



TRAFFIC IMPACT ASSESSMENT (TIA)

**Proposed Fuel Depot Development
Lot 43 DP46657, Sturt Highway, Euston**

Reference: 22.670r01v03
Date: March 2023

Suite 2.08, 50 Holt St
Surry Hills, NSW 2010

t: (02) 8324 8700
w: www.traffic.com.au

DOCUMENT VERIFICATION

Job Number	22.670			
Project	Proposed Fuel Depot Lot 43 DP46657, Sturt Highway, Euston			
Client	SGH Petroleum Pty Ltd			
Revision	Date	Prepared By	Checked By	Signed
v03	08/03/2023	Timothy Le	Thomas Yang	

CONTENTS

1. Introduction	1
2. Location and Site	2
3. Existing Traffic Conditions	5
3.1 Road Network	5
3.2 Key Intersection	7
3.3 Existing Intersection Volumes	7
3.4 Crash Data	8
3.5 Approved 25/26m Route	8
3.6 Existing Intersection Performance	9
4. Description of Proposed Development	11
5. Parking Requirements	12
5.1 Car Parking	12
6. Traffic and Transport Impacts	13
6.1 Existing Site Traffic Generation	13
6.2 Development Trip Generation	13
6.3 Traffic Distribution	15
6.4 Proposed Development Intersection Performance	16
7. Access and Internal Design Aspects	18
7.1 Light Vehicular Access	18
7.2 Heavy Vehicle Access	18
7.3 Internal Design	19
7.4 Summary	19
8. Austroads Compliance	20
8.1 Warrants for Turn Treatments	20
8.2 Basic Left Turn (BAL) Treatment	21
8.3 Basic Right Turn (BAR) Treatment	22
8.4 Sight Distances	23
9. Conclusions	25

Appendices

Appendix A: Reduced Plans

Appendix B: SIDRA Outputs

Appendix C: Swept Path Analysis

1. INTRODUCTION

TRAFFIX has been commissioned by SGH Petroleum Pty Ltd to undertake a Traffic Impact Assessment (TIA) in support of a development application (DA) relating to a proposed fuel depot development located on Lot 43 DP46657. The development is located within the Baranald Shire Council Local Government Area (LGA) and has been assessed under that Council's controls.

This report documents the findings of our investigations and should be read in the context of the Statement of Environmental Effects (SEE) prepared separately. The proposed development requires referral to Transport for New South Wales (TfNSW) under the provisions of the State Environmental Planning Policy (Transport and Infrastructure) 2021.

The report is structured as follows:

- Section 2: Describes the site and its location
- Section 3: Documents existing traffic conditions
- Section 4: Describes the proposed development
- Section 5: Assesses the parking requirements
- Section 6: Assesses traffic impacts
- Section 7: Discusses access and internal design aspects
- Section 8: Discusses compliance with Austroads Guidelines
- Section 9: Presents the overall study conclusions

2. LOCATION AND SITE

The subject site is legally described as Lot 43 DP46657 and is located on the north-western corner of the intersection Sturt Highway and Morris Road. In a regional context, it is located about 1.6-kilometres north-west of the Euston Town Centre.

The site has a triangular-shaped configuration and has a site area of approximately 2.64-hectares. It currently accommodates agricultural land and has a southern frontage to Sturt Highway measuring approximately 328-metres, eastern frontage to Morris Road measuring approximately 260-metres and northern boundary to adjacent agricultural land measuring 201-metres.

A Location Plan is presented in **Figure 1**, with a Site Plan presented in **Figure 2** which provides an appreciation of the general character of roads and other key attributes in proximity to the site.

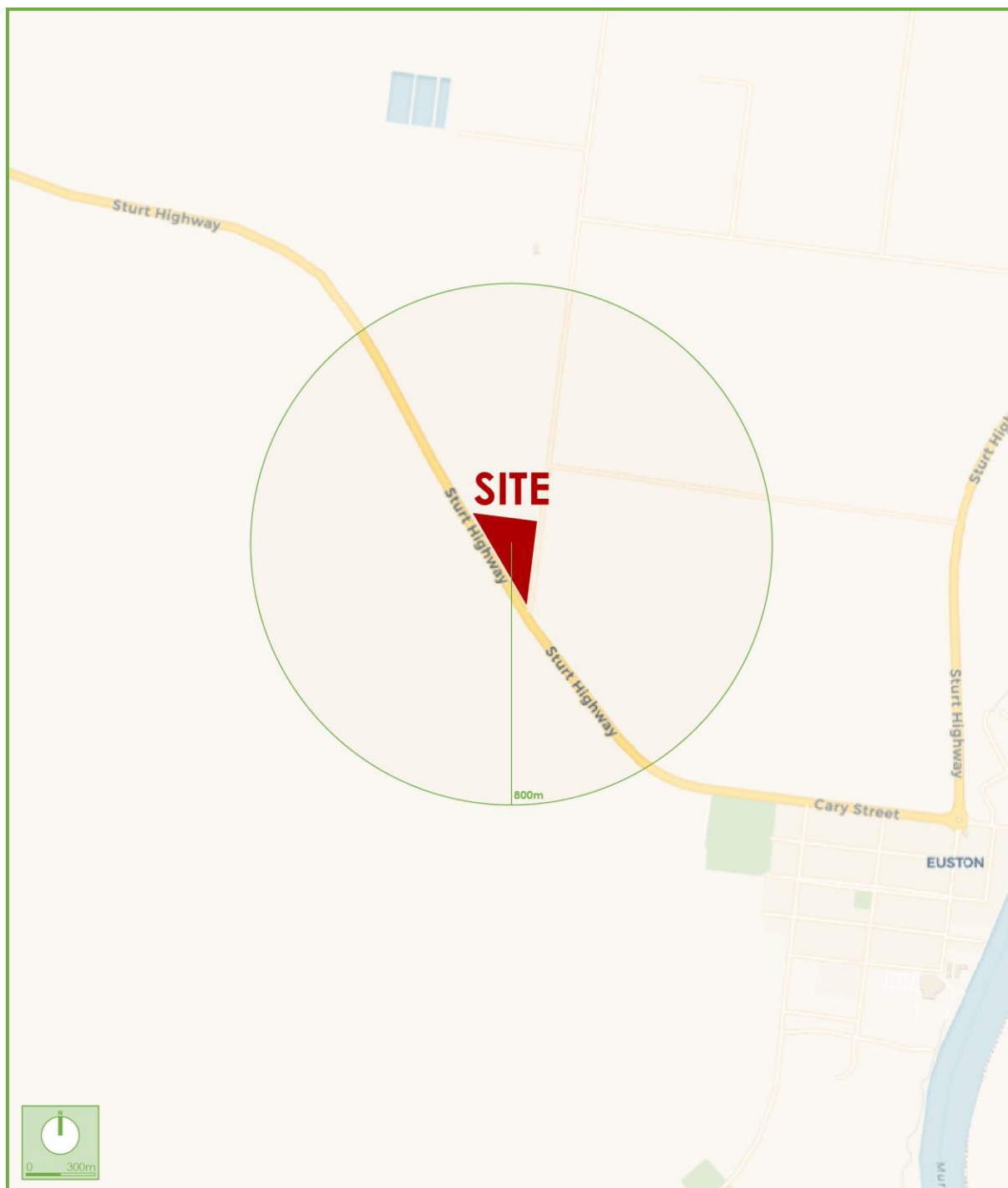


Figure 1: Location Plan



Figure 2: Site Plan

3. EXISTING TRAFFIC CONDITIONS

3.1 Road Network

The road hierarchy in the vicinity of the site is shown in **Figure 3** with the following roads of particular interest:

- **Sturt Highway:** a TfNSW Highway (HW14) that generally traverses in an east-west direction between Newell Highway, Gillenbah in the east and Deakin Avenue, Mildura in the west. Within vicinity of the site, Sturt Highway is subject to 80km/hr speed zoning and accommodates one (1) traffic lane in either direction within an undivided carriageway.
- **Morris Road:** a local road that generally traverses in a north-south direction between a cul-de-sac in the north and Sturt Highway in the south. Within vicinity of the site, Morris Road is subject to 80km/hr speed zoning and accommodates one (1) traffic lane in either direction within an undivided carriageway.

It is evident from **Figure 3** that the site is ideally located with respect to Sturt Highway, with excellent opportunities to service vehicles (particularly heavy vehicles) travelling past the site.

