MIDSON traffic pty ltd

Department of Justice

Northern Correctional Facility
Traffic Impact Assessment

January 2023

ENGINEERS AUSTRALIA

PROFESSIONAL ENGINEER OF THE YEAR
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1. Introduction

1.1 Background

Midson Traffic were engaged by the Department of Justice to prepare a traffic impact assessment (TIA) for a proposed Northern Correctional Facility (NCF) development at the existing Ashley Youth Detention Centre (AYDC), Deloraine.

This TIA is intended to assist the Department of Justice with the traffic and parking considerations associated with the planning stages of the NCF.

1.2 Traffic Impact Assessment

A TIA is a process of compiling and analysing information on the impacts that a specific development proposal is likely to have on the operation of roads and transport networks. A TIA should not only include general impacts relating to traffic management, but should also consider specific impacts on all road users, including on-road public transport, pedestrians, cyclists and heavy vehicles.

This TIA has been prepared in accordance with the Department of State Growth (DSG) publication, *Traffic Impact Assessment Guidelines*, August 2020. This TIA has also been prepared with reference to the Austroads publication, *Guide to Traffic Management,* Part 12: *Traffic Impacts of Developments*, 2019.

Land use developments generate traffic movements as people move to, from and within a development. Without a clear understanding of the type of traffic movements (including cars, pedestrians, trucks, etc), the scale of their movements, timing, duration and location, there is a risk that this traffic movement may contribute to safety issues, unforeseen congestion or other problems where the development connects to the road system or elsewhere on the road network. A TIA attempts to forecast these movements and their impact on the surrounding transport network.

A TIA is not a promotional exercise undertaken on behalf of a developer; a TIA must provide an impartial and objective description of the impacts and traffic effects of a proposed development. A full and detailed assessment of how vehicle and person movements to and from a development site might affect existing road and pedestrian networks is required. An objective consideration of the traffic impact of a proposal is vital to enable planning decisions to be based upon the principles of sustainable development.

This TIA also addresses the relevant clauses of C2.0, *Parking and Sustainable Transport Code*, and C3.0, *Road and Railway Assets Code*, of the Tasmanian Planning Scheme – Meander Valley, 2021.

1.3 Statement of Qualification and Experience

This TIA has been prepared by an experienced and qualified traffic engineer in accordance with the requirements of Council's Planning Scheme and The Department of State Growth's, *Traffic Impact Assessment Guidelines*, August 2020, as well as Council's requirements.

The TIA was prepared by Keith Midson. Keith's experience and qualifications are briefly outlined as follows:

- 27 years professional experience in traffic engineering and transport planning.

- Master of Transport, Monash University, 2006
- Master of Traffic, Monash University, 2004
- Bachelor of Civil Engineering, University of Tasmania, 1995
- Engineers Australia: Fellow (FIEAust); Chartered Professional Engineer (CPEng); Engineering Executive (EngExec); National Engineers Register (NER)

1.4 Project Scope

The project scope of this TIA is outlined as follows:

- Review of the existing road environment in the vicinity of the site and the traffic conditions on the road network.
- Provision of information on the proposed development with regards to traffic movements and activity.
- Identification of the traffic generation potential of the proposal with respect to the surrounding road network in terms of road network capacity.
- Review of the parking requirements of the proposed development. Assessment of this parking supply with Planning Scheme requirements.
- Traffic implications of the proposal with respect to the external road network in terms of traffic efficiency and road safety.

1.5 Subject Site

The subject site is located at 4260 Meander Valley Road, Deloraine, PID 6275320, Title Reference 12/6765.

The subject site and surrounding road network is shown in Figure 1.

Figure 1 Subject Site & Surrounding Road Network

Image Source: LIST Map, DPIPWE

1.6 Reference Resources

The following references were used in the preparation of this TIA:

- Tasmanian Planning Scheme – Meander Valley, 2021 (Planning Scheme)
- Austroads, *Guide to Traffic Management,* Part 12: *Traffic Impacts of Developments*, 2019
- Austroads, *Guide to Traffic Management*, Part 6: Intersections, Interchanges and Crossings, 2020
- Austroads, *Guide to Road Design*, Part 4A: Unsignalised and Signalised Intersections, 2021
- Department of State Growth, *Traffic Impact Assessment Guidelines*, 2020
- Roads and Maritime Services NSW, *Guide to Traffic Generating Developments*, 2002 (RMS Guide)
- Roads and Maritime Services NSW, *Updated Traffic Surveys,* 2013 (Updated RMS Guide)
- Australian Standards, AS2890.1, *Off-Street Parking*, 2004 (AS2890.1)

2. Existing Conditions

2.1 Transport Network

For the purposes of this report, the transport network consists of Meander Valley Road, Highland Lakes Road, Bowerbank Link Road and the Bass Highway.

2.1.1 Meander Valley Road

Meander Valley Road is a rural collector road that connects between the Highland Lakes Road/ Bowerbank Link Road roundabout at its western end and Bass Highway at its eastern end.

It is a two-lane/ two-way road with edge and centre line marking and a pavement width of 7 metres. It has a posted speed limit of 100-km/h near the subject site. Meander Valley Road carries approximately 1,900 vehicles per day near the subject site[1]. The distribution of hourly flows by day of week is summarised in Figure 4. Meander Valley Road carries 11.4% heavy vehicles.

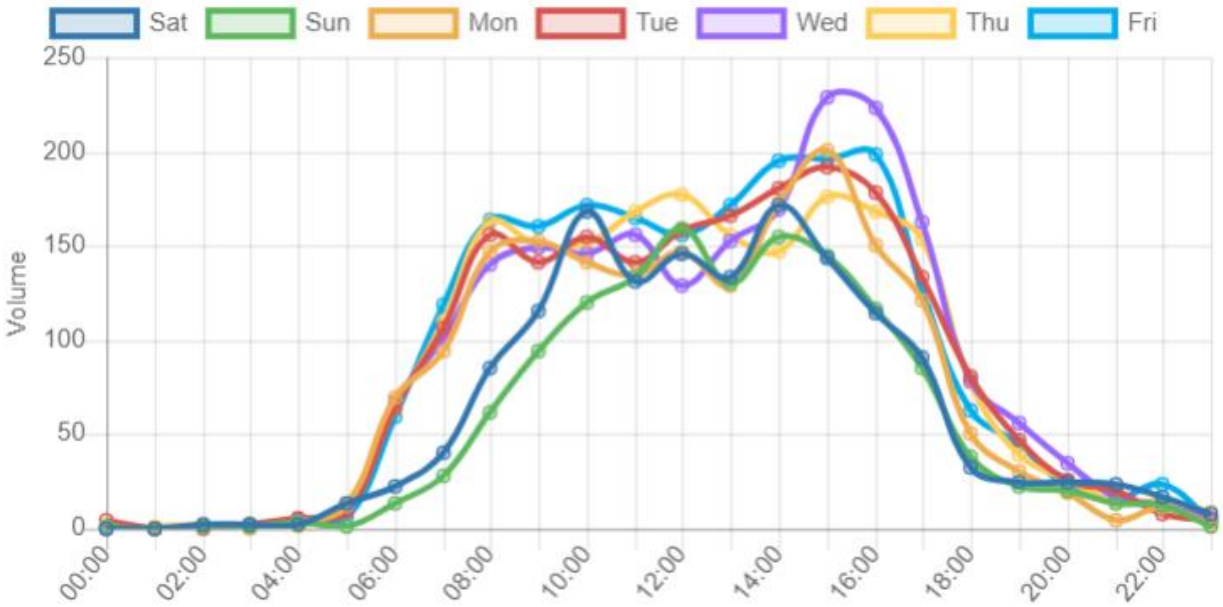
Meander Valley Road adjacent to the subject site is shown in Figure 2 and Figure 3.

