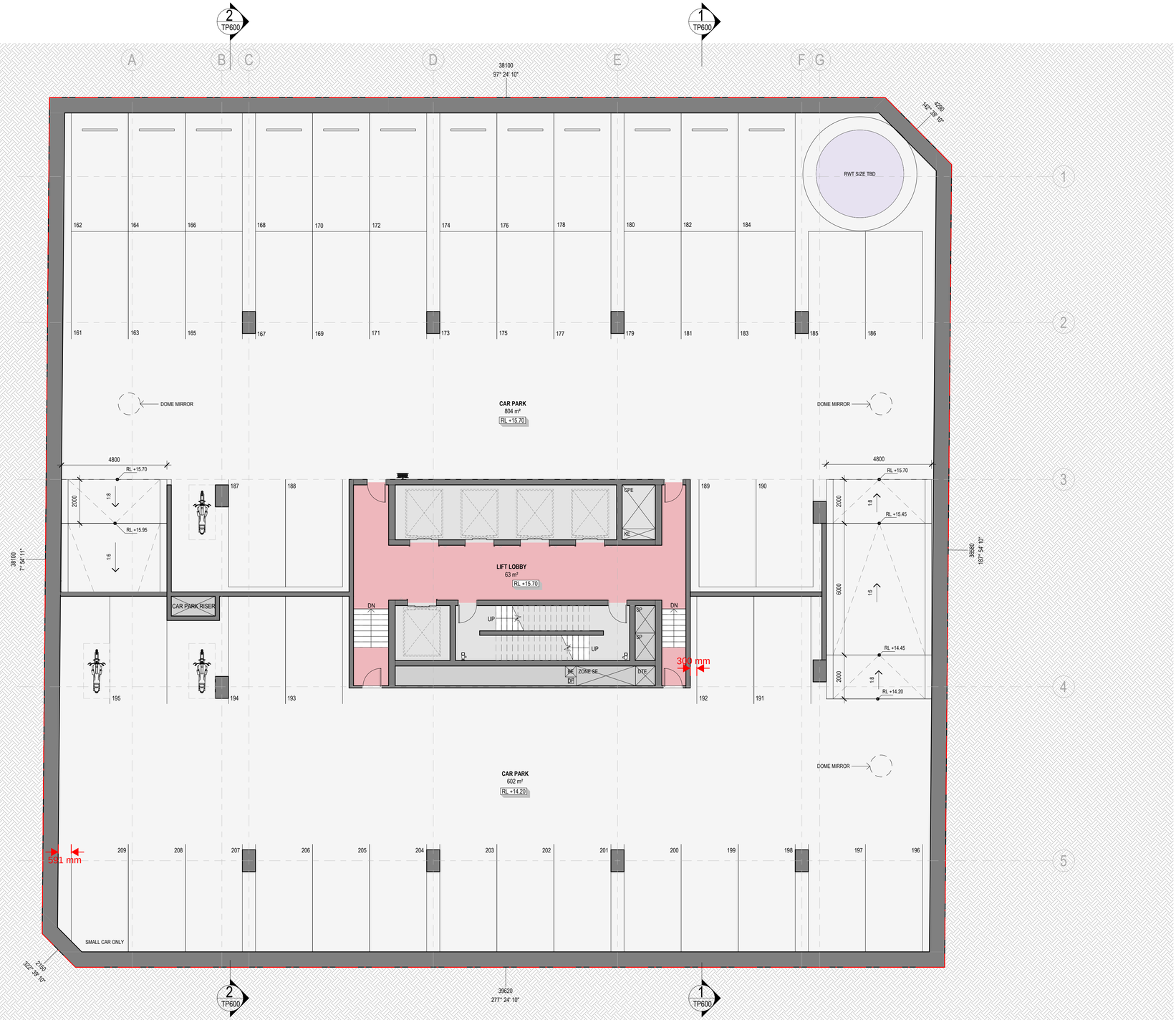
— The intersection of South Road / Taylor Street / Jasper Road is currently carrying high volumes of traffic and SIDRA modelling suggests it is operating at capacity under existing conditions, as the other nearby intersections are likely to be.

— Post development traffic modelling indicates that the relative impact of the estimated site generated traffic on the intersection is expected to be generally minor when compared to the existing operating conditions running at capacity.

— As with many congested corridors and intersections on the arterial road network that have no options to further increase capacity through upgrade works, commuters will respond to increased traffic growth by adjusting their travel patterns. This may include a mix choosing alternative transport modes, alternate travel routes, travelling outside of the peak periods which results in a spreading of the peak hour traffic, utilising flexible work arrangements to reduce how often they travel to work. This is what is expected to occur as strategic high density development continues to occur around the public transport and activity hub around Moorabbin Station.

— While there isn't any opportunity to physically upgrade the intersection to improve operational capacity, it is noted that the outside lanes on South Road do not currently have any clearway restrictions and are generally used as parking lanes. If DTP were to implement clearway restrictions during peak hours, this would notably improve the capacity of the South Road / Taylor Street / Jasper Road intersection, as well as the other nearby signals.

Appendix A : Development Plans



ADVERTISED
PLAN

REVISION	ISSUE	CHECKED	DATE
1	ISSUE FOR REVIEW		23/02/2024

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FI - FOR INFORMATION
SK - SCHEMATIC DESIGN
TP - TOWN PLANNING
DD - DESIGN DEVELOPMENT
TI - TENDER ISSUE
MK - MARKETING
BP - BUILDING PERMIT
IFC - ISSUE FOR CONSTRUCTION

ISSUE FOR TOWN PLANNING

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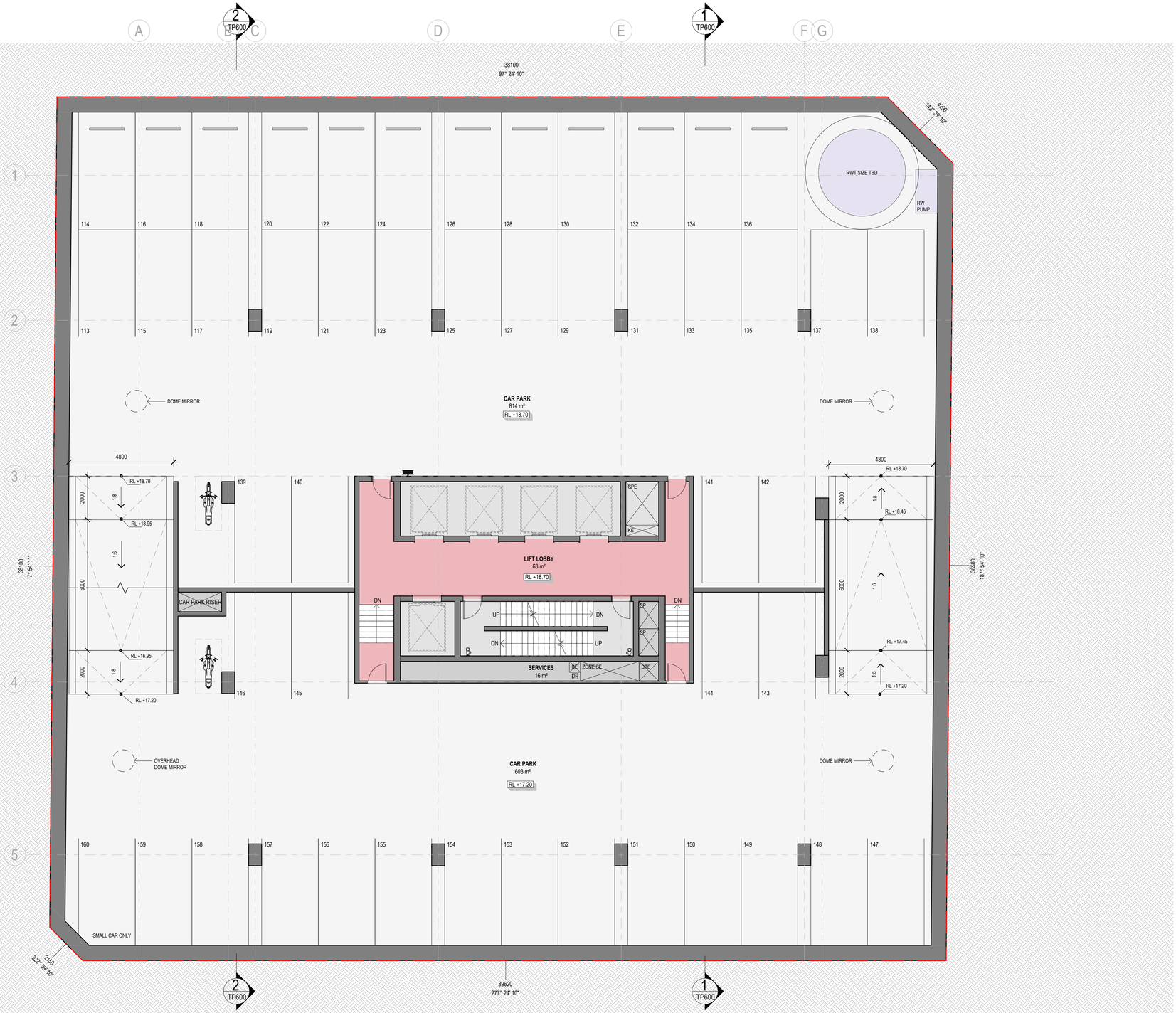
enquiries@kud.com.au

TITLE:
LEVEL B5 PROPOSED GA PLAN
ADDRESS:
360-372 SOUTH ROAD, MOORABBIN
CLIENT:

PROJECT NO.
23-001

DRAWN: **FON/AV**
REV: **1**
SCALE: **1 : 100@A1**
SHEET NO. **TP300**



REVISION	ISSUE	CHECKED	DATE
1	ISSUE FOR REVIEW		23/02/2024

DRAWING LEGEND:

FI - FOR INFORMATION
SK - SCHEMATIC DESIGN
TP - TOWN PLANNING
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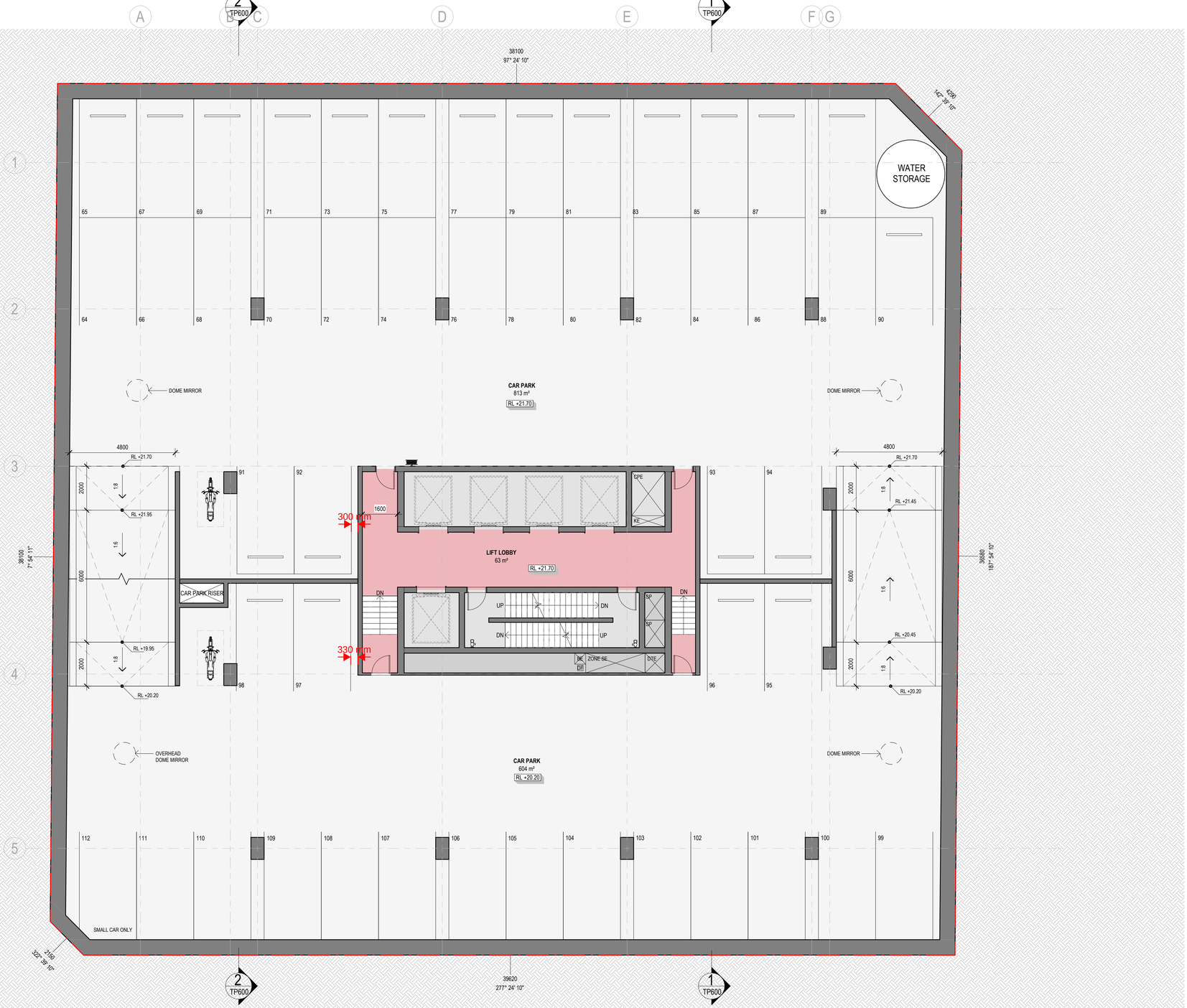
TITLE:
LEVEL B4 PROPOSED GA PLAN
ADDRESS:
360-372 SOUTH ROAD, MOORABBIN
CLIENT:

PROJECT NO.
23-001

DRAWN: **FON/AV**
REV: **1**
SCALE: **1 : 100@A1**
SHEET NO. **TP301**



ADVERTISED PLAN

REVISION	ISSUE	CHECKED	DATE
1	ISSUE FOR REVIEW		23/02/2024

DRAWING LEGEND:

FI - FOR INFORMATION
SK - SCHEMATIC DESIGN
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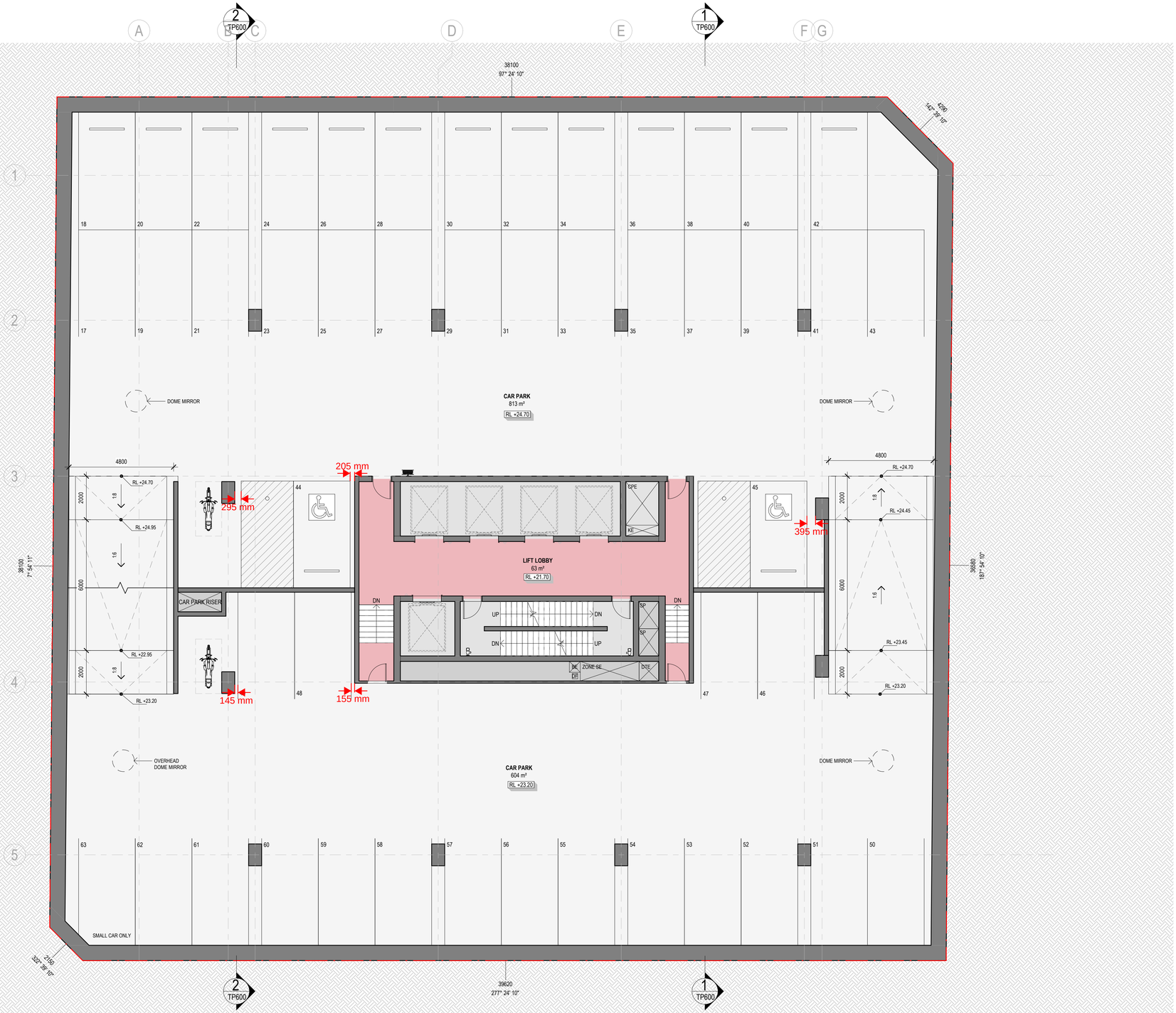
TITLE:
LEVEL B3 PROPOSED GA PLAN
ADDRESS:
360-372 SOUTH ROAD, MOORABBIN
CLIENT:

PROJECT NO.
23-001

DRAWN: **FON/AV**
REV: **1**
SCALE: **1 : 100@A1**
SHEET NO. **TP302**



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ISSUE FOR TOWN PLANNING

TITLE:
LEVEL B2 PROPOSED GA PLAN
ADDRESS:
360-372 SOUTH ROAD, MOORABBIN
CLIENT:

PROJECT NO.
23-001

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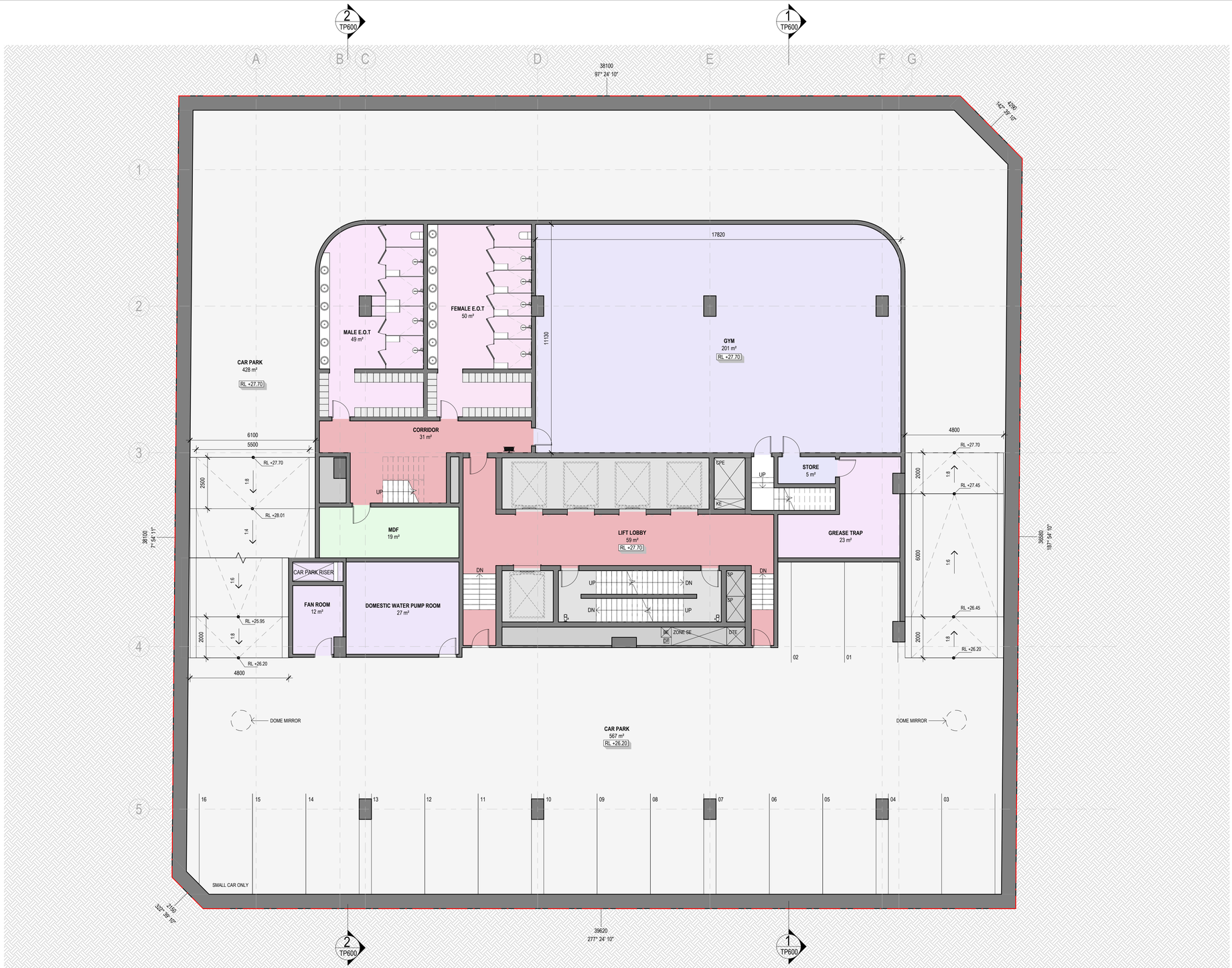
SCALE: **1 : 100@A1**
SHEET NO. **TP303**