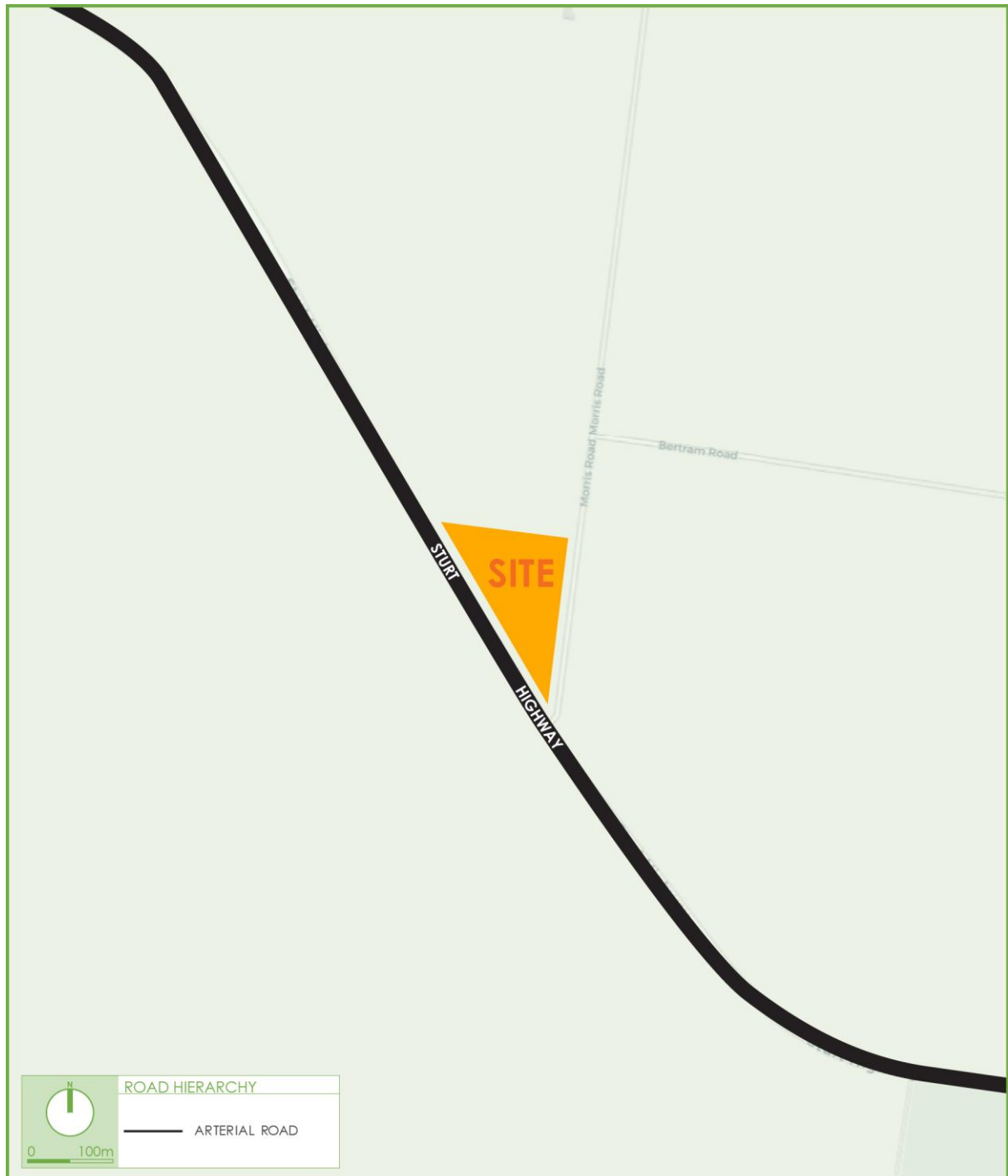


Figure 3: Road Hierarchy

3.2 Key Intersection

It can be seen from **Figure 4** that the intersection of Sturt Highway and Morris Road is a give-way controlled T-intersection. The main attributes of each approach are outlined below:

- Sturt Highway southbound approach provides a combined through and left-turn lane into Morris Road;
- Sturt Highway northbound approach provides a combined through and right-turn lane into Morris Road; and,
- Morris Road southbound approach provides a combined left-turn and right-turn lane into Sturt Highway.



Figure 4. Intersection of Sturt Highway and Morris Road

3.3 Existing Intersection Volumes

TRAFFIX has conducted an intersection survey at the intersection of Sturt Highway and Morris Road on Wednesday 15 February 2023.

The following intersection traffic volumes (total throughput) were recorded during the weekday peak periods (7:00-9:00am and 3:00-6:00pm).

- 193 vehicles in the AM peak hour period; and
- 227 vehicles in the PM peak hour period.

3.4 Crash Data

A review of the publicly available crash data (5-year period) at the intersection of Sturt Highway and Morris Road reveals there have been no recorded accidents, indicating the intersection operates safe and satisfactory.

3.5 Approved 25/26m Route

It is highly noteworthy that Sturt Highway is an approved 25/26m B-double route. The extent of the approval is outlined in **Figure 5** below.

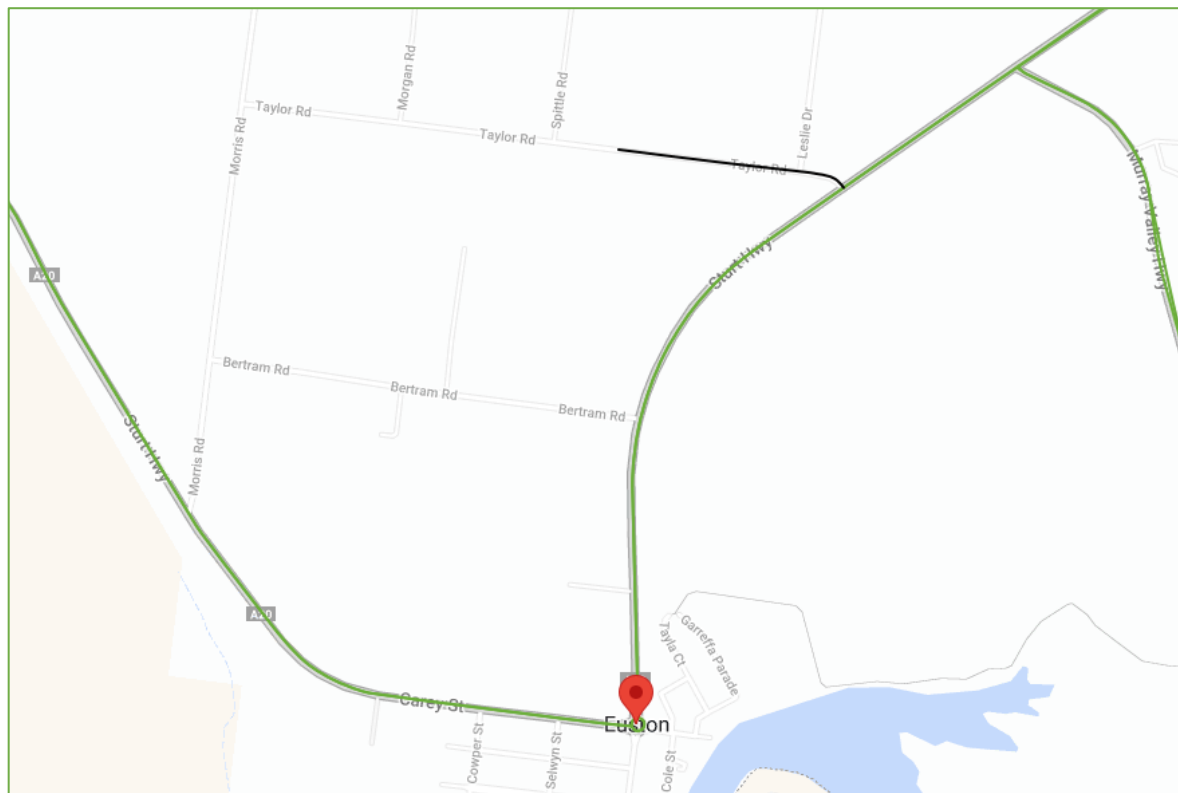


Figure 5: Approved 25/26m B-Double Route

3.6 Existing Intersection Performance

The intersection of Sturt Highway and Morris Road was analysed using the SIDRA 9.1 computer program to determine their performance characteristics under existing traffic conditions. The SIDRA model produces a range of outputs, the most useful of which are the Degree of Saturation (DOS) and Average Vehicle Delay per vehicle (AVD). The AVD is in turn related to a level of service (LOS) criteria. These performance measures can be interpreted using the following explanations:

DOS - the DOS is a measure of the operational performance of individual intersections. As both queue length and delay increase rapidly as DOS approaches 1, it is usual to attempt to keep DOS to less than 0.9. When DOS exceeds 0.9 residual queues can be anticipated, as occurs at many major intersections throughout the metropolitan area during peak periods. For intersections controlled by roundabout or give way/stop control, satisfactory intersection operation is generally indicated by a DOS of 0.8 or less.

AVD - the AVD for individual intersections provides a measure of the operational performance of an intersection. In general, levels of acceptability of AVD for individual intersections depend on the time of day (motorists generally accept higher delays during peak commuter periods) and the road system being modelled (motorists are more likely to accept longer delays on side streets than on the main road system).

LOS - this is a comparative measure which provides an indication of the operating performance of an intersection as shown below in **Table 1**:

Table 1: TfNSW Level of Service Criteria for Intersections

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	<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 & 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

A summary of the modelled results is provided below in **Table 2** and the SIDRA Outputs are presented in **Appendix B**.

Table 2: Existing Intersection Performance

Intersection	Control Type	Period	Degree of Saturation (DoS)	Intersection Delay	Level of Service
Sturt Highway / Morris Road	Give-way	AM	0.080	2.9	A
		PM	0.062	2.1	A

It can be seen from **Table 2** that the intersection of Sturt Highway / Morris Road currently operates with a Level of Service (LoS) 'A' in the AM and PM peak periods with spare capacity.

