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TRAFFIC IMPACT ASSESSMENT
PROPOSED MIXED USE DEVELOPMENT
272 – 276 & 280 - 284 MERRYLANDS ROAD & 1 ADDLESTONE ROAD MERRYLANDS

Ref: 13-066

OCTOBER 2013

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1. INTRODUCTION

The Practice of Thompson Stanbury Associates has been commissioned by Dyldam Developments to prepare a Traffic Impact Statement accompanying a Development Application (DA) lodged with Holroyd City Council. The subject DA proposes a mixed use development comprising 146 residential apartments and 2,237m^2 of retail floor space on land located on the southern side of Merrylands Road, also fronting Addlestone Road and Burford Street, Merrylands (hereafter referred to as the 'subject site').

The purpose of this report is to assess and document the likely traffic and parking implications of the proposed development and to recommend appropriate remedial measures where required. Specifically, this report:

- Assesses the adequacy, or otherwise, of the proposed off-street parking provision having regard to the rates specified by Holroyd City Council and the Roads and Maritime Services;
- Assesses the suitability of the proposed vehicular access arrangements based on standards specified by the Roads and Maritime Services;
- Assesses the proposed parking layout with respect to internal circulation and vehicle manoeuvrability;
- Reviews the existing traffic conditions within the vicinity of the site, including traffic volumes, traffic efficiency and general traffic safety; and
- Determines the expected traffic generation from the proposed development based on Roads and Maritime Services generation rates, and assesses the impact of the net increase in traffic on the surrounding road network.

Throughout this report, reference is made to the following:

- Roads and Maritime Services' *Guide to Traffic Generating* Developments;
- Australian Standard *Parking Facilities Part 1: Off-Street Parking* (AS 2890.1-2004), *Part 2: Off-Street Commercial Vehicle Facilities* (AS2890.1-2002) and *Part 6: Off-Street Parking for People with Disabilities* (AS2890.6-2009); and
- Holroyd City Council's *Holroyd Development Control Plan 2013* (DCP 2013).

The report should be read in conjunction with architectural plans prepared by iDraft Architects, relevant extracts of which (basement and ground floor plans only) are included as **Appendix 1**.

2. SITE DETAILS

2.1 Site Location

The subject site is situated on the southern side of Merrylands Road immediately opposite its junction with Treves Street and also fronting Addlestone Road and Burford Street, Merrylands. This location is illustrated in the neighbourhood context as **Figure 1** overleaf, being an extract of UBD's *Australian City Streets, Version 4.*

2.2 Site Description

The subject site provides a street address of 272 – 276 and 280 – 284 Merrylands Road as well as 1 Addlestone Road, Merrylands. The site is predominantly rectangular in shape providing an approximate frontage to Merrylands Road of 90m, and extending to the south to provide frontages to Addlestone Road and Burford Street in the order of 60m.

The site is split into two sections, being bisected by a Sydney Water drainage easement, which runs in a north-east / south-west alignment through the south-eastern portion of the site.

2.3 Existing Uses

The subject site currently accommodates the following:

- A single storey retail building accommodating a pool shop is located approximately within the north-eastern corner of the site providing an approximate floor area of 350m^2 fronting and accessed via Merrylands Road;
- A single storey commercial building is located within the central northern portion of the site accommodating a finance company providing an approximate floor area of 120m^2 fronting and accessed via Merrylands Road; and
- A single storey vacant retail building is located within the north-western corner of the site providing an approximate floor area of 700m^2, accessed via Burford Street.

2.4 Surrounding Uses

The site is located on the south-western fringe of the Merrylands town centre. In this regard, the site is surrounded by a mixture of commercial / retail land uses to the east and north and medium to high density residential development to the west and south.

3. PROPOSED DEVELOPMENT

3.1 Built Form

The subject DA seeks Council approval for the demolition of existing site structures and the construction of a mixed use development comprising the following:

- 146 residential apartments including:
  - 16 one bedroom dwellings;
  - 118 two bedroom dwellings; and
  - 12 three bedroom dwellings.
- 7 commercial tenancies providing a total floor area of 2,237m^2.

The development is proposed to be effectively split into two components, being separated by the Sydney Water drainage easement bisecting the south-eastern portion of the site. The main portion of the site is proposed to accommodate a 9 storey building containing 6 ground floor commercial tenancies below the abovementioned total development residential yield. The minor south-eastern portion of the site is proposed to accommodate a two storey building containing the single remaining commercial tenancy.

The main portion of the site is proposed to be serviced by an accessway running along the southern boundary between Burford Street and the Sydney Water drainage easement, linking with Burford Street in the south-western corner of the site via a combined ingress / egress driveway. This accessway is proposed to provide connectivity to an internal loading area containing two loading docks in conjunction with a garbage collection area. This accessway is also proposed to provide connectivity to an internal ramp linking with two basement parking levels containing 238 parking spaces.

The minor south-eastern portion of the site is proposed to be serviced by a further accessway running along the southern site boundary between Addlestone Road and the Sydney Water drainage easement, linking with Addlestone Road in the south-eastern corner of the site via a combined ingress / egress driveway. This accessway is proposed to provide connectivity to an internal parking area containing 8 spaces and loading bay.

It was the original intention of the site design to provide a continuous accessway along the southern boundary of the site, linking Burford Street and Addlestone Road, in accordance with Council's vision contained with DCP 2013. It is however understood that liaison with Sydney Water to date has indicated that they will not consent to the provision of a bridge over the easement bisecting the site. Notwithstanding this, it is noted that the development scheme subject to this application does provide flexibility in this regard should the position of Sydney Water on this issue alter in the future.

4. ACCESS & INTERNAL CONSIDERATIONS

4.1 Access Arrangements

Vehicular access to the subject development is proposed as follows:

- A 7.8m wide combined ingress / egress driveway is proposed to facilitate traffic movements between Burford Street and the primary site parking and loading areas, located within the south-western corner of the site; and

- A 7m wide combined ingress / egress driveway is proposed to provide connectivity between Addlestone Road and the small parking and loading area servicing the single two storey commercial tenancy, located within the south-eastern corner of the site.

Holroyd City Council provides the following locally sensitive driveway design requirements within DCP 2013, relevant to the subject development:

- Clause 3.5 of Part A specifies that roadways providing connectivity to over 50 spaces and service bays are to provide a width of between 6m – 8m; and

- Clause 2.4 of Part C specifies that the width of driveways servicing commercial loading docks and servicing is limited to a maximum of 6m – 8m.

The abovementioned proposed access driveway widths suitably comply with the abovementioned relevant DCP 2013 requirements.

In order to further demonstrate that vehicles are capable of entering and exiting the site via the subject driveways, this Practice has prepared a series of swept path plans utilising Autoturn, copies of which are contained within **Appendix 2** for reference. These plans illustrate the following:

- Passenger vehicles are capable of accessing and vacating the subject site via the proposed driveways in combination; and

- The driveways are capable of accommodating access and egress swept paths of the largest vehicles expected to service the site (comprising MRVs and garbage collection vehicles via the Burford Street access and SRVs via the Addlestone Road access).

The proposed access driveway arrangements are therefore considered to be satisfactory.

4.2 Off-Street Parking

4.2.1 Vehicular Parking

The development is proposed to provide a total of provides a total of 246 off-street parking spaces on-site, comprising 172 resident, 29 residential visitor and 45 commercial spaces.

Holroyd City Council's DCP 2013 provides the following specific off-street parking requirements relevant to the subject development:

Dwellings in mixed use development in B4 Mixed Use zone

A minimum of:
0.8 spaces per 1 bedroom dwelling
1 space per 2 and 3 bedroom dwelling; and
0.2 spaces per dwelling for visitors

A maximum of:
1 space per 1 bedroom dwelling
1.2 spaces per 2 and 3 bedroom dwelling; and
0.2 spaces per dwelling for visitors

Commercial (including retail premises, business premises and offices premises – B4 zone

A minimum of:
1 space per 50m^2

A maximum of:
1 space per 15m^2

Table 1 summaries the off-street parking required based on the above rates.

TABLE 1
SUMAMRY OF CAR PARKING REQUIREMENTS

	Proposed Development	Minimum		Maximum	
		Car Parking Rate	Car Parking Required	Car Parking Rate	Car Parking Required
Resident	16 x 1 bedroom units	0.8 spaces / unit	12.8	1 space / unit	16
	118 x 2 bedroom units	1 space / unit	118	1.2 spaces / unit	141.6
	12 x 3 bedroom units	1 space / unit	12	1.2 spaces / unit	14.4
Residential Visitor	146 units	0.2 spaces / unit	29.2	0.2 spaces / unit	29.2
Commercial	2,237m^2	1 / 50m^2	44.7	1 / 15m^2	149.1
		TOTAL	**216.7**	**TOTAL**	**350.3**

The following can be summarised with respect to the compliance of the proposed parking provision:

- The provision of 172 resident parking spaces suitably complies with Council's minimum and maximum requirements of 142.8 and 172 spaces respectively;
- The provision of 29 residential visitor spaces suitably complies with Council's requirement of 29.2 (adopt 29) spaces; and
- The provision of 45 commercial parking spaces suitably complies with Council's minimum and maximum requirement of 44.7 and 149.1 spaces respectively.

The proposed off street parking provision is therefore considered to be satisfactory.

4.2.2 Bicycle Parking

A total of 54 resident bicycle racks are proposed to be provided within the basement parking area for residents.

Holroyd City Council provides the following parking requirements for bicycle parking relevant to the subject proposal within DCP 2013:

> ***Resident***
> *0.5 resident spaces per 1, 2 and 3 bedroom dwellings*
> *0.1 visitor spaces per unit*
>
> ***Commercial***
> *1 employee space per 300m^2 of ground floor space*
> *1 employee space per 200m^2 of first floor space*
> *1 visitor space per 2,500m^2 of ground floor space*
> *1 visitor space per 750m^2 of ground floor space*

Based on 146 residential dwellings, a total of 73 resident and 15 visitor spaces are required in accordance with DCP 2013. Further, based on a ground and first commercial floor area provision of 1,957m^2 and 280m^2 respectively, a total of 8 staff and 1 visitor spaces are required in accordance with DCP 2013.

The proposal therefore represents a parking shortfall with respect to bicycle parking. The proposed parking provision is however understood to have been provided in accordance with current market requirements. In this regard, Council's bicycle parking requirements appear excessive given the fact that the site is not located within the immediate vicinity of any noted off-street bicycle routes (see Section 5.4.3 of this report).

Further, Council's rates don't appear to take into consideration the proximity of the site to other public transport infrastructure (see Section 5.4 of this report) and shopping centres. In light of this, it has been considered more prudent through the design process to provide formalised motorcycle parking within the development. In this regard, the design provides for a total of 10 formalised motorcycle parking spaces

to be provided within the basement parking levels. Notwithstanding this, should it be considered necessary, it is noted that there appears to be scope within the project design to accommodate some additional bicycle parking racks, particularly within the communal open spaces areas at ground floor level.

4.3 Internal Passenger Vehicle Circulation

It has previously been presented that the development is effectively proposed to be split into two components as a result of a Sydney Water drainage easement bisecting the site. The Burford Street access driveway is proposed to provide connectivity to an internal accessway running along the southern boundary of the site. This accessway is proposed to provide a width of 7.8m providing a two-way traffic function servicing two levels of basement parking containing 238 spaces in conjunction with two commercial delivery docks and garbage collection area.

A short section of median is proposed to be provided within this accessway in the vicinity of the basement access. The primary purpose of this median is understood to assist in the appropriate distribution of overland water flow during flood events, however it is noted that the median will also assist in the effective separation of passenger vehicles entering and exiting the basement parking areas.

It is acknowledged that heavy vehicles servicing the loading docks and garbage collection area will be required to travel around this median thereby entering into a potential conflict situation with passenger vehicles exiting the basement parking areas. Vehicles exiting the basement parking areas will therefore be required to give way to heavy vehicles entering the site and accordingly, appropriate priority linemarking and signposting will be required to govern the situation.

Whilst this is a somewhat non-standard arrangement, it is noted that vehicles exiting the basement parking area would have been required to give way to heavy vehicles entering the site is the median was not provided. In fact, the provision of the median actually improves the level of sight distance afforded to entering trucks by relocating the conflict point towards the southern boundary, away from the basement access ramp. In any event, it is considered that the proposed arrangement can be appropriately managed through the installation of appropriate approach warning and regulatory signage.

In addition to the abovementioned accessway connecting with Burford Street, a further accessway is proposed to connect with Addlestone Road in the south-eastern corner of the site. This accessway is proposed to provide a width of 7.8m, according with that connecting with Burford Street, thereby providing flexibility in the future, should Sydney Water agree to the provision of a bridge over the drainage easement bisecting the site. This accessway is proposed to exclusively service the two storey commercial building fronting Addlestone Road, providing direct connectivity 8 staff parking spaces in conjunction with a loading bay.

4.3.1 Passenger Vehicles

The basement and at-grade passenger vehicle parking areas have been designed to incorporate standard 90 degree angled parking bays being servicing by adjoining circulation aisles. The basement and at-grade parking and circulation areas have been designed in accordance with AS2890.1-2004 and AS2890.6-2009 providing the following minimum dimensions:

- Resident parking space width = 2.4m;
- Commercial staff parking space width = 2.4m;
- Commercial visitor parking space width = 2.6m;
- Disabled parking space width = 2.4m (with adjoining 2.4m wide shared area);
- Additional space width where parking space adjoins an obstruction = 0.3m;
- Parking space length = 6.2m;
- One-way straight roadway width = 3.5m;
- One-way curved roadway width = 4.0m;
- Two-way straight roadway / ramp widths = 6.5m;
- Parking aisle extension adjoining end parking space = 1.0m;
- Headroom = 2.2m (2.5m above disabled spaces);
- Maximum ramp grade = 1 in 4;
- Maximum ramp grade for the first 6m inside the site = 1 in 20;
- Maximum summit change in grade = 1 in 8;
- Maximum sag change in grade = 1 in 6.7m; and
- Length of transitional grades = 2.0m.

In order to further demonstrate the internal passenger vehicle manoeuvrability within the parking areas, this Practice has prepared a number of swept path plans (scale 1:200 at A1) which are included as **Appendix 2**. The turning paths provided on the plans have been generated using Autoturn software and derived from B85 vehicle specifications provided within the *Australian Standard for Parking Facilities Part 1: Off-Street Car Parking* (AS2890.1-2004).

Section B4.4 of AS2890.1-2004 states the following with regard to the use of templates to assess vehicle manoeuvring:

'Constant radius swept turning paths, based on the design vehicle's minimum turning circle are not suitable for determining the aisle width needed for manoeuvring into and out of parking spaces. Drivers can manoeuvre vehicles within smaller spaces than swept turning paths would suggest.'

It would therefore appear that whilst the turning paths provided within AS 2890.1 - 2004 can be utilised to provide a 'general indication' of the suitability or otherwise of internal parking and manoeuvring areas, vehicles can generally manoeuvre more efficiently than the paths indicate. Notwithstanding this, the swept path plans illustrate that passenger vehicles can access and exit parking spaces and manoeuvre throughout the site with a reasonable level of efficiency.

4.3.2 Heavy Vehicles

The site design provides for the following with respect to the accommodation of heavy vehicles:

- Two indented loading bays servicing the primary western portion of the development, capable of accommodating MRVs;
- A garbage collection area adjacent to the abovementioned loading bays, capable of accommodating 10m long garbage trucks; and
- A single indented loading bay servicing the secondary eastern portion of the development, capable of accommodate a SRV.

In order to assess the ability of the site design to service the abovementioned vehicles, swept turning paths as provided by AS2890.2-2002 have been overlaid on the architectural plans utilising Autoturn software, contained within **Appendix 2** for reference. These swept paths indicate that such vehicles can access the site in a forward direction, manoeuvre into the loading areas and thence exit the site in a forward direction. It is acknowledged that the garbage truck will be required to undertake a number of movements in order to be aligned with the internal garbage storage bay. These movements will however be wholly contained within the site and most likely undertaken outside peak operational periods of the site such that there will be limited impact on internal vehicle manoeuvrability.

