LOWER FITZROY RIVER
INFRASTRUCTURE PROJECT

Appendix Q2

Traffic and transport supporting material

Part 2

Weir construction and traffic impact assessment

Appendix A DTMR road traffic count data

Appendix B Extract from Chapter 13: Intersection at Grade, Road Planning Design Manual

SunWater
MAKING WATER WORK

Gladstone Area Water Board

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Part 2 – Weir construction traffic impact assessment

2.1 Overview and qualifications

Construction traffic calculations have been undertaken for the Bruce Highway/Atkinson Road and Capricorn Highway/Third Street intersections in relation to access for the construction of Eden Bann Weir (Stage 3) and Rookwood Weir (Stage 2), respectively. Calculations are based on concept level construction methodologies and schedules and traffic volume data as available from DTMR Appendix A. For the purposes of calculating 'worst case' traffic volumes, the construction sequencing described assumes upper limits of development for the Project (raising of Eden Bann Weir to Stage 3 and construction of Rookwood Weir to Stage 2) (further detail on Project staging and development options is provided in Chapter 2 Project description of the EIS):

- Eden Bann Weir – 24 months comprising four phases:
  - Phase 1: Mobilisation and site preparation (seven months) - construction equipment will be required to prepare the site including works to clear the site, excavate soil, develop internal roads, assemble site offices, sheds and storage silos and set up the aggregate screening plant and concrete batching plant. Bulldozers, back hoes, excavators, cranes, plant and machinery will be delivered to the site using a vehicle transporter (Austroads Class 6 vehicle). These construction vehicles, plant and machinery are assumed to be stationed on site for the duration of Phase 1 works. By Phase 2 some of this equipment (for example extra bulldozers and excavators) will not be required for the construction of the weir
  - Phase 2: Weir construction (22 months) - construction of the weir will commence and will require materials for the on-site concrete batching plant. Aggregate will be sourced from the site (and up to 1 km away) and cement and fly ash will need to be delivered to the on-site plant to produce concrete. Bulk tankers (Austroads Class 9 vehicle) have been assumed to be used for transporting these materials to site
  - Phase 3: Installation of weir flap gates and equipment (four months)
  - Phase 4: Demobilisation (one month)
- Rookwood Weir – 35 months comprising four phases:
  - Phase 1: Mobilisation and site preparation (seven months)
  - Phase 2: Weir construction (20 months)
  - Phase 3: Installation of weir flap gates and equipment (five months)
  - Phase 4: Demobilisation (two month).

Construction activities are assumed to commence in early 2015 (short term), however additional calculations for 2020 (medium term) and 2025 (long term) assessment years were also undertaken should the start date be deferred based on demand triggers.

A worker's camp will not be required and labour will be sourced from and/or housed locally from nearby towns and brought in by bus and own private transport for the work day. It was assumed that the maximum number of workers (60 workers at Rookwood Weir and 40 workers at Eden Bann Weir) will be required during the most busy period (Phase 2), with 50 per cent travelling to/from the site by private transport (four wheel drive utilities and troop carriers) and the rest by a 50-seat capacity worker's bus (Austroads Class 3 vehicle). During Phases 1, 3 and 4, it was assumed that 50 per cent of the workforce would be used.

Haulage trucks (Austroads Class 4 vehicle) will be required to transport excavated material, steel, reinforcement and equipment, to/from the site. A fuel truck (Austroads Class 9 vehicle) will be required throughout construction period to deliver fuel on a weekly basis to power the generators and equipment.

Calculations considered both peak travel days and non-peak (or other) days for the duration of the construction period. To estimate the ESAL for the heavy construction vehicles the following ESA:CV ratios were used (based on the Road and Planning Design Manual (Chapter 5) (DTMR 2004):

- Austroads Class 3 vehicle (worker's bus): 3.0 ESAs
- Austroads Class 4 vehicle (haulage truck): 3.7 ESAs
- Austroads Class 6 vehicle (vehicle transporter): 4.4 ESAs

Austroads Class 9 vehicle (fuel, cement or fly ash tanker): 5.1 ESAs

It is anticipated that construction will be a six-day per week operation with one construction shift operating from 6.00 am to 6.00 pm. It was assumed that:

- No night-time haulage of materials and plant will be implemented
- Construction will be limited to daylight hours (as far as is practicable).

The region within which the study area is located experiences seasonal flooding (typically between December and April) that result in roads and crossings being inaccessible to traffic. It is likely that construction activities cannot be carried out for between one and two months in a year due to inclement weather conditions. For the purpose of the analysis it was assumed that construction activities will be timed to avoid the wet season and construction will proceed within a 12-month interval; this is a conservative assumption.

For the purpose of the analysis, it was assumed that the construction site will be operational 310 days a year (6 days/week x 4.3 weeks/month x 12 months).

A range of construction plant and equipment will be needed to enable the construction work. It is expected that the plant and equipment will be sourced predominantly from Rockhampton and also from nearby towns like Emerald, Blackwater, Duaringa, Stanwell, Kunwarara and Marlborough.

The following directional traffic distributions were assumed for the delivery of plant and equipment to each weir location:

- Eden Bann Weir – 40 per cent from northern regions (for example, Kunwarara and Maryborough) and 60 per cent from southern regions (for example, Parkhurst and Rockhampton)
- Rookwood Weir – 30 per cent from the west (for example, Emerald, Blackwater and Duaringa) and 70 per cent from the east (for example, Stanwell, Gracemere and Rockhampton).

The same assumption was adopted for the traffic distribution of the construction workforce. It is anticipated that a total construction workforce of 60 persons is required for the construction of Rookwood Weir and 40 persons for the raising of Eden Bann Weir.

The road impact assessment was conducted in line with the Guidelines for Assessment of Road Impacts of Development (GARID) published by the Department of Transport and Main Roads (2006).

2.2 Traffic generation

Construction traffic generated for the delivery of cement and fly ash is tabulated in Table 2-1. This translates to one trip/day of cement and fly ash at Eden Bann Weir and one trip/day for cement and fly ash at Rookwood Weir.

Table 2-1 Traffic generation for cement and fly ash delivery

Location	Volume required (tonnes) concrete	Volume required* (t)		Total number of loads^		Duration		Number of loads per day		
		Cement	Fly ash	Cement	Fly ash	Months	Days	Cement	Fly ash	Total
Rookwood	21,735	13,041	8,694	307	205	20	516	0.6	0.4	1.0
Eden Bann Weir	12,075	7,245	4,830	170	114	22	516	0.3	0.2	1.0

*Based on a 60:40 ratio of cement to fly ash and concrete volumes of:

- Rookwood: 90,000 m^3 concrete @230 kg/m^3, plus 5% loss equates to 21,735 t.
- Eden Bann Weir: 50.000 m^3 concrete @230 kg/m^3, plus 5% loss equates to 12,075 t; and

^Based on a capacity of 42.5 t per bulk tanker.

2.2.1 Eden Bann Weir

The estimated traffic generated during construction at Eden Bann Weir is summarised in Table 2-2 and described below.

Table 2-2 Construction traffic generated for Eden Bann Weir

Vehicle type	Proposed activity	Assumed 24 month construction period	Stage 1		Stage 2		Stage 3		Stage 4	
			7 months		22 months		4 months		1 month	
			Site preparation		Weir construction		Install flap gates demobilise/ equipment			
			Trips		Trips		Trips		Trips	
			181 days		568 days		103 days		26 days	
Heavy vehicles										
Bulldozers	Clearing of vegetation, removal of topsoil and development of internal roads		1	one trip	1	one trip	0	one trip	0	one trip
Back hoe	Transfer aggregate		1	one trip	0	one trip	0	one trip	0	one trip
Excavators	Excavation of soil, aggregate, levelling the site, etc.		1	one trip	1	one trip	0	one trip	1	one trip
Crane	Assembling plant equipment, storage sheds/soils, sheet walls, etc.		1	one trip	0	one trip	0	one trip	1	one trip
Over-sized vehicles	Generators, concrete batching plant equipment, aggregate screening plant, etc. (possibly convoy under private escort and police)		10	one trip	0	one trip	18	one trip	10	one trip
Trucks	Haulage of excavated material, steel, reinforcement, storage sheds, equipment, etc.		30	daily	5	daily	5	daily	30	daily
Bulk tankers	Delivery of cement and fly ash		0	daily	1	daily	0	daily	0	Daily
Fuel Truck	Delivery of diesel fuel (assume 1 trip per week)		1	weekly	1	weekly	1	weekly	1	Weekly
Work force vehicles	50 percent travel by workers bus (assume 50 seat capacity bus)		1	daily	1	daily	1	daily	1	daily
(40 workers total)		**Sub total**	**45**		**10**		**25**		**44**	
Light vehicles										
	Assume 50 percent travel by private car Assume 50 percent of total workers needed in Stages 1,3 and 4		10	Daily	20	daily	10	daily	10	daily
		Sub total	**10**		**20**		**10**		**10**	
		Total	**56**		**30**		**35**		**54**	

2.2.1.1 Traffic volume

- Phase 1 (7 months = 181 days)
  - Light vehicles = 10 vehicles/day (for 181 days)
  - Heavy vehicles = 14 vehicles/day (for 1 day)
  - Heavy vehicles = 32 vehicles/day (for 181 days)
  - Total number of vehicle on the peak day = 10+14+32 = 56 vehicles/day (traffic volume selected for analysis as it is the peak day demand)
  - Total number of vehicles on other days = 10+32 = 42 vehicles/day
- Phase 2 (part of) (5 months = 129 days)
  - Light vehicles = 20 vehicles/day (for 129 days)
  - Heavy vehicles = 2 vehicles/day (for 1 day)
  - Heavy vehicles = 8 vehicles/day (for 129 day)
  - Total number of vehicles on the peak day = 20+2+9 = 31 vehicles/day
  - Total Number of Vehicle on Other Days = 20+9 = 29 vehicles/day.