4. DESCRIPTION OF PROPOSED DEVELOPMENT

The proposed development primarily involves the establishment of a bulk fuel depot, enabling the loading and distribution of bulk fuels and lubricants to local farms which is expected to comprise 80% of the business operation of the site.

The second component of this depot is the establishment of an unmanned fuel site that will be solely operated by an OPT or outside payment Terminal that accepts account customers cards and Shell cards.

In summary, the development application for which seeks approval for the construction of a fuel depot development comprising the following:

- A bulk fuel depot with six (6) fuel pumps (unmanned) and an office (96m²) / warehouse (330m²) component;
- Left-in entry only driveway via Sturt Highway (i.e. eastbound traffic only);
- Entry / Exit driveway via Morris Road located towards the north-eastern end of the site street frontage; and
- Exit only driveway to Morris Road located towards the south-eastern end of the site street frontage.

It is understood that the proposed warehouse will be for the general storage associated with the unmanned refuelling station, and the proposed office will only be utilised as needed with no fixed working hours.

The parking and traffic impacts arising from the development are discussed in **Section 5** and **Section 6**. Reference should be made to the plans submitted separately to Council which are presented at reduced scale in **Appendix B**.

5. PARKING REQUIREMENTS

5.1 Car Parking

The proposed development is located within the Balranald Shire Council Local Government Area, and Council's DCP does not provide parking rates. Therefore, reference should be made to the RTA (now TfNSW) Guide to Traffic Generating Developments 2002 (GTGD) for each component of the proposed development.

5.1.1 Fuel Depot / Refuelling Station Component

The GTGD does not provide parking rates for a rural refuelling station. It is noted in this regard that the proposed fuel depot / refuelling station does not propose any convenience or service facility, and there would be no reason for any vehicle refuelling to park on site. Therefore, no parking would be required for this component of the development.

5.1.2 Office Component

The GTGD provides car parking rates for office developments, with a rate of 1 car space per 40m² GFA. Application of this rate to the proposed 96m² Office GFA equates to a minimum requirement of two (2) car parking spaces.

5.1.3 Warehouse Component

The GTGD provides car parking rates for warehouse developments, with a rate of one (1) car space per 300m² GFA. Application for this rate to the proposed 330m² Warehouse GFA equates to a minimum requirement of one (1) car parking space.

5.1.4 Proposed Parking Provision

The proposed development makes provision for a total of five (5) car parking space, including one (1) accessible space, thereby satisfying the requirements of the GTGD.

6. TRAFFIC AND TRANSPORT IMPACTS

6.1 Existing Site Traffic Generation

The site is currently utilised as agricultural farmland. It is reasonable to assume the site therefore does not generate any traffic movements.

6.2 Development Trip Generation

6.2.1 Bulk Fuel Depot Component

Neither the GTGD nor the Technical Direction provide traffic generation rates for a bulk fuel depot. In order to provide an estimate of the daily and peak hour traffic volumes generated by the proposed development, the operator has advised that bulk fuel depot is envisaged to reach 225,000 litres of bulk fuel delivery per week after 12 months operation, which corresponds to approximately 1.5 semi-trailer movements per weekday.

That level of traffic movement is negligible and not expected to coincide with road network peak periods.

6.2.2 Refuelling Station Component

Neither the GTGD nor the Technical Direction provide traffic generation rates for a rural unmanned refuelling station. In order to provide an estimate of the daily and peak hour traffic volumes generated by the proposed development, a detailed breakdown of the expected movements (light and heavy vehicles) is provided taking into consideration a business model assessment.

In this regard, the operator has advised that the unmanned refuelling station is envisaged to reach 100,000 litres of fuel sales per month after 12 months operation averaging around 250 litres of fuel for each vehicle, this equates to approximately 14 inbound and outbound vehicle movements.

If it was conservatively assumed the vehicle trips are distributed over a 10-hour period, the proposed development can be expected to result in the following trip generation estimate:

- 14 vehicle trips per day (7 in, 7 out);
- 2 vehicle trips in the AM peak hour (1 in, 1 out); and,
- 2 vehicle trips in the PM peak hour (1 in, 1 out).

6.2.3 Office Component

The TfNSW Technical Direction TDT 2013/04 provides revised trip generation rates for office developments. The following trip generation rates are provided:

- 1.6 vehicle trips per hour per 100m² GFA in the AM peak; and,
- 1.2 vehicle trips per hour per 100m² GFA in the PM peak.

Application of the above rates to the proposed 96m² Office GFA results in the following trip generation:

- 2 vehicle trips per hour in the AM peak; and, (2 in, 0 out); and,
- 1 vehicle trips per hour in the PM peak. (0 in, 1 out).

6.2.4 Warehouse Component

The GTGD provides trip generation rates for warehouse developments, with a rate of 0.5 vehicle trips per 100m² GFA during the morning peak period. The GTGD does not provide a specific rate for the evening peak period, therefore it is assumed the evening trip generation is equal to the morning peak trip generation. Application of this rate to the proposed 330m² GFA results in the following:

- 2 vehicle trips per hour in the AM peak (2 in, 0 out); and,
- 2 vehicle trips per hour in the PM peak (0 in, 2 out).

6.2.5 Combined Proposed Development Traffic Generation

The combined generation of the refuelling station, office and warehouse components can be summarised as follows:

- 6 vehicle trips per hour in the AM peak (5 in, 1 out); and,
- 5 vehicle trips per hour in the PM peak (1 in, 4 out).

6.3 Traffic Distribution

It is reasonable to assume the traffic distribution of the proposed development will be similar to existing conditions, and the assumed overall traffic distributions are presented in **Figure 6** and **Figure 7**.

