NK TRAFFIC
TRAFFIC AND TRANSPORT CONSULTANTS

TRAFFIC REPORT

TRAFFIC AND PARKING IMPACT STUDY
MULTI – UNIT DEVELOPMENT

588 -592 PRINCESS HIGHWAY, ROCKDALE 2216

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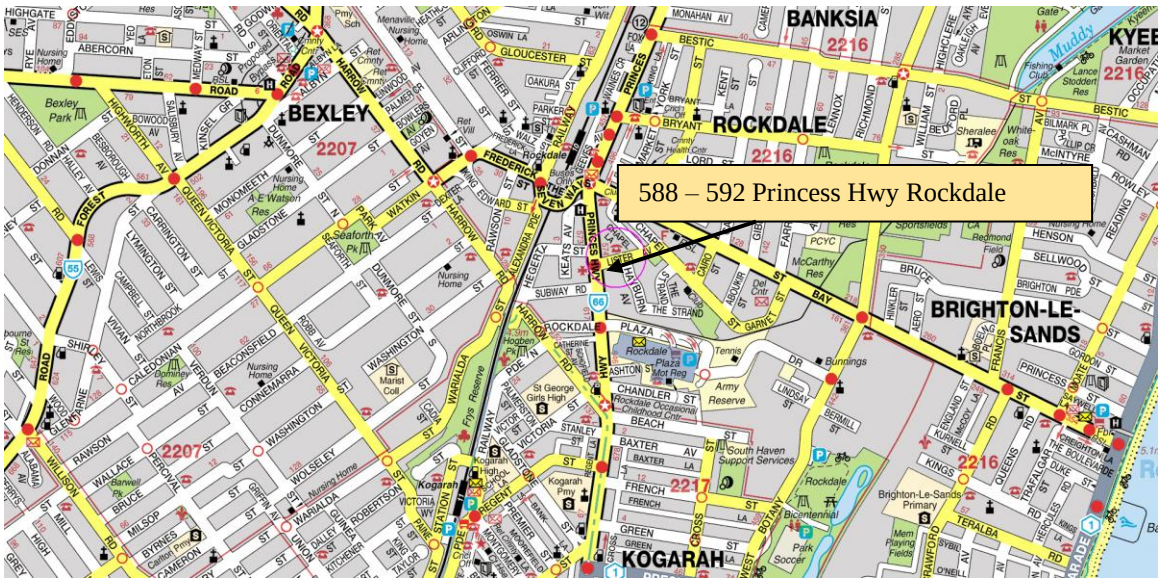


Source: UBD maps

Locality Map
588 - 592 Princess Highway Rockdale

1.0 INTRODUCTION

NK TRAFFIC was commissioned by Moweno Pty to prepare a traffic report for the construction of proposed 101 Units at 588 – 592 Princess Highway, Rockdale. A Development Application is submitted with Bayside Council for consideration.

This traffic report assesses the traffic and parking implications of the above proposal and is prepared to accompany the development application.

The proposal is located within the Bayside Council LGA and sits within Rockdale Town Centre Zoned "B2-Town Centre". The proposal is well served by public transport with a major train station and bus interchange.

588 – 592 Princess Highway, Rockdale

2.0 PURPOSE OF THE REPORT

This report has been undertaken by NK Traffic to accompany the Development Application which is submitted to Bayside City Council for the construction of a multi-storey residential development to accommodate 101 residential apartment units, 407.8 m² of retail/commercial space and 4-level basement car parking.

The following topics have been presented related to the traffic and parking assessment

- Description of proposal
- Existing Traffic Conditions
- Public Transport
- Traffic Generation
- Intersection Capacity Assessment
- Access
- Parking Supply
- Assessment of the Car park
- Summary

3.0 DESCRIPTION OF THE PROPOSAL

The proposed development site is located at 588 – 592 Princess Highway, which is situated approximately 12 km south of the Sydney CBD.

The site (2077 m²) located on the south–west corner of the intersection of Lister Ave and Princes Highway which is in Bayside Council.

The proposed development involves the demolition of the existing Commercial complex and the replacement with a new mixed use/commercial development. There are 101 apartments proposed in 12 storeys and the development has 4 levels of basement car parking. The proposed total residential area is 7539.4 m² and total retail/commercial area is 407.8 m².

The provision of parking within the four basement levels is assessed in accordance with Rockdale Council's DCP – Section 4.6 and Rockdale Guidelines.

Specifically, the Residential component provides 114 Residential parking spaces which includes 10 Accessible, 15 Visitor parking spaces plus one wash bay, 12 Motorcycle, and 42 Bicycles spaces.

The Commercial component provides for 10 commercial parking spaces plus 1 accessible space, 2 motorcycle and 10 bicycle spaces.

The total parking provided is **140** parking spaces, which include 11 Accessible, 15 Visitor, 10 Commercial, 14 Motorcycle and 52 Bicycle parking spaces.

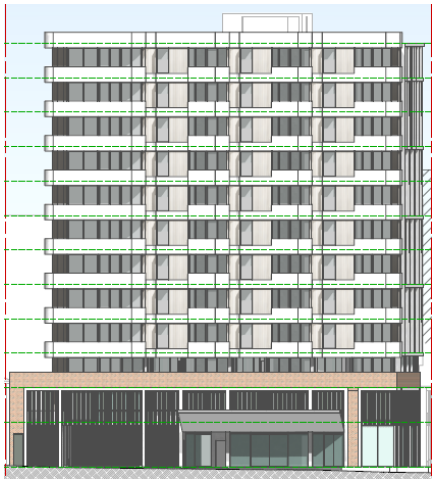
The designed access driveway to the car park is along Lister Ave.

The development is subject to Rockdale DCP 2011, which deals with the design, environmental objectives, and controls for the assessment of the application. The number and type and distribution of residential apartments are listed in the following table. There are 20 x 1 -bedroom, 68 x 2 bedroom and 13 x 3-bedroom units. A total of 101 units designed.

TABLE 1

	Studio	1 Bed	2 Bed		3 Bed	TOTAL
			1 Bath	2 Bath		PER FLOOR
LEVEL 12		1	1	2	1	5
LEVEL 11		1	1	2	1	5
ROOF TERRACE - LEVEL 10		1	1	2	1	5
LEVEL 09		2	2	5	1	10
LEVEL 08		2	2	5	1	10
LEVEL 07		2	2	5	1	10
LEVEL 06		2	2	5	1	10
LEVEL 05		2	2	5	1	10
LEVEL 04		2	2	5	1	10
LEVEL 03		2	4	3	1	10
LEVEL 02		2	3	4	1	10
LISTER AVE - LEVEL 01		1		2	1	4
SOUTH - LEVEL 00				1	1	2
TOTAL	**0**	**20**	**22**	**46**	**13**	**101**
DISTRIBUTION	19.8%		67.3%		12.9%	

There is also 407.8 m² retail / commercial area proposed on level 01.



The DCP requires a min rate of 1 parking space per 1 x bedroom, 1 parking space per 2 bedroom and 2 parking spaces per 3-bedroom apartments, 1 visitor space per 7 units and 1 parking space per 40 square metres of retail/commercial area. A total of 10 parking spaces are required for the commercial component and 14.4 visitor parking spaces.

The proposal provides 114 residential parking spaces, 15 visitor parking and 11 Commercial/ Retail parking spaces. A total of 140 parking spaces plus a car wash bay located at level 1 car parking area. The parking includes 10 accessible parking spaces for the residential component and 1 accessible space for the commercial/retail component. The proposal also provides a total of 14 motorcycle and 52 bicycle parking spaces. It also provides a loading bay area for the waste vehicle. Two motorcycle and 10 bicycle spaces are dedicated to the commercial component.

In accordance with Bayside Council's DCP for multi – unit developments the following parking requirements and provisions are shown in the following table.

DCP Required	Rate	No of spaces required
1 bed	1	20
2 bed	1	68
3 bed	2	26
Visitor	1 per 7 units	14.4
Commercial	1 per 40 m²	10.195
Total		138.59

The parking provided per parking level is:

Provision	**Commercial	Residential	Accessible	Visitor	Motor cycle	Bicycle
Basement 01	10 (+ 1 acc)		1 (comm)	8	2	10
Basement 02		38	2	0	4	14
Basement 03		33	4	2	4	14
Basement 04		33	4	5	4	14
***Total** (140)	10	104	11	15	14	52

*Total provision of parking spaces = 140 plus 1 was bay in basement level 01.
**The 11 Commercial parking spaces on basement Level 01 include 1 accessible parking spaces

Basement Parking Areas

4.0 EXISTING TRAFFIC CONDITIONS

The site is located on the Princess Highway and is well served by the arterial road network as shown. The NSW Road hierarchy comprise of the following road classification:

Lister Ave and Princess Highway

State Roads: Freeways and Arterials (under the jurisdiction).

Regional Roads: Secondary or sub arterials (Council managed and partly funded by RMS).

Local Roads: Collector and local roads (Managed by Council).

Collector Road – typically a secondary road carrying between 2,000 – 10,000 vehicles per day and over 250 and 1,000 vehicles per hour in the peak periods. They provide a link between local areas and regional areas carrying traffic volumes. At volumes greater than 5,000 vehicles per day, residential amenity begins to decline.

Local Road - typically a local street carrying less than 2,000 vehicles per day and 250 vehicles per hour in the peak period. They provide direct access to individual houses and carry low traffic volumes

A summary of road characteristics under the functional classification system is outlines in the following Table – Functional Classification of Roads.

Road Type	Traffic Volume (AADT)	Through Traffic	Inter-Connections	Speed Limit (km/h)
Arterial/ Freeway	No Limit	Yes	Sub-Arterial	70-110
Sub-Arterial	<20,000	Some	Arterial/ Collector	60-80
Collector	<5,000	Little	Sub-Arterial/ Local	40-60
Local	<2,000	No	Collector	40

Princess Highway is classified as a state road with 60 km / hour speed limit. At the site's frontage the carriageway comprises of three traffic lanes in each direction. There are Clearway restrictions on the side of the site signposted as "Clearway 3.00 pm to 7.00 pm Monday – Friday". On the opposite side of the site, there are clearway restrictions signposted as "Clearway 6.00 am to 10.00 am Monday Friday"

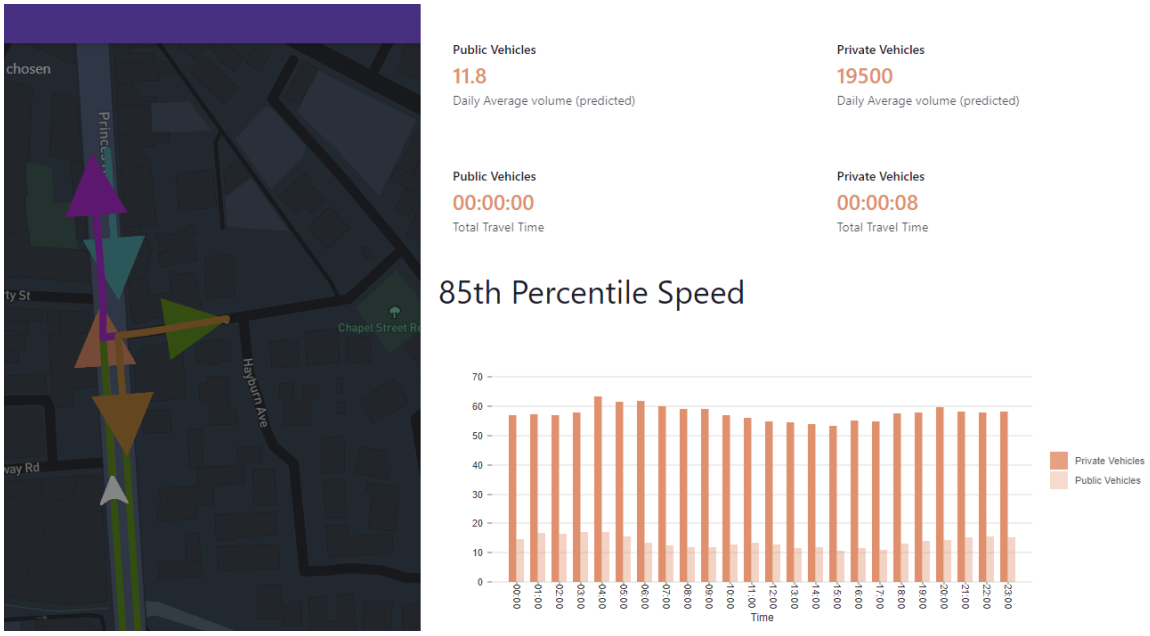
Road Hierarchy

Lister Ave is classified as a regional road. The carriageway comprises one traffic lane in each direction (two lanes at the approach of Princess Highway). 'No Stopping' restrictions apply on the south side of Lister Ave and unrestricted street parking on the northern side of the road.

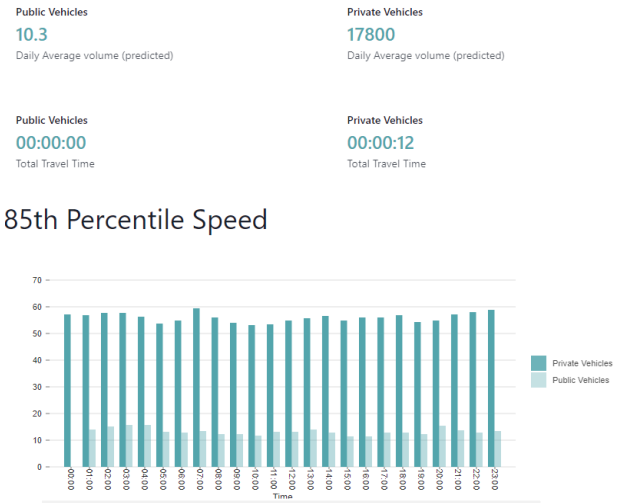
The speed limit in Lister Ave is the default 50 km/hour. Access for vehicles entering and exiting the site is at Lister Ave from Princess Highway and is connected to Bay Street via Chapel Street. The intersection of Lister Ave and Princess Highway is controlled by traffic signals where all traffic movements are permitted.

Compass IoT Speed Survey Platform (Speed & Volumes)

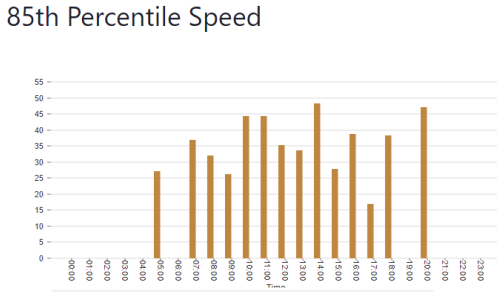
The travelling speed have been obtained using the Compass IoT connected vehicle data Survey platform*.