Figure 2 Meander Valley Road West of Existing Access

[1] Department of State Growth traffic data, 500 metres east of Bowerbank Link Road roundabout, 2021.

Figure 3 Meander Valley Road at Existing Access

Figure 4 Meander Valley Road Hourly Traffic Flow



2.1.2 Bowerbank Link Road

Bowerbank Link Road connects between the Bass Highway and Meander Valley Road. It is approximately 1-kilometer in length and has a two-lane configuration. Its connection with Bass Highway is a grade separated interchange and its connection with Meander Valley Road is a roundabout.

It has a posted speed limit of 100-km/h and carries approximately 2,500 vehicles per day.

2.1.3 Bass Highway

The Bass Highway is classified as a Category 1, Trunk Road in accordance with the Department of State Growth's Road Hierarchy. Trunk Roads are the State's major highways and are crucial to the effective functioning of Tasmanian Industry, commerce and the community. They carry large numbers of heavy vehicles and are the key links supporting future economic development in Tasmania.

In a regional context, the Highway connects between Launceston at its eastern end and Marrawah at its western end. Bass Highway has a posted speed limit of 110-km/h and has a traffic volume of approximately 10,600 vehicles per day.

2.2 Road Safety Performance

Crash data can provide valuable information on the road safety performance of a road network. Existing road safety deficiencies can be highlighted through the examination of crash data, which can assist in determining whether traffic generation from the proposed development may exacerbate any identified issues.

Crash data was obtained from the Department of State Growth for a 5+ year period between 1st January 2017 and 30th September 2022 for Meander Valley Road between Bowerbank Link Road and Exton Road, and the full length of Bowerbank Link Road.

The findings of the crash data is summarised as follows:

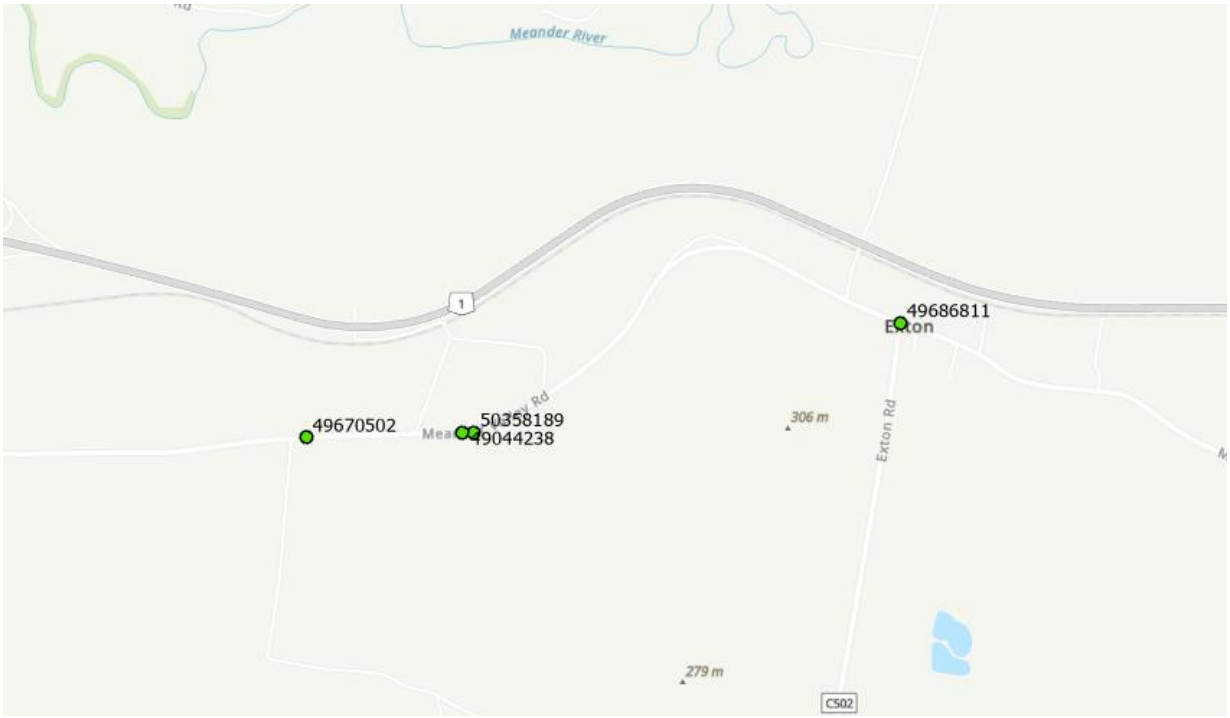
Meander Valley Road

- A total of 4 crashes were reported in Meander Valley Road east of the roundabout during this time.
- Severity. 1 crash involved minor injury; 3 crashes involved property damage only.
- Day of week. No crash trends were noted by day of week, with 1 crash reported on a Wednesday, Thursday, Friday and a Saturday.
- Time of day. All crashes were reported between 10:50am and 6:00pm with no trends noted.
- Crash types. 2 crashes involved 'other-curve' single vehicle incidents; 1 crash involved 'left-near' collision between two vehicles; 1 crash involved 'left-off-carriageway'.
- Vehicle types. All crashes involved light vehicles (cars), with one crash involving a car and a heavy vehicle (truck).
- Crash locations. The crash locations on Meander Valley Road east of the roundabout are shown in Figure 5.