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PLAN

REVISION	ISSUE	CHECKED	DATE
1	ISSUE FOR REVIEW		23/02/2024

DRAWING LEGEND:

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SK - SCHEMATIC DESIGN
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TITLE:
LEVEL B1 PROPOSED GA PLAN
ADDRESS:
360-372 SOUTH ROAD, MOORABBIN
CLIENT:

PROJECT NO.
23-001

DRAWN: **FON/AV**
REV: **1**
SCALE: **1 : 100@A1**
SHEET NO. **TP304**

56 STATION STREET, MOORABBIN

54 STATION STREET, MOORABBIN

52 STATION STREET, MOORABBIN

50 STATION STREET, MOORABBIN

48 STATION STREET, MOORABBIN

46 STATION STREET, MOORABBIN

44 STATION STREET, MOORABBIN

42 STATION STREET, MOORABBIN

SOUTH ROAD

MAC LANE

TAYLOR STREET

ROWY

17 TAYLOR STREET, MOORABBIN

RETAIL
194 m²
RL +31.20
CITY CAVE

FIRE BOOSTER CABINET

FIRE CONTROL ROOM
11 m²

LIFT LOBBY
222 m²
RL +30.70

CAFE
227 m²
RL +30.70

RETAIL
174 m²
RL +30.70
YOGA

BIKE STORAGE
81 m²
RL +30.70
BIKE COUNT: 110

COMMS
6 m²

FP ROOM
35 m²

BIN ROOM
32 m²

LOADING BAY
36 m²
RL +30.70

DIESEL PUMP
7 m³

SUBSTATION
19 m²
RL +31.20

SWITCH ROOM
24 m²

SPRINKLER CONTROL VALVE

GENERAL
PAPER
ORG
RECYCLING
HARD WASTE + E-WASTE

PEDESTRIAN SIGHT SPLAY

BIKE LANE

PROPOSED CROSSOVER TO BE DESIGNED AS PER COUNCIL'S VEHICLE CROSSOVER SPECIFICATIONS

ADVERTISED PLAN

REVISION	ISSUE	CHECKED	DATE
1	ISSUE FOR REVIEW		23/02/2024

DRAWING LEGEND:

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TITLE:
LEVEL 00 PROPOSED GA PLAN
ADDRESS:
360-372 SOUTH ROAD, MOORABBIN
CLIENT:

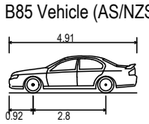
PROJECT NO.
23-001

DRAWN: **FON/AV**
REV: **1**
SCALE: **1 : 100@A1**

SHEET NO.
TP305

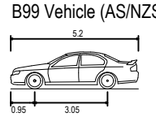
Appendix B : Swept Path Assessment

B85 Vehicle (AS/NZS2890.1:2004)



VEHICLE ENVELOPE (FORWARD)	
300mm CLEARANCE (FORWARD)	
VEHICLE ENVELOPE (REVERSE)	
300mm CLEARANCE (REVERSE)	
Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	5.80m

B99 Vehicle (AS/NZS2890.1:2004)



VEHICLE ENVELOPE (FORWARD)	
300mm CLEARANCE (FORWARD)	
VEHICLE ENVELOPE (REVERSE)	
300mm CLEARANCE (REVERSE)	
Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	2.200m
Min Body Ground Clearance	0.312m
Track Width	1.840m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	6.30m

ratio:
RATIO CONSULTANTS PTY LTD
ABN 005 422 104
8 GWYNNE STREET
CREMORNE, VICTORIA 3121
TELEPHONE (03)9429 3111
FACSIMILE (03)9429 3011

Proposed Mixed Use Development
360-372 South Road, Moorabbin
Swept Path Assessment - Ground Floor

ADVERTISED PLAN

NOTE:
1) Base Plan Supplied By KUD on 14/03/2023
2) Maximum Design Speed 10km/h

RATIO REFERENCE	SHEET No.	PREPARED BY	SCALE	DATE
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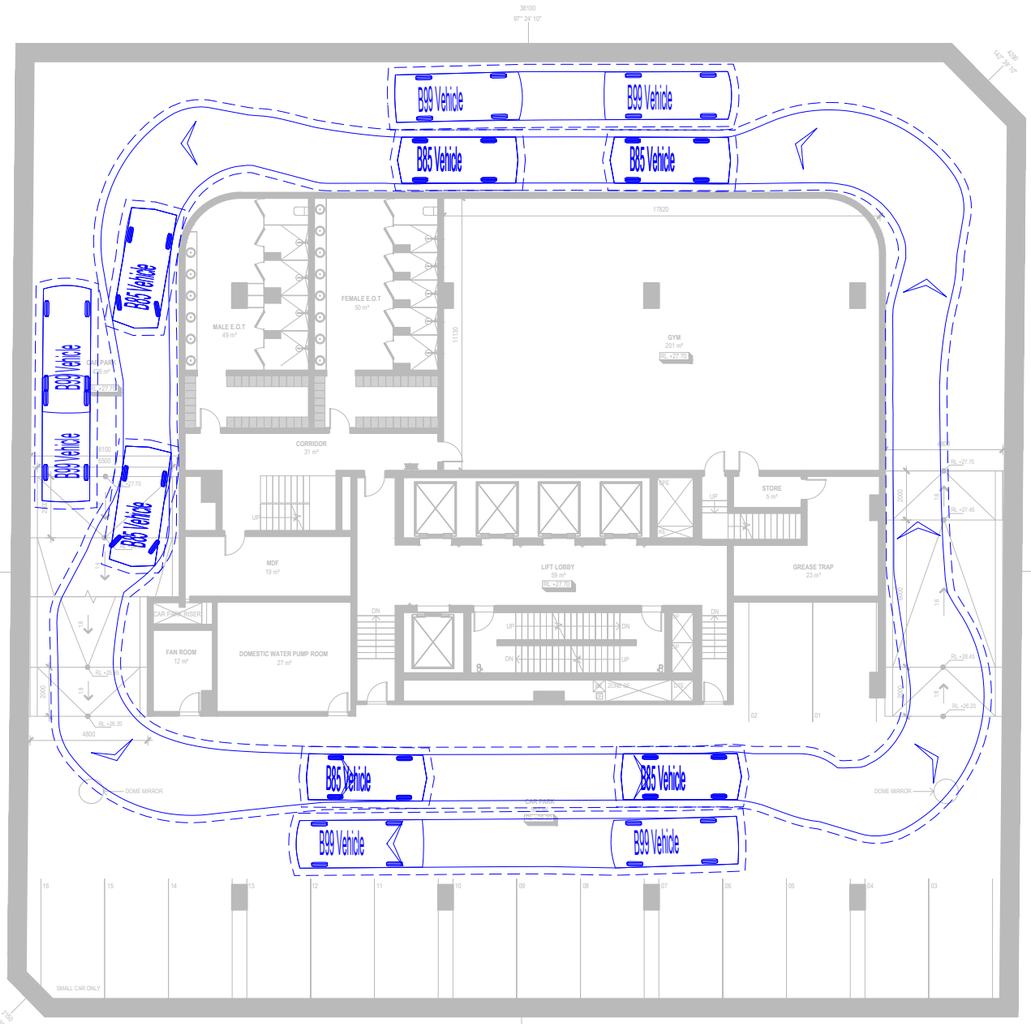

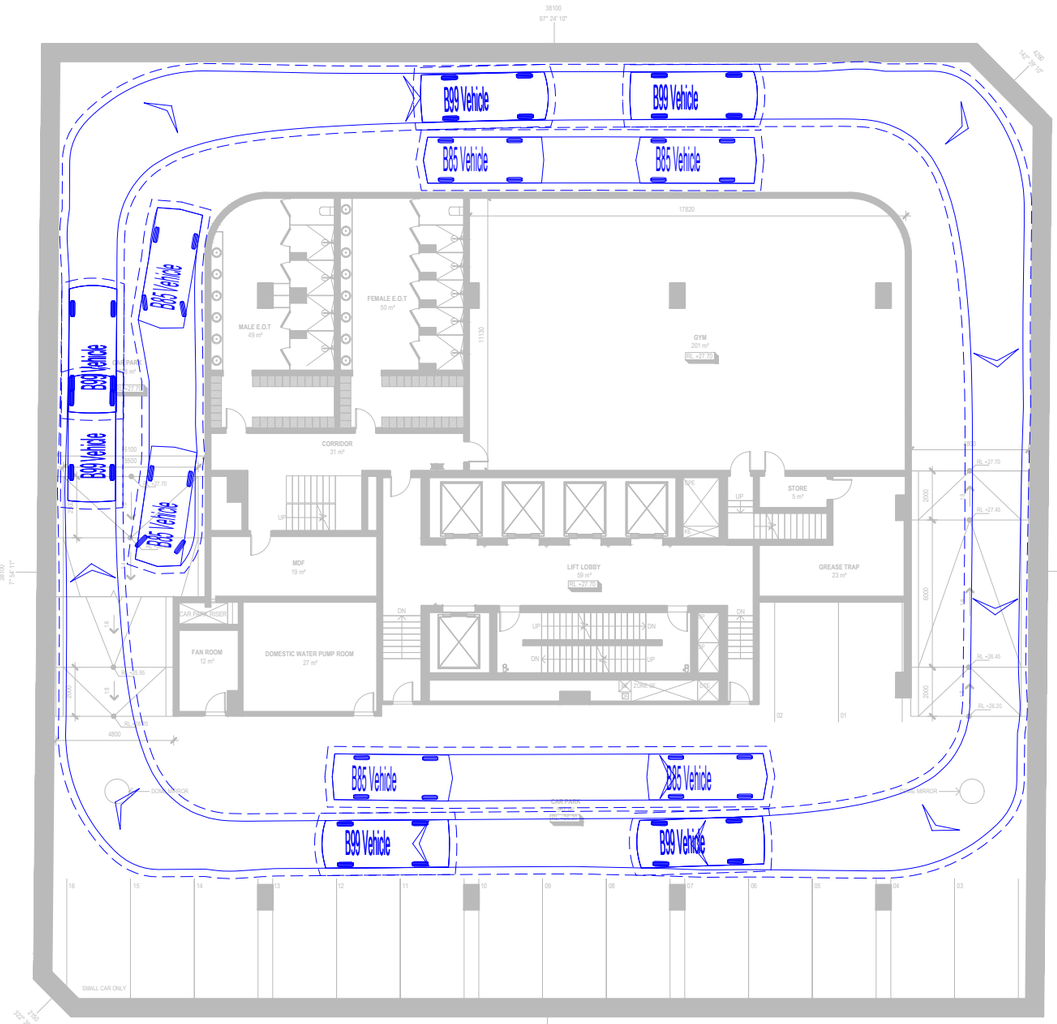

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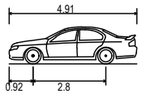
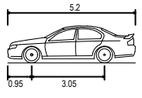
B85 Vehicle (AS/NZS2890.1:2004)