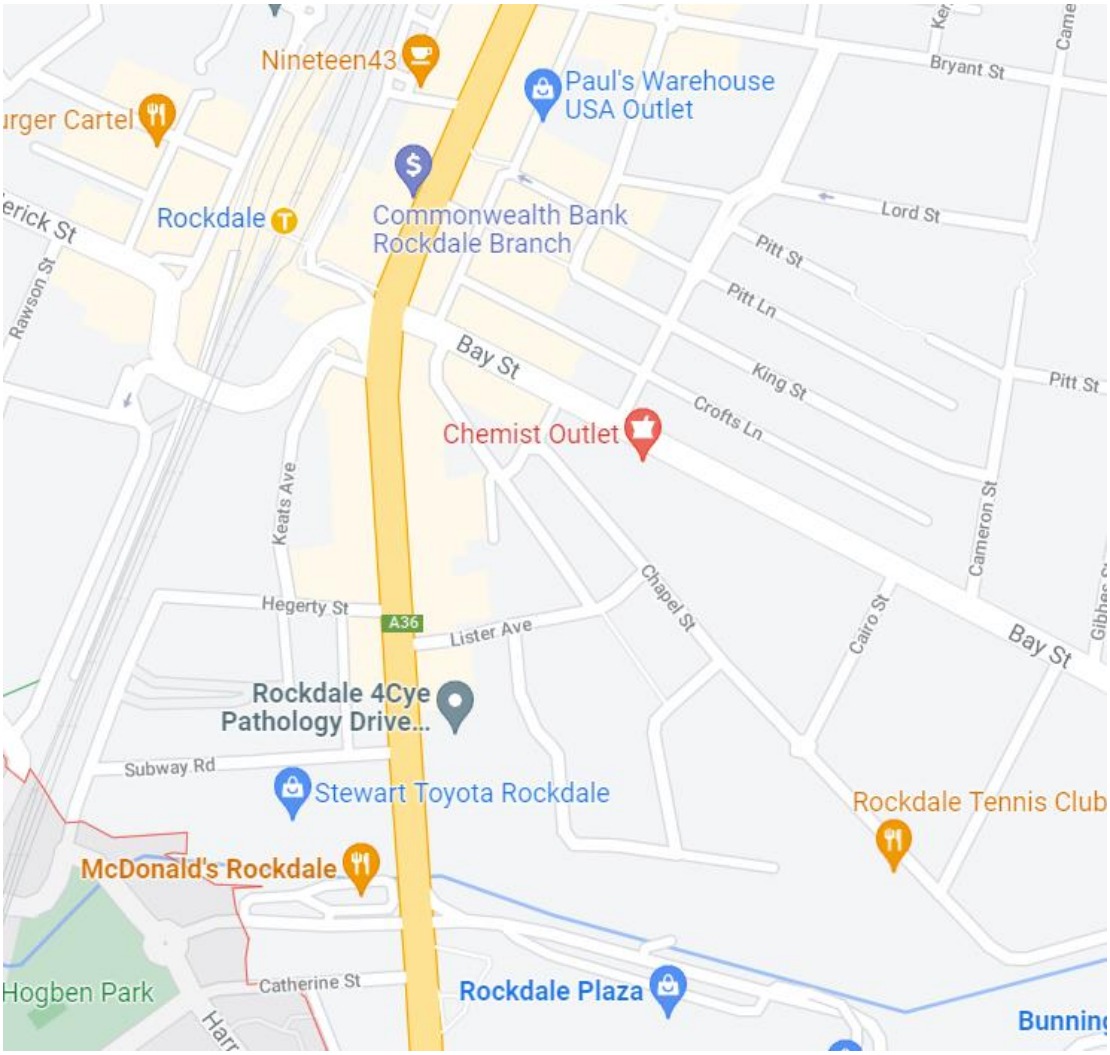
*COMPASS IOT (Compass) is a data aggregation and Analytics Company that uses connected vehicles to generate in-depth insights across transport networks. It is a new innovative way of surveying roads, collecting data, and planning cities. Compass collects data from both private and public data providers and has developed sophisticated algorithms to predict speed and volume across Australian roads.



Compass IoT counts Princess Highway



Compass IoT counts Lister Ave



UBD maps

Road Network surrounding the site

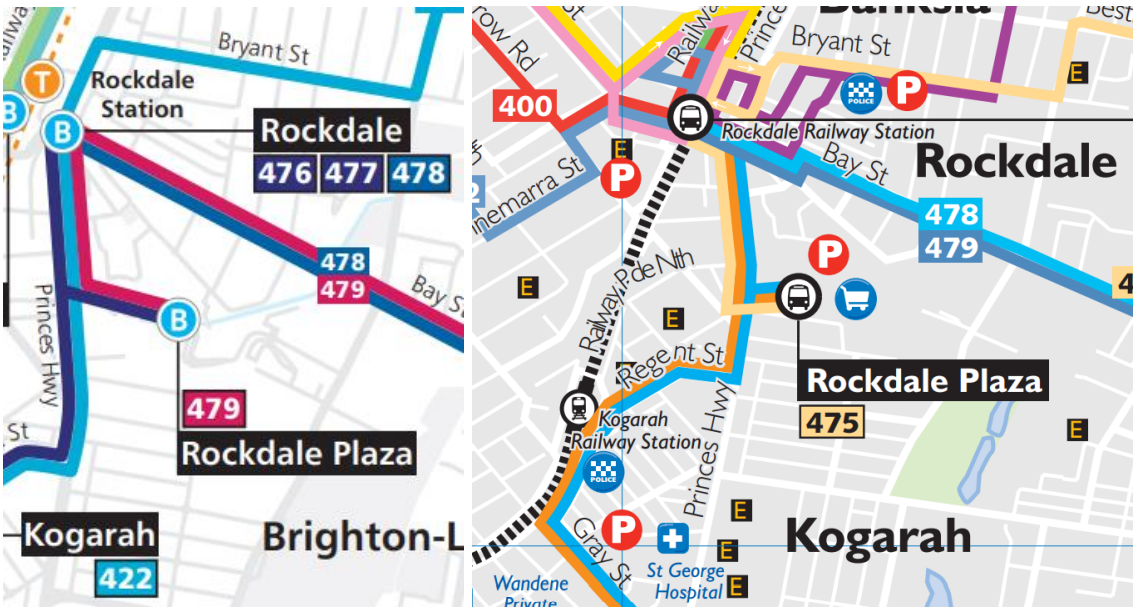
Lister Ave – Traffic conditions

5.0 PUBLIC TRANSPORT

There is a bus and train interchange approximately 400 metres from the site. Multiple bus services are also located along Princes Highway providing public transport access within proximity and short walking distance to the site. The provision of high public transport access to the site reduces dependency on private vehicles for residents and visitors.

5.1 Bus Services

There are bus services operating at the front of the site. The following Bus Services operate at the front of the property.



Route 422
Operates daily along the site at Princess Highway for every 30 minutes. This 422 provides a connection between Kogarah and the City.
Route 476
Operates daily along the site at Princess Highway for every 30 minutes. This 476 provides a connection between Kogarah and the City.
Route 477
Operates daily along the site at Princess Highway for every 30 minutes. This 477 Service provides a connection between Rockdale Station and Miranda.
Route 479
Operates daily along the site at Princess Highway for every 30 minutes. This 476 provides a connection between Rockdale and Kyeemagh.

5.2 Train Services

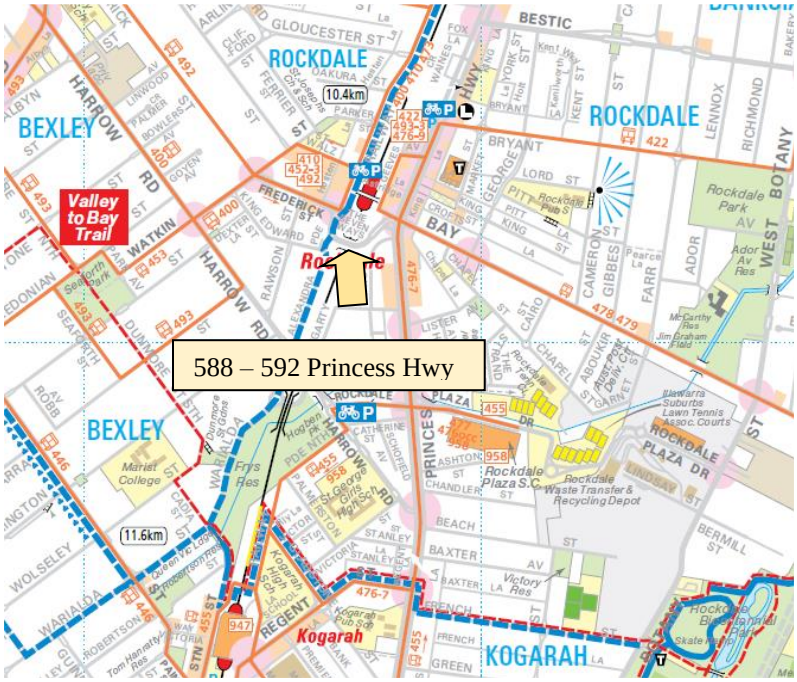
Rockdale railway station operates weekday peak hour all station services to:

- Bondi Junction via Central
- Hurstville and Sutherland via Hurstville
- Limited Stops and off – peak hour all-station services to:
- Bondi Junction via Central
- Sutherland, Cronulla, or Waterfall via Hurstville

5.3 Bicycle and Walking Routes

The area surrounding the development is also well served by various bicycle and walking routes. Bayside is updating the walking and bicycle plan delivering a range of initiatives to support cycling as a convenient alternative to private vehicle trips within Bayside Council.

The updated bicycle plan is aiming to increase the community's use of walking and cycling for every day local transport needs. The updated plans provide more opportunities for the reduction of private vehicles trips especially for short trips within the LGA which will also have a positive impact to the proposed development.



Source Rockdale Council - Bicycle and Walking routes

6.0 TRAFFIC GENERATION

The traffic generation of the existing Use is compared to the future traffic generation created by the proposed development to assess the impacts to the surrounding road network. The RMS Guide to Traffic Generating Developments has updated the rates per vehicle trips per unit within Sydney Metropolitan area. These rates are shown in the Table below.

6.1 Residential traffic generation rates

The RMS surveys for High density residential flat dwellings shown in the RMS Technical Direction Guide (TDT 2013 / 04a) the following:

TABLE 2 - RMS SURVEY TRAFFIC GENERATION RATES

Weekday Rates	Sydney Average	Sydney Range
AM PEAK (1 hour) vehicle trips per unit	0.19	0.07-0.32
AM PEAK (1 hour) vehicle trips per car space	0.15	0.09-0.29
AM PEAK (1 hour) vehicle trips per car bedroom	0.09	0.03-0.13
PM PEAK (1 hour) vehicle trips per unit	0.15	0.06-0.41
PM PEAK (1 hour) vehicle trips per car space	0.12	0.05-0.28
PM PEAK (1 hour) vehicle trips per bedroom	0.07	0.03-0.17
DAILY VEHICLE TRIPS per unit	1.52	0.77-3.14
DAILY VEHICLE TRIPS per car space	1.34	0.56-2.16
DAILY VEHICLE TRIPS per bedroom	0.72	0.35 -1.29

The above Guide refers to Sydney average of 0.19 trips per peak hour, per apartment. This figure represents the expected average number of trips generated by the proposal on a weekday.

High Density Residential flat building residential traffic generation rates.
Metropolitan Regional Centres
Peak Hour Vehicle Trips = 0.19 trips per unit.

The proposal accommodates for 101 apartments. In accordance with the above, the max trips expected to be generated by the residential component is 101 x 0.19 = **20** trips per peak hour (approx.). The above number of vehicles when added to the existing street traffic volumes has insignificant effects to the surrounding road network.

6.2 Commercial use

The proposal has also a commercial component which consists of 407.8 m². In terms of commercial use, the RMS Guide to Traffic Generating Developments provides the following guide in relation to the peak traffic generation associated with the commercial usage of this type of proposal.

Office and Commercial	per day	per peak hour
Commercial premises	10/100 m² GFA	2 / 100 m² GFA

RMS Guide to Traffic Generating Developments

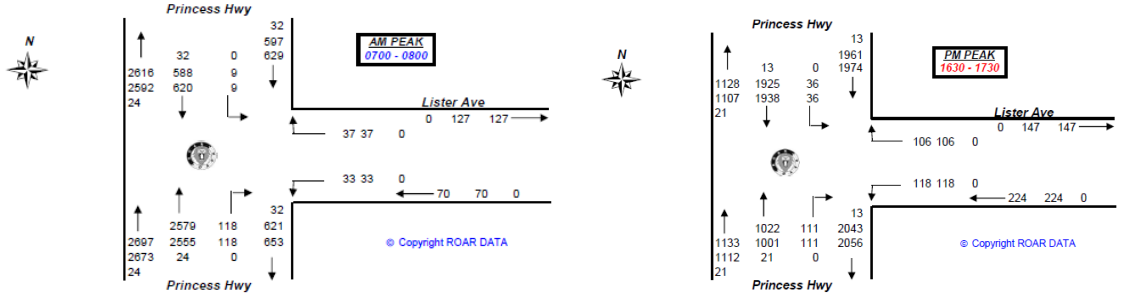
In accordance with the above, the Commercial component of the proposed development is expected to generate 407.8 / 100 x 2 = 5 vehicles per peak hour. In accordance with the above, the total commercial and residential trips expected to be generated as a result of the proposal, is 20 (Residential Use) + 5 (Commercial Use), a total of **25** vehicles per peak hour. In the following topics the existing street volumes and the intersection volumes are shown demonstrating with SIDRA analysis the low impact of the traffic generated by the existing development.

6.3 Traffic Generation - Existing development

The existing proposal was used as a gymnasium over two levels. As the current usage is classified as a gymnasium and at the top level a Reception Centre, the parking rates provided in the RMS Guide for this type of development is
3 trips per 100 m². The total amount of traffic generated by the existing development is 1050 /100 x 2 = 21 trips per peak hour.

The traffic predicted to be generated by the proposed development is only slightly higher than the traffic estimated to be generated by the proposal. The net decrease of traffic generated by the proposed development is 4 vehicle per peak hour. Therefore, in accordance with the above, the estimated trips which are expected to be generated by the proposed development will have insignificant impact to the surrounding road network.

The current AM and PM intersection traffic volumes are provided in topic 6.4 and shown below:



Existing Traffic Volumes

6.4 Traffic Volumes

Traffic volume surveys were undertaken at the intersection of Princess Highway and Lister Ave on Wednesday 22 September 2021 to determine the existing peak traffic conditions and the impact of the traffic generation which the proposed development will likely have at the above intersection and the surrounding road network. The peak morning traffic counts were undertaken from 7.00 am to 8.00 am and the peak afternoon counts were undertaken from 4.30 – pm to 5.30 pm.

The traffic surveys were undertaken to assess the impact of the traffic generation on the existing road network and to also assess the traffic volumes expected by any additional number of vehicles due to the proposed development. The traffic surveys undertaken showed the following.

TABLE 3 - Lister Ave - Vehicular Volume survey

Time/Direction	Westbound	Eastbound	Total
7.00 am – 8.00 am	70	127	197
4.30 pm – 5.30 pm	224	147	371

As shown in the Table 3, in the morning peak, 197 and 371 vehicles in the afternoon peak were recorded in Lister Ave. The above traffic surveys show that traffic volumes at the front of the site in both directions, are low and in terms of Environmental Capacity of a local Street, these volumes are considered low.

The current volumes generated by the existing development are 21 vehicles per hour (topic 6.1). The existing traffic volumes measured in Lister Ave are 197 and 371 vehicles per hour respectively for the morning and afternoon peaks. In the morning peak, 127 vehicles travelling eastbound and 70 vehicles travelling westbound. In the afternoon peak 147 vehicles are travelling eastbound and 224 are travelling westbound. The traffic generation of the existing use is compared to the future traffic generation created from the proposed development, to assess the impacts to the surrounding road network.

Due to the volumes generated by the existing development, the net increase of traffic in Lister Ave is the difference between the existing 21 vehicles generated and the projected 25 vehicles from the proposed development.

