



Transport Impact Statement

Project: Proposed Service Station
Corner Newcastle Road and Colebatch Street, Northam

Client: IOR Petroleum

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1. Introduction

1.1. Proponent

Shawmac Pty Ltd has been commissioned by IOR Petroleum to prepare a Transport Impact Statement (TIS) for a proposed fuel station in Northam. The local council is the Shire of Northam.

This TIS has been prepared in accordance with the Western Australian Planning Commission (WAPC) *Transport Impact Assessment Guidelines Volume 4 – Individual Developments*. The assessment considers the following key matters:

- The site and surrounding road network.
- Traffic generation characteristics.
- Traffic distribution and network assignment.
- Parking assessment and management.
- Vehicle access and circulation.
- Road safety assessment.
- Pedestrian and cyclist accessibility.
- Public transport accessibility.

1.2. Site Location

The site is on the corner of Newcastle Road and Colebatch Street in Northam.

The general location is shown in **Figure 1**. An aerial photo of the existing site is shown in **Figure 2**.



Figure 1: Site Location



Figure 2: Aerial View (November 2020)

2. Proposed Development

2.1. Land Use

The site has previously been used for industrial purposes and currently has two buildings in the south-east corner of the lot.

It is proposed to establish a self-serve diesel fuel outlet with two fuelling points and a trailer parking area. The facility is proposed to operate 24/7 and will accommodate vehicles up to 36.5m long (RAV Category 7). RAV trucks will travel to and from the site towards Great Eastern Highway.

The proposed site layout is shown in **Figure 3**.



Figure 3: Proposed Site Layout

3. Traffic Management on Frontage Streets

3.1. Road Network

3.1.1. Existing Road Layout and Hierarchy

The layout and hierarchy of the existing local road network according to the Main Roads WA *Road Information Mapping System* is shown in **Figure 4**. The current speed limits are shown in **Figure 5**.



Figure 4: Existing Road Network Hierarchy

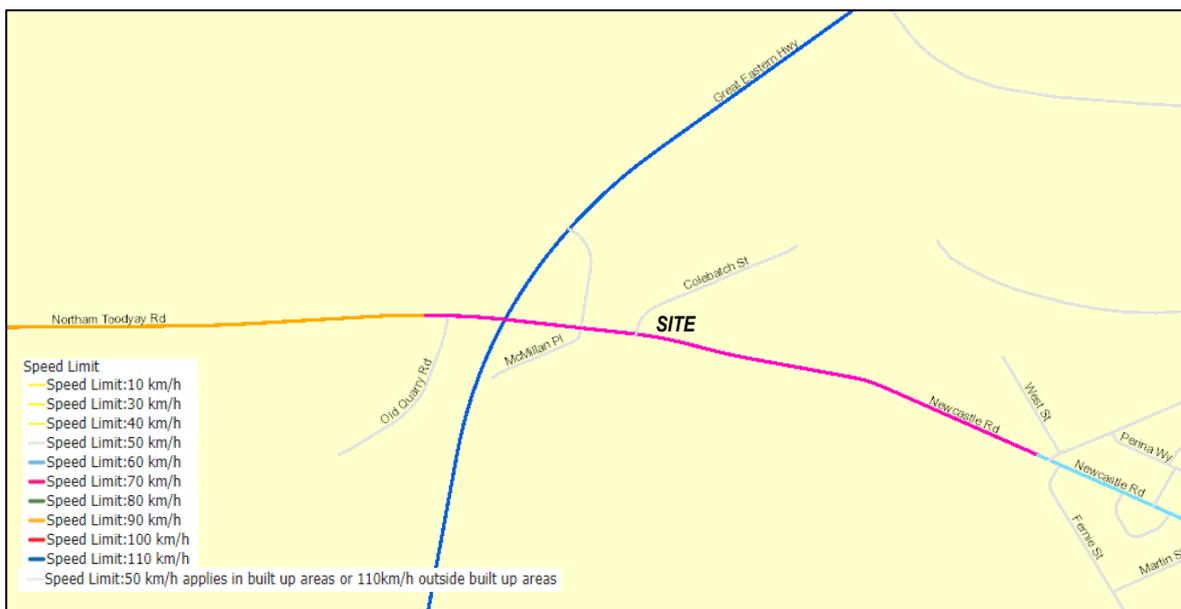


Figure 5: Speed Limits

Northam-Toodyay Road west of Great Eastern Highway and Great Eastern Highway north of Northam-Toodyay Road are permitted to carry Restricted Access Vehicles (RAV) up to RAV Category 7 (Tandem Drive). Some sections of road allow Tri-Drive vehicles up to RAV Category 4.

On Northam-Toodyay Road, the RAV network ends approximately 1.7km west of Great Eastern Highway which is just beyond the CBH access road.

The extent of the Tandem Drive RAV 7 network is shown in **Figure 6**.



Figure 6: RAV 7 Network

Both Great Eastern Highway and Northam-Toodyay Roads are state roads controlled by Main Roads WA.

3.2. Traffic Volumes

The latest traffic counts along the adjacent roads were obtained from the Main Roads WA as summarised in **Figure 7** and attached as **Appendix A**.

Traffic counts were not available for Colebatch Street. Colebatch Street is a no-through road which only serves the subject site and the agricultural supplier on the opposite side of the road (Bodiam Pty Ltd).