VEHICLE ENVELOPE (FORWARD)	
300mm CLEARANCE (FORWARD)	
VEHICLE ENVELOPE (REVERSE)	
300mm CLEARANCE (REVERSE)	
Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	5.80m

B99 Vehicle (AS/NZS2890.1:2004)



VEHICLE ENVELOPE (FORWARD)	
300mm CLEARANCE (FORWARD)	
VEHICLE ENVELOPE (REVERSE)	
300mm CLEARANCE (REVERSE)	
Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	2.200m
Min Body Ground Clearance	0.312m
Track Width	1.840m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	6.30m

ratio:
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FACSIMILE (03)9429 3011

Proposed Mixed Use Development
360-372 South Road, Moorabbin
Swept Path Assessment - Basement 1

NOTE:
1) Base Plan Supplied By KUD on 14/03/2023
2) Maximum Design Speed 10km/h

RATIO REFERENCE	SHEET No.	PREPARED BY	SCALE	DATE
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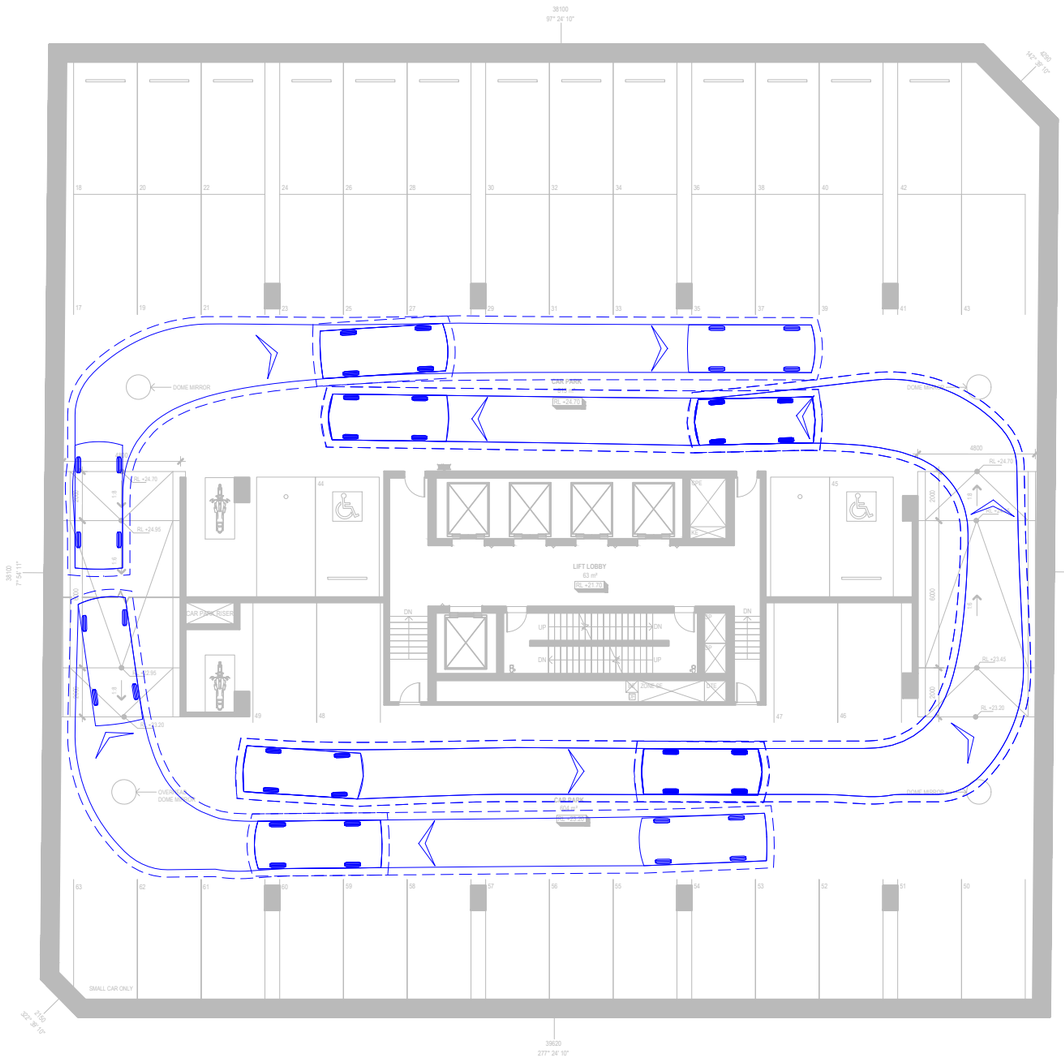

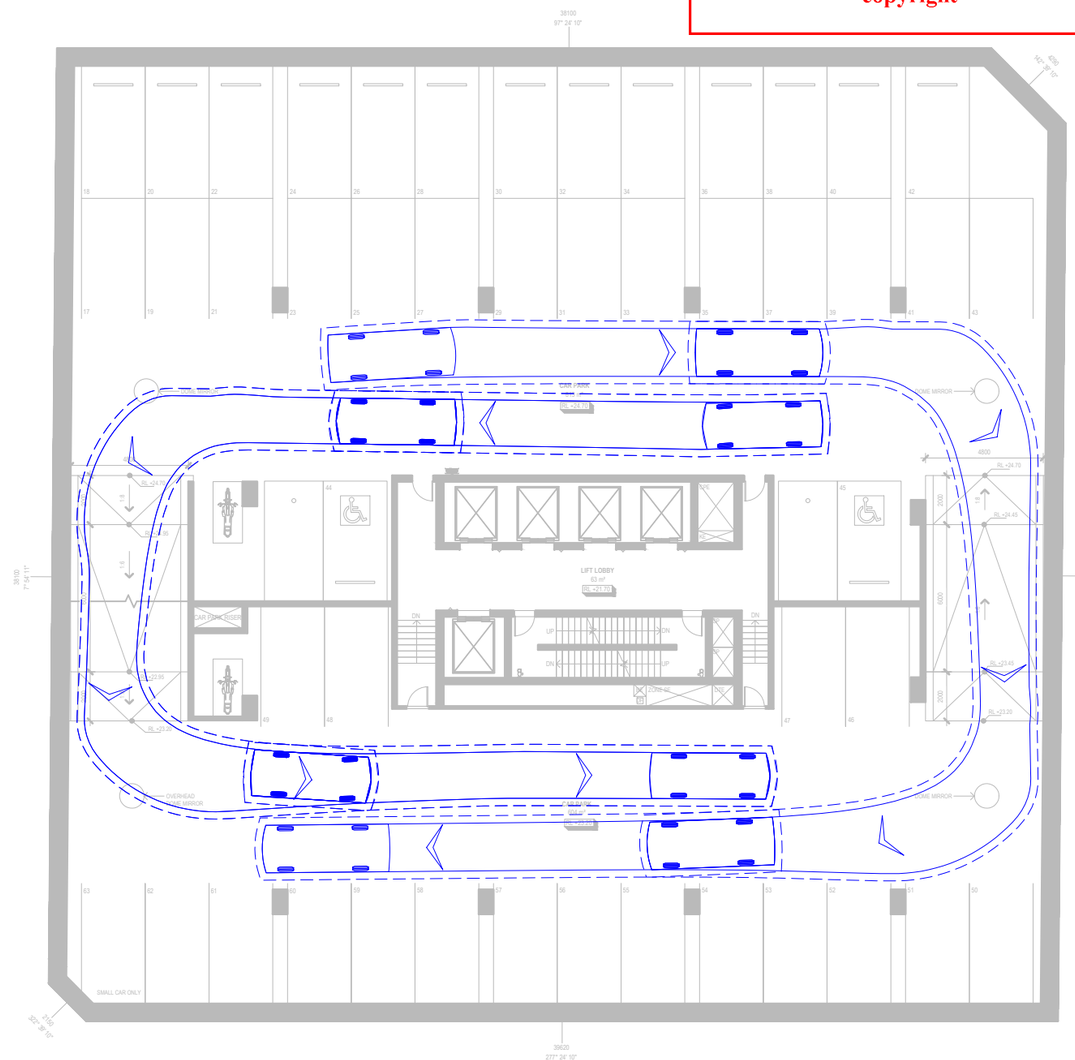

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ratio:
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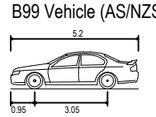
CREMORNE, VICTORIA 3121
TELEPHONE (03)9429 3111
FACSIMILE (03)9429 3011

B99 Vehicle (AS/NZS2890.1:2004)



VEHICLE ENVELOPE (FORWARD)
300mm CLEARANCE (FORWARD)
VEHICLE ENVELOPE (REVERSE)
300mm CLEARANCE (REVERSE)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	2.200m
Min Body Ground Clearance	0.312m
Track Width	1.840m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	6.30m

Proposed Mixed Use Development
360-372 South Road, Moorabbin
Swept Path Assessment - Basement 2-5