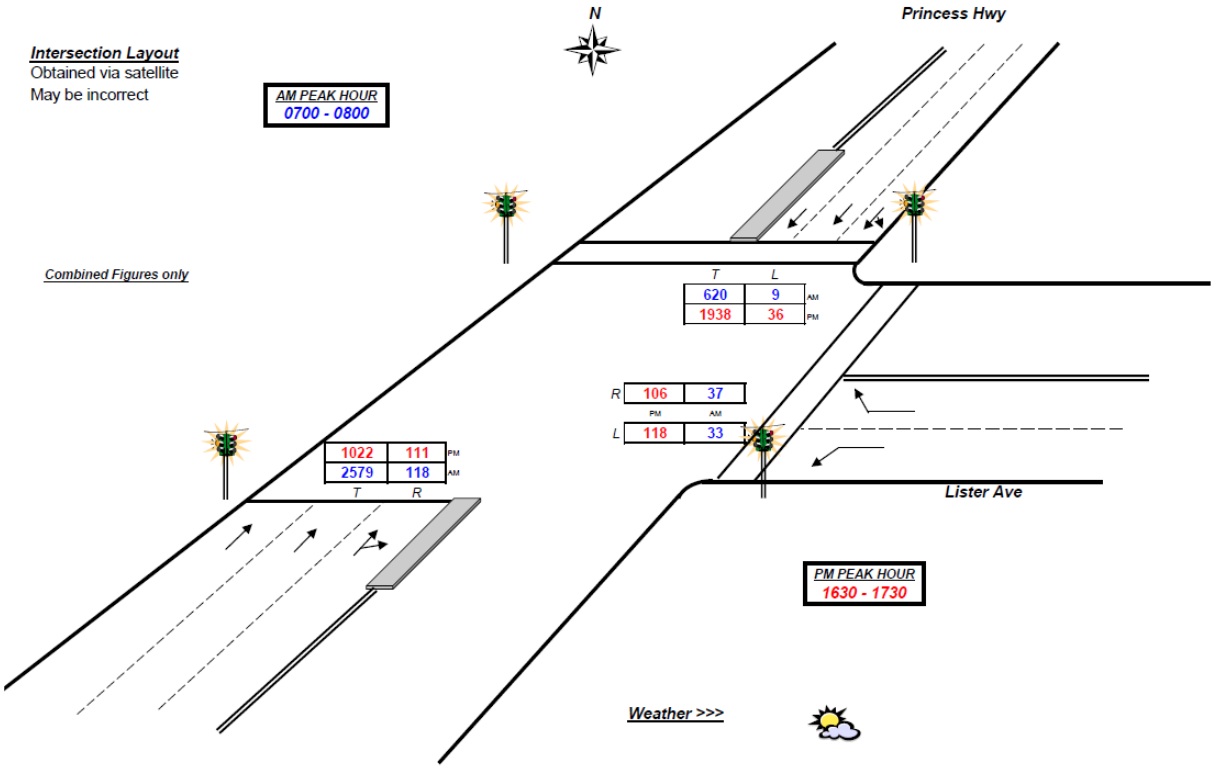
Therefore, 4 vehicles per peak hour is the net increase of traffic movements. Although that is the case for the purpose of projecting additional traffic onto the road network the exiting traffic generated is not taken into consideration so the worst-case scenario is used to determine the traffic impact as a result of the proposal.

The traffic projections are shown in the following Table – 4 below:

TABLE 4 - Projected Traffic Volumes

Time/Direction	Existing + projected
7.00 am – 8.00 am	197 + 25 = 222
4.30 pm – 5.30 pm	371 + 25 = 396

As indicated above, the impact is negligible and there are no adverse traffic impacts expected as a result of the proposed development.



Lister Ave and Princess Hwy
Traffic Volumes

6.5 Environmental Capacity Performance Standards

The Environmental Capacity concept, which is applied in traffic management, is adopted in the RMS Guide to Traffic Generating Developments and provides Environmental Capacity Performance standards on Residential Streets. The following table provides a summary of these thresholds. The following table provides a summary of these thresholds.

TABLE 5 - Environmental Capacity Performance Standards on Residential Streets.

Road Class	Road Type	Max Peak Hour Volume (veh/hr)
Local	Access way	100
Local	Street	200-300
Collector	Street	500

RTA Guide to Traffic Generating Developments

The number of vehicles travelling along Lister Ave is within the capacity performance limits of a residential street. The existing and projected volumes in Lister Ave is within the acceptable peak hour volumes shown in the above table.

The traffic expected to be generated by the proposed development will not have an adverse impact on the Level of Service (LOS) or on street capacity issues in Lister Ave. It should be noted that the projected net amount of traffic in Lister Ave is negligible. Therefore, the amount of traffic expected to be generated by the additional number of vehicle movements will not be significant on the road network.

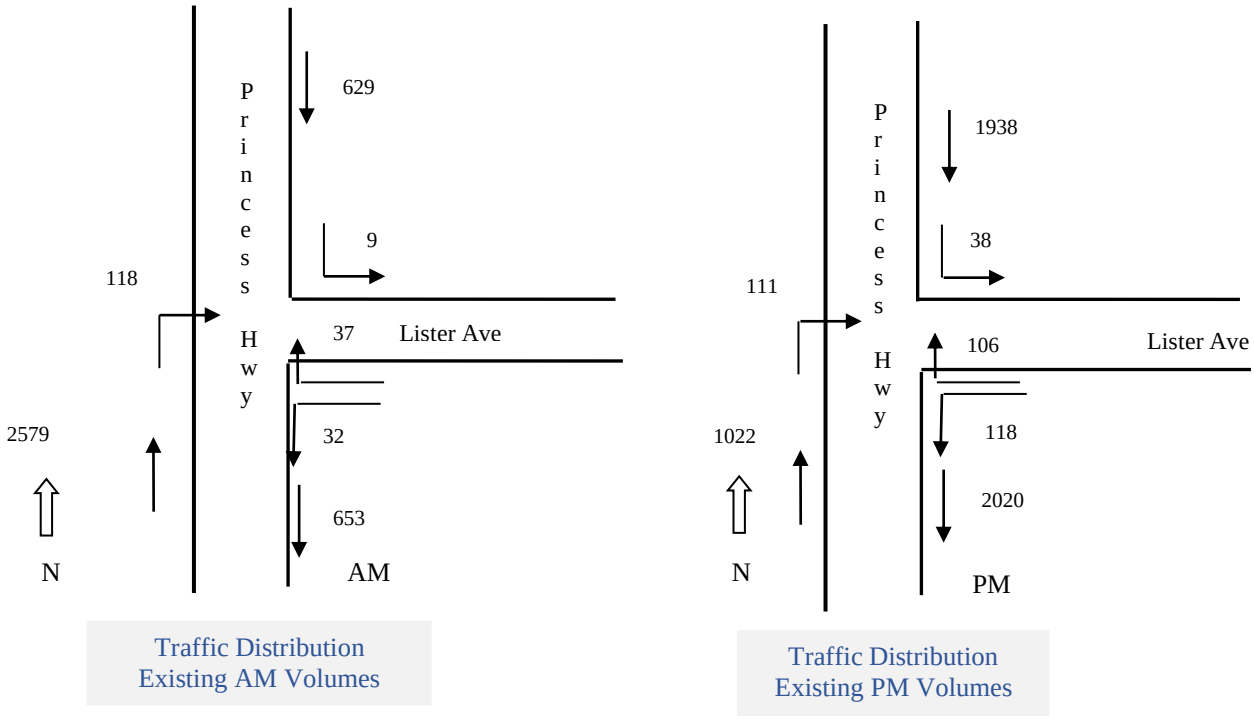


Figure 1 *Traffic Distribution - Existing Volumes*

6.6 Intersection Capacity

An intersection modelling assessment has been undertaken using SIDRA modelling analysis. The performance indicators of an intersection are provided in the modelling software. The main performance indicators are:

Degree of Saturation: - the total usage of the intersection representing the use/saturation in terms of percentage.

Average Delay – The average delay of all vehicles passing through the intersection. Each approach at the intersection is reviewed as a long delay of one leg of the intersection may create delays to the other legs. 95% of Queue Lengths – This is the queue length in metres that has about 5% probability of being exceeded during the analysis period.

Levels of Service: This is a categorisation of average delay. The following guide is provided by RMS related to the level of service.

TABLE 6 - Criteria for Evaluating Capacity of Intersection

Level of Service	Ave. Delay / Vehicles. (Seconds)	Traffic Signals
A	Less than 14	good operation
B	15 - 28	good with acceptable delays
C	29-42	satisfactory
D	43-56	poor but manageable
E	57-70	at capacity
F	Over 70	unsatisfactory

TABLE 7 - Sidra Existing Intersection Modelling Assessment

Period	Intersection	LOS	Avg Delay	Deg of Sat
AM Peak	Lister Ave and Princess Highway	B	23.9	0.739
PM Peak	Lister Ave and Princess Highway	B	24.1	0.781

The assessment of the above signalised intersection indicated for morning peak Level of Service B, average delay of 21.9 and Degree of Saturation 0.0291. For afternoon peak Level of Service B, average delay 21.9 and Degree of Saturation 0.0490.

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total Veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed Km/h
Princess Hwy south											
1	T1	2579	5.1	0.772	13.1	LOS A	29.0	168.2	0.58	0.57	34.1
2	R2	118	1.2	0.702	39.0	LOS C	5.3	35.6	1.00	0.79	16.3
Approach		2697	4.6	0.705	12.0	LOS A	29.0	175.2	0.58	0.59	31.3
Lister Ave											
4	L2	33	1.0	0.201	22.1	LOS B	5.1	32.3	0.56	0.67	8.6
6	R2	37	1.0	0.350	34.5	LOS C	5.2	31.2	0.71	0.69	7.3
Approach		70	1.0	0.259	31.6	LOS C	5.5	33.6	0.71	0.69	7.6
Princess Hwy north											
7	L2	9	1.0	0.647	36.1	LOS C	35.6	152.5	0.52	0.79	8.1
8	T1	620	5.3	0.749	33.1	LOS C	35.6	152.5	0.52	0.79	6.7
Approach		629	4.7	0.765	32.2	LOS C	35.6	152.5	0.52	0.79	6.7
All Vehicles		3396	4.5	0.739	23.9	LOS B	35.6	171.5	0.68	0.79	6.2

The traffic volumes associated with the new proposal have been applied and added to the surveyed traffic counts and the analysis is summarised below. The estimated traffic volumes from the existing development are 21 vehicles per peak hour. As a result of the proposal the projected traffic volumes have been taken into consideration with insignificant change.

The traffic assessment summarised below, shows that the traffic generation which is expected of the proposed development will continue to be accommodated adequately by the road network and is not expected to create any adverse traffic impacts at the intersection of Lister Ave and Princess Highway.

The model provides parameters of the performance of an intersection including the degree of saturation. In accordance with the adequacy of the capacity of an intersection, it is assessed by whether it can physically and operationally cater for the traffic using it.

Intersection of Lister Ave and Princess Highway

A Traffic modelling assessment has been undertaken of the impact at the intersection of Princess Highway and Lister Ave. The performance of the intersection was assessed using the *SIDRA* Intersection Modelling software program. The recommended Criteria for evaluating capacity of the intersection is shown in the following **Table 8**.

TABLE 8 Criteria for Evaluating Capacity of Intersection

Level of Service	Degree of Saturation	Ave. Delay / Veh. (Seconds)
A good operation	Less than 0.80	Less than 14
B good with acceptable delays	Less than 0.80	15 - 28
C satisfactory	0.80 – 0.85	29-42
D poor but manageable	0.85 - 0.90	43-56
E At capacity	0.90 and over	57-70
F unsatisfactory	Over 0.90	Over 70

**The Environmental Traffic Capacity is defined as the maximum number of vehicles that should be permitted to pass through a given environmental situation over time and under prevailing environmental solutions.*

588 – 592 Princess Highway

The assessment at the above intersection, when compared with the above criteria showed that the Intersection of Princess Ave and Lister Ave operates at B (Good with acceptable delays and spare capacity) Level of Service during the morning and afternoon peaks. The existing minimum queuing of vehicles during the morning or afternoon traffic peaks has no impact on the above intersection and its Level of Service (LOS) will continue to operate as "B". (Modelling Analysis shown in Annexures).

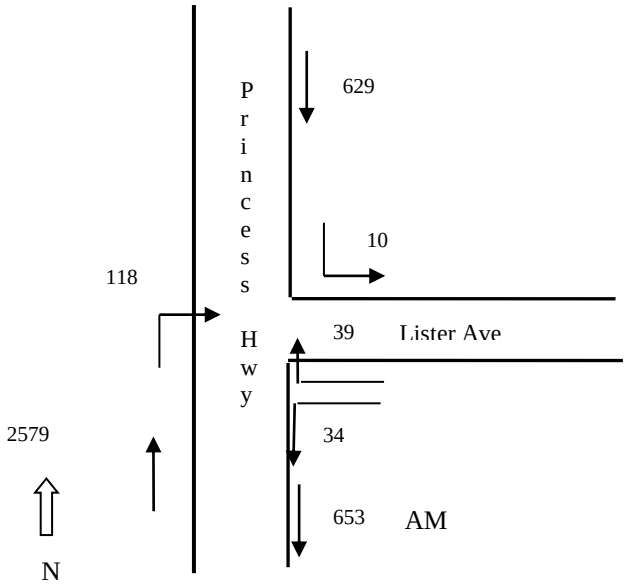
The additional number of traffic generated vehicles by the above development, will not change the Level of Service (LOS) at the above intersection. The model provides parameters of the performance of an intersection including the degree of saturation. In accordance with the adequacy of the capacity of an intersection, it is assessed by whether it can physically and operationally cater for the traffic using it. The recommended Criteria for evaluating capacity of the intersection is shown in the following **Table 9**.

The following Table with the projected intersection modelling summarises the impacts at the above due to the projected traffic from the development.

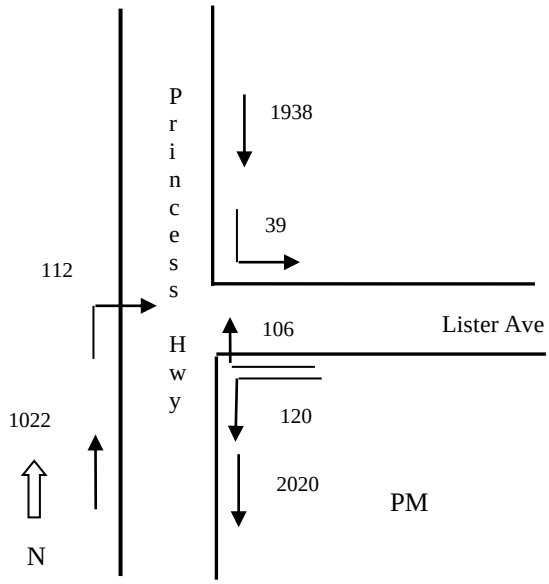
TABLE 9 - Sidra Projected Intersection Modelling

Period	Intersection	LOS	Avg Delay	Deg of Sat
AM Peak	Lister Ave and Princess Highway	B	24.2	0.751
PM Peak	Lister Ave and Princess Highway	B	24.8	0.782

The operation of the traffic signals at the intersection of Lister Ave and Princess Highway is operating well within its capacity with a Level of Service B and due to the proposed development, the Level of Service (LOS) at the above intersection is not expected to change.



Traffic Distribution
Potential AM Volumes



Traffic Distribution
Potential PM Volumes

The SIDRA traffic modelling shows that the intersection of Lister Ave and Princess Highway has been assessed and shows, that the proposal will have minimal impact in the overall road network. There are no improvements required at the above intersection, as the traffic modelling showed that the Level of Services (LOS) of the above intersection remains the same.

7.0 PARKING SUPPLY

The parking supply has been assessed in relation to Rockdale Council's DCP – Section 4.6 and Rockdale Guidelines – Traffic, Parking and Access specifications in relation to the parking rates specified for this type of development.

The parking assessment has also been assessed the RMS Guide for Traffic Generating Developments and consideration has been given to the SEPP 65 parking concessions and the parking rate provision has been assessed to determine the parking supply provided for the proposal.

Bayside parking DCP provision
(Rockdale DCP 2011)

Bayside Council DCP for multi unit developments provied the following parking rates. The following parking rates are assessed to examine the parking provisions provided the for residential, visitor, retail/commercial, accessible, motorcycle and bicycle component.