Bowerbank Link Road

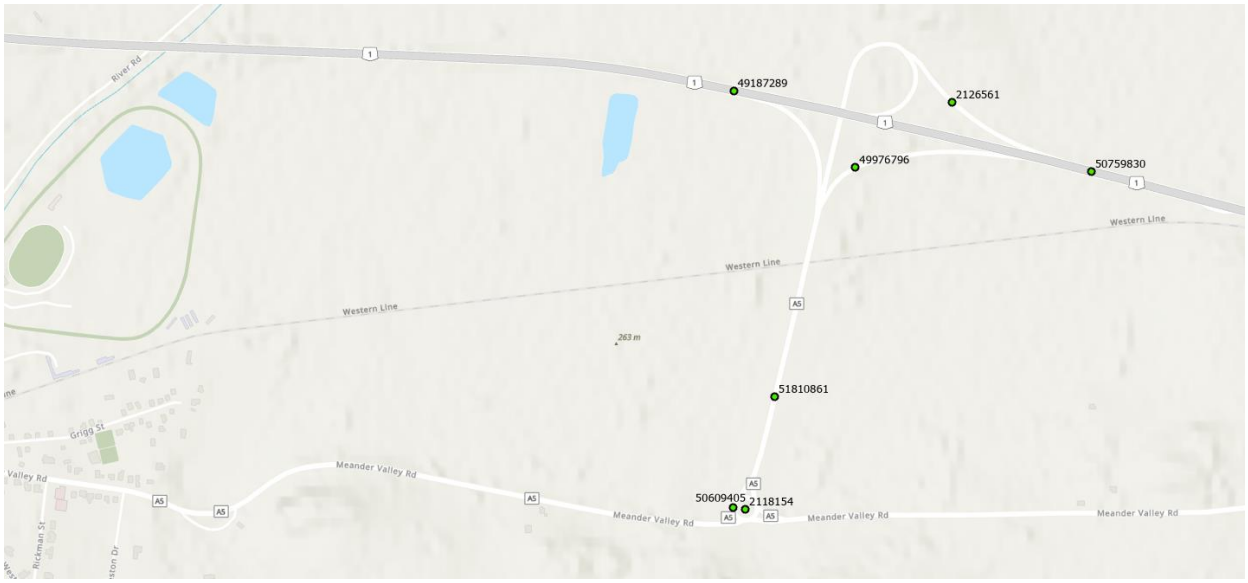
- A total of 4 crashes were reported within the Bowerbank Link Road during this time.
- Severity. 1 crash involved minor injury; 3 crashes involved property damage only.
- Day of week. No crash trends were noted by day of week, with 1 crash reported on a Monday, Wednesday, Thursday, and a Sunday.
- Time of day. All crashes were reported between 7:30am and 8:50pm with no trends noted.
- Crash types. No crash trends were noted by crash type. 1 crash involved a 'rear-end' collision; 2 crashes involved a single vehicle loss of control on the carriageway; 1 crash involved 'permanent-obstruction-on-carriageway'.
- Vehicle types. 1 crash involved a heavy vehicle; 3 crashes involved light vehicles.
- Crash locations. The crash locations on Bowerbank Link Road (also indicating several crashes recorded within the Bass Highway interchange that were not assessed in this report) are shown in Figure 6.

Figure 5 Meander Valley Road Crash Locations



Source: Department of State Growth

Figure 6 Bowerbank Link Road and Bass Highway Crash Locations



Source: Department of State Growth

2.3 Ashley Youth Detention Centre

The Ashley Youth Detention Centre (AYDC) has a capacity of 51 beds for 10 to 18-year old offenders. The AYDC typically has 30 to 40 staff on-site during a normal day.

Depending on the progress of developing the new alternate accommodation arrangements for youth in the State, there is a possibility that the AYDC will remain operational for a short period while the proposed NCF is being constructed

3. Proposed Development

3.1 Development Proposal

Development plans have not yet been prepared. The proposed NCF is a 270-bed correctional facility which is proposed to be located within the same property boundaries as the AYDC.

The NCF is expected to be constructed in two stages. Stage one is expected to take two to three years to complete and is anticipated to be operational while stage two is under construction. Once fully operational (following stage 2) the NCF will be staffed with up to 370 staff, with approximately 230 facility staff plus other site visitors, such as visitors to offenders, delivery's, ancillary support staff etc., expected to be present during the busiest time of day (weekday).

The NCF facility will operate 24 hours a day, seven days a week.

4. Traffic Impacts

4.1 NCF Trip Generation

Traffic generation was determined from first principles and references to survey resources where available.

The primary traffic movements associated with a correctional facility include:

- Staff movements
- Offender transport.
- Medical transfers.
- Visitor movements.
- Service vehicle movements (linen, food, etc).

Daily staff movements typically average 1.8 trips per staff (two-way movements). This accounts for an average car occupancy of 1.1 people per vehicle and two trips per day (inward and outward). This equates to 672 vehicles per day. The peak staff traffic generation is estimated to be 170 vehicles per hour.

Additional vehicle movements to staff movements inclusive of transports, deliveries and visitors is estimated at 100 vehicles per day (two-way movements). The total traffic generation is therefore 772 vehicles per day, with a peak of 180 vehicles per hour.

4.2 AYDC Traffic Generation

Depending on the progress of developing the new alternate accommodation arrangements for youth in the State, there is a possibility that the AYDC will remain operational for a short period while the proposed NCF is being constructed.

AYDC staff movements are estimated to be between 54 to 72 vehicles per day.

In terms of non-staff and visitor related traffic generation, AYDC have approximately 2 to 3 offender transports per week with approximately an additional 10 movements per day of various services (linen, food, etc).

The total daily traffic generation associated with AYDC is therefore 76 to 94 two-way vehicles per day. The peak traffic generation associated with AYDC is estimated to be 30 vehicles per hour.

4.3 Trip Assignment

The majority of trips will be left-in/ right-out at the site's access with Meander Valley Road. This is due to the connectivity of Bowerbank Link Road to the Highway, as well as the proximity of Deloraine town centre.

The distribution of traffic at the access generated by the NCF during peak periods is summarised in Table 1.

If the existing AYDC access is to be utilised to access the NCF, then the total turning movements at the access junction are summarised in Table 2.

