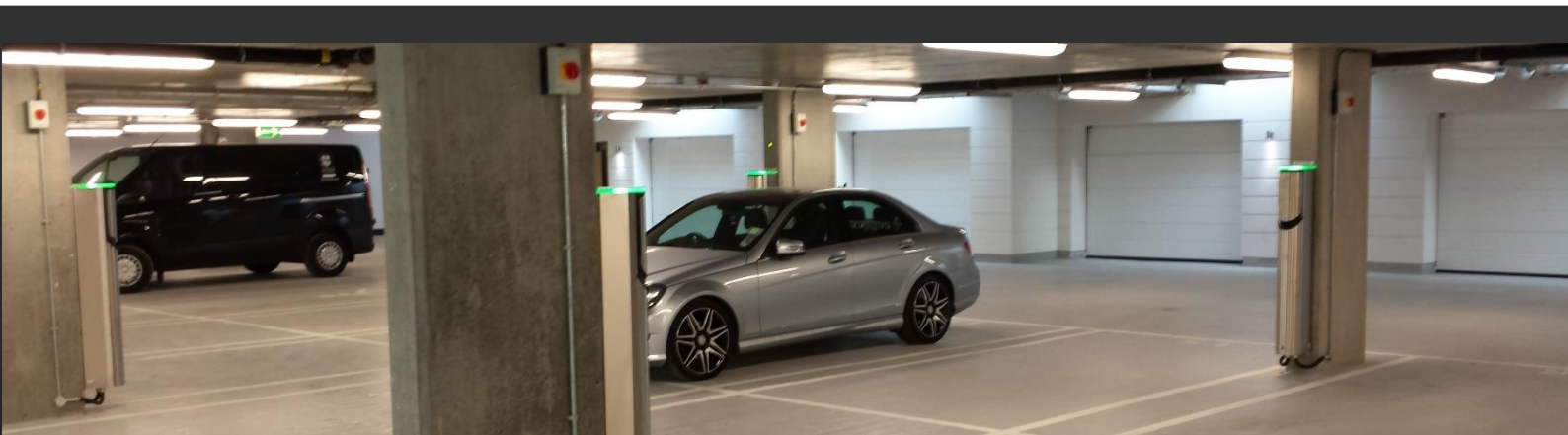


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409 Clayton Road, Clayton

Transport Impact Assessment



200170TIA001F-F
27 November 2020

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EXECUTIVE SUMMARY

It is proposed to develop the site for a mixed use, comprising, retail, commercial and residential uses. The development includes car parking across multiple levels and a generous bicycle parking provision.

The traffic and transport assessment of the development indicates that sufficient bicycle and car parking is provided on-site to meet the needs of the development, with an appropriate design outcome in relation to access, loading and parking.

Six development principals have been devised in order to guide the direction of the proposed development at 409 Clayton Road, Clayton, as listed below.

- Principal 1 – The 10 Minute Community;
- Principal 2 – Employment;
- Principal 3 – Diversity & Affordability;
- Principal 4 – Sustainability;
- Principal 5 – Health, Wellbeing & Security; and
- Principal 6 – Architectural Leadership.

This Transport Impact Assessment outlines a number of the measures which address Principal 1 – The 10 Minute Community, which seeks to provide substantial new housing with immediate access to employment opportunities, public transport and existing local services, all within 10 minutes of the home and office. In this regard, the location of the site is within close proximity to numerous goods and services, is afforded excellent access to public transport as well as large employment precincts such as Monash Hospital and Monash University.

CONTENTS

EXECUTIVE SUMMARY	3
1 INTRODUCTION.....	6
2 EXISTING CONDITIONS	6
2.1 Site Location	6
2.2 Planning Zones and Overlays.....	8
2.3 Road Network.....	9
2.3.1 Clayton Road	9
2.3.2 Centre Road.....	10
2.4 Sustainable Transport	11
2.4.1 Public Transport	11
2.4.2 Bicycle Facilities	12
2.5 Walkability	13
3 DEVELOPMENT PROPOSAL.....	14
3.1 General	14
3.2 Car Parking and Vehicular Access	14
3.3 Bicycle Parking	14
3.4 Waste Collection.....	15
4 DESIGN ASSESSMENT	15
4.1 Monash Planning Scheme – Clause 52.06.....	15
4.1.1 Design Standard 1 – Accessways	15
4.1.2 Design Standard 2 – Car Parking Spaces	16
4.1.3 Design Standard 3 – Gradients	17
4.2 Waste Collection.....	17
4.3 Bicycle Parking	18
4.4 Clause 52.29 – Land Adjacent to a Road Zone, Category 1	18
5 LOADING	19
6 BICYCLE PARKING	19
7 CAR PARKING	20
7.1 Statutory Car Parking Requirements.....	20
7.1.1 Car Parking Requirements – Clause 52.06	20
7.1.2 Proposed Car Parking Provision	20
7.2 Car Parking Demand Assessment	21
7.2.1 Residential	21
7.2.2 Shop	21
7.2.3 Office	22
7.3 Review of Car Parking Provision.....	22
7.4 Accessible Car Parking.....	22
8 TRAFFIC.....	23
8.1 Traffic Generation	23
8.1.1 Residential	23
8.1.2 Office	23
8.1.3 Retail.....	24
8.1.4 Anticipated Traffic Generation	24
8.1.5 Previous Use - Service Station	24
8.1.6 Net Change	25
8.2 Traffic Impact	25
9 CONCLUSIONS.....	26

TABLES

Table 1	Public Transport Provision	11
Table 2	Proposed Development	14
Table 3	Clause 52.06-9 Design Assessment – Design Standard 1	15
Table 4	Clause 52.06-9 Design Assessment – Design Standard 2	16
Table 5	Clause 52.06-9 Design Assessment – Design Standard 3	17
Table 6	Clause 52.34 – Bicycle Parking Requirements	19
Table 7	Clause 52.34 – Bicycle Facility Requirements	19
Table 8	Clause 52.06 – Car Parking Requirements	20
Table 9	Proposed Car Parking	20
Table 10	Residential Traffic Generation	23
Table 11	Office Traffic Generation	23
Table 12	Retail Traffic Generation	24
Table 13	Anticipated Traffic Generation	24
Table 14	Service Station Traffic Generation	24
Table 15	Unique Trips Traffic Generation	25
Table 16	Net Change in Traffic	25

FIGURES

Figure 1	Site Location	6
Figure 2	Site Context (28 April 2020)	7
Figure 3	Planning Scheme Zones	8
Figure 4	Principal Public Transport Network	8
Figure 5	Clayton Road, looking north from the subject site frontage.....	9
Figure 6	Clayton Road, looking south at the intersection with Centre Road	9
Figure 7	Centre Road, looking east past the frontage of the subject site	10
Figure 8	Centre Road, looking west from the frontage of the subject site	10
Figure 9	Public Transport Provision	11
Figure 10	Strava Cycling Heatmap	12

APPENDICES

APPENDIX A	VEHICLE SWEEP PATHS.....	27
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1 INTRODUCTION

onemilegrid has been requested by Tango Projects Pty Ltd to undertake a Transport Impact Assessment of the proposed mixed-use development at 409 Clayton Road, Clayton.

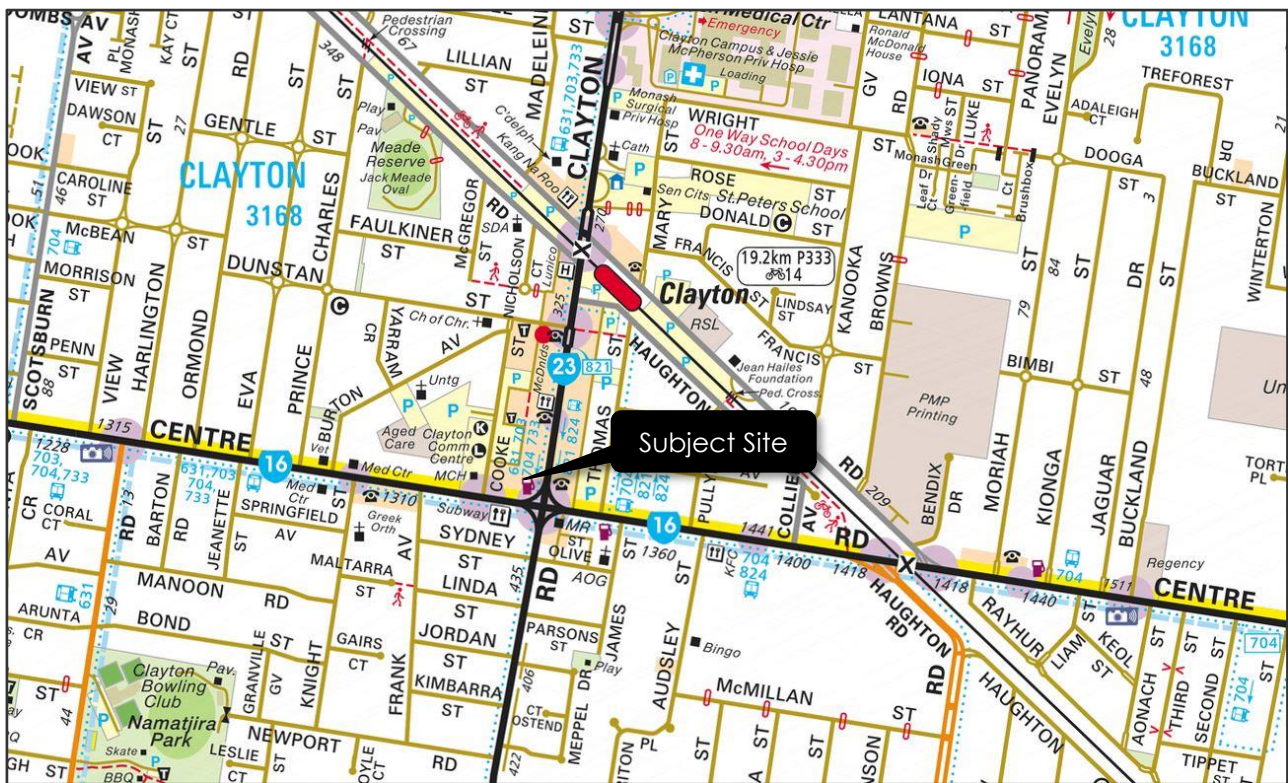
As part of this assessment the subject site has been inspected with due consideration of the development proposal, traffic and parking data has been sourced and relevant background reports have been reviewed.

