



**PROPOSED FOOD AND DRINK PREMISES AND
NEIGHBOURHOOD SHOP DEVELOPMENT**

LOTS 85 AND 87 DP 1167633

HANRAHAN PLACE, ORANGE

Traffic and Parking Assessment Report

21 July 2015

Ref: 14073

Prepared by

Terraflow Pty Ltd
Traffic and Parking Consultants



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1. INTRODUCTION

This report has been prepared to accompany Development Application (DA) to Orange City Council for a proposed food and drink premises and neighbourhood shop development on two (2) sites known as Lots 85 and 86, DP1167633, Hanrahan Place, Orange (Figures 1 and 2).

The development sites are generally located on the north-eastern corner of the Northern Distributor Road/Leeds Parade/Hanrahan Place intersection. Both sites straddle Hanrahan Place with Lot 85 having a total site area of 5,027m² and frontage of 153.7m to Hanrahan Place. Lot 87 has a site area of 4,550m² and 102.6m frontage to Hanrahan Place.

Both development sites are currently vacant. A survey plan prepared by Craig Jaques & Associates (Orange) Pty Ltd is reproduced in the following pages.

The proposal includes:

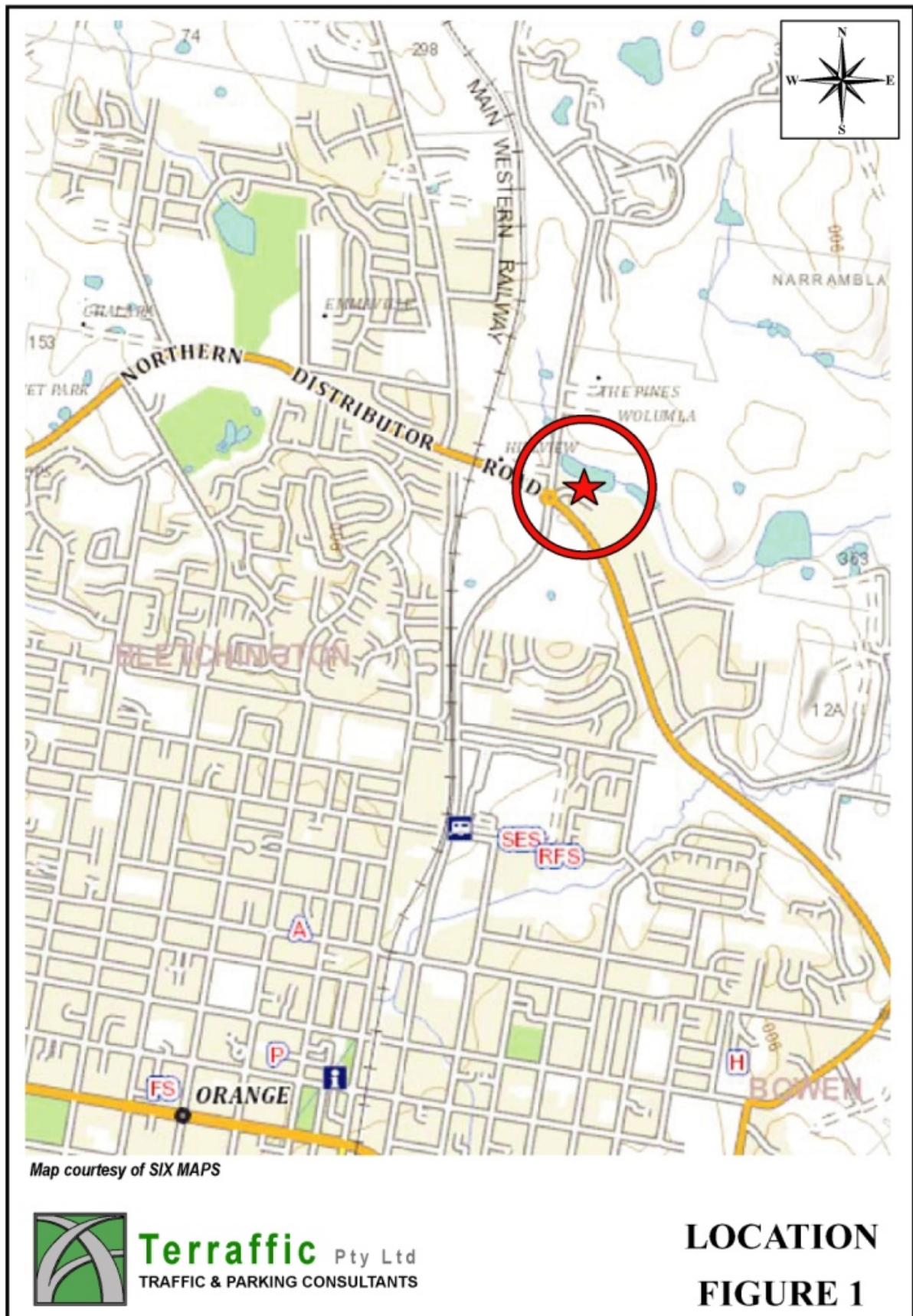
- A single takeaway food and drink premises with a drive-through facility on Lot 85 DP 1167633 along with a small complex for 4 tenants that is proposed to comprise 2 smaller takeaway food and drink premises; a restaurant/cafe; and a neighbourhood shop. The total GFA for the 4 retail tenancies will be 401.6m².
- A small complex for 3 tenants and off-street parking on Lot 87 DP 1167633. The complex is proposed to provide a takeaway food and drink premises; a restaurant/cafe; and a neighbourhood shop. The total GFA for the 3 retail tenancies will be 300.32m². The site includes a future liquor outlet comprising a drive-through facility that can accommodate 2 parked cars and up to 8 queued vehicles (a total of up to 10 vehicles).

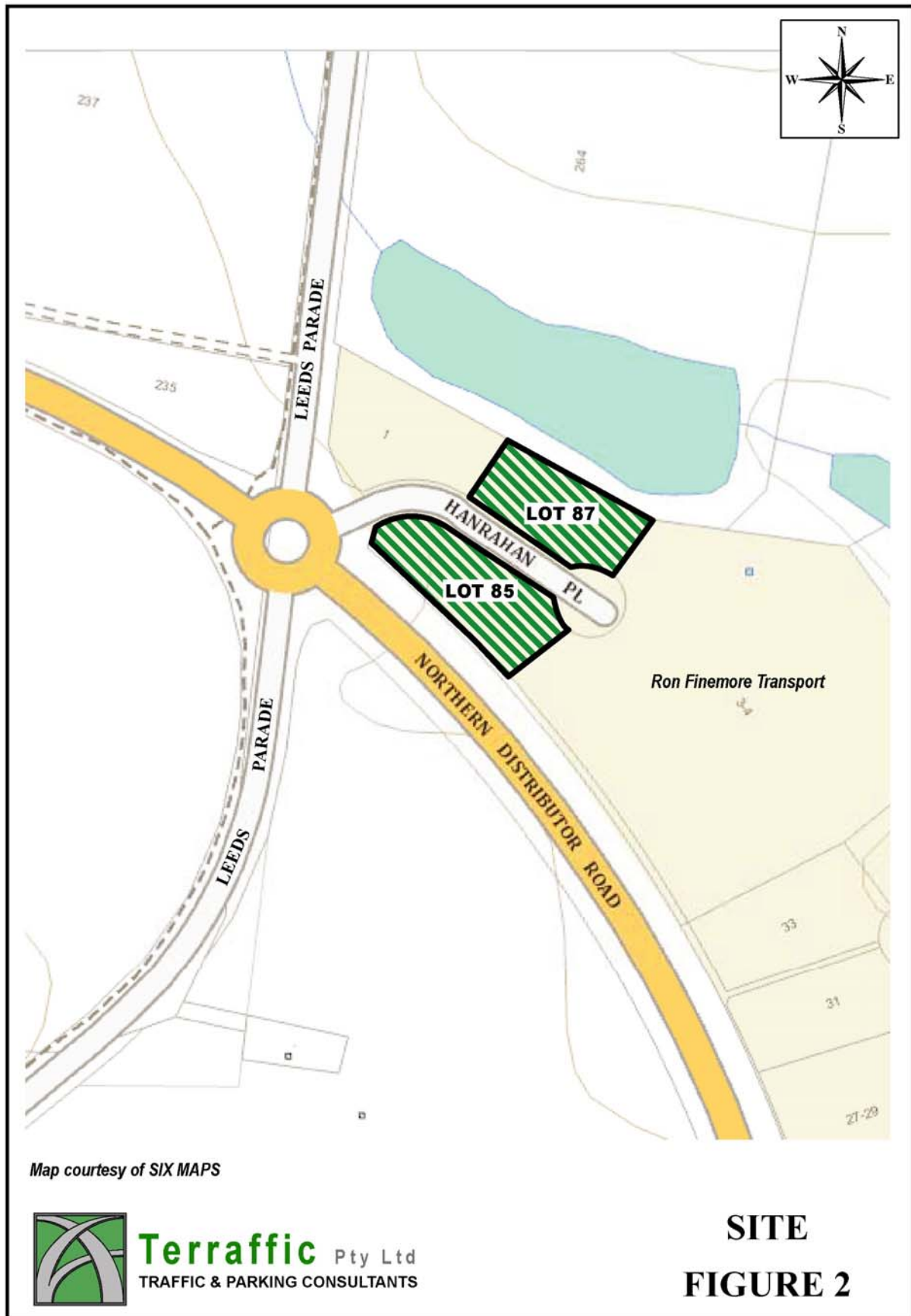
The purpose of this report is to assess the traffic and parking implications of the development proposal. To that end, this report:

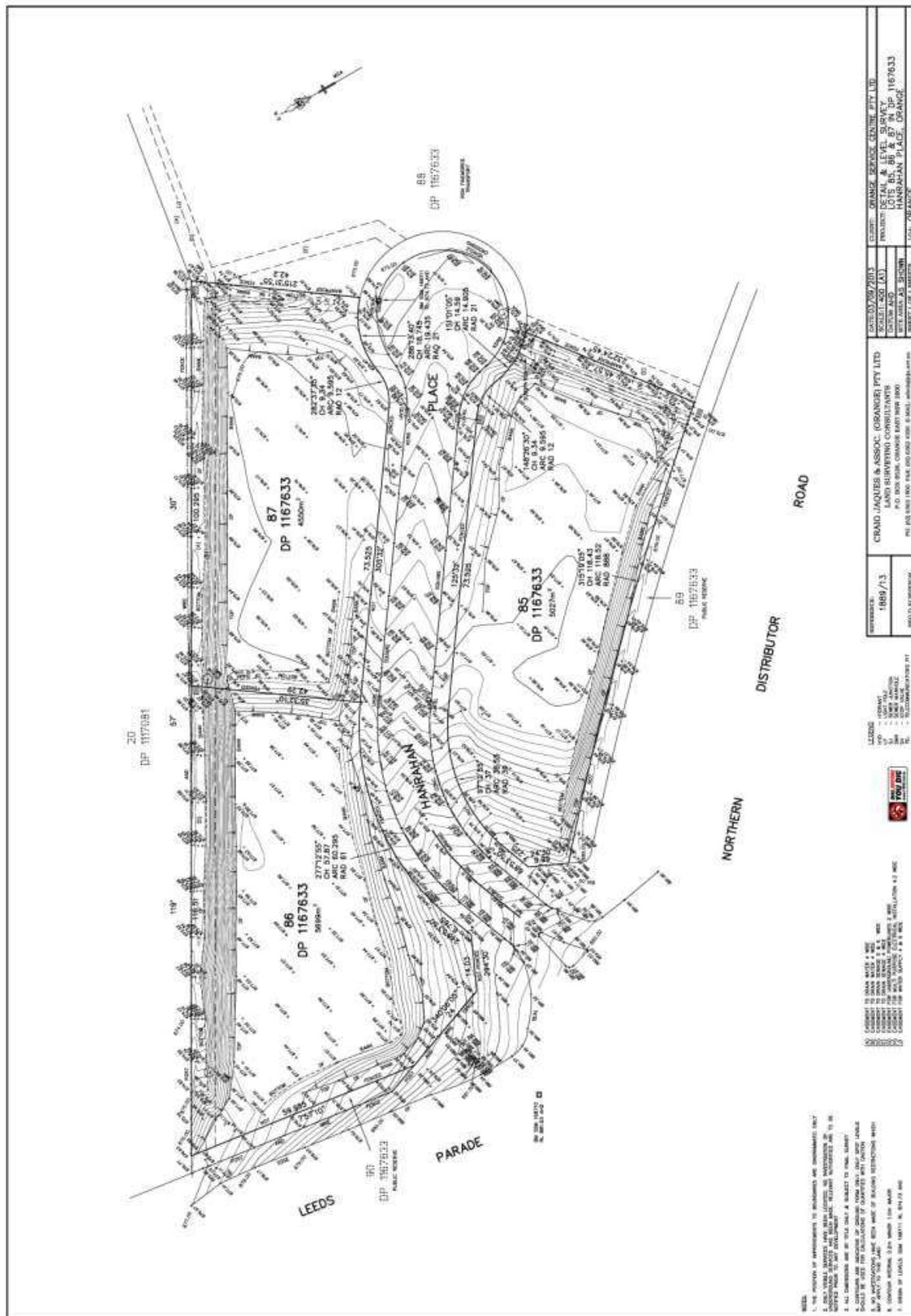
- describes the site and provides details of the development proposal



- assesses the adequacy and suitability of the quantum of off-street carparking provided on the site
- assesses the adequacy and suitability of the loading facilities provided on the site
- reviews the geometric design features of the proposed carparking facilities for compliance with the relevant codes and standards
- reviews the road network in the vicinity of the site, and the traffic conditions on that road network
- estimates the traffic generation potential of the proposed developments and assigns the additional traffic generation to the road network serving the site
- collates information and traffic generation data for the proposed developments in the vicinity of the site (Woolworths Filling Station and Bunnings)
- assesses the traffic implications of the development proposal in terms of road network capacity









2. PROPOSED DEVELOPMENT

Development on Lot 85 DP 1167633

As noted in the Introduction, the proposed development within Lot 85 DP 1167633 comprises:

Stand-Alone Takeaway Food and Drink Premises

This building has a gross floor area of approximately 316.46m² and drive-through facilities. As a tenant is yet to be secured for this shop, an internal layout and seating arrangement is unknown at this stage. It is understood that a future DA for signage and fit-out will be required for the eventual tenant.

This building will be served by approximately 25 off-street car parking spaces and a drive-through facility. A loading bay capable of accommodating the Australian Standard AS2890.2:2002 8.8m long Medium Rigid Vehicle (MRV) has been provided to serve the premises.

Small Complex (4 Tenancies)

The proposed small complex comprises 4 tenancies with a total gross floor area of 401.6m² (approximately 100m² each). The proposed tenancies include 2 x takeaway food and drink premises, 1 x cafe/restaurant and 1 neighbourhood shop. A common amenities area is proposed and would provide male, female and accessible toilets, as well as a cleaner room and plant room.

The complex will be served by approximately 39 off-street car parking spaces. A communal loading bay capable of accommodating the 8.8m long MRV has been provided adjacent to the bin area and amenities area.

Vehicular access to the 64 spaces serving the proposed development on Lot 85 comprises a centrally located combined 8.0m wide entry/exit driveway and a 6.0m wide exit only driveway located towards the western end of the site. The site has been designed so that all vehicles can enter and exit in a forward direction.



The proposed development within Lot 87 DP 1167633 comprises:

Small Complex (3 Tenancies)

The proposed complex comprises 3 tenancies with a combined total floor area of 300.32m². The proposed tenancies include 1 x takeaway food and drink premises, 1 x cafe/restaurant and 1 neighbourhood shop. A common amenities area is proposed and would provide male, female and accessible toilets, as well as a cleaner room and plant room.

The complex will be served by up to 21 off-street car parking spaces. A communal loading bay capable of accommodating the 8.8m long MRV has been provided adjacent to the bin area and amenities area.

Future Liquor Outlet (subject to LEP amendment)

The future liquor outlet/shop has a floor area of approximately 572.62m² and a drive-through facility that can accommodate 2 parked cars and up to 8 queued vehicles (a total of up to 10 vehicles).

The future liquor shop will be served by up to 26 off-street car parking spaces plus the 10 vehicles associated with the drive-through facility (approximately 36 vehicles in total). A loading bay capable of accommodating the Australian Standard AS2890.2:2002 8.8m long Medium Rigid Vehicle (MRV) has been provided to serve the future liquor shop.

Vehicular access to the 47 spaces serving the proposed development on Lot 87 comprises a combined 6.2m wide entry/exit driveway located towards the western end of the site and a 7.5m wide combined entry/exit driveway located towards the eastern end of the site. The site has been designed so that all vehicles can enter and exit in a forward direction.

Plans of the proposed development prepared by TVS Architects are reproduced in Appendix A of this report.



3. PARKING ASSESSMENT

Orange Development Control Plan 2004 (30 June 2007) specifies the following parking requirements which are relevant to the proposed development:

Shops and Shopping Centres (0 - 10,000m²GLFA)

6.1 spaces per 100m² GLFA

Restaurants (outside of CBD)

1 spaces per 10m² GFA or 1 space per 3 seats whichever is greater

Fast Food Outlet - Development with no on-site seating or drive-through facilities:

12 spaces per 100m² GFA

Fast Food Outlet - Development with on-site seating and drive-through facilities, the greater of:

1 space per 2 seats (internal seating), or

1 space per 3 seats (internal and external seating)

As noted in the foregoing, a tenant is yet to be secured for the fast food outlet on Lot 85. As such, a seating plan has not been prepared at this stage. This assessment will therefore assume that the proposed fast food outlet on Lot 85 will accommodate a total of 75 internal and external seats.

Application of those requirements to the proposed development yields the following parking requirements:

Lot 85 (Fast food, restaurant and neighbourhood shop)

Neighbourhood shop (1 tenancy of 100m²)

100m² @ 6.1 spaces per 100m² 6 spaces

Restaurant or cafe (1 tenancy of 100m²)

100m² @ 1 space per 10m² 10 spaces

Fast Food (2 tenancies of 100m² each)

200m² @ 12 spaces per 100m² 24 spaces

Fast Food Outlet

75 internal/external seats @ 1 space per 3 seats 25 spaces

Total 65 spaces

As noted in the foregoing, the proposed development on Lot 85 provides a total of 64 spaces representing a shortfall of 1 space when calculated in accordance with the Council DCP. As



can be appreciated, this shortfall is very minor and is acceptable in this case especially as the drive-through facility for the takeaway food and drink premises should allow queuing for approximately 9 to 10 vehicles.

Lot 87 (Future liquor outlet, fast food, restaurant and neighbourhood shop)

Neighbourhood shop (1 tenancy of 100m²)

100m² @ 6.1 spaces per 100m² 6 spaces

Restaurant or cafe (1 tenancy of 100m²)

100m² @ 1 space per 10m² 10 spaces

Fast Food (1 tenancy of 100m²)

100m² @ 12 spaces per 100m² 12 spaces

Future Liquor Outlet

572.62m² @ 6.1 spaces per 100m² 35 spaces

Total 63 spaces

The proposed retail development on Lot 87 provides a total of 47 spaces representing a shortfall of 16 spaces when calculated in accordance with the Council DCP. This shortfall is considered acceptable in this case as:

1. The proposed drive-through facility serving the future liquor shop can accommodate 2 parked cars and a queue of up to 8 cars (a total of 10 vehicles) which will effectively reduce the parking shortfall to only 6 spaces
2. It is anticipated that customers of one component of a development will also patronise another (*dual use* of parking). For instance, a proportion of customers to the neighbourhood shop or restaurant can be expected to patronise the future liquor shop.
3. *Complementary use* of parking spaces occurs when the peak parking demand of one component of a development does not coincide with the peak parking demand of another. In this case, the peak parking demand of the future liquor outlet or restaurant may be after 5pm weekdays and on weekends, whereas the peak parking demand of the neighbourhood shop is throughout the weekday (9am-5pm).



4. If the amendment to the LEP is not approved and the liquor shop is not permissible, the layout of the liquor shop can be modified to comply with the parking requirements of the DCP.