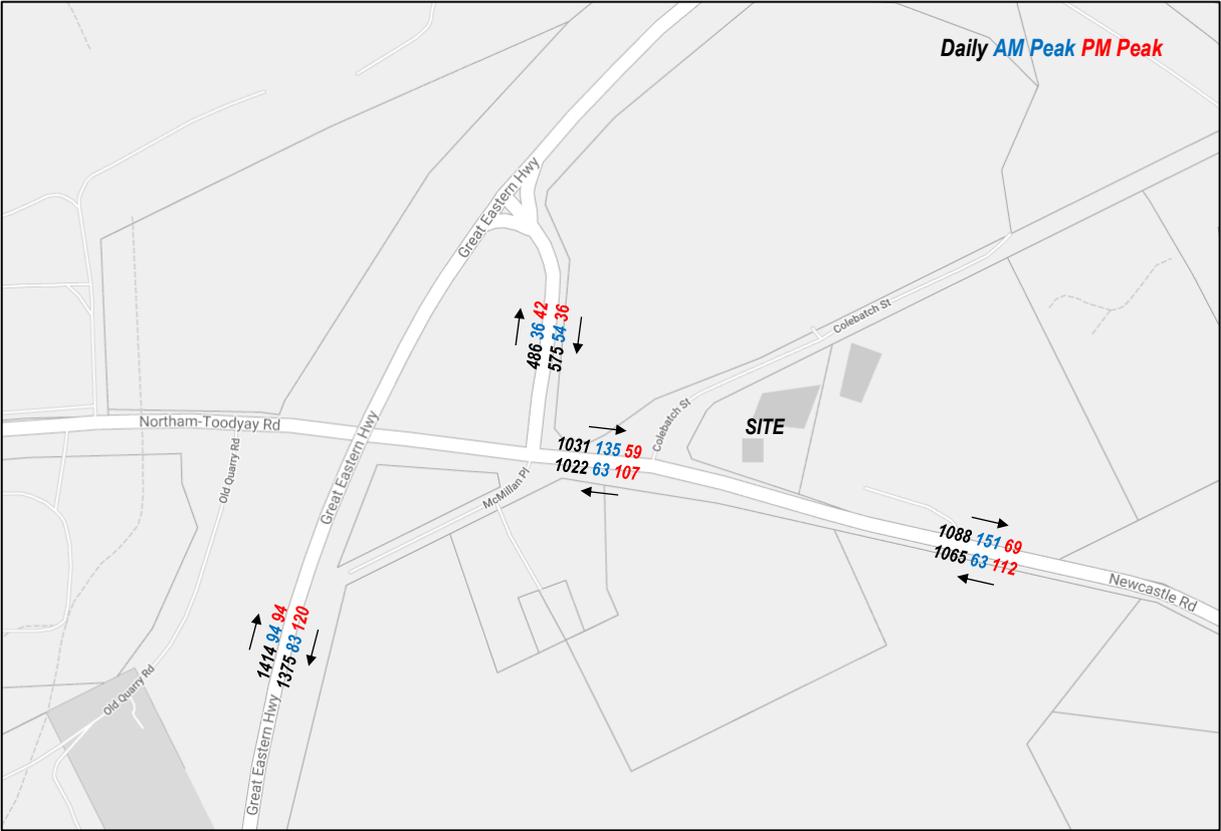


Figure 7: Latest Average Weekday Traffic



4. Traffic Generation

Traffic generation at fuel outlets can vary significantly depending on various factors including location, fuel types, vehicle types, services offered (convenience store, auto repairs, car wash).

In this instance, standard trip generation rates are unlikely to be realistic and so the traffic generation has been estimated by the client to be an average of 20-30 trucks per day once the site is fully established and has operated for a period of time. Traffic generation will be lower initially and is likely to increase gradually as the customer base grows.

Peak hour traffic generation is generally around 10% of the daily traffic and so the peak hour traffic is estimated to be 2 to 3 trucks.

This volume of traffic is considered to be low and can be accommodated within the existing capacity of the road network.

5. Vehicle Access and Parking

5.1. Access

5.1.1. Access Layout

Vehicle access is proposed from Colebatch Street via new entry only crossover and a new exit only crossover. As all vehicles will be headed to and from Newcastle Road, the crossovers have been angled in this direction. The internal loop road will be sealed and the remainder of the site will be unsealed.

The proposed access arrangement is shown in **Figure 8**.



Figure 8: Proposed Access Arrangement

5.1.2. Access Sight Distance

The sight distance requirements from exit points for commercial vehicles according to Australian Standard AS2890.2 are shown in **Figure 9**. As Colebatch Street is a relatively short no through road that is partly unsealed, it is assumed that the frontage road speed is approximately 50km/h. A frontage road speed of 50km/h requires a minimum of 69m sight distance.