2 EXISTING CONDITIONS

2.1 Site Location

The subject site is located at the northwest corner of Clayton Road and Centre Road, Clayton, as shown in Figure 1.

Figure 1 Site Location



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The site is irregular in shape and includes frontages to Centre Road and Clayton Road of approximately 43 metres and 37 metres respectively, for an overall site area of approximately 2,100 square metres. In addition, the site has a partial abutment to a laneway in the northwest corner of the site.

The site until recently operated as a Caltex service station with an associated convenience shop. Site access is provided via two crossovers to each of Clayton Road and Centre Road allowing separate entry and exit movements.

Land use in the immediate vicinity of the site is mixed in nature and includes the Clayton strip shopping precinct along Clayton Road to the north, Clayton Station at the north, and a range of

residential development surrounding the site. In addition, there is a Coles supermarket which abuts the site directly to the west and a Council car park to the northwest.

An aerial view of the subject site is provided in Figure 2.

Figure 2 Site Context (28 April 2020)



Copyright Nearmap

2.2 Planning Zones and Overlays

It is shown in Figure 3 that the site is located within a Commercial 1 Zone (C1Z). Additionally, the site sits at the corner of Clayton Road and Centre Road, both of which are within a Road Zone (RDZ). Figure 4 below shows that the site is located within the Principal Public Transport Network (PPTN).

Figure 3 Planning Scheme Zones

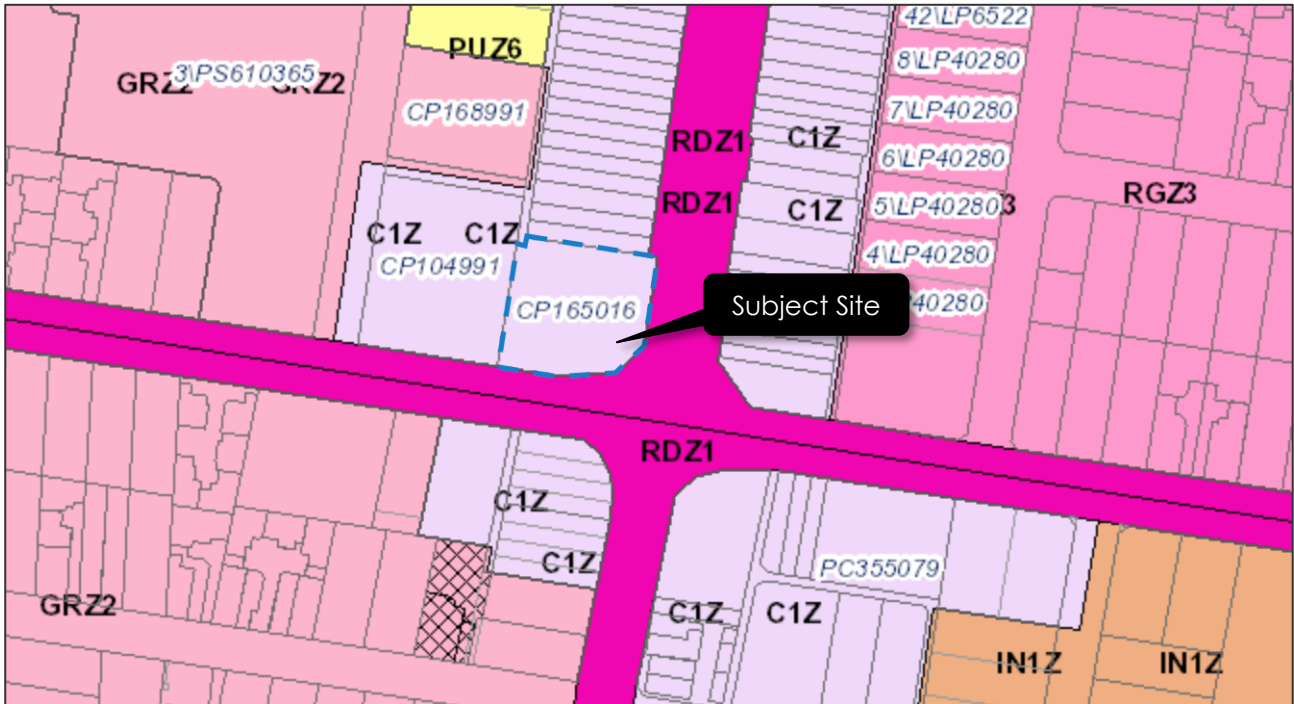
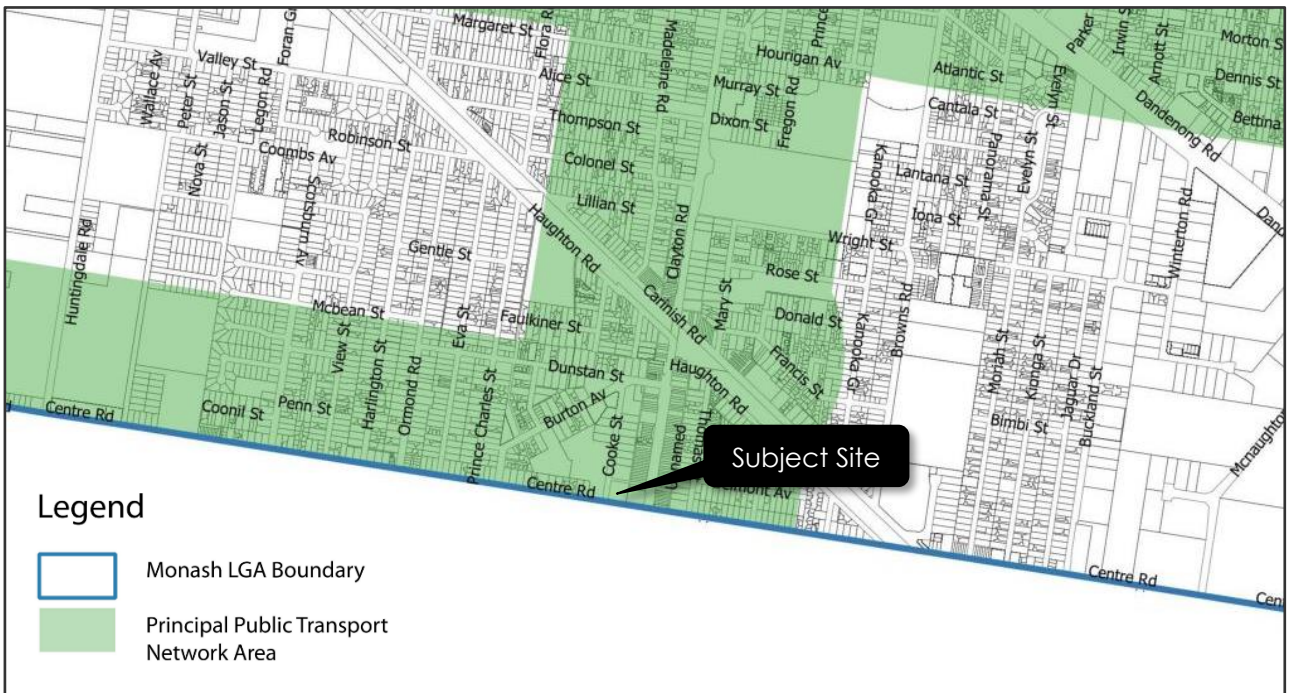


Figure 4 Principal Public Transport Network



2.3 Road Network

2.3.1 Clayton Road

Clayton Road is an arterial road generally aligned north to south, running between Ferntree Gully Road, approximately 3.3km north of the site, and the intersection of Kingston Road and Heatherton Road, approximately 3.3km to the south. Clayton Road provides two traffic lanes in each direction adjacent to the site. Angled kerbside parking is provided on both sides of the road, generally restricted to 1-hour parking to the north of the site servicing the strip shopping centre.

Views of Clayton Road at the frontage of the site are shown in Figure 5 and Figure 6.

Figure 5 Clayton Road, looking north from the subject site frontage



Figure 6 Clayton Road, looking south at the intersection with Centre Road



Clayton Road is generally subject to a 60km/h speed limit, with the limit reduced to 40km/h to the north of Centre Road, adjacent the site and through the Clayton shopping precinct.

2.3.2 Centre Road

Centre Road is an arterial road generally aligned east to west, running between Springvale Road, approximately 3.3km to the east of the site, and Hampton Street, Brighton, approximately 10km to the west. Centre Road provides two traffic lanes in each direction adjacent to the site.

The cross-section of Centre Road at the frontage of the site is shown in Figure 7 and Figure 8.

Figure 7 Centre Road, looking east past the frontage of the subject site



Figure 8 Centre Road, looking west from the frontage of the subject site



A 60km/h speed limit applies to Centre Road in the vicinity of the site.

2.4 Sustainable Transport

2.4.1 Public Transport

The site has excellent public transport accessibility, with a wide variety of transport modes and services servicing the immediate vicinity of the site. Of note, a bus stop is located at the southwest corner of the site. The full public transport provision in the vicinity of the site is shown in Figure 9 and detailed in Table 1.