TABLE 10 Rockdale DCP – Parking requirements

Type	Car Parking Requirements	Bicycle Parking Requirements	Motorcycle Parking Requirements
One and two bedrooms	1 space per apartment	1 space per 10 dwellings	1 space per 15 per apartments
3 Bedroom apartment	2 spaces per apartment		
Visitor Parking	1 per 7 apartments		
Retail – Shops	1 space per 40 m²	1 space/ 200 m² 15% accessible by visitors	1 space for 20 car spaces

Rockdale Council's DCP 11 - Technical Specification – Traffic, Parking and Access, also allows that the commercial parking bay requirements be combined with the residential service bays provided that a loading dock management plan is developed by the strata, which restricts the hours of access for different users. The following parking requirements are provided for the proposed development.

The parking area is provided over four basement parking levels
Basement Level 1: 19 spaces
Basement Level 2: 40 spaces
Basement Level 3: 39 spaces
Basement Level 4: 42 spaces
A total of **140** parking spaces plus **one** car washing bay.

TABLE 11 – Car Parking Requirements

Type	Car Parking Requirements	Car Parking spaces Required
1 Bedroom (20)	1 space per 1x bed apartment	20
2 Bedroom (68)	1 space per 2 x bed apartment	68
3 Bedroom (13)	2 space per apartment	26
	Sub Total Parking	**114**
Visitor Parking	1 space per 7 apartments	14.4
Commercial (407.8 m²)	1 space per 40 m²	10.19
Total		**138.59**

*** As per DCP a 20 % reduction shall apply to non – residential parking spaces*
The parking spaces provided for the development are more than adequate as a comparison is shown below by providing the parking rates indicated in the Guide for Traffic Generating Developments. (ADG Rates).

The following Table shows the number of parking spaces provided per car parking level.

TABLE 12 Vehicle Parking – Resident – Accessible and Commercial

Provision	**Commercial	Residential	Accessible	Visitor	Motor cycle	Bicycle
Basement 01	10 (+ 1 acc)		1 (com)	8	2	10
Basement 02		38	2	0	4	14
Basement 03		33	4	2	4	14
Basement 04		33	4	5	4	14
***Total** (140)	10	104	11	15	14	52

TABLE 13 – Bicycle and Motorcycle Parking required (DCP)

Resident Bicycle requirements	Resident Motorcycle Requirements	Commercial Bicycle requirements	Commercial Motorcycle requirements
1 space per 10 dwellings	1 space per 15 dwellings	1 space per 200m² GFA	1 space per 20 car spaces
10	7	2	1

The motorcycle and bicycle parking provided is shown below, which exceed the bicycle and motorcycle parking required in Bayside Council's DCP.

TABLE 14 - Bicycle & Motorcycle parking provided

Resident Bicycle provided	Resident Motorcycle provided	Commercial Bicycle provided	Commercial Motorcycle provided
1 space per 10 dwellings	1 space per 15 dwellings	1 space per 200m² GFA	1 space per 20 car spaces
42	12	10	2

The bicycle and motorcycle parking provided is more than the minimum required as per DCP. Therefore, the proposed development's proposed parking provision is supported.

Parking Concessions consideration

Bayside Council's DCP refers to the following regarding parking concessions:
For developments within Rockdale Town Centre the DCP allows for a traffic demand reduction in the non-residential component of parking for all developments within the Rockdale Town Centre. The development is located within walking distance of the train station and Rockdale Town Centre and adjacent to bus stops and public transport.

In the Rockdale DCP 4.6, a shared parking concession can be applied so that the development provides more efficient supply of parking. The DCP allows for a shared parking register which takes into consideration the peak period of parking for the residential and commercial component. This will provide a shared register of visitor parking, where some parking spaces can be shared between different users depending on the peak parking demand. Therefore, the following measures are proposed to improve the parking efficiency.

The Rockdale DCP allows for a 20% reduction to the non – residential component (commercial). The demand reduction if applied to the non- residential component allows for a reduction of 10 x 20% = 2 parking spaces. The permitted parking reduction for the required non-residential parking spaces are 2 parking spaces. Therefore, in accordance with the above, following the concession reduction, the required commercial parking spaces are 8. The proposal provides 11 commercial parking spaces, it includes 10 spaces plus one accessible.

RMS Guidelines for Traffic Generating Developments

The RMS developed Guidelines in relation to traffic generating developments provide guides for traffic generation and parking impacts. The Definition provided in the above guide for high density residential flat buildings is the following:

"A high density residential flat building refers to a building containing 20 or more dwellings. This does not include aged or disabled persons' housing. High density residential flat buildings are usually more than five levels, have basement level car parking and located in close proximity to public transport services. The building may contain a component of commercial use."

The proposal has been assessed in accordance with the RMS Guidelines to determine the parking rates, which apply to high density residential flat buildings. The following parking rates are provided:

0.4 spaces per 1 x bedroom unit
0.7 spaces per 2 x bedroom unit
1.2 spaces per 3 x bedroom unit +
1 space per 7 units (visitor parking)

As per the above parking rates, the RMS Guide to Traffic Generating Developments provides much lower parking rates than Bayside Council's DCP. By calculating the above parking rates, the parking required as per RMS Guide is as follows:

TABLE 15 – RMS Parking rate requirements

Type of apartment	RMS rates	Parking Spaces Required
20 x 1 bed	0.4 spaces per 1x bedroom unit	8
68 x 2 bed	0.7 spaces per 2 x bedroom unit	47.6
13 x 3 bed	1.2 spaces per 3 x bedroom unit	15.6
Visitor = 101/7	1.0 spaces per 7 units (visitor parking)	14.4
Total Residential		85.6
Commercial 407.8 m²	1 parking spaces per 40 m²	10.19
Grand Total		96

*As per RMS Guide to Traffic Generating Developments *Discounted by 20% as per SEPP 66 parking reduction*

As per the RMS guide a total 96 parking spaces are sufficient for the residential and commercial component.

SEPP 65 – Parking Concessions

Car Parking requirements are set in SEPP 65 – *Design Quality Residential Apartment Design (SEPP 65)* and the apartment Design Guide. In designated accessible Sydney locations and nominated centres in Regional NSW, the Department Design Guide applies a minimum parking requirement that is the lesser of either the relevant rate set out in the Guide to Traffic Generating Developments (GTTGD) or the Council Car parking requirement.

The guide introduces parking requirements for some sites in Metropolitan Sydney and nominated regional centres. Objective 3J-1 states: Car parking is provided based on proximity to public transport in metropolitan Sydney and centres in regional areas. The design criterion sets out measurable requirements for how this objective can be achieved in apartment developments, as follows:

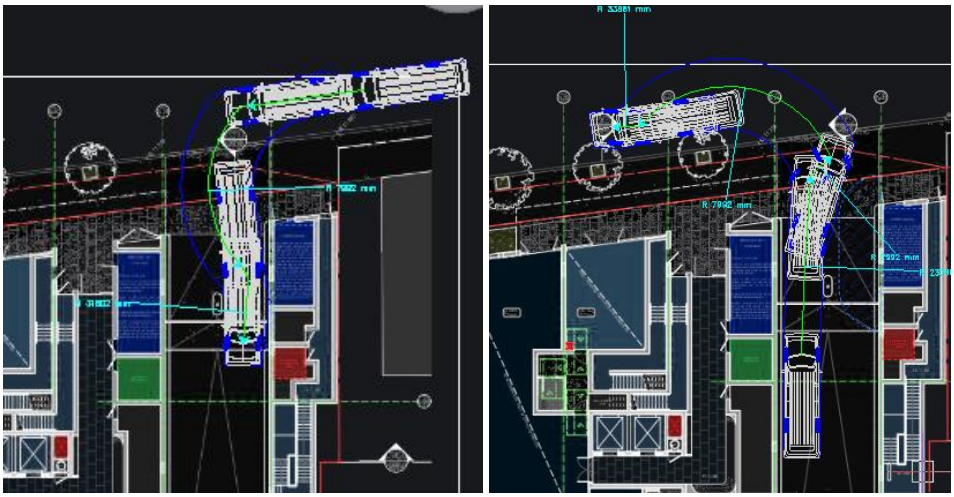
On sites that are within 800 m of a railway station or light rail stop in the Sydney Metropolitan Area: or on land zoned, and sites within 400m of land zoned, B3 Commercial Core, B4 Mixed Use or equivalent in a nominated regional centre. In this case the Guide to Traffic Generating Developments is the lesser one with a total of 96 parking spaces required as per the parking concessions.

The proposal provides a total of 140 parking spaces for a total of **101** units and 407.8 m² of commercial development. The parking provided is 44 parking spaces in addition to what the SEPP 65 indicates when the parking concession rates are applied and more spaces than the DCP requirements. Therefore, the parking supply provided for this type of development is considered as more than adequate and will meet and exceed the demands in terms of parking provision.

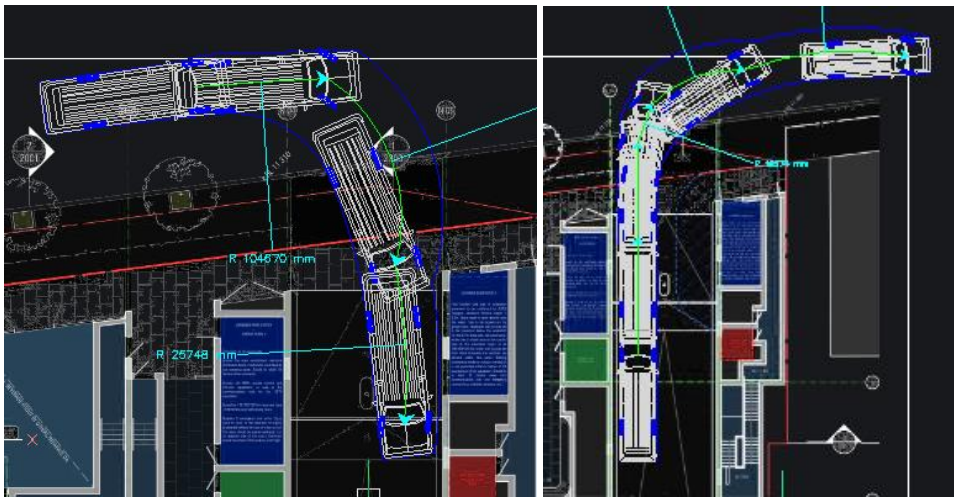
The application of the Car Parking requirements is also set in SEPP 65 – Design Quality Residential Apartment Design (SEPP 65) and in accordance with the Guide to Traffic Generating Developments (GTTGD) the required car parking requirements are 96 parking spaces. The proposal provides a total of 140 (+ 1 car wash bay) parking spaces, which exceed the minimum parking spaces required per the GTTGD and SEPP 65.

The visitor car parking basement spaces on Basement 01 is proposed to be shared between residential visitor sand commercial visitors. This arrangement ensures, without compromising the parking spaces to visitor or residential parking. This is practical due to the fact, that residential visitor spaces have different demand times than the commercial parking. The main demand times for visitor parking is Friday and Saturday evenings, which does not interfere with the commercial parking demand times.