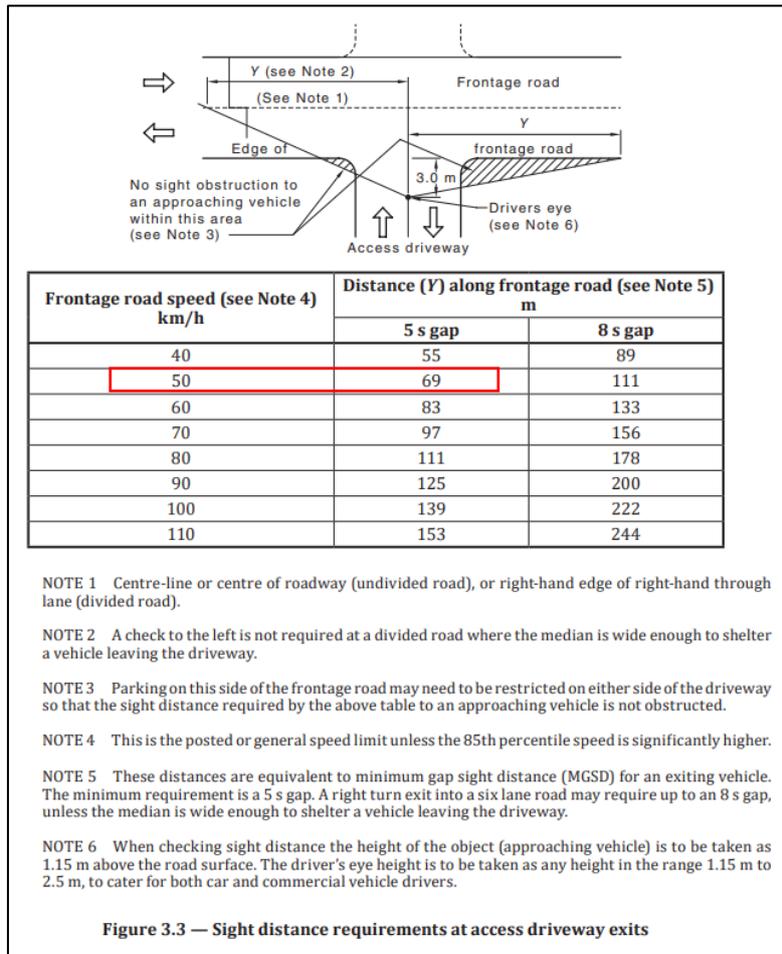


Figure 9: Sight Distance Requirements

As shown in **Figure 10**, the minimum sight distance is achieved towards the east but some trimming or clearing of vegetation to the west of the exit crossover may be required to achieve adequate sight distance. Some of this vegetation may already need to be cleared to construct the crossover.



Figure 10: Sight Distance Check

5.2. Intersection Sight Distance

The Newcastle Road / Colebatch Street intersection has been checked for sight distance. According to Austroads *Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (AGRD04A)*, Safe Intersection Sight Distance (SISD) is the minimum sight distance that should be provided on the major road at any intersection.

The standard SISD values based on the design speed and reaction times are shown in **Figure 11**.

Table 3.2: Safe intersection sight distance (SISD) and corresponding minimum crest vertical curve size for sealed roads (S < L)

Design speed (km/h)	Based on safe intersection sight distance for cars ⁽¹⁾ $h_1 = 1.1$; $h_2 = 1.25$, $d = 0.36$ ⁽²⁾ ; Observation time = 3 sec					
	$R_T = 1.5$ sec ⁽³⁾		$R_T = 2.0$ sec		$R_T = 2.5$ sec	
	SISD (m)	K	SISD (m)	K	SISD (m)	K
40	67	4.9	73	6	–	–
50	90	8.6	97	10	–	–
60	114	14	123	16	–	–
70	141	22	151	25	–	–
80	170	31	181	35	–	–
90	201	43	214	49	226	55
100	234	59	248	66	262	74
110	–	–	285	87	300	97
120	–	–	324	112	341	124
130	–	–	365	143	383	157

Figure 11: SISD Values

Based on an 80km/h design speed (70km/h speed limit) along Newcastle Road, the minimum SISD requirement is 181 metres. A review of the contours indicates that the adjacent road alignment is relatively flat and so no adjustment for grade is required.

As shown in **Figure 12**, the SISD is achieved in both directions.

The RAV guidelines require Entering Sight Distance (ESD) at intersections for RAV vehicles. The ESD is based on SISD but with differing reaction times and decelerations rates. The ESD values are all lower than SISD and so where SISD is achieved, the ESD is also achieved and does not need to be checked.



Figure 12: SISD Check

5.3. Auxiliary Lanes

Considering the 70km/h speed limit and the proportion of heavy vehicles along Newcastle Road, the Austroads warrants for turn treatments at intersections has been applied to the Newcastle Road / Colebatch Street intersection.

The warrants are outlined in Austroads *Guide to Road Design Part 4: Intersections and Crossings – General* (AGRD04) and are used to provide guidance on the provision of intersection turn treatments from the major road based on safety and capacity. The warrants assessment has been undertaken using the Main Roads WA Intersection Warrants Calculator spreadsheet which modifies the AGRD04 equation to account for the high percentage of heavy vehicles in WA.

The input traffic volumes have been calculated as per **Figure 13**.

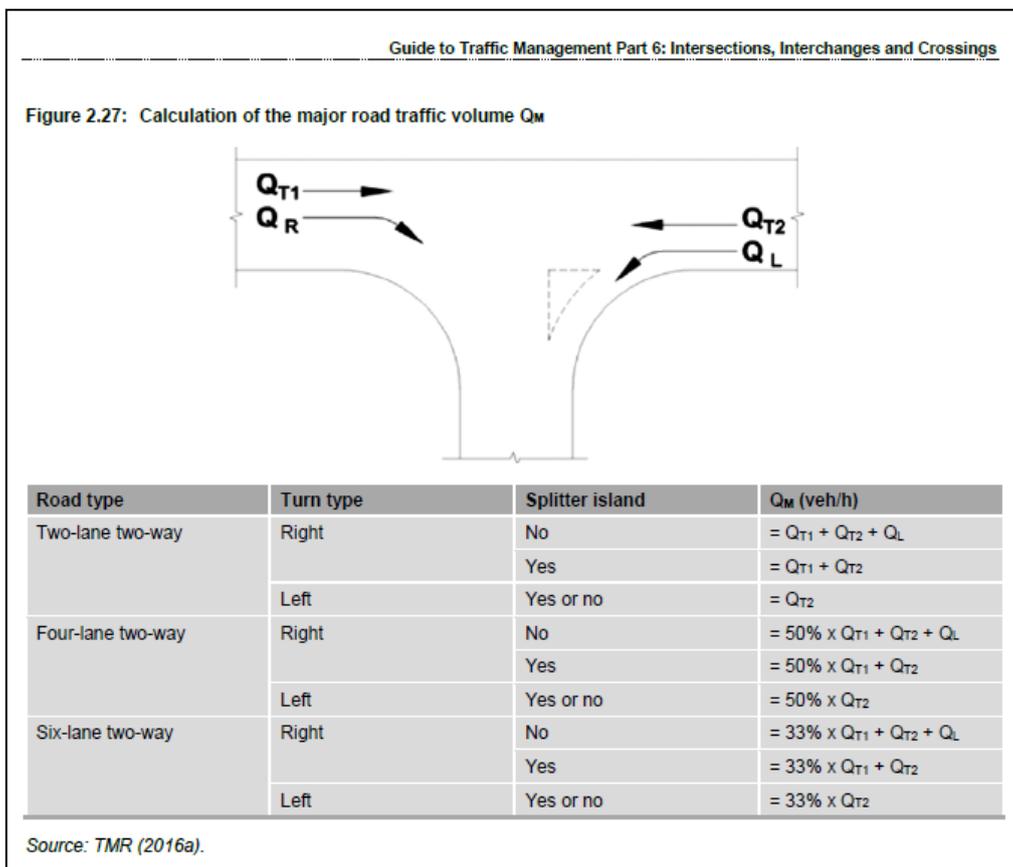


Figure 13: Major Road Traffic Volume Calculation

As shown in **Figure 14**, the through volumes have been derived from MRWA traffic count data and the inbound turning volumes have been estimated to be 20 vehicles from each direction to account for the proposed development traffic and traffic generated by Bodiam.