Figure 9 Public Transport Provision

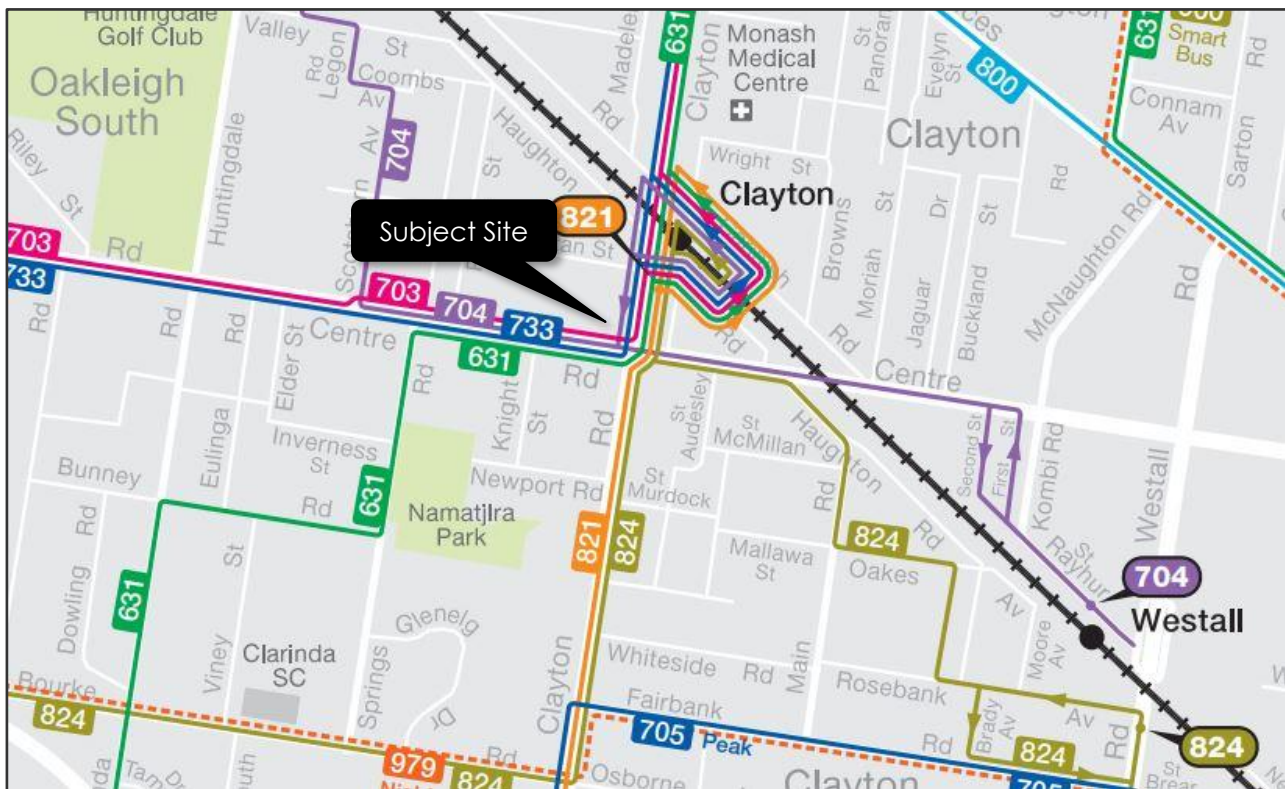


Table 1 Public Transport Provision

Mode	Route No	Route Description	Nearest Stop/Station
Train		Cranbourne Line	Clayton Station
		Pakenham Line	
Bus	631	Southland - Waverley Gardens via Clayton, Monash University	Centre Road (at the site frontage)
	703	Middle Brighton - Blackburn via Bentleigh, Clayton, Monash University	
	704	East Clayton - Oakleigh via Clayton, Huntingdale	
	733	Oakleigh - Box Hill via Clayton, Monash University, Mt Waverley	
	821	Southland - Clayton via Heatherton	
	824	Moorabbin - Keysborough via Clayton, Westall	

Further to the existing public transport services in the vicinity, it is noted that the Suburban Rail Loop which has just been announced by the State Government will run through Clayton Station, connecting the middle suburbs of Melbourne.

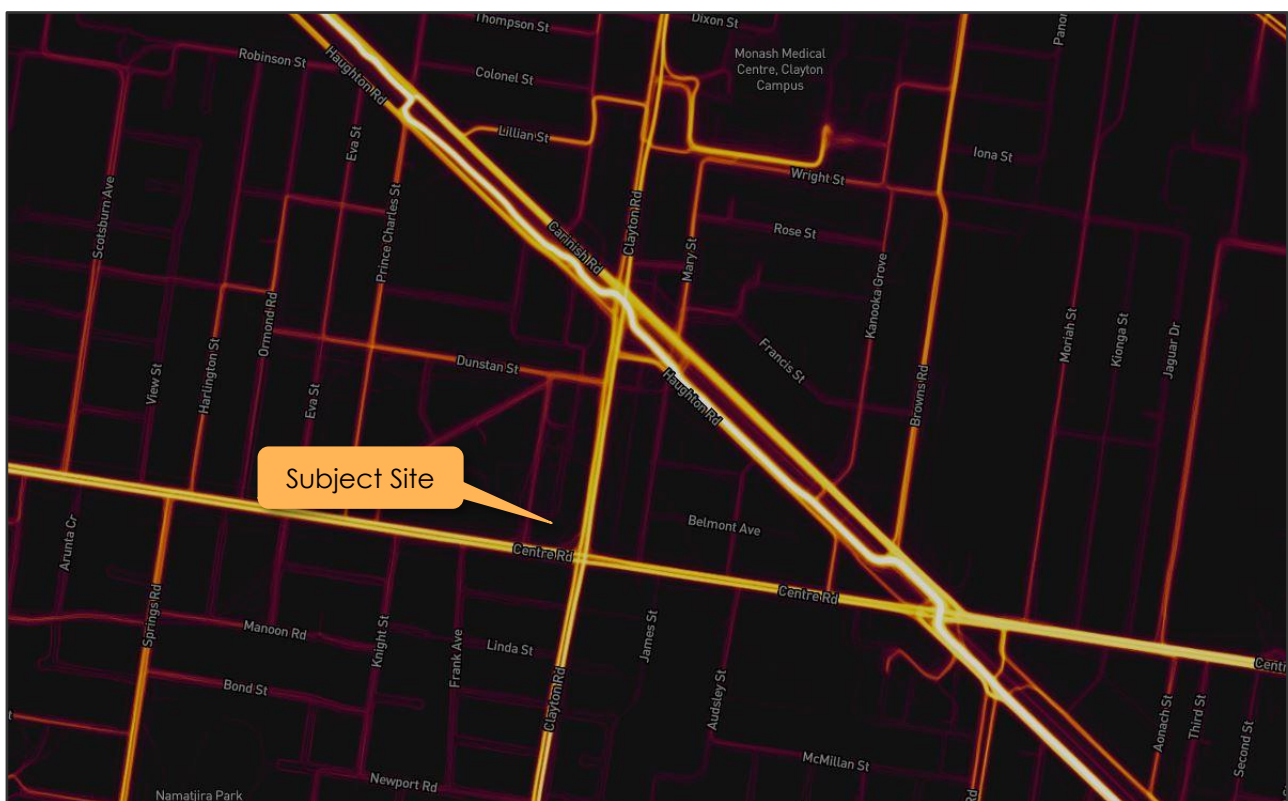
2.4.2 Bicycle Facilities

Strava is a social network and training tool for cyclists, runners and swimmers. Users record their physical activity using a dedicated GPS device or utilise the mobile app, and upload the file to their profile.

Strava anonymised this information and makes it available through their “Global Heatmap” tool, showing aggregated all public activities over the last two years across the world.

A view of the cycling heatmap in proximity to the study area is provided below in Figure 10. Routes of higher usage are brighter in colour.

Figure 10 Strava Cycling Heatmap



As shown above, primary routes in and out of the study area comprise:

- Clayton Road;
- Centre Road; and
- The Station Trail that runs under the Cranbourne/Pakenham train line.

It is noted that this information includes all cycling activities recorded on the platform, inclusive of weekend trips, and all trips throughout the day. Additionally, the data is skewed towards sports cyclists, given that the bulk of commuter and recreational cyclists will not be tracking their rides.

2.5 Walkability

Walkability is a measure of how friendly an area is to walking. Walkability has many health, environmental, and economic benefits. Factors influencing walkability include the presence or absence and quality of footpaths or other pedestrian rights-of-way, traffic and road conditions, land use patterns, building accessibility, and safety.

The site has a Walk Score rating of 90/100 and is very walkable, with most errands able to be accomplished on foot.

3 DEVELOPMENT PROPOSAL

3.1 General

It is proposed to develop the subject site for the purposes of a multi-level mixed-use development, containing both residential and commercial uses, as shown in Table 2.

Table 2 Proposed Development

<i>Component</i>	<i>No/Area</i>
1-Bedroom Apartment	105
2-Bedroom Apartment	46
3-Bedroom Apartment	1
Total Apartments	152
Retail	1,479 m ²
Office	1,197 m ²

Private communal amenities are provided on the fourth floor, which will only be accessible by residents of the development. It is understood that the communal amenities may include a gym, library, working spaces, and/or veggie garden.

3.2 Car Parking and Vehicular Access

A total of 196 car spaces are proposed across a basement car park and three podium levels, with access provided via a crossover to Centre Road generally located in the location of the western most crossover. The proposed site access will be restricted to left in / left out movements only.

All remaining crossovers to the site on Centre Road (1) and Clayton Road (2) will be reinstated with kerb and channel.

The site access leads to the development car park which includes parking on the ground level, basement and upper podium levels. Access between levels is provided by a ramp system with one ramp leading to the basement and a second ramp providing access to the podium levels.

Included within the provision are two accessible spaces within the basement level and eight electric vehicle charging spaces on the ground level.

It is proposed to allocate the car parking across the various uses as follows: -

- 153 residential spaces;
- 13 retail spaces; and
- 30 office spaces.

3.3 Bicycle Parking

A total of 44 bicycle spaces are proposed in a secure compound within the ground level car park that will be made available for residents, staff. Further bicycle parking is provided, with 18 spaces provided in ground mounted hoops at the Centre Road and Clayton Road frontages of the site.