The carparking and access arrangements have also been designed in accordance with the requirements of the Australian Standard AS/NZS2890.1:2004 – “*Off-street car parking*” as follows:

- *Class 3 (short-term)* parking spaces have a minimum length of 5.5m and width of 2.6m
- *Class 3 (short-term)* manoeuvring aisle has a minimum width of 6.2m
- An additional 0.3m has been provided for spaces adjacent to a wall or obstruction
- Dead-end aisle extensions 1.0m wide have been provided as per Figure 2.3 of the Standard
- Access driveways satisfy the width requirements of Clause 3.2 of the Standard
- Pedestrian and vehicle sight lines have been provided in accordance with Clause 3.2.4

The disabled parking spaces have also been designed in accordance with the Australian Standard AS/NZS2890.6:2009 – “*Off-street parking for people with disabilities*” as follows:

- A 5.4m long x 2.6m wide dedicated (non-shared) parking space
- An adjacent shared area that is also 5.4m long x 2.4m wide
- Pavement cross-falls in disabled spaces do not exceed 2.5% (1 in 40) in any direction

In the circumstances, it can be concluded that the parking provision incorporated in the development proposal is adequate such that the proposed development has no unacceptable parking implications.



4. SERVICING ASSESSMENT

The Australian Standards AS/NZS2890.1:2004 -“*Off-street car parking facilities*” and AS2890.2:2002 -“*Off-street commercial vehicle facilities*” identify the following categories of trucks and delivery vehicles:

Standard	Vehicle class	Length	Width	Clearance height	Design turning radius
AS2890.1	B99 courier van	5.2m	1.94m	2.2m	6.3m
AS2890.2	Small Rigid Vehicle (SRV)	6.4m	2.3m	3.5m	7.1m
AS2890.2	Medium Rigid Vehicle (MRV)	8.8m	2.5m	4.5m	10.0m
AS2890.2	Heavy Rigid Vehicle (HRV)	12.5m	2.5m	4.5m	12.5m
AS2890.2	Articulated Vehicle (AV)	19.0m	2.5m	4.5m	12.5m

Small Complexes

The small complexes proposed on Lots 85 and 87 contain communal loading areas capable of accommodating Medium Rigid Vehicles (MRV). The loading areas are located adjacent to the bin areas and will provide convenient access to each tenancy.

While there is no specific data available to accurately predict the number of deliveries per day, it can be assumed that each tenancy will not generate more than say 2 deliveries per day. To that end, the commercial vehicle activity will be as follows:

Lot 85	4 shops @ 2 deliveries per day	8 deliveries per day
Lot 87	3 shops @ 2 deliveries per day	6 deliveries per day
Total commercial delivery activity		14 deliveries per day

Deliveries can be co-ordinated amongst tenancies to ensure that large commercial vehicles do not queue in the carpark. It should be noted that during non-peak periods, deliveries by courier vans can be carried out in parking spaces adjacent to each tenancy.



The ability of the MRV to access each site and manoeuvre to/from the loading areas has been tested using the AutoTrack computer simulation software. This test found that the MRV can comfortably access the site and the loading areas. Manoeuvring paths of the MRV are shown on the architectural plans.

Stand-Alone Takeaway Food and Drink Premises (Lot 85)

This building contains a dedicated loading area capable of accommodating the MRV. The loading area is located adjacent to the building and will provide convenient access to the premises.

While there is no specific data available to accurately predict the number of deliveries per day, it can be assumed that the premises will generate in the order of 4-5 deliveries per day ranging from courier vans to MRV's.

The ability of the MRV to manoeuvre to/from the loading area has also been tested using the AutoTrack computer simulation software. This test found that the MRV can comfortably access the loading area serving the fast food outlet. Manoeuvring paths of the MRV are shown on the architectural plans.

Future Liquor Outlet (Lot 87)

The proposed Liquor Outlet on Lot 87 contains a dedicated loading area capable of accommodating the MRV. The loading area is located adjacent to the building and will provide convenient access to the shop. It can be assumed that the liquor outlet will generate in the order of 2-3 deliveries per day ranging from courier vans to MRV's.

The ability of the MRV to manoeuvre to/from the loading area has also been tested using the AutoTrack computer simulation software. This test found that the MRV can comfortably access the loading area serving the fast food outlet.

In the circumstances, the proposed development will have no unacceptable servicing implications.



5. TRAFFIC ASSESSMENT

Existing Road Network

Northern Distributor Road is an unclassified road performing a sub-arterial road function. It forms an alternate route for traffic bypassing the Orange City Centre. The Northern Distributor Road has an undivided carriageway that generally carries a single lane of traffic in each direction. The intersection of Northern Distributor Road/Leeds Parade/Hanrahan Place is controlled by a two lane roundabout.



**Aerial photograph of the
Northern Distributer Rd/Leeds Pde/Hanrahan Pl roundabout**

Hanrahan Place is an unclassified local road with a primary function of providing access to properties along its length. It has a pavement width of 13m and carries a single lane of traffic in each direction. The only traffic currently utilising Hanrahan Place is that generated by Ron Finemore Transport located at the end of Hanrahan Place.



Existing Traffic Conditions

An indication of the existing traffic conditions on the road network in the vicinity of the site is provided by peak period traffic surveys undertaken at the intersection of Northern Distributor Road/Leeds Parade/Hanrahan Place between 4.00-6.00pm on Friday 5th September 2014 and 11.00am – 1.00pm on Saturday 6th September. The results of the traffic surveys are illustrated on Figure 3 and Figure 4 and reveal that:

- the traffic flow on Northern Distributor Road past the site during the weekday afternoon peak period was 528 vehicles per hour (vph) comprising 290vph heading westbound and 238vph heading eastbound
- during the afternoon peak, Hanrahan Place carries in the order of only 32vph with the majority of that traffic departing Hanrahan Place
- the traffic flow on Northern Distributor Road past the site during the Saturday midday peak period was 325vph comprising 142vph heading westbound and 183vph heading eastbound
- during the Saturday peak, Hanrahan Place carries in the order of only 11vph

Traffic Generating Potential of Proposed Development

Section 3.11 of the RMS publication “*Guide to Traffic Generating Developments*” (October 2002) specifies the following traffic generating rates that can apply to the proposed development:

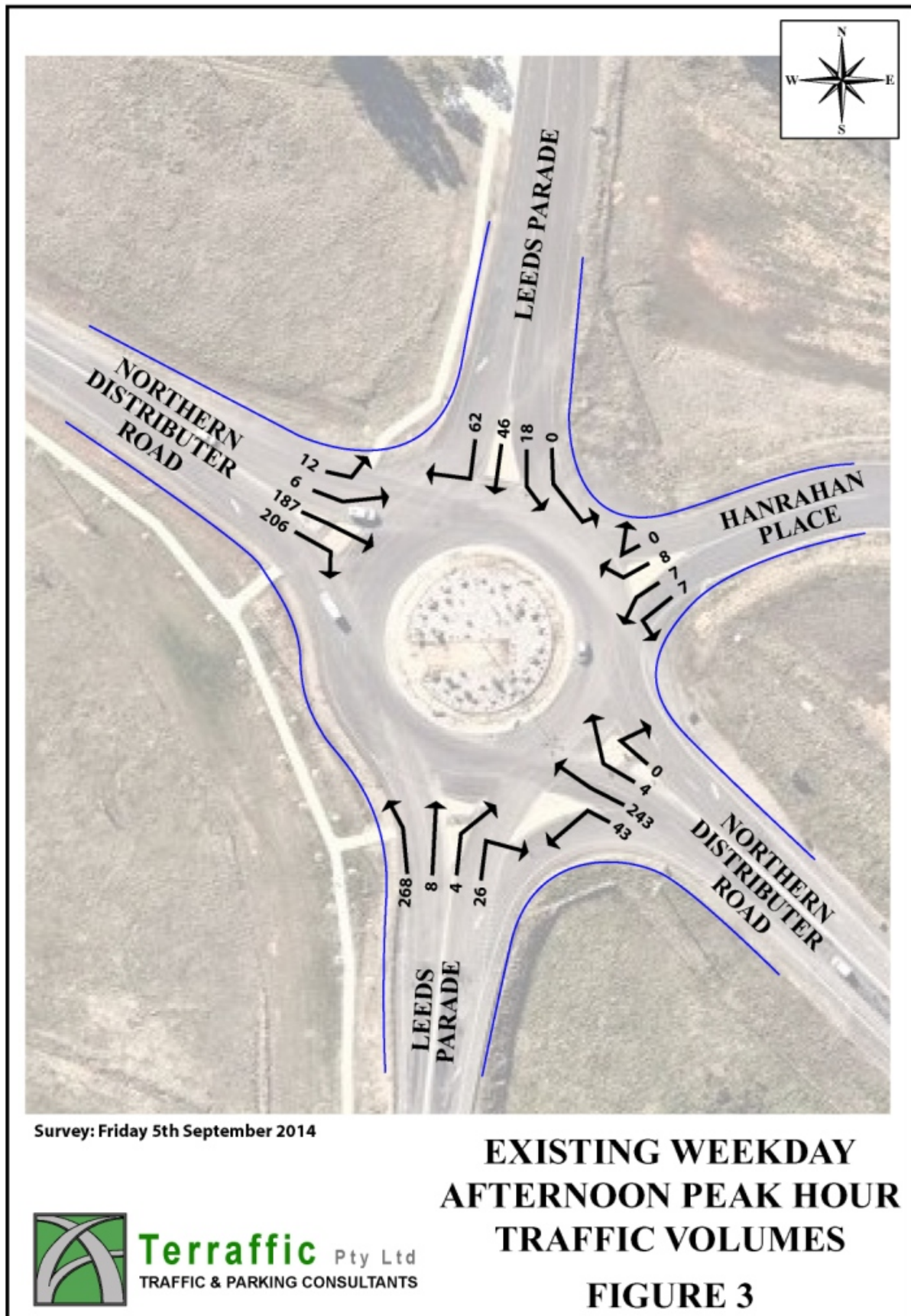
Specialty Retail

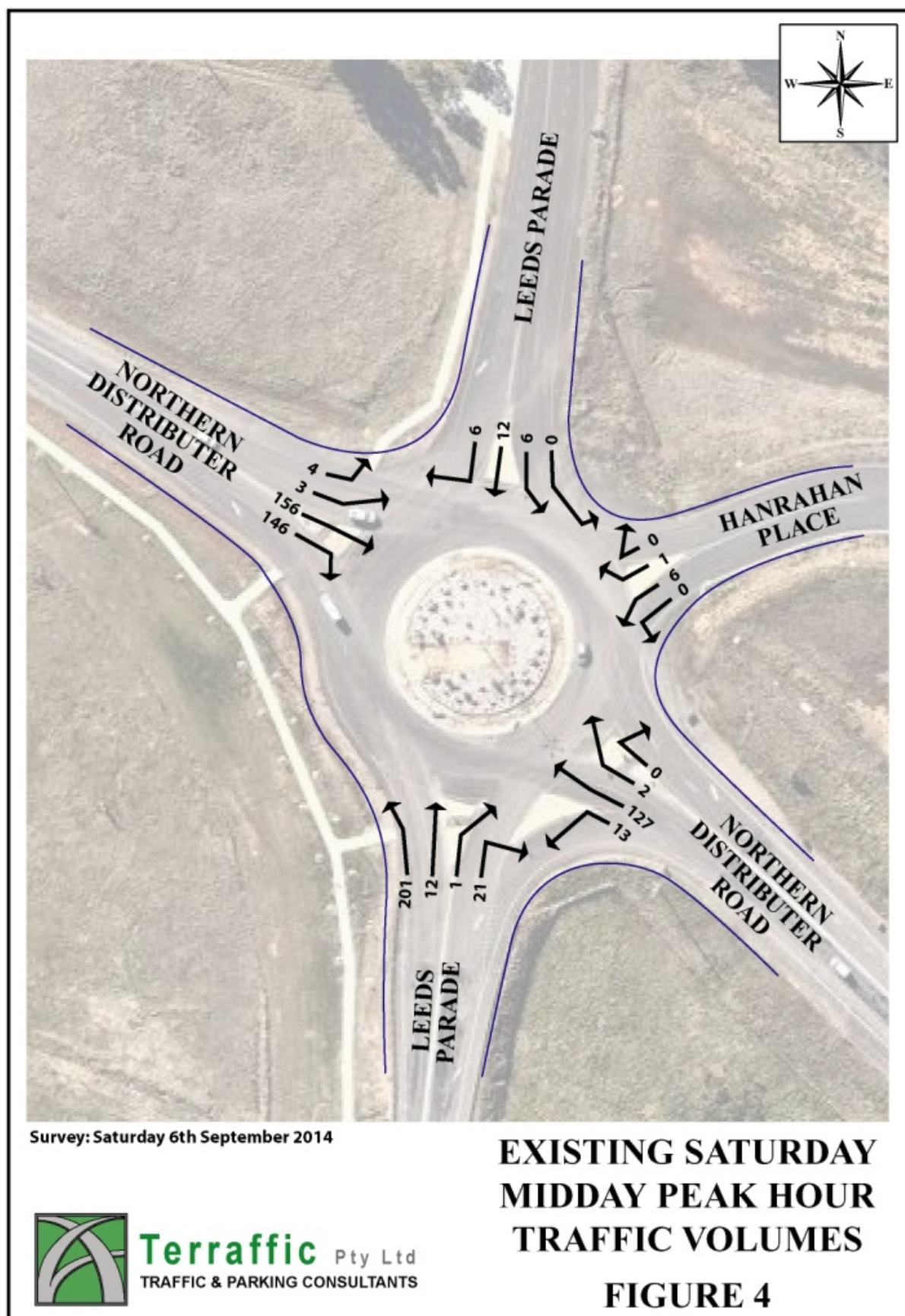
Friday Evening Peak Periods	5.6vtph per 100m ²
Saturday Midday Peak Periods	10.7vtph per 100m ²

Drive-in take away food outlets (assume KFC)

Evening peak hour vehicle trips:

- assume 100vtph for average development (mean of survey results).
- for sensitivity test, assess effect of 120vtph (maximum of survey results).







Application of the abovementioned RMS traffic generating rates to the remaining components of the proposed development yields the following:

Friday Afternoon Peak Period

Lot 85 tenancies	401.6m ² @ 5.6vtph per 100m ²	22vtph
Lot 85 Fast Food	(assume KFC average)	100vph
Total Lot 85		122vph (61 in / 61 out)
Lot 87 tenancies	300.32m ² @ 5.6vtph per 100m ²	17vtph
Lot 85 Liquor Outlet	572.62m ² @ 5.6vtph per 100m ²	32vtph
Total Lot 85		49vph (24 in / 25 out)
Combined Lot 85 + Lot 87		171vph (85 in / 86 out)

Saturday Midday Peak Period

Lot 85 tenancies	401.6m ² @ 10.7vtph per 100m ²	43vtph
Lot 85 Fast Food	(assume KFC peak)	120vph
Total Lot 85		163vph (82 in / 81 out)
Lot 87 tenancies	300.32m ² @ 10.7vtph per 100m ²	32vtph
Lot 85 Liquor Outlet	572.62m ² @ 10.7vtph per 100m ²	62vtph
Total Lot 85		94vph (47 in / 47 out)
Combined Lot 85 + Lot 87		257vph (129 in / 128 out)

For the purposes of providing a conservative assessment, the following traffic generating characteristics have been adopted for the combined Lots:

Friday Afternoon Peak Period	180vph (90 in / 90 out)
Saturday Midday Peak Period	274vph (137 in / 137 out)

The RMS Guidelines also note the following with regard to passing trade associated with shopping centres:

The incidence of linked and multi-purpose trips can reduce overall trip generation rates. A linked trip is a trip taken as a side-track from another trip, for example, a person calling in to the centre on the way home from work. A multi-purpose trip is where more than one shop or facility is visited. Any trip discounts would apply differently in new free-standing centres and for new shops within existing



centres. Discounts in the former case vary depending on the nature of the adjacent road network. With the latter case, an average discount of about 20% is suggested, with this figure reducing with increasing centre size, with rates of 25% (less than 10,000 m² GLFA), 20% (10,000-30,000 m² GLFA) and 15% (over 30,000 m² GLFA) indicative. Note that these discounts apply to trip generation but not to parking demand. Discounts of this nature should not apply without adequate substantiation.

In accordance with the RMS Guidelines, this assessment will apply a 25% discount for multi-purpose and linked trips. To that end, the additional traffic generated by the proposed development on the local road network will be as follows:

Friday Afternoon Peak Period (180vtph x 0.75)

Combined Lot 85 + Lot 87 135vph (67 in / 68 out)

Saturday Midday Peak Period (274vtph x 0.75)

Combined Lot 85 + Lot 87 206vph (103 in / 103 out)

Neighbouring Traffic Generating Developments Currently Under Review by Council

In addition to the proposed development, an application has been recently made to Orange City Council for a proposed petrol filling station on the vacant site adjacent to Lot 87. The proposed filling station on the corner of Leeds Parade and Hanrahan Place will be operated by Woolworths and will contain a convenience store and drive-through cafe.

Vehicular access to this development is via an entry only driveway off Hanrahan Place and exit only driveway to Leeds Parade. The traffic and parking assessment for the proposed Woolworth petrol station was carried out in June 2014 by Colston Budd Hunt & Kafes Pty Ltd (CBHK). The report estimated that the proposed filling station would generate 240vtph (120 in / 120 out) during the weekday afternoon and Saturday midday peak periods.

The CBHK report also noted an application was made in 2013 for a proposed 17,345m² Bunnings on the north-western corner of the Northern Distributer Road/Leeds Parade intersection. Access to the proposed Bunnings is via a left in/left out access driveway directly onto the Northern Distributer Road and via two combined entry/exit driveways off Leeds Parade. The access driveways on the Northern Distributer Road and the southernmost access



off Leeds Parade will provide vehicular access to 330 off-street carparking spaces serving the site.

According to the CBHK report, the traffic report prepared for the proposed Bunnings development estimated that it would generate 310vtph (155 in / 155 out) during the weekday evening peak and 600vtph (300 in / 300 out) during the Saturday midday peak. Some 15% of Bunnings traffic on weekdays and some 10% on Saturdays would be passing trade.

The projected traffic generating flows for the proposed development and neighbouring developments are illustrated on Figures 5 to 9 as follows:

Figure 5	Proposed Lot 85 and Lot 87 Traffic Assignment (Friday Evening Peak)
Figure 6	Proposed Lot 85 and Lot 87 Traffic Assignment (Saturday Midday Peak)
Figure 7	Proposed Woolworths Petrol Station Traffic Assignment (Friday and Saturday Peaks)
Figure 8	Proposed Bunnings Traffic Assignment (Friday Evening Peak)
Figure 9	Proposed Bunnings Traffic Assignment (Saturday Midday Peak)

It should be noted that the traffic assignment for the Woolworths Petrol Station was illustrated in the CBHK report, however the Bunnings traffic assignment was not illustrated. To that end, this assessment has assumed the following:

- 40% of traffic will be drawn from the west of the site along the Northern Distributor Road
- 40% of traffic will be drawn from the east of the site along the Northern Distributor Road
- 20% of traffic will be drawn from the south of the site along Leeds Parade

Traffic Implications of Proposed Development

The main traffic implications of the proposed development plus neighbouring sites in terms of road network capacity concern the effect of the additional traffic demand generated by these developments on the operating performance of the Northern Distributer Road/Leeds Parade/Hanrahan Place roundabout.

That effect can be assessed using the SIDRA traffic model and criteria for interpreting the results of SIDRA analysis are set out on the schedule reproduced in the following pages.



The results of the SIDRA analysis of the operating performance of the Northern Distributer Road/Leeds Parade/Hanrahan Place roundabout under existing conditions and projected post-development traffic demand is set out in Table 5.1 and on the SIDRA MOVEMENT SUMMARY SHEETS reproduced in Appendix B.

TABLE 5.1 – RESULTS OF SIDRA ANALYSIS OF NORTHERN DISTRIBUTOR ROAD/LEEDS PARADE/HANRAHAN PLACE INTERSECTION

	Level of Service	Degree of Saturation	Total Average Vehicle Delay (sec)
Friday Afternoon Peak - Existing	A	0.216	7.3
Friday Afternoon Peak - Projected	A	0.264	9.0
Saturday Midday Peak - Existing	A	0.139	6.8
Saturday Midday Peak - Projected	A	0.244	9.3

As can be seen, the SIDRA analysis reveals that the intersection operates satisfactorily under existing and projected post-development traffic demand. The additional traffic generated by the proposed development, the proposed Bunnings and proposed Woolworths Filling Station will have minimal impact on the operating performance of the Northern Distributer Road roundabout.

In the circumstances, it can be concluded that the proposed development has no unacceptable traffic implications.



Criteria for Interpreting Results of SIDRA Analysis

1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good operation.	Good operation.
'B'	Good with acceptable delays and spare capacity.	Acceptable delays and spare capacity.
'C'	Satisfactory.	Satisfactory but accident study required.
'D'	Operating near capacity.	Near capacity and accident study required.
'E'	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode.	At capacity and requires other control mode.
'F'	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode.