Table 1 Peak NCF Turning Movements at New Access

Peak	Left In	Right In	Left Out	Right Out
AM Peak	101 vph	25 vph	11 vph	43 vph
PM Peak	43 vph	11 vph	25 vph	101 vph

Table 2 Peak NCF & AYDC Turning Movements at AYDC Access

Peak	Left In	Right In	Left Out	Right Out
AM Peak	118 vph	29 vph	13 vph	50 vph
PM Peak	50 vph	13 vph	29 vph	118 vph

4.4 Access Arrangements

A critical consideration for the NCF is the access arrangements to the site. The proposed NCF has two principal viable options for obtaining access to the transport network (although the possibility of potentially having two access points also exists based on the following analysis):

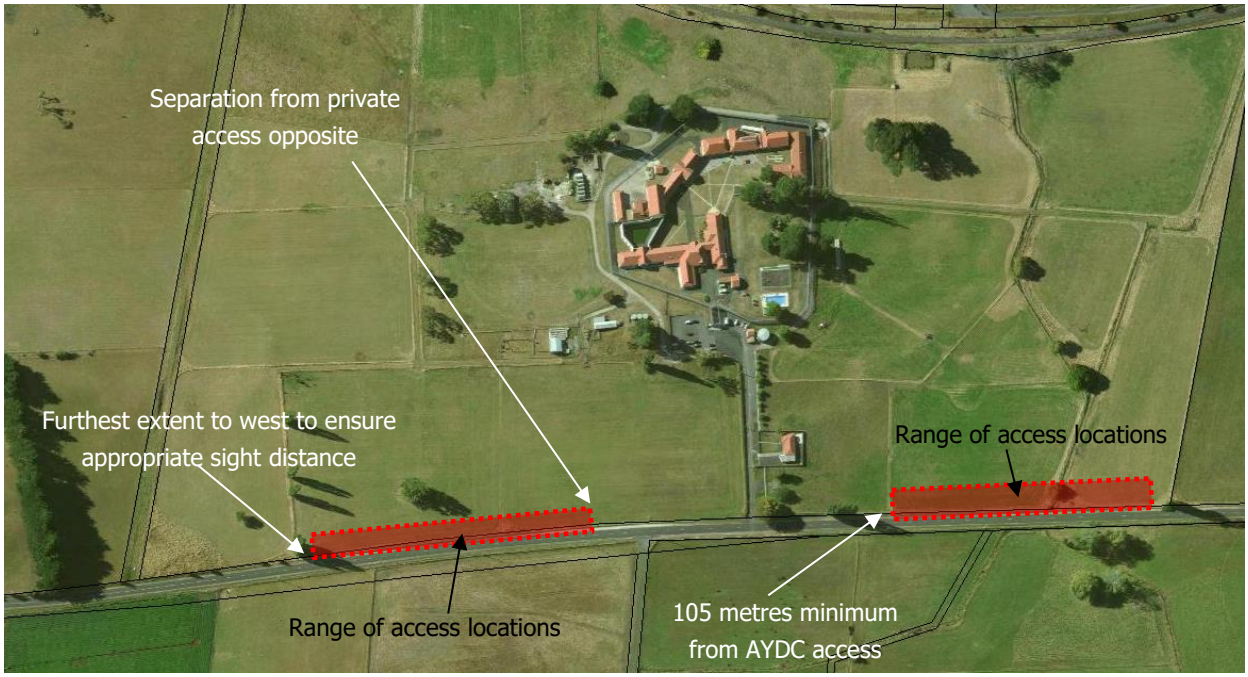
- Utilise and upgrade the existing AYDC access; and
- Construct a new access to Meander Valley Road.

Note that direct vehicular access is not possible to the Bass Highway as it is classified as a Category 1 road which is proclaimed as a limited access road. For similar reasons it would not be appropriate to provide access to the site from Bowerbank Link Road.

4.4.1 Potential New Access Locations

If a new access is constructed for the NCF, then the minimum spacing between the AYDC and NCF should be at least 105 metres in accordance with Austroads requirements. This results in a range of possible locations to the west and the east of the AYDC access. Access locations to the west of the AYDC access are limited by sight distance restrictions, as well as a private access located opposite. The potential locations for a new access are shown indicatively in Figure 7.

Figure 7 Potential NCF Driveway Locations



4.4.2 Existing or New Access Considerations

The access considerations for both options are summarised in Table 3. It can be seen that both options provide viable access arrangements for the NCF.

This report does not recommend either option but supports both options with careful design considerations.

Table 3 Access Options Comparison Summary

	Shared AYDC Access	New Access
Access design considerations	The existing access would need to be upgraded to accommodate additional vehicle movements associated with the NCF and AYDC facilities. This is covered in Section 4.9.	A new access would need to be designed to accommodate the forecast traffic movements associated with the NCF only. The existing AYDC junction should also be upgraded to current design standards. This is covered in Section 4.9.
Road safety considerations	A single shared access will reduce the number of conflict points on Meander Valley Road, which is a high-speed environment. A single access therefore provides a safer road environment.	Two accesses would need to have adequate separation to minimise potential conflicts between accesses.
Network impacts	A single access will have less impact on traffic flow on Meander Valley Road.	Two accesses will have a minor impact on traffic flow on Meander Valley Road.
Land acquisition requirements	Both access arrangements will require modifications to the road corridor width to accommodate turning facilities. There is sufficient corridor width to facilitate this without requiring property acquisition of neighbouring properties.	
Sight distance	Site investigations revealed that adequate sight distance is available at the existing access as well as a proposed separate NCF access on Meander Valley Road. It is noted that the existing AYDC access is in a location that maximises sight distance along Meander Valley Road.	
Construction Impacts	NCF construction stage activity will have an impact on the existing operation of the AYDC access.	The construction of a new access to facilitate the NCF will enable the AYDC access to continue uninterrupted.
Other considerations	Utilising the existing AYDC access will require an internal junction within the access to separate the NCF traffic from the AYDC traffic. A large amount of angle parking is also located along the existing AYDC access. This parking would not be appropriate to retain with the increase in traffic utilising the access (increased risk of parking manoeuvring crashes and pedestrian movements). If the existing AYDC access were to be utilised, then the parking should be relocated to a separate parking facility that connects to the access.	

4.5 Traffic Capacity Analysis

SIDRA traffic modelling analysis was undertaken of the following junctions/ scenarios:

- Existing AYDC access utilised for NCF
- Potential new NCF access
- Meander Valley Road/ Bowerbank Link Road

SIDRA uses complex analytical traffic models coupled with iterative approximation technique to provide estimates of capacity and performance of intersections. SIDRA is endorsed as a modelling tool by Austroads.

One of the key SIDRA outputs is an indication of level of service (LOS) at intersections. The LOS concept describes the quality of traffic service in terms of 6 levels, with level of service A (LOS A) representing the best operating condition (ie. at or close to free flow) and level of service F (LOS F) representing the worst (i.e. forced flow). Other key outputs of SIDRA include average movement delay and 95th percentile queue lengths[2].

The level of service method used in the modelling is the Delay method, where level of service is based solely on average movement delay, including geometric delay, as summarised in Table 4.