2.2.2.2 Equivalent standard axle load calculation

The calculated number of equivalent standard axles (ESA) by construction phase for Eden Bann Weir is as follows:

- Phase 1 (7 months)
  - Loaded vehicle transporter (Austroads Class 6) = 14 x 4.4 ESA/vehicle x 1 day = 62 ESAs
  - Loaded bus (Austroads Class 3) = 1 x 3.0 ESA/vehicle x 181 days = 543 ESAs
  - Loaded haulage truck (Austroads Class 4) = 30 x 3.7 ESA/vehicle x 181 = 20,091 ESAs
  - Loaded fuel truck (Austroads Class 9) = 1 x 5.1 ESA/vehicle x 26 weeks = 132 ESAs
- Phase 2 (part of) (5 months)
  - Unloaded vehicle transporter (Austroads Class 6) = 2 x 1.7 ESA/vehicle x 1 day = 4 ESAs
  - Loaded bus (Austroads Class 3) = 1 x 3.0 ESA/vehicle x 129 days = 387 ESAs
  - Loaded haulage truck (Austroads Class 4) = 5 x 3.7 ESA/vehicle x 129 = 2,386 ESAs
  - Loaded fuel truck (Austroads Class 9) = 1 x 5.1 ESA/vehicle x 18 weeks = 92 ESAs
  - Loaded cement/fly ash truck (Austroads Class 9) = 1 x 5.1 ESA/vehicle x 129 days = 658 ESAs

It is estimated that 24,356 ESA/year will be generated from construction traffic at Eden Bann Weir during the peak construction year.

2.2.2 Rookwood

The estimated traffic generated during construction of Rookwood Weir is summarised in Table 2-3 and described below.

Table 2-3 Construction traffic generated for Rookwood Weir

Vehicle type	Proposed activity	Assumed 35 month construction period	Stage 1		Stage 2		Stage 3		Stage 4	
			7 months		20 months		5 months		2 months	
			Site preparation		Weir construction		Install flap gates demobilise/ equipment			
			Trips		Trips		Trips		Trips	
			181 days		516 days		129 days		52 days	
Heavy vehicles										
Bulldozers	Clearing of vegetation, removal of topsoil and development of internal roads		1	one trip	1	one trip	0	one trip	0	one trip
Back hoe	Transfer aggregate		1	one trip	0	one trip	0	one trip	0	one trip
Excavators	Excavation of soil, aggregate, levelling the site, etc.		1	one trip	1	one trip	0	one trip	1	one trip
Crane	Assembling plant equipment, storage sheds/soils, sheet walls, etc.		1	one trip	0	one trip	0	one trip	1	one trip
Over-sized vehicles	Generators, concrete batching plant equipment, aggregate screening plant, etc. (possibly convoy under private escort and police)		10	one trip	0	one trip	14	one trip	10	one trip
Trucks	Haulage of excavated material, steel, reinforcement, storage sheds, equipment, etc.		30	daily	5	daily	5	daily	30	daily
Bulk tankers	Delivery of cement and fly ash		0	daily	1	daily	0	daily	0	daily
Fuel truck	Delivery of diesel fuel (assume 1 trip per week)		1	weekly	1	weekly	1	weekly	1	weekly
Work force vehicles	50 percent travel by workers bus (assume 50 seat capacity bus)		1	daily	1	daily	1	daily	1	daily
(60 workers total)		**Sub total**	**46**		**10**		**21**		**44**	
Light vehicles										
	Assume 50 percent travel by private car Assume 50 percent of total workers needed in Stages 1,3 and 4		15	Daily	30	daily	15	daily	15	daily
		Sub total	**15**		**30**		**15**		**15**	
		Total	**61**		**40**		**36**		**59**	

2.2.2.1 Traffic Volumes

- Phase 1 (7 months = 181 days)
  - Light vehicles = 15 vehicles/day (for 181 days)
  - Heavy vehicles = 14 vehicles/day (for 1 day)
  - Heavy vehicles = 32 vehicles/day (for 181 days)
  - Total number of vehicles on the peak day = 15+14+32 = 61 vehicles/day (traffic volume selected for analysis as it is the peak day demand)
  - Total number of vehicle on other days = 15+32 = 47 vehicles/day
- Phase 2 (part of) (5 months = 129 days)
  - Light vehicles = 30 vehicles/day (for 129 days)
  - Heavy vehicles = 2 vehicles/day (for 1 day)
  - Heavy vehicles = 10 vehicles/day (for 129 days)
  - Total number of vehicles on the peak day = 30+2+10 = 42 vehicles/day
  - Total Number of Vehicles on other days = 30+10 = 40 vehicles/day

2.2.2.2 Equivalent stand axle load Calculation

The calculated ESAs by construction phase for the Rookwood Weir is as foolwos:

- Phase 1 (7 months)
  - Loaded vehicle transporter (Austroads Class 6) = 14 x 4.4 ESA/vehicle x 1 day = 62 ESAs
  - Loaded bus (Austroads Class 3) = 1 x 3.0 ESA/vehicle x 181 days = 543 ESAs
  - Loaded haulage truck (Austroads Class 4) =30x 3.7 ESA/vehicle x181 days=20,091 ESAs
  - Loaded fuel truck (Austroads Class 9) = 1 x 5.1 ESA/vehicle x 26 weeks = 133 ESAs
- Phase 2 (part of) (5 months)
  - Unloaded vehicle transporter (Austroads Class 6) = 2 x 1.7 ESA/vehicle x 1 day = 4 ESAs
  - Loaded bus (Austroads Class 3) = 1 x 3.0 ESA/vehicle x 129 days = 387 ESAs
  - Loaded haulage truck (Austroads Class 4) = 5 x 3.7 ESA/vehicle x 129 = 2,387 ESAs
  - Loaded fuel truck (Austroads Class 9) = 1 x 5.1 ESA/vehicle x 18 weeks = 92 ESAs
  - Loaded cement/fly ash truck (Austroads Class 9) = 1 x 5.1 ESA/vehicle x 129 days = 658 ESAs

It is estimated that 24,357 ESA/year will be generated from construction traffic at Rookwood Weir during the peak construction year.

2.3 Road and traffic impact assessment

2.3.1 Eden Bann Weir

Access for construction vehicles to the Eden Bann Weir will be facilitated via the existing Bruce Highway/Atkinson Road intersection along the state-controlled road network.

Current (2012) 24-hour traffic volumes predicted at the Bruce Highway/Atkinson Road intersection are shown in Figure 2-1. As agreed with DTMR, these traffic volumes were estimated from 1999 traffic count data provided by DTMR. Figure 2-2 shows the estimated 24-hour background traffic volumes in 2015 (during the construction stage) at the Bruce Highway/Atkinson Road intersection. The 2015 traffic volumes were estimated by applying an average linear growth rate of nine per cent per annum for through traffic movements and two and a half per cent per annum for turning traffic movements. These growth rates are based on historical data (2009-2012) for the Bruce Highway.

Figure 2-3 and Figure 2-4 show the results of additional forecasting of background traffic volumes performed for the years 2020 and 2025, respectively, to represent the potential for later construction commencement years.

Figure 2-5 shows the estimated construction traffic volumes at the intersection.

The road impact assessment was conducted for the 'loaded vehicle' direction and represents a 'worst case' scenario. Improvements identified in the 'loaded vehicle' direction of the carriageway will be deemed to apply to the 'unloaded vehicle' direction as well, particularly for two-lane highways without a median like the intersection in question.

The road links assessed at the Bruce Highway/Atkinson Road intersection are:

- Bruce Highway North approach
- Bruce Highway South approach
- Atkinson Road West approach.

Figure 2-6 provides a summary of the assessment results for construction commencing in 2015.