Further, the following provides a summary of the base design characteristics in accordance with the relevant requirements of AS2890.2-2002:

- SRV loading bay width = 3.5m;
- MRV loading bay width = 3.5m;
- SRV loading bay length = 6.4m;
- MRV loading bay length = 8.8m;
- Clearance above loading bays and manoeuvring area = unlimited;

- Maximum grade in areas where service vehicles are required to reverse = 1 in 10; and

- Maximum grade within the loading docks = 1 in 25.

In consideration of this and the above discussion, the proposed servicing arrangements are therefore considered to be satisfactory.

5. EXISTING TRAFFIC CONDITIONS

5.1 Surrounding Road Network

It is usual to classify roads according to road hierarchy in order to determine their functional role within the road network. Changes to traffic flows on the roads can then be assessed within the context of the road hierarchy. Roads are classified according to the role they fulfil and the volume of traffic they should appropriately carry. In this regard, the Roads & Maritime Services has set down the following guidelines for the functional classification of roads:

- **Arterial Road** – typically a main road carrying over 15,000 vehicles per day and fulfilling a role as a major inter-regional link (over 1,500 vehicles per peak hour);

- **Sub-Arterial Road** – defined as secondary inter-regional links, typically carrying volumes between 5,000 and 20,000 vehicles per day (500 to 2,000 vehicles per peak hour);

- **Collector Road** – provides a link between local roads and regional roads, typically carrying between 2,000 and 10,000 vehicles per day (250 to 1,000 vehicles per peak hour). At volumes greater than 5,000 vehicles per day, residential amenity begins to decline noticeably; and

- **Local Road** – provides access to individual allotments, carrying low volumes, typically less than 2,000 vehicles per day (250 vehicles per peak hour).

Peak hour volumes on most roads are typically eight to twelve percent of the daily volumes. In accordance with the above, the roads in the vicinity of the subject site are therefore described below:

- **Merrylands Road** performs a collector road function under the care and control of Holroyd City Council. It is essentially split into two sections, being bisected by the South / Cumberland Railway Lines at Merrylands. The western section extends between the Merrylands town centre in the vicinity of the site to connect with Gipps Road / Greystanes Road in the west. It also intersects with Cumberland Highway at Merrylands West. To the east of the railway line, Merrylands Road provides connectivity to Woodville Road, with which it intersects under traffic signal control.

  Merrylands Road forms T-junctions with Burford Street and Addlestone Road adjoining the site to the north-west and north-east respectively. Both junctions operate under priority signage control with Merrylands Road forming the priority route. Immediately adjacent to the site, Merrylands Road intersects with Treves Street under traffic signal control.

  To the west of Treves Street, Merrylands Road provides a four lane undivided carriageway within 13m of pavement providing two through lanes of traffic in each direction. Traffic flow is governed by a sign posted speed limit of 60km/h. To the east of Treves Street, parallel kerb side parking within

Merrylands Road restricts traffic flow to one lane in each direction and a high pedestrian activity area speed limit of 40km/h applies.

- **Treves Street**, with Neil Street, Mombri Street and Loftus Street continues the previously presented Merrylands Road collector road function around the northern periphery of the Merrylands town centre to the eastern section of Merrylands Road over the railway line. Treves Street provides a 13m wide pavement providing two through lanes in each direction however through movements are contained within a single lane in sections where exclusive turning lanes are provided on approach to McFarlane Street (with which it intersects under traffic signal control) and the Stockland Shopping Centre. Traffic flow is governed by a sign posted speed limit of 60km/h.

- **Addlestone Road** performs a local access function under the care and control of Holroyd City Council. It provides a connection between Merrylands Road adjacent to the site to the south to link with St Ann Street, also intersecting with Newman Street under single lane circulating roundabout control.

  Addlestone Road provides a 13m wide pavement providing one through lane of traffic in each direction with parallel parking along both alignments. Traffic flow is governed by a sign posted speed limit of 50km/h. A marked raised pedestrian crossing is provided over the Addlestone Road approach to Merrylands Road.

- Burford Street performs a similar local access function to Addlestone Road under the care and control of Holroyd City Council. It provides a connection between Merrylands Road adjacent to the site to the south to link with St Ann Street, also intersecting with Newman Street under single lane circulating roundabout control.

  Burford Street provides a 10m wide pavement providing one through lane of traffic in each direction with parallel parking along both alignments. Traffic flow is governed by a sign posted speed limit of 50km/h.

5.2 Traffic Volumes

5.2.1 Existing Traffic Demands

This Practice has been provided with Thursday peak hour (7.00am – 9.00am and 4.00pm – 6.00pm) traffic volume surveys undertaken on the 23rd of September 2010 by others in associated with a separate project at the following intersections immediately surrounding the subject site:

- Merrylands Road and Addlestone Road;
- Merrylands Road and Treves Street;
- Merrylands Road and Burford Street;
- Addlestone Road and Newman Street; and

- Burford Street and Newman Street.

It is acknowledged that the surveys are now three years old however recent check surveys undertaken by staff of this Practice indicate that the surveyed traffic demands remain valid. **Figure 2** on page 17 illustrates the surveyed peak hour traffic flows at the subject intersections, whilst more detailed summaries are available upon request. There are minor net gains and losses between intersections associated with private development access locations, parking / unparking manoeuvres as well as slightly differing periods of peak hourly traffic flows at the respective intersections.

5.2.2 10 Year Projected Traffic Volumes

Council has specifically requested that this assessment undertake an assessment of existing and projected conditions incorporating 10 years of traffic growth. In order to undertake this assessment, this Practice has applied a 15% growth factor to the existing weekday morning and afternoon peak hour traffic volumes, a graphical representation of which is provided as **Figure 3** on page 18.

The above growth rate has been applied based on the findings of previous traffic assessments for the Merrylands town centre including the *Merrylands Town Centre Road and Traffic Improvements Report* prepared by GHD in 2006 and the *Merrylands Neil Street Precinct Traffic Report* prepared by C. Stapleton Consulting in 2002. These reports projected a traffic growth rate of approximately 1.3% per annum for the Merrylands town centre.

FIGURE 2
EXISTING (2010) WEEKDAY PEAK HOUR TRAFFIC VOLUMES
WITHOUT DEVELOPMENT

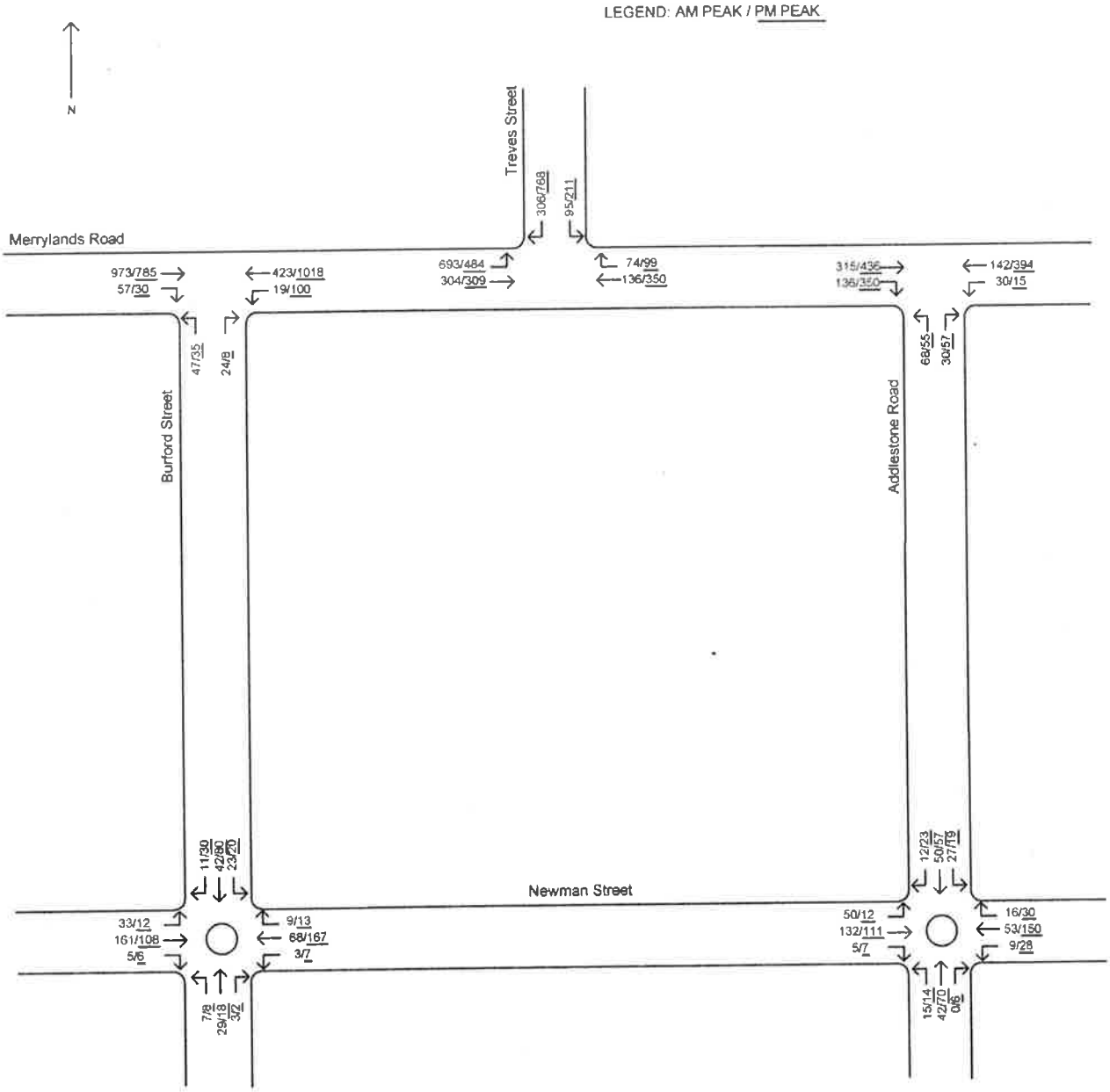
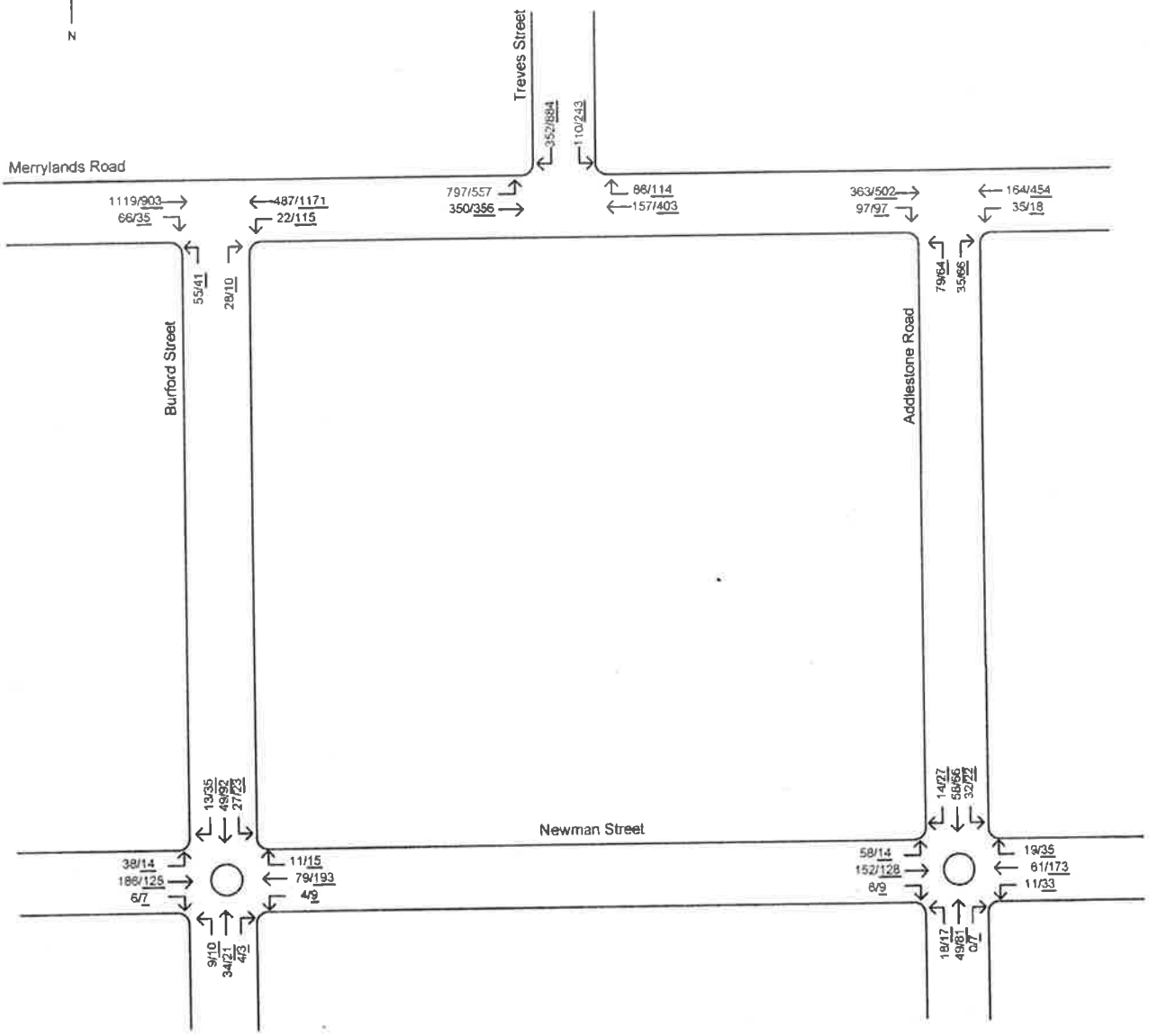


FIGURE 3
PROJECTED (2020) WEEKDAY PEAK HOUR TRAFFIC VOLUMES
WITHOUT DEVELOPMENT

LEGEND: AM PEAK / PM PEAK



5.3 Intersection Operation

In order to objectively assess the operation of the surveyed intersections, they have been analysed using SIDRA computer intersection analysis program. SIDRA is a computerised traffic arrangement program which, when volume and geometrical configurations of an intersection are imputed, provides an objective assessment of the operation efficiency under varying types of control (i.e. signs, signal and roundabouts). Key indicators of SIDRA include level of service where results are placed on a continuum from A to F, with A providing the greatest intersection efficiency and therefore being the most desirable by the Roads and Traffic Authority.

Other key indicators provided by SIDRA are average vehicle delay, the number of stops per hour and the degree of saturation. Degree of saturation, known as the X-value, is the ratio of the arrival rate of vehicles to the capacity of the approach. The X-value is a useful and professionally accepted measure of intersection performance. A value of 0.75 permits the intersection to operate in a generally satisfactory manner and provides tolerance for minor disturbances and fluctuations in the traffic conditions. At values of 'X' at 0.8 the traffic will be subject to queuing and delays which could extend over more than one signal cycle. For intersections controlled by traffic signals both queue length and delay increase rapidly as DS approaches 1.0.

For intersections controlled by a roundabout or give way or stop signs, a degree of saturation of 0.8 or less indicates satisfactory intersection operation. SIDRA provides analysis of the operating conditions that can be compared to the performance criteria set out in **Table 2** (adapted from the Roads & Maritime Services' *Guide to Traffic Generating Developments*).

TABLE 2
LEVELS OF SERVICE CRITERIA FOR INTERSECTION

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	Less than 14	Good Operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & Spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode
F	> 70	Extra capacity required	Extreme delay, traffic signals or other major treatment required

5.3.1 Intersection Modelling Output

The results of the analyses for both the 2010 and 2020 traffic volumes are presented in **Table 3** whilst full details are available upon request.