Table 4 SIDRA LOS Performance standards

Level of Service	Signals and Roundabouts	Sign Control (Give Way & Stop)
A	$d \leq 10$	$d \leq 10$
B	$10 < d \leq 20$	$10 < d \leq 15$
C	$20 < d \leq 35$	$15 < d \leq 25$
D	$35 < d \leq 55$	$25 < d \leq 35$
E	$55 < d \leq 80$	$35 < d \leq 50$
F	$80 < d$	$50 < d$

The lowest target level of service considered acceptable for a rural environment is LOS C, which corresponds to a maximum delay of 25 seconds for give-way control and 35 seconds for roundabout control. LOS E and F represent the junction operating at capacity, with forced flow conditions. LOS D is generally considered acceptable in an urban environment.

[2] This is the queue length not exceeded 95% of the time

The SIDRA modelling results are provided in the following sections for each option/ scenario.

4.5.1 Existing AYDC Access Assessment

The shared access arrangement will result in peak traffic generation of 210 vehicles per hour. The SIDRA modelling summary for the access is provided in Table 5 and Table 6 for the AM and PM peaks respectively.

It can be seen that the access can cater for the increased traffic generation associated with the NCF combined with AYDC traffic at a high level of efficiency.

Table 5 Shared AYDC Access AM SIDRA Modelling Summary

Movement Performance - Vehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m
East: Meander Valley Rd								
5	T	74	5.0	0.065	0.9	LOS A	0.4	2.7
6	R	31	5.0	0.065	9.6	LOS A	0.4	2.7
Approach		104	5.0	0.065	3.4	NA	0.4	2.7
North: AYDC access								
7	L	14	5.0	0.100	10.8	LOS B	0.4	2.8
9	R	53	5.0	0.100	10.9	LOS B	0.4	2.8
Approach		66	5.0	0.100	10.9	LOS B	0.4	2.8
West: Meander Valley Rd								
10	L	124	5.0	0.069	8.4	LOS A	0.0	0.0
11	T	98	5.0	0.052	0.0	LOS A	0.0	0.0
Approach		222	5.0	0.069	4.7	NA	0.0	0.0
All Vehicles		393	5.0	0.100	5.4	NA	0.4	2.8

Level of Service (LOS) Method: Delay (HCM 2000).
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.

Table 6 Shared AYDC Access PM SIDRA Modelling Summary

Movement Performance - Vehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m
East: Meander Valley Rd								
5	T	107	5.0	0.068	0.5	LOS A	0.4	2.9
6	R	14	5.0	0.068	9.2	LOS A	0.4	2.9
Approach		121	5.0	0.068	1.5	NA	0.4	2.9
North: AYDC access								
7	L	31	5.0	0.223	10.7	LOS B	1.0	7.0
9	R	124	5.0	0.223	10.8	LOS B	1.0	7.0
Approach		155	5.0	0.223	10.8	LOS B	1.0	7.0
West: Meander Valley Rd								
10	L	53	5.0	0.029	8.4	LOS A	0.0	0.0
11	T	83	5.0	0.044	0.0	LOS A	0.0	0.0
Approach		136	5.0	0.044	3.2	NA	0.0	0.0
All Vehicles		412	5.0	0.223	5.6	NA	1.0	7.0

Level of Service (LOS) Method: Delay (HCM 2000).
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.

4.5.2 New Access Assessment

SIDRA modelling was not undertaken for a new access. The modelling results of the shared AYDC/ NCF access demonstrated that a high level of service would be achieved (LOS B) during both peak periods.

A separate access would result in an access that would perform at a higher level of service due to reduced traffic volume utilising the access.

A new access will therefore operate at a high level of efficiency with acceptable delays and queues.

4.5.3 Meander Valley Rd/ Bowerbank Link Rd Assessment

The existing roundabout at Meander Valley Road/ Bowerbank Road was assessed when considering existing traffic movements combined with traffic generation associated with the NCF. The layout of the roundabout is shown in Figure 8.

The modelling was undertaken using the following assumptions:

- Existing turning movements were estimated using known approach and departure hourly volumes obtained from the Department of State Growth.
- A ten-year compound growth factor of 3.5% per annum was applied to the existing turning movements based on historic growth rates of Meander Valley Road. This provides the likely base turning movements of the roundabout in 2032.
- All NCF traffic generation was applied to the roundabout (2032 turning movements). It is noted that not all traffic accessing the NCF would utilise the roundabout (some will arrive/ depart via Meander Valley Road to the east), however this provides a 'worst-case' scenario for modelling purposes.
- Origins and destinations of NCF traffic were split 50%/ 50% Deloraine (Meander Valley Road) and Bass Highway (Bowerbank Link Road).

The SIDRA modelling summary for the roundabout is provided in Table 7 and Table 8 for the 2032 AM and 2032 PM peaks respectively. It can be seen that the roundabout can cater for the increased traffic generation associated with the NCF at a high level of efficiency (LOS B).

Figure 8 Meander Valley Rd/ Bowerbank Link Rd Roundabout

Image Source: LIST Map, DPIPWE

Table 7 2032 Meander Valley Rd/ Bowerbank Link Rd AM SIDRA Modelling Summary

Movement Performance - Vehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m
East: Meander Valley Rd								
5	T	158	5.0	0.122	2.7	LOS A	0.7	4.8
6	R	37	5.0	0.122	11.5	LOS B	0.7	4.8
Approach		195	5.0	0.122	4.4	LOS A	0.7	4.8
North: Brimbank Link Road								
7	L	83	5.0	0.100	4.7	LOS A	0.5	3.7
9	R	62	5.0	0.100	11.8	LOS B	0.5	3.7
Approach		145	5.0	0.100	7.7	LOS A	0.5	3.7
West: Meander Valley Rd								
10	L	100	5.0	0.158	4.2	LOS A	0.8	6.2
11	T	163	5.0	0.158	2.6	LOS A	0.8	6.2
Approach		263	5.0	0.158	3.2	LOS A	0.8	6.2
All Vehicles		603	5.0	0.158	4.7	LOS A	0.8	6.2

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
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 used.

Table 8 2032 Meander Valley Rd/ Bowerbank Link Rd PM SIDRA Modelling Summary

Movement Performance - Vehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m
East: Meander Valley Rd								
5	T	200	5.0	0.196	3.2	LOS A	1.1	8.4
6	R	84	5.0	0.196	11.9	LOS B	1.1	8.4
Approach		284	5.0	0.196	5.7	LOS A	1.1	8.4
North: Brimbank Link Road								
7	L	65	5.0	0.163	4.8	LOS A	0.9	6.6
9	R	166	5.0	0.163	12.0	LOS B	0.9	6.6
Approach		232	5.0	0.163	10.0	LOS A	0.9	6.6
West: Meander Valley Rd								
10	L	91	5.0	0.178	4.4	LOS A	1.0	7.4
11	T	188	5.0	0.178	2.8	LOS A	1.0	7.4
Approach		279	5.0	0.178	3.3	LOS A	1.0	7.4
All Vehicles		795	5.0	0.196	6.1	LOS A	1.1	8.4

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
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 used.