Figure 2-1 Bruce Highway/Atkinson Road intersection background traffic volumes (2012)

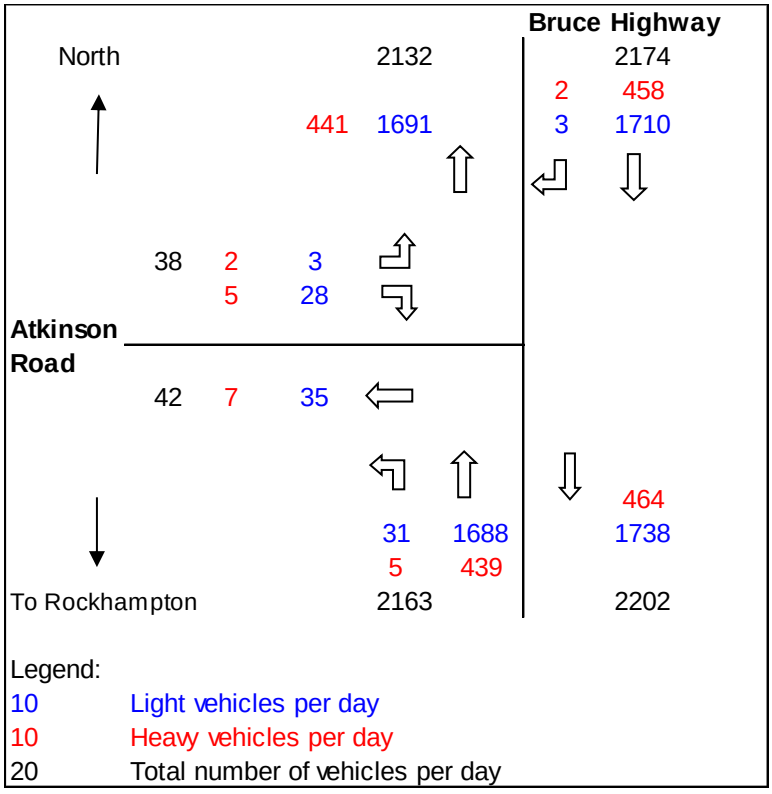


Figure 2-2 Bruce Highway/Atkinson Road intersection estimated background traffic volumes (2015)

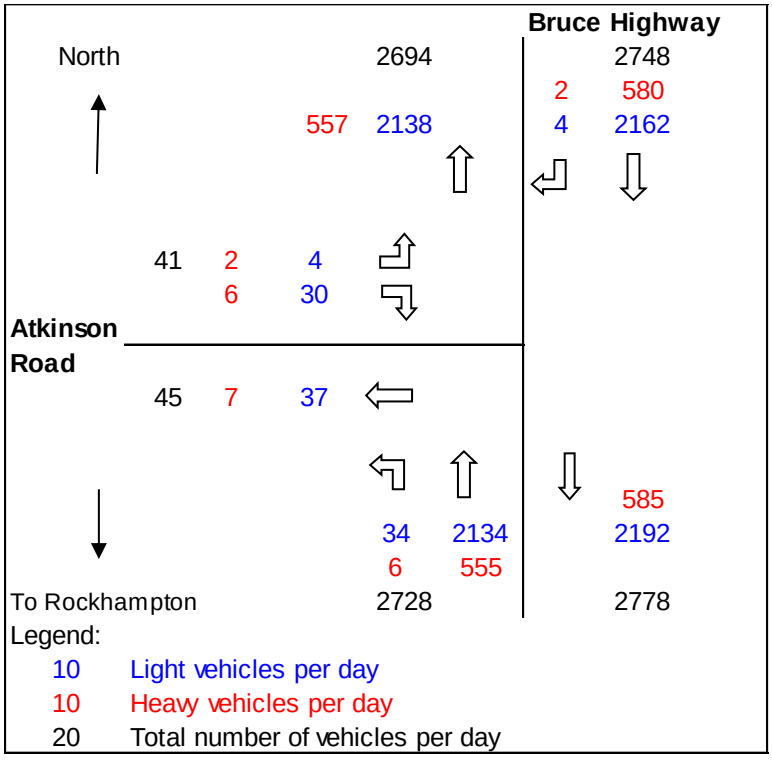


Figure 2-3 Bruce Highway/Atkinson Road intersection estimated background traffic volumes (2020)

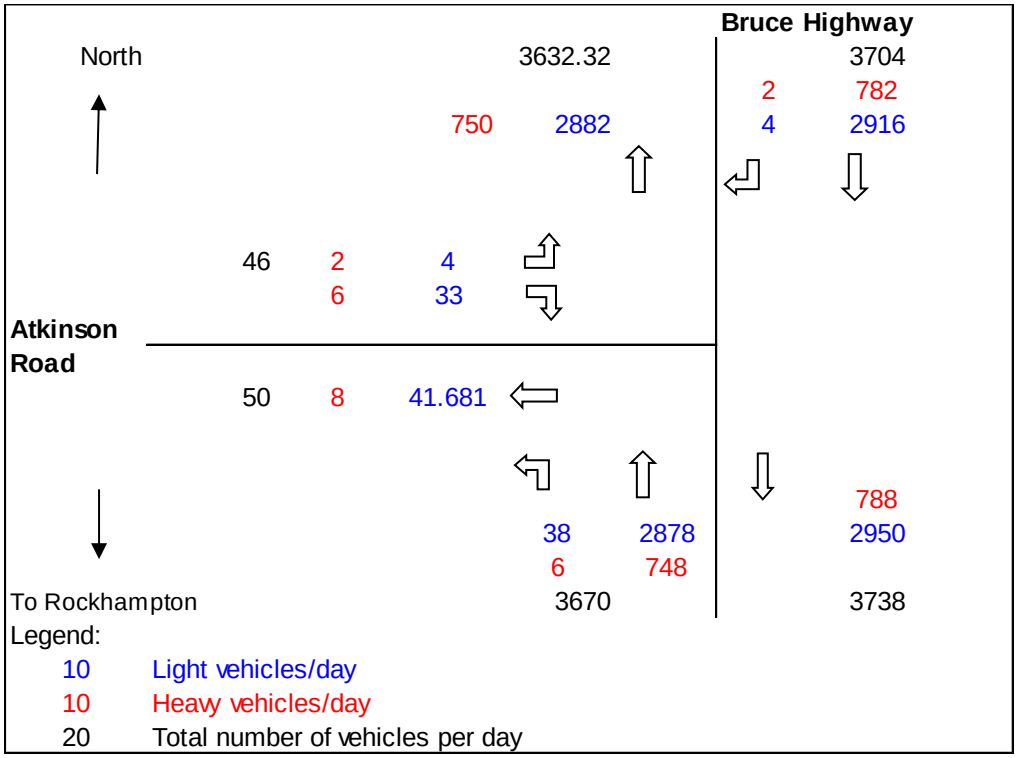


Figure 2-4 Bruce Highway/Atkinson Road intersection estimated background traffic volumes (2025)

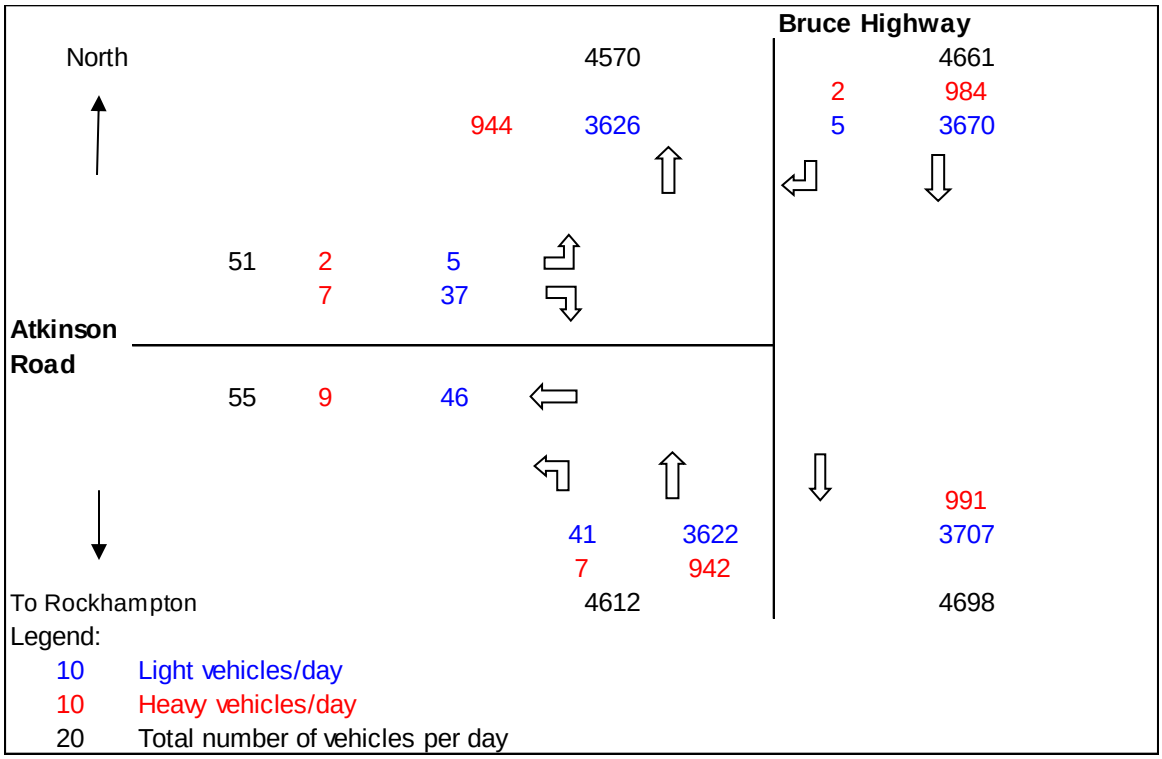


Figure 2-5 Bruce Highway/Atkinson Road intersection construction generated traffic volumes