NOTE:
1) Base Plan Supplied By KUD on 14/03/2023
2) Maximum Design Speed 10km/h

RATIO REFERENCE	SHEET No.	PREPARED BY	SCALE	DATE
20161T-SK001-B	3 of 6	C.D.	1:250 @A3	18/03/2024

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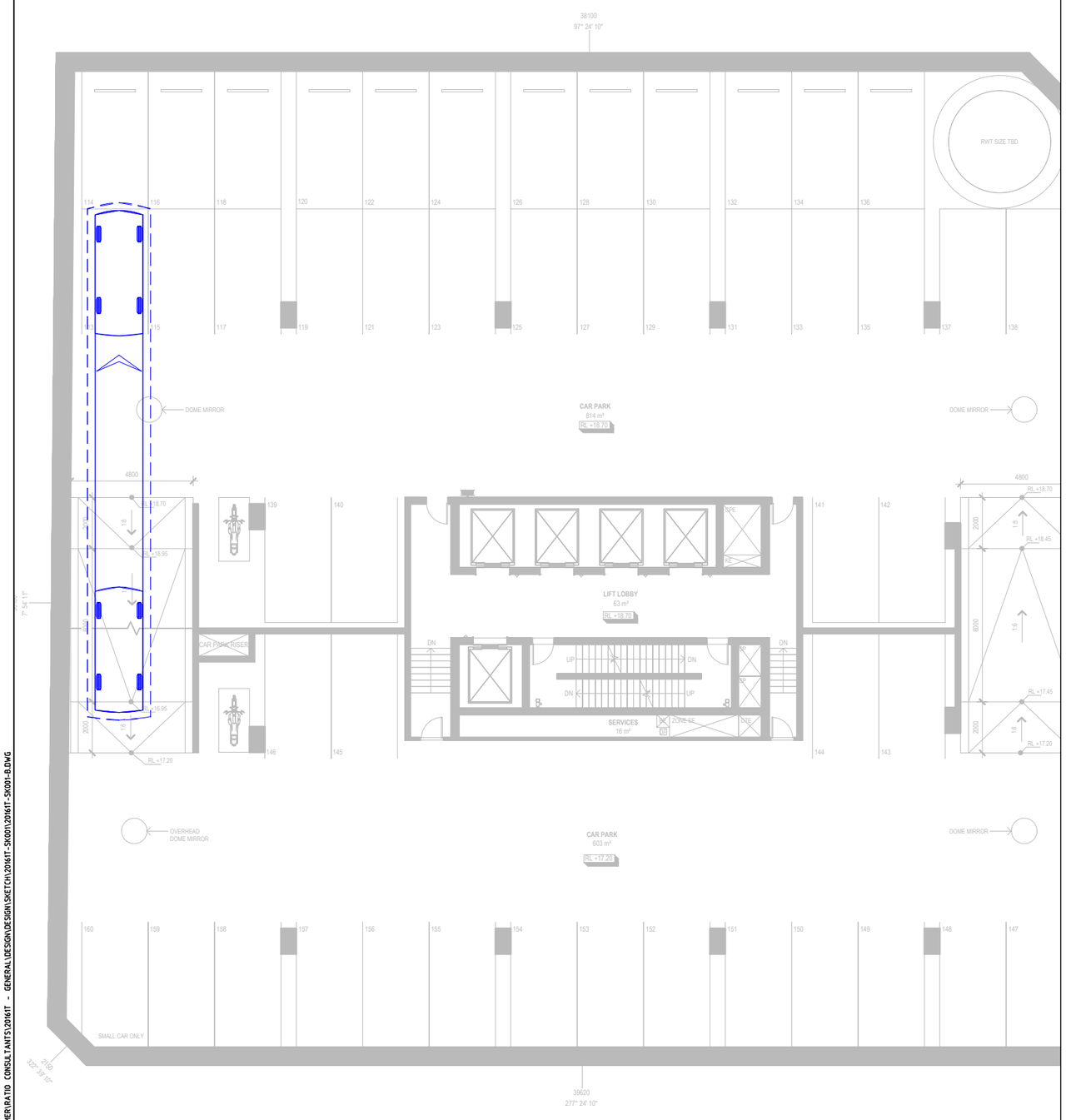

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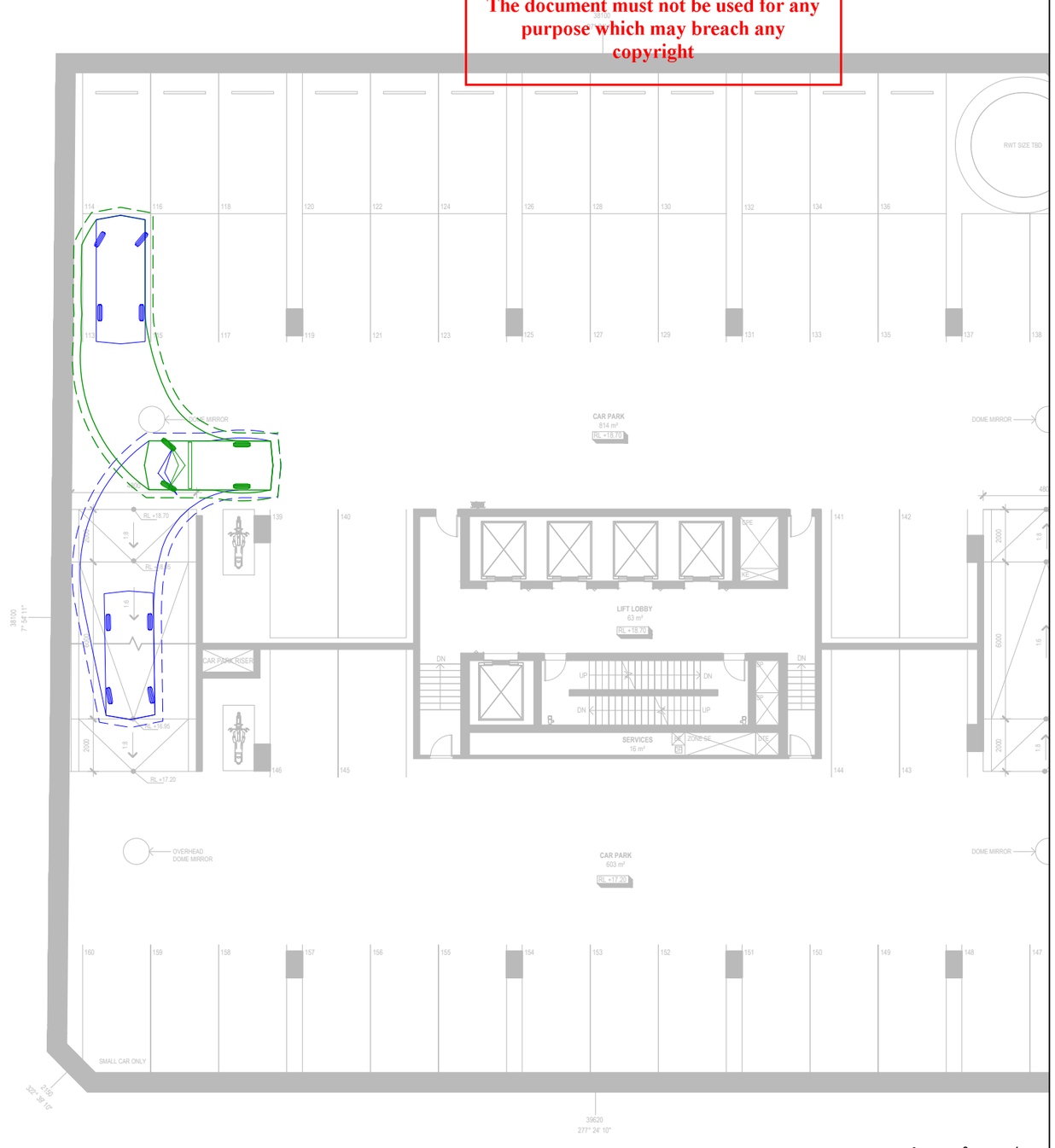

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ratio:

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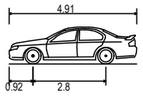
CREMORNE, VICTORIA 3121
TELEPHONE (03)9429 3111
FACSIMILE (03)9429 3011

B85 Vehicle (AS/NZS2890.1:2004)



VEHICLE ENVELOPE (FORWARD)
300mm CLEARANCE (FORWARD)
VEHICLE ENVELOPE (REVERSE)
300mm CLEARANCE (REVERSE)

Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	5.80m

Proposed Mixed Use Development
360-372 South Road, Moorabbin
Swept Path Assessment - Critical Parking Space

NOTE:
1) Base Plan Supplied By KUD on 14/03/2023
2) Maximum Design Speed 10km/h

RATIO REFERENCE	SHEET No.	PREPARED BY	SCALE	DATE
20161T-SK001-B	4 of 6	C.D.	1:200 @A3	18/03/2024

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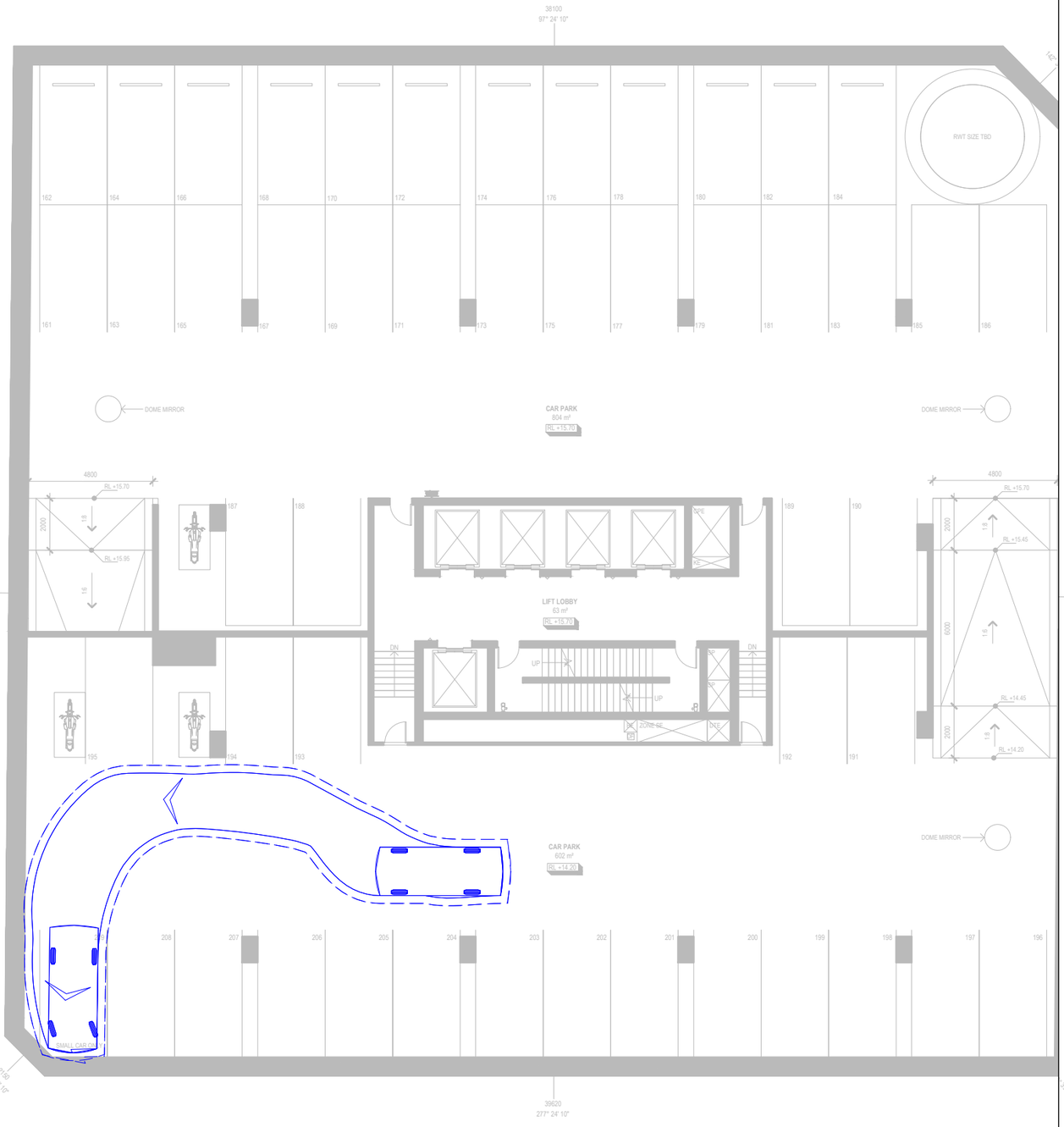