2. Average Vehicle Delay (AVD)

The AVD provides a measure of the operational performance of an intersection as indicated on the table below which relates AVD to LOS. The AVD=s listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (ie inner city conditions) and on some roads (ie minor side street intersecting with a major arterial route).

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

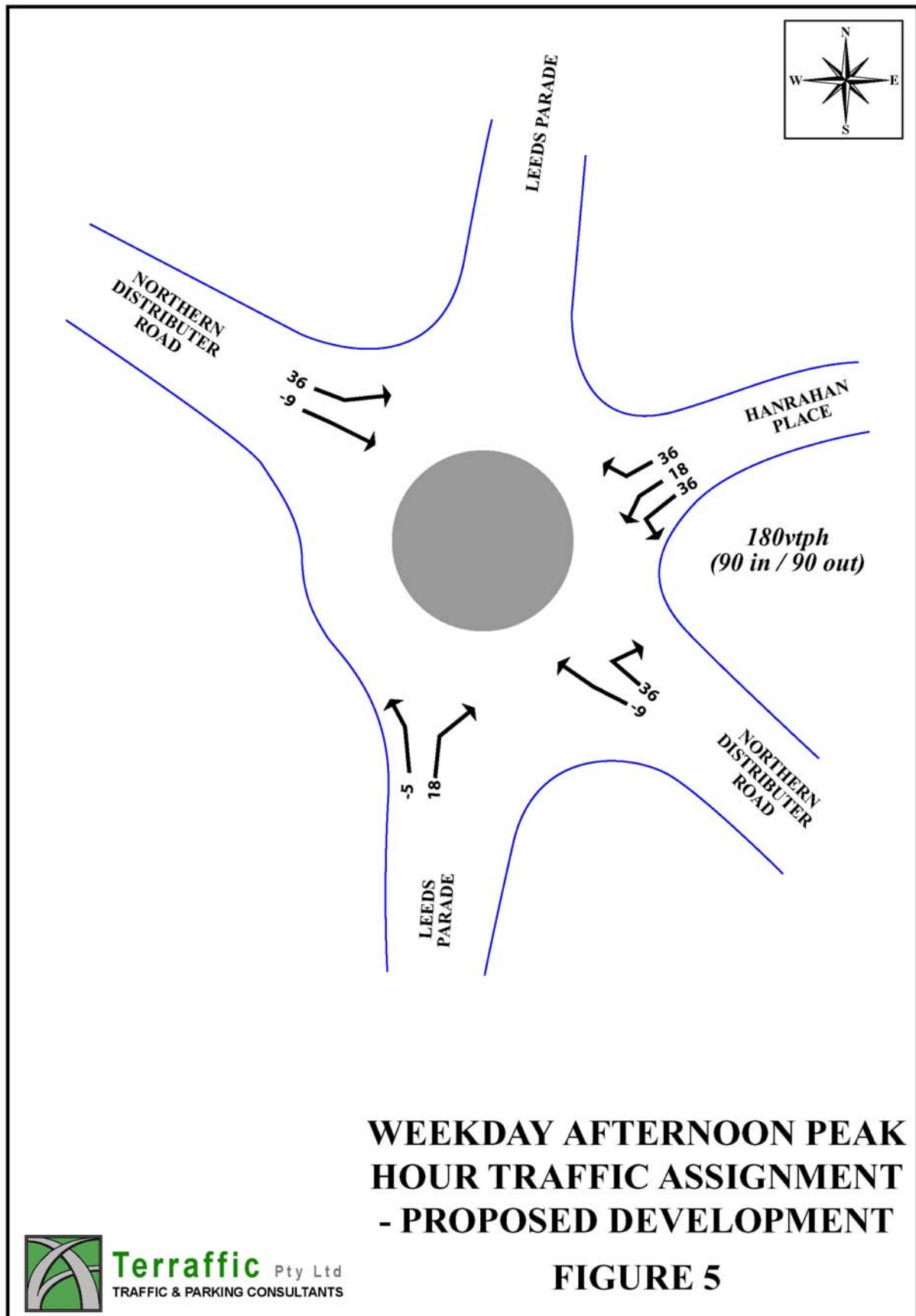
3. Degree of Saturation (DS)

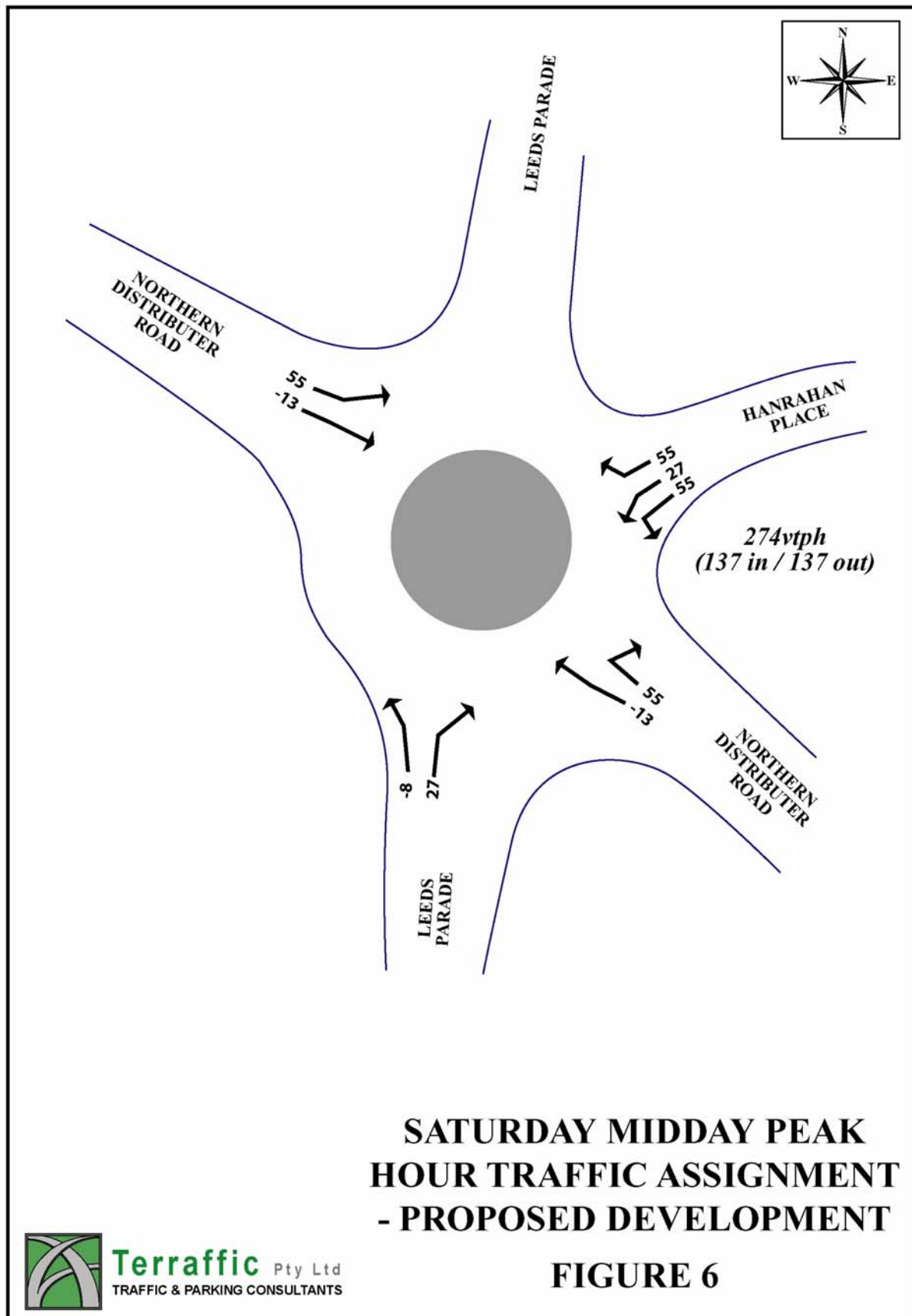
The DS is another measure of the operational performance of individual intersections.

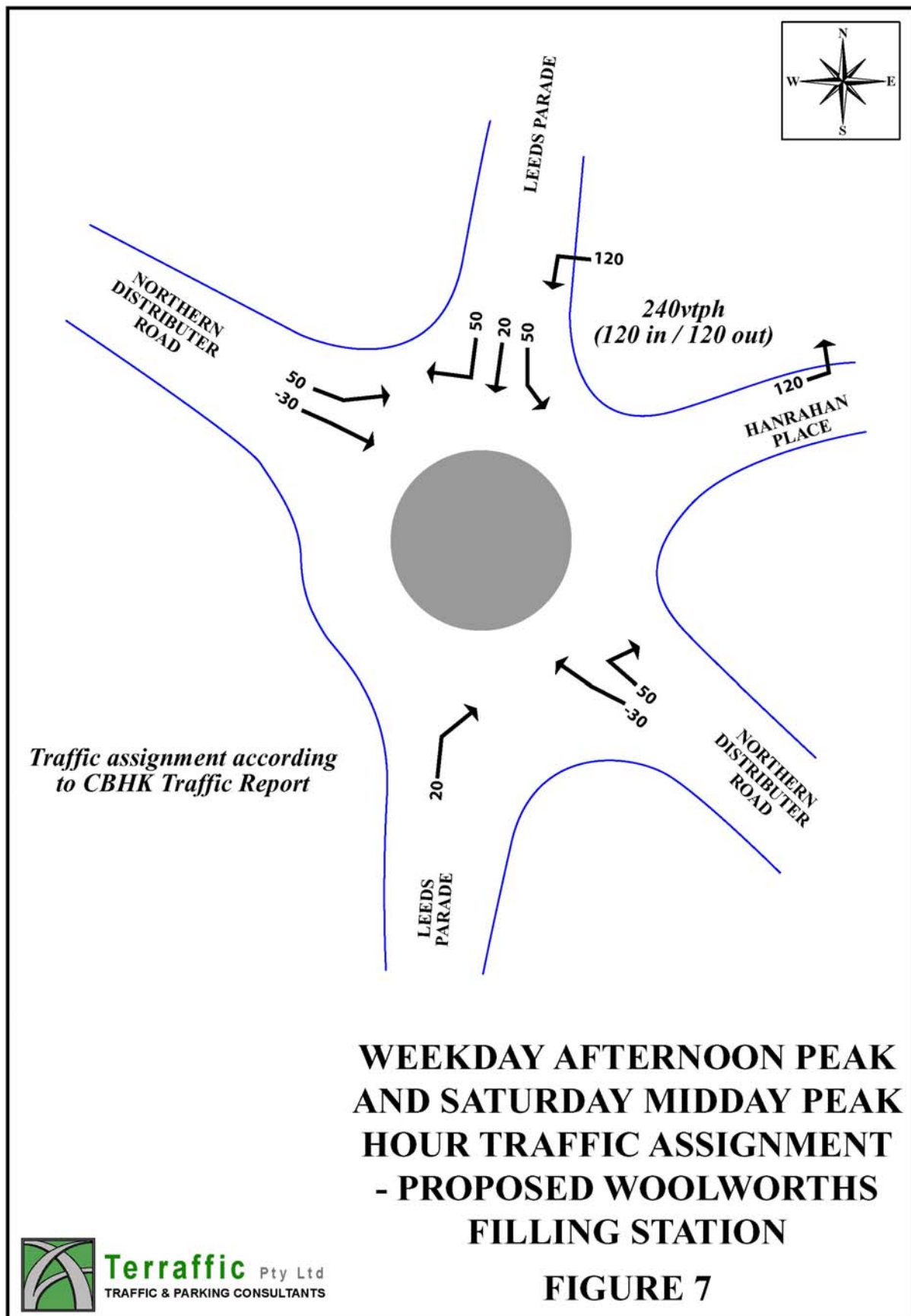
For intersections controlled by traffic signals¹ both queue length and delay increase rapidly as DS approaches 1, and it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 queues can be anticipated.