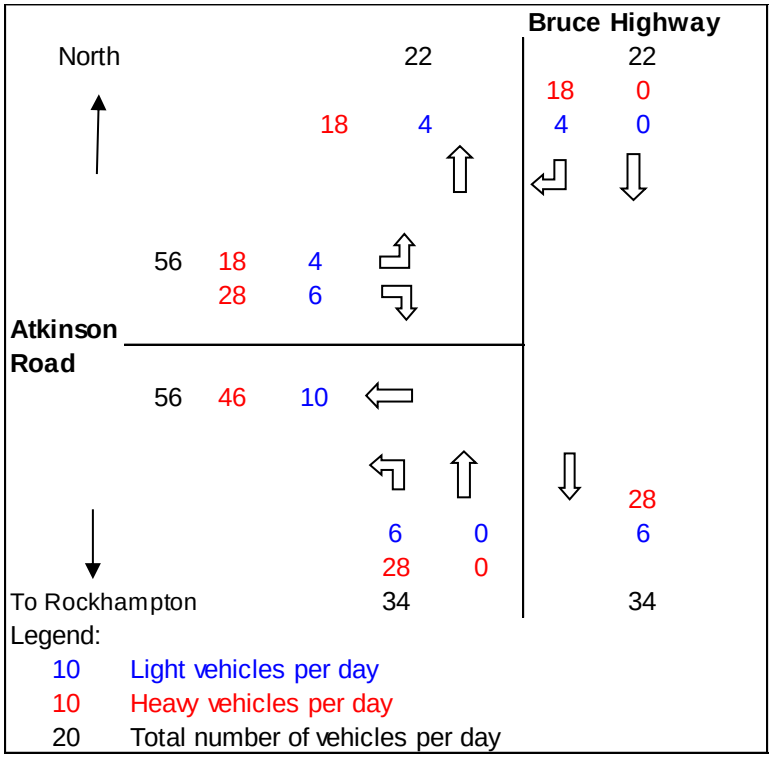
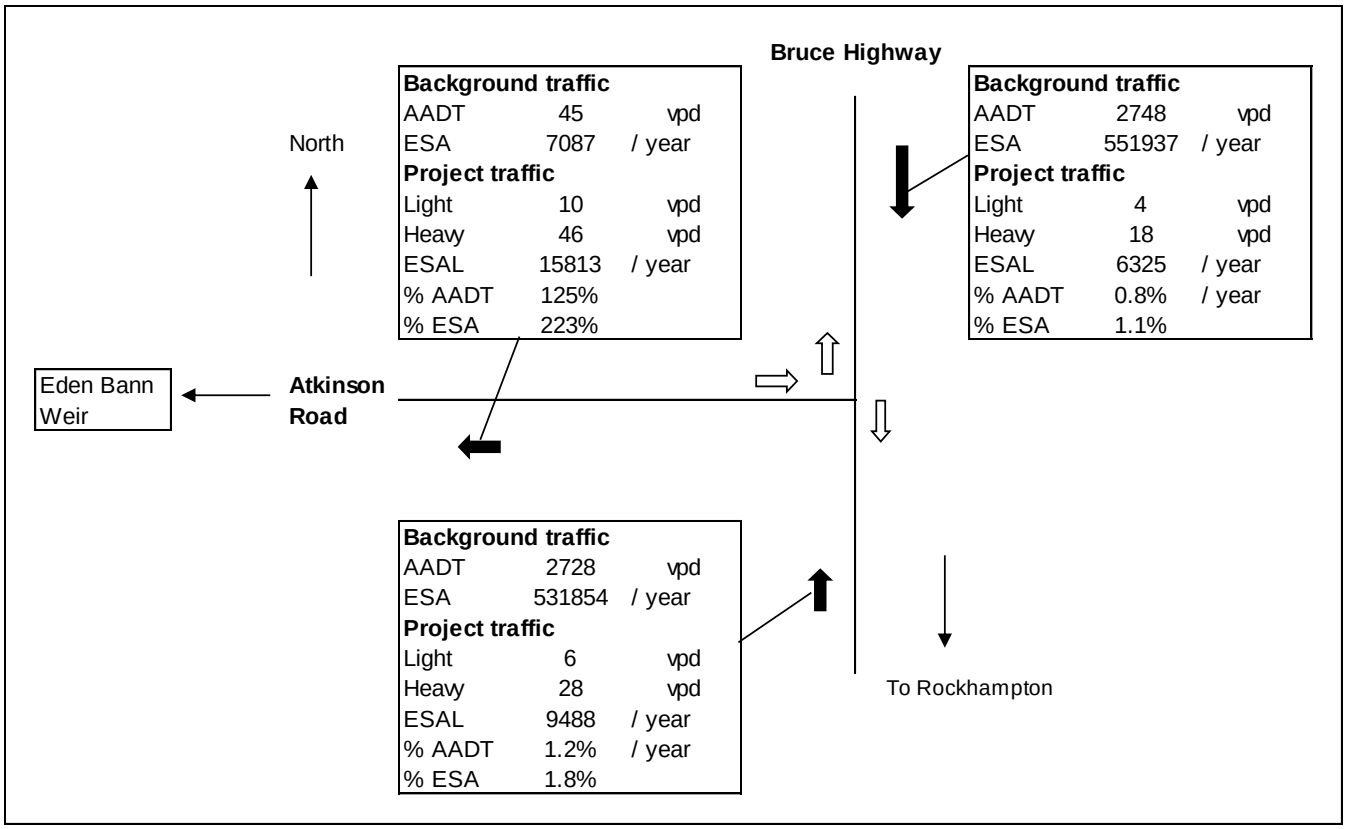


Figure 2-6 Bruce Highway/Atkinson Road intersection assessment summary



The analysis indicated the following:

- Bruce Highway north approach: The generated construction traffic contributes less than five per cent to the annual average daily traffic (AADT) and ESA, which complies with Criteria 2, Criteria 3 and Criteria 4 of GARID. Therefore, a pavement impact assessment is not required for the approach. Impact on traffic operation for the approach is expected to be minimal and the impact of heavy vehicle movement is expected to be minimal
- Bruce Highway south approach: The generated construction traffic contributes less than five per cent to the AADT and ESA, which complies with Criteria 2, Criteria 3 and Criteria 4 of GARID. Therefore, a pavement impact assessment is not required for the approach. Impact on traffic operation for the approach is expected to be minimal and the impact of heavy vehicle movement is expected to be minimal. A sensitivity test was conducted to assess the impact of the assumed directional distributions on resulting ESAs. It was found that if a 30/70 split was adopted (instead of 40/60 as assumed) the construction traffic still generates less than five per cent of the ESA which complies with Criteria 2, Criteria 3 and Criteria 4 of GARID
- Atkinson Road west approach: The generated construction traffic contributes more than five per cent of both the AADT and ESA, which does not comply with Criteria 2, Criteria 3 and Criteria 4 of GARID. Therefore, the requirement for a pavement impact assessment is triggered for the approach. Traffic operation and impact of heavy vehicle movements has to be considered for the approach. However, the extent of the improvements / level of assessment required for the Atkinson Road approach needs to be discussed with DTMR / RRC as Atkinson Road approach is not of the same standard as the Bruce Highway approaches.

To examine the impact of the increased traffic volumes and heavy vehicle movements at the Bruce Highway/Atkinson intersection (and the approach), particularly the required turn treatment from the Bruce Highway, an analysis of the required intersection form was conducted. The current intersection consists of a basic right turn (BAR) and an auxiliary left turn (AUL) off the Bruce Highway.

As the traffic volumes were considered to be low for the turning movements the required intersection treatment was selected based on warrants specified in Figure 13.22, Chapter 13: Intersections at Grade, of the Road Planning and Design Manual (DTMR, 2006) (Appendix B). The warrants apply to turning movements from the Bruce Highway only (that is the road with the priority). The required intersection treatment is dependent on:

- Through movement volumes (Q(T1) and Q(T2)) (vehicles/hour) on the Bruce Highway
- Left turn volumes (Q(L)) (vehicles/hour) from the Bruce Highway
- Q(R) – Right turn volumes (Q(R)) (vehicles/hour) from the Bruce Highway
- Summation of the above movements (Q(M)) depending on the turn type and presence of splitter islands.

Table 2-4 summarises the through and turning movement volumes for the base year 2012 and years 2015, 2020, 2025 with, and without construction traffic. It also tabulates the applicable intersection treatment based on the warrants as shown in Figure 2-7, for a road with a design speed of 100 km/hour or more.