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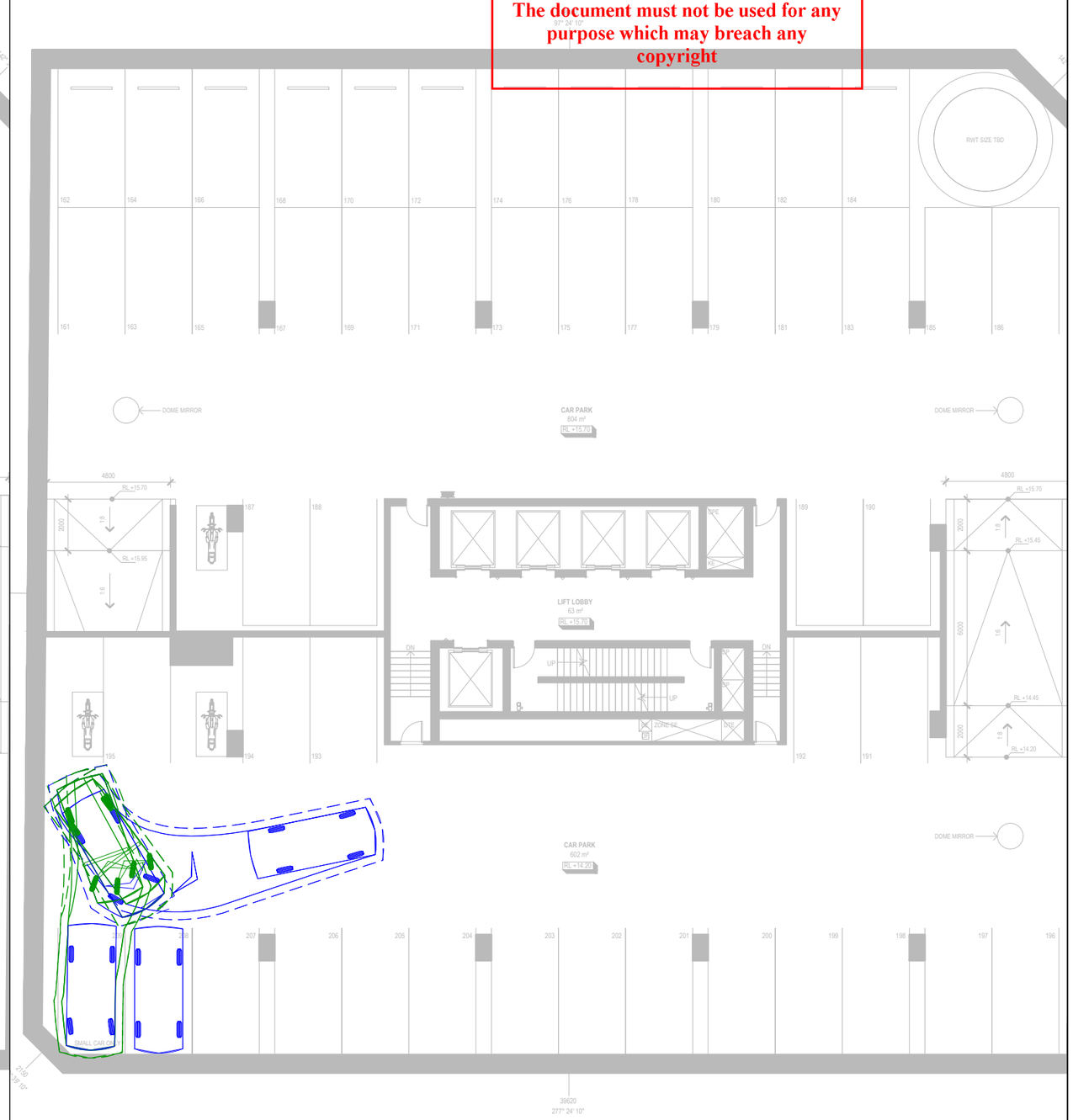

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ratio:

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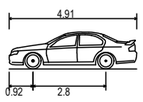
ABN 005 422 104
8 GWYNNE STREET
CREMORNE, VICTORIA 3121
TELEPHONE (03)9429 3111
FACSIMILE (03)9429 3011

B85 Vehicle (AS/NZS2890.1:2004)



VEHICLE ENVELOPE (FORWARD)
300mm CLEARANCE (FORWARD)
VEHICLE ENVELOPE (REVERSE)
300mm CLEARANCE (REVERSE)

Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	5.80m

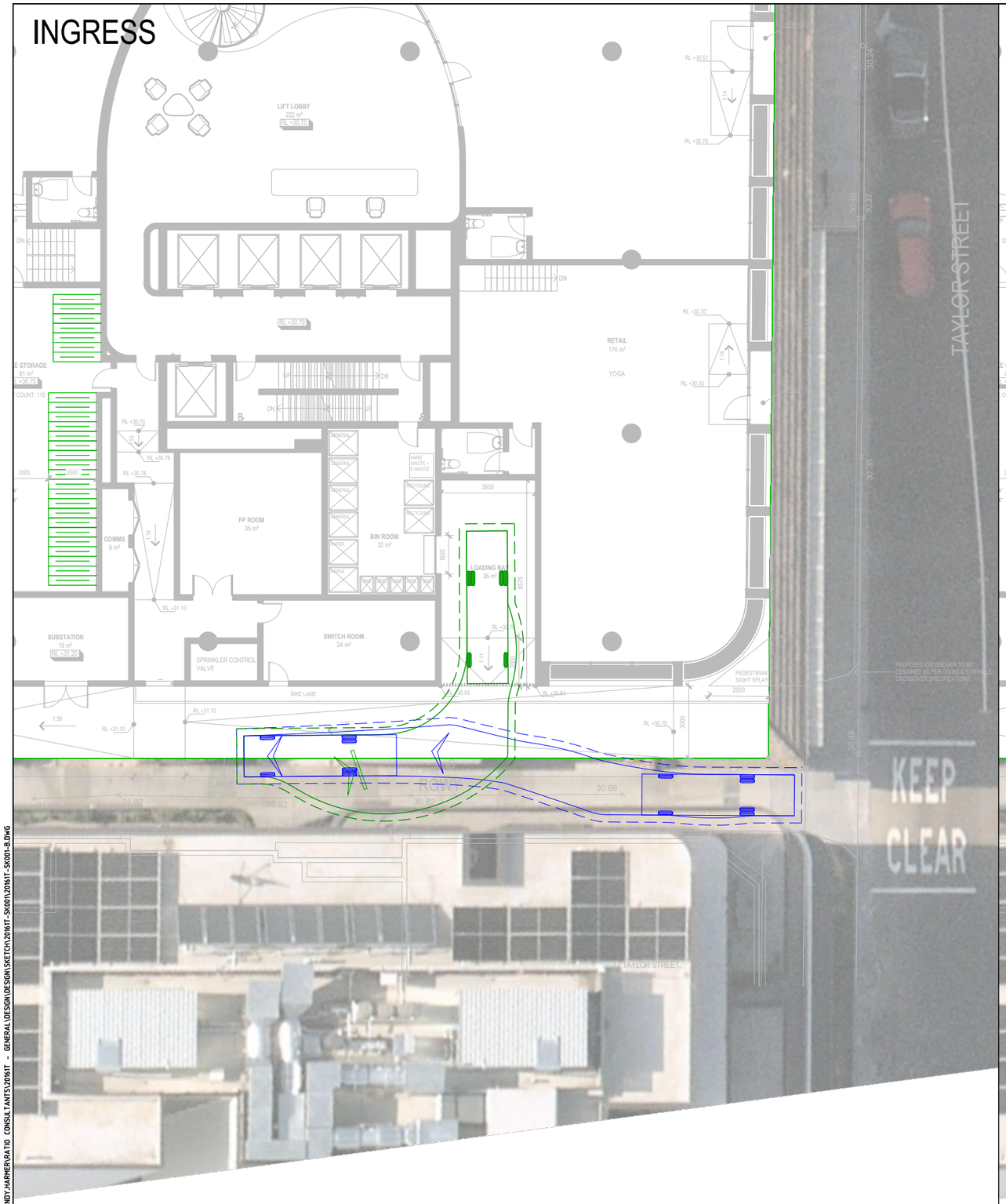
Proposed Mixed Use Development
360-372 South Road, Moorabbin
Swept Path Assessment - Ground Floor