4.6 Public Transport

Deloraine does not have commuter public transport services. Regional coach services operate between Deloraine and other areas such as Launceston, Devonport and Burnie. These services are operated by Merseylink and Redline Coaches.

Public transport therefore cannot be relied upon for staff movements within the existing bus framework within Deloraine.

Any future public bus service along Meander Valley Road must incorporate indented bus stop parking bays due to the speed limit. Installation of new bus stop infrastructure should be located near the NCF access on both sides of Meander Valley Road.

4.7 Agricultural Traffic

The site is located in a rural area and as such agricultural machinery utilises Meander Valley Road on an infrequent basis.

Agricultural vehicles (tractors and the like) generally travel at speeds lower than the speed limit. Meander Valley Road has relatively straight horizontal geometry and permits overtaking along the majority of its length near the subject site. The passage of agricultural machinery on Meander Valley Road will therefore not have any significant impact on the accessibility of the NCF site.

4.8 Access Impacts

4.8.1 Construction of New Access

The Acceptable Solution A1.2 of Clause C3.5.1 of the Planning Scheme states "*For a road, excluding a category 1 road or a limited access road, written consent for a new junction, vehicle crossing, or level crossing to serve the use and development has been issued by the road authority*".

A new access on Meander Valley Road will therefore require road authority approval from road authority.

The location of any new access to service the NCF is limited to the locations shown in Figure 7. The design of any new access should be in accordance with Austroads as outlined in Section 4.9.

4.8.2 Utilisation of Existing AYDC Access

The Acceptable Solution A1.4 of Clause C3.5.1 of the Planning Scheme states: "*Vehicular traffic to and from the site, using an existing vehicle crossing or private level crossing, will not increase by more than: (a) the amounts in Table C3.1; or (b) allowed by a licence issued under Part IVA of the Roads and Jetties Act 1935 in respect to a limited access road*".

Table C3.1 specifies a maximum increase of 10% of exiting traffic volume utilising an access, or 10 vehicles per day, whichever is greater. In this case the NCF will generate an increase in traffic that exceeds Table C3.1 requirements and therefore cannot satisfy the Acceptable Solution.

The Performance Criteria P1 of Clause C3.5.1 of the Planning Scheme states:

> *"Vehicular traffic to and from the site must minimise any adverse effects on the safety of a junction, vehicle crossing or level crossing or safety or efficiency of the road or rail network, having regard to:*
>
> *(a) any increase in traffic caused by the use;*
>
> *(b) the nature of the traffic generated by the use;*
>
> *(c) the nature of the road;*
>
> *(d) the speed limit and traffic flow of the road;*
>
> *(e) any alternative access to a road;*
>
> *(f) the need for the use;*
>
> *(g) any traffic impact assessment; and*
>
> *(h) any advice received from the rail or road authority".*

The following is relevant with respect to the proposed NCF if the existing AYDC access is to be utilised:

a. Increase in traffic. The existing access currently has approximately 80 vehicles per day utilising the access, with a peak of approximately 30 vehicles per hour. The NCF is estimated to generate 772 vehicles per day, with a peak of up to 180 vehicles per hour. Whilst the increase is substantial

compared to existing volumes, it can be accommodated safely and efficiently with appropriate redesign (as detailed in Section 4.9).

b. Nature of traffic. The type of traffic that would utilise the ADYC access will be consistent with existing traffic in terms of vehicle types and users.

c. Nature of road. Meander Valley Road is a rural collector road. The function of the road is compatible with intensification of the access.

d. Speed limit and traffic flow. Meander Valley Road has a posted speed limit of 100-km/h and has an average daily traffic volume of 1,900 vehicles per day. The traffic flow conditions of Meander Valley Road are compatible with retaining a single access location that services the NCF and AYDC.

e. Alternative access. No alternative access is possible.

f. Need for use. The access is required to service the transport requirements associated with the NCF.

g. Traffic impact assessment. This report documents the findings of a traffic impact assessment.

h. Road authority advice. This TIA has been prepared to support the planning stages of the NCF development. As such no road authority advice has been sought.

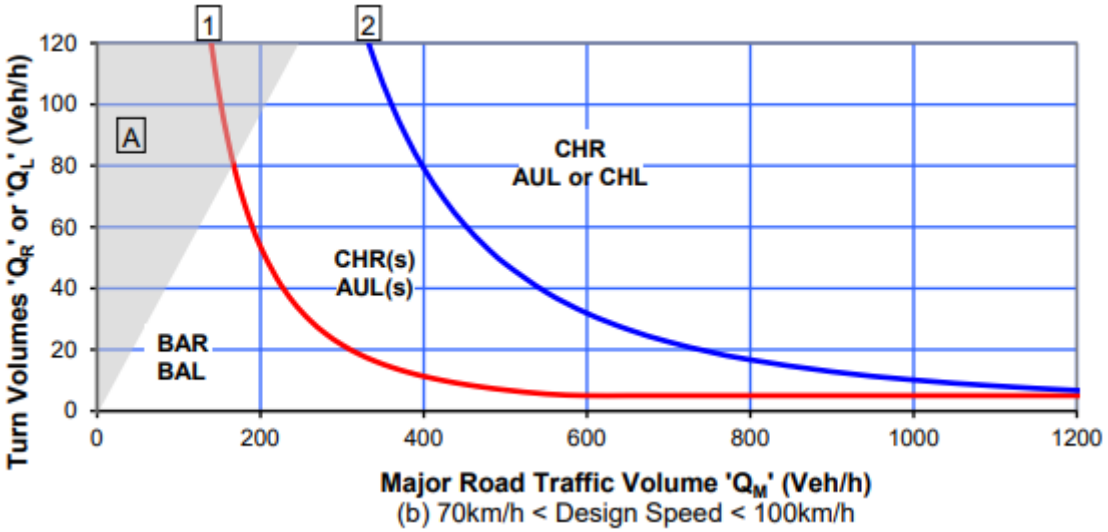
Based on the above assessment, the development meets the requirements of Performance Criteria P1 of Clause C3.5.1 of the Planning Scheme.

4.9 Junction Design Requirements

The Austroads publication, Guide to Traffic Management, Part 6: Intersections, Interchanges and Crossings, 2020, provides the guiding technical requirements for junction treatments.