Figure 2-7 Warrants for turn treatment on the Bruce Highway

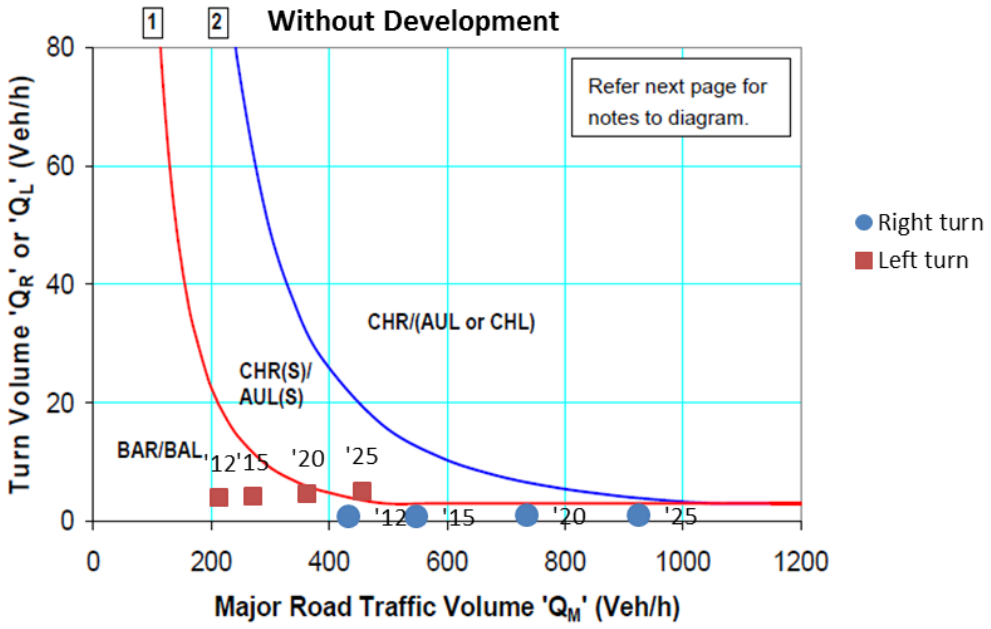


Figure 13.22 Warrants for Turn Treatments on Roads with a Design Speed ≥100km/h

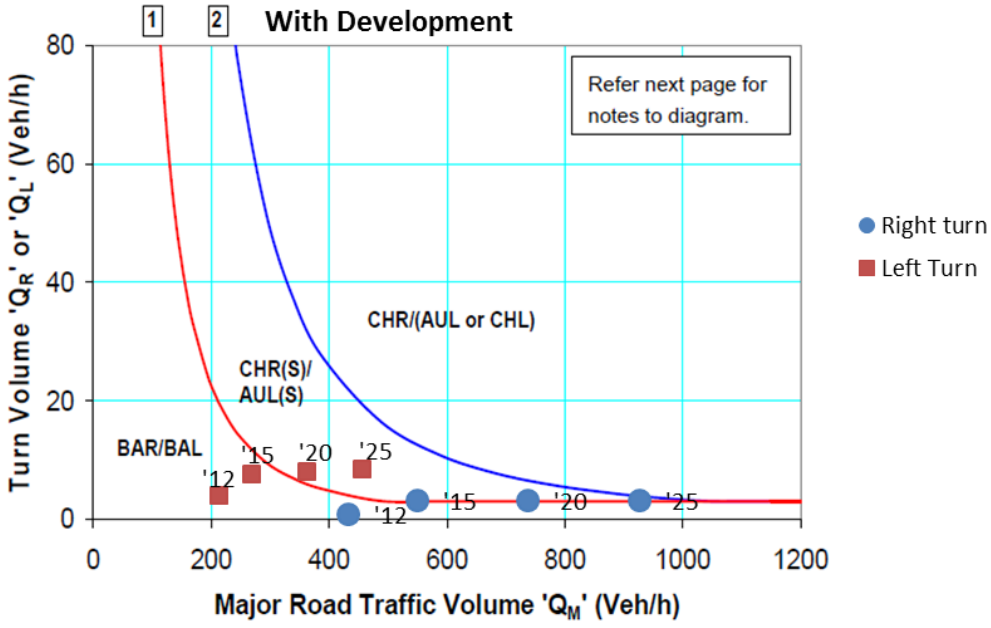


Figure 13.22 Warrants for Turn Treatments on Roads with a Design Speed ≥100km/h

Table 2-4 Bruce Highway/Atkinson Road intersection through and turning movement analysis

Analysis scenario	Peak hour*				Existing treatment on Major Road		Applicable turn treatment on Major Road **	
	Q(R)	Q(M)	Q(L)	Q(M)	Right turn	Left turn	Right turn	Left turn
2012 - Existing Traffic	1	433	4	213	BAR	AUL	BAR	BAL
2015 – Without Construction Traffic	1	547	4	269	BAR	AUL	BAR	BAL
2015 – With Construction Traffic	3	550	7	269	BAR	AUL	CHR(S)	BAL
2020 – Without Construction Traffic	1	737	4	363	BAR	AUL	BAR	BAL
2020 – With Construction Traffic	3	740	8	363	BAR	AUL	CHR(S)	AUL(S)
2025 – Without Construction Traffic	1	927	5	456	BAR	AUL	BAR	AUL(S)
2025 – With Construction Traffic	3	930	8	456	BAR	AUL	CHR(S)	AUL(S)

Note:

* 10% of AADT traffic volumes have been used for through and turn movement traffic. This may result in an under or over estimation of peak hour volumes in this table

** Based on Figure 13.23, Chapter 13 Intersections at Grade, Road Planning and Design Manual (DTMR) 2006

Figure 2-7 indicates that the existing (2012) and future traffic volumes in 2015 and 2020 (without construction traffic) warrant a basic left turn (BAL) / basic right turn (BAR) treatment with the 2025 traffic volumes (without construction traffic) requiring an auxiliary left turn with short lanes (AUL(S)) / BAR. The existing intersection treatment (auxiliary left turn (AUL) / BAR) is considered appropriate for these without construction traffic scenarios.

The future traffic volumes for the 2015 with construction traffic scenario warrants a BAL / channelised right turn treatment with a short slot (CHR(S)) treatment. The future traffic volumes for the 2020 and 2025 with construction traffic scenarios warrant AUL(S) / CHR(S) treatments. The Bruce Highway / Atkinson Road intersection will be upgraded as applicable to a standard adequate to accommodate Project traffic during the construction phase.

2.3.2 Rookwood Weir

Access for construction vehicles to the proposed Rookwood Weir will be facilitated via the existing Capricorn Highway/Third Street intersection along the state-controlled road network at Gogango.

Current (2012) 24-hour traffic volumes predicted at the Capricorn Highway/Third Street intersection are shown in Figure 2-8. As agreed with DTMR, these traffic volumes were estimated from 1999 traffic count data provided by DTMR. Figure 2-9 shows the estimated 24-hour background traffic volumes in 2015 (during the construction stage) at the Capricorn Highway/Third Street intersection. The 2015 traffic volumes were estimated by applying an average linear growth rate of 7.5 per cent per annum for through traffic movements and four per

cent per annum for turning traffic movements. These growth rates are based on historical data (2009-2012) for the Capricorn Highway.

Figure 2-9 and Figure 2-10 show the results of additional forecasting of background traffic volumes performed for the years 2020 and 2025, respectively, to represent the potential for later construction commencement years.

Figure 2-12 shows the estimated construction traffic volumes at the intersection.

The road impact assessment was conducted for the 'loaded vehicle' direction and represents a 'worst case' scenario. Improvements identified in the 'loaded vehicle' direction of the carriageway will be deemed to apply to the 'unloaded vehicle' direction as well, particularly for two-lane highways without a median like the intersection in question.

The intersection approaches assessed at the Capricorn Highway / Third Street intersection are:

- Capricorn Highway east approach
- Capricorn Highway west approach
- Third Street north approach

Figure 2-13 provides a summary of the assessment results for construction commencing in 2015.

Figure 2-8 Capricorn Highway/Third Street intersection background traffic volumes (2012)

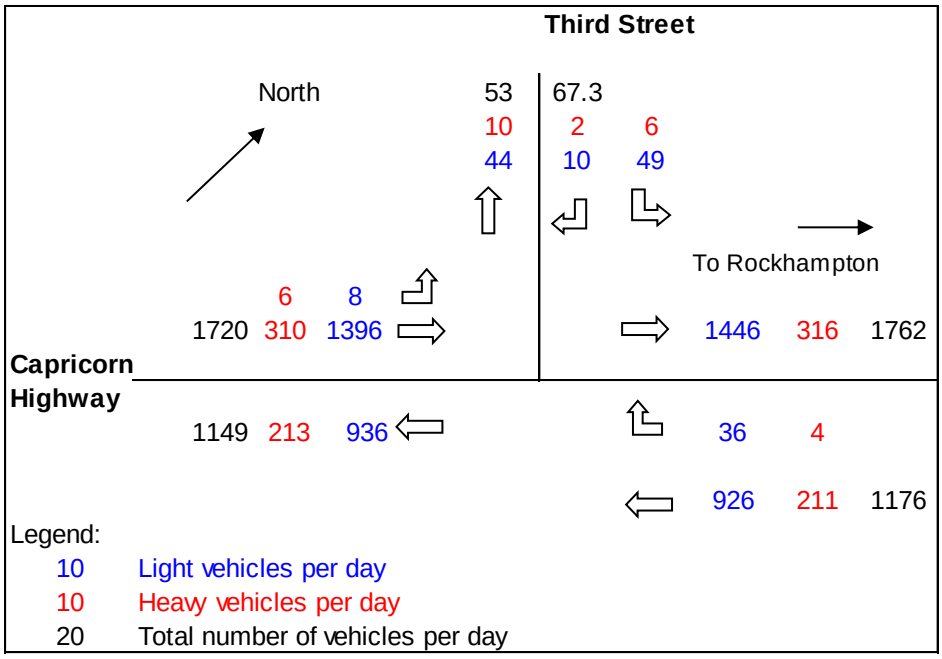


Figure 2-9 **Capricorn Highway/Third Street intersection estimated background traffic volumes (2015)**