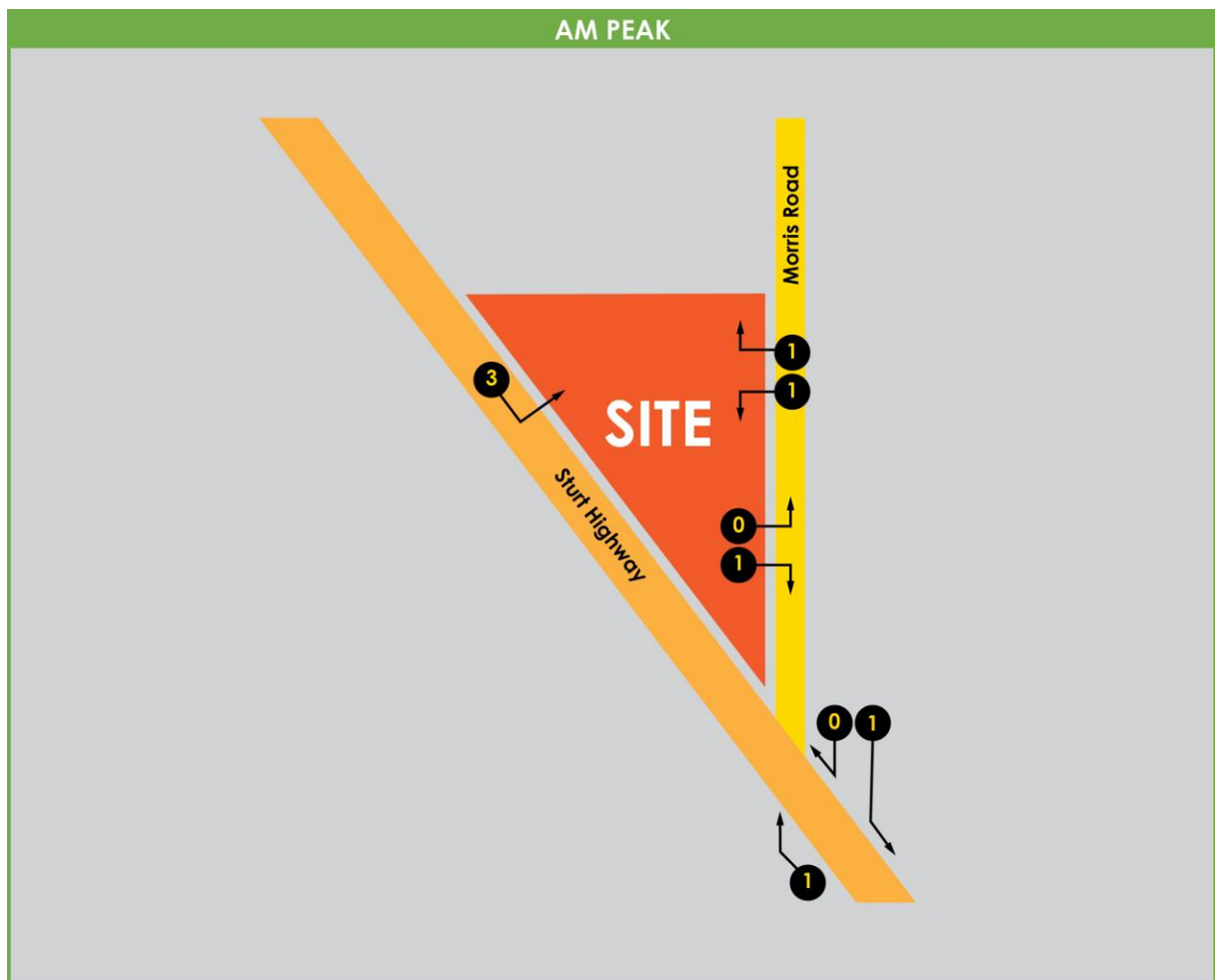


Figure 6. Traffic Distribution AM Peak

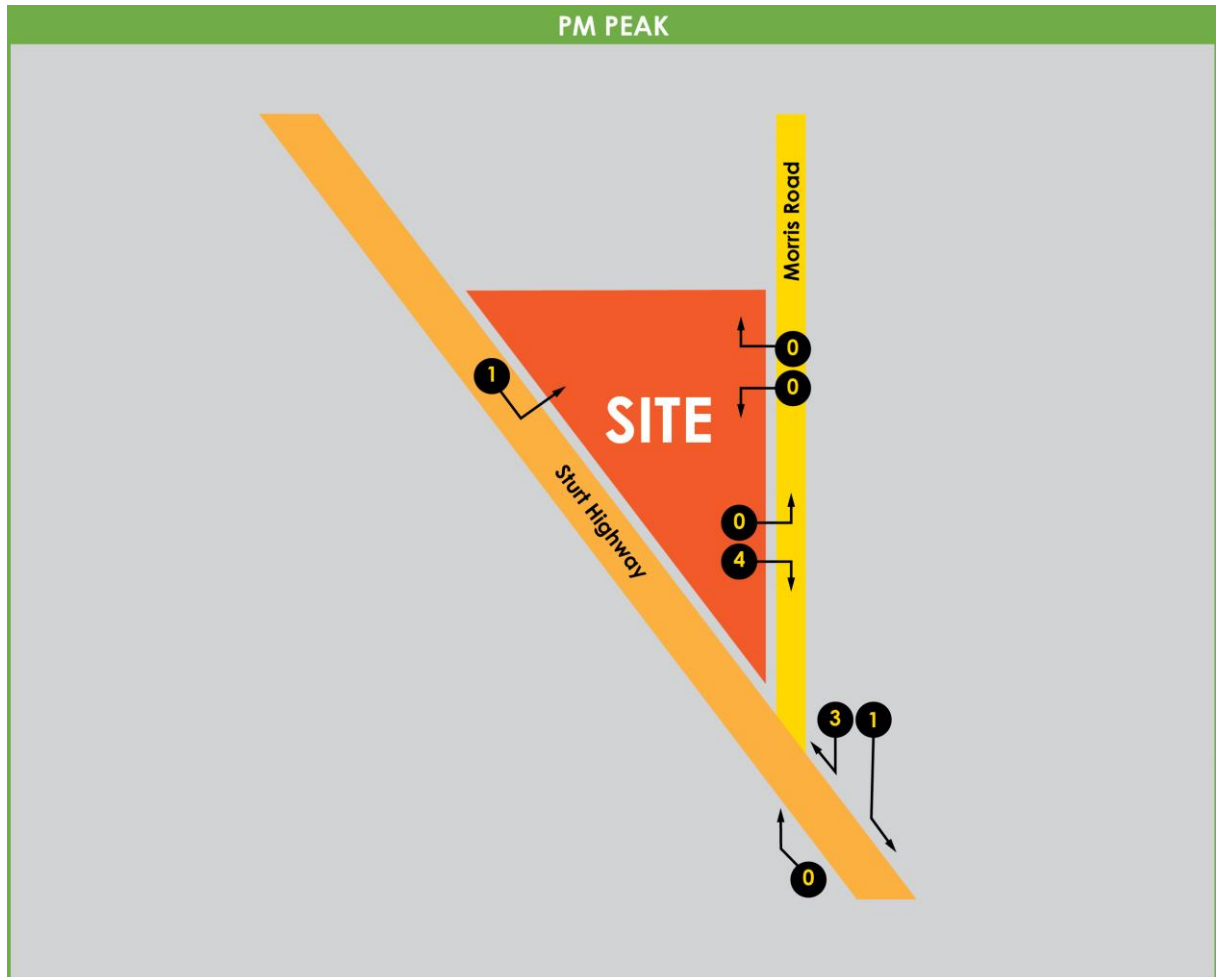


Figure 7. Traffic Distribution PM Peak

6.4 Proposed Development Intersection Performance

As aforementioned intersection traffic surveys were conducted at the key intersection described in **Section 3.2**. This was used to establish the existing intersection performance.

The traffic impacts above arising from the proposed development during the critical morning and evening peak periods have been assessed by loading the distributed traffic volumes into the SIDRA intersection model. The results of this software modelling are summarised in **Table 3** below, with detailed outputs provided in **Appendix B** for individual approaches.

Table 3: Existing and Proposed Intersection Performance

Intersection	Control Type	Scenario	Period	Degree of Saturation (DoS)	Intersection Delay	Level of Service
Sturt Highway / Morris Road	Give-way	Existing	AM	0.080	2.9	A
			PM	0.062	2.1	A
		Proposed	AM	0.080	3.0	A
			PM	0.062	2.3	A

It can be seen from **Table 3** that the additional development volumes will have negligible impact to average delay and Level of Service at the key intersection. Therefore, the Sturt Highway / Morris Road intersection will operate satisfactorily at LoS 'A' during both the AM and PM peak periods.

On the above basis, the development is considered supportable from a traffic planning perspective with no external improvements to the network required.

7. ACCESS AND INTERNAL DESIGN ASPECTS

7.1 Light Vehicular Access

The proposed development provides five (5) User Class 1A parking spaces with access via Sturt Highway and Morris Road, an arterial and local road, respectively. It therefore requires a Category 1 access facility under AS2890.1 (2004), which is defined as having a combined entry / exit width of 3.0 to 5.5m.

In response, the development provides an entry driveway via Sturt Highway, an entry / exit driveway located towards the north-eastern end of the Morris Road site frontage, and an exit-only driveway located at the south-eastern end of the Morris Road site frontage, each measuring 19m, 18m, and 18m respectively.

7.2 Heavy Vehicle Access

As mentioned above, the proposed development proposes the following access arrangements:

- Left-in entry-only via Sturt Highway for eastbound traffic only;
- Entry / exit driveway located towards the north-eastern end of the Morris Road site frontage; and
- Exit-only driveway located at the south-eastern end of the Morris Road site frontage.

It should be noted the exit-only driveway located at the south-eastern end of the Morris Road site frontage is located approximately 80-metres from the Sturt Highway, providing sufficient distance to allow a B-Double vehicle to exit and straighten up before it arrives at the Sturt Highway / Morris Road intersection.

Furthermore, all driveways have been designed to allow satisfactory manoeuvres in / out of the site. Reference should be made to **Appendix C** which demonstrates adequate movements in, out and throughout the site for the largest sized vehicle (design vehicle) to be accommodate on-site.

7.3 Internal Design

The internal car park complies with the requirements of AS 2890.1 (2004) and AS2890.2 (2018). and the following characteristics are noteworthy:

- All standard car parking spaces have been designed in accordance with User Class 1A being for employee parking only. These spaces are provided with a minimum space length of 5.4m, a minimum width of 2.4m and a minimum aisle width of 5.8m.
- A minimum clear head height of 2.2m is provided for all circulation and parking areas, in accordance with AS2890.1 (2004).
- A minimum clear head height of 4.5m is to be provided for all heavy vehicle parking spaces and circulation areas in accordance with AS2890.2 (2018).

7.4 Summary

In summary, the internal configuration of the car park has been designed in accordance with AS 2890.1 (2004) and AS 2890.2 (2018). It is however envisaged that a condition of consent would be imposed requiring compliance with these standards and as such any minor amendments considered necessary (if any) can be dealt with prior to the release of a Construction Certificate.

8. AUSTRROADS COMPLIANCE

8.1 Warrants for Turn Treatments

The provision for turn treatments at the intersection of Sturt Highway / Morris Road has been assessed with reference to Figure 3.25 of AustRoads Guide to Traffic Management Part 6 (Intersections, Interchanges and Crossings Management) as per **Figure 8**.