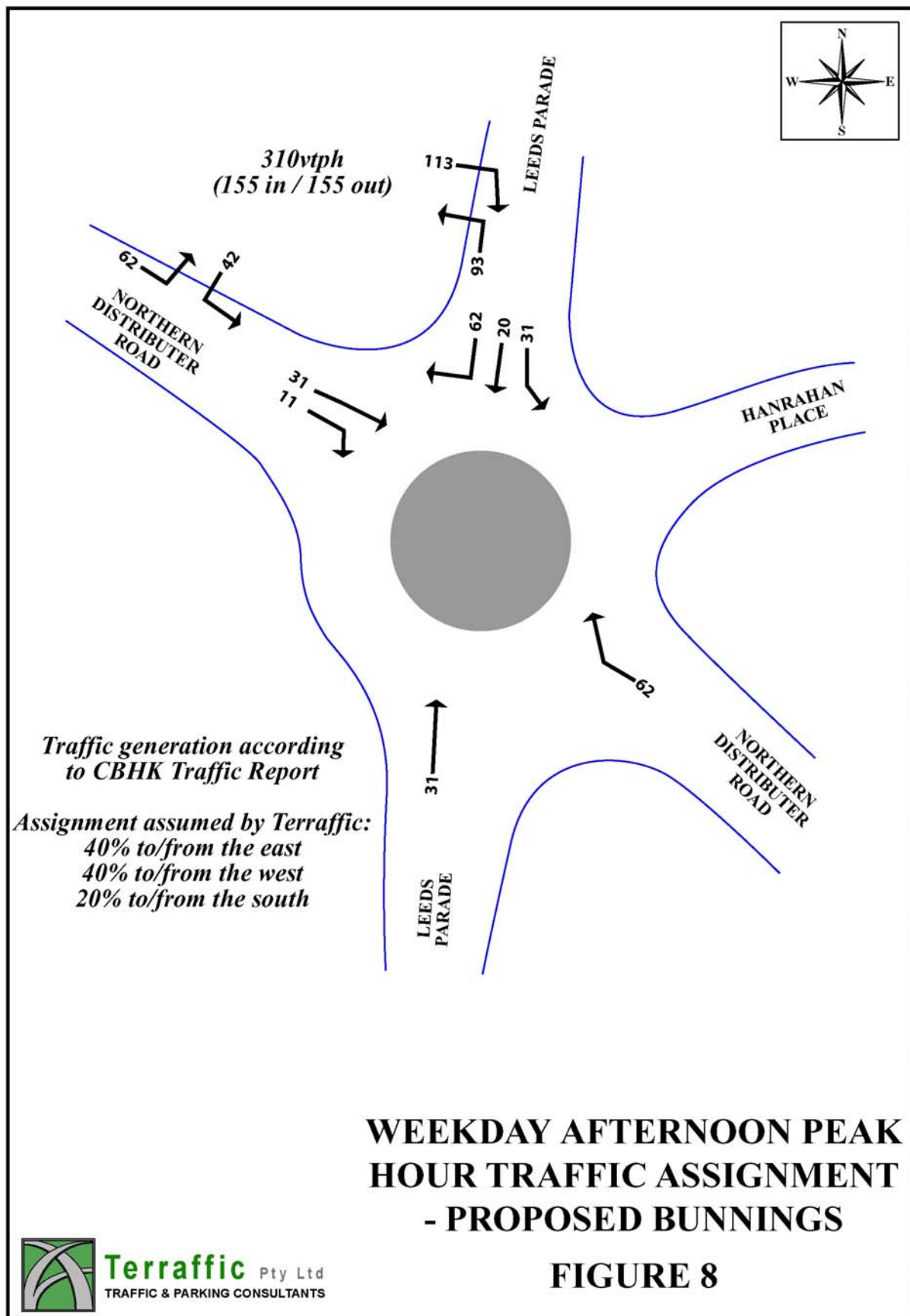
For intersections controlled by a roundabout or GIVE WAY or STOP signs, satisfactory intersection operation is indicated by a DS of 0.8 or less.

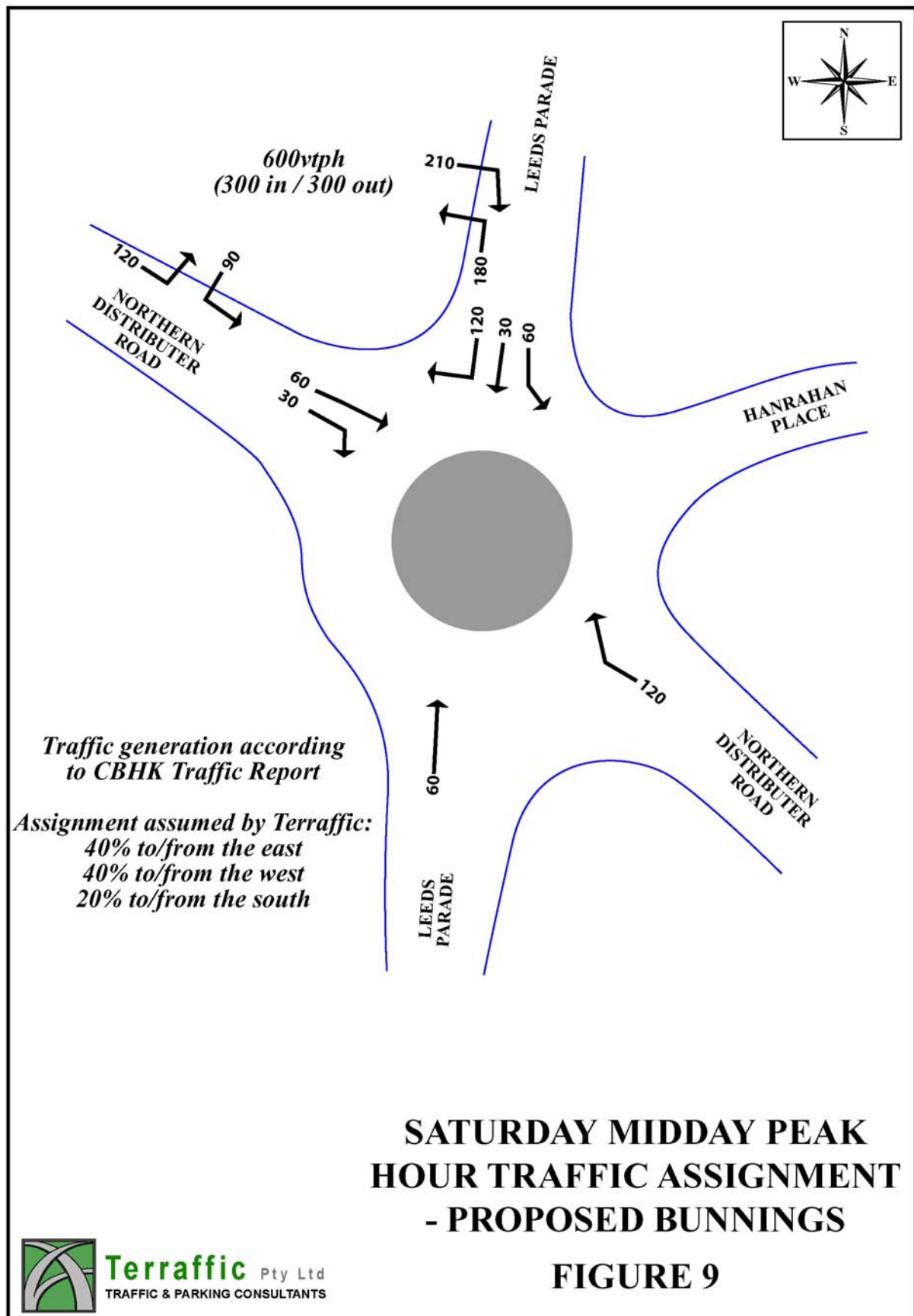
¹ The values of DS for intersections under traffic signal control are only valid for cycle length of 120 secs.