Figure 14: Peak Hour Traffic Volumes – Newcastle Road / Colebatch Street Intersection

The results of the warrants assessment are shown in Figure 15.

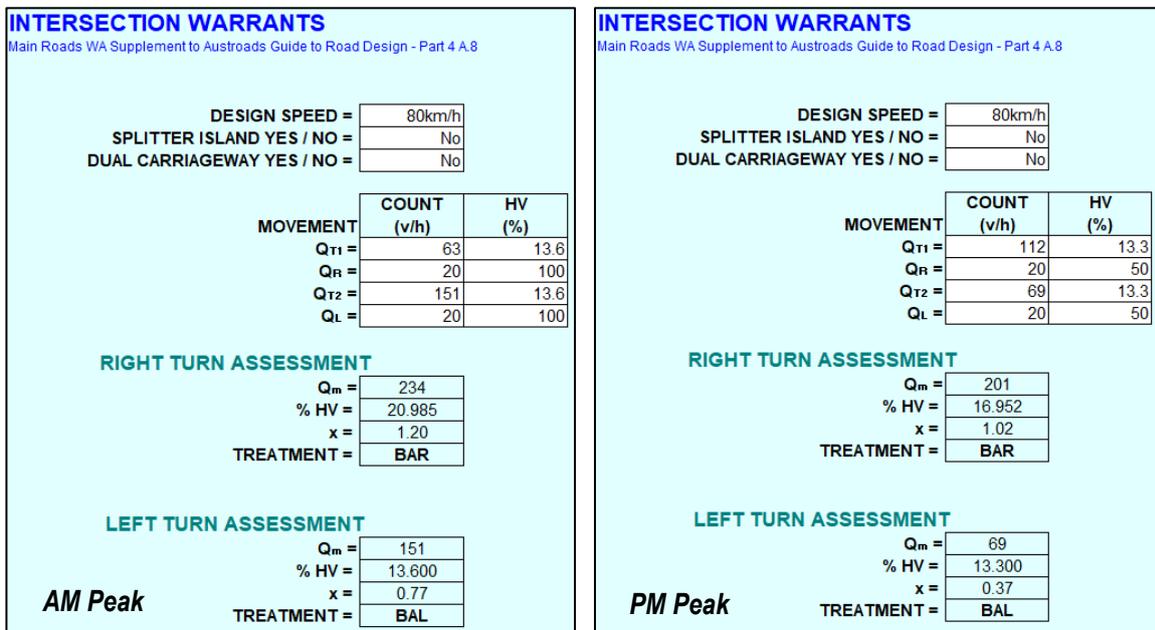


Figure 15: Warrants Assessment Results

As shown, the intersection volumes warrant a Basic Right (BAR) and a Basic Left (BAL) treatment. A BAR and BAL is the lowest level of treatment and so no intersection treatment is required.

5.4. RAV Access

As Colebatch Street and Newcastle Road are not currently permitted to carry RAV vehicles, the roads and intersections along the proposed route will require upgrading to accommodate the proposed RAV 7 vehicles and an application to permit these vehicles will need to be submitted to Main Roads WA for assessment and approval.

A swept path assessment has been undertaken in Autodesk Vehicle Tracking to identify the widening requirements at the nearby intersections and to check the internal manoeuvring. The assessment is based on the Main Roads WA 36.5m B-Triple vehicle template which is the standard template used to assess RAV Category 5 to 7. The results of the assessment are shown in **Figure 16** and attached as **Appendix B**.

The assessment shows that the internal layout is adequate but widening is required at both intersections to accommodate the 36.5m RAV vehicles.

5.5. Parking

The proposed facility is likely to generate minimal car parking demand and any car parking could be accommodated informally in the unsealed areas.