End of trip facilities for staff are provided on the commercial levels in the form of showers and change rooms.

3.4 Waste Collection

A bin storage room is provided on the basement level for all waste streams. Waste will be collected on-site by a private contractor.

Refer to the waste management plan prepared by **onemilegrid** for more information.

4 DESIGN ASSESSMENT

4.1 Monash Planning Scheme – Clause 52.06

onemilegrid has undertaken an assessment of the car parking layout and access for the proposed development with due consideration of the Design Standards detailed within Clause 52.06-9 of the Planning Scheme. A review of those relevant Design Standards is provided in the following section.

4.1.1 Design Standard 1 – Accessways

A summary of the assessment for Design Standard 1 is provided in Table 3.

Table 3 Clause 52.06-9 Design Assessment – Design Standard 1

Requirement	Comments
Be at least 3 metres wide	Satisfied – minimum width of the ramps is 6.1 metres, with accessways a minimum of 5.8 metres wide, each allowing for two-way traffic
Have an internal radius of at least 4 metres at changes of direction or intersection or be at least 4.2 metres wide	Satisfied – all accessways exceed 4 metres width
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 – private car park
Provide at least 2.1 metres headroom beneath overhead obstructions, calculated for a vehicle with a wheel base of 2.8 metres	Satisfied – a minimum height clearance of 2.2 metres is achieved
If the accessway serves four or more car spaces or connects to a road in a Road Zone, the accessway must be designed so that cars can exit the site in a forward direction	Satisfied – 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 Road Zone	Satisfied – a passing area is provided which is 6.1 metres wide and in excess of 7 metres long
Have a corner splay or area at least 50 per cent clear of visual obstructions extending at least 2 metres along the frontage road from the edge of an exit lane and 2.5 metres 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 – The pedestrian splay to the east of the accessway is clear of obstructions greater than 900mm height. On the west side, the pedestrian splay sits within the entry lane of the accessway, and accordingly, is clear of obstructions.

Requirement	Comments
If an accessway to four or more car parking spaces is from land in a Road Zone, the access to the car spaces must be at least 6 metres from the road carriageway.	Satisfied – the first car space is located in excess of 6 metres from the Centre Road carriageway

onemilegrid have prepared a series of swept paths to demonstrate that access and circulation throughout the proposed ramp system is suitable and will allow for two cars to pass at bends. These swept paths are included in Appendix A.

4.1.2 Design Standard 2 – Car Parking Spaces

A summary of the assessment for Design Standard 2 is provided in Table 4.

Table 4 Clause 52.06-9 Design Assessment – Design Standard 2

Requirement	Comments
Car parking spaces and accessways must have the minimum dimensions as outlined in Table 2 of Design Standard 2.	Satisfied - Car parking spaces are dimensioned in accordance with Table 2.
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 - The car park is designed in accordance with Diagram 1. A height clearance of 2.2m is provided.
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 – Spaces are within a car park.
Where parking spaces are provided in tandem (one space behind the other) an additional 500mm in length must be provided between each space.	Satisfied
Where two or more car parking spaces are provided for a dwelling, at least one space must be under cover.	Satisfied – All spaces are under cover
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 – Accessible spaces are provided with a length of 5.4m

Car spaces on-site are proposed with a minimum width of 2.6 metres, length of 4.9 metres and are accessed from aisles of no less than 6.4 metres on the ground level, with spaces on the other levels which are accessed via a reduced aisle width of no less than 5.8 metres, increased to 2.8 metres width, all in accordance with the Planning Scheme. Furthermore, spaces adjacent to walls have been suitably widened in accordance with Design Standard 2. Notwithstanding the above compliance, a series of swept paths have been prepared to demonstrate access to a sample of car spaces within the on-site car park. These are included in Appendix A.

The accessible bays are provided with a length of 5.4 metres and a width of 2.4 metres, and an adjacent shared area of the same dimensions, in accordance with the Australian Standard for Off-Street Parking for People with Disabilities AS2890.6.

4.1.3 Design Standard 3 – Gradients

A summary of the assessment for Design standard 3 is provided in Table 5.

Table 5 Clause 52.06-9 Design Assessment – Design Standard 3

Requirement	Comments
<p>Accessway grades must not be steeper than 1:10 (10 per cent) within 5 metres 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.</p>	<p>Satisfied – No ramps are proposed within 5 metres of the property boundary</p>
<p>Ramps (except within 5 metres of the frontage) must have the maximum grades as outlined in Table 3 (of Design standard 3) and be designed for vehicles travelling in a forward direction.</p>	<p>Generally satisfied – A maximum grade of 1:4 is proposed. It is noted that one of the ramps has a 21.8m length 1:4 grade, exceeding the requirements of the Planning Scheme. Nevertheless, the slight exceedance is not expected to impact the usability of the ramp, noting the designation as a private car park with allocated spaces. In this regard, the ramp grades are considered acceptable</p>
<p>Where the difference in grade between two sections of ramp or floor is greater than 1:8 (12.5 per cent) for a summit grade change, or greater than 1:6.7 (15 per cent) for a sag grade change, the ramp must include a transition section of at least 2 metres to prevent vehicles scraping or bottoming.</p>	<p>Satisfied – a maximum change in grade of 12.5 % is proposed</p>

The first 2 metres at the top and bottom of each ramp has been provided with a grade of 1:8 while the maximum grade of the remainder of the ramp is no more than 1:4, in accordance with the requirements of Design Standard 3. Transitions are provided where changes of grade exceed 12.5%, and transition lengths have been designed to prevent potential scraping.

4.2 Waste Collection

A bin storage area is located within the basement. A private contractor will be engaged to collect and remove waste directly from the basement level. Swept paths have been undertaken which demonstrate access to and from the basement with a 6.4m length waste collection vehicle, which are attached in Appendix A.

Refer to the Waste Management Plan for further information.

4.3 Bicycle Parking

It is proposed to provide vertically mounted bicycle racks within a storage area on the ground floor of the development accommodating 42 bicycles, plus one horizontal hoop which will provide an additional two spaces. At the frontage of the site, a further 18 bicycle spaces have been provided in ground mounted hoops.

The vertical mounted racks have been designed in accordance with the Australian Standards; specifically, they are located at 500 mm centres, with an envelope of 1.2 metres provided for bicycles and a 2 metre access aisle.

The bicycle hoops have been designed in accordance with the Australian Standards; specifically, they are provided at one metre centres, with an envelope of 1.8 metres provided for bicycles and a 1.5 metre access aisle.

In addition, 20 of the 62 bicycle parking spaces proposed have been provided as on-ground hoops exceeding the Australian Standard requirement for 20% of spaces being provided on-ground.

4.4 Clause 52.29 – Land Adjacent to a Road Zone, Category 1

The development proposal is subject to the requirements of Clause 52.29 of the Monash Planning Scheme which applies to land adjacent to a Road Zone Category 1 (Centre Road) and aims to ensure appropriate access is provided to identified roads.

Relevant to the proposed development, the Clause states that a permit is required to create or alter access to a road in a Road Zone, Category 1, and that the proposal is to be referred to the relevant referral authority (in this case the Department of Transport (VicRoads)).

Before deciding on the appropriateness or otherwise of an application to alter access to the Road Zone, the responsible authority must consider the following:

- The Municipal Planning Strategy and the Planning Policy Framework.
- The views of the relevant road authority.
- The effect of the proposal on the operation of the road and on public safety.
- Any policy made by the relevant road authority pursuant to Schedule 2, Clause 3 of the Road Management Act 2004 regarding access between a controlled access road and adjacent land.

The proposed development seeks to maintain one crossover to Centre Road, while removing the remaining three crossovers. Furthermore, the proposed development is expected to see a small increase in traffic intensity compared to the existing service station use.

In light of the above, it is considered that the proposed development will satisfy the requirements of Clause 52.29.

5 LOADING

Clause 65 (Decision Guidelines) of the Monash Planning Scheme identifies that "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."

It is proposed to accommodate all loading within the car parking areas. As such, retail uses may be required to schedule deliveries around peak staffing periods to provide an available space for loading vehicles. In relation to waste collection, a separate collection location is provided within the basement specifically for waste vehicles.

The provision for loading is therefore considered appropriate for the proposed use.

6 BICYCLE PARKING

The bicycle parking requirements for the subject site are identified in Clause 52.34 of the Monash Planning Scheme, which specifies the following requirements for the different components of the proposed development.

Table 6 Clause 52.34 – Bicycle Parking Requirements

Component	No/Area	Requirement	Total
Dwelling	152 dwellings	1 space per 5 dwellings for residents	30
		1 space per 10 dwellings for visitors	15
Office	1,197 m ²	1 space per 300m ² for employees	4
		1 space per 1000m ² for visitors	1
Retail premises	1,479 m ²	1 space per 300m ² for employees	5
		1 space per 500m ² for visitors	3
Total		Residents	30
		Employees	9
		Visitors	19

Furthermore, where 5 or more employee bicycle spaces are provided, employee facilities are required in accordance with Clause 52.34 of the Monash Planning Scheme, as identified below.

Table 7 Clause 52.34 – Bicycle Facility Requirements

Facility	Employee Bicycle Spaces	Requirement	Total
Showers	9 spaces	1 shower for the first 5 employee bicycle spaces; plus 1 to each 10 employee bicycle spaces thereafter	2

Showers must have access to a communal change room, or combined shower and change room

It is proposed to provide a total of 44 bicycle parking spaces within the ground level car park, available for employee, resident and residential visitor use, with an additional 18 spaces along the street frontage available for use by visitors. Considering the above, the proposed provision of bicycle parking exceeds the requirements of the Planning Scheme. In relation to end of trip facilities, these are provided for staff and are located adjacent the bicycle storage room.

7 CAR PARKING

7.1 Statutory Car Parking Requirements

7.1.1 Car Parking Requirements – Clause 52.06

The car parking requirements for the subject site are identified in Clause 52.06 of the Monash Planning Scheme. In this regard, Clause 52.06 also identifies that where any part of the land is identified as being within the Principal Public Transport Network Area, the Column B car parking rates apply to the proposed development. As shown in Figure 4, the site is located within the Principal Public Transport Network Area, and therefore, the Column B rates apply, as shown below.