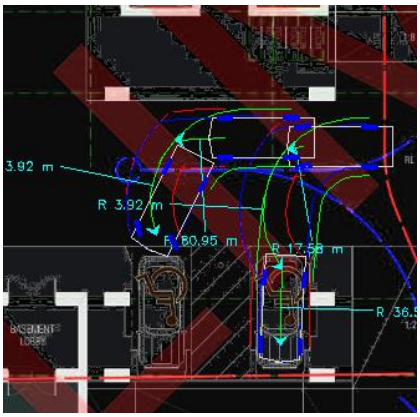
SWEPT PATHS



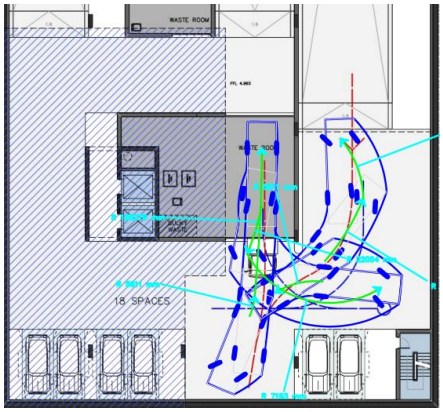
Commercial Accessible Parking



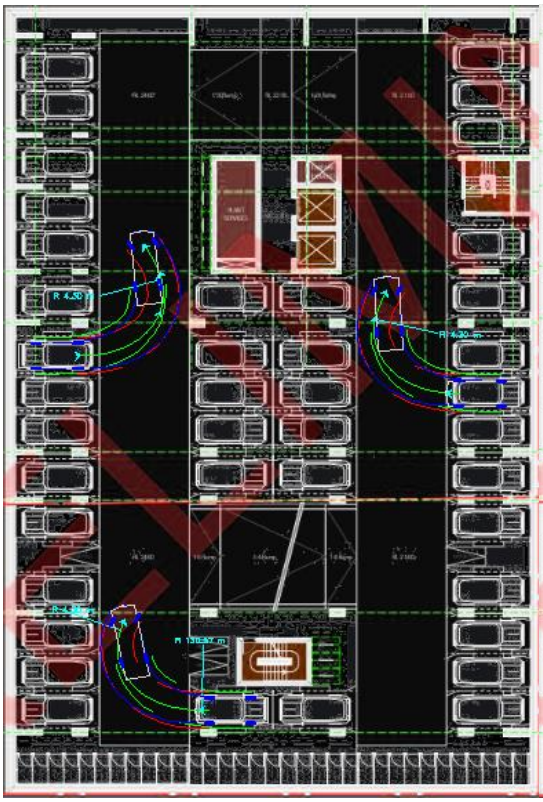
Commercial Access



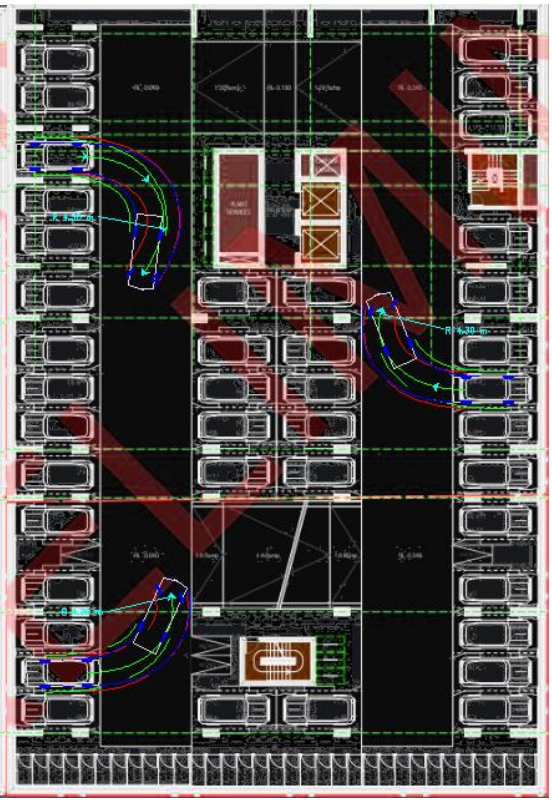
Accessible Parking swept paths



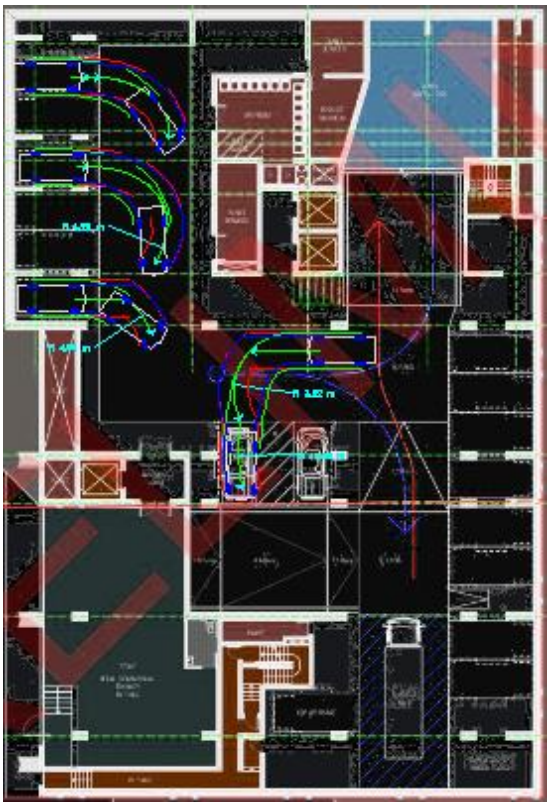
Waste area turning paths



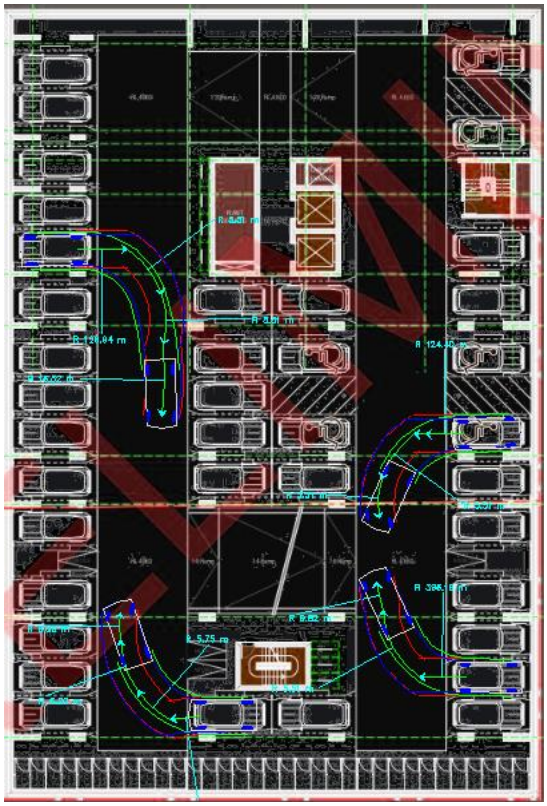
Basement L-03



Basement L-04



Basement L-01



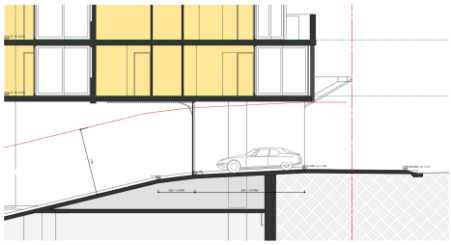
Basement L-02

8.0 ACCESS

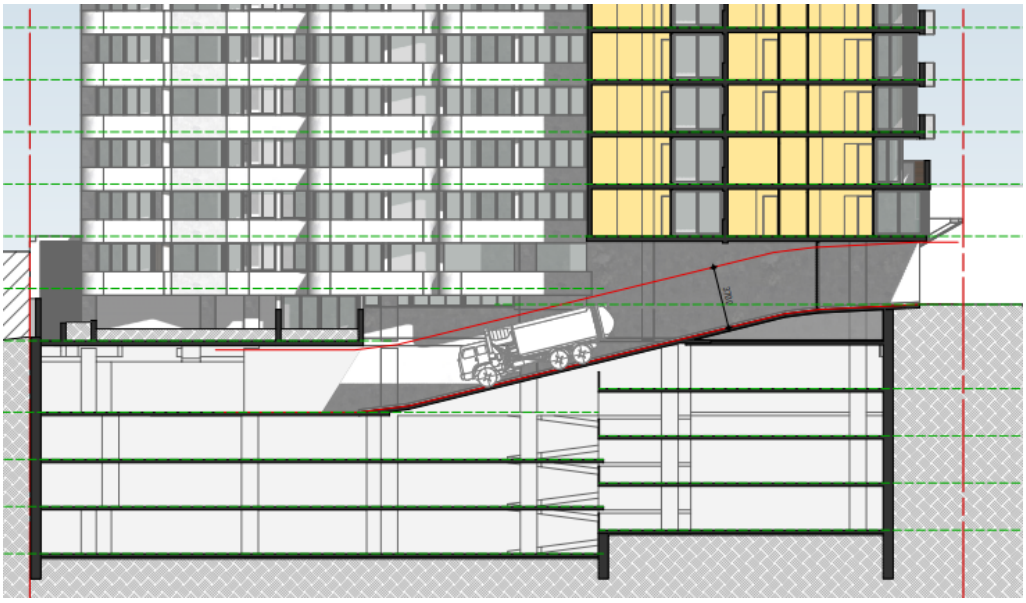
The proposal provides a combined Entry / Exit single access driveway which is located off Lister Ave. This is in accordance with RMS's guide to limit the provision of driveways on major roads which results in minimum disruption of traffic on the main road. The proposal's access also allows for a large rigid vehicle to enter the site. The access design is in accordance with AS 2890.1.

The following issues have been considered to assess whether Rockdale Council's access objectives have been met and AS/NZS 2890.1- 2004 have been complied with. The access to the parking area is designed using the B85 base swept path in accordance with AS/NZ 2890.1 – 2004. The assessment of the turning path indicates that a car could adequately access and manoeuvre safely within the car parking area.

SECTION - GROUND FLOOR ACCESS



Ramp vertical Section

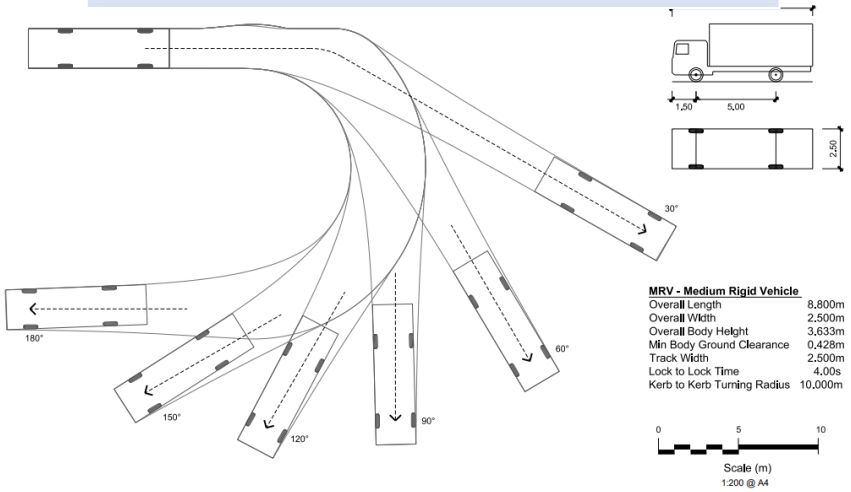


Service Vehicle access

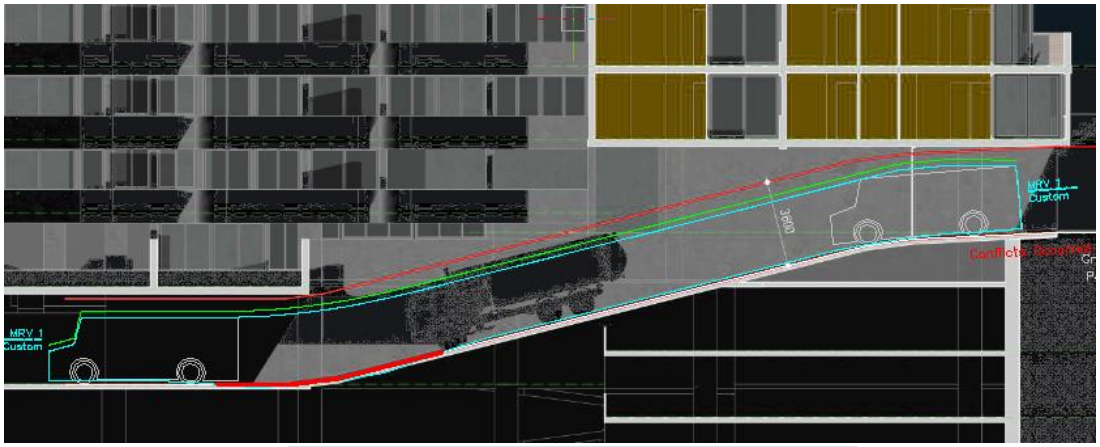
Typical Council Garbage Truck used for Domestic Waste Collection	
Length overall	9.64m
Front overhang	1.51m
Wheelbase	5.20m
Rear overhang	2.93m
Turning circle kerb to kerb	17.86m
Turning circle wall to wall	20.56m
Front of vehicle to collection arm	3.8m
Maximum reach of side arm	3.0m
Travel height	3.63m
Clearance height for loading	3.9m

Provided by Bayside Council

Typical Dimensions of Council Waste Truck

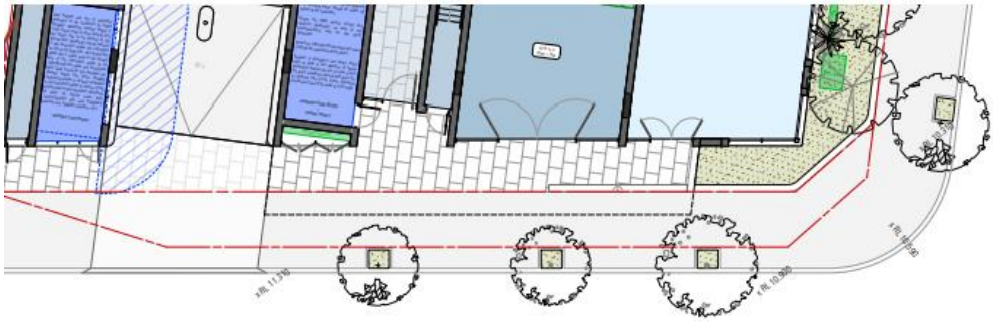


MRV typical dimensions and swept path



Ramp vertical access path

The driveway access is designed to allow for vehicles entering and exiting in a forward direction with minimum conflict. The parking spaces have been assessed using the B85 Design Templates in accordance with AS/NZS 2890.1:2004. The assessment demonstrates that the access area into and out of the proposed development provides adequate manoeuvring for cars and service vehicles to enter, set down and exit in a convenient manner.



588 – 592 Princess Highway –Access Plan

AS/NZ 2890.1:2004 (3.2.2) for a type 2-3 driveway specifies that widths of 6 - 9 metres entry / exit combined (Table 14). In accordance with the Guide to Traffic Generating Developments, the proposed access driveways - ingress and egress, is Type 2-3 (Table 16) which, requires a combined minimum 6-9 metres. The designed width of the driveway is considered adequate and in accordance with the RMS above Guide. The proposal also allows for the first 6 metres from the property boundary a 6.0 metres wide access driveway, which complies with AS 2890.

TABLE 16 – Criteria re driveway widths AS 2890.1

Recommended driveway types

Type	Entry Width (Metres) W	Exit Width (Metres) W	Min Separation of Driveways (Metres)	Splay at Kerbline (Metres) S	Kerb Return Turnout Radius (Metres) R
1	3-6	combined	NA	0.5	-
2	6-9	combined	NA	1	-
3	6	4-6	1-3	1	2-9
4	6-8	6-8	1-3	1	2-9
5	Direct feed from a controlled intersection via a dedicated public roadway				
6	8-10	8-10	3	1	2-9
7	10-12	10-12	3	1	2-9

Guide to Traffic Generating Developments. October 2002 Issue 2.2 6-3

Selection of driveway type based on parking spaces Road

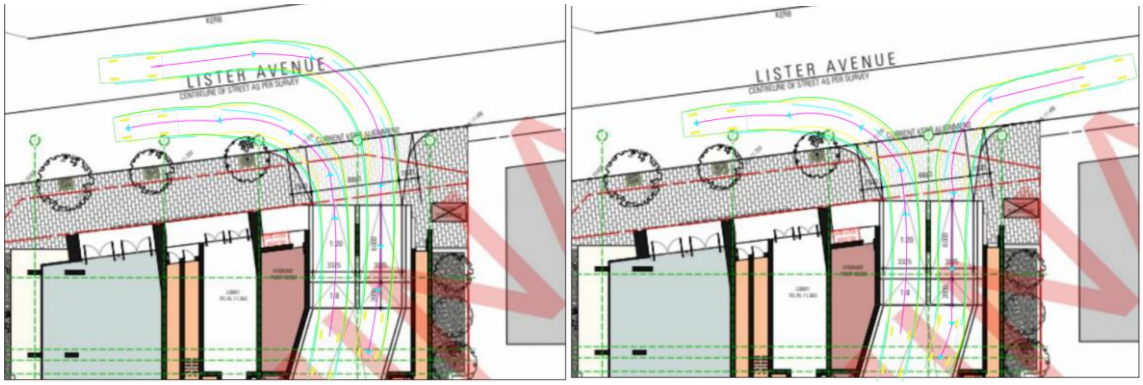
Frontage	Number of Car Parking Spaces Served by the Driveway					
	Less than 25	25-100	101-300	301-600	More than 600	Heavy Vehicles
Major	1 - 2	2 - 3	3 - 4	4	5	7
Minor	1	1 - 2	2 - 3	3 - 4	4	6

Source: AS/NZ 2890.1:2004

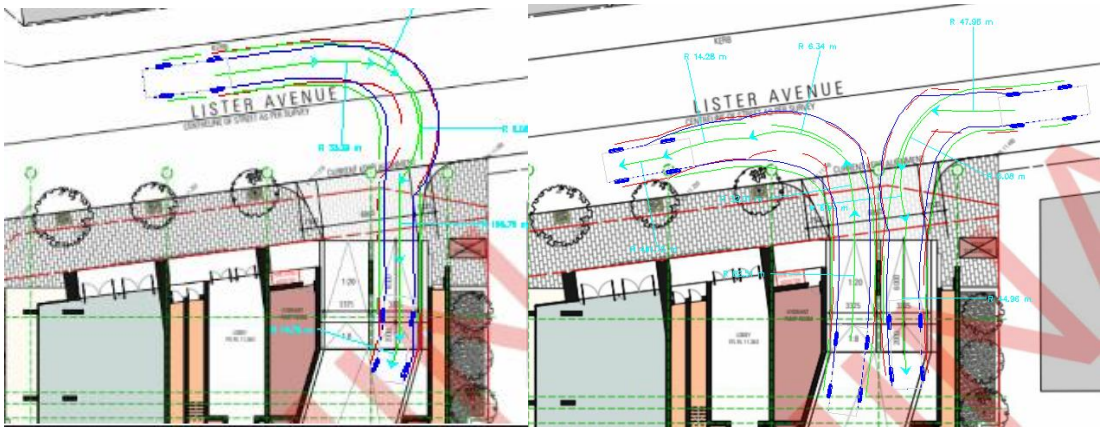
The proposed car parking area is designed in accordance with Off Street Parking and AS 2890.1 – Off Street Parking and AS 2890.2 – 2002, Off Street Commercial vehicle facilities. The parking set up and dimensions of these spaces have been assessed and comply with AS/NZS 2890.1- 2004.

The minimum dimensions of the 90 – degree parking spaces are 2.4 X 5.4 m and designed in accordance with AS/NZS 2890.1- 2004. This design allows for safe manoeuvring in and out of the parking bays. The proposed loading bay on the ground level is designed in accordance with AS 2890.2 – 2002. Off Street Commercial vehicle facilities.