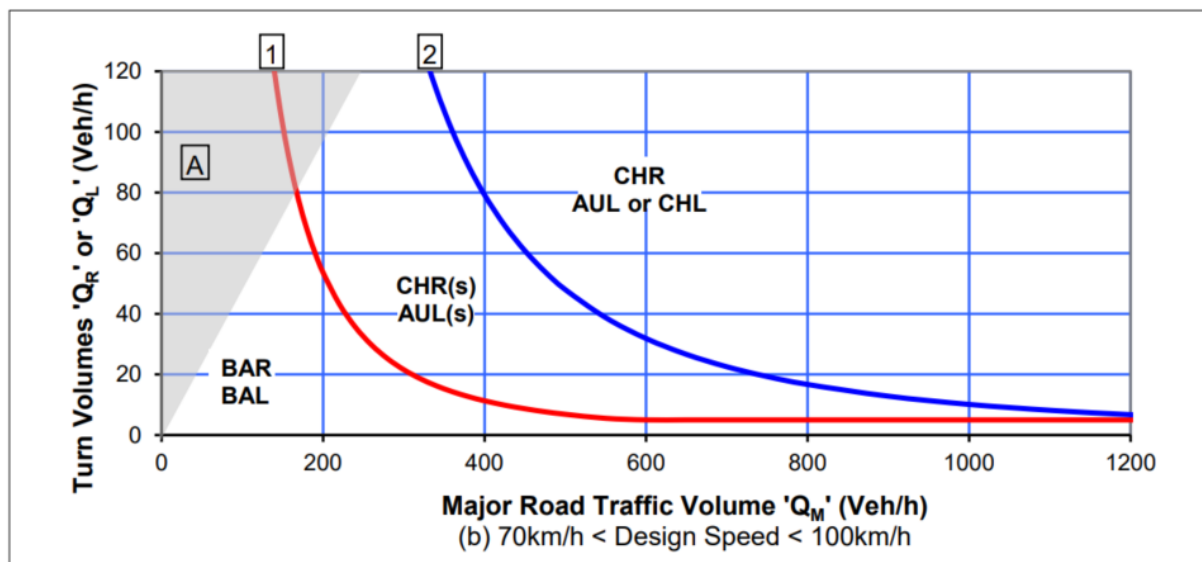


Figure 8. Warrants for Turn Treatments Chart

$$Q_m = Q_{T1} + Q_{T2}$$

$$Q_{T1} + Q_{T2} = \text{Total Through Traffic Volume in both directions (Peak Hour)}$$

$$Q_m(AM) = 121 \text{ \& } Q_m(PM) = 168$$

$$Q_L(AM) = 49 \text{ \& } Q_L(PM) = 22$$

$$Q_R(AM) = 4 \text{ \& } Q_R(PM) = 2$$

In accordance with **Figure 8** with consideration of the additional turning movements generated by the proposed development and existing traffic movements during the AM and PM peaks, the intersection of Sturt Highway / Morris Road warrants for a BAL/BAR treatment.

8.2 Basic Left Turn (BAL) Treatment

The BAL turn treatment shown in Figure 8.2 of AustRoads Guide to Road Design Part 4A (Unsignalised and Signalised Intersections) is applicable to the intersection of Sturt Highway / Morris Road. The following figure summarises the required dimensions of the treatment:

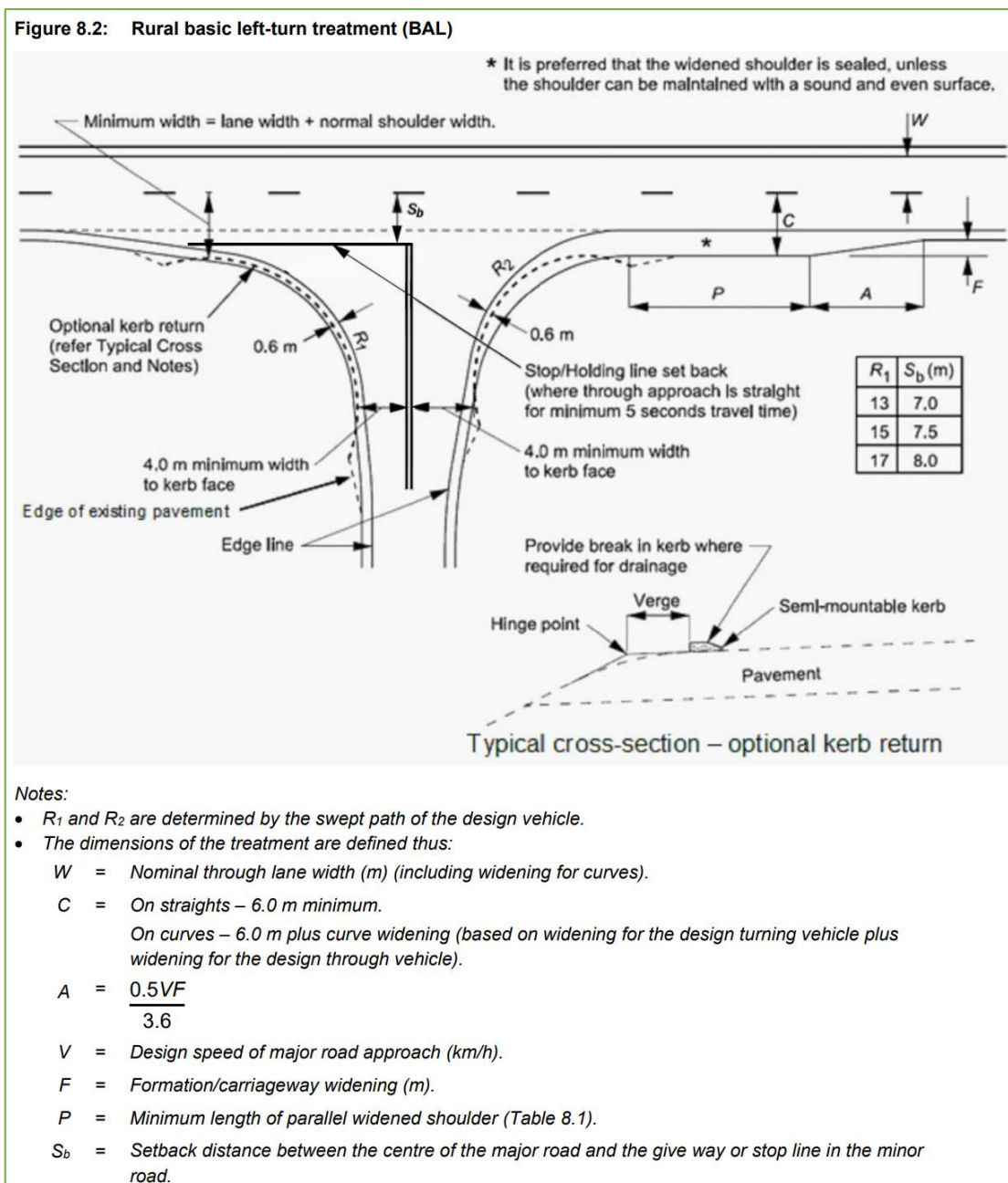


Figure 9. Rural Basic Left-turn Treatment (BAL) dimensions

$$W = 3.8\text{m [Existing]}$$

$$C = 6\text{m}$$

$$A = \frac{0.5 \times 90 \times (6 - 3.8)}{3.6} = 27.5\text{m}$$

$$P = 20\text{m}$$

8.3 Basic Right Turn (BAR) Treatment

The BAR turn treatment shown in Figure 7.6 of AustRoads Guide to Road Design Part 4A (Unsignalised and Signalised Intersections) is applicable to the intersection of Sturt Highway / Morris Road. The following figure summarises the required dimensions of the treatment:

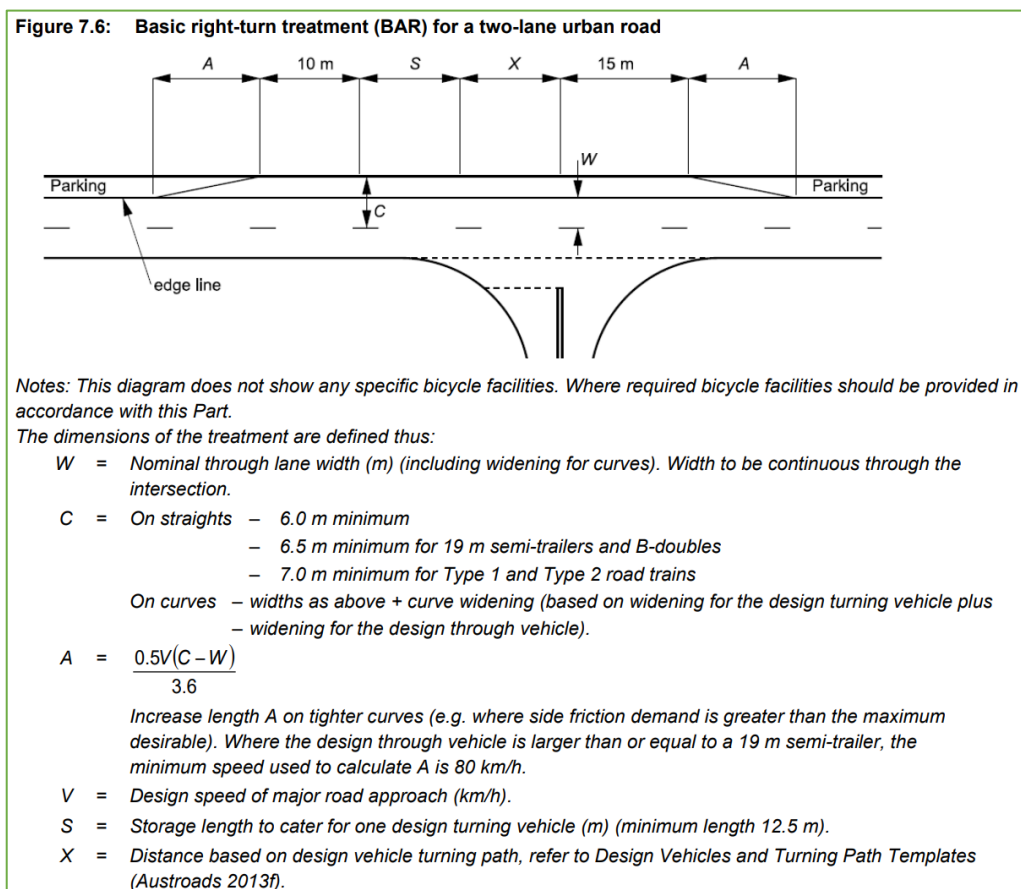


Figure 10. Urban Basic Right-turn Treatment (BAR) dimensions

$$W = 3.8\text{m [Existing]}$$

$$C = 6.5\text{m}$$

$$A = \frac{0.5 \times 90(6.5 - 3.8)}{3.6} = 33.75\text{m}$$

$$S = 26\text{m [B – Double Vehicle]}$$

$$X = 10 - 15\text{m}$$

8.4 Sight Distances

8.4.1 Approach Sight Distance

As defined by Austroads, Approach Sight Distance (ASD) is “the minimum level of sight distance which must be available on the minor road approaches to all intersections to ensure drivers are aware of the presence of an intersection”.