TABLE 3
SIDRA OUTPUT – INTERSECTION EFFICIENCY WITHOUT DEVELOPMENT

Intersection	2010 Conditions		2020 Conditions	
	AM	PM	AM	PM
Merrylands Road & Addlestone Road				
Delay	10.3	20.5	11.1	27.6
Degree of Saturation	0.17	0.28	0.20	0.42
Level of Service	B	C	B	D
Merrylands Road & Treves Street				
Delay	13.6	17.3	13.9	18.1
Degree of Saturation	0.41	0.56	0.47	0.65
Level of Service	B	B	B	B
Merrylands Road & Burford Street				
Delay	36.0	64.3	68.5	156.7
Degree of Saturation	0.35	0.35	0.65	0.85
Level of Service	E	F	F	F
Addlestone Road & Newman Street				
Delay	6.5	6.8	6.5	6.9
Degree of Saturation	0.10	0.13	0.12	0.16
Level of Service	A	A	A	A
Burford Street & Newman Street				
Delay	6.3	6.6	6.4	6.6
Degree of Saturation	0.11	0.14	0.13	0.17
Level of Service	A	A	A	A

Table 3 indicates the following:

Merrylands Road and Addlestone Road

- The junction currently operates with a level of service 'B' during morning peak period, representing good operation with spare capacity;
- The junction currently operates with a level of service 'C' during the evening peak period, representing satisfactory operation;
- The level of service is projected to remain at 'B' during the morning peak incorporating 10 year traffic projections; and
- The junction level of service is projected to reduce to 'D' during the evening peak incorporating 10 year traffic projections, representing operation near capacity.

Merrylands Road and Treves Street

- The junction currently operates with a level of service 'B' during both the morning and evening peak period; and

- The level of service at the junction is projected to remain at 'B', incorporating 10 year traffic projections.

Merrylands Road and Burford Street

- The junction currently operates with a level of service 'E' during the morning peak period, representing operation near capacity and requiring infrastructure or traffic management modification;

- The junction currently operates with a level of service 'F' during the evening peak period, representing unsatisfactory operation thereby requiring infrastructure or traffic management modification; and

- The junction level of service is projected to be 'F' during both peak periods incorporating 10 year traffic projections.

Addlestone Road and Newman Street

- The intersection currently operates with a level of service 'A' during both peak periods, representing good operation with spare capacity; and

- The intersection level of service is projected to remain at 'A' during both peak periods incorporating 10 year traffic projections.

Burford Street and Newman Street

- The intersection currently operates with a level of service 'A' during both peak periods, representing good operation with spare capacity; and

- The intersection level of service is projected to remain at 'A' during both peak periods incorporating 10 year traffic projections.

5.3.2 Discussion of Output

The SIDRA analysis indicates that the junction of Merrylands Road and Addlestone Road currently and is projected to provide motorists with a satisfactory level of service incorporating current and 10 year projection traffic demands. Notwithstanding this, **Table 2** indicates that any signage controlled intersection providing a level of service of 'C' or worse should be subject to a crash analysis. Accordingly, this Practice has accordingly obtained 5 year (2008 – 2012 inclusive) crash history from the Roads & Maritime Service for the signage controlled junction of Merrylands Road and Addlestone Road. This analysis indicates that the junction was the site of 1 recorded crash (not fatal) during the 5 year period (full details are available upon request). Such a number of crashes in a five year period are not considered to result in a safety concern warranting infrastructure alteration.

The SIDRA analysis indicates that the junction of Merrylands Road and Burford Street currently and is projected to continue to provide motorists with an unsatisfactory level of service incorporating 10 year projection traffic demands, thereby requiring some form of infrastructure or traffic management modification.

A review of the SIDRA analysis indicates that the unacceptable level of service is largely attributed to vehicles exiting Burford Street, particularly right turn movements. Left turn movements from Burford Street have been modelled to incur notable delays however the SIDRA analysis does not accurately take into consideration the punctuation of the Merrylands Road westbound traffic flow as a result of the operation of the traffic signals at Treves Street. These signals provide regular and extended gaps within Merrylands Road westbound traffic flow assisting left turn movements from Burford Street, such that this movement is provided with an acceptable level of service.

Right turn movements from Merrylands Road to Burford Street have been modelled to with a satisfactory level of service. In this regard, observations have indicated that these movements are also assisted by the abovementioned operation of the traffic signals at Treves Street. It is however noted that stationary right turning vehicles within Merrylands Road have the potential to impede trailing through vehicles and result in undesirable merging of vehicles into the eastbound kerb side lane, which then forms an exclusive left turn slip lane into Treves Street.

In order to assess the most appropriate infrastructure or traffic management modification, this Practice has obtained a 5 year (2008 – 2012 inclusive) crash history from the Roads & Maritime Service for the signage controlled junction of Merrylands Road and Burford Street. This analysis indicates that the junction was the site of 6 recorded crashes (none fatal) during the 5 year period, with 4 of these being directly or non-directly associated with right turn movements to and from Burford Street (full details are available upon request).

In consideration of the crash history and the abovementioned discussion, it is recommended that right turn movements to and from Burford Street be prohibited by way of the installation of 'No Right Turn' signage at the subject intersection. It is considered that this prohibition should only apply during weekday peak periods as observations during other periods have indicated that right turn movements are able to occur with a satisfactory level of safety and efficiency.

5.4 Public Transport & Non Car Travel

5.4.1 Train

The site is located approximately 500m to the west of Merrylands Railway Station. This station is served by the South Line that runs between the City and Campbelltown and the Cumberland Line, which runs between Seven Hills and Campbelltown.

5.4.2 Bus

The Merrylands Area is well served by Westbus and Veolia Transport bus services. There are 10 services operating from the transport interchange located along Terminal Street, as follows:

- Route 802 – Liverpool via Fairfield, Canley Heights, Bonnyrigg and Miller;
- Route 804 – Liverpool via Fairfield, Greenfield Park and Hinchinbrook;

- Route 806 – Liverpool via Greystanes, Prairiewood and Abbotsbury;
- Route 809 – Greystanes and Pemulwuy via Hilltop and South Wentworthville;
- Route 810 – Greystanes and Pemulwuy via Kenyons Road and Merrylands West;
- Route 818 – Westmead via South Wentworthville;
- Route 820 – Guildford Station via Bristol Street and Guildford West;
- Route 822 – Guildford Station via Railway Terrace;
- Route 908 – Bankstown via Auburn;
- Route N60 – City via Parramatta and Strathfield; and
- Route N60 – Fairfield via Guildford.

The bus stops located closest to the subject site are on Merrylands Road, immediately to the east of Addlestone Road.

5.4.3 Bicycle

There are a limited number of on and off-road bicycle routes within the vicinity of the site, the closest to the site being a an east-west route running between Burnett Street, through Merrylands Park and the Goodlet Street reservation, Merrylands Memorial Park and to the north of Stockland Shopping Centre to link with a north-south route on the eastern side of the railway line.

5.5 Pedestrian Conditions / Infrastructure

Merrylands Road between Terminal Place and Treves Street is defined as a High Pedestrian Activity Zone with the speed limit restricted to 40km/h to create pedestrian awareness. Facilities such as zebra crossings and raised pedestrian crossings are placed in strategic locations to assist pedestrians accessing the Merrylands town centre. Further, signalised pedestrian crossings are provided over the eastern and northern approaches to the junction of Merrylands Road and Treves Street. Footpaths are provided on both sides of Burford Street, Addlestone Road, Treves Street and Merrylands Road.

6. PROJECTED TRAFFIC GENERATION & IMPACTS

6.1 Traffic Generation

6.1.1 Existing Site Generation

Section 2.3 of this report presents the following summary of the existing site improvements:

- A single storey retail building accommodating a pool shop is located approximately within the north-eastern corner of the site providing an approximate floor area of 350m^2 fronting and accessed via Merrylands Road;
- A single storey commercial building is located within the central northern portion of the site accommodating a finance company providing an approximate floor area of 120m^2 fronting and accessed via Merrylands Road; and
- A single storey vacant retail building is located within the north-western corner of the site providing an approximate floor area of 700m^2, accessed via Burford Street.

In order to undertake an assessment of the existing traffic generating ability of the site, reference is made to the Roads & Maritime Services' *Guide to Traffic Generating Developments*. This publication provides the following peak hour traffic generation rates relevant to the existing site improvements:

Retail Floor Space
4.6 trips per 100m^2

Commercial Office
2 trips per 100m^2 GFA

The following peak hour traffic generation calculations are provided for the existing site improvements, utilising the Roads & Maritime Services' rates:

4.6(1,050m^2 / 100m^2) + 2(120m^2 / 100m^2) = 51 trips

The existing site improvements therefore provide a traffic generating capacity of 51 peak hour trips, 32 of which are generated to / from Burford Street whilst the remaining 19 are generated to / from Merrylands Road directly.

6.1.2 Projected Development Traffic Generation

It is not known what type of users (standard retail, office, restaurant etc) will accommodate the commercial tenancies, however for the purposes of this assessment and in order to create an absolute worst case scenario, this Practice has applied the standard retail floor space traffic generation rate of 4.6 trips per 100m^2 to all tenancies.

Based on a development yield of 2,237m^2, the commercial component of the development is projected to generate in the order of 103 peak hour vehicle trips.

It is however noted that extended shopping hours experienced throughout the retail sector now mean that the shoppers have much more choice over the times they choose to satisfy shopping needs. Having regard to this increased shopping time choice, it is unlikely that shoppers will choose to leave home and go shopping during peak traffic periods and therefore subject themselves to unnecessary delays.

It is further noted that the subject proposal will be in competition with the other retail outlets within the Merrylands town centre and is therefore likely to result in a redistribution of existing vehicle trips rather than generate new trips. We would therefore contend that users of the commercial component of the proposed development during peak hours are in fact existing trips and are combining journeys to / from work with shopping trips. Therefore these motorists would have been using the road system irrespective of the subject proposal.

With regard to the above, the incidence of linked and multi-purpose trips can reduce overall trip generation rates of a mixed commercial development such as that proposed. In this regard, it is considered reasonably that a reduction rate of 20% be applied the above Roads & Maritime Services' calculations. Incorporating such a reduction rate the commercial component of the development has been calculated to generate 83 peak hour vehicle trips.

Further, the Roads & Maritime Services provide the following peak hour traffic generation rates for residential development within its *Guide to Traffic Generating Developments*:

> ***High Density Residential Building – Metropolitan Sub Regional Centre***
> *0.29 trips per unit*

Based on a development yield of 146 dwellings, the residential component of the development is projected to generate 43 peak hour vehicle trips.

The total development is therefore projected to generate in the order of 126 peak hour vehicle trips to and from the site.

6.1.3 Nett Additional Traffic Generation and Distribution

The existing site improvements have been estimated to provide a traffic generating capacity of 51 peak hour vehicle trips. The subject proposal therefore represents a potential additional traffic generating ability of 75 peak hour trips over and above that currently approved for the site. Notwithstanding this and in order to generate an absolute worst case scenario, the existing and approved site improvements and their traffic generating ability have not been incorporated within this assessment.

6.2 Trip Assignment

In order to gauge the impact of the altered traffic generation and distribution, an assessment of the likely assignment of traffic is required to be undertaken. This involves distributing the traffic generated by the proposed development along the major approach routes before it dissipates throughout the general road network. In this regard, it is normal traffic engineering practice to assign altered traffic generation throughout the road system based on current traffic distributions as illustrated within **Figure 2**.

Notwithstanding the above, it has previously been recommended that right turn movements at the junction of Merrylands Road and Burford Street be prohibited during peak periods to improve traffic safety and efficiency. These peak hour restrictions will result in a minor redistribution of local traffic movements. In this regard, in order to create an absolute worst case scenario, all existing right turn movements from Merrylands Road into Burford Street have been redistributed to Addlestone Road. Further, all existing right turn movements from Burford Street to Merrylands Road have also been redistributed to Addlestone Road, as a combination of left and right turn movements.

Further to the above, the following assumptions have been made in order to generate a trip assignment:

- All commercial based vehicular trips have been evenly assigned as ingress and egress trips during both peak periods;
- 80% of residential based vehicular trips have been assigned to constitute outbound trips during the morning peak with the remaining 20% comprising inbound trips; and
- The reverse of the abovementioned residential assignment has been applied during the evening peak.

Figures 4 and **5** contained within the following pages provide a summary of development trip assignment derived from the above assessment. It is noted in a number of cases, a particular movement traffic demand is projected to reduce as a result of the subject proposal.

FIGURE 4
PROJECTED WEEKDAY PEAK DEVELOPMENT TRIP ASSIGNMENT - 2010

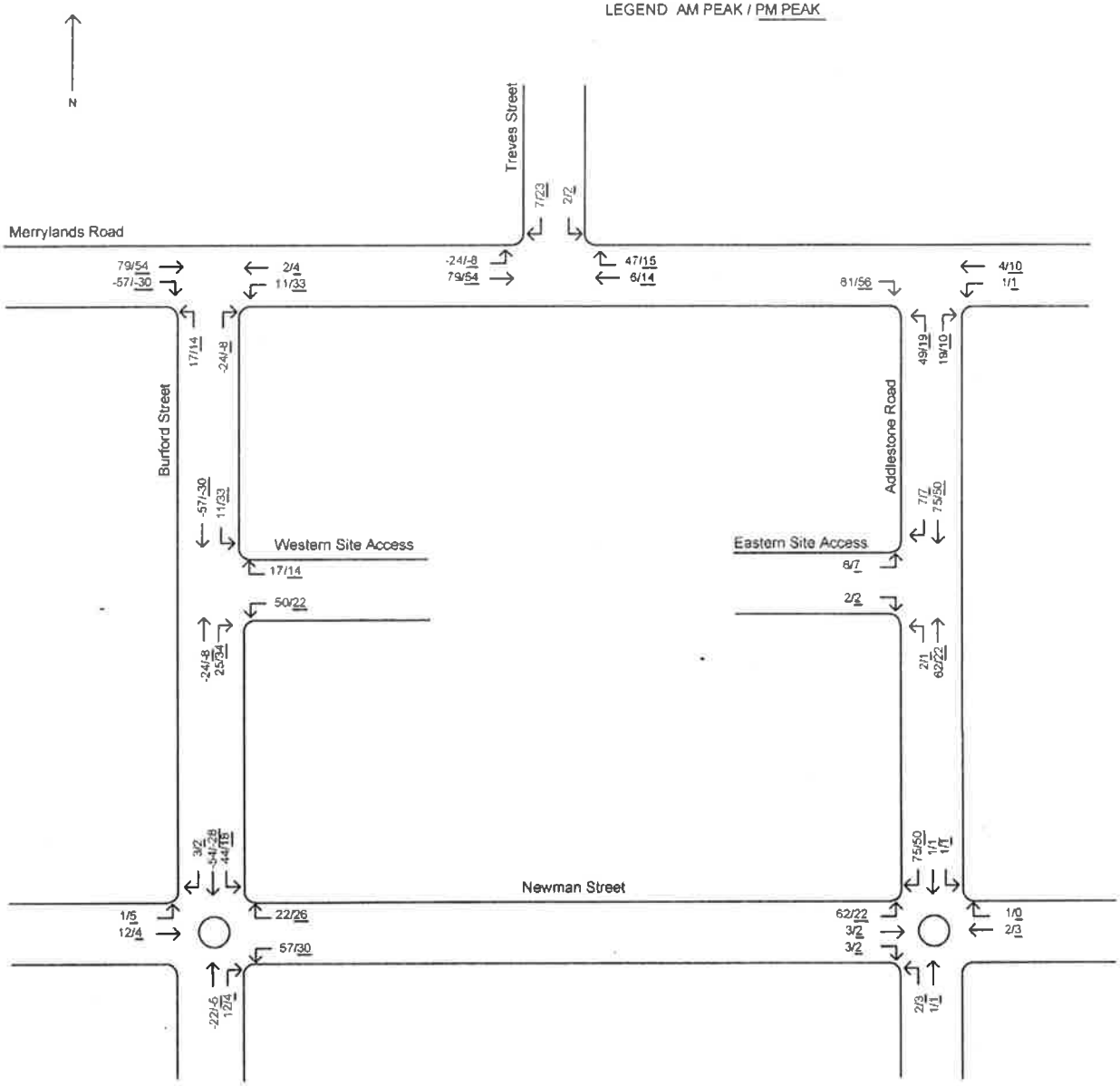
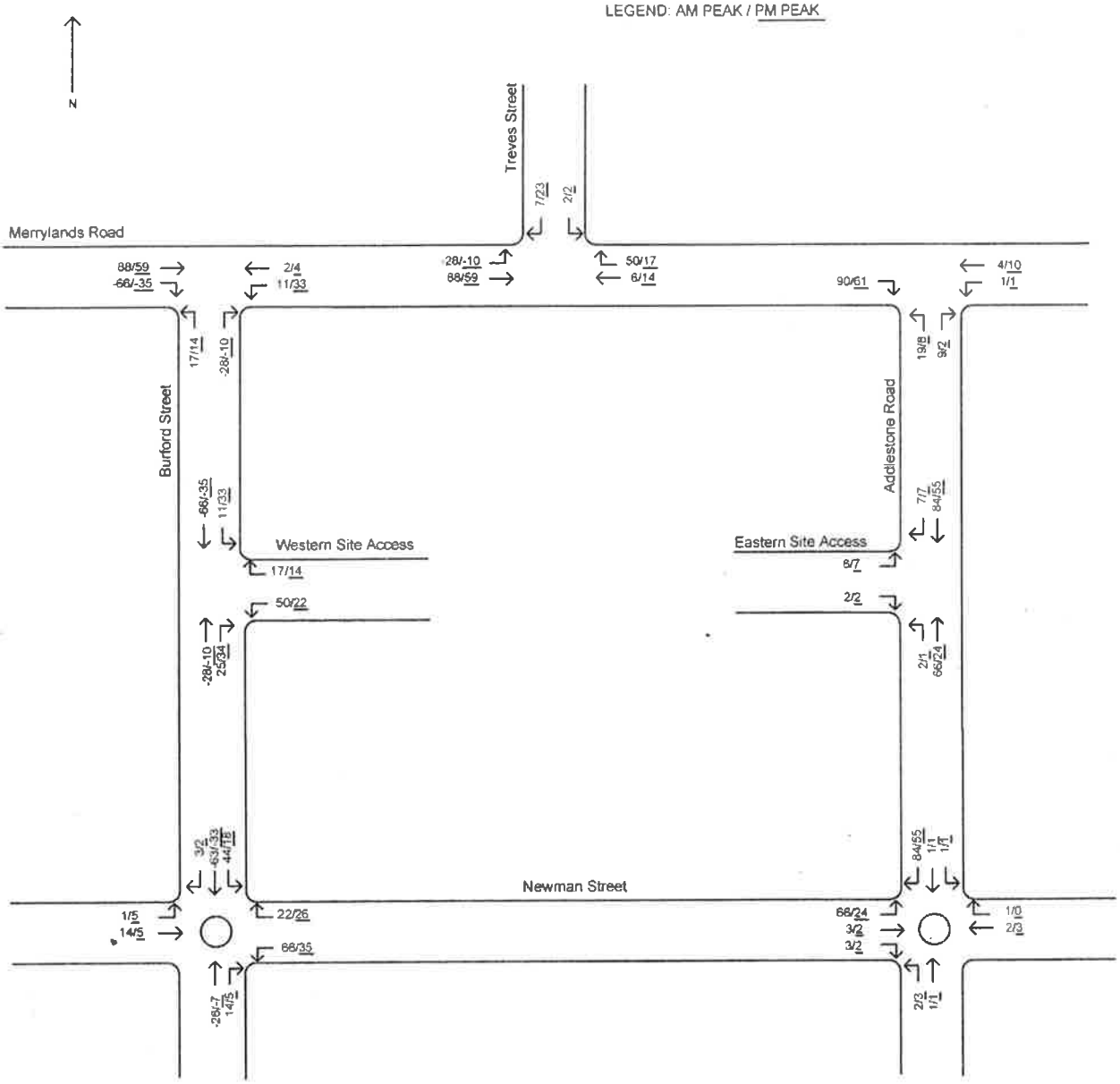