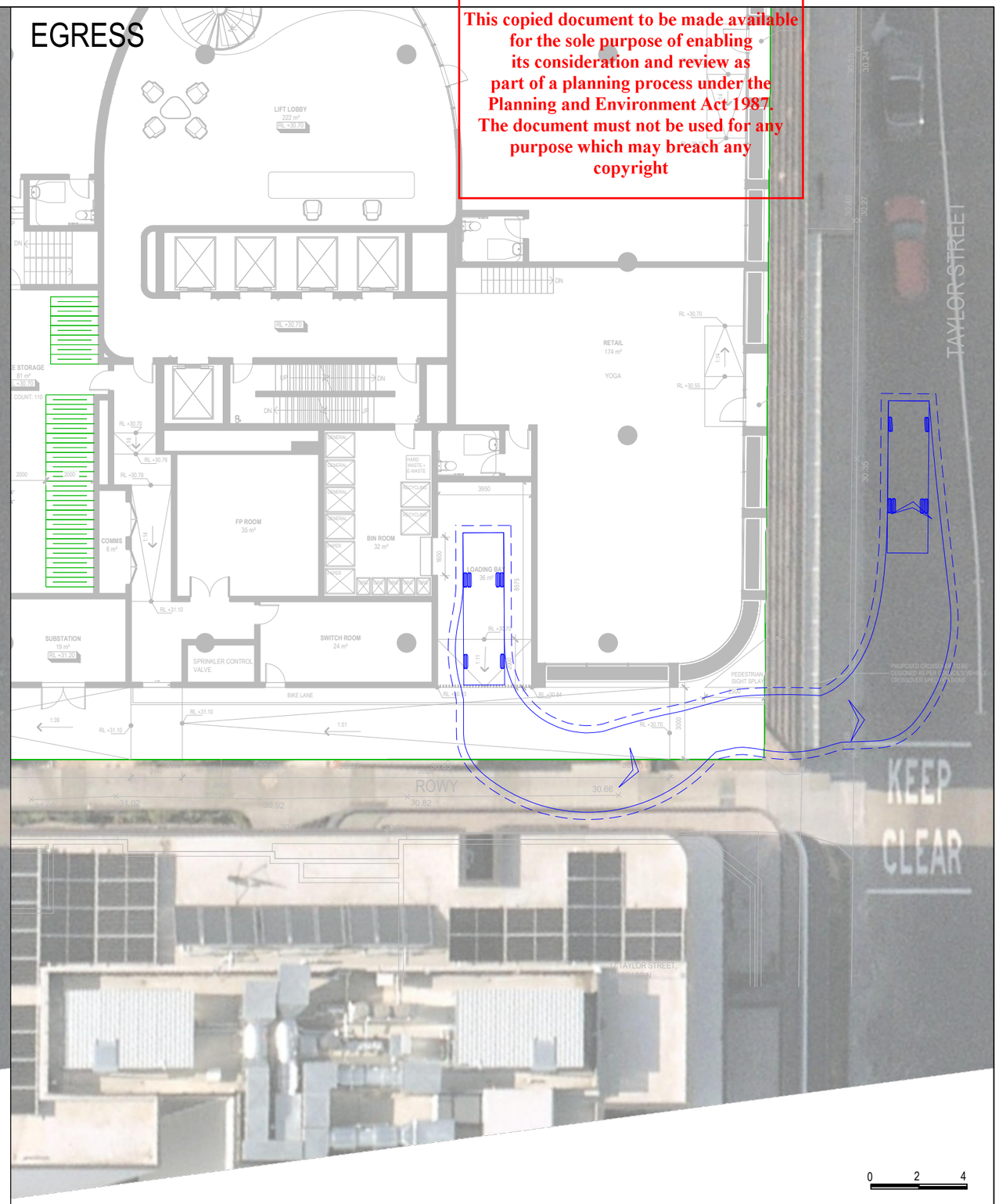
NOTE:
1) Base Plan Supplied By KUD on 14/03/2023
2) Maximum Design Speed 10km/h

RATIO REFERENCE	SHEET No.	PREPARED BY	SCALE	DATE
20161T-SK001-B	5 of 6	C.D.	1:200 @A3	18/03/2024

INGRESS

EGRESS





0 2 4

ratio:
RATIO CONSULTANTS PTY LTD
ABN 005 422 104
8 GWYNNE STREET
CREMORNE, VICTORIA 3121
TELEPHONE (03)9429 3111
FACSIMILE (03)9429 3011

Mini-Rear Loader Waste Collection Vehicle

VEHICLE ENVELOPE (FORWARD)
300mm CLEARANCE (FORWARD)
VEHICLE ENVELOPE (REVERSE)
300mm CLEARANCE (REVERSE)

Overall Length	6.345m
Body Width	1.700m
Overall Body Height	2.080m
Min Body Ground Clearance	0.235m
Track Width	1.670m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	6.450m

Proposed Mixed Use Development
360-372 South Road, Moorabbin
Swept Path Assessment - On-Site Loading

ADVERTISED PLAN

NOTE:
1) Base Plan Supplied By KUD on 14/03/2023
2) Maximum Design Speed 10km/h

RATIO REFERENCE	SHEET No.	PREPARED BY	SCALE	DATE
20161T-SK001-B	6 of 6	C.D.	1:200 @A3	18/03/2024

C:\USERS\ANDY-HARMER\RATIO CONSULTANTS\20161T - GENERAL\DESIGN\DESIGN\SKETCH\20161T-SK001\20161T-SK001-B.DWG
19/03/2024 8:59:33 AM

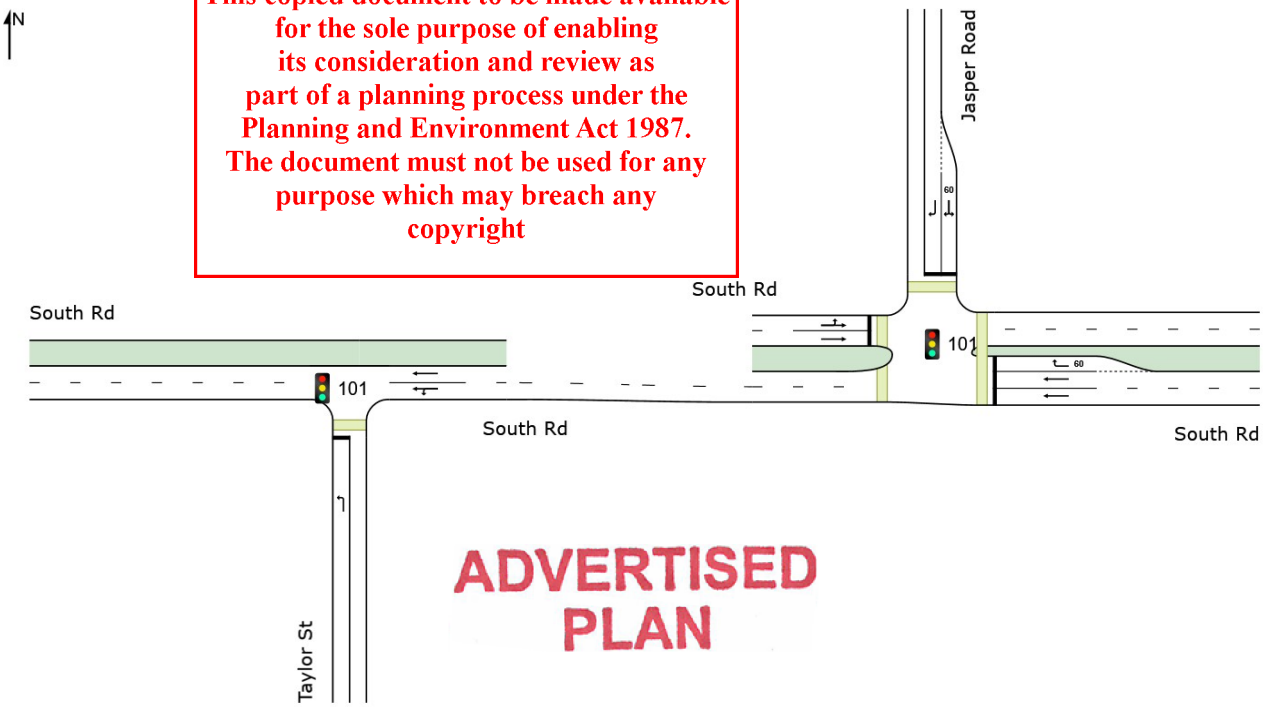
Appendix C : SIDRA Intersection Modelling Results

NETWORK LAYOUT

Network: N101 [PM Post Development (Network Folder: General)]

New Network
Network Category: (None)
EQUISAT (Fixed-Time/SCATS) Isolated
Common Control Group: CCG1 [South Rd / Jasper Road / Taylor Street]

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
101	CCG1	South Rd / Jasper Rd - PM Post Development
101	CCG1	South Rd / Taylor St - PM Post Development

CCG MOVEMENT SUMMARY

Common Control Group: CCG1 [South Rd / Jasper Road / Taylor Street]

Network: N101 [AM Existing (Network Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (CCG Practical Cycle Time)

Vehicle Movement Performance (CCG)

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	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
Site: 101 [South Rd / Jasper Rd - AM Existing]															
East: South Rd															
8	T1	All MCs	1900	5.0	1900	5.0	0.913	43.9	LOS D	45.3	330.5	0.94	0.91	1.00	29.0
9	R2	All MCs	521	0.0	521	0.0	* 1.331	397.8	LOS F	52.3	366.2	1.00	1.64	2.59	8.4
Approach			2421	3.9	2421	3.9	1.331	120.1	LOS F	52.3	366.2	0.95	1.07	1.35	14.2
North: Jasper Road															
10	L2	All MCs	96	0.0	96	0.0	1.202	244.5	LOS F	22.9	160.2	1.00	1.39	2.20	10.9
12	R2	All MCs	440	0.0	440	0.0	1.202	297.4	LOS F	22.9	160.2	1.00	1.39	2.20	6.2
Approach			536	0.0	536	0.0	1.202	288.0	LOS F	22.9	160.2	1.00	1.39	2.20	6.7
West: South Rd															
1	L2	All MCs	356	0.0	356	0.0	* 1.335	345.0	LOS F	98.3	706.9	1.00	2.02	2.56	4.9
2	T1	All MCs	1608	5.0	1608	5.0	1.335	363.7	LOS F	98.3	708.3	1.00	2.15	2.56	5.0
Approach			1964	4.1	1964	4.1	1.335	360.3	LOS F	98.3	708.3	1.00	2.12	2.56	4.9
All Vehicles			4921	3.6	4921	3.6	1.335	234.2	LOS F	98.3	708.3	0.98	1.52	1.92	7.8
Site: 101 [South Rd / Taylor St - AM Existing]															
South: Taylor St															
4	L2	All MCs	33	0.0	33	0.0	0.176	73.3	LOS E	1.4	9.6	0.95	0.73	0.95	26.7
Approach			33	0.0	33	0.0	0.176	73.3	LOS E	1.4	9.6	0.95	0.73	0.95	26.7
East: South Rd															
7	L2	All MCs	46	0.0	45	0.0	0.601	3.0	LOS A	0.0	0.0	0.00	0.02	0.00	54.8
8	T1	All MCs	2294	5.0	2222	5.2	0.601	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.3
Approach			2340	4.9	2267	5.1	0.601	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	59.2
All Vehicles			2373	4.8	2299	5.0	0.601	1.1	LOS A	1.4	9.6	0.01	0.02	0.01	57.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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).