Table 8 Clause 52.06 – Car Parking Requirements

Use	No/Area	Rate	Car Parking Measure	Total
Dwelling	151	1	to each one or two bedroom dwelling, plus	151
	1	2	to each three or more bedroom dwelling (with studies or studios that are separate rooms counted as bedrooms), plus	2
	152	0	for visitors to every 5 dwellings for developments of 5 or more dwellings	0
Office	1,197 m ²	3	to each 100m ² of net floor area	35
Shop	1,479 m ²	3.5	to each 100m ² of leasable floor area	51
Total				239

Based on the above calculations, a total of 239 parking spaces are required for the proposed development.

It is noted that the above assessment for shop / retail tenancies has been based on the shop rate which provides for flexibility to allow the use of the tenancy for a food and drink premises if required.

7.1.2 Proposed Car Parking Provision

The proposed car parking provision and allocation is outlined in Table 9 below.

Table 9 Proposed Car Parking

Use	52.06 Requirement	Proposed Allocation	Reduction Sought
Dwellings	153	153	-
Office	35	30	5
Shop	51	13	38
Total	239	196	43

As shown above, the proposed development seeks a reduction in car parking for 43 car spaces with 5 spaces associated with the office component and 38 spaces for the shop / retail component. It is noted that the reduction for the retail component is likely to be associated with customers.

Clause 52.06-7 of the Monash Planning Scheme indicates that an application to reduce (including reduce to zero) the requirement for car spaces must be accompanied by a Car Parking Demand

Assessment. The Assessment must assess the car parking demand likely to be generated by the proposed development, having consideration to:

- 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 to or occupants (residents or employees) of the land.
- Any empirical assessment or case study.

Practice Note 22 (June 2015) specifies that the provisions for reducing car parking requirements draw a distinction between the assessment of the likely demand for parking spaces (the Car Parking Demand Assessment), and whether it is appropriate to allow the supply of fewer spaces than assessed by the car parking demand assessment. These are two separate considerations, one technical while the other is more strategic. Different factors are taken into account in each consideration.

Accordingly, the applicant must satisfy the responsible authority that the provision of car parking is appropriate on the basis of a two-step process, which has regard to:

- The car parking demand likely to be generated by the use; and
- Whether it is appropriate to allow fewer spaces to be provided than the likely demands generated.

An assessment of the likely parking demands and the appropriateness of reducing the car parking provision below them is set out below.

7.2 Car Parking Demand Assessment

7.2.1 Residential

For the purposes of this assessment, it will be assumed that the development generates car parking demands for the residential uses in accordance with the Planning Scheme rates, thus generating a demand for 153 car spaces. The proposed residential provision is therefore considered satisfactory.

7.2.2 Shop

While the final uses which will lease the retail tenancies have not been finalised, the Planning Scheme rate for a shop use has been adopted to provide some flexibility for the final tenants, noting that food and drink uses are also required to provide 3.5 space per 100m².

In locations such as the subject site where a variety of complimentary uses exist, it has been our experience that car parking demands range from 2 – 3.5 spaces per 100 square metres. These reduced demands are exhibited whereby a tenancy generates a demand from those already in the area rather than a demand in their own right. In this regard it is expected that the demands generated will be towards the lower end of the range.

Nevertheless, for retail, shop and food and drink uses alike, car parking demands are comprised of staff demands and customer demands. In this regard, staff demands typically equate to in the order of 1 space per 100m², with the remaining demand associated with visitors / customers.

For the purposes of this assessment it will be assumed that a total demand for 2.0 spaces per 100 square metres will be generated which equates to a demand for 30 spaces comprising 15 staff spaces and the remaining 15 spaces attributed to visitors / customers.

It is reiterated that a large proportion of visitors to the proposed shop uses are expected to be visitors to the broader activity centre, and as such each shop use will not necessarily generate a demand for visitor / customer parking in its own right, with visitors to each tenancy expected to visit a number of other uses as part of the one trip. In this regard, the actual visitor demand generated by the proposed shop uses is expected to be less than the projected demand visitor demand for 15 spaces.

7.2.3 Office

It is typical that the office car parking requirement is anticipated to account for staff and their visitors. In this regard, visitors are typically expected to account for 10% of the office car parking requirements. As such, with a requirement for 35 spaces, 4 of these spaces are expected to be attributable to visitors which require short term parking.

7.3 Review of Car Parking Provision

The proposed provision of car parking across the site will accommodate all residential parking demands, as well as most long-term demands associated with office and shop staff. In this regard, it is anticipated that there may be a shortfall of up to three (3) long-term parking spaces, including one (1) office staff and two (2) retail staff spaces. Nevertheless, a review of parking restrictions in the area surrounding the proposed development indicates that on-street parking is heavily restricted, and there is limited opportunity for long-term staff or resident parking in the area. These restrictions are therefore expected to ensure employees do not travel to the site in a private vehicle, as they will not be able to conveniently park their vehicle long-term on-street in the vicinity of the site. Further to the above, a Green Travel Plan has been prepared for the site which will directly target staff within the development, aiming to reduce their reliance on vehicular travel.

The major anticipated shortfall generated by the development is that associated with customers of the shop uses and up to four office visitors, with a total shortfall of up to 19 spaces. Nevertheless, it is noted that this figure is highly conservative as it fails to consider the crossover of demand between uses which is typical of similar activity centres, whereby customers arrive to the local area and visit numerous uses in one trip.

Based on the foregoing assessment, and with regard to the array of public transport services within the immediate vicinity of the site, the proposed level of car parking is considered appropriate for the proposed development.

7.4 Accessible Car Parking

The Building Code of Australia (BCA) specifies the minimum requirements for provision of accessible car parking.

It is noted that an office development, classified as a Class 5 building, requires provision of one accessible car spaces for every 100 car parking spaces or part thereof, while a retail use, classified as a Class 6 building, requires provision of one accessible car spaces for every 50 car parking spaces or part thereof.

Noting the proposed provision of 30 spaces allocated to the office, and 13 spaces allocated to the retail uses, the BCA requires at least two accessible car spaces are provided on-site.

The proposed provision of two spaces thus satisfies the BCA requirements.

8 TRAFFIC

8.1 Traffic Generation

8.1.1 Residential

Surveys undertaken by other traffic engineering firms at residential dwellings have shown that the daily traffic generation rates vary depending on the size, location and type of the dwelling, the parking provision and proximity to local facilities and public transport.

Medium to high density dwelling in inner areas generate traffic with rates between 3.0 and 6.0 movements per dwelling. Considering the location of the subject site and moreover the excellent access to public transport, it is expected that generation rates will be towards the lower end of the range. Nevertheless, for the purposes of this assessment a daily rate of in the order of 4.0 movements per day per dwelling will be adopted with 10% occurring during the peak hours.

Application of the above rates indicates that the 153 dwellings with car parking will generate 612 movements per day, inclusive of 61 vehicle movements during the morning and afternoon peak hours.

Furthermore, during the morning peak, it is estimated that 80% of the residential traffic will be outbound, while during the afternoon peak, 60% of the residential traffic will be inbound. The projected peak hour traffic volumes are detailed in Table 10 below.

Table 10 Residential Traffic Generation

	<i>AM Peak</i>	<i>PM Peak</i>
Inbound	12	37
Outbound	49	24
Total	61	61

8.1.2 Office

For the purposes of the following assessment it will be assumed that 50% of the parking allocated to office staff (30 spaces) will fill in the AM peak hour and vacate in the PM peak hour, equating to 15 movements in each peak period. As such, the peak hour traffic volumes are detailed in Table 11 below.

Table 11 Office Traffic Generation

	<i>AM Peak</i>	<i>PM Peak</i>
Inbound	15	0
Outbound	0	15
Total	15	15

8.1.3 Retail

With regard to the retail tenancies, it is anticipated that all of the allocated parking spaces may turnover during each the AM and PM peak periods. The projected peak hour traffic volumes are detailed below in Table 12.

Table 12 Retail Traffic Generation

	<i>AM Peak</i>	<i>PM Peak</i>
Inbound	13	0
Outbound	0	13
Total	13	13

8.1.4 Anticipated Traffic Generation

Based on the above, the anticipated traffic generated by the proposed development is shown in Table 13.

Table 13 Anticipated Traffic Generation

	<i>AM Peak</i>	<i>PM Peak</i>
Inbound	40	37
Outbound	49	52
Total	89	89

8.1.5 Previous Use - Service Station

In order to determine the resulting traffic impact of the proposed development to the local road network, the existing traffic generated by the previous use of the site has been estimated.

It is noted that the traffic generated by a service station use depends on the location of the site, time of day, surrounding traffic volumes, and whether a convenience store or other uses are included in the development.

It has been commonly shown via case studies at similar service station developments in various locations that peak traffic generation typically varies between 100 and 180 movements during the weekday commuter peak hours.

Considering the location of the site, it has been assumed the site previously generated 160 movements during both peak hours, equally split between inbound and outbound movements as summarised in Table 14.

Table 14 Service Station Traffic Generation

	<i>AM Peak</i>	<i>PM Peak</i>
Inbound	80	80
Outbound	80	80
Total	160	160

Of service station traffic, it is commonly accepted that a large majority of trips are that of passing trade. These are movements diverted to the service station as part of an existing trip. It has been our experience that passing trade accounts for approximately 80% of service station traffic. In this regard, Table 15 below outlines the expected unique traffic generated by the existing service station.

Table 15 Unique Trips Traffic Generation

	<i>AM Peak</i>	<i>PM Peak</i>
Inbound	16	16
Outbound	16	16
Total	32	32

8.1.6 Net Change

Based on the foregoing assessment, the net change in traffic outlined below, based on the removal of the traffic generated by the existing service station use and the addition of the traffic generated by the dwellings, shop and office uses. It is noted that the net increase in weekend traffic would be significantly less than the below considering the office will not be operating.