FIGURE 5
PROJECTED WEEKDAY PEAK DEVELOPMENT TRIP
ASSIGNMENT - 2020



6.3 Projected Traffic Volumes

Figures 6 and **7** below and overleaf provide an estimation of the post development 2010 and 2020 traffic volumes incorporating the previously presented traffic generation and trip assignment.

FIGURE 6
PROJECTED 2010 WEEKDAY PEAK HOUR TRAFFIC VOLUMES
INCORPORATING THE SUBJECT DEVELOPMENT

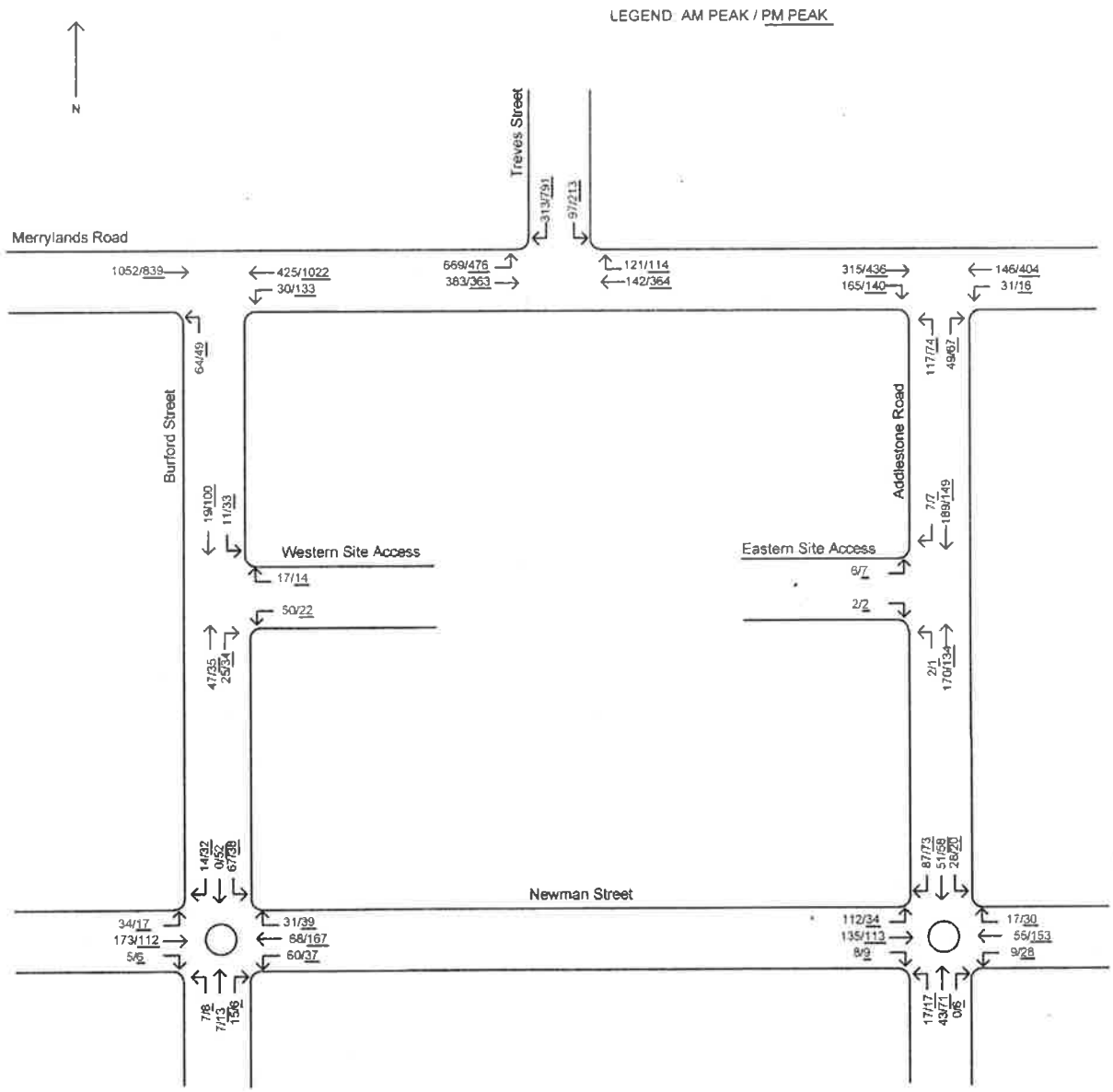
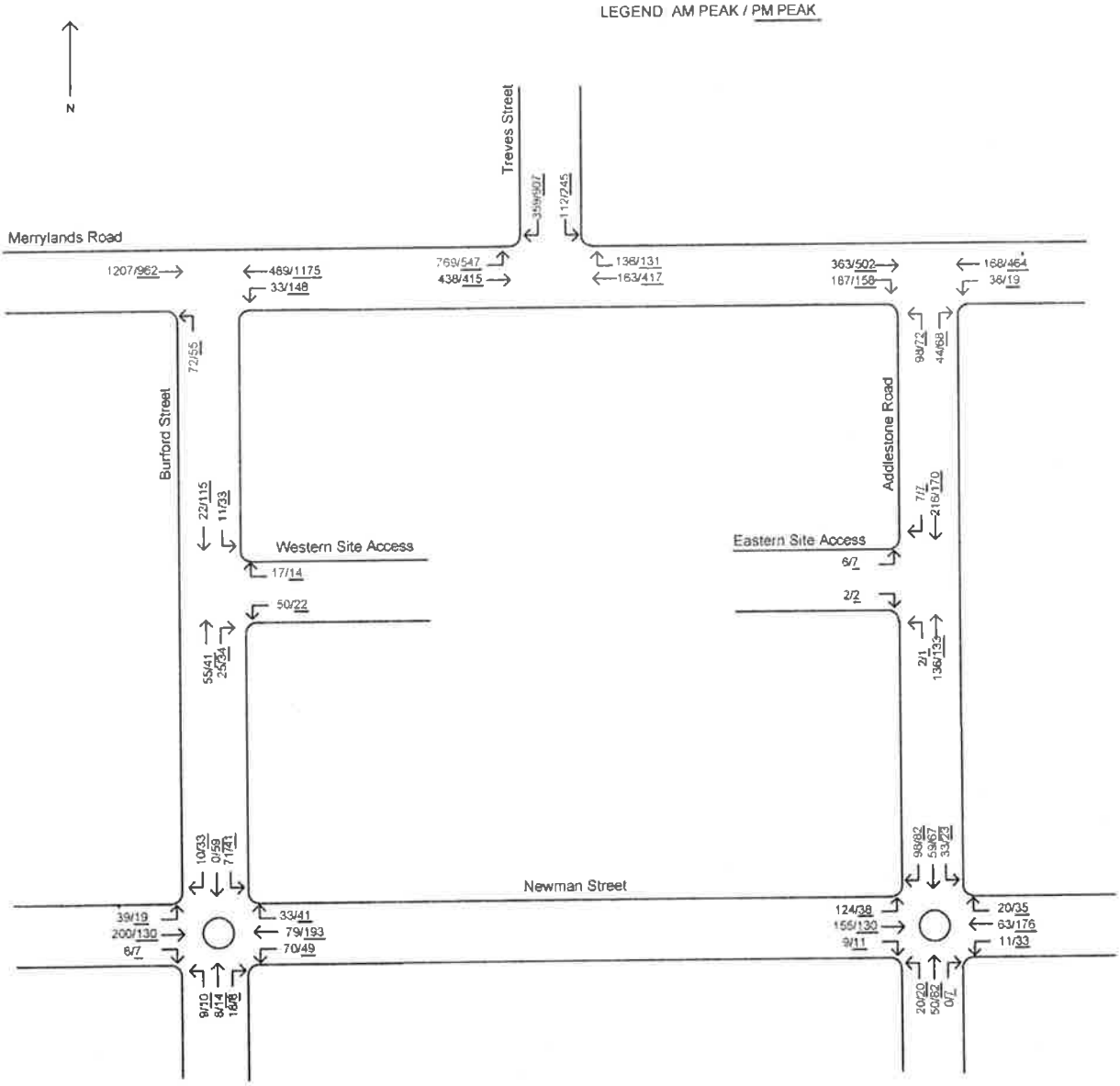


FIGURE 7
PROJECTED 2020 WEEKDAY PEAK HOUR TRAFFIC VOLUMES
INCORPORATING THE SUBJECT DEVELOPMENT



6.4 Projected Intersection Performance

Utilising the projected traffic generation characteristics of the proposed development and the previously presented trip assignment, the surrounding intersections have been modelled in order to estimate that likely impact on traffic safety and efficiency. A summary of the most pertinent results are indicated within **Table 4** below whilst full details are available if required.

TABLE 4
SIDRA OUTPUT – INTERSECTION EFFICIENCY WITHOUT & WITH DEVELOPMENT

Intersection	Without Development				With Development			
	2010 Conditions		2020 Conditions		2010 Conditions		2020 Conditions	
	AM	PM	AM	PM	AM	PM	AM	PM
Merrylands Rd & Addlestone Rd								
Delay	10.3	20.5	11.1	27.6	11.0	23.0	12.1	31.6
Degree of Saturation	0.17	0.28	0.20	0.42	0.29	0.37	0.25	0.50
Level of Service	B	C	B	D	B	C	B	D
Merrylands Rd & Treves St								
Delay	13.6	17.3	13.9	18.1	14.0	17.8	14.3	19.1
Degree of Saturation	0.41	0.56	0.47	0.65	0.39	0.60	0.45	0.71
Level of Service	B	B	B	B	B	B	B	B
Merrylands Rd & Burford St								
Delay	36.0	64.3	68.5	156.7	13.4	35.0	14.5	52.5
Degree of Saturation	0.35	0.35	0.65	0.85	0.28	0.31	0.32	0.44
Level of Service	E	F	F	F	B	E	B	F
Addlestone Rd & Newman St								
Delay	6.5	6.8	6.5	6.9	7.3	7.3	7.4	7.5
Degree of Saturation	0.10	0.13	0.12	0.16	0.16	0.17	0.16	0.19
Level of Service	A	A	A	A	A	A	A	A
Burford St & Newman St								
Delay	6.3	6.6	6.4	6.6	6.9	6.8	6.8	6.9
Degree of Saturation	0.11	0.14	0.13	0.17	0.12	0.15	0.13	0.17
Level of Service	A	A	A	A	A	A	A	A
Addlestone Rd & Site Access								
Delay	-	-	-	-	10.1	9.4	9.8	9.5
Degree of Saturation	-	-	-	-	0.11	0.09	0.13	0.10
Level of Service	-	-	-	-	B	A	A	A
Burford Rd & Site Access								
Delay	-	-	-	-	8.1	9.2	8.2	9.4
Degree of Saturation	-	-	-	-	0.07	0.07	0.07	0.08
Level of Service	-	-	-	-	A	A	A	A

Table 4 indicates the following projected operational conditions with respect to the additional traffic projected to be generated by the subject development and the redistribution of traffic associated with the implementation of a peak hour right turn prohibition at the junction of Merrylands Road and Burford Street:

Junction of Merrylands Road and Addlestone Road

- The average vehicular delay and degree of saturation at the junction is projected to increase marginally, however the junction level of service is projected to be unchanged from that without the development.

Junction of Merrylands Road and Treves Street

- The subject proposal is not projected to result in any alteration to the level of service provided at the junction, whereby the junction is projected to continue to operate with a level of service 'B' up to 2020.

Junction of Merrylands Road and Burford Street

- The implementation of right turn bans during peak periods is projected to significantly improve the overall performance of the junction, with the morning peak level of service improving from 'E' / 'F' to 'B'.

- The level of service during the afternoon peak is projected to remain poor however the average delay and the junction degree of saturation is projected to improve markedly.

- The poor level of service during the afternoon period is wholly associated with the left turn movement from Burford Street to Merrylands Road, which has previously been presented to operate with a significantly greater level of service than that modeled, given the SIDRA model does not effectively take into consideration the punctuation of westbound Merrylands Road traffic flow by the traffic signals at Treves Street. The operation of these signals provides regular and extended gaps in westbound Merrylands Road traffic flow allowing left turn movements from Burford Street to occur with a reasonable level of service. This is projected to continue incorporating the additional traffic projected to be generated by the subject development.

Intersection of Addlestone Road & Newman Street

- The subject proposal is not projected to result in any alteration to the level of service provided at the intersection, whereby the junction is projected to continue to operate with a level of service 'A' up to 2020.

Intersection of Burford Street & Newman Street

- The subject proposal is not projected to result in any alteration to the level of service provided at the intersection, whereby the junction is projected to continue to operate with a level of service 'A' up to 2020.

Junction of Addlestone Road and the Site Access

- The eastern site access junction is projected to operate with a level of service 'A' / 'B' up to 2020, thereby allowing motorists to enter and exit the site with a good level of service.

Junction of Burford Street and the Site Access

- The western site access junction is projected to operate with a level of service 'A' up to 2020, thereby allowing motorists to enter and exit the site with a good level of service.