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 (CCG)											
Mov ID	Crossing	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
Site: 101 [South Rd / Jasper Rd - AM Existing]											
East: South Rd											
P3	Full	11	69.2	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
North: Jasper Road											
P4	Full	11	69.2	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
West: South Rd											
P11	Stage 1	53	69.3	LOS F	0.2	0.2	0.96	0.96	84.7	20.0	0.24
P12	Stage 2	53	69.3	LOS F	0.2	0.2	0.96	0.96	84.7	20.0	0.24
All Pedestrians		126	69.3	LOS F	0.2	0.2	0.96	0.96	84.6	20.0	0.24
Site: 101 [South Rd / Taylor St - AM Existing]											
South: Taylor St											
P2	Full	11	69.2	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		11	69.2	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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.

CCG MOVEMENT SUMMARY

Common Control Group: CCG1 [South Rd / Jasper Road / Taylor Street]

Network: N101 [PM Existing (Network Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (CCG Practical Cycle Time)

Vehicle Movement Performance (CCG)

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	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
Site: 101 [South Rd / Jasper Rd - PM Existing]															
East: South Rd															
8	T1	All MCs	2313	5.0	2313	5.0	0.990	68.9	LOS E	67.9	495.9	1.00	1.15	1.22	20.3
9	R2	All MCs	222	0.0	222	0.0	* 1.025	153.3	LOS F	13.9	97.4	1.00	1.15	1.62	18.5
Approach			2535	4.6	2535	4.6	1.025	76.3	LOS E	67.9	495.9	1.00	1.15	1.25	18.2
North: Jasper Road															
10	L2	All MCs	126	0.0	126	0.0	0.991	108.5	LOS F	14.6	102.0	1.00	1.09	1.49	20.4
12	R2	All MCs	351	0.0	351	0.0	0.991	130.4	LOS F	14.6	102.0	1.00	1.09	1.50	12.7
Approach			477	0.0	477	0.0	0.991	124.6	LOS F	14.6	102.0	1.00	1.09	1.50	14.2
West: South Rd															
1	L2	All MCs	401	0.0	401	0.0	* 0.994	52.9	LOS D	62.6	450.2	1.00	1.15	1.24	18.7
2	T1	All MCs	1799	5.0	1799	5.0	0.994	72.5	LOS E	62.6	454.0	1.00	1.17	1.24	19.2
Approach			2200	4.1	2200	4.1	0.994	69.0	LOS E	62.6	454.0	1.00	1.17	1.24	19.1
All Vehicles			5212	3.9	5212	3.9	1.025	77.6	LOS E	67.9	495.9	1.00	1.15	1.27	18.0
Site: 101 [South Rd / Taylor St - PM Existing]															
South: Taylor St															
4	L2	All MCs	136	0.0	136	0.0	0.997	119.8	LOS F	7.9	55.5	1.00	1.08	1.59	19.9
Approach			136	0.0	136	0.0	0.997	119.8	LOS F	7.9	55.5	1.00	1.08	1.59	19.9
East: South Rd															
7	L2	All MCs	95	0.0	95	0.0	0.705	3.0	LOS A	0.0	0.0	0.00	0.04	0.00	54.4
8	T1	All MCs	2566	5.0	2566	5.0	0.705	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	58.8
Approach			2661	4.8	2661	4.8	0.705	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	58.7
All Vehicles			2797	4.6	2797	4.6	0.997	6.0	LOS A	7.9	55.5	0.05	0.07	0.08	50.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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).

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 (CCG)											
Mov ID	Crossing	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
Site: 101 [South Rd / Jasper Rd - PM Existing]											
East: South Rd											
P3	Full	11	69.2	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
North: Jasper Road											
P4	Full	11	69.2	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
West: South Rd											
P11	Stage 1	53	69.3	LOS F	0.2	0.2	0.96	0.96	84.7	20.0	0.24
P12	Stage 2	53	69.3	LOS F	0.2	0.2	0.96	0.96	84.7	20.0	0.24
All Pedestrians		126	69.3	LOS F	0.2	0.2	0.96	0.96	84.6	20.0	0.24
Site: 101 [South Rd / Taylor St - PM Existing]											
South: Taylor St											
P2	Full	11	69.2	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		11	69.2	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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.

CCG MOVEMENT SUMMARY

Common Control Group: CCG1 [South Rd / Jasper Road / Taylor Street]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

Network: N101 [AM Post Development (Network Folder: General)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (CCG Practical Cycle Time)

Vehicle Movement Performance (CCG)

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	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
Site: 101 [South Rd / Jasper Rd - AM Post Development]															
East: South Rd															
8	T1	All MCs	1924	5.0	1924	5.0	0.936	51.6	LOS D	50.4	368.0	0.98	0.98	1.08	25.8
9	R2	All MCs	521	0.0	521	0.0	* 1.335	401.1	LOS F	52.5	367.6	1.00	1.65	2.61	8.4
Approach			2445	3.9	2445	3.9	1.335	126.1	LOS F	52.5	368.0	0.98	1.12	1.41	13.6
North: Jasper Road															
10	L2	All MCs	96	0.0	96	0.0	1.257	294.5	LOS F	25.8	180.7	1.00	1.46	2.39	9.6
12	R2	All MCs	464	0.0	464	0.0	1.257	347.4	LOS F	25.8	180.7	1.00	1.46	2.39	5.3
Approach			560	0.0	560	0.0	1.257	338.4	LOS F	25.8	180.7	1.00	1.46	2.39	5.8
West: South Rd															
1	L2	All MCs	359	0.0	359	0.0	* 1.339	348.7	LOS F	99.1	712.4	1.00	2.03	2.57	4.9
2	T1	All MCs	1612	5.0	1612	5.0	1.339	367.4	LOS F	99.1	713.8	1.00	2.16	2.57	4.9
Approach			1971	4.1	1971	4.1	1.339	364.0	LOS F	99.1	713.8	1.00	2.13	2.57	4.9
All Vehicles			4976	3.6	4976	3.6	1.339	244.2	LOS F	99.1	713.8	0.99	1.56	1.98	7.5
Site: 101 [South Rd / Taylor St - AM Post Development]															
South: Taylor St															
4	L2	All MCs	42	0.0	42	0.0	0.213	72.6	LOS E	1.8	12.3	0.95	0.74	0.95	26.8
Approach			42	0.0	42	0.0	0.213	72.6	LOS E	1.8	12.3	0.95	0.74	0.95	26.8
East: South Rd															
7	L2	All MCs	96	0.0	92	0.0	0.609	3.0	LOS A	0.0	0.0	0.00	0.04	0.00	54.6
8	T1	All MCs	2294	5.0	2203	5.2	0.609	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.1
Approach			2389	4.8	2295	5.0	0.609	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	58.9
All Vehicles			2432	4.7	2337	4.9	0.609	1.4	LOS A	1.8	12.3	0.02	0.04	0.02	56.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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).

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 (CCG)											
Mov ID	Crossing	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
Site: 101 [South Rd / Jasper Rd - AM Post Development]											
East: South Rd											
P3	Full	11	69.2	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
North: Jasper Road											
P4	Full	11	69.2	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
West: South Rd											
P11	Stage 1	53	69.3	LOS F	0.2	0.2	0.96	0.96	84.7	20.0	0.24
P12	Stage 2	53	69.3	LOS F	0.2	0.2	0.96	0.96	84.7	20.0	0.24
All Pedestrians		126	69.3	LOS F	0.2	0.2	0.96	0.96	84.6	20.0	0.24
Site: 101 [South Rd / Taylor St - AM Post Development]											
South: Taylor St											
P2	Full	11	69.2	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		11	69.2	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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.

CCG MOVEMENT SUMMARY

Common Control Group: CCG1 [South Rd / Jasper Road / Taylor Street]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

Network: N101 [PM Post Development (Network Folder: General)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (CCG Practical Cycle Time)

Vehicle Movement Performance (CCG)

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	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
Site: 101 [South Rd / Jasper Rd - PM Post Development]															
East: South Rd															
8	T1	All MCs	2316	5.0	2316	5.0	*1.045	108.5	LOS F	78.3	571.3	1.00	1.34	1.43	14.3
9	R2	All MCs	222	0.0	222	0.0	1.025	156.2	LOS F	13.9	97.4	1.00	1.15	1.62	18.5
Approach			2538	4.6	2538	4.6	1.045	112.7	LOS F	78.3	571.3	1.00	1.32	1.44	13.7
North: Jasper Road															
10	L2	All MCs	126	0.0	126	0.0	1.033	132.7	LOS F	15.7	109.9	1.00	1.15	1.63	18.0
12	R2	All MCs	354	0.0	354	0.0	*1.033	154.7	LOS F	15.7	109.9	1.00	1.15	1.63	10.9
Approach			480	0.0	480	0.0	1.033	148.9	LOS F	15.7	109.9	1.00	1.15	1.63	12.4
West: South Rd															
1	L2	All MCs	425	0.0	425	0.0	1.004	58.8	LOS E	65.9	473.3	1.00	1.18	1.27	17.8
2	T1	All MCs	1823	5.0	1823	5.0	1.004	77.8	LOS E	65.9	477.3	1.00	1.20	1.27	18.2
Approach			2248	4.1	2248	4.1	1.004	74.2	LOS E	65.9	477.3	1.00	1.20	1.27	18.2
All Vehicles			5266	3.9	5266	3.9	1.045	99.6	LOS F	78.3	571.3	1.00	1.25	1.39	15.1
Site: 101 [South Rd / Taylor St - PM Post Development]															
South: Taylor St															
4	L2	All MCs	209	0.0	209	0.0	*0.995	117.5	LOS F	12.3	86.1	1.00	1.08	1.52	20.2
Approach			209	0.0	209	0.0	0.995	117.5	LOS F	12.3	86.1	1.00	1.08	1.52	20.2
East: South Rd															
7	L2	All MCs	100	0.0	96	0.0	0.677	3.0	LOS A	0.0	0.0	0.00	0.04	0.00	54.5
8	T1	All MCs	2566	5.0	2459	5.0	0.677	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	58.9
Approach			2666	4.8	2555	4.8	0.677	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	58.8
All Vehicles			2876	4.5	2765	4.6	0.995	9.0	LOS A	12.3	86.1	0.08	0.10	0.12	46.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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).

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 (CCG)											
Mov ID	Crossing	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
Site: 101 [South Rd / Jasper Rd - PM Post Development]											
East: South Rd											
P3	Full	11	69.2	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
North: Jasper Road											
P4	Full	11	69.2	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
West: South Rd											
P11	Stage 1	53	69.3	LOS F	0.2	0.2	0.96	0.96	84.7	20.0	0.24
P12	Stage 2	53	69.3	LOS F	0.2	0.2	0.96	0.96	84.7	20.0	0.24
All Pedestrians		126	69.3	LOS F	0.2	0.2	0.96	0.96	84.6	20.0	0.24
Site: 101 [South Rd / Taylor St - PM Post Development]											
South: Taylor St											
P2	Full	11	69.2	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		11	69.2	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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.