Table 16 Net Change in Traffic

	<i>AM Peak</i>	<i>PM Peak</i>
Inbound	24	21
Outbound	33	36
Total	57	57

8.2 Traffic Impact

Reviewing the volumes above, the additional traffic which is anticipated to be generated by the proposed mixed-use development, is considered low, with a maximum of 57 movements per hour projected. This level of traffic equates to less than one movement every minute during the peak hour which is expected to be easily absorbed into the surrounding road network.

Furthermore, it is noted that movements to and from the site will be restricted to left in / left out movements only thus further minimising the impact to the road network.

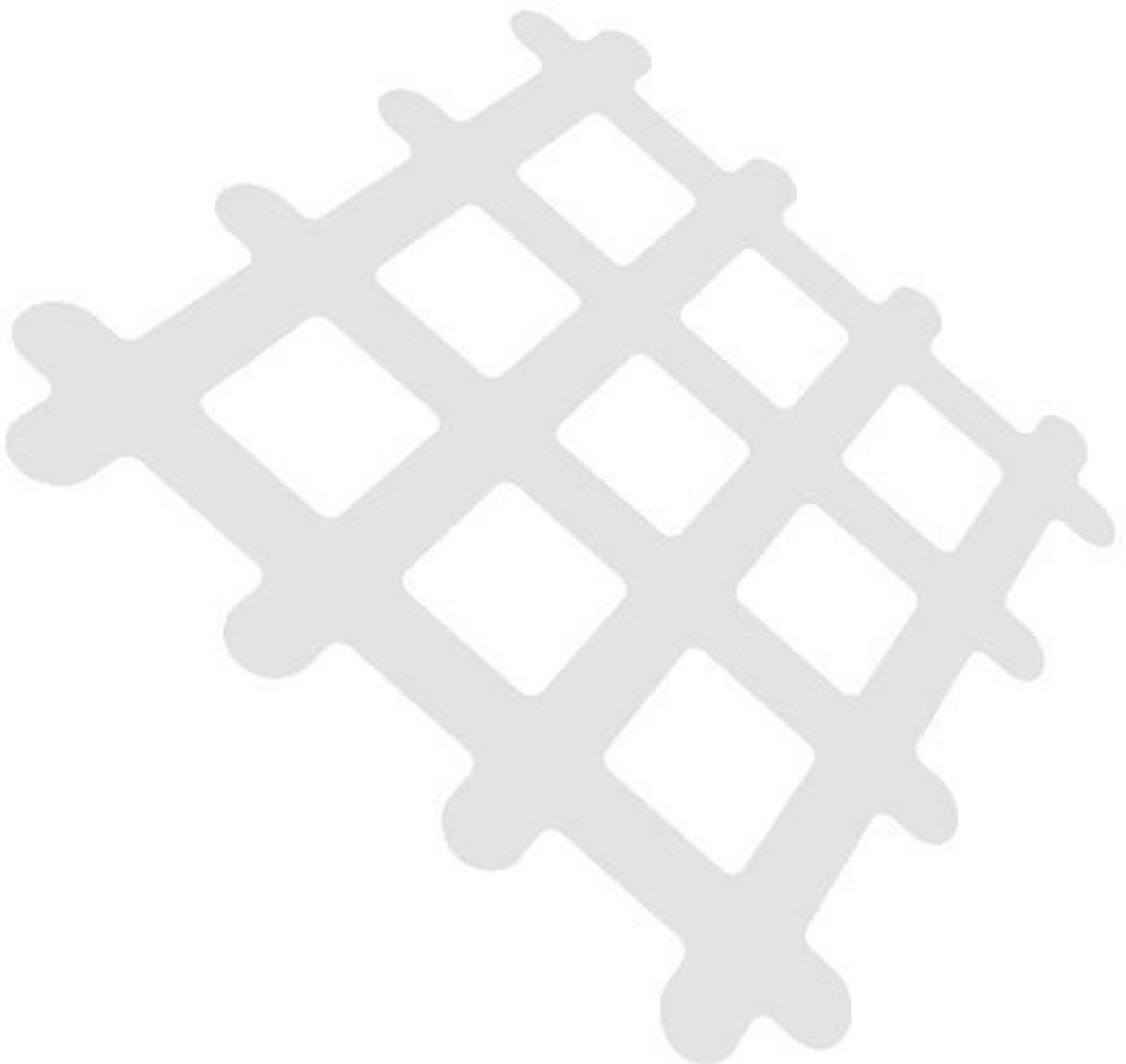
9 CONCLUSIONS

It is proposed to develop the subject site for the purposes of a mixed-use development.

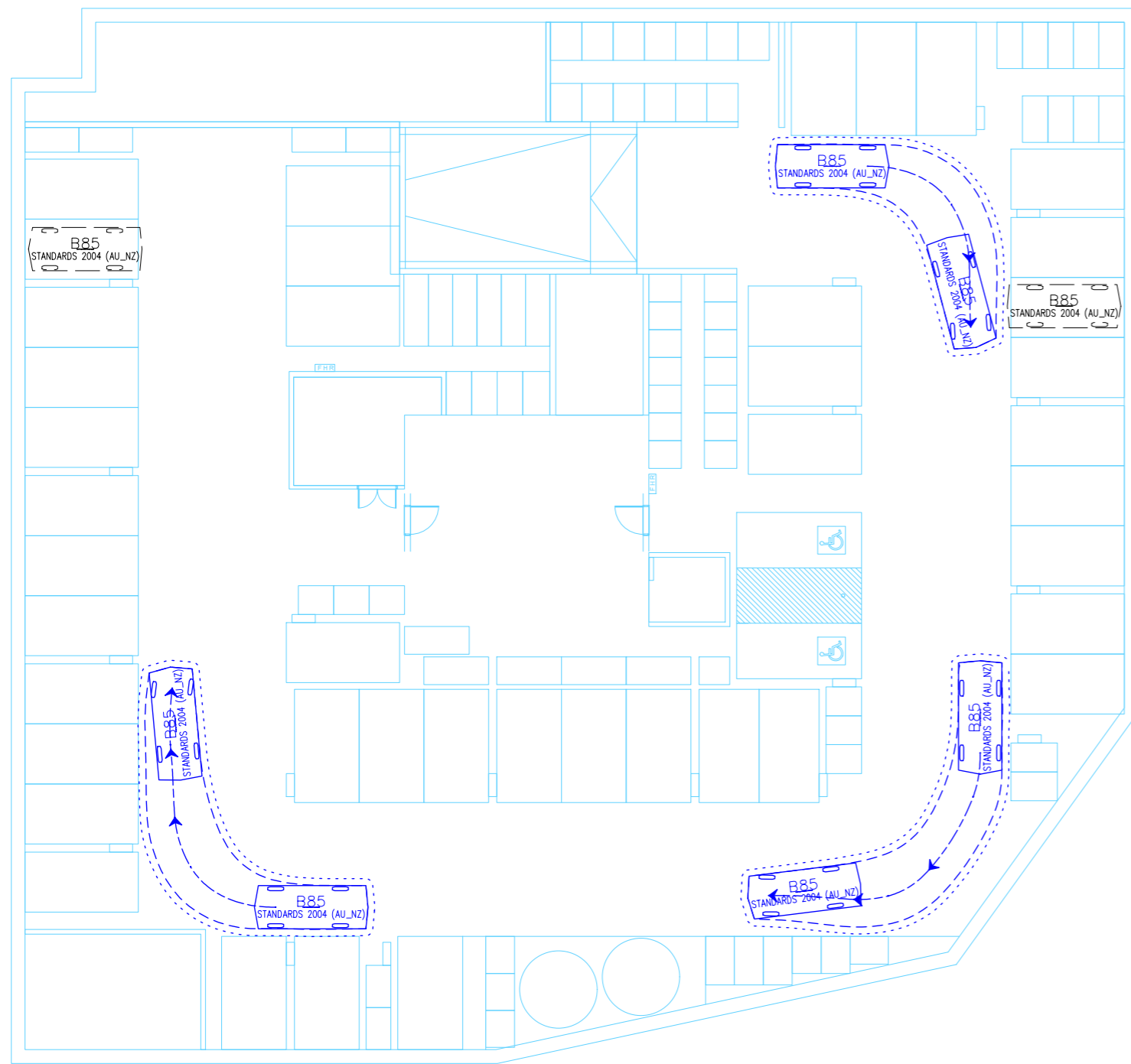
Considering the analysis presented above, it is concluded that:

- The location of the site with respect to good, services, public transport services and employment precincts satisfies the '10 Minute Community' development principal;
- The car parking layouts and accesses have been designed generally in accordance with the requirements of the Planning Scheme and are considered appropriate;
- The proposed provision of bicycle parking exceeds the statutory requirements;
- The proposed provision of car parking meets the statutory requirements for resident car parking and is considered acceptable;
- The proposed provision of parking for the retail and office car parking generates a shortfall of up to 43 spaces, which are mostly comprised of short-term visitor spaces;
- Based on the location within an activity centre, the proximity to sustainable transport options, and the crossover in parking demand, the shortfall is considered appropriate;
- The anticipated traffic volumes generated by the development are not expected to have a notable impact on the operation of Centre Road or Clayton Road.