6.5 Safety Assessment

The implementation of a peak hour right turn prohibition at the junction of Merrylands Road and Burford Street is projected to significantly improve the level of safety at that junction, during peak commuter periods.

The level of safety afforded to motorists associated with the development site access movements is largely dependent on the provision of adequate sightly distance along the access roads. In this regard, the consistent vertical and horizontal alignment of Addlestone Road and Burford Street in the immediate vicinity of the subject site results in good sight distance between the development site access locations and the frontage roads. Accordingly, motorists are envisaged to be able to access and vacate the subject development with a good level of safety.

Further to the above, the subject development will result in the deletion of a number of access driveways connecting with Merrylands Road in the immediate vicinity and within the signalised junction with Treves Street. The deletion of these driveways will effectively delete existing undesirably private development access / egress movements thereby reducing the potential for conflict at this location.

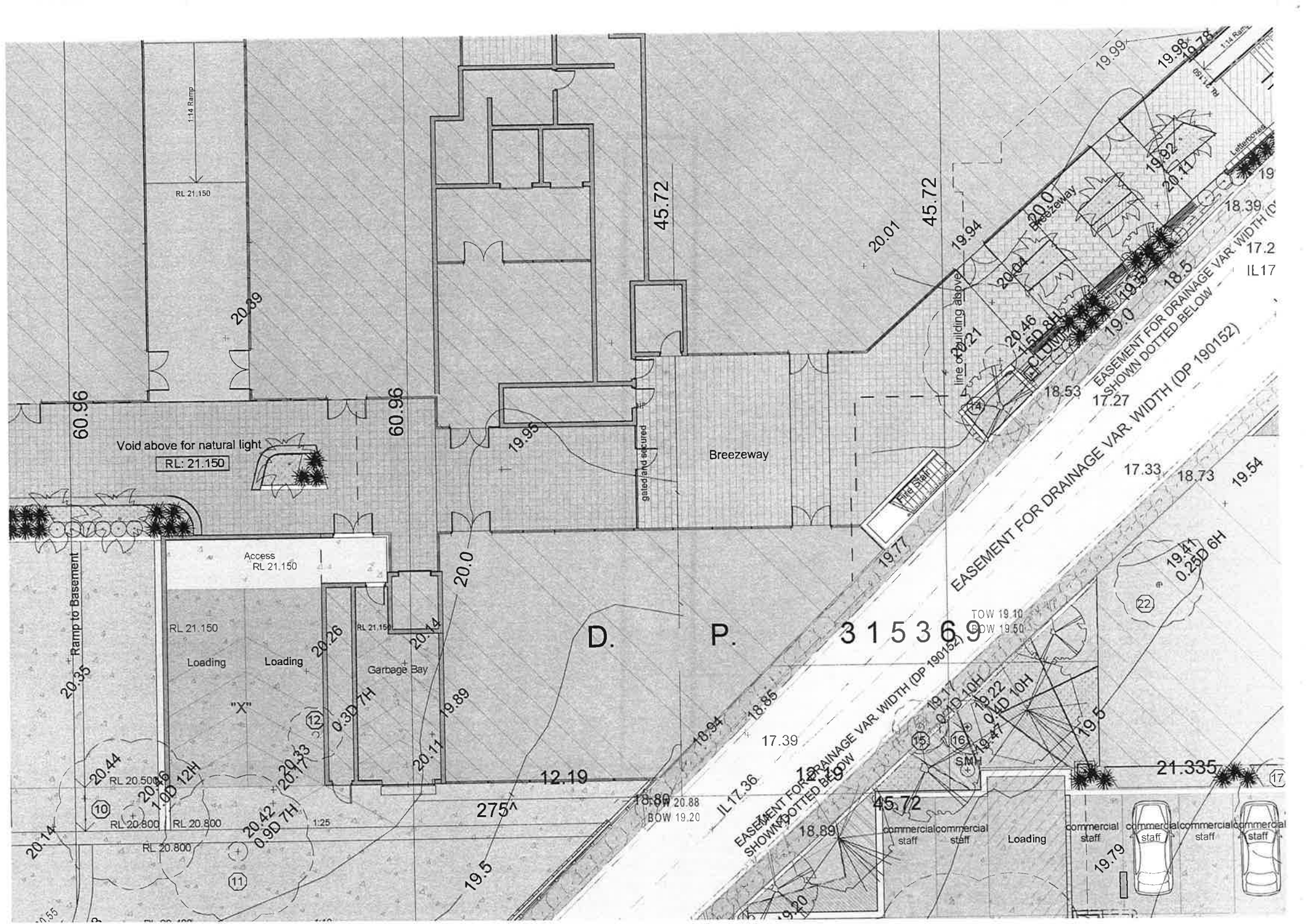
7. CONCLUSION

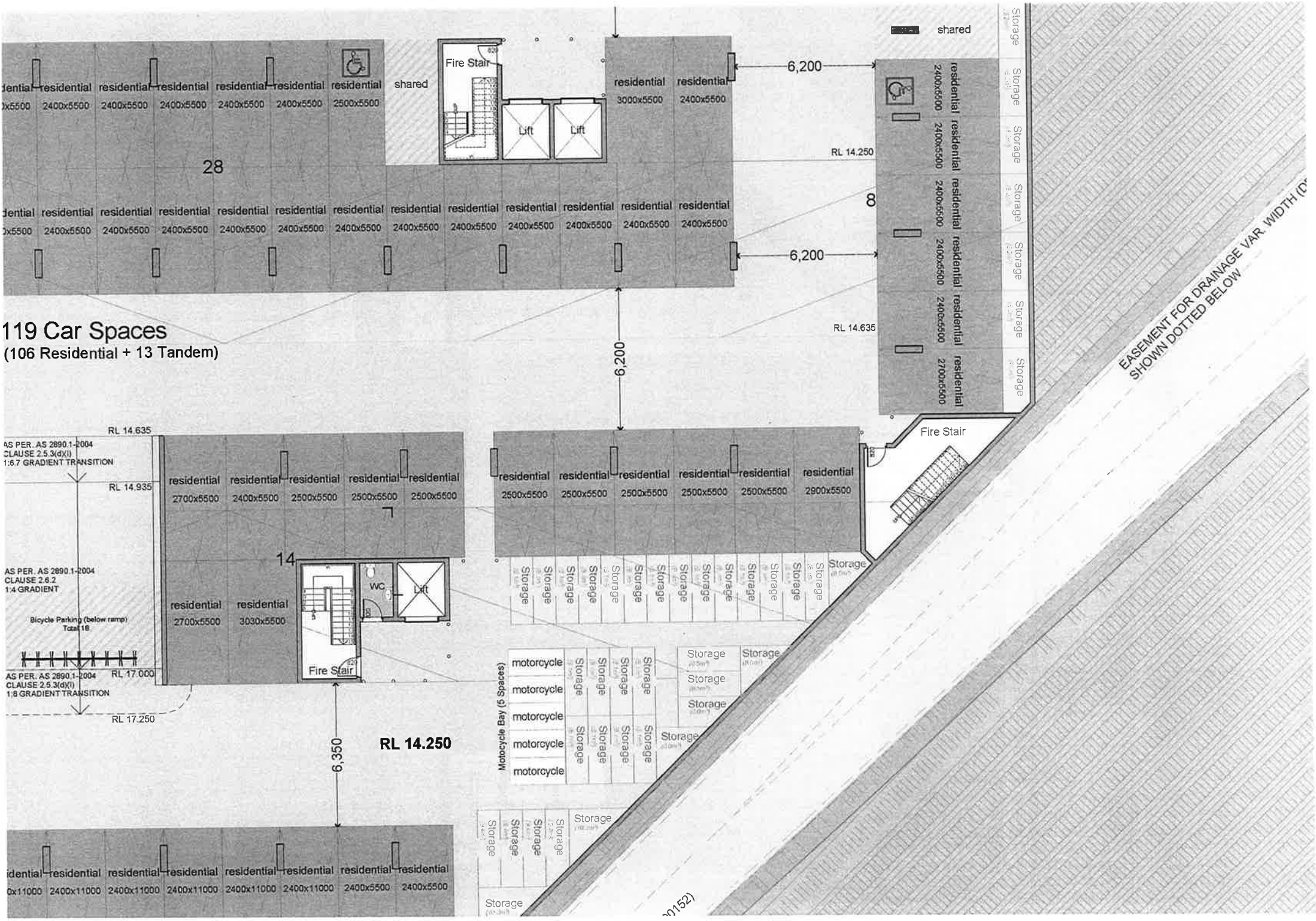
This Practice has undertaken an assessment of the potential traffic implications associated with a mixed use development proposed for land at 272 – 276 and 280 – 284 Merrylands Road and 1 Addlestone Road, Merrylands. Based on this assessment, the following conclusions are now made:

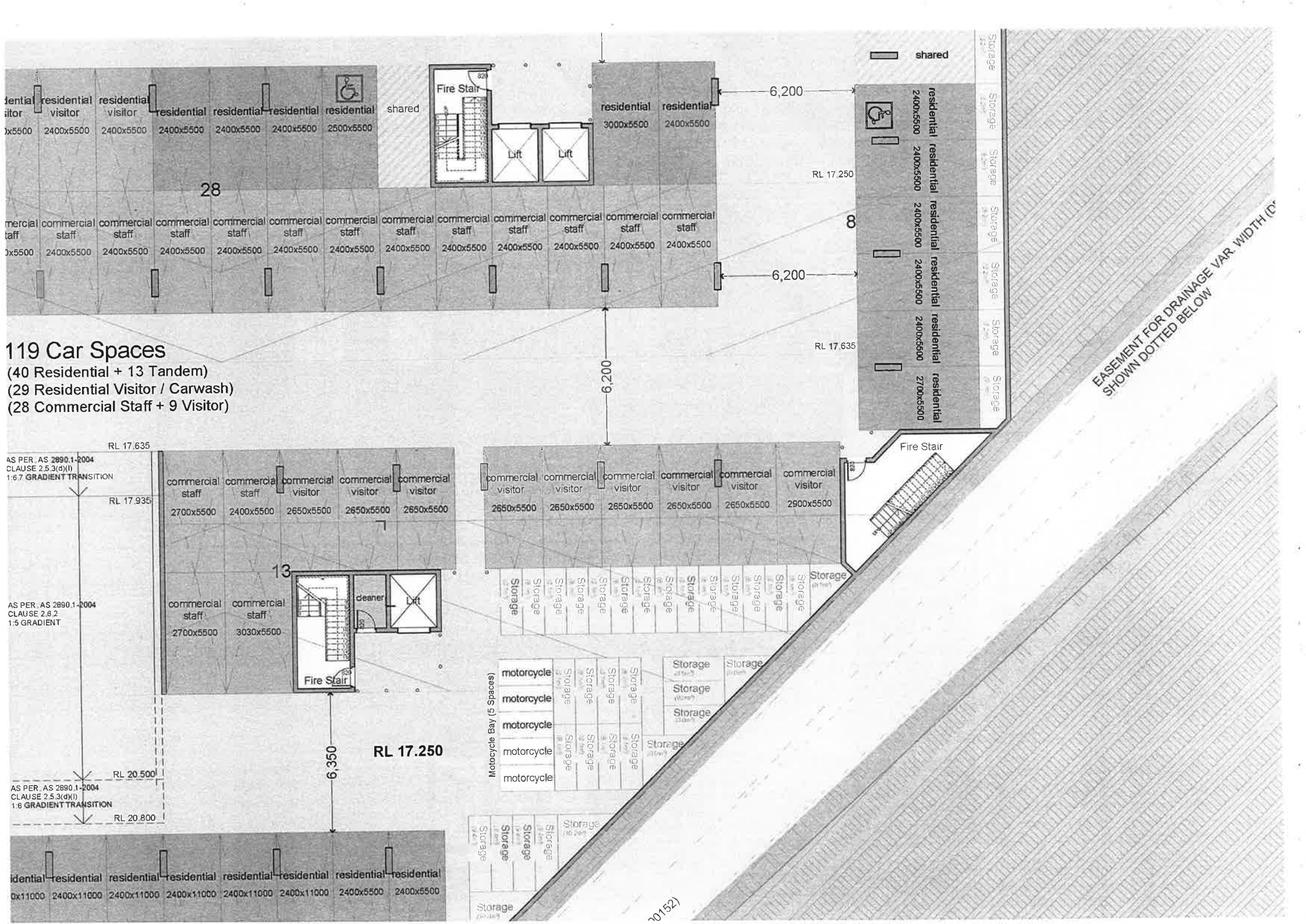
- The proposed site-wide off-street parking provision complies with the requirements contained within DCP 2013;
- The proposed access arrangements are projected to provide for safe and efficient site access movements;
- The proposed internal circulation and manoeuvring arrangements are capable of providing for safe and efficient vehicular movements during peak times;
- The overall existing level of service throughout the surrounding road network is good, with the exception of the junction of Merrylands Road and Burford Street;
- In order to improve the level of safety and efficiency at the junction of Merrylands Road and Burford Street, it is recommended that a peak hour right turn prohibition be implemented;
- The subject development is projected to generate in the order of 126 peak hour vehicle trips to and from the subject site; and
- The surrounding road network is projected to be capable of accommodating the additional traffic projected to be generated by the subject development as well as the local redistribution of traffic associated with the recommended implementation of a right turn prohibition at the junction of Merrylands Road and Burford Street up to 2020.

Based on the contents of this report, we consider that there are no traffic related issues that should prevent approval of the subject application and we therefore recommend that action to Council.