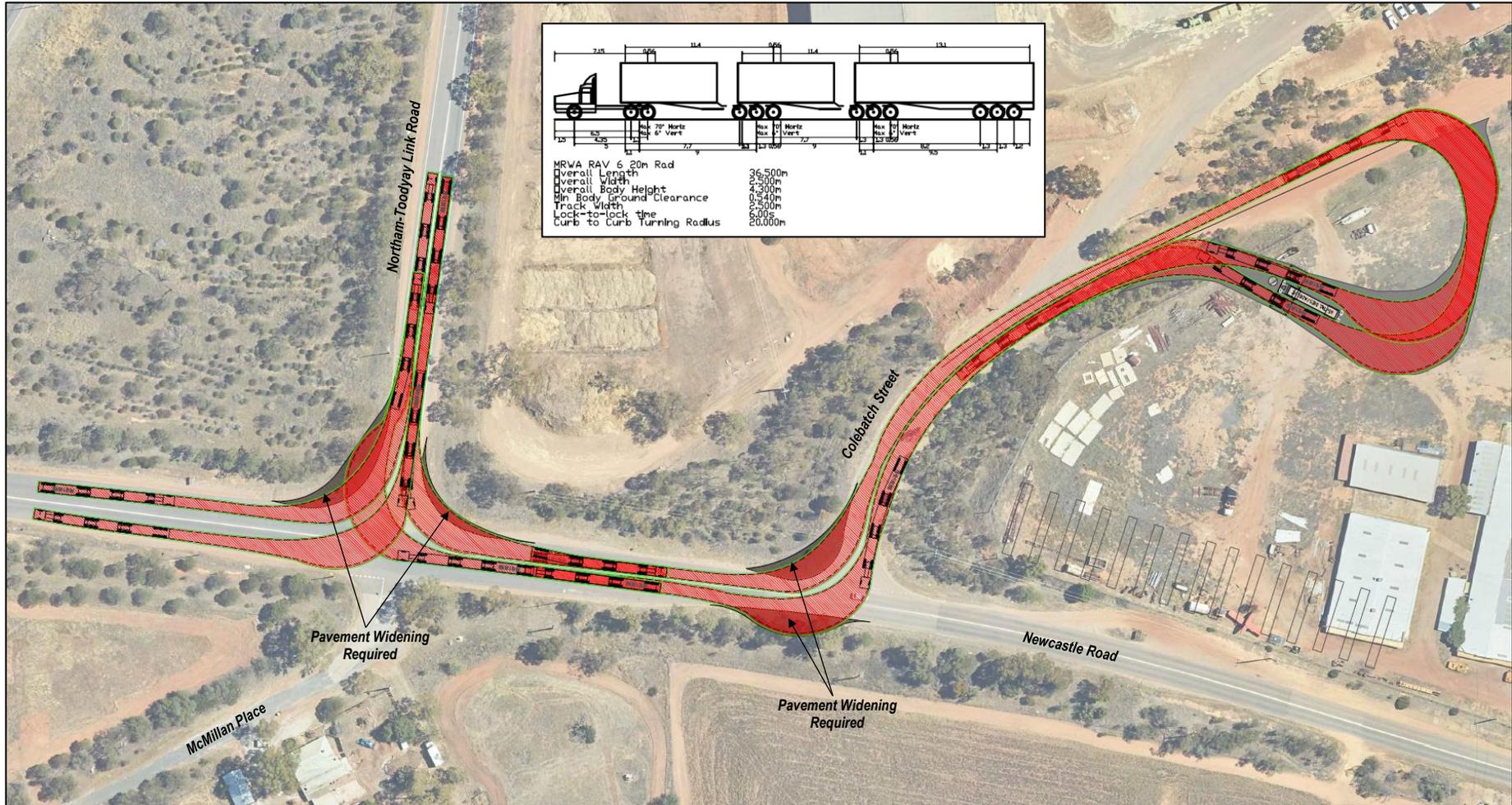


Figure 16: Swept Path Assessment



6. Pedestrian and Cyclist Access

There is no existing pedestrian or cyclist infrastructure near the site. Based on the proposed use and location, there would be minimal demand for walking or cycling to the site and so the provision of additional infrastructure is not considered necessary.

7. Public Transport Access

The proposed development is unlikely to generate demand for public transport use.

8. Site Specific Issues and Safety Issues

8.1. Crash History

The crash history of the adjacent road network was obtained from the MRWA Reporting Centre, with the summary of the recorded incidents over the five-year period ending December 2020 is shown in **Figure 17**.