The applicable ASD for a 90km/h design speed and reaction time of two (2) seconds is 139m and is expected to be comfortably achieved given the general straight and flat alignment of Morris Road.

8.4.2 Safe Intersection Sight Distance

As defined by Austroads, Safe Intersection Sight Distance (SISD) is “the minimum sight distance which should be provided on the major road at any intersection”.

The following equation is used to determine SISD:

$$SISD = \frac{D_T \times V}{3.6} + \frac{V^2}{254 \times (d + 0.01 \times a)}$$

Where;

SISD = Safe Intersection Sight Distance (m)

D_T = Decision time (sec)

V = operating (85th percentile) speed (km/h)

d = coefficient of deceleration

a = longitudinal grade on %

The following values were adopted:

$D_T = 5 \text{ sec}$

$V = 90 \text{ km/h}$

$d = 0.24$ (truck value from Table 3.3)

$a = 0\%$ north of access and 0% south of access

The resultant SISD requirements equate to 258m along Sturt highway, and is expected to be comfortably achieved given the general straight and flat alignment of the road.

8.4.3 Minimum Gap Sight Distance

As defined by Austroads, Minimum Gap Sight Distance (MGSD) is *"based on distances corresponding to the critical acceptance gap that drivers are prepared to accept when undertaking a cross or turning manoeuvre at intersections"*.

The different minimum gap sight distance for various movement is as follows:

- Left-turn from Morris Road: 125m; and
- Right-turn from Sturt Highway: 100m.

Both of the above gap sight distance requirements are expected to be comfortably achieved given the general straight and flat alignment of the road.

9. CONCLUSIONS

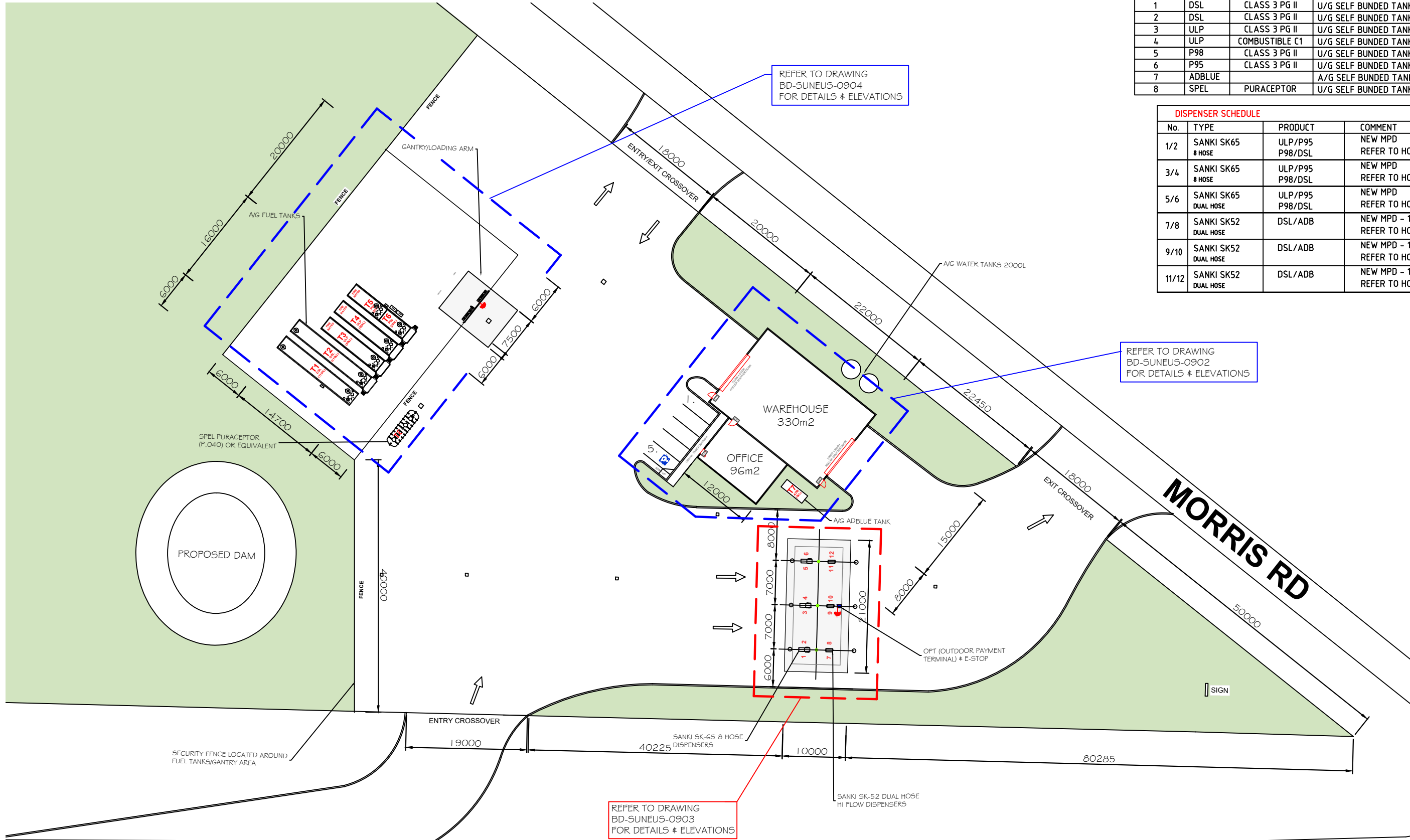
In summary:

- The proposal seeks approval to establish a bulk fuel depot on the corner of Sturt Highway / Morris Road, Euston, with a secondary function of a unmanned fuel site that has an office / warehouse component.
- A total of five (5) car parking spaces is proposed on-site, for the occasional use of the office / warehouse.
- Three accesses are proposed: Entry-only via Sturt Highway (eastbound), Entry / exit on north-eastern corner of site to / from Morris Road and Exit-only on south-eastern corner of site to Morris Road. All accesses have been designed in compliance with AS2890.2 (2018) and to accommodate all vehicle sizes up to and including 26m B-Double vehicles. Swept path analysis has been undertaken for critical movements.
- The proposed development has been assessed to generate 6 vehicle trips per hour during the AM peak period and 5 vehicle trips per hour during the PM peak period. SIDRA modelling has been undertaken at the Sturt Highway / Morris Road intersection, with the results demonstrating that the intersection will continue to perform with spare capacity.
- The design of the car park complies with AS2890.1 (2004).
- BAL / BAR treatments are required at the Sturt Highway / Morris Road intersection accordance with AustRoads Guide to Road Design Part 4A (Unsignalised and Signalised Intersections).
- Sight distances at the Sturt Highway / Morris Road intersection have been assessed in accordance with Austroads Guidelines, which demonstrates sufficient sight distance can be comfortably achieved.

This traffic impact assessment therefore demonstrates that the subject application is supportable on traffic planning grounds. TRAFFIX anticipates an ongoing involvement during the development approval process.