The accessibility parking spaces are assessed against AS 2890.6, Off Street Parking with People with Disabilities. AS 2890.6 requires parking bay dimensions 2.4 x 5.4 meters with a shared space of 2.4 metres. For each accessible parking space, a shared parking bay has been provided in accordance with AS 2890.6. The assessment of the accessible parking spaces indicates that, the car park design complies with the requirements of AS 2890.6.



ACCESS – PASSENGER VEHICLES

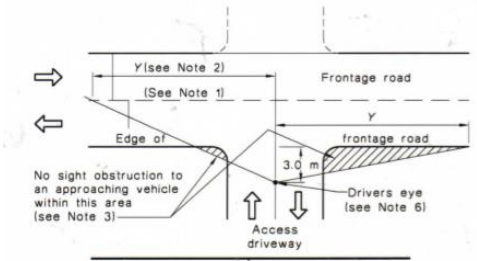


ACCESS LOCATION - MRV

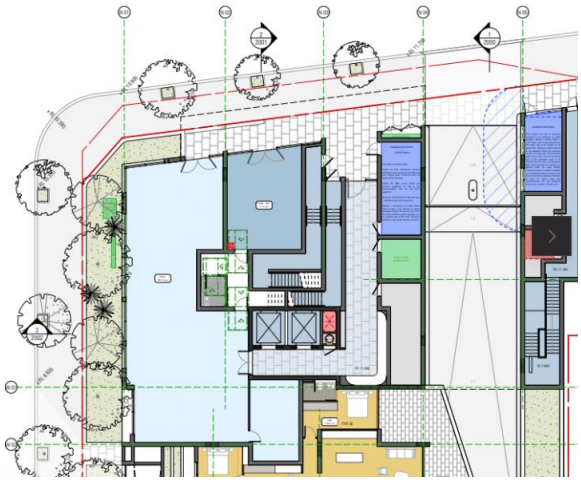
The set - out design of the parking and the unrestricted site distances within the car parking area, allows for convenient and safe access to the access with minimum conflict between vehicular and pedestrian traffic. The turning manoeuvring clearances for the car parking area have been assessed in accordance with AS/NZS 2890.1 and the RMS Guide to Generating Developments. The B85 and vehicle templates have been applied and showed that; cars can enter and exit the off-street parking bays with adequate clearances.

The total amount of off-street parking spaces provided for the needs of the proposed development, as described in previous topics, are adequate for the development's parking demand. The parking associated with the proposal will not impact the surrounding residential area nor access, or parking activities associated with other surrounding developments and will not have any adverse on-street parking impact.

The Sight Distances from the proposed vehicular crossings to vehicles on The Hume Highway are in accordance with the Austroads Guide to Road Design: Part 4A: Unsignalized and signalised Intersections (Section 3 – Sight Distance) and in accordance with AS 2890.1. The site distance at the front of the access assessed are in accordance with the above AS 2890.1 Figure 3.3 below.



Frontage road speed (Note 4) km/h	Distance (Y) along frontage road (Note 5) m	
	5 s gap	8 s gap
40	55	89
50	69	111
60	83	133
70	97	156
80	111	178
90	125	200
100	139	222
110	153	244



AS 2890.1 - Figure 3.3

The proposed driveway at Lister Ave has been assessed in accordance with AS 2890.1. (Section 3.2). As the speed limit in Lister Ave is 50 km/hour, the desirable sight distance for this speed is 65 metres and the minimum speed is 45 metres.

Drivers' Sight Distance view from Driveway

As there are 'No Stopping' signs, adjacent to the site, the proposed driveway is unobstructed from both directions and the driveway's visibility is not restricted. The access to the site's driveway is unobstructed. The design of the access driveway has been assessed and the assessed 'Sight Distances' at the access location comply with AS/NZS 2890.1.

9.0 SUMMARY / CONCLUSION

This traffic and parking report includes the assessment of the traffic and parking implications for the proposed development. It has been prepared to supplement the development application submitted to Bayside Council for consideration. The traffic and parking assessment requires to be considered in conjunction with the Architectural plans submitted to Council.

The proposed development comprises of 101 residential units and a Retail Gross Floor Area of approximately 407.8 m² of commercial space and 4 level basement car parks at 588 – 592 Princess Highway, Rockdale.

The proposed development comprises of the following numbers of apartments.

1 bedroom	20
2 bedroom	68
3 bedroom	13
Total apartments	**101**

The provision of parking on each basement level is shown below.
Basement Level 1: 19 spaces
Basement Level 2: 40 spaces
Basement Level 3: 39 spaces
Basement Level 4: 42 spaces
A total of **140** parking spaces plus 1 car washing bay.

There are commercial units proposed on the ground floor and one in the lower ground floor with a cumulative area of 407.8 m². There are total of 140 off- street parking spaces proposed, comprising of 114 residential parking spaces, 15 Visitor spaces 10 Commercial spaces, 11 accessible parking spaces, 1 car washing bay and a parking bay for waste vehicles. The proposal also provides a total of 14 motorcycle and 52 bicycle parking spaces, of which, 2 motorcycle and 10 bicycle spaces are dedicated to the commercial component.

The Car Parking exemption in accordance with SEPP 65, requires fewer parking spaces than what the DCP rates indicate. The SEPP 65 Design Guide applies a minimum parking requirement that is the lesser of either the relevant rate set out in the Guide to Traffic Generating Developments (GTTGD) or the Council Car parking requirement. The parking requirements as per the RMS Guide are 96 parking spaces. The proposed designs provide 140 parking spaces which exceed the RMS parking rates for this type of development and Council's DCP minimum parking requirements.

The visitor car parking basement spaces on Basement 01 is proposed to be shared between residential visitor sand commercial visitors. This arrangement ensures, without compromising the parking spaces to visitor or residential parking.

The access to the parking area is designed using the B85 base swept path in accordance with AS/NZ 2890.1 – 2004. The layout design of the proposed car parking facilities complies with AS 2890.1 – 2004, AS 2890.6, regarding parking bay dimensions, aisles widths, ramps, swept paths gradients and access. The assessment of the turning paths indicates that vehicles could adequately access and manoeuvre safely within the car parking area. The proposed for the waste bay area on the basement level 01 is designed in accordance with AS 2890.2 – 2002. The driveway access is designed to allow for vehicles entering and exiting in a forward in accordance with AS/NZS 2890.1:2004 and AS 2890.2.

The traffic generation assessment based on the RMS Guide to Traffic Generating Developments shows, that the vehicle trips generated by the proposed development during peak hour are very low and will have insignificant and not noticeable impact on the surrounding road network. There are 25 vehicles expected to be distributed on the road network in accordance with the RMS Guide to Traffic Generating Developments rates. In actual terms, the traffic generated by the existing commercial building is similar with the projected vehicle trips. Therefore, in can be safely assumed that the traffic impact of the proposed development is negligible and not expected to generate any adverse impact on the road network.

The Traffic modelling (SIDRA) of the intersection of Lister Ave and Princess Hwy indicates that, following the construction of the proposed development, the Level of Service (LOS) at the intersection of Lister Ave and Princess Hwy will remain unchanged, (LOS B) with non-noticeable traffic impacts to the operation of the traffic signals.

The proposal is considered as highly accessible to the public transport hub. Cycling is also within a small distance from transport facilities and the Plaza. The Development's proximity to accessing Rockdale Railway Station, Public Transport and Rockdale Plaza Shopping Centre allows for the reduction of vehicle trips for residents and visitors.

In summary, the proposed parking design satisfies Council's Guidelines, Bayside DCP, RMS Guide to Traffic Generating Developments as well as the Australian Standards There are no adverse parking or traffic implications identified.

The Design submitted for the proposed residential development at 588 – 592 Princess Highway complies with standards set with; AS/NZ 2890.1:2004, AS 2890.6: 2009 (Off Street Parking for people with disabilities), Rockdale Council's DCP and the RMS Guide for Generating Developments.

Therefore, following assessment the proposed traffic and parking arrangements for the proposal at 588 – 599 Princess Highway are supported.

ANNEXURES

R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : NK Traffic
Job No/Name : 5950 ROCKDALE Lister Ave
Day/Date : Wednesday 24th February 2016

Lights

Time Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
0700 - 0715	112	2	10	9	27	721	881
0715 - 0730	154	1	8	3	23	638	827
0730 - 0745	155	3	10	18	25	634	845
0745 - 0800	167	3	9	3	43	562	787
0800 - 0815	135	3	19	18	37	510	722
0815 - 0830	212	5	5	20	41	489	772
0830 - 0845	186	4	11	19	59	522	801
0845 - 0900	190	8	7	18	65	458	746
Per End	1311	29	79	108	320	4534	6381

Heavies

Time Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
0700 - 0715	7	0	0	0	0	2	9
0715 - 0730	7	0	0	0	0	7	14
0730 - 0745	7	0	0	0	0	10	17
0745 - 0800	11	0	0	0	0	5	16
0800 - 0815	7	0	0	0	0	12	19
0815 - 0830	13	0	0	0	0	5	18
0830 - 0845	4	0	0	0	1	8	13
0845 - 0900	7	0	0	0	0	8	15
Per End	63	0	0	0	1	57	121

Combined

Time Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
0700 - 0715	119	2	10	9	27	723	890
0715 - 0730	161	1	8	3	23	645	841
0730 - 0745	162	3	10	18	25	644	862
0745 - 0800	178	3	9	3	43	567	803
0800 - 0815	142	3	19	18	37	522	741
0815 - 0830	225	5	5	20	41	494	790
0830 - 0845	190	4	11	19	60	530	814
0845 - 0900	197	8	7	18	65	466	761
Per End	1374	29	79	108	321	4591	6502

Lights

Peak Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
0700 - 0800	588	9	37	33	118	2555	3340
0715 - 0815	611	10	46	42	128	2344	3181
0730 - 0830	669	14	43	59	146	2195	3126
0745 - 0845	700	15	44	60	180	2083	3082
0800 - 0900	723	20	42	75	202	1979	3041
PEAK HR	588	9	37	33	118	2555	3340

Heavies

Peak Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
0700 - 0800	32	0	0	0	0	24	56
0715 - 0815	32	0	0	0	0	34	66
0730 - 0830	38	0	0	0	0	32	70
0745 - 0845	35	0	0	0	1	30	66
0800 - 0900	31	0	0	0	1	33	65
PEAK HR	32	0	0	0	0	24	56

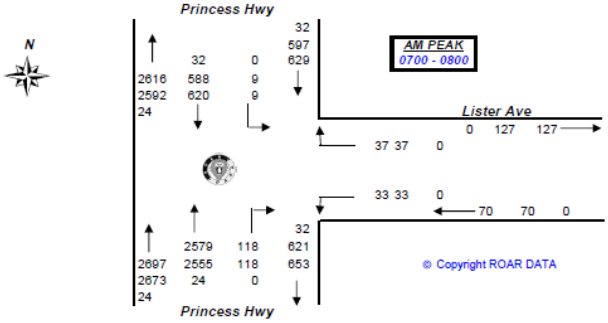
Combined

Peak Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
0700 - 0800	620	9	37	33	118	2579	3396
0715 - 0815	643	10	46	42	128	2378	3247
0730 - 0830	707	14	43	59	146	2227	3196
0745 - 0845	735	15	44	60	181	2113	3148
0800 - 0900	754	20	42	75	203	2012	3106
PEAK HR	620	9	37	33	118	2579	3396

Peds

Time Per	NORTH Princess	EAST Lister Ave	SOUTH Princess	TOT
0700 - 0715	1	9	0	10
0715 - 0730	3	7	0	10
0730 - 0745	4	21	1	26
0745 - 0800	6	8	0	14
0800 - 0815	5	9	0	14
0815 - 0830	4	11	0	15
0830 - 0845	4	14	1	19
0845 - 0900	1	12	0	13
Per End	28	91	2	121

Peak Per	NORTH Princess	EAST Lister Ave	SOUTH Princess	TOT
0700 - 0800	14	45	1	60
0715 - 0815	18	45	1	64
0730 - 0830	19	49	1	69
0745 - 0845	19	42	1	62
0800 - 0900	14	46	1	61
PEAK HR	14	45	1	60



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : NK Traffic
Job No/Name : 5950 ROCKDALE Lister Ave
Day/Date : Wednesday 24th February 2016

Lights

Time Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
1600 - 1615	502	9	21	26	26	237	821
1615 - 1630	472	7	14	27	41	253	814
1630 - 1645	449	8	30	27	26	249	789
1645 - 1700	505	9	25	26	26	264	855
1700 - 1715	461	10	26	38	32	237	804
1715 - 1730	510	9	25	27	27	251	849
1730 - 1745	424	12	23	29	28	225	741
1745 - 1800	522	16	26	19	25	247	855
Per End	3845	80	190	219	231	1963	6528

Heavies

Time Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
1600 - 1615	7	0	0	0	0	3	10
1615 - 1630	6	0	0	0	0	11	17
1630 - 1645	1	0	0	0	0	4	5
1645 - 1700	4	0	0	0	0	5	9
1700 - 1715	5	0	0	0	0	4	9
1715 - 1730	3	0	0	0	0	8	11
1730 - 1745	6	0	0	0	0	4	10
1745 - 1800	3	0	0	0	0	2	5
Per End	35	0	0	0	0	41	76

Combined

Time Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
1600 - 1615	509	9	21	26	26	240	831
1615 - 1630	478	7	14	27	41	264	831
1630 - 1645	450	8	30	27	26	253	794
1645 - 1700	509	9	25	26	26	269	864
1700 - 1715	466	10	26	38	32	241	813
1715 - 1730	513	9	25	27	27	259	860
1730 - 1745	430	12	23	29	28	229	751
1745 - 1800	525	16	26	19	25	249	860
Per End	3880	80	190	219	231	2004	6604

Lights

Peak Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
1600 - 1700	1928	33	90	106	119	1003	3279
1615 - 1715	1887	34	95	118	125	1003	3262
1630 - 1730	1925	36	106	118	111	1001	3297
1645 - 1745	1900	40	99	120	113	977	3249
1700 - 1800	1917	47	100	113	112	960	3249
PEAK HR	1925	36	106	118	111	1001	3297

Heavies

Peak Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
1600 - 1700	18	0	0	0	0	23	41
1615 - 1715	16	0	0	0	0	24	40
1630 - 1730	13	0	0	0	0	21	34
1645 - 1745	18	0	0	0	0	21	39
1700 - 1800	17	0	0	0	0	18	35
PEAK HR	13	0	0	0	0	21	34