Appendix A Vehicle Swept Paths

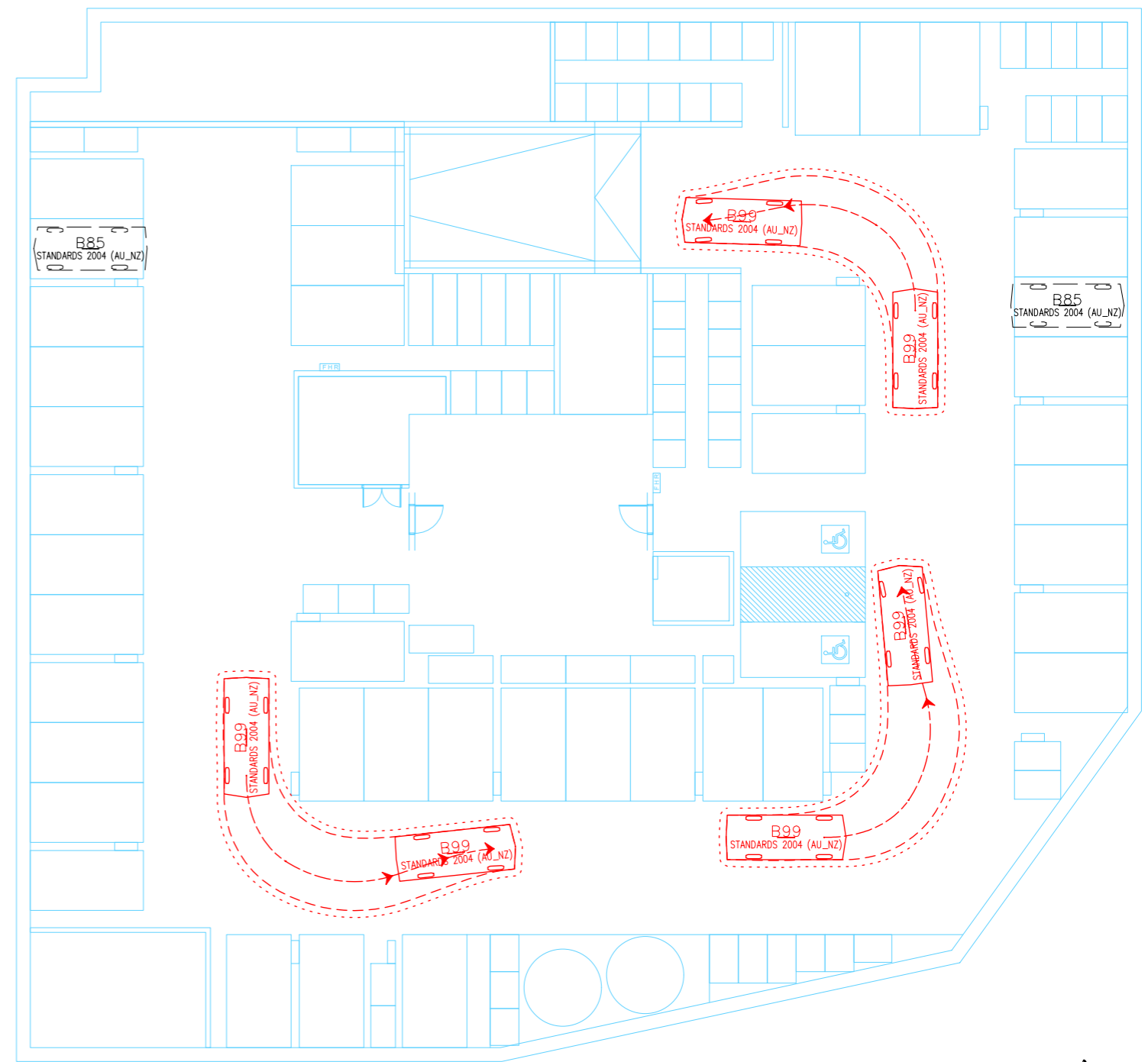


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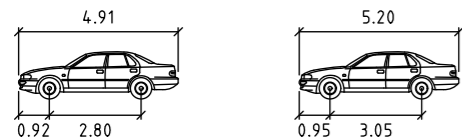
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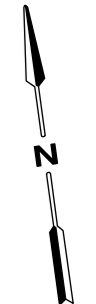
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B99	1.94	1.84	6.0	33.9

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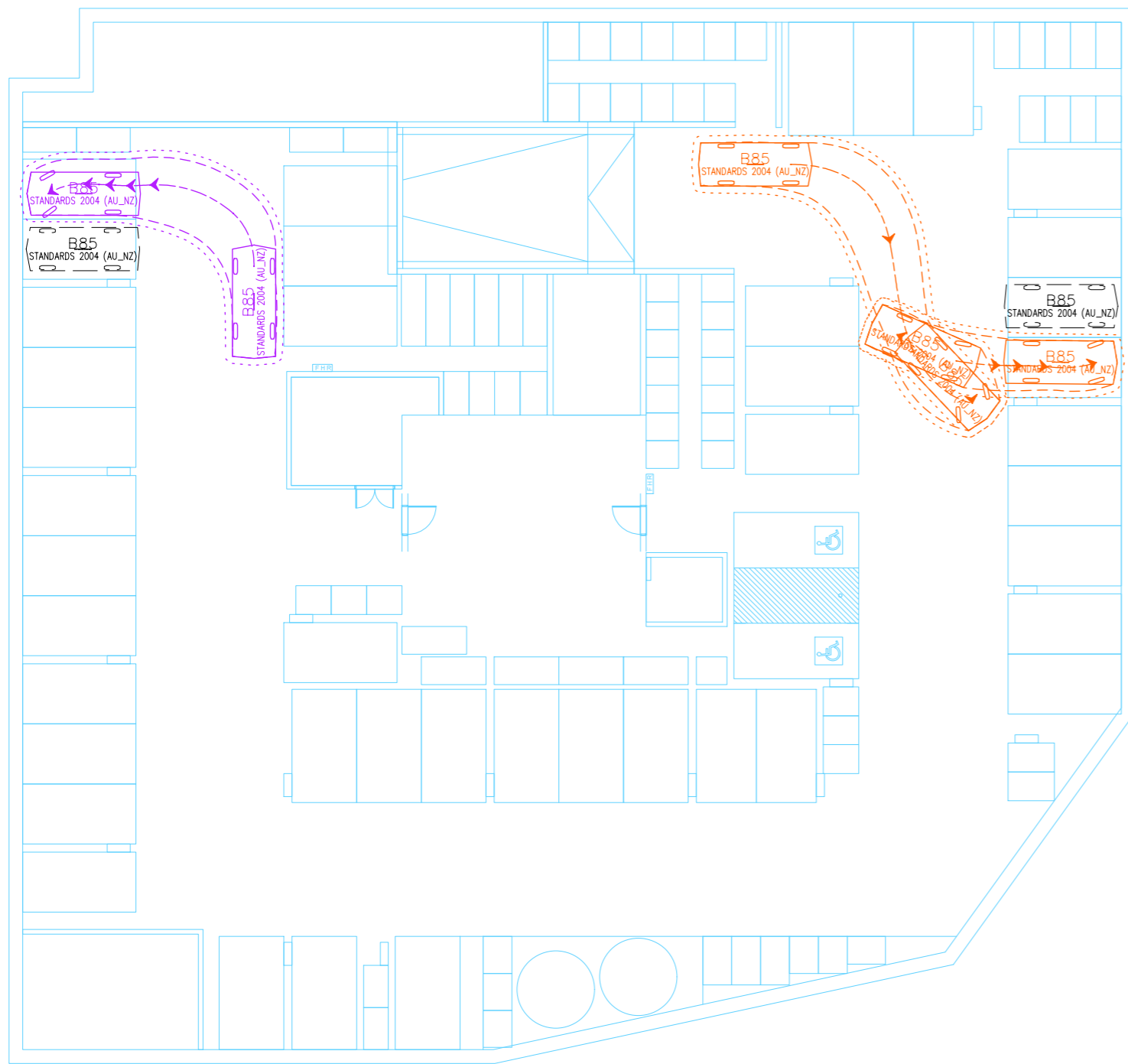
56 Down Street, Collingwood, VIC 3066
 Email: info@onemilegrid.com.au Web: www.onemilegrid.com.au
 Phone (03) 9939 8250