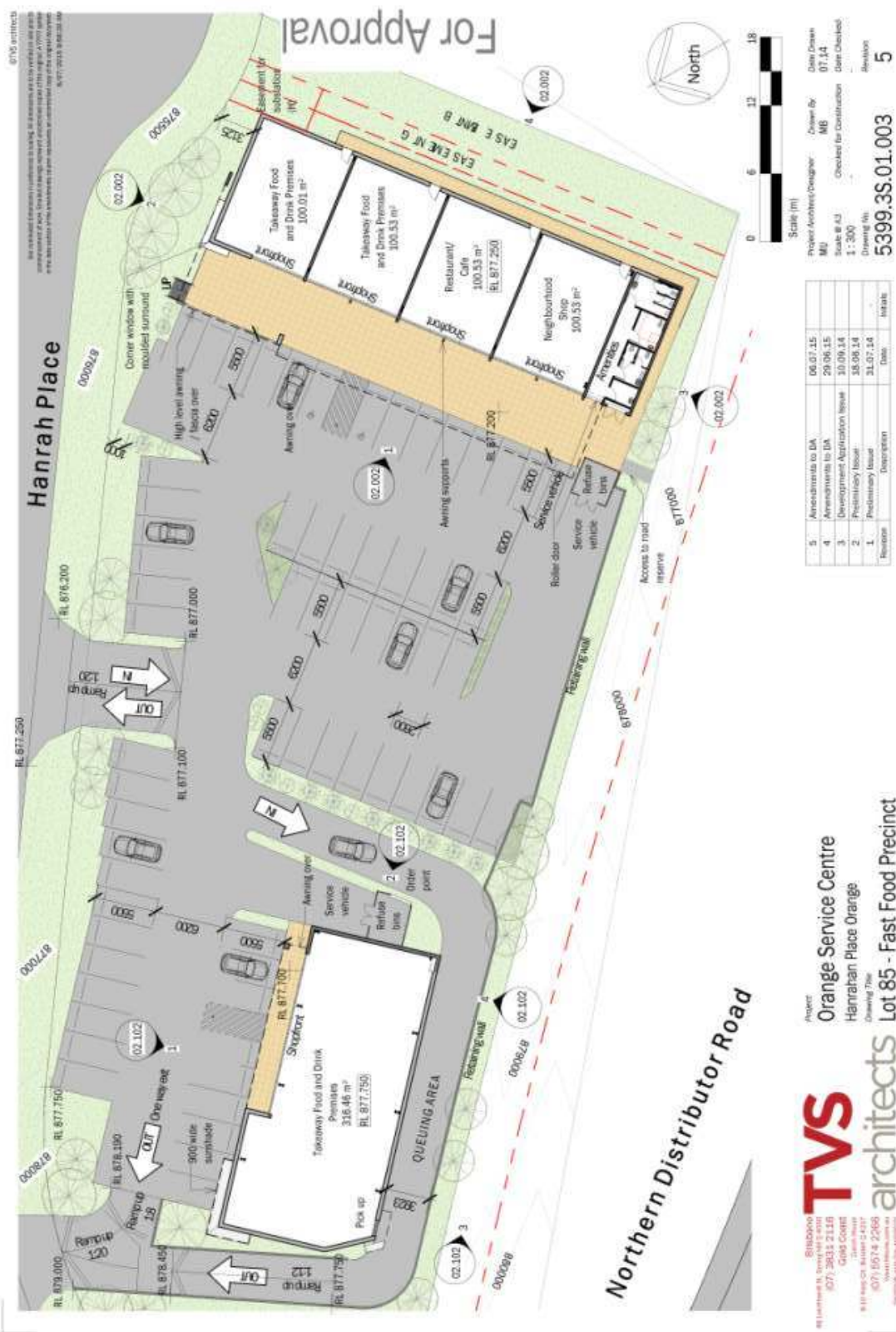




APPENDIX A

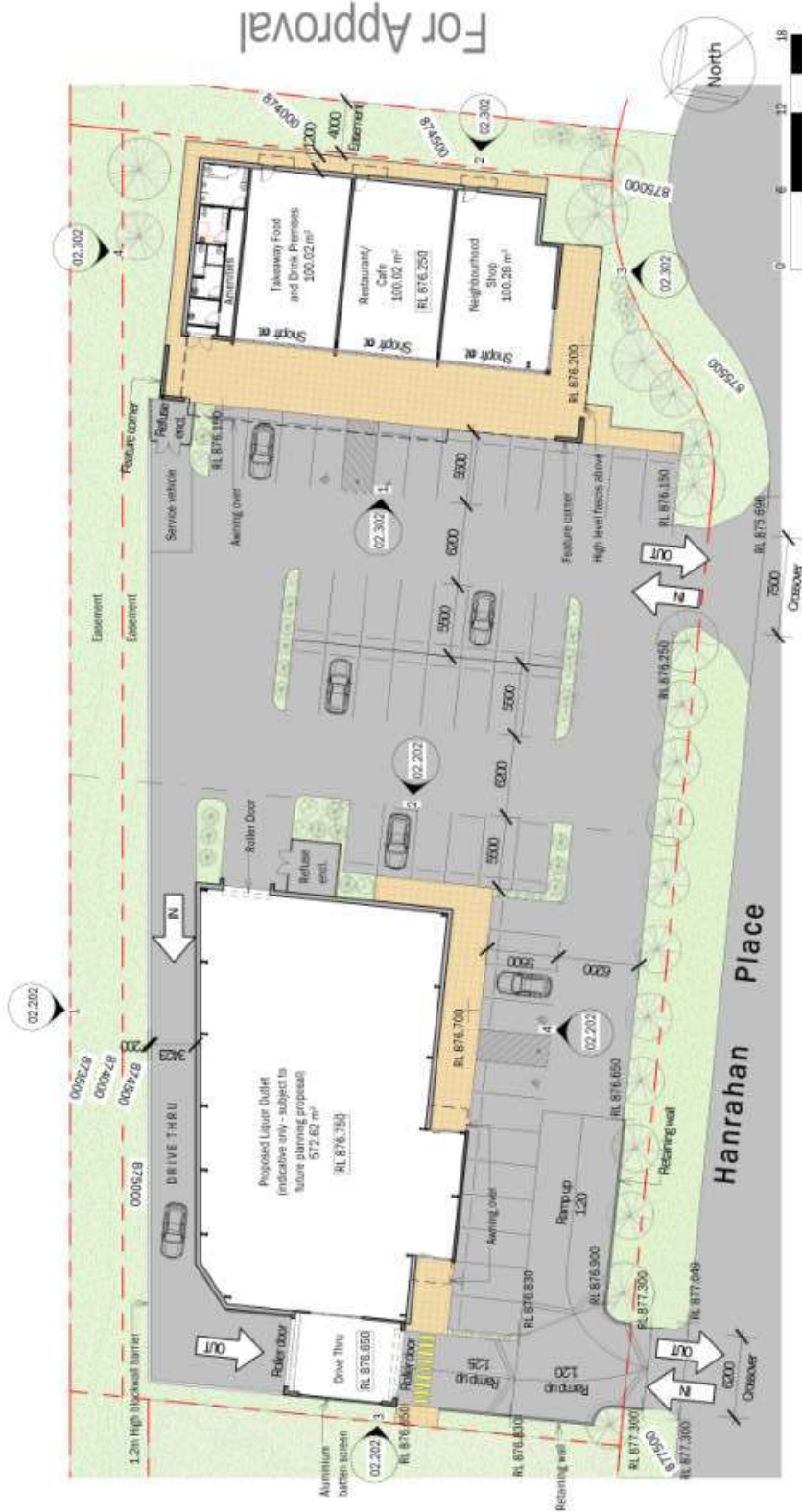
PLANS OF PROPOSED DEVELOPMENT PREPARED BY TVS ARCHITECTS







0176 architects
This site plan is prepared in accordance with the provisions of the Planning and Design Act 2015 and the provisions of the Planning and Design Regulations 2016. It is a preliminary site plan and is not to be used for any other purpose. It is the responsibility of the client to ensure that the site plan is accurate and that it complies with all relevant legislation and standards. The client is advised that the site plan is not a guarantee of any particular outcome and that the client should seek professional advice before relying on it.



Scale (m)
0 6 12 18

Project Architect/Designer: MB
Client: MB
Scale @ A3: 1:300
Drawing No: 5399.3S.01.004
Revision: 6

No	Description	Date	Initials
6	Amendments to DA	06.07.15	
5	Amendments to DA	29.06.15	
4	Development Application Issue	10.06.14	
3	Preliminary Issue	10.06.14	
2	Preliminary Issue	18.06.14	
1	Issue	18.06.14	

TVS architects
Orange Service Centre
Hanrahan Place Orange
Lot 87 - Shops



APPENDIX B

SIDRA MOVEMENT SUMMARY SHEETS FOR THE NORTHERN DISTRIBUTOR ROAD / LEEDS PARADE / HANRAHAN PLACE ROUNDABOUT

**MOVEMENT SUMMARY**

Site: Northern Distributor Road/Leeds Parade/Hanrahan Place, Orange - Existing Friday Peak

Existing Friday PM Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Leeds Parade											
1	L2	268	3.0	0.216	6.3	LOS A	1.0	6.9	0.40	0.59	64.2
2	T1	8	3.0	0.045	7.3	LOS A	0.2	1.2	0.40	0.68	63.4
3a	R1	4	5.0	0.045	12.3	LOS A	0.2	1.2	0.40	0.68	39.5
3	R2	26	3.0	0.045	13.8	LOS A	0.2	1.2	0.40	0.68	61.4
Approach		306	3.0	0.216	7.1	LOS A	1.0	6.9	0.40	0.60	63.6
East: Northern Distributor Road											
4	L2	43	3.0	0.092	5.7	LOS A	0.4	2.7	0.39	0.53	63.1
5	T1	243	5.0	0.152	5.7	LOS A	0.7	4.9	0.38	0.50	63.3
6	R2	4	3.0	0.152	11.9	LOS A	0.7	4.9	0.38	0.49	64.9
6b	R3	1	5.0	0.152	13.4	LOS A	0.7	4.9	0.38	0.49	51.6
Approach		291	4.7	0.152	5.8	LOS A	0.7	4.9	0.38	0.50	63.2
NorthEast: Hanrahan Place											
24b	L3	7	5.0	0.024	3.9	LOS A	0.1	0.6	0.44	0.53	53.1
24a	L1	7	5.0	0.024	3.0	LOS A	0.1	0.6	0.44	0.53	58.3
26a	R1	8	5.0	0.024	8.1	LOS A	0.1	0.6	0.44	0.53	55.0
26b	R3	1	5.0	0.024	10.2	LOS A	0.1	0.6	0.44	0.53	60.2
Approach		23	5.0	0.024	5.3	LOS A	0.1	0.6	0.44	0.53	55.5
North: Leeds Parade											
7b	L3	1	3.0	0.039	6.7	LOS A	0.1	1.0	0.41	0.58	58.2
7	L2	18	3.0	0.039	6.8	LOS A	0.1	1.0	0.41	0.58	63.7
8	T1	46	3.0	0.070	7.0	LOS A	0.3	2.0	0.39	0.63	65.6
9	R2	62	3.0	0.070	13.3	LOS A	0.3	2.0	0.38	0.67	61.9
Approach		127	3.0	0.070	10.0	LOS A	0.3	2.0	0.39	0.64	63.4
West: Northern Distributor Road											
10	L2	12	3.0	0.100	4.6	LOS A	0.4	3.2	0.15	0.40	64.6
10a	L1	6	5.0	0.100	4.3	LOS A	0.4	3.2	0.15	0.40	60.9
11	T1	187	5.0	0.179	4.8	LOS A	0.9	6.4	0.15	0.48	63.1
12	R2	206	3.0	0.179	11.1	LOS A	0.9	6.4	0.14	0.59	62.4
Approach		411	3.9	0.179	7.9	LOS A	0.9	6.4	0.14	0.53	62.8
All Vehicles		1158	3.8	0.216	7.3	LOS A	1.0	6.9	0.30	0.55	63.1

Level of Service (LOS) Method: Delay (RTANSW).