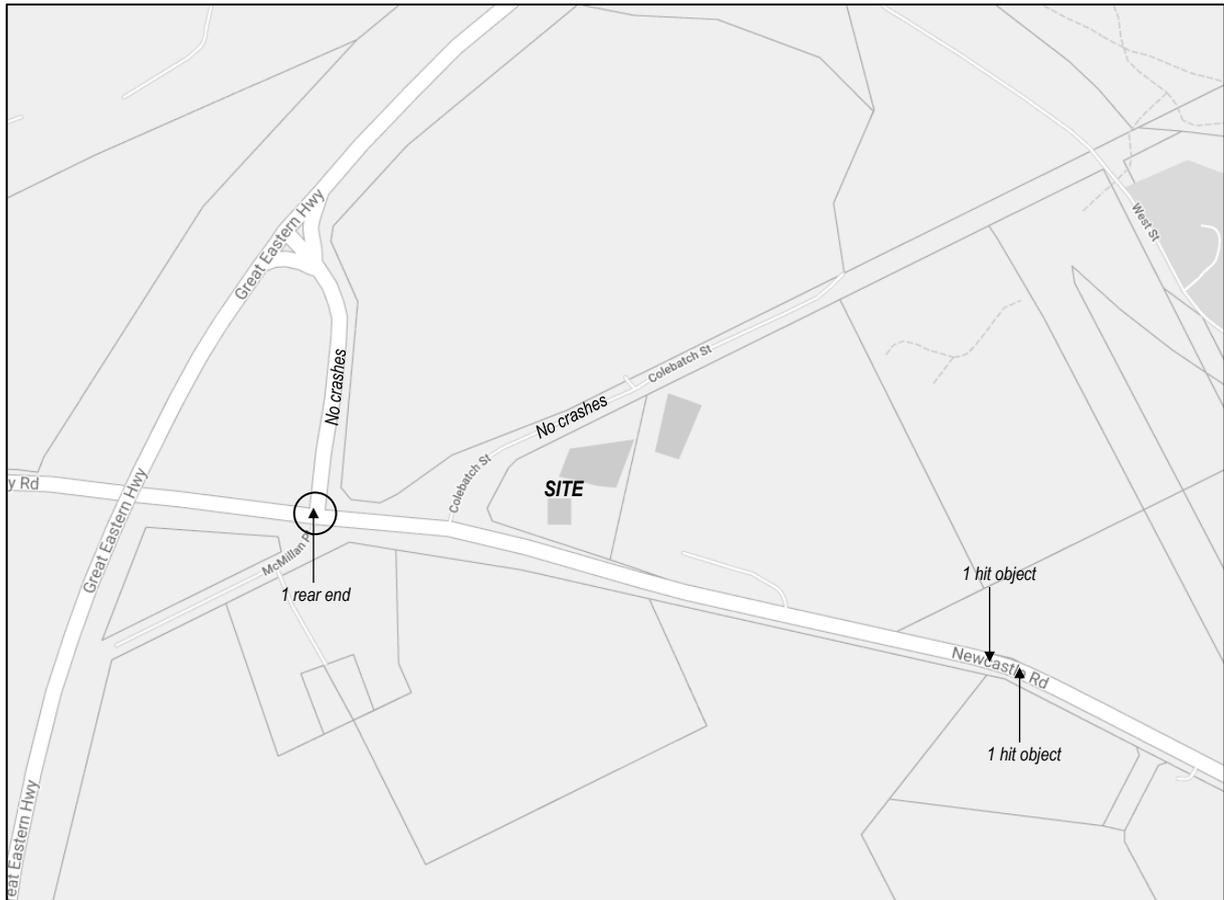


Figure 17: Crash History January 2016 to December 2020

A review of the crash details indicates that the three recorded crashes all occurred in 2016 and none have been recorded since. The crash history does not indicate any safety issues on the adjacent road network. There is no indication that the traffic generated by the proposed development would increase the risk of crashes to unacceptable levels.

8.2. Other Issues

It is noted that there is an existing sight distance issue at the Bodiam site as the driveway is aligned at a very acute angle with Colebatch Street and so sight distance between vehicles on the Bodiam driveway and vehicles on Colebatch Street is restricted. As the Bodiam driveway is sealed and Colebatch Street changes to an unsealed road just beyond the Bodiam Driveway, it can be unclear which road segment has priority.

It is recommended that, subject to discussions with Bodiam, the Bodiam driveway is realigned closer to 90 degrees with Colebatch Street to improve sight distance from their driveway. Depending on where the driveway is realigned, the driveways for the proposed fuel outlet may need to be shifted slightly to ensure they do coincide with the Bodiam driveway. As this is outside the subject site and beyond the proponent's control, this option may not be feasible.

A potential alternative solution could be to install give-way line marking on the Bodiam driveway approach to enforce priority along Colebatch Street and to clear vegetation in between the two road segments to improve sight distance.

The recommended measures are shown in **Figure 18**.

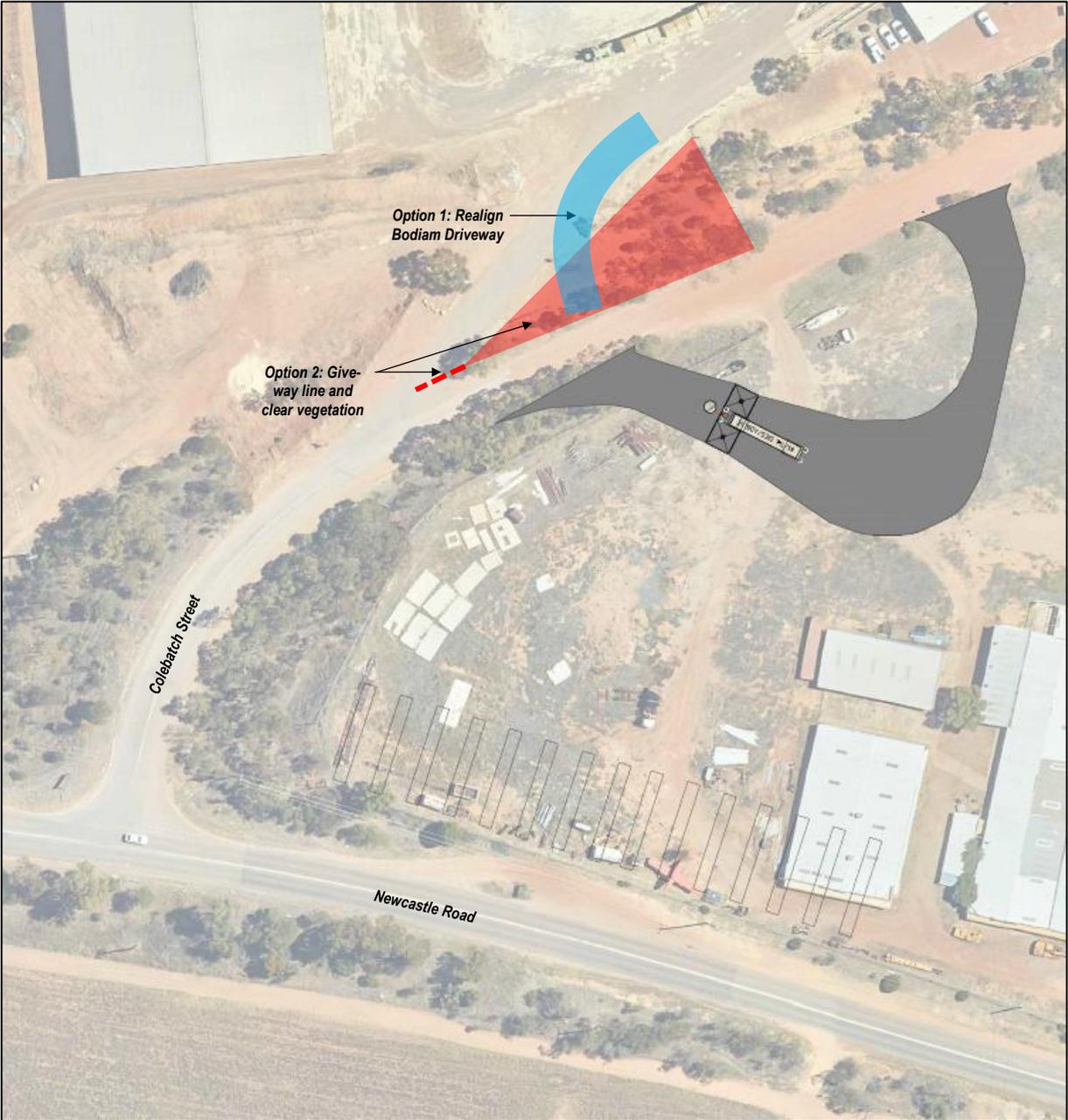


Figure 18: Recommended Coordination of Driveways on Colebatch Street

9. Conclusion

A Transport Impact Statement for the proposed fuel outlet concluded the following:

- The existing road network will have sufficient capacity to accommodate the traffic generated by the development.
- Adequate sight distance is available from the proposed exit crossover subject to some trimming and clearing of the vegetation to the west of the crossover.
- The estimated traffic volumes at the Newcastle Road / Colebatch Street intersection would warrant a Basic Right (BAR) and a Basic Left (BAL) treatment. A BAR and BAL is the lowest level of treatment and so no intersection treatment is required.
- The facility is likely to generate minimal car parking demand and any car parking could be accommodated informally in the unsealed areas.
- A swept path assessment shows that the internal layout is adequate but widening is required at the adjacent intersections to accommodate the turning movements of 36.5m RAV vehicles.
- The demand for walking, cycling and public transport is likely to be minimal and so the provision of paths, cycle lanes or additional public transport services is not required.
- The crash history does not indicate any issues with the road network that will be significantly changed by the introduction of additional traffic.
- There is an existing sight distance issue at the Bodiam site as the driveway is aligned at a very acute angle with Colebatch Street. It is recommended that, subject to discussions with Bodiam, the Bodiam driveway is realigned closer to 90 degrees with Colebatch Street to improve sight distance from their driveway.
- A potential alternative solution could be to install give-way line marking on the Bodiam driveway approach to enforce priority along Colebatch Street and to clear vegetation in between the two road segments to improve sight distance.

Appendix A – Traffic Count Data



SITE 52696

Hourly Volume

Newcastle Rd (4212224)

2019/20
Monday to Friday

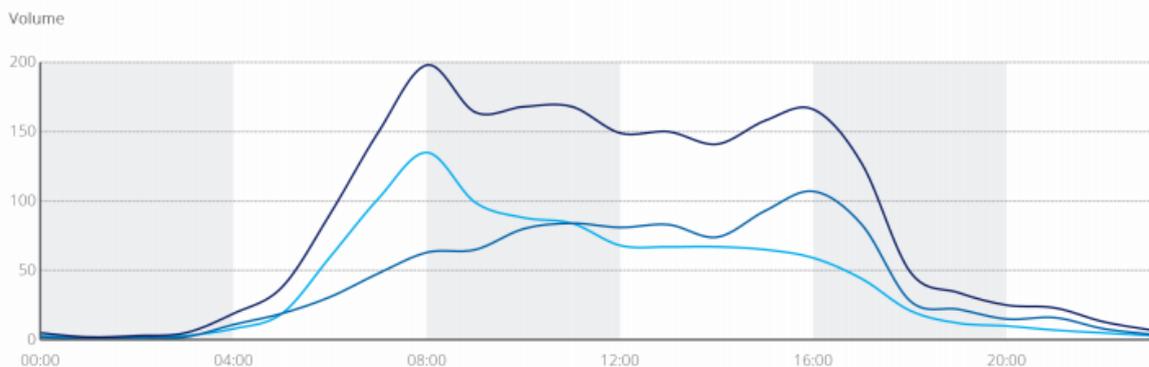
West of Colebatch Rd (SLK 2.91)

	All Vehicles			Heavy Vehicles				
	EB	WB	Both	EB	WB	Both	Truck	%
00:00	3	2	5	1	1	2		40.0
01:00	1	1	2	0	0	0		0.0
02:00	1	2	3	0	0	0		0.0
03:00	3	2	5	2	0	2		40.0
04:00	8	11	19	3	2	5		26.3
05:00	19	19	38	8	5	13		34.2
06:00	60	31	91	18	7	25		27.5
07:00	102	48	150	21	10	31		20.7
08:00	135	63	198	27	16	43		21.7
09:00	99	65	164	24	12	36		22.0
10:00	88	80	168	21	11	32		19.0
11:00	84	84	168	21	10	31		18.5
12:00	68	81	149	18	11	29		19.5
13:00	67	83	150	20	11	31		20.7
14:00	67	74	141	20	11	31		22.0
15:00	65	93	158	22	11	33		20.9
16:00	59	107	166	15	10	25		15.1
17:00	44	83	127	10	6	16		12.6
18:00	21	28	49	4	1	5		10.2
19:00	12	22	34	3	2	5		14.7
20:00	10	15	25	1	1	2		8.0
21:00	7	16	23	1	1	2		8.7
22:00	5	8	13	2	1	3		23.1
23:00	3	4	7	1	1	2		28.6
TOTAL	1031	1022	2053	263	141	404		19.7



Peak Statistics

AM	TIME	07:30	10:30	07:30	07:30	07:45	07:45
	VOL	146	84	207	29	17	46
PM	TIME	13:15	16:15	16:15	14:45	15:30	14:45
	VOL	70	114	170	24	13	35



Hourly Volume

Northam Toodyay Link Rd (H741)

2020/21
Monday to Friday

North of Northam Toodyay Rd (SLK 0.20)