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 SWEEP PATH ANALYSIS

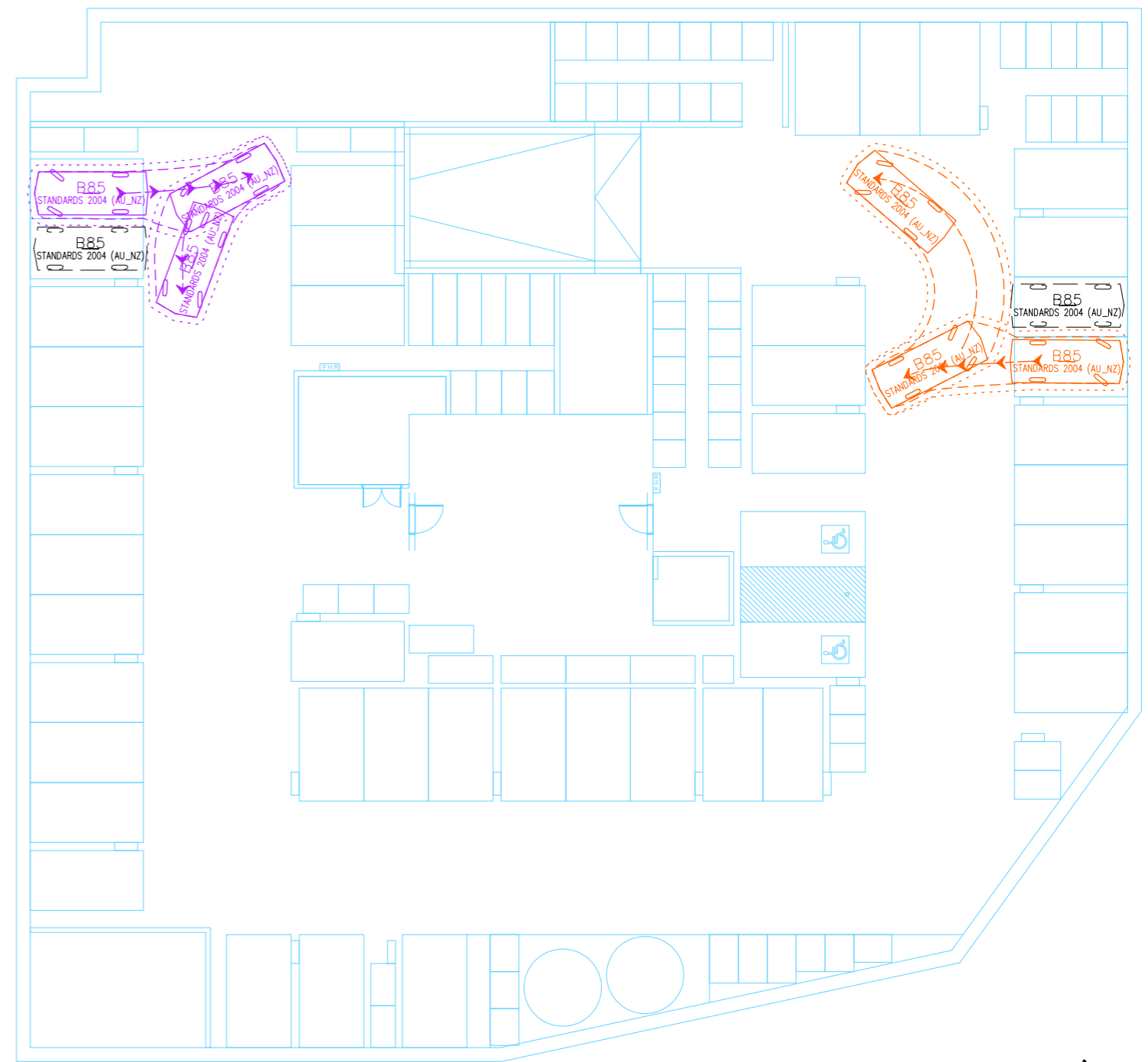
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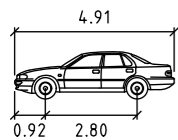
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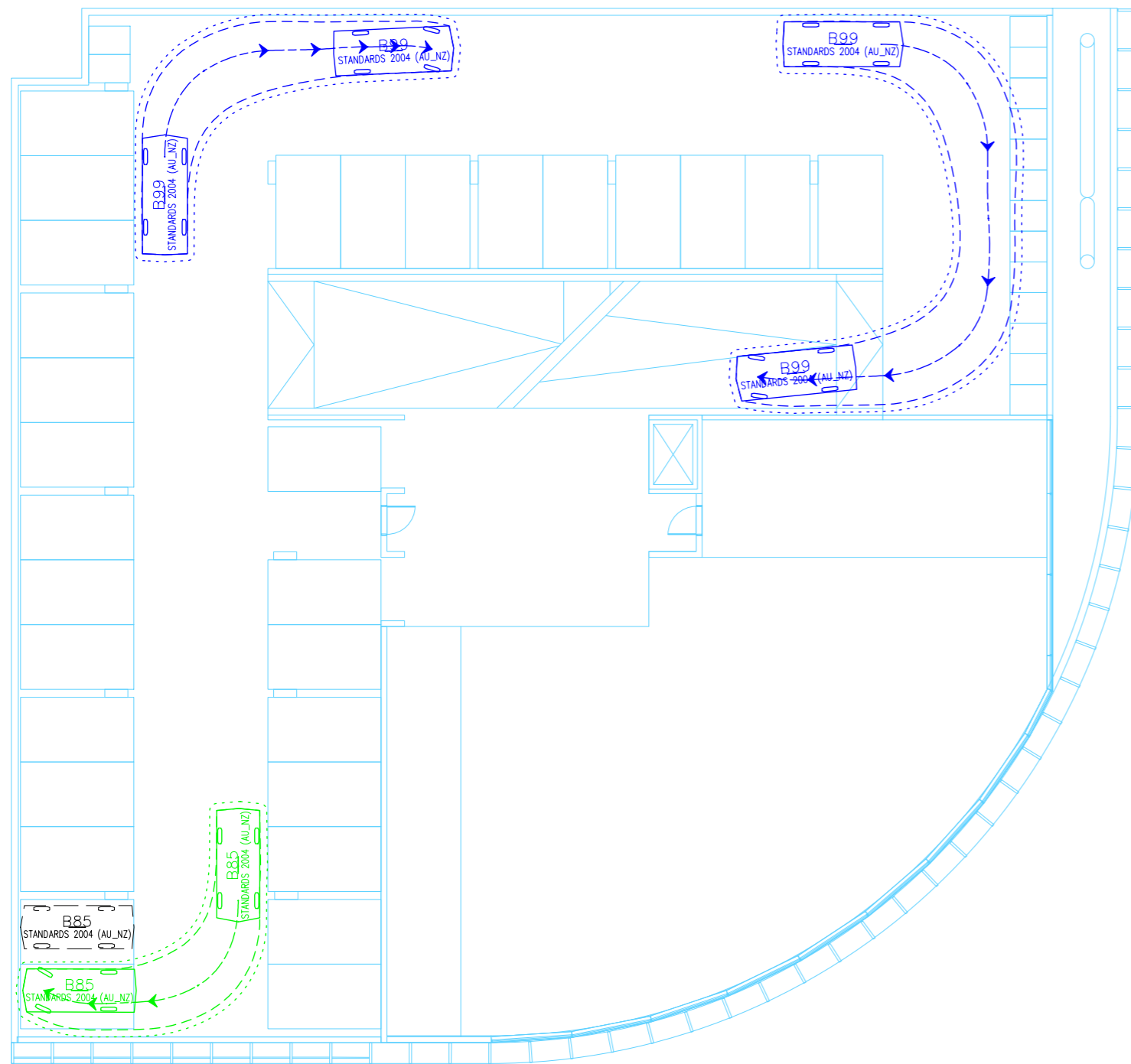
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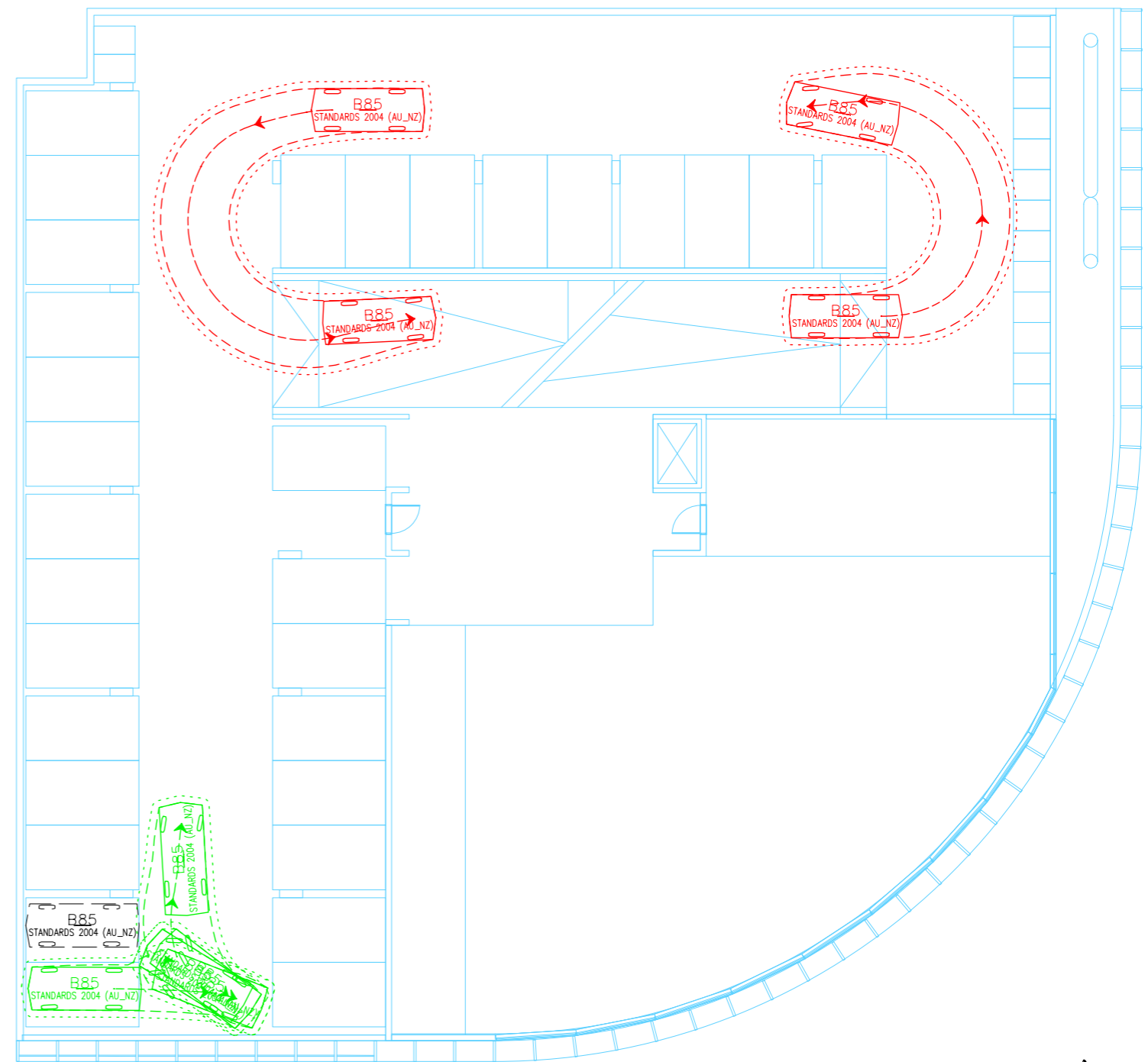
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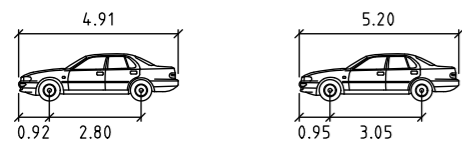
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EXIT MANOEUVRES

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B85	units	B99	units
Width	: 1.87	Width	: 1.94
Track	: 1.77	Track	: 1.84
Lock to Lock Time	: 6.0	Lock to Lock Time	: 6.0
Steering Angle	: 34.1	Steering Angle	: 33.9