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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**MOVEMENT SUMMARY**

 **Site: Northern Distributor Road/Leeds Parade/Hanrahan Place, Orange - Existing Saturday Peak**

Existing Saturday Middyday Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Leeds Parade											
1	L2	201	3.0	0.139	5.8	LOS A	0.6	4.3	0.25	0.52	65.0
2	T1	12	3.0	0.036	6.5	LOS A	0.1	1.0	0.27	0.61	64.9
3a	R1	1	5.0	0.036	11.5	LOS A	0.1	1.0	0.27	0.61	40.4
3	R2	21	3.0	0.036	13.0	LOS A	0.1	1.0	0.27	0.61	62.8
Approach		235	3.0	0.139	6.5	LOS A	0.6	4.3	0.25	0.53	64.7
East: Northern Distributer Road											
4	L2	13	3.0	0.041	5.1	LOS A	0.2	1.2	0.27	0.45	63.7
5	T1	127	5.0	0.068	5.2	LOS A	0.3	2.0	0.26	0.44	64.1
6	R2	2	3.0	0.068	11.5	LOS A	0.3	2.0	0.26	0.44	65.8
6b	R3	1	5.0	0.068	12.9	LOS A	0.3	2.0	0.26	0.44	52.5
Approach		143	4.8	0.068	5.3	LOS A	0.3	2.0	0.26	0.44	64.0
NorthEast: Hanrahan Place											
24b	L3	1	5.0	0.008	3.3	LOS A	0.0	0.2	0.36	0.40	54.3
24a	L1	6	5.0	0.008	2.4	LOS A	0.0	0.2	0.36	0.40	59.8
26a	R1	1	5.0	0.008	7.5	LOS A	0.0	0.2	0.36	0.40	56.3
26b	R3	1	5.0	0.008	9.6	LOS A	0.0	0.2	0.36	0.40	61.8
Approach		9	5.0	0.008	3.9	LOS A	0.0	0.2	0.36	0.40	58.9
North: Leeds Parade											
7b	L3	1	3.0	0.007	6.3	LOS A	0.0	0.2	0.36	0.53	59.1
7	L2	6	3.0	0.007	6.5	LOS A	0.0	0.2	0.36	0.53	64.4
8	T1	12	3.0	0.013	6.6	LOS A	0.0	0.3	0.33	0.56	66.5
9	R2	6	3.0	0.013	13.0	LOS A	0.0	0.3	0.32	0.56	64.2
Approach		25	3.0	0.013	8.1	LOS A	0.0	0.3	0.33	0.55	65.2
West: Northern Distributer Road											
10	L2	4	3.0	0.075	4.6	LOS A	0.3	2.3	0.13	0.39	64.7
10a	L1	3	5.0	0.075	4.3	LOS A	0.3	2.3	0.13	0.39	61.1
11	T1	156	5.0	0.135	4.8	LOS A	0.6	4.4	0.12	0.48	63.3
12	R2	146	3.0	0.135	11.1	LOS A	0.6	4.4	0.12	0.59	62.8
Approach		309	4.0	0.135	7.7	LOS A	0.6	4.4	0.12	0.53	63.0
All Vehicles		721	3.8	0.139	6.8	LOS A	0.6	4.4	0.20	0.51	63.8

Level of Service (LOS) Method: Delay (RTANSW).

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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**MOVEMENT SUMMARY**

 **Site: Northern Distributor Rd/Leeds Pde/Hanrahan Pl, Orange - Projected Friday Peak - All developments**

Projected Friday PM Peak - All 3 developments
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Leeds Parade											
1	L2	236	3.0	0.239	7.0	LOS A	1.0	7.3	0.53	0.68	63.4
2	T1	39	3.0	0.124	8.0	LOS A	0.5	3.9	0.53	0.73	63.9
3a	R1	42	5.0	0.124	13.0	LOS A	0.5	3.9	0.53	0.73	39.6
3	R2	26	3.0	0.124	14.5	LOS B	0.5	3.9	0.53	0.73	61.9
Approach		343	3.2	0.239	8.5	LOS A	1.0	7.3	0.53	0.69	60.4
East: Northern Distributer Road											
4	L2	43	3.0	0.146	7.0	LOS A	0.7	5.0	0.55	0.63	62.0
5	T1	204	5.0	0.240	6.9	LOS A	1.3	9.5	0.56	0.67	60.5
6	R2	66	3.0	0.240	13.0	LOS A	1.3	9.5	0.56	0.69	60.9
6b	R3	86	5.0	0.240	14.4	LOS A	1.3	9.5	0.56	0.69	47.9
Approach		399	4.5	0.240	9.5	LOS A	1.3	9.5	0.56	0.67	58.4
NorthEast: Hanrahan Place											
24b	L3	43	5.0	0.134	5.0	LOS A	0.6	4.3	0.57	0.68	52.0
24a	L1	25	5.0	0.134	4.1	LOS A	0.6	4.3	0.57	0.68	57.0
26a	R1	44	5.0	0.134	9.2	LOS A	0.6	4.3	0.57	0.68	53.8
26b	R3	1	5.0	0.134	11.3	LOS A	0.6	4.3	0.57	0.68	58.9
Approach		113	5.0	0.134	6.5	LOS A	0.6	4.3	0.57	0.68	53.8
North: Leeds Parade											
7b	L3	1	3.0	0.123	7.4	LOS A	0.5	3.4	0.52	0.70	57.8
7	L2	99	3.0	0.123	7.5	LOS A	0.5	3.4	0.52	0.70	63.5
8	T1	86	3.0	0.221	7.4	LOS A	1.0	7.0	0.51	0.73	63.5
9	R2	174	3.0	0.221	13.8	LOS A	1.0	7.0	0.51	0.73	61.4
Approach		360	3.0	0.221	10.5	LOS A	1.0	7.0	0.51	0.73	62.4
West: Northern Distributer Road											
10	L2	12	3.0	0.147	5.7	LOS A	0.7	4.9	0.40	0.51	63.2
10a	L1	92	5.0	0.147	5.4	LOS A	0.7	4.9	0.40	0.51	58.9
11	T1	179	5.0	0.264	5.6	LOS A	1.4	10.2	0.40	0.59	61.0
12	R2	217	3.0	0.264	11.9	LOS A	1.4	10.2	0.41	0.62	61.7
Approach		500	4.1	0.264	8.3	LOS A	1.4	10.2	0.40	0.59	61.1
All Vehicles		1715	3.8	0.264	9.0	LOS A	1.4	10.2	0.50	0.66	60.3

Level of Service (LOS) Method: Delay (RTANSW).

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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**MOVEMENT SUMMARY**

 **Site: Northern Distributor Rd/Leeds Pde/Hanrahan Pl, Orange - Projected Saturday Peak**

Projected Saturday Midday Peak - All 3 developments
Roundabout

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 of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Leeds Parade											
1	L2	193	3.0	0.164	6.9	LOS A	0.8	5.5	0.50	0.65	63.6
2	T1	72	3.0	0.147	7.7	LOS A	0.6	4.7	0.51	0.69	64.8
3a	R1	48	5.0	0.147	12.7	LOS A	0.6	4.7	0.51	0.69	40.1
3	R2	21	3.0	0.147	14.2	LOS A	0.6	4.7	0.51	0.69	62.7
Approach		334	3.3	0.164	8.4	LOS A	0.8	5.5	0.50	0.67	60.4
East: Northern Distributer Road											
4	L2	13	3.0	0.112	6.9	LOS A	0.5	3.8	0.53	0.61	61.9
5	T1	84	5.0	0.112	7.1	LOS A	0.5	3.8	0.53	0.61	62.4
6	R2	122	3.0	0.196	12.9	LOS A	1.1	7.7	0.54	0.73	58.4
6b	R3	105	5.0	0.196	14.3	LOS A	1.1	7.7	0.54	0.73	45.7
Approach		324	4.2	0.196	11.6	LOS A	1.1	7.7	0.53	0.70	55.9
NorthEast: Hanrahan Place											
24b	L3	55	5.0	0.165	4.8	LOS A	0.7	5.3	0.56	0.66	52.3
24a	L1	33	5.0	0.165	3.9	LOS A	0.7	5.3	0.56	0.66	57.4
26a	R1	56	5.0	0.165	8.9	LOS A	0.7	5.3	0.56	0.66	54.2
26b	R3	1	5.0	0.165	11.0	LOS A	0.7	5.3	0.56	0.66	59.3
Approach		145	5.0	0.165	6.2	LOS A	0.7	5.3	0.56	0.66	54.1
North: Leeds Parade											
7b	L3	1	3.0	0.131	7.1	LOS A	0.5	3.7	0.50	0.70	58.0
7	L2	116	3.0	0.131	7.3	LOS A	0.5	3.7	0.50	0.70	63.6
8	T1	62	3.0	0.203	7.2	LOS A	0.9	6.3	0.50	0.73	63.1
9	R2	176	3.0	0.203	13.7	LOS A	0.9	6.3	0.50	0.73	61.1
Approach		355	3.0	0.203	10.4	LOS A	0.9	6.3	0.50	0.72	62.2
West: Northern Distributer Road											
10	L2	4	3.0	0.136	6.2	LOS A	0.6	4.6	0.47	0.56	62.8
10a	L1	108	5.0	0.136	5.9	LOS A	0.6	4.6	0.47	0.56	58.4
11	T1	143	5.0	0.244	6.0	LOS A	1.3	9.6	0.48	0.63	60.3
12	R2	176	3.0	0.244	12.3	LOS A	1.3	9.6	0.48	0.64	61.5
Approach		431	4.2	0.244	8.6	LOS A	1.3	9.6	0.48	0.62	60.5
All Vehicles		1589	3.8	0.244	9.3	LOS A	1.3	9.6	0.51	0.67	59.5

Level of Service (LOS) Method: Delay (RTANSW).

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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.