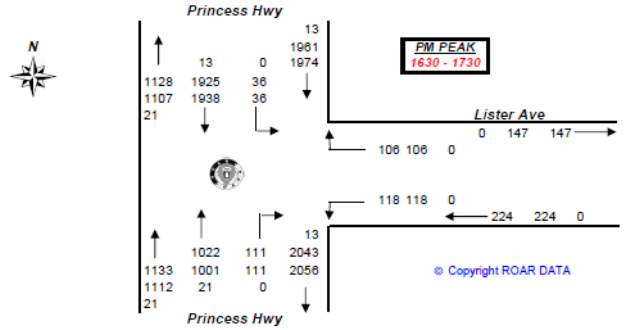
Combined

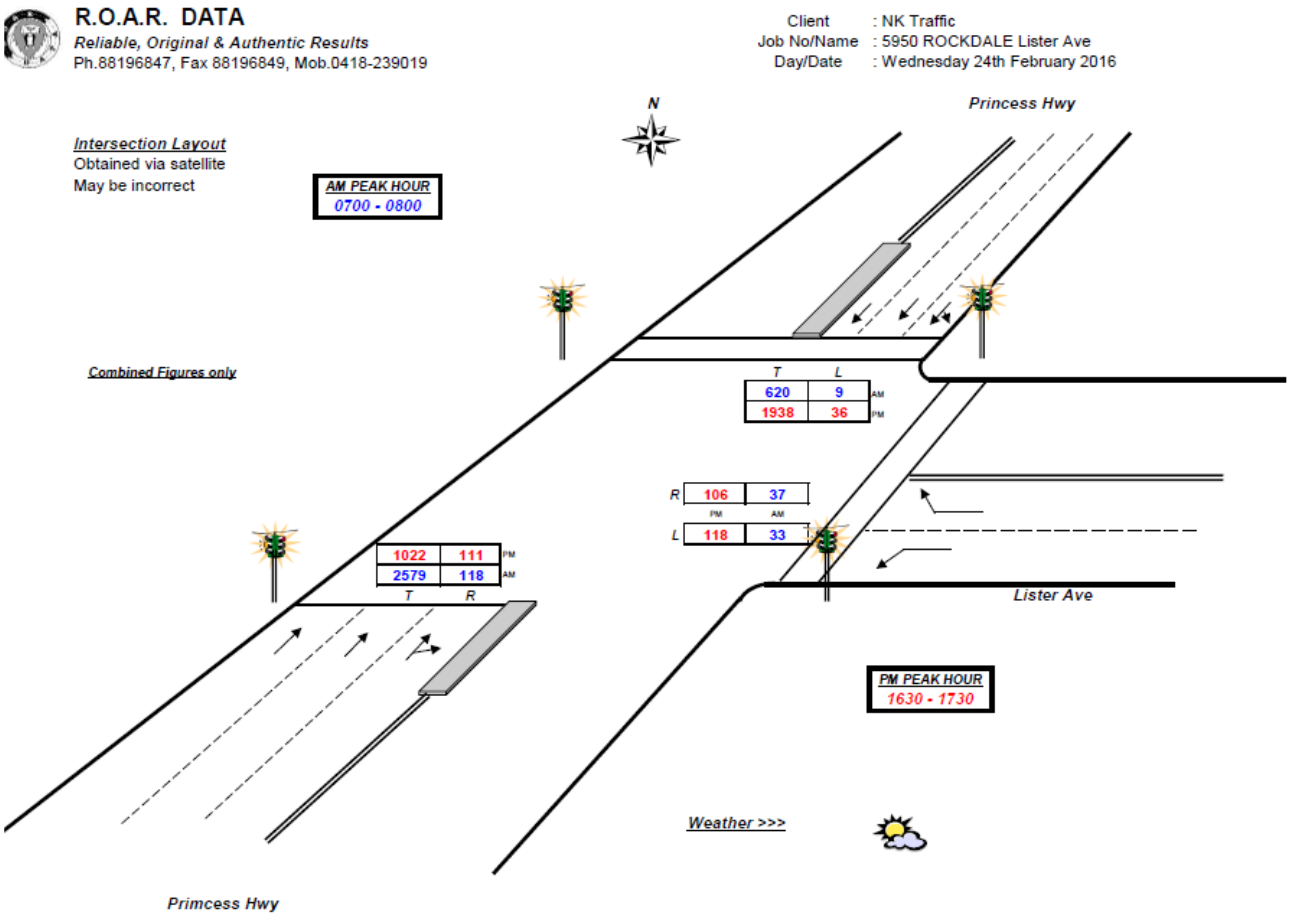
Peak Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
1600 - 1700	1946	33	90	106	119	1026	3320
1615 - 1715	1903	34	95	118	125	1027	3302
1630 - 1730	1938	36	106	118	111	1022	3331
1645 - 1745	1918	40	99	120	113	998	3288
1700 - 1800	1934	47	100	113	112	978	3284
PEAK HR	1938	36	106	118	111	1022	3331

Peds

Time Per	NORTH Princess	EAST Lister Ave	SOUTH Princess	TOT
1600 - 1615	7	10	0	17
1615 - 1630	8	3	0	11
1630 - 1645	1	1	0	2
1645 - 1700	5	7	0	12
1700 - 1715	15	23	0	38
1715 - 1730	8	11	0	19
1730 - 1745	11	14	0	25
1745 - 1800	5	9	0	14
Per End	60	78	0	138

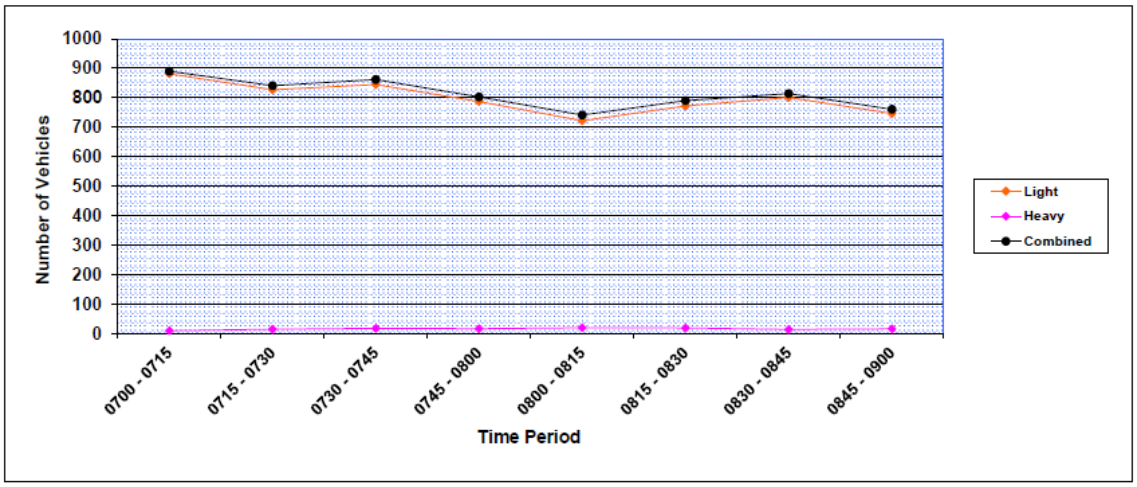
Peak Per	NORTH Princess	EAST Lister Ave	SOUTH Princess	TOT
1600 - 1700	21	21	0	42
1615 - 1715	29	34	0	63
1630 - 1730	29	42	0	71
1645 - 1745	39	55	0	94
1700 - 1800	39	57	0	96
PEAK HR	29	42	0	71





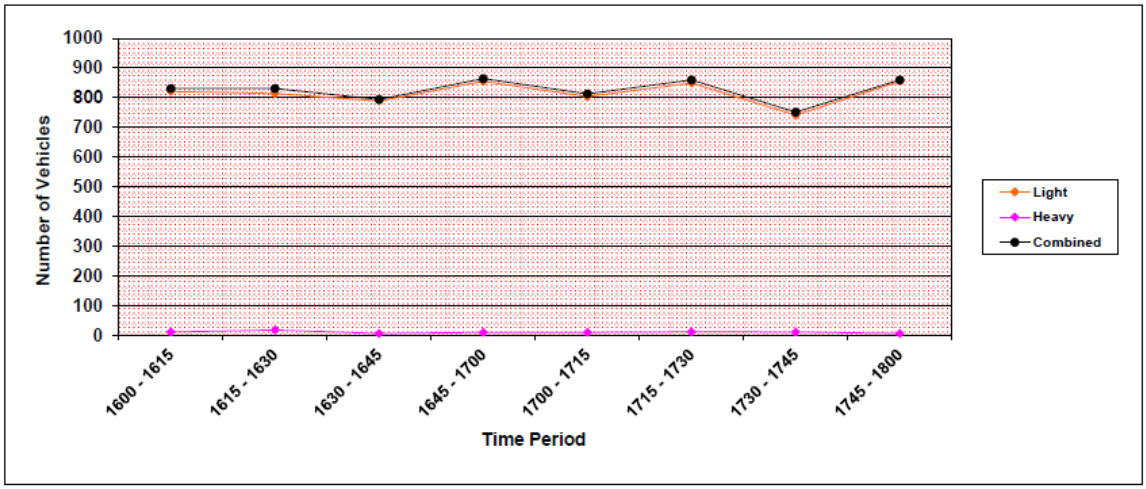
Intersection Lister Ave and Princess Highway

AM
Lister Ave & Princess Hwy

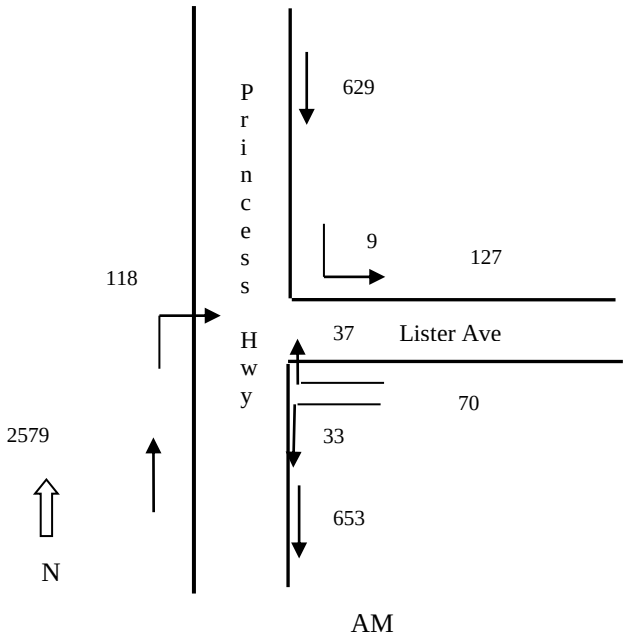


Number of Vehicles vs Time Period

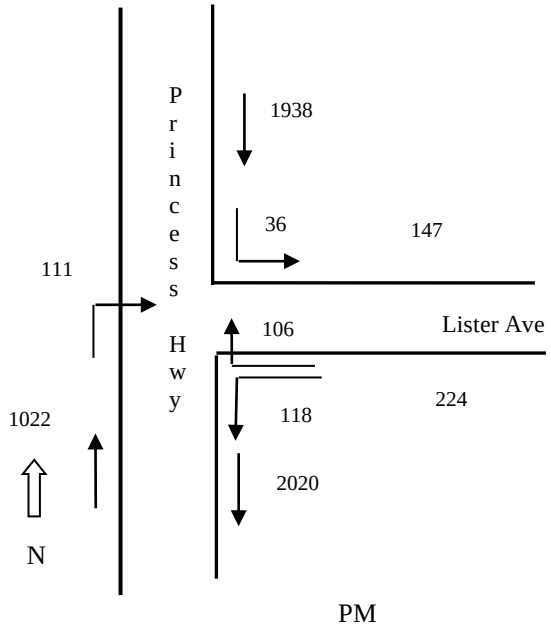
PM
Lister Ave & Princess Hwy



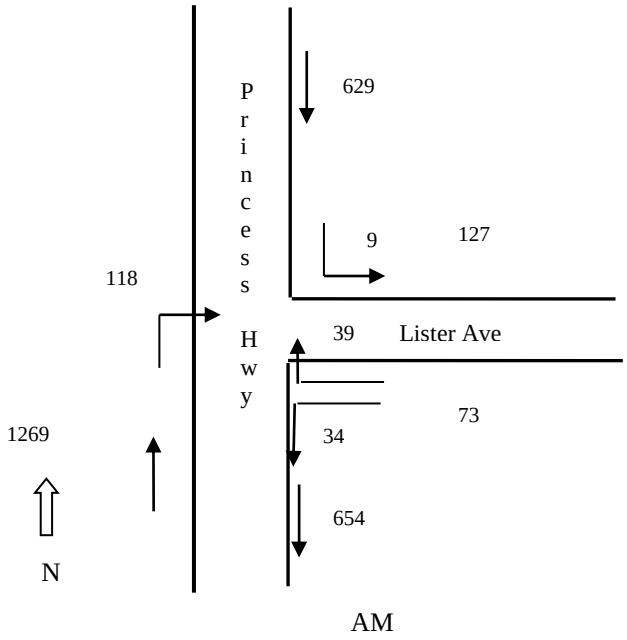
Number of Vehicles vs Time Period

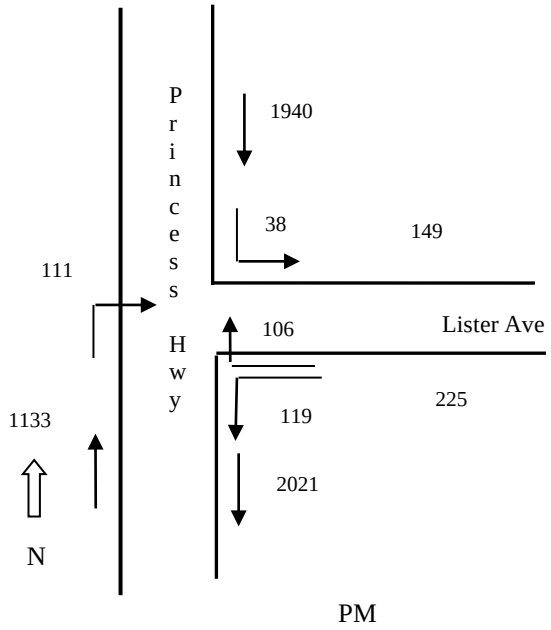


Traffic Distribution
Existing AM Volumes



Traffic Distribution
Existing PM Volumes





Traffic Distribution
Potential AM Volumes

Traffic Distribution
Potential PM Volumes

MOVEMENT SUMMARY

Site: Lister Ave and Princes Hwy - AM EXISTING

Upstream intersection to Subway Rd and Princes Hwy
Signals - Fixed Time Cycle Time = 100 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Total Veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed Km/h
Princess Hwy south											
1	T1	2579	5.1	0.772	13.1	LOS A	29.0	168.2	0.58	0.57	34.1
2	R2	118	1.2	0.702	39.0	LOS C	5.3	35.6	1.00	0.79	16.3
Approach		2697	4.6	0.705	12.0	LOS A	29.0	175.2	0.58	0.59	31.3
Lister Ave											
4	L2	33	1.0	0.201	22.1	LOS B	5.1	32.3	0.56	0.67	8.6
6	R2	37	1.0	0.350	34.5	LOS C	5.2	31.2	0.71	0.69	7.3
Approach		70	1.0	0.259	31.6	LOS C	5.5	33.6	0.71	0.69	7.6
Princess Hwy north											
7	L2	9	1.0	0.647	36.1	LOS C	35.6	152.5	0.52	0.79	8.1
8	T1	620	5.3	0.749	33.1	LOS C	35.6	152.5	0.52	0.79	6.7
Approach		629	4.7	0.765	32.2	LOS C	35.6	152.5	0.52	0.79	6.7
All Vehicles		3396	4.5	0.739	23.9	LOS B	35.6	171.5	0.68	0.79	6.2

MOVEMENT SUMMARY

Site: Lister Ave and Princes Hwy - PM EXISTING

Upstream intersection to Subway Rd and Princes Hwy
Signals - Fixed Time Cycle Time = 110 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Total Veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed Km/h
Princess Hwy south											
1	T1	1022	5.1	0.672	11.1	LOS A	28.0	162.2	0.65	0.60	34.1
2	R2	111	1.2	0.702	37.0	LOS C	5.3	37.6	1.00	0.83	16.3
Approach		1013	4.6	0.705	13.0	LOSA	28.0	181.4	0.68	0.62	31.3
Lister Ave											
4	L2	118	1.0	0.211	23.1	LOS B	5.1	35.3	0.59	0.70	8.6
6	R2	106	1.0	0.300	36.5	LOS C	5.3	36.2	0.72	0.71	7.3
Approach		214	1.0	0.289	32.6	LOS C	5.5	37.6	0.73	0.70	7.6
Princess Hwy north											
7	L2	36	1.0	0.732	37.1	LOS C	38.6	171.2	0.81	0.78	8.1
8	T1	1938	5.3	0.749	34.1	LOS C	38.6	171.2	0.81	0.78	6.7
Approach		1974	4.7	0.780	34.2	LOS C	38.6	171.2	0.81	0.78	6.7
All Vehicles		3201	4.5	0.781	24.1	LOS B	38.6	181.6	0.81	0.78	6.2