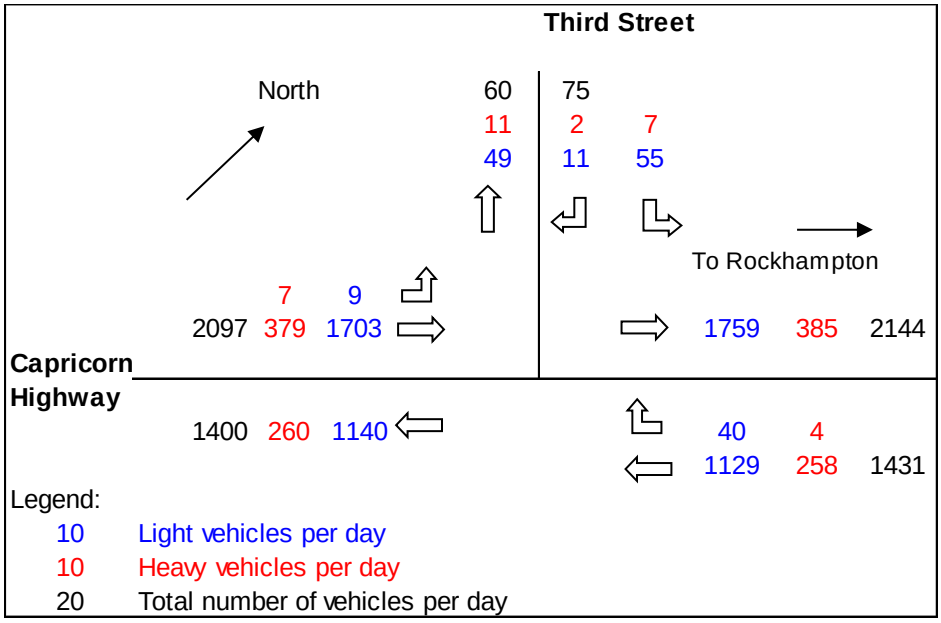


Figure 2-10 **Capricorn Highway/Third Street intersection estimated background traffic volumes (2020)**

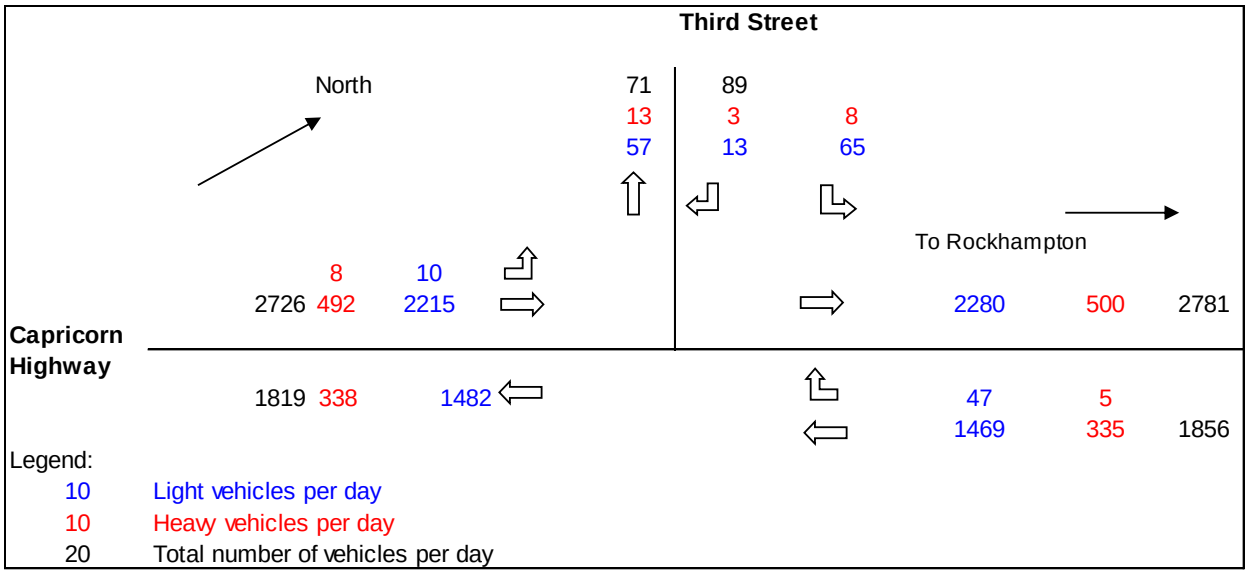


Figure 2-11 Capricorn Highway/Third Street intersection estimated background traffic volumes (2025)

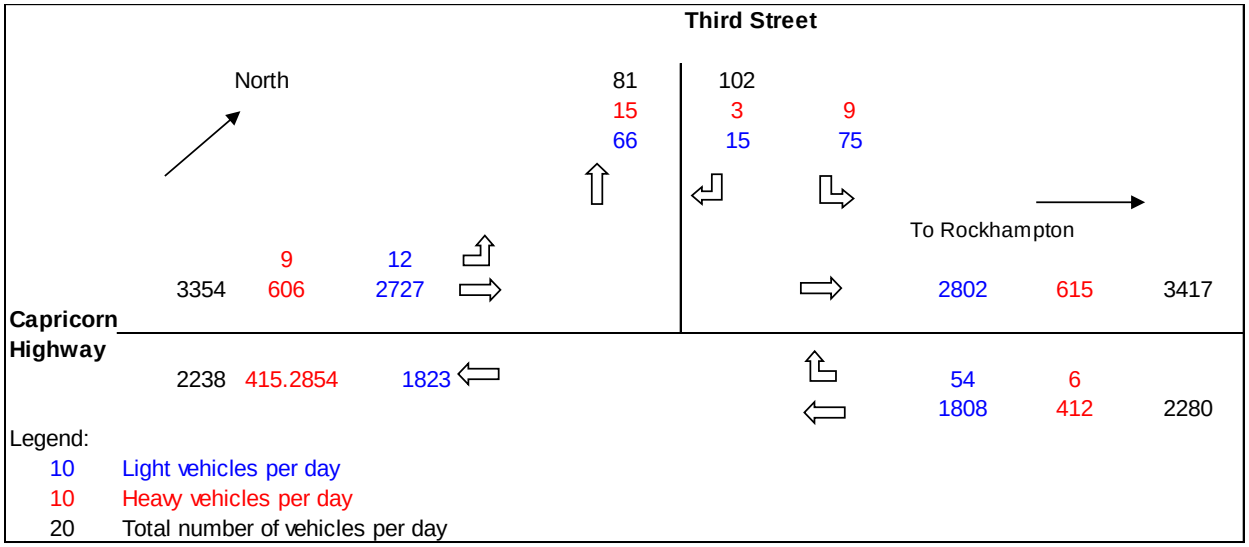


Figure 2-12 Capricorn Highway/Third Street intersection construction generated traffic volumes