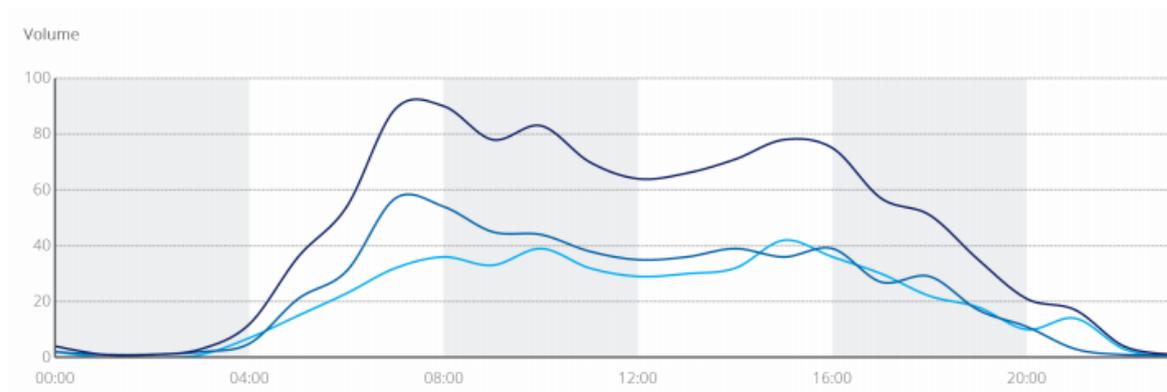
	All Vehicles			
	NB	SB	Both	
00:00	2	2	4	
01:00	0	1	1	
02:00	0	1	1	
03:00	1	2	3	
04:00	7	5	12	
05:00	15	21	36	
06:00	23	31	54	
07:00	32	57	89	
08:00	36	54	90	
09:00	33	45	78	
10:00	39	44	83	
11:00	32	38	70	
12:00	29	35	64	
13:00	30	36	66	
14:00	32	39	71	
15:00	42	36	78	
16:00	36	39	75	
17:00	30	27	57	
18:00	22	29	51	
19:00	18	17	35	
20:00	10	11	21	
21:00	14	3	17	
22:00	3	1	4	
23:00	0	1	1	
TOTAL	486	575	1061	

	Heavy Vehicles				%
	NB	SB	Both		
00:00	1	1	2	50.0	
01:00	0	0	0	0.0	
02:00	0	0	0	0.0	
03:00	0	1	1	33.3	
04:00	0	3	3	25.0	
05:00	4	12	16	44.4	
06:00	12	17	29	53.7	
07:00	13	27	40	44.9	
08:00	18	22	40	44.4	
09:00	18	26	44	56.4	
10:00	26	27	53	63.9	
11:00	19	23	42	60.0	
12:00	18	24	42	65.6	
13:00	17	16	33	50.0	
14:00	16	22	38	53.5	
15:00	17	21	38	48.7	
16:00	15	19	34	45.3	
17:00	15	15	30	52.6	
18:00	12	15	27	52.9	
19:00	10	8	18	51.4	
20:00	6	7	13	61.9	
21:00	4	0	4	23.5	
22:00	0	0	0	0.0	
23:00	0	1	1	100.0	
TOTAL	241	307	548	51.6	



Peak Statistics

AM	TIME	10:00	07:30	07:30	10:00	07:00	10:00
	VOL	39	63	97	26	27	53
PM	TIME	15:00	14:15	14:45	12:45	14:15	14:15
	VOL	42	43	81	20	25	43



Hourly Volume

Great Eastern Hwy (H005)

2018/19
Monday to Friday

East of Rifle Range Acc (SLK 89.50)

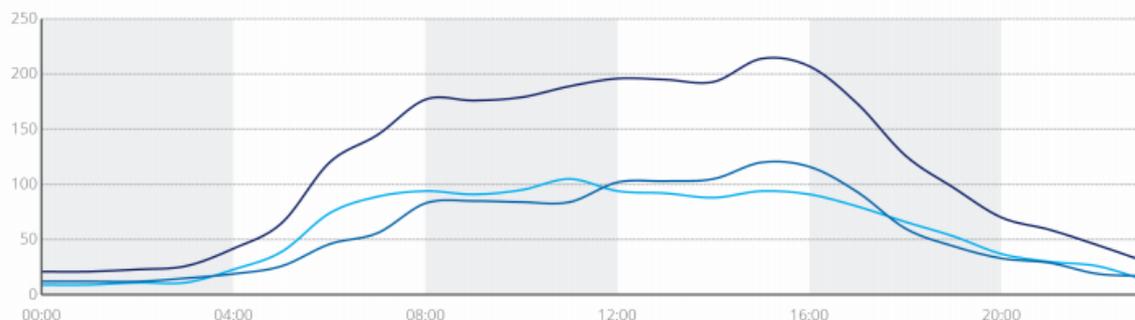
	All Vehicles				Heavy Vehicles						
	E	EB	W	WB	Both	E	EB	W	WB	Both	%
00:00		9		12	21		6		9	15	71.4
01:00		9		12	21		5		8	13	61.9
02:00		11		12	23		8		9	17	73.9
03:00		11		15	26		8		10	18	69.2
04:00		23		19	42		14		9	23	54.8
05:00		39		26	65		15		14	29	44.6
06:00		74		46	120		25		23	48	40.0
07:00		89		56	145		29		18	47	32.4
08:00		94		83	177		33		26	59	33.3
09:00		91		85	176		30		25	55	31.3
10:00		95		84	179		32		23	55	30.7
11:00		105		84	189		38		23	61	32.3
12:00		94		102	196		33		31	64	32.7
13:00		92		103	195		33		32	65	33.3
14:00		88		105	193		30		29	59	30.6
15:00		94		120	214		32		30	62	29.0
16:00		91		116	207		32		29	61	29.5
17:00		80		93	173		24		24	48	27.7
18:00		66		60	126		28		21	49	38.9
19:00		53		44	97		25		15	40	41.2
20:00		37		33	70		20		13	33	47.1
21:00		30		29	59		19		14	33	55.9
22:00		26		19	45		18		9	27	60.0
23:00		13		17	30		8		10	18	60.0
TOTAL		1414		1375	2789		545		454	999	35.8



Peak Statistics

AM	TIME	10:45	11:45	11:45	10:45	08:45	10:45
	VOL	105	97	195	39	27	63
PM	TIME	15:00	15:00	15:00	14:15	12:45	14:15
	VOL	94	120	214	34	34	65

Volume





Appendix B – Swept Path Assessment