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

MOVEMENT SUMMARY

Site: Lister Ave and Princes Hwy - AM Future

Upstream intersection to Subway Rd and Princes Hwy
Signals - Fixed Time Cycle Time = 130 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Total Veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed Km/h
Princess Hwy south											
1	T1	2579	5.1	0.772	13.1	LOS A	29.0	168.2	0.58	0.57	34.1
2	R2	118	1.2	0.702	39.0	LOS C	5.3	35.6	1.00	0.79	16.3
Approach		2697	4.6	0.705	12.0	LOSA	29.0	176.3	0.58	0.59	31.3
Lister Ave											
4	L2	34	1.0	0.231	22.4	LOS B	5.1	34.1	0.56	0.67	8.6
6	R2	39	1.0	0.355	34.8	LOS C	5.2	32.3	0.71	0.69	7.3
Approach		73	1.0	0.271	31.9	LOS C	5.5	33.1	0.71	0.69	7.6
Princess Hwy north											
7	L2	9	1.0	0.647	36.1	LOS C	35.6	153.7	0.62	0.79	8.1
8	T1	620	5.3	0.749	33.1	LOS C	35.6	153.7	0.62	0.79	6.7
Approach		629	4.7	0.772	32.2	LOS C	35.6	153.7	0.62	0.79	6.7
All Vehicles		3399	4.5	0.751	24.2	LOS B	35.6	175.4	0.68	0.79	6.2

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

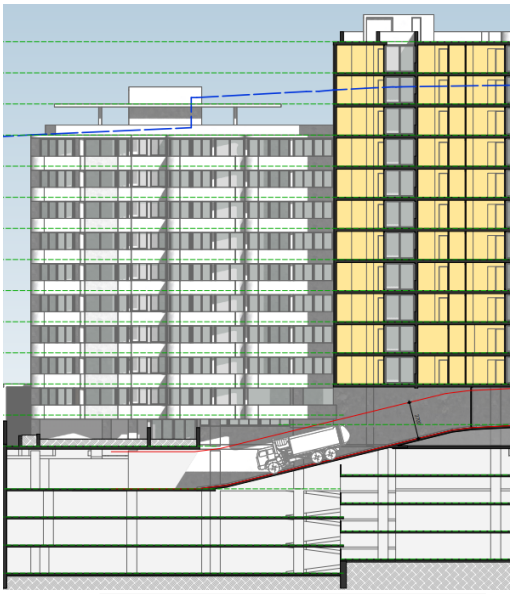
MOVEMENT SUMMARY

Site: Lister Ave and Princes Hwy - PM Future

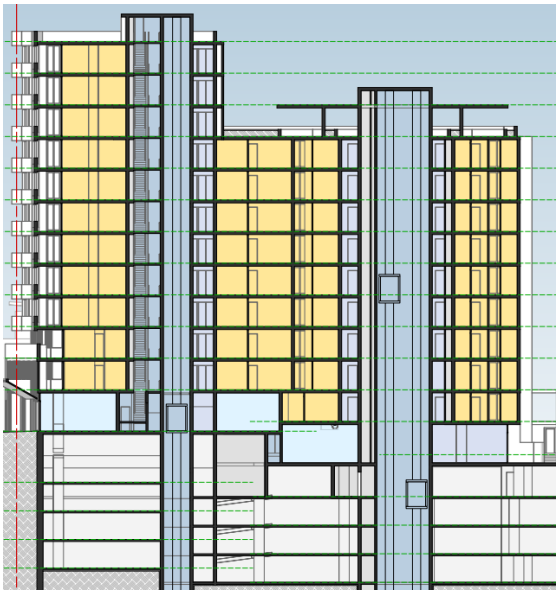
Upstream intersection to Subway Rd and Princes Hwy
Signals - Fixed Time Cycle Time = 110 seconds (Practical Cycle Time)

Movement Performance - Vehicles

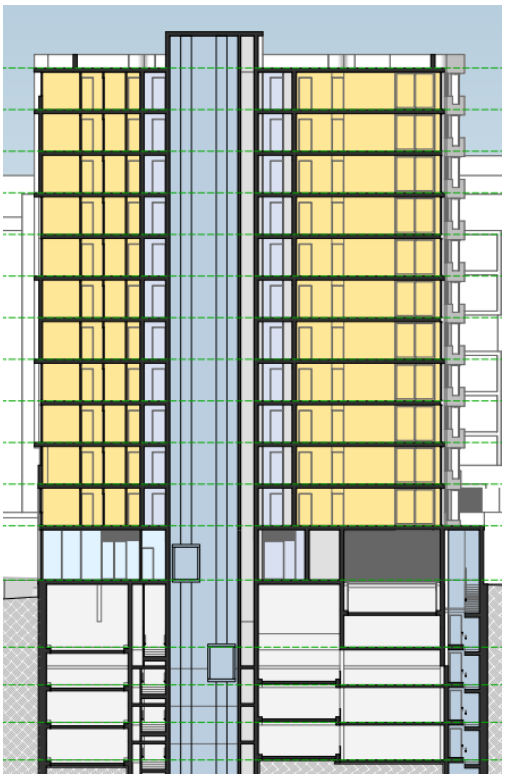
Mov ID	OD Mov	Demand Total Veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed Km/h
Princess Hwy south											
1	T1	1022	5.1	0.672	11.1	LOS A	28.0	162.4.	0.65	0.60	34.1
2	R2	111	1.2	0.702	37.0	LOS C	5.3	37.6	1.00	0.83	16.3
Approach		1113	4.6	0.705	13.0	LOSA	28.0	181.4	0.68	0.62	31.3
Lister Ave											
4	L2	119	1.0	0.220	23.8	LOS B	5.6	35.8	0.59	0.70	8.6
6	R2	106	1.0	0.315	36.7	LOS C	5.3	36.2	0.72	0.71	7.3
Approach		225	1.0	0.345	32.8	LOS C	5.5	38.6	0.73	0.70	7.6
Princess Hwy north											
7	L2	38	1.0	0.742	38.2	LOS C	38.9	175.7	0.81	0.78	8.1
8	T1	1938	5.3	0.782	34.5	LOS C	38.6	175.7	0.81	0.78	6.7
Approach		1974	4.7	0.782	34.6	LOS C	38.6	175.7	0.81	0.78	6.7
All Vehicles		3312	4.5	0.782	24.8	LOS B	38.6	175.7	0.81	0.78	6.2



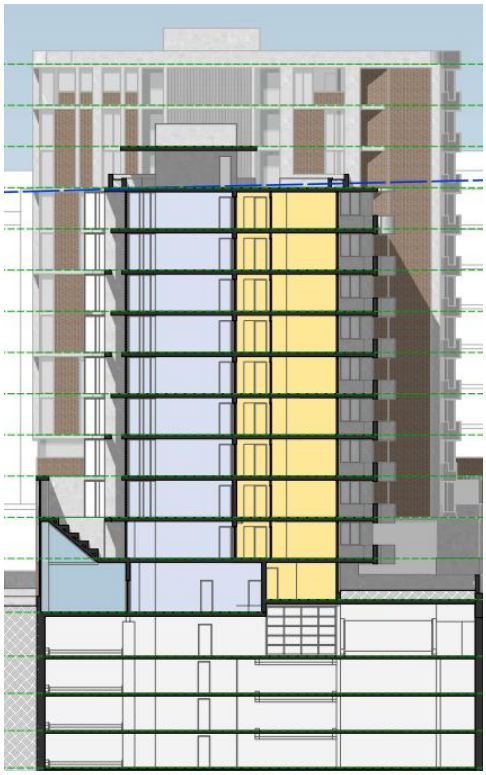
Section – Through Driveway



Section – Longitudinal



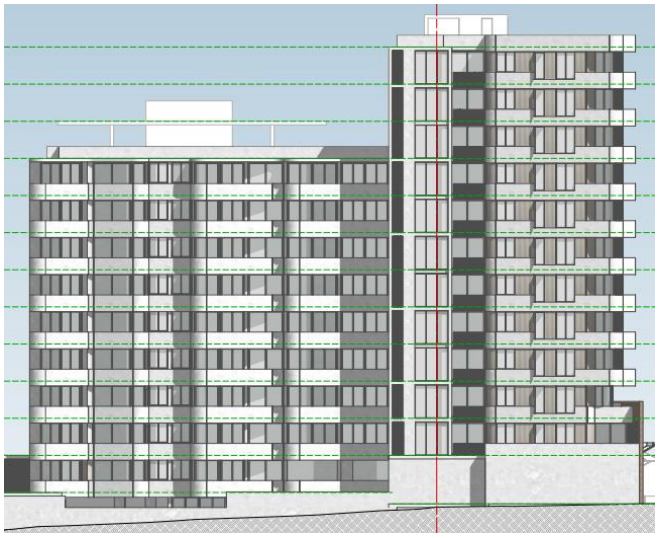
Section – Through Tower



Section – Through Tail

North Elevation

West Elevation



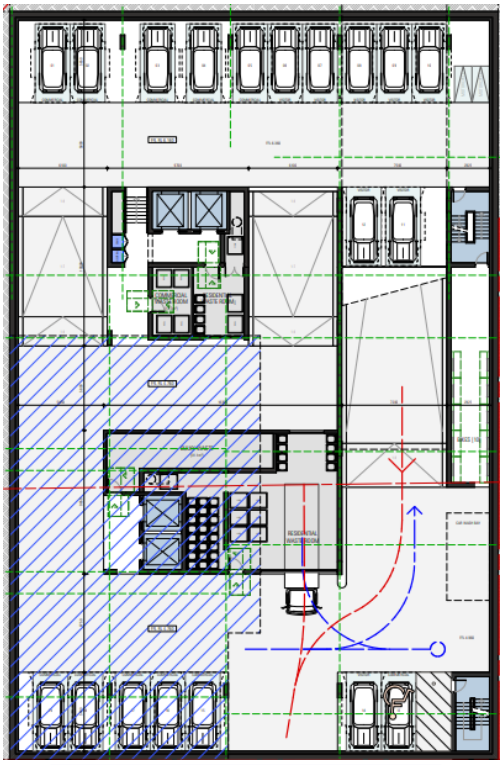
East Elevation

DEVELOPMENT SUMMARY

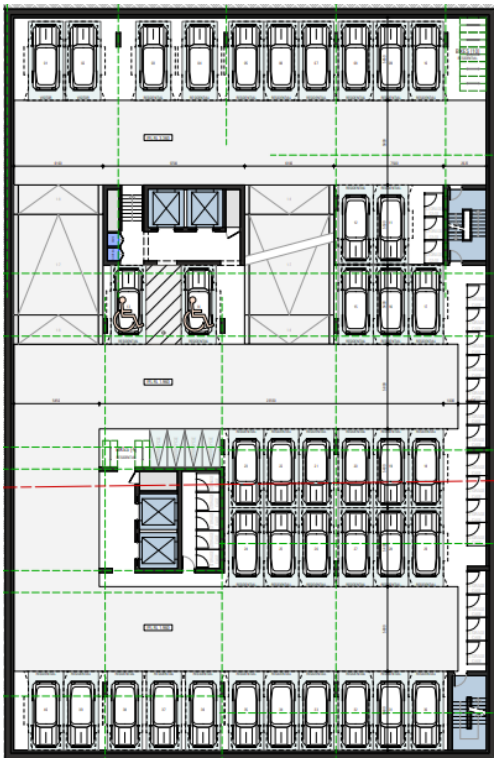
Proposed Development
588-592 Princess Highway, Rockdale

	Studio	1 Bed	2 Bed		3 Bed	TOTAL	NSA	
			1 Bath	2 Bath		PER FLOOR	Residential	Retail/Commercial
LEVEL 12		1	1	2	1	5	370.3sqm	
LEVEL 11		1	1	2	1	5	370.3sqm	
ROOF TERRACE - LEVEL 10		1	1	2	1	5	370.3sqm	
LEVEL 09		2	2	5	1	10	739.0sqm	
LEVEL 08		2	2	5	1	10	739.0sqm	
LEVEL 07		2	2	5	1	10	739.0sqm	
LEVEL 06		2	2	5	1	10	739.0sqm	
LEVEL 05		2	2	5	1	10	739.0sqm	
LEVEL 04		2	2	5	1	10	739.0sqm	
LEVEL 03		2	4	3	1	10	728.0sqm	
LEVEL 02		2	3	4	1	10	733.4sqm	
LISTER AVE - LEVEL 01		1		2	1	4	335.8sqm	225.4sqm
SOUTH - LEVEL 00				1	1	2	197.1sqm	182.4sqm
TOTAL	**0**	**20**	**22**	**46**	**13**	**101**	**7539.4sqm**	**407.8sqm**
DISTRIBUTION	19.8%		67.3%		12.9%			

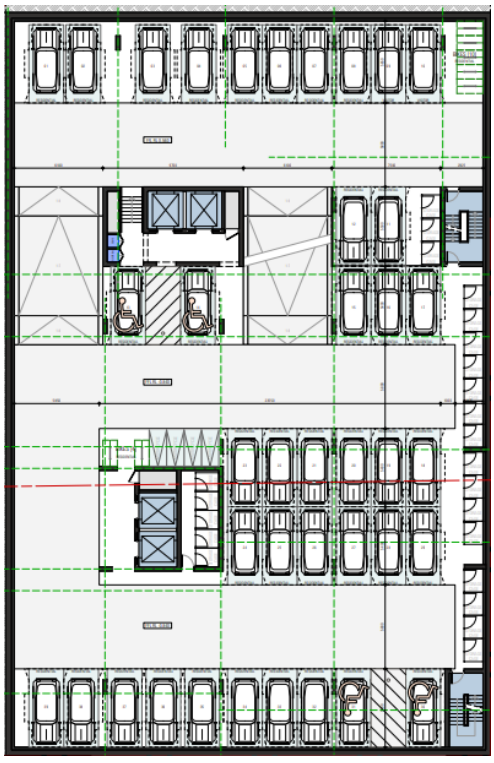
Provision	**Commercial	Residential	Accessible	Visitor	Motor cycle	Bicycle
Basement 01	10 (+ 1 acces)		1 (com)	8	2	10
Basement 02		38	2	0	4	14
Basement 03		33	4	2	4	14
Basement 04		33	4	5	4	14
***Total** (140)	10	104	11	15	14	52



Basement 01+ 02



Basement 2



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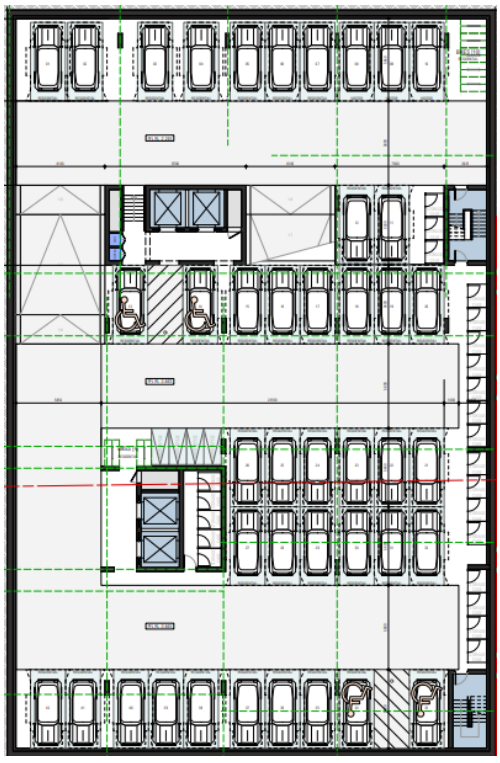

Basement 4

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