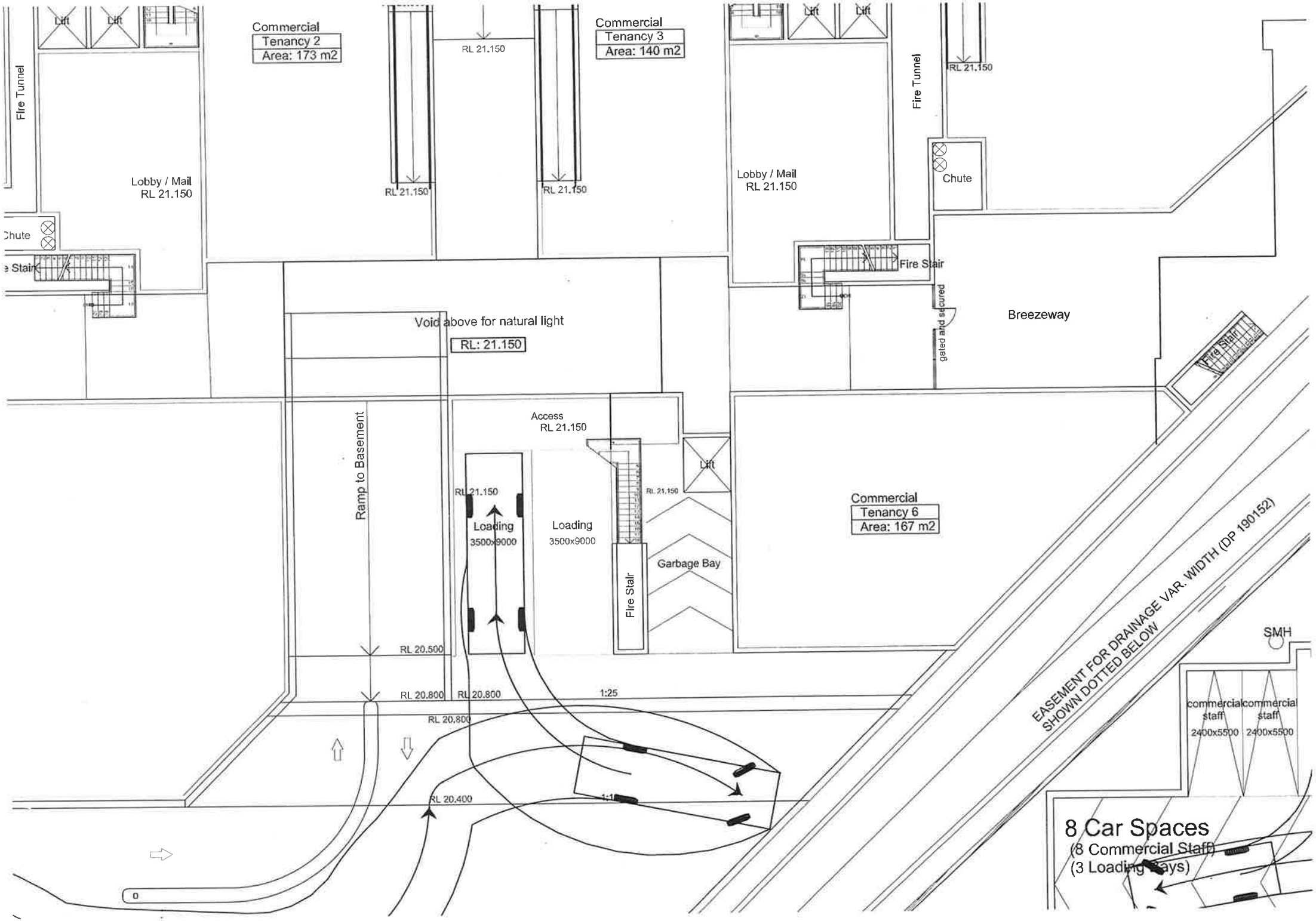
APPENDIX 1

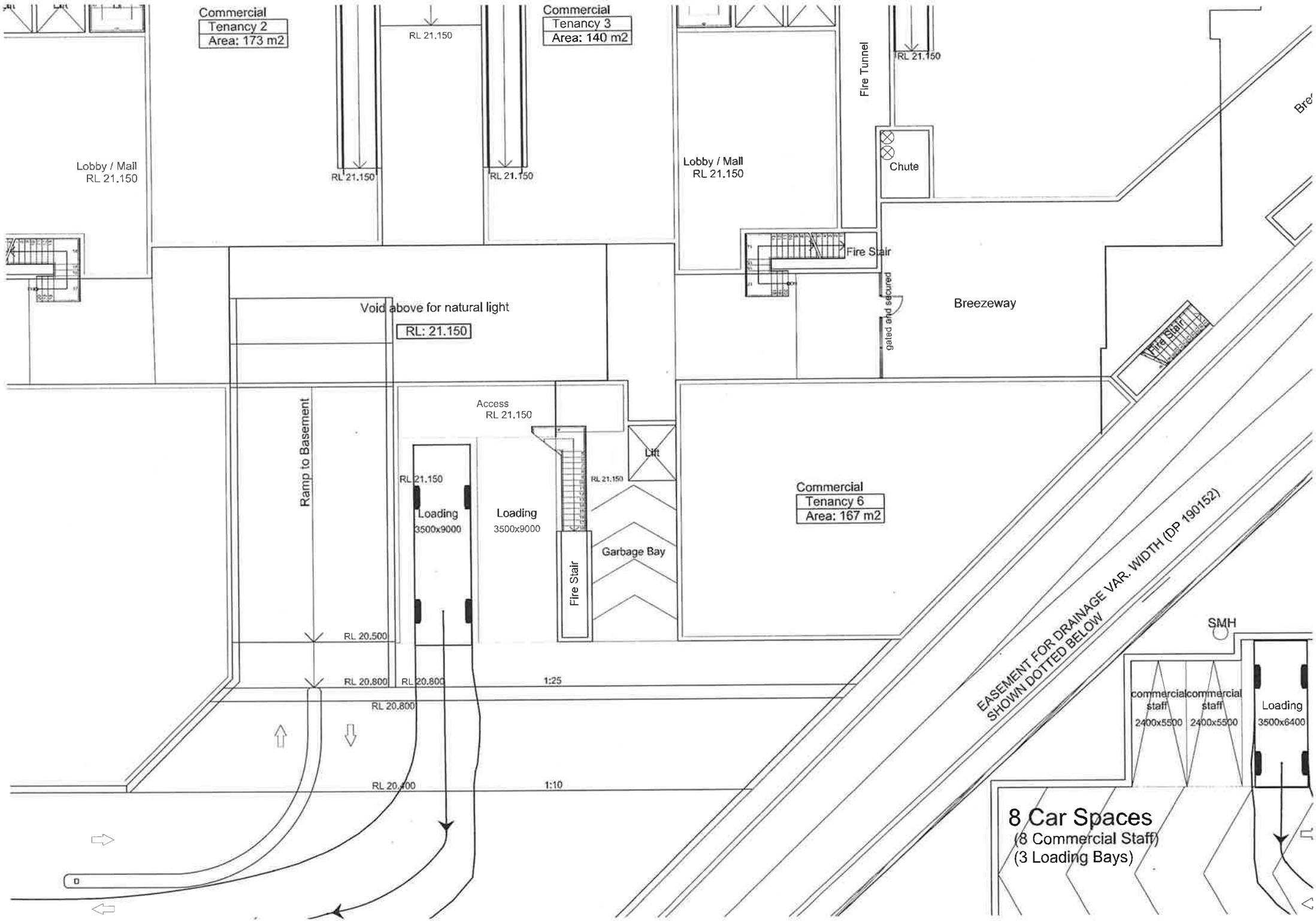

1:14 Ramp
RL 21.150
20.89
60.96
60.96
45.72
45.72
20.01
19.94
20.0
Breezeway
19.99
19.98
19.92
20.11
18.39
17.2
IL17
line of building above
20.04
20.21
20.46
1.5D 8H
CLOMF
19.0
18.5
18.53
17.27
EASEMENT FOR DRAINAGE VAR. WIDTH (DP 190152) SHOWN DOTTED BELOW
Void above for natural light
RL: 21.150
19.95
gated and secured
Breezeway
Fire Stair
19.77
17.33
18.73
19.54
19.41
0.25D 6H
Access
RL 21.150
20.0
Ramp to Basement
20.35
RL 21.150
Loading
Loading
"X"
20.26
RL 21.150
20.14
Garbage Bay
0.3D 7H
19.89
20.11
D. P. 315369
TOW 19.10
BOW 19.50
EASEMENT FOR DRAINAGE VAR. WIDTH (DP 190152)
18.94
18.85
17.39
19.17
0.1D 10H
19.22
0.4D 10H
19.47
SMH
19.5
21.335
20.44
RL 20.500
20.46
1.0D 12H
20.42
0.9D 7H
20.33
20.17
12.19
275°
18.80
BOW 20.88
BOW 19.20
IL17.36
EASEMENT FOR DRAINAGE VAR. WIDTH (DP 190152) SHOWN DOTTED BELOW
45.72
18.89
commercial staff
commercial staff
Loading
commercial staff
commercial staff
commercial staff
commercial staff
19.79
20.14
RL 20.800
RL 20.800
RL 20.800
1:25
19.5
10
11
12
15
16
17
22

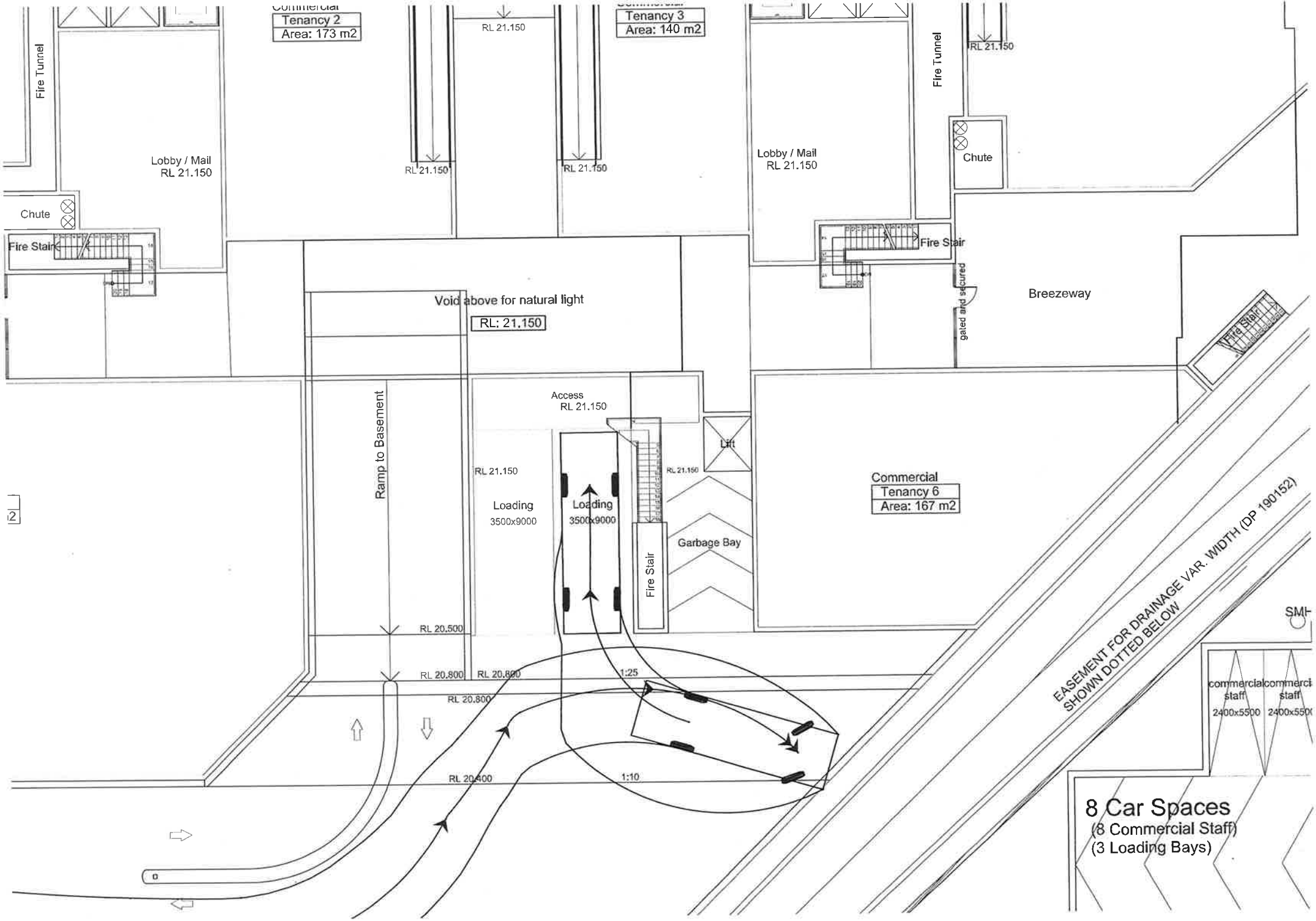

shared
Fire Stair
Lift
Lift
28
6,200
RL 14.250
8
6,200
RL 14.635
6,200
EASEMENT FOR DRAINAGE VAR. WIDTH (D
SHOWN DOTTED BELOW
119 Car Spaces
(106 Residential + 13 Tandem)
RL 14.635
AS PER. AS 2890.1-2004
CLAUSE 2.5.3(d)(i)
1:6.7 GRADIENT TRANSITION
RL 14.935
AS PER. AS 2890.1-2004
CLAUSE 2.6.2
1:4 GRADIENT
Bicycle Parking (below ramp)
Total 18
AS PER. AS 2890.1-2004
CLAUSE 2.5.3(d)(i)
1:8 GRADIENT TRANSITION
RL 17.000
RL 17.250
14
WC
Lift
Fire Stair
Fire Stair
6,350
RL 14.250
Motocycle Bay (5 Spaces)
motorcycle
Storage
residential
shared

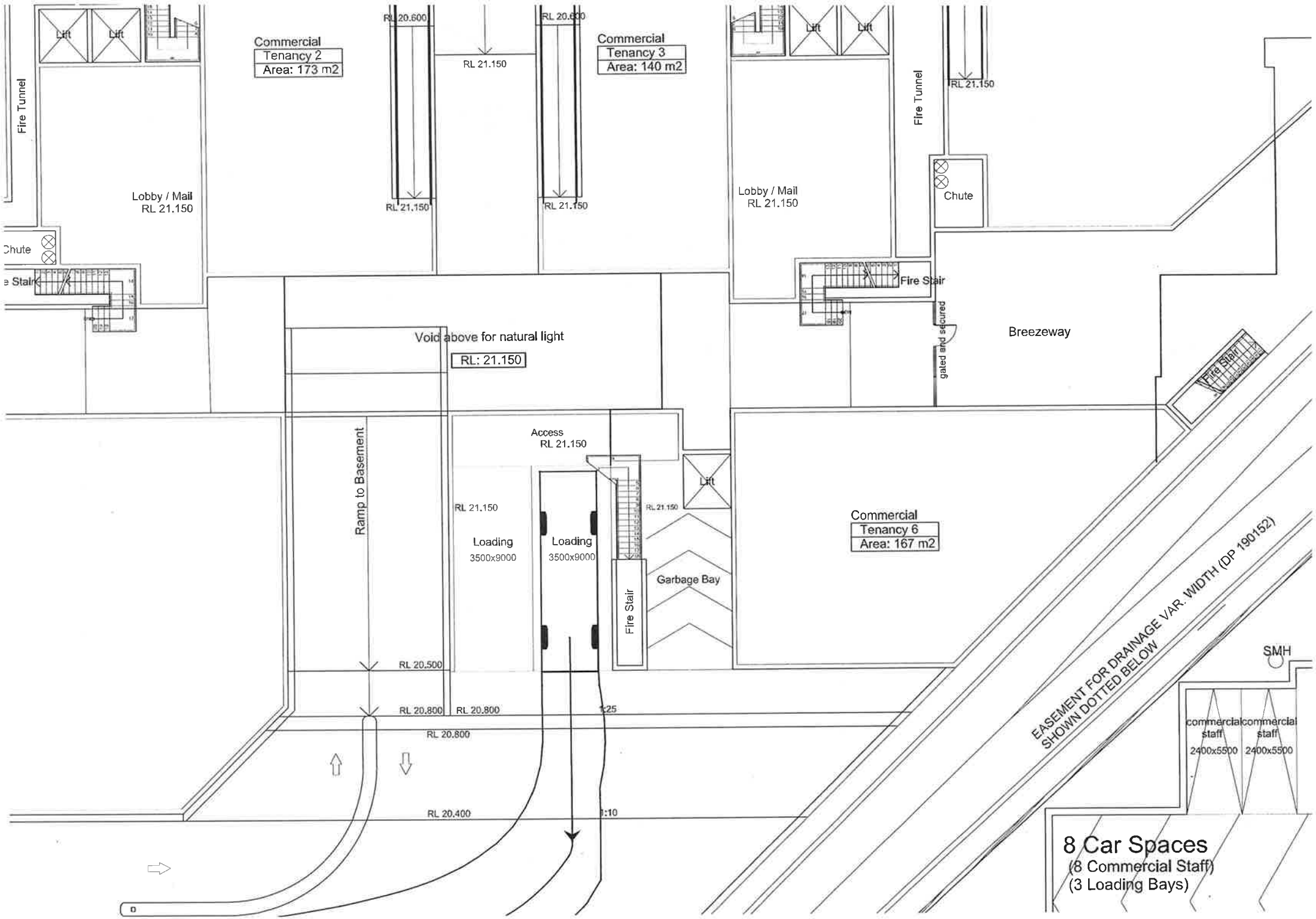

119 Car Spaces
(40 Residential + 13 Tandem)
(29 Residential Visitor / Carwash)
(28 Commercial Staff + 9 Visitor)
28
13
8
shared
Fire Stair
Lift
Lift
cleaner
6,200
6,200
6,200
6,350
RL 17.250
RL 17.635
RL 17.935
RL 20.500
RL 20.800
RL 17.635
RL 17.250
AS PER, AS 2890.1-2004
CLAUSE 2.5.3(d)(I)
1:6.7 GRADIENT TRANSITION
AS PER, AS 2890.1-2004
CLAUSE 2.6.2
1:5 GRADIENT
AS PER, AS 2890.1-2004
CLAUSE 2.5.3(d)(I)
1:8 GRADIENT TRANSITION
Motocycle Bay (5 Spaces)
motorcycle
EASEMENT FOR DRAINAGE VAR. WIDTH (D
SHOWN DOTTED BELOW