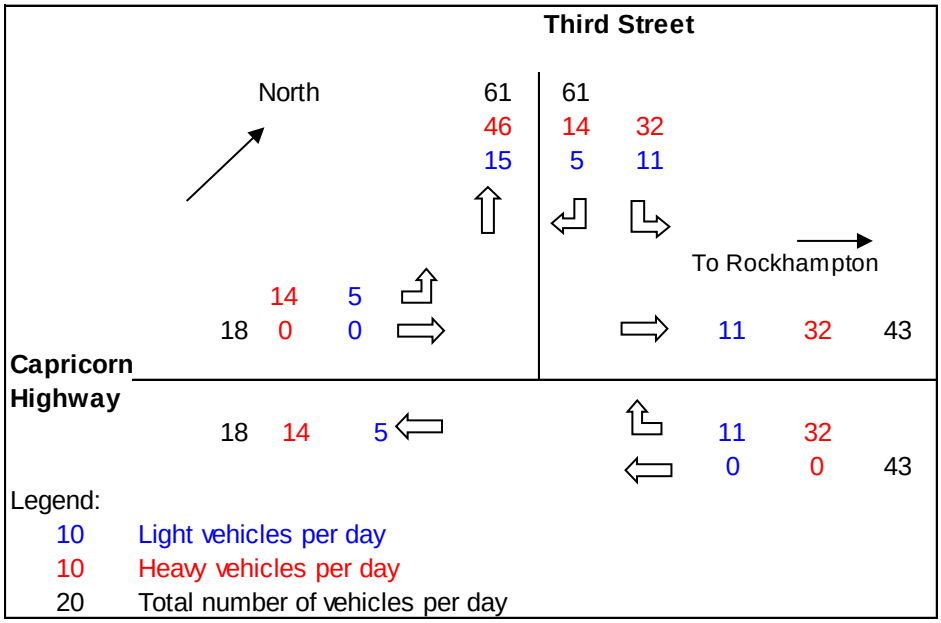
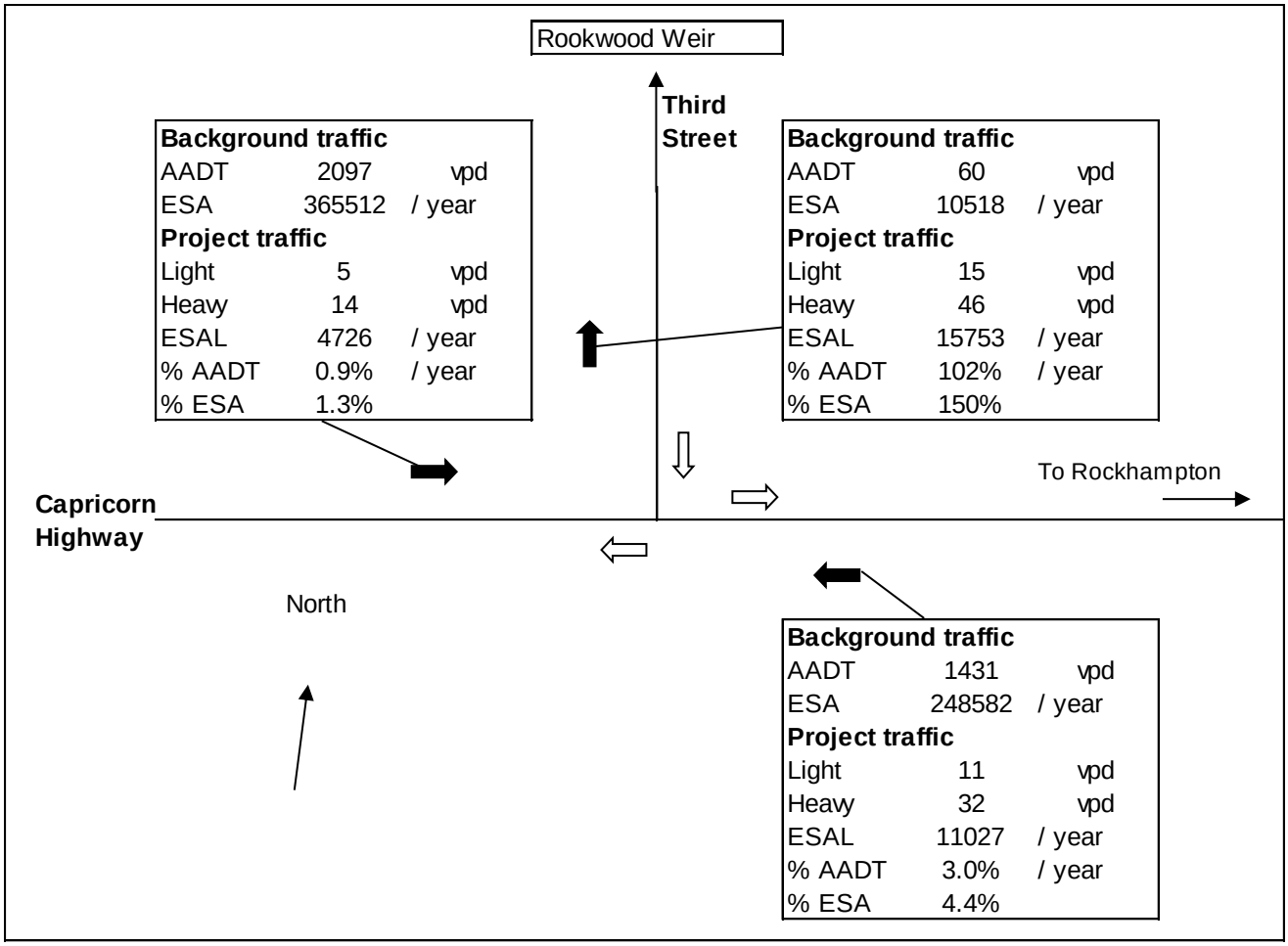


Figure 2-13 Capricorn Highway/Third Street intersection assessment summary



The analysis indicated the following:

- Capricorn Highway west approach: The generated construction traffic contributes less than five per cent to the AADT and ESA, which complies with Criteria 2, Criteria 3 and Criteria 4 of GARID. Therefore, a pavement impact assessment is not required for the approach. Impact on traffic operation on the approach is expected to be minimal, as is the impact of heavy vehicles
- Capricorn Highway east approach: The generated construction traffic contributes less than five per cent to the AADT and ESA, which complies with Criteria 2, Criteria 3 and Criteria 4 of GARID. Therefore, a pavement impact assessment is not required for the approach. Impact on traffic operation for the approach is expected to be minimal and the impact of heavy vehicle movement is expected to be minimal. A sensitivity test was conducted to assess the impact of the assumed directional distributions on resulting ESAs. It was found that if a 30/70 split was adopted (instead of 40/60 as assumed), the construction traffic still generates less than five per cent of the ESA which complies with Criteria 2, Criteria 3 and Criteria 4 of GARID
- Third Street north approach: The generated construction traffic contributes more than five per cent of both the AADT and ESA, which does not comply with Criteria 2, Criteria 3 and Criteria 4 of GARID. Therefore, the requirement for a pavement impact assessment is triggered for

the approach. Traffic operation and the impact of heavy vehicle movement need to be considered for the approach. However, the extent of the improvements / level of assessment required for the Third Street approach has to be discussed with DTMR / RRC as the Third Street approach is not of the same standard as the Capricorn Highway approaches.

To examine the impact of the increased traffic volumes and heavy vehicle movements at the intersection (and the approach) particularly the required turn treatment from the Capricorn Highway, an analysis of the required intersection form was conducted.

The existing layout of the Capricorn Highway / Third Street intersection is of an AUL(S) on the Capricorn Highway. While a right turn is legal, there is no provision for right turning traffic (from the Capricorn Highway) at the intersection (BAR). The intersection is also located close to Young Street, creating a staggered intersection.

Similar to the Bruce Highway/Atkinson Road intersection, as the traffic volumes were considered to be low (particularly for the turning movements), the required intersection turn treatment was selected based on warrants specified in Figure 13.22, Chapter 13: Intersections at Grade, of the Road Planning and Design Manual (DTMR, 2006). The required intersection treatment is dependent on:

- Through movement volumes (Q(T1) and Q(T2)) (vehicles/hour) on the Capricorn Highway
- Left turn volumes (Q(L)) (vehicles/hour) from the Capricorn Highway
- Right turn volumes (Q(R)) (vehicles/hour) from the Capricorn Highway
- Summation of the above movements (Q(M)) depending on the turn type and presence of splitter islands

Table 2-5 summarises the through and turning movement volumes for the base year 2012 and years 2015, 2020, 2025 with, and without construction traffic. It also tabulates the applicable intersection treatment based on the warrants as shown in Figure 2-14, for a road with a design speed of 100 km/hour or more.

Figure 2-14 indicates that without construction traffic the existing (2012) and future traffic volumes in 2015 warrant a BAL / BAR treatment on the Capricorn Highway. The existing AUL(S) / BAR treatment is considered appropriate for these without construction traffic scenarios. Without construction traffic future traffic volumes in 2020 and 2025 warrant BAL / CHR(S) treatments.

With construction traffic volumes for all scenarios (2015, 2020 and 2025) warrant AUL(S) / CHR(S) treatments. While the current AUL(S) treatment is considered adequate for with construction traffic scenarios the intersection will be upgraded to a standard adequate to accommodate Project traffic during the construction phase.

Table 2-5 Capricorn Highway/Third Street intersection through and turning movement analysis

Analysis scenario	Peak hour (*)				Existing treatment on Major Road		Applicable turn treatment on Major Road (**)	
	Q(R)	Q(M)	Q(L)	Q(M)	Right turn	Left turn	Right turn	Left turn
2012 - Existing Traffic	4	286	1	171	BAR	AUL(S)	BAR	BAL
2015 – Without Construction Traffic	4	348	2	208	BAR	AUL(S)	BAR	BAL
2015 – With Construction Traffic	9	350	3	208	BAR	AUL(S)	CHR(S)	BAL
2020 – Without Construction Traffic	5	453	2	271	BAR	AUL(S)	CHR(S)	BAL
2020 – With Construction Traffic	9	455	4	271	BAR	AUL(S)	CHR(S)	BAL
2025 – Without Construction Traffic	6	557	2	333	BAR	AUL(S)	CHR(S)	BAL
2025 – With Construction Traffic	10	559	4	333	BAR	AUL(S)	CHR(S)	BAL

Note:

(*) 10% of AADT traffic volumes have been used for through and turn movement traffic. This may result in an under or over estimation of peak hour volumes in this table

(**) Based on Figure 13.23, Chapter 13 Intersections at Grade, Road Planning and Design Manual (DTMR) 2006