Whilst the posted speed limit of Meander Valley Road is 100-km/h, the 85th percentile speed is estimated to be between 80-km/h and 90-km/h. The Austroads requirements for junction treatments for the speed environment are reproduced in Figure 9.

Figure 9 Austroads Warrants for Turn Lanes



Considering the turning movements detailed in Table 1, Austroads requires a Basic Auxiliary Right turn lane (BAR) treatment for right turning entry traffic and a Short Auxiliary Left turn lane (AUL(s)) treatment for left turning entering traffic.

BAR treatments require localised road widening to facilitate a vehicle passing a right turning stationary vehicle. AUL treatments require road widening and a short left turn lane. The AUL(S) treatment is required due to the relatively high proportion of left-turning entering traffic generated by the NCF.

Conceptually these turning facilities are reproduced from Austroads in Figure 10 and Figure 11 respectively.

Figure 10 BAR Design Requirements

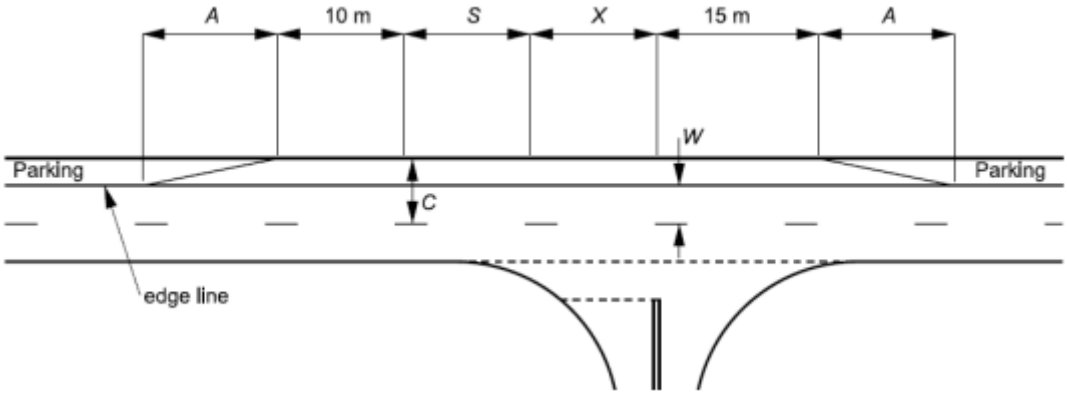
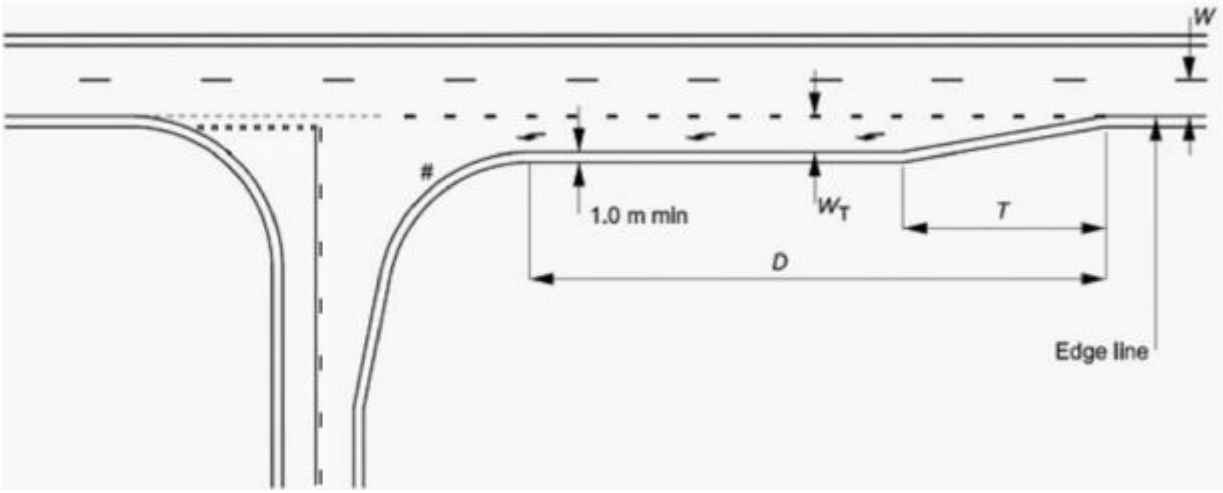


Figure 11 AUL(S) Design Requirements



The right turn BAR treatment requires a distance of approximately 70 metres of localised pavement widening.

The left turn AUL(S) treatment requires a total of 55 metres diverge/ deceleration lane (D), which includes 25 metres of taper length (T).

4.10 Sight Distance

Austroads Part 4A provides the applicable sight distance requirements for a new road junction. Austroads defines Safe Intersection Sight Distance (SISD) as the minimum sight distance that should be provided on the major road at any intersection. It is measured in accordance with requirements reproduced in Figure 12. The SISD requirements are based on the 85th percentile speed[3] of vehicles on the frontage road.

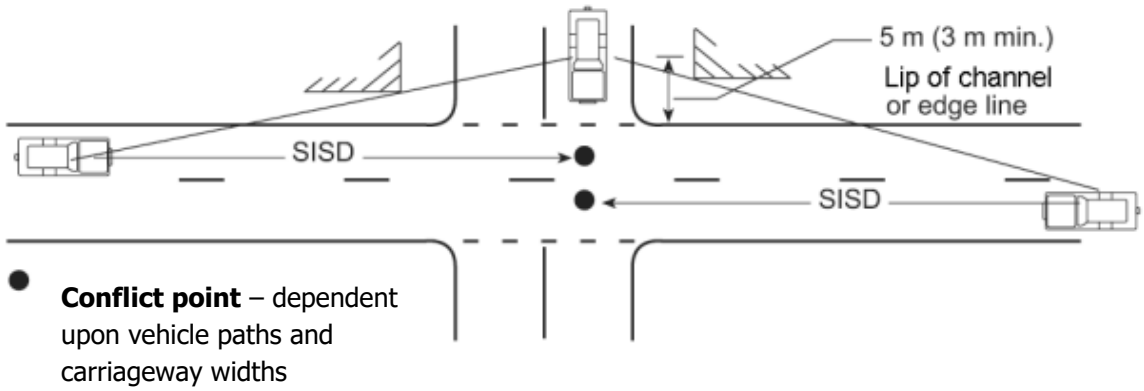
A small sample of vehicle speeds were obtained near the existing AYDC access. The 85th percentile speed was estimated to be 90-km/h. In a rural environment (reaction time of 2.0 seconds), the Austroads SISD requirement for 90-km/h is 214 metres.