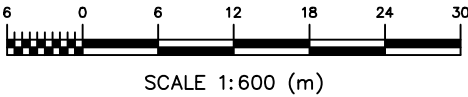
APPENDIX A

Reduced Plans



TANK SCHEDULE				
TANK No	PRODUCT	PROD. CLASS	DESCRIPTION	TANK CAP's Ltrs
1	DSL	CLASS 3 PG II	U/G SELF BUNDED TANKS	110,000
2	DSL	CLASS 3 PG II	U/G SELF BUNDED TANKS	110,000
3	ULP	CLASS 3 PG II	U/G SELF BUNDED TANKS	55,000
4	ULP	COMBUSTIBLE C1	U/G SELF BUNDED TANKS	54,000
5	P98	CLASS 3 PG II	U/G SELF BUNDED TANKS	30,000
6	P95	CLASS 3 PG II	U/G SELF BUNDED TANKS	25,000
7	ADBLUE		A/G SELF BUNDED TANKS	5,000
8	SPEL	PURCEPTOR	U/G SELF BUNDED TANK	5,000

DISPENSER SCHEDULE			
No.	TYPE	PRODUCT	COMMENT
1/2	SANKI SK65 8 HOSE	ULP/P95 P98/DSL	NEW MPD REFER TO HOSE LOCATION ORDER
3/4	SANKI SK65 8 HOSE	ULP/P95 P98/DSL	NEW MPD REFER TO HOSE LOCATION ORDER
5/6	SANKI SK65 DUAL HOSE	ULP/P95 P98/DSL	NEW MPD REFER TO HOSE LOCATION ORDER
7/8	SANKI SK52 DUAL HOSE	DSL/ADB	NEW MPD - 110 LPM REFER TO HOSE LOCATION ORDER
9/10	SANKI SK52 DUAL HOSE	DSL/ADB	NEW MPD - 110 LPM REFER TO HOSE LOCATION ORDER
11/12	SANKI SK52 DUAL HOSE	DSL/ADB	NEW MPD - 110 LPM REFER TO HOSE LOCATION ORDER



DO NOT SCALE
DIMENSIONS IN MM
DRAWING PRACTICE
TO AS1100

DWG. No.	DATE	BY	REVISION/COMMENTS
1	17/11/22	TJB	ISSUED FOR COMMENT

BLACK DUCK DEVELOPMENTS		
MOB: 0412 149 167 SUITE 6, 497 BURKE ROAD HAWTHORN EAST VIC 3123		
ABN : 68 086 502 838		
DRAWN DATE NOV. 2022	DRAWN BY TJB	CLIENT SGH PETROLEUM

SGH PETROLEUM
CNR CAREY ST & MORRIS RD
EUSTON NSW 2737

SITE LAYOUT - DETAIL		
DRAWING No. BD-SUNEUS-0901	SIZE A3	REVISION 1

PRELIMINARY
NOT FOR CONSTRUCTION

APPENDIX B

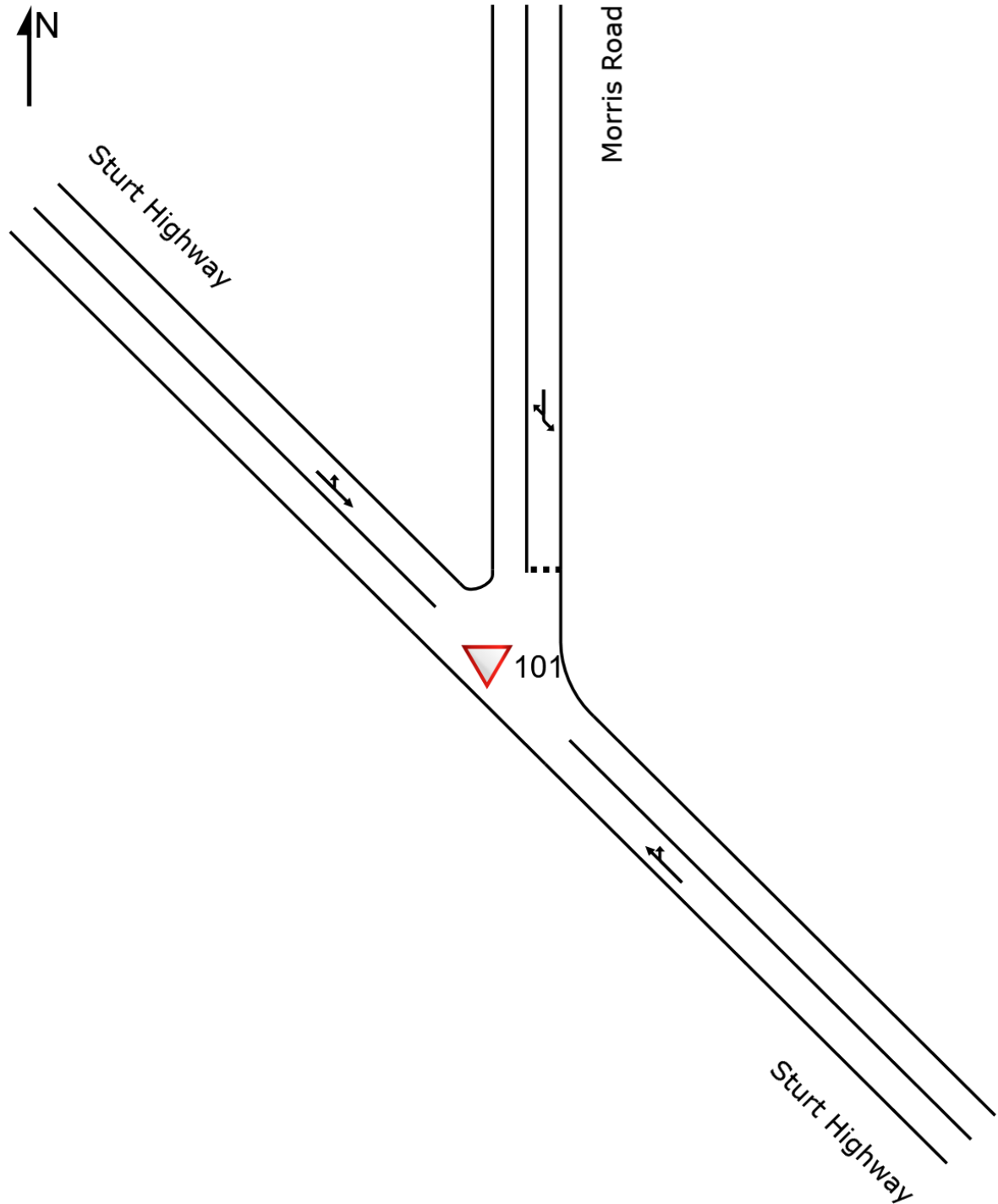
SIDRA Outputs

SITE LAYOUT

▽ Site: 101 [101-1 AM EX Sturt Highway & Morris Road (Site Folder: EXISTING)]

Intersection: Sturt Highway & Morris Road
Period: AM Peak Hour
Scenario: Existing
Site Category: (None)
Give-Way (Two-Way)

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



MOVEMENT SUMMARY

Site: 101 [101-1 AM EX Sturt Highway & Morris Road (Site Folder: EXISTING)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Intersection: Sturt Highway & Morris Road
Period: AM Peak Hour
Scenario: Existing
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh. veh	Dist] m				
			veh/h	%	veh/h	%	v/c	sec							km/h
SouthEast: Sturt Highway															
22	T1	All MCs	51	50.0	51	50.0	0.035	0.0	LOS A	0.0	0.1	0.02	0.03	0.02	79.0
23a	R1	All MCs	2	0.0	2	0.0	0.035	6.4	LOS A	0.0	0.1	0.02	0.03	0.02	73.0
Approach			53	48.0	53	48.0	0.035	0.3	NA	0.0	0.1	0.02	0.03	0.02	78.8
North: Morris Road															
7a	L1	All MCs	2	0.0	2	0.0	0.020	6.7	LOS A	0.1	0.4	0.23	0.63	0.23	63.3
9b	R3	All MCs	20	0.0	20	0.0	0.020	7.8	LOS A	0.1	0.4	0.23	0.63	0.23	63.2
Approach			22	0.0	22	0.0	0.020	7.7	LOS A	0.1	0.4	0.23	0.63	0.23	63.2
NorthWest: Sturt Highway															
27b	L3	All MCs	52	0.0	52	0.0	0.080	8.0	LOS A	0.0	0.0	0.00	0.29	0.00	68.1
28	T1	All MCs	77	34.2	77	34.2	0.080	0.0	LOS A	0.0	0.0	0.00	0.29	0.00	73.5
Approach			128	20.5	128	20.5	0.080	3.2	NA	0.0	0.0	0.00	0.29	0.00	71.2
All Vehicles			203	25.4	203	25.4	0.080	2.9	NA	0.1	0.4	0.03	0.26	0.03	72.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [101-2 PM EX Sturt Highway & Morris Road (Site Folder: EXISTING)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Intersection: Sturt Highway & Morris Road
Period: PM Peak Hour
Scenario: Existing
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	[Total HV]	[Veh. veh]	[Dist]				m					
			veh/h	%	veh/h	%	v/c	sec							km/h
SouthEast: Sturt Highway															
22	T1	All MCs	99	27.7	99	27.7	0.060	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	79.8
23a	R1	All MCs	1	0.0	1	0.0	0.060	6.1	LOS A	0.0	0.1	0.01	0.01	0.01	73.6
Approach			100	27.4	100	27.4	0.060	0.1	NA	0.0	0.1	0.01	0.01	0.01	79.7
North: Morris Road															
7a	L1	All MCs	2	0.0	2	0.0	0.036	6.7	LOS A	0.1	0.8	0.26	0.65	0.26	63.2
9b	R3	All MCs	37	0.0	37	0.0	0.036	7.9	LOS A	0.1	0.8	0.26	0.65	0.26	63.1
Approach			39	0.0	39	0.0	0.036	7.8	LOS A	0.1	0.8	0.26	0.65	0.26	63.1
NorthWest: Sturt Highway															
27b	L3	All MCs	23	0.0	23	0.0	0.062	8.0	LOS A	0.0	0.0	0.00	0.17	0.00	70.2
28	T1	All MCs	78	29.7	78	29.7	0.062	0.0	LOS A	0.0	0.0	0.00	0.17	0.00	76.0
Approach			101	22.9	101	22.9	0.062	1.8	NA	0.0	0.0	0.00	0.17	0.00	74.6
All Vehicles			240	21.1	240	21.1	0.062	2.1	NA	0.1	0.8	0.04	0.18	0.04	74.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 201-1 [201-1 AM EX Sturt Highway & Morris Road (Site Folder: EXISTING + DEVELOPMENT)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Intersection: Sturt Highway & Morris Road
Period: AM Peak Hour
Scenario: Existing + Development
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh. veh	Dist] m				
			veh/h		veh/h		v/c	sec							km/h
SouthEast: Sturt Highway															
22	T1	All MCs	51	50.0	51	50.0	0.038	0.0	LOS A	0.0	0.4	0.05	0.06	0.05	78.6
23a	R1	All MCs	3	33.3	3	33.3	0.038	9.2	LOS A	0.0	0.4	0.05	0.06	0.05	67.5
Approach			54	49.0	54	49.0	0.038	0.5	NA	0.0	0.4	0.05	0.06	0.05	77.8
North: Morris Road															
7a	L1	All MCs	3	33.3	3	33.3	0.022	7.6	LOS A	0.1	0.5	0.24	0.63	0.24	58.2
9b	R3	All MCs	20	0.0	20	0.0	0.022	7.8	LOS A	0.1	0.5	0.24	0.63	0.24	63.0
Approach			23	4.5	23	4.5	0.022	7.8	LOS A	0.1	0.5	0.24	0.63	0.24	62.3
NorthWest: Sturt Highway															
27b	L3	All MCs	52	0.0	52	0.0	0.080	8.0	LOS A	0.0	0.0	0.00	0.29	0.00	68.1
28	T1	All MCs	77	34.2	77	34.2	0.080	0.0	LOS A	0.0	0.0	0.00	0.29	0.00	73.5
Approach			128	20.5	128	20.5	0.080	3.2	NA	0.0	0.0	0.00	0.29	0.00	71.2
All Vehicles			205	26.2	205	26.2	0.080	3.0	NA	0.1	0.5	0.04	0.27	0.04	71.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 201-2 [201-2 PM EX Sturt Highway & Morris Road (Site Folder: EXISTING + DEVELOPMENT)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