APPENDIX 2


Lift
Lift
Fire Tunnel
Commercial
Tenancy 2
Area: 173 m2
RL 21.150
Commercial
Tenancy 3
Area: 140 m2
Lift
Lift
Fire Tunnel
RL 21.150
Lobby / Mail
RL 21.150
RL 21.150
RL 21.150
Lobby / Mail
RL 21.150
Chute
Chute
Fire Stair
Fire Stair
gated and secured
Breezeway
Void above for natural light
RL: 21.150
Access
RL 21.150
Ramp to Basement
Lift
RL 21.150
RL 21.150
Loading
3500x9000
Loading
3500x9000
Commercial
Tenancy 6
Area: 167 m2
Garbage Bay
Fire Stair
RL 20.500
RL 20.800
RL 20.800
RL 20.800
1:25
RL 20.400
1:1
EASEMENT FOR DRAINAGE VAR. WIDTH (DP 190152)
SHOWN DOTTED BELOW
SMH
commercial staff
2400x5500
commercial staff
2400x5500
8 Car Spaces
(8 Commercial Staff)
(3 Loading Bays)


Commercial
Tenancy 2
Area: 173 m2
Commercial
Tenancy 3
Area: 140 m2
RL 21.150
RL 21.150
RL 21.150
RL 21.150
Fire Tunnel
Lobby / Mall
RL 21.150
Lobby / Mall
RL 21.150
Chute
Fire Stair
gated and secured
Breezeway
Fire Stair
Void above for natural light
RL: 21.150
Ramp to Basement
Access
RL 21.150
Lift
RL 21.150
RL 21.150
Loading
3500x9000
Loading
3500x9000
Fire Stair
Garbage Bay
Commercial
Tenancy 6
Area: 167 m2
EASEMENT FOR DRAINAGE VAR. WIDTH (DP 190152)
SHOWN DOTTED BELOW
SMH
commercial
staff
2400x5500
commercial
staff
2400x5500
Loading
3500x6400
RL 20.500
RL 20.800
RL 20.800
1:25
RL 20.800
RL 20.400
1:10
8 Car Spaces
(8 Commercial Staff)
(3 Loading Bays)


Commercial
Tenancy 2
Area: 173 m2
Tenancy 3
Area: 140 m2
Fire Tunnel
Lobby / Mail
RL 21.150
Chute
Fire Stair
RL 21.150
Void above for natural light
RL: 21.150
Ramp to Basement
Access
RL 21.150
Lift
Loading
3500x9000
Garbage Bay
Commercial
Tenancy 6
Area: 167 m2
Breezeway
gated and secured
EASEMENT FOR DRAINAGE VAR. WIDTH (DP 190152)
SHOWN DOTTED BELOW
commercial staff
2400x5500
RL 20.500
RL 20.800
RL 20.600
RL 20.400
1:25
1:10
8 Car Spaces
(8 Commercial Staff)
(3 Loading Bays)


Lift
Lift
Fire Tunnel
Commercial
Tenancy 2
Area: 173 m2
RL 20.600
RL 21.150
RL 20.600
Commercial
Tenancy 3
Area: 140 m2
Lift
Lift
Fire Tunnel
RL 21.150
Lobby / Mail
RL 21.150
RL 21.150
RL 21.150
Lobby / Mail
RL 21.150
Chute
Chute
Fire Stair
Fire Stair
gated and secured
Breezeway
Void above for natural light
RL: 21.150
Fire Stair
Access
RL 21.150
Ramp to Basement
RL 21.150
Loading
3500x9000
Loading
3500x9000
RL 21.150
Lift
Commercial
Tenancy 6
Area: 167 m2
Garbage Bay
Fire Stair
EASEMENT FOR DRAINAGE VAR. WIDTH (DP 190152)
SHOWN DOTTED BELOW
SMH
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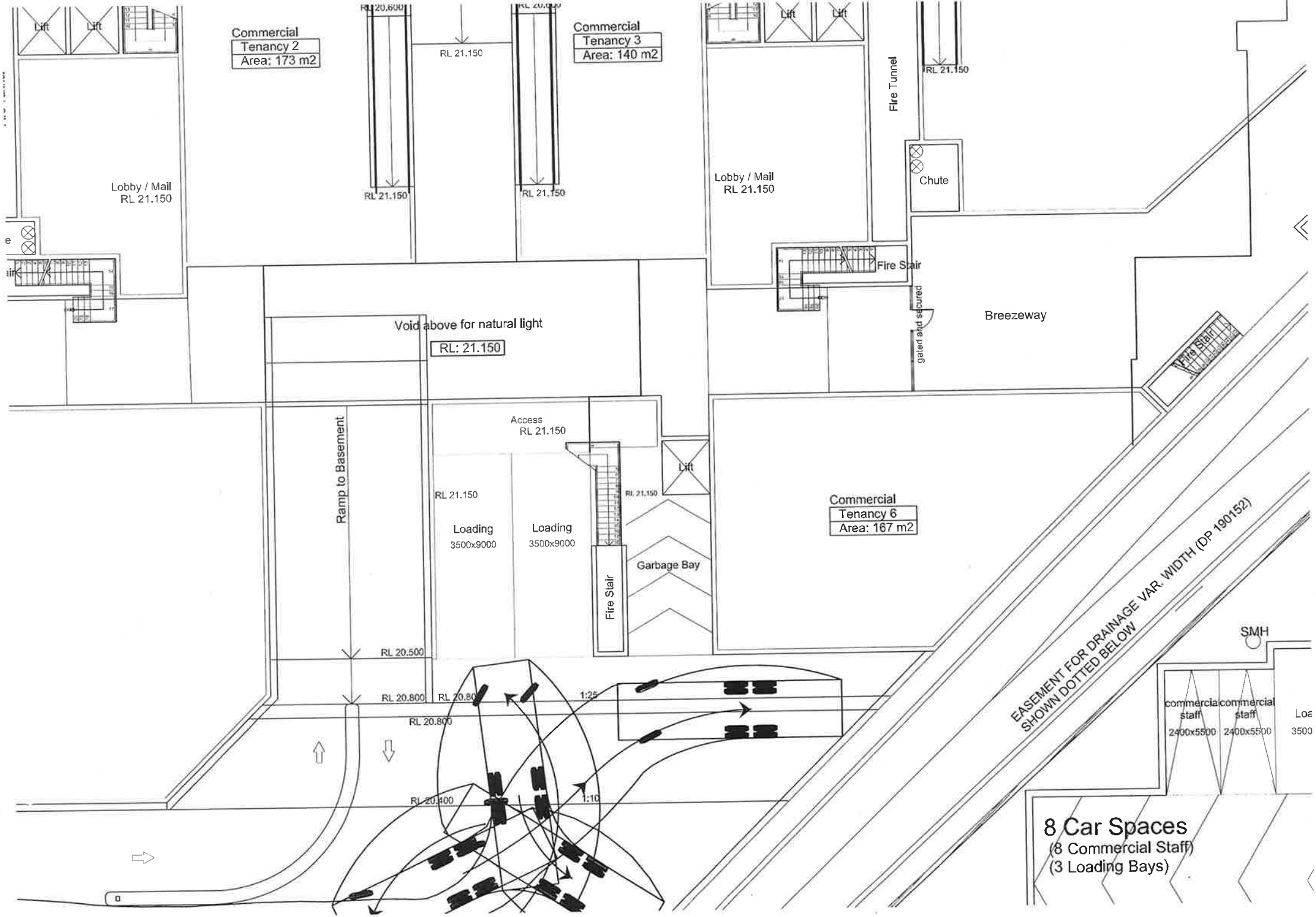
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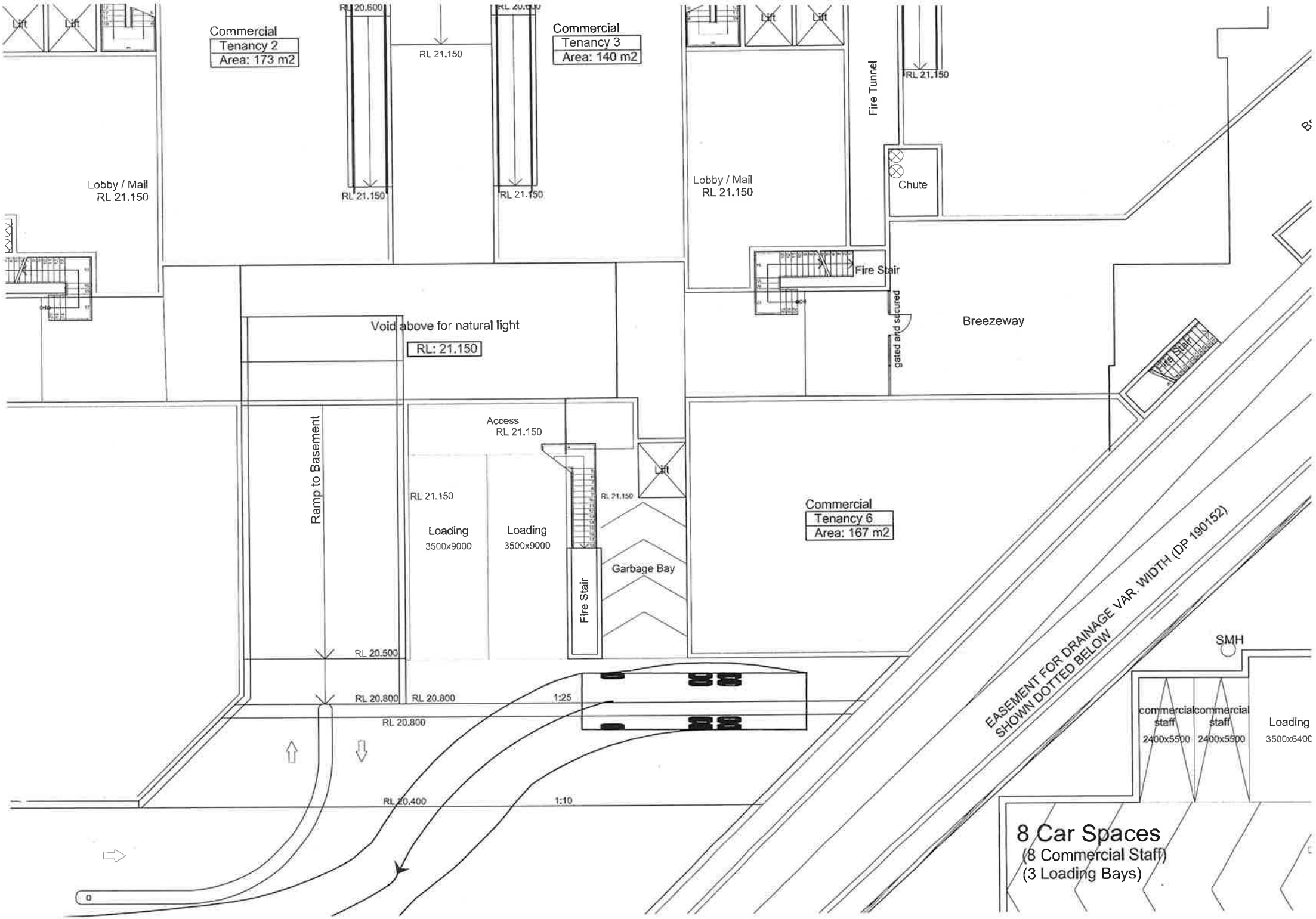
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commercial staff
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(8 Commercial Staff)
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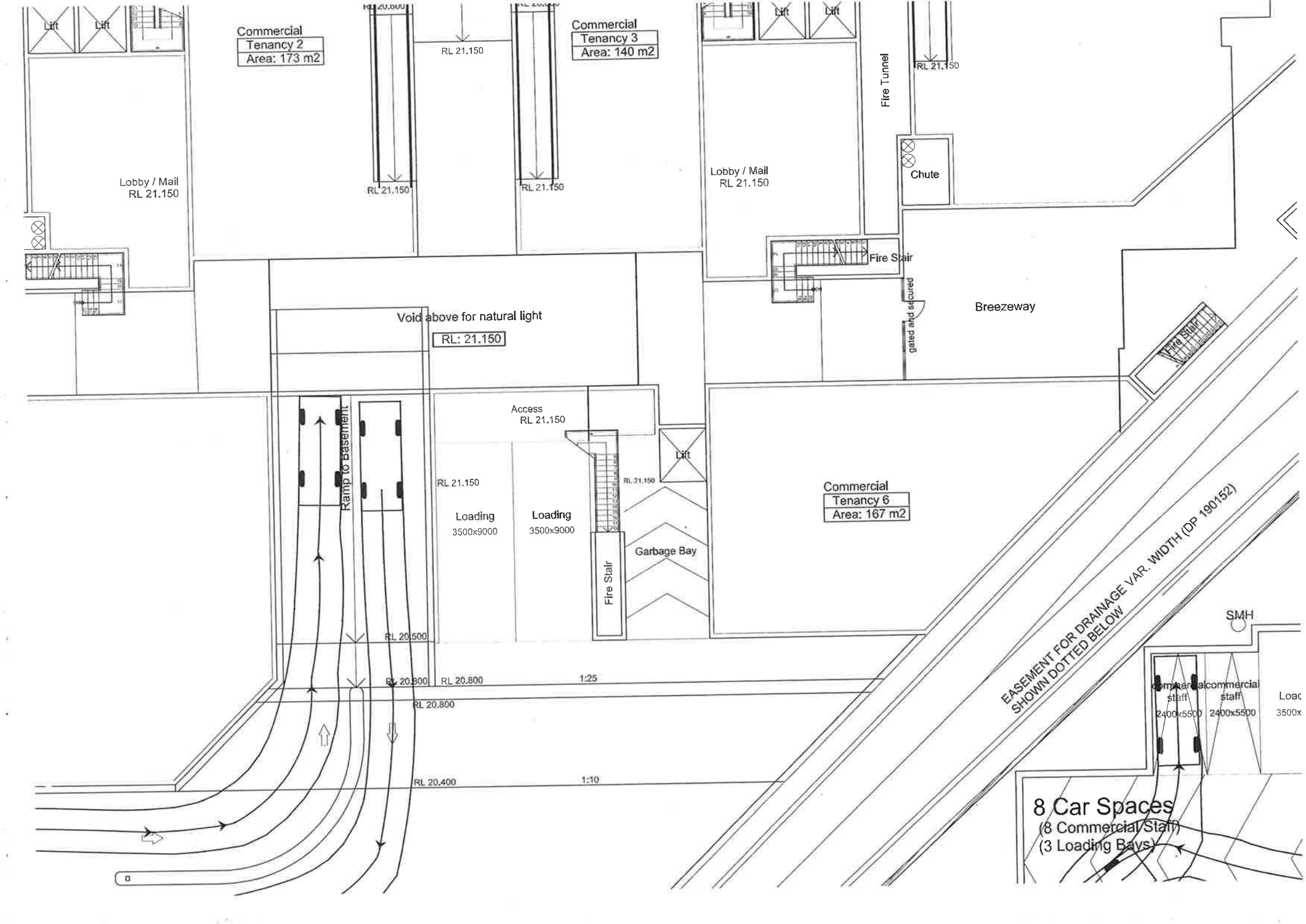
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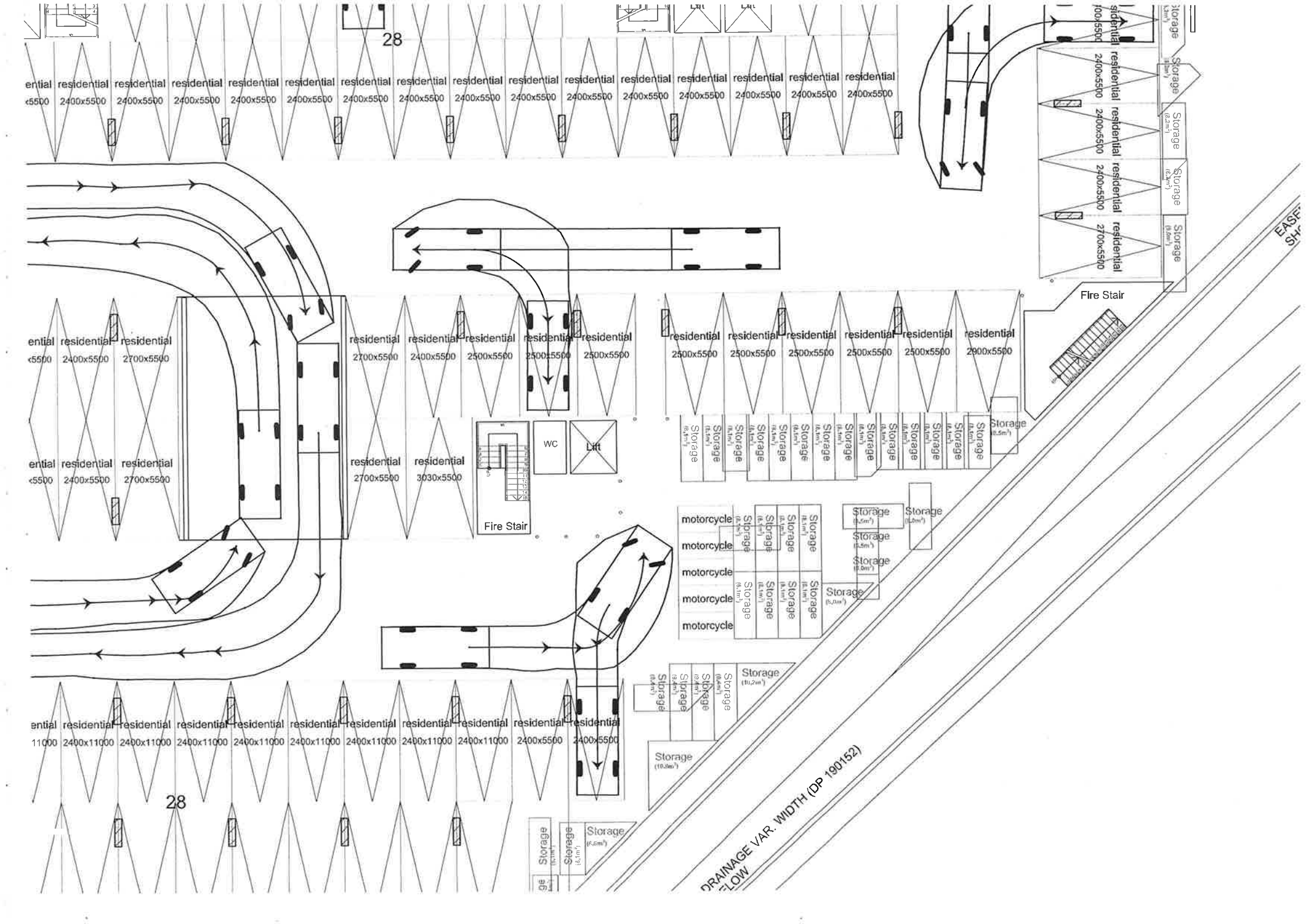
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DRAINAGE VAR. WIDTH (DP 190152)