The available sight distance exceeds 300 metres in both directions from the existing AYDC access, therefore complying with the SISD requirements of Austroads.

In the case where a new access is constructed to service the NCF, the SISD requirements can be met in the regions provided in Figure 7.

[3] The 85th percentile speed is the speed not exceeded by 85 percent of all vehicles.

Figure 12 Austroads SISD Requirements



4.11 Road Safety Impacts

No significant road safety impacts are foreseen for the proposed NCF development. This is based on the following:

- The surrounding road transport network is capable of absorbing the estimated traffic generation of the developed development. The peak traffic generation of the development is estimated to be 180 vehicles per hour. Analysis of the junction arrangements (either existing AYDC access or new access) demonstrates that the junction(s) can operate at a high level of efficiency.
- Analysis of the junction at Meander Valley Road and Bowerbank Link Road indicates that the roundabout will operate at a high level of efficiency in 2032 with the forecast traffic generated by the proposed NCF.
- The crash history of the surrounding road network near the subject site does not indicate that there are any specific road safety issues that are likely to be exacerbated by the proposed development.

A key road safety issue relates to the proposed access arrangements for the NCF. As noted in Section 4.4, two access arrangements are possible:

- Utilising the existing AYDC access.
- Constructing a new access.

Both access arrangements can be achieved safely provided they are designed appropriately. Utilising the existing AYDC access minimises vehicular conflict points, which theoretically provides a higher level of safety compared to two separate accesses.

A new access can be constructed to provide an appropriate level of safety. The new access requires separation from the existing access by a distance of 105 metres or more. The areas highlighted in Figure 7 provide a range of potential access locations that provide adequate separation and sight distance.

5. Parking Assessment

5.1 Parking Provision

5.1.1 AYDC Parking

The existing AYDC facility has on-site car parking provision for approximately 60 spaces. This includes a small 4-space car parking area a short distance from Meander Road within the access, angel parking along the access road, and a larger car park at the end of the access driveway.

Additional parking is also provided within the secure (fenced) area of the AYDC site for service vehicles.

5.1.2 NCF Parking Proposal

No plans have been developed for the proposed NCF. Staff and visitor parking will be required.

5.2 Planning Scheme Requirements

The Acceptable Solution A1 of Clause C2.5.1 of the Planning Scheme states:

> *"The number of on-site car parking spaces must be no less than the number specified in Table C2.1, excluding if:*
>
> *(a) the site is subject to a parking plan for the area adopted by council, in which case parking provision (spaces or cash-in-lieu) must be in accordance with that plan;*
>
> *(b) the site is contained within a parking precinct plan and subject to Clause C2.7;*
>
> *(c) the site is subject to Clause C2.5.5; or*
>
> *(d) it relates to an intensification of an existing use or development or a change of use where:*
>
> *(i) the number of on-site car parking spaces for the existing use or development specified in Table C2.1 is greater than the number of car parking spaces specified in Table C2.1 for the proposed use or development, in which case no additional on-site car parking is required; or*
>
> *(ii) the number of on-site car parking spaces for the existing use or development specified in Table C2.1 is less than the number of car parking spaces specified in Table C2.1 for the proposed use or development, in which case on-site car parking must be calculated as follows:*
>
> *N = A + (C- B)*
>
> *N = Number of on-site car parking spaces required*
>
> *A = Number of existing on site car parking spaces*
>
> *B = Number of on-site car parking spaces required for the existing use or development specified in Table C2.1*

C= Number of on-site car parking spaces required for the proposed use or development specified in Table C2.1".

Table C2.1 requires the provision of 1 space per 2 employees plus 1 space per 5 offenders. This equates to a parking provision of 169 spaces based on 270 offenders and 230 on-site staff. This parking provision should be provided as a minimum to meet the requirements of Acceptable Solution A1 of Clause C2.5.1 of the Planning Scheme.

Consideration should be made to separate staff parking from visitor parking.

5.3 Car Parking Layout

The car parking areas have not yet been designed. The car parking should be designed in accordance with Australian Standards, AS2890.1. A design complying with AS2890.1 will satisfy the requirements of the Acceptable Solution A1.1(b) of Clause C2.6.2 of the Planning Scheme.

Staff parking must have the following minimum dimensions to comply with AS2890.1:

- User Class 1A (Residential, domestic and employee parking)
- Space width 2.4 metres
- Space length 5.4 metres
- Aisle width 5.8 metres

Visitor parking spaces must have the following minimum dimensions to comply with AS2890.1:

- User Class 2 (Long-term city and town centre parking, sports facilities, entertainment centres, hotels, motels, airport visitors)
- Space width 2.5 metres
- Space length 5.4 metres
- Aisle width 5.8 metres

The minimum access driveway width to service the parking areas must be a minimum of 6.0 metres.

6. Conclusions

This traffic impact assessment (TIA) investigated the traffic and parking impacts of a proposed correctional facility development at 4260 Meander Valley Road, Deloraine. The proposed NCF is a 270-bed correctional facility which is proposed to be located within the same property boundaries as the Ashley Youth Detention Centre.

The key findings of the TIA are summarised as follows:

- The total traffic generation of the NCF is estimated to be 772 vehicles per day, with a peak of 180 vehicles per hour.
- The proposed NCF has two viable options for obtaining access to the transport network:
  - → Utilise and upgrade the existing AYDC access; and
  - → Construct a new access to Meander Valley Road.
- Both access arrangements are considered appropriate for providing access to the NCF facility. This report does not recommend either option, but supports both options with careful design considerations.
  - → AYDC access. Upgrade works will be required to the existing access, including the provision of a BAR right turn lane and a CHL(S) left turn lane. Existing AYDC angle parking along the access should be relocated to a new parking area reduce vehicular conflicts along the access.
  - → New access. A new access will need to be include the provision of a BAR right turn lane and a CHL(S) left turn lane. The new access must have adequate separation from the AYDC access and adequate available sight distance along Meander Valley Road. Two areas were identified along the Meander Valley Road frontage that satisfy these requirements.
- The surrounding road transport network is capable of absorbing the estimated traffic generation of the developed development. Analysis of the junction arrangements (either existing AYDC access or new access) demonstrates that the junction(s) can operate at a high level of efficiency.
- Analysis of the junction at Meander Valley Road and Bowerbank Link Road indicates that the roundabout will operate at a high level of efficiency in 2032 with the forecast traffic generated by the proposed NCF.
- To satisfy the requirements of Acceptable Solution A1 of Clause C2.5.1 of the Planning Scheme, the NCF must provide a minimum parking provision of 169 spaces based on 270 offenders and 230 on-site staff.

Based on the findings of this report and subject to the recommendations above, the proposed development is supported on traffic grounds.

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