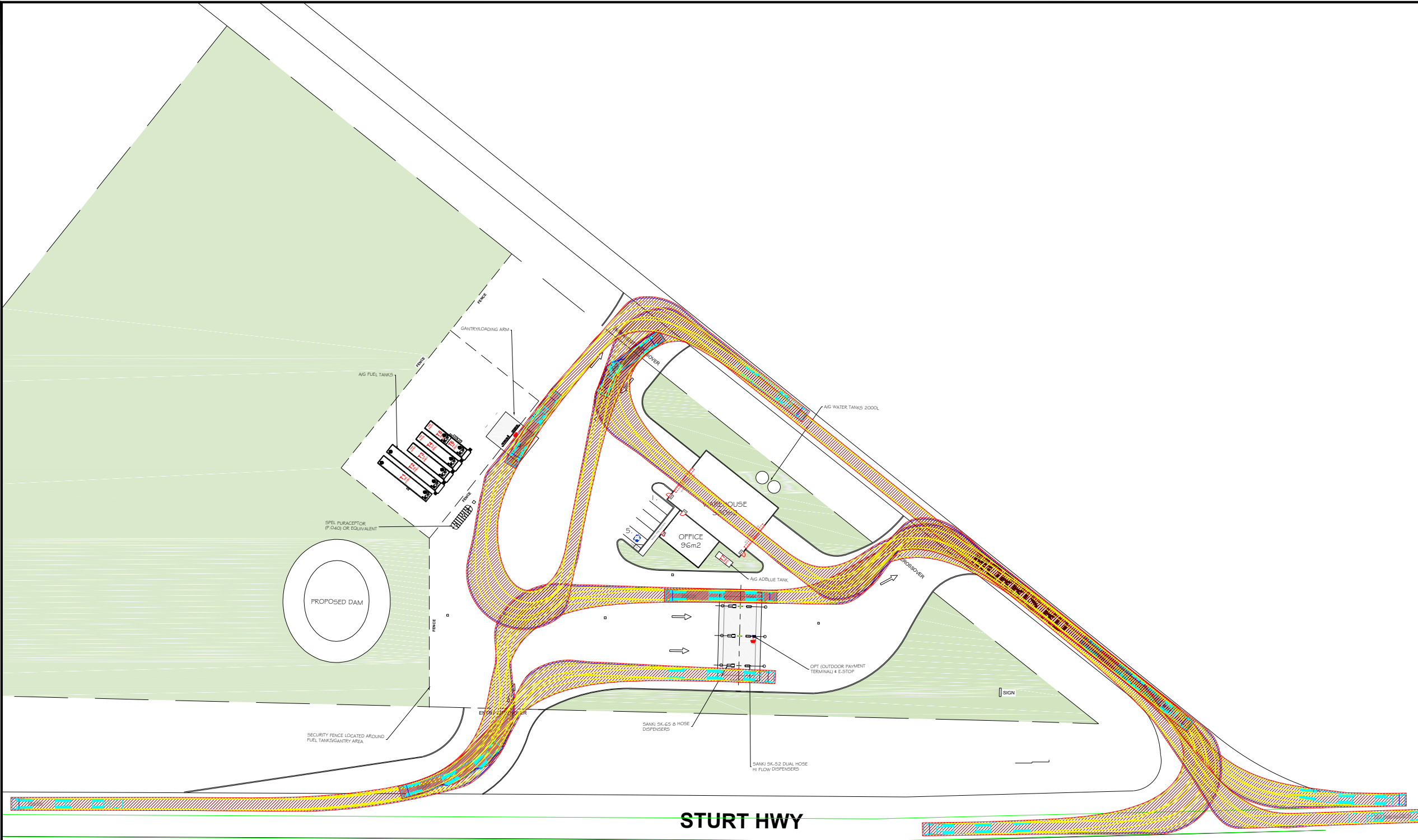
Intersection: Sturt Highway & Morris Road
Period: PM Peak Hour
Scenario: Existing + Development
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh. veh	Dist] m				
			veh/h		veh/h		v/c	sec							km/h
SouthEast: Sturt Highway															
22	T1	All MCs	99	27.7	99	27.7	0.060	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	79.8
23a	R1	All MCs	1	0.0	1	0.0	0.060	6.1	LOS A	0.0	0.1	0.01	0.01	0.01	73.6
Approach			100	27.4	100	27.4	0.060	0.1	NA	0.0	0.1	0.01	0.01	0.01	79.7
North: Morris Road															
7a	L1	All MCs	3	33.3	3	33.3	0.048	7.6	LOS A	0.2	1.3	0.28	0.65	0.28	57.6
9b	R3	All MCs	40	7.9	40	7.9	0.048	8.4	LOS A	0.2	1.3	0.28	0.65	0.28	61.0
Approach			43	9.8	43	9.8	0.048	8.4	LOS A	0.2	1.3	0.28	0.65	0.28	60.8
NorthWest: Sturt Highway															
27b	L3	All MCs	23	0.0	23	0.0	0.062	8.0	LOS A	0.0	0.0	0.00	0.17	0.00	70.2
28	T1	All MCs	78	29.7	78	29.7	0.062	0.0	LOS A	0.0	0.0	0.00	0.17	0.00	76.0
Approach			101	22.9	101	22.9	0.062	1.8	NA	0.0	0.0	0.00	0.17	0.00	74.6
All Vehicles			244	22.4	244	22.4	0.062	2.3	NA	0.2	1.3	0.05	0.19	0.05	73.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

APPENDIX C

Swept Path Analysis



Notes:

This drawing is prepared for information purposes only. It is not to be used for construction.

TRAFFIX is responsible for vehicle swept path diagrams and/or drawing mark-ups only. Base drawing prepared by others.

Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (AS/NZS 2890.1:2004 Parking facilities - Off-street car parking, and/or AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev.	Revision Note	By.	Date
A	Design Review	TL	28-02-23

Swept Path Legend	
	Wheel Path
	Vehicle Body Envelope
	Clearance Envelope (300mm)

Architect

Client
SGH Petroleum Pty Ltd
C/- James Golsworthy Consulting
PO Box 1650 Mildura VIC 2502

Scale / Plan Orientation

0 2 4 6 8m

1:200 @ A3

Project Description
Proposed Service Station
Lot 43 DP46657

Drawing Prepared By

TRAFFIX
TRAFFIC AND TRANSPORT PLANNERS

Suite 2.08, 50 Holt Street t: +61 2 8324 8700
Surry Hills, NSW 2010 f: +61 2 9830 4481
PO Box 1124 w: www.traffix.com.au
Strawberry Hills, NSW 2012

Drawing Title
Design Review & Swept Path Analysis
26m B-Double Design Vehicle
20m Articulated Vehicle (AV)

Drawn: TL	Checked: TY	Date: 28-02-23
-----------	-------------	----------------

22.670d01v01 TRAFFIX [230224 Plans] Design Review.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
22.670	DA	TX.01	A