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THOMPSON STANBURY ASSOCIATES

ABN: 79 943 737 368

18 March 2014

The General Manager
Holroyd City Council
PO Box 42
MERRYLANDS
NSW 2160

Attention: Mark Stephenson, Senior Development Planner

Your reference: DA 2013/450

Dear Sir,

PROPOSED MIXED USE DEVELOPMENT
272-276 & 280 – 284 MERRYLANDS ROAD & 1 ADDLESTONE ROAD MERRYLANDS

Reference is made to your email correspondence to Sally Atalah of iDraft Architects dated 21 January 2014 requesting additional information in relation to the subject development application.

This Practice prepared a Traffic Impact Assessment report in support of the development application in October 2013. This Practice has been retained by the applicant, Dyldam Developments Pty. Ltd., to address a number of items raised in your correspondence relating to our discipline

This Practice has undertaken a detailed review of the site plans and recommended a number of alterations to the development scheme in order to suitably address the items in your correspondence. Amended architectural plans have been prepared by iDraft Architects, copies of which are submitted under separate cover.

This correspondence provides comments directly in response to the items raised with respect to *Traffic Management* in your correspondence as follows:

1. *A copy of SIDRA maximum queuing has not been provided in the Traffic Impact Assessment (October 2013 – Thompson Stanbury Associates). SIDRA summary output per movement or approach shall be provided.*

   Comment

   A copy of the detailed SIDRA movement summary output is submitted with this correspondence as a CD, forming **Appendix 1**.

2. *Any modification (including traffic signal phasing and timing) to the existing traffic signal intersection at Treves Street and Merrylands Road shall be detailed and requires approval from the RMS.*

Comment

No modifications to the traffic signal operation are proposed or required.

3. *The Traffic Impact Assessment (October 2013 – Thompson Stanbury Associates) does not provide traffic distribution details. Graphical representation of traffic distribution assumptions shall be provided (i.e. traffic route origin/destinations shown as percentages).*

Comment

The trip assignment / distribution was provided in terms of additional or reduced traffic volume data in graphical form within **Figures 4** and **5** of the October 2013 Traffic Impact Assessment report. The preceding discussion in the report presented that additional traffic projected to be generated by the subject development was assigned in accordance with existing surveyed traffic distributions. This was however complicated by the fact that the proposal involved deletion and redistribution of existing right turn movements at the junction of Merrylands Road and Burford Street in conjunction with the deletion of existing site access and egress movements associated with existing development connecting with both Merrylands Road and Burford Street.

The simplified traffic distribution details of the development generated traffic, shown as percentages, is attached to this correspondence as **Appendix 2**.

4. *Traffic Impact Assessment (October 2013 – Thompson Stanbury Associates) recommended 'No Right Turn' movement on Merrylands Road and Burford Street during weekday peak periods. The installation of the restriction is subject to Holroyd Traffic Committee (HTC) and the matter will be reported to the next available meeting. Further comments will be proved following the HTC meeting.*

Comment

Noted.

5. *The Traffic Impact Assessment (October 2013 – Thompson Stanbury Associates) shall also address the following:*

   - *Impact of the proposed development on local roads with consideration for local road environmental capacities and impact on residential amenities including Burford Street, Addlestone Road and Newman Street.*

Comment

The Roads & Maritime Services provide environmental capacity performance standards on residential streets within its Guide to Traffic Generating Developments as follows:

- A local access street provides an environmental capacity of 300 vehicles per hour; and

- A collector street provides an environmental capacity of 500 vehicles per hour.

The application of the local access street environmental capacity analysis to Burford Street, Addlestone Road and Newman Street is considered unreasonable, given the connector function of the roads to the Merrylands town centre which results in the roads accommodating significant proportion of non-residential traffic. Accordingly, the above Roads & Maritime Services' environmental capacity for collector streets has been applied to the subject streets.

Table 1 provides a summary of the existing and projected peak hour two directional traffic demands within Burford Street, Addlestone Road and Newman Street, obtained from pre and post development traffic volume figures contained within the October 2013 Traffic Impact Assessment

TABLE 1
TWO-DIRECTIONAL PEAK HOUR TRAFFIC VOLUMES

	Burford Street	Addlestone Road	Newman Street
WITHOUT THE DEVELOPMENT			
2010 AM Peak	147	212	267
2010 PM Peak	173	211	317
2020 AM Peak	171	246	311
2020 PM Peak	201	245	368
WITH THE DEVELOPMENT			
2010 AM Peak	143	362	414
2010 PM Peak	191	297	399
2020 AM Peak	161	365	469
2020 PM Peak	207	316	459

Table 1 indicates that Burford Street, Addlestone Road and Newman Street are projected to continue to accommodate peak hour traffic demands below the environmental capacity specified by the Roads & Maritime Services for collector streets.

Further to the above, directional Burford Street, Addlestone Road and Newman Street traffic flows are projected to continue to operate with a worst case Level of Service 'B' up to 2020 incorporating the subject development, as defined by the Roads & Maritime Services' *Guide to Traffic Generating Developments*. This publication provides defines a Level of Service 'B' within urban conditions, a zone of stable flow whereby drivers have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream. In consideration of this and the above discussion, Burford Street, Addlestone Road and Newman Street are projected to continue to provide an acceptable Level of Service and amenity to abutting land-uses.

- *A Road Safety Audit/Assessment shall be undertaken on the pedestrian crossings at the intersection of Addlestone Road and Merrylands Road considering the impact of the increased traffic resulting from the proposed development and right turn restrictions at the intersection of Burford Street with Merrylands Road. Appropriate measures shall be recommended to address any issues identified.*

Comment

A raised marked pedestrian crossing is currently provided over Addlestone Road at its junction with Merrylands Road. This facility, when combined with a sign posted High Pedestrian Activity 40km/h speed limit along both Merrylands Road and Addlestone Road, approach warning signage and good sight distance between the crossing and the approach roads is considered to provide pedestrians with a safe and efficient management facility to cross Addlestone Road. The facility would not have been originally installed had it not met the relevant design criteria.

Table 1 indicates that the Addlestone Road traffic demands are projected to increase by a maximum of 150 vehicle movements during peak periods. This level of additional traffic, equating to, on average, an additional vehicle movement every 24 seconds, is not projected to alter the existing level of safety and efficiency experienced by pedestrians utilising the crossing facility.

It is however acknowledged that the likelihood of turning movements from Merrylands Road to Addlestone Road being delayed by these pedestrians utilising the facility could be increased. Such delays are however unlikely to have any unreasonable impacts on the efficiency of existing through Merrylands Road traffic movements as the existing pavement width (and existing parking restrictions) allow trailing through vehicles to pass decelerating or stationary vehicles wishing to undertake left and right turning movements. In consideration of this and the above discussion, no additional measures are considered to be warranted or therefore recommended for implementation.

- *Details of measures to encourage the use of sustainable forms of transport (i.e public transport, walking and cycling) shall be provided.*

The subject site is provided in close proximity to a range of public transport infrastructure. It is accordingly apparent that the development is likely to partly rely on public transport utilisation and other non-car relating travel. In this regard, a Green Travel Plan / Travel Access Guide could be considered for the subject development to provide a series of voluntary travel behaviour change initiatives aimed at encouraging the use of more sustainable transport such as walking, cycling, car pooling and public transport. The aim of the Plan would be to achieve travel behaviour change through raising awareness of alternatives to motor vehicle use.

The Plan would addresses the provision of advice to prospective residential apartment purchasers and tenants about the public transport options which are available, including the provision of the proposed car share spaces. A summary of suitable objectives and potential inclusions of a site based Plan is provided within **Appendix 3** for reference. It is considered that the preparation of such a Plan could reasonably be imposed by Council as a condition of consent.

6. *The car wash bay shall be a common, independent area and not serve as a visitor parking space.*

Comment

It is a common design solution for car wash bays to be combined with residential visitor parking. Council's Development Control Plans do not provide a specific requirement for the separation of car wash and visitor parking spaces. The provision of a separate car wash bay will result in the undesirable reduction in the number of parking spaces servicing the development. Accordingly, it requested that Council favourably consider the combining of the car wash bay with a residential visitor parking space.

7. *A long section of the ramps with a scale of 1:25 shall be provided and demonstrates no scraping or bottoming of the vehicular in accordance to AS2890.1-2004. It is noted that vehicles are likely to scrape at the top of the ramp on the ground floor.*

Comment

The amended architectural plans incorporate the required longitudinal sections of internal ramps. These sections illustrate the following design characteristics in accordance with AS2890.1-2004:

- Maximum ramp grade = 1:4;
- Maximum summit change ion grade = 1:8;
- Maximum sag change in grade = 1:6.7; and
- Minimum length of transitional grade = 2m.

The longitudinal sections have been provided at a scale of 1:50 in order to limit the plan size to A1.

8. *Columns in the basement car parks have been placed in the car spaces which do not comply with AS2890.1-2004. Plans shall be revised showing appropriate clearance from columns.*

Comment

In order to demonstrate that that the proposed column locations do not unreasonably impede passenger vehicle door opening or manoeuvrability, the standard passenger vehicle envelope (Figure 5.2 of AS2890.1-2004) has been overlayed on a number of parking spaces and detailed on the amended architectural plans.

Further to the above, it should be noted that the dimensions of all parking spaces illustrated on the plans are measured from the face of columns, thereby providing a true representation of the effective space dimensions.

9. *Fencing and structures at the entry/exit of the eastern and western side of the property shall be modified to ensure sight distance to pedestrians is not restricted in accordance with AS2890.1 – 2004.*

Comment

The amended architectural plans demonstrate compliance with Figure 3.3 of AS2890.1-2004, whereby there are no obstructions to visibility within a triangle measuring 2.5m x 2.0m adjoining the northern and southern sides of the Addlestone Road and Burford Road access driveways (proposed to accommodate exiting traffic).

10. *Sight distance between heavy vehicles exiting the western loading bay and cars exiting the car park is restricted by the wall structure at the top of the ramp at the ground floor. Structures (wall, ramp, etc) shall be modified or measures implemented to the address the issue.*

Comment

The architectural plans have been amended to provide a convex mirror at the southern end of the low height wall separating the loading bay and passenger vehicle access ramp to ensure that sight distance between the two is facilitated.

11. *The access to the western loading dock is on the opposing side of the driveway which is a safety concern (potential collision with cars exiting the site). The loading dock access shall be revised to resolve the safety issue.*

Comment

A short section of median is proposed to be provided within the western internal accessway in the vicinity of the basement access. The primarily purpose of this median is understood to assist in the appropriate distribution of overland water flow during flood events, however it is noted that the median will also assist in the effective separation of passenger vehicles entering and exiting the basement parking areas.

It is acknowledged that heavy vehicles servicing the loading docks and garbage collection area will be required to traffic around this median thereby entering into a potential conflict situation with passenger vehicles exiting the basement parking areas. Vehicles exiting the basement parking areas will therefore be required to give way to heavy vehicles entering the site and accordingly, appropriate priority linemarking and signposted will be required to govern the situation.

Whilst this is a somewhat non-standard arrangement, it is noted that vehicles exiting the basement parking area would have been required to give way to heavy vehicles entering the site if the median was not provided. In fact, the provision of the median actually improves the level of sight distance afforded to entering trucks by relocating the conflict point towards the southern boundary, away from the basement access tramp. In any event, it is considered that the proposed arrangement can be appropriately managed through the installation of appropriate approach warning ad regulatory signage.

12. *Swept path analyses indicates heavy vehicle encroaching into the wall/structure of the Sydney Water Canal. Amended swept path analyses shall be provided addressing this issue.*

Comment

Amended swept path plans for the ground floor are attached as **Appendix 4**.

13. *Swept path analysis shall be provided demonstrating that a vehicle can enter and exit the eastern car park in a forward direction when all the car spaces are occupied.*

Comment

The wide aisle width (7.8m) within the eastern car park is capable of accommodating a three point turn by a passenger vehicle. Swept paths demonstrating this are attached as **Appendix 4**.

14. *Entrances/ exit of stairs and lifts in both upper and lower basement should have a landing with a raised kerb. The width of the carpark aisle, internal roadway or car spaces shall not be reduced.*

Comment

In order to differentiate the entrances / exit of stairs and lifts from the remainder of the basement parking areas, the architectural plans have been amended to incorporate feature brick paving and a series of bollards in these areas in preference to raised kerbing.

15. *Wheel stops and/or bollards should be installed to stop vehicles from colliding with structures/devices which require protection (e.g. lifts, fire hydrants, mechanical devices etc).*

Comment

The amended architectural plans provide wheel stops where necessary.

16. *The northern edge of the vehicular crossing along Addlestone Road shall be perpendicular to the street in accordance to Holroyd City Council Vehicular Crossing Policy.*

Comment

The amended architectural plans ensure that the eastern development access driveway intersects with Addlestone Road at 90 degrees.

17. *Details of signs and linemarking shall be provided in a separate plan in accordance with Australian Standards. Signs and linemarking shall be shown for access points, treatments at intersections, treatment on ramps, designation of spaces, disabled spaces, location of convex mirrors, etc.*

Comment

A signage and linemarking plan is a normal requirement at Construction Certificate stage and one that can be conditioned in a development consent as requiring certification by a traffic engineer.

18. *The total provision of 54 resident bicycles parking shall be clearly shown on the plan.*

Comment

The amended architectural plans provide for 54 resident bicycle parking spaces.

19. *All updated plans shall be endorsed by a suitably qualified traffic practitioner.*

Comment

This correspondence provides the necessary endorsement of the amended architectural plans.

20. *The tandem spaces shall be for per single unit.*

Comment

The proposed development design facilitates this however it could also reasonably be imposed as a condition of development consent.

21. *All vehicles can enter and exit in a forward direction on and off the site.*

Comment

The proposed development design facilitates this however it could also reasonably be imposed as a condition of development consent.

It would be appreciated if the additional information within this correspondence could be incorporated within Council's ongoing assessment of the subject application.

Submitted for your consideration.

Yours faithfully,

David Thompson
Transport Planner