Figure 2-14 Warrants for turn treatment on the Capricorn Highway

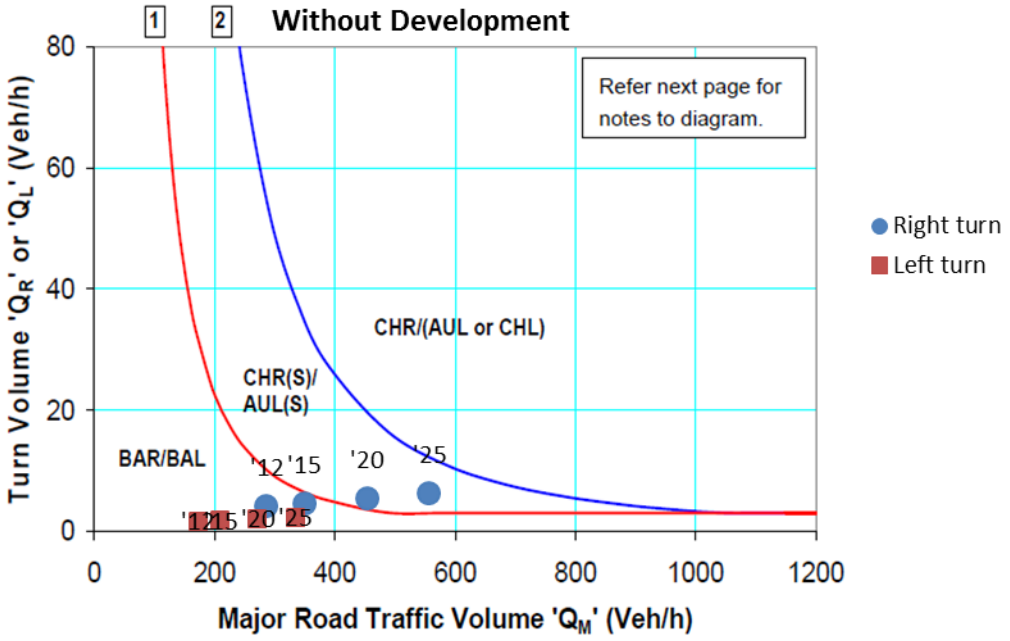


Figure 13.22 Warrants for Turn Treatments on Roads with a Design Speed ≥100km/h

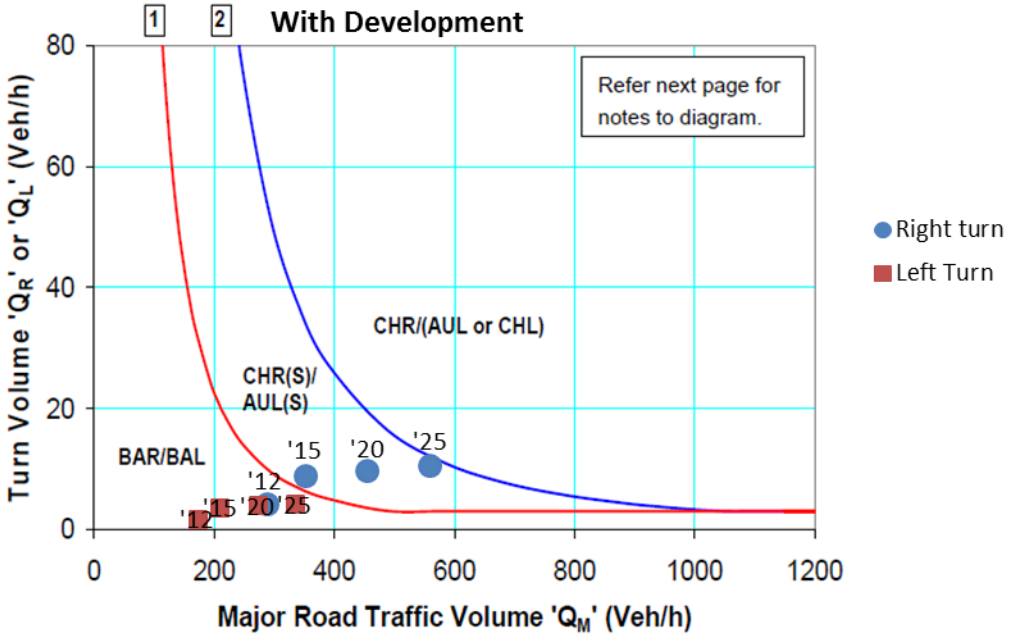


Figure 13.22 Warrants for Turn Treatments on Roads with a Design Speed ≥100km/h

Appendix A – DTMR road traffic count data

AADT Segment Report

District 15 - Central Highlands District
Road Section 5101 - Duaringa - Apis Creek Road
Traffic Year 2008

Road Segments Summary

Start TDist	End TDist	Site	Site TDist	Description	AADT			VKT (Millions)			Data Year	Page
					G	A	B	G	A	B		
0.000 km	76.320 km	159542	10.000 km	Duaringa-Apis Ck Rd 10km N of Cap Hway	36	36	72	0.003	0.003	0.005	2008	2
							Totals	0.003	0.003	0.005		

Site 159542. Point 350000254. Duaringa-Apis Ck Rd 10km N of Cap Hway.
10.00 km

The width of each Road Segment is proportional to its AADT.

0.00 km
Start Point 350000255.

76.32 km
End Point 350000256.

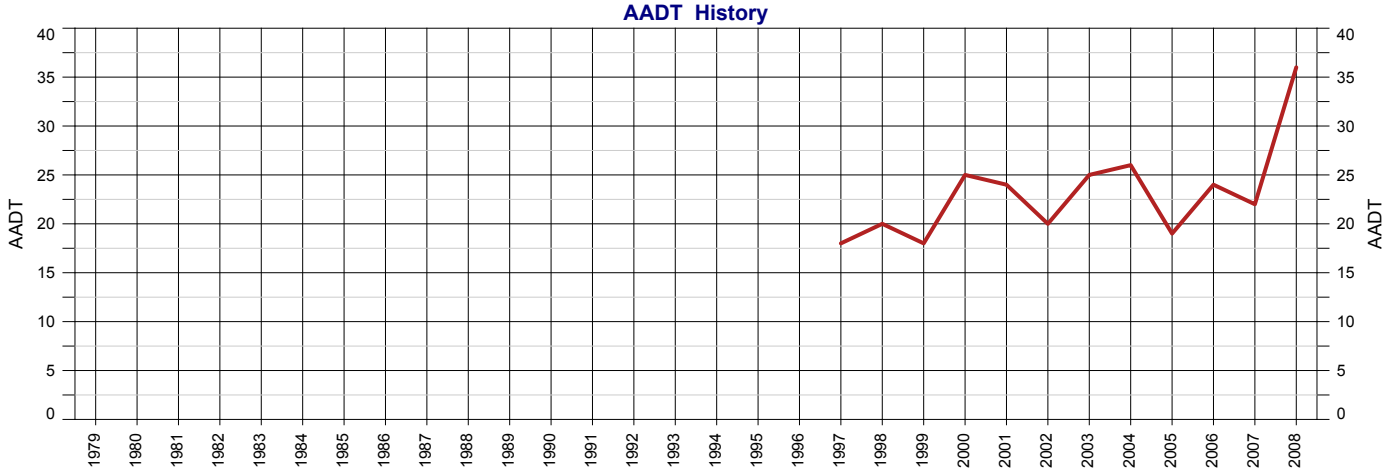
This report shows Annual Average Daily Traffic values (AADTs). Because the AADT values are converted to whole numbers, there will be occasional inaccuracies due to rounding. These inaccuracies are statistically insignificant.

All Vehicles (00)			
G	36	100%	
A	36	100%	
B	72	100%	
Light Vehicles (0A)			
G	22	60.15%	
A	25	68.35%	
B	46	64.26%	
Heavy Vehicles (0B)			
G	14	39.85%	
A	11	31.65%	
B	26	35.74%	
Short Vehicles (1A)			
G	22	60.15%	
A	25	68.35%	
B	46	64.26%	
Trucks and Buses (1B)			
G	8	22.51%	
A	6	15.64%	
B	14	19.07%	
Articulated Vehicles (1C)			
G	3	8.39%	
A	3	7.14%	
B	6	7.76%	
Road Trains (1D)			
G	3	8.95%	
A	3	8.87%	
B	6	8.91%	
Short 2-Axle Vehicles (2A)			
G	21	58.13%	
A	23	65.04%	
B	44	61.60%	
Short Vehicles Towing (2B)			
G	1	2.02%	
A	1	3.31%	
B	2	2.66%	
2-Axle Trucks and Buses (2C)			
G	6	17.96%	
A	4	11.29%	
B	11	14.62%	
3-Axle Trucks and Buses (2D)			
G	1	4.14%	
A	1	3.88%	
B	3	4.01%	
4-Axle Trucks (2E)			
G	0	0.41%	
A	0	0.47%	
B	0	0.44%	
3-Axle Articulated (2F)			
G	0	0.16%	
A	0	0.05%	
B	0	0.10%	
4-Axle Articulated (2G)			
G	1	1.81%	
A	0	0.79%	
B	1	1.30%	
5-Axle Articulated (2H)			
G	1	1.50%	
A	1	1.52%	
B	1	1.51%	
6-Axle Articulated (2I)			
G	2	4.92%	
A	2	4.78%	
B	3	4.85%	
B Double (2J)			
G	1	2.43%	
A	1	2.26%	
B	2	2.34%	
Double Road Trains (2K)			
G	2	6.52%	
A	2	6.61%	
B	5	6.57%	
Triple Road Trains (2L)			
G	0	0%	
A	0	0%	
B	0	0%	

District	15 - Central Highlands District
Road Section	5101 - Duaringa - Apis Creek Road
Site	159542 - Duaringa-Apis Ck Rd 10km N of Cap Hway
Thru Dist	10.0
Type	C - Coverage
Stream	T1 - Thru traffic in Lane 1 -in gazettal dirn

Year	2008	Growth last Year	63.64%
AADT	36	Growth last 5 Yrs	12.23%
Avg Week Day	39	Growth last 10 Yrs	7.47%
Avg Weekend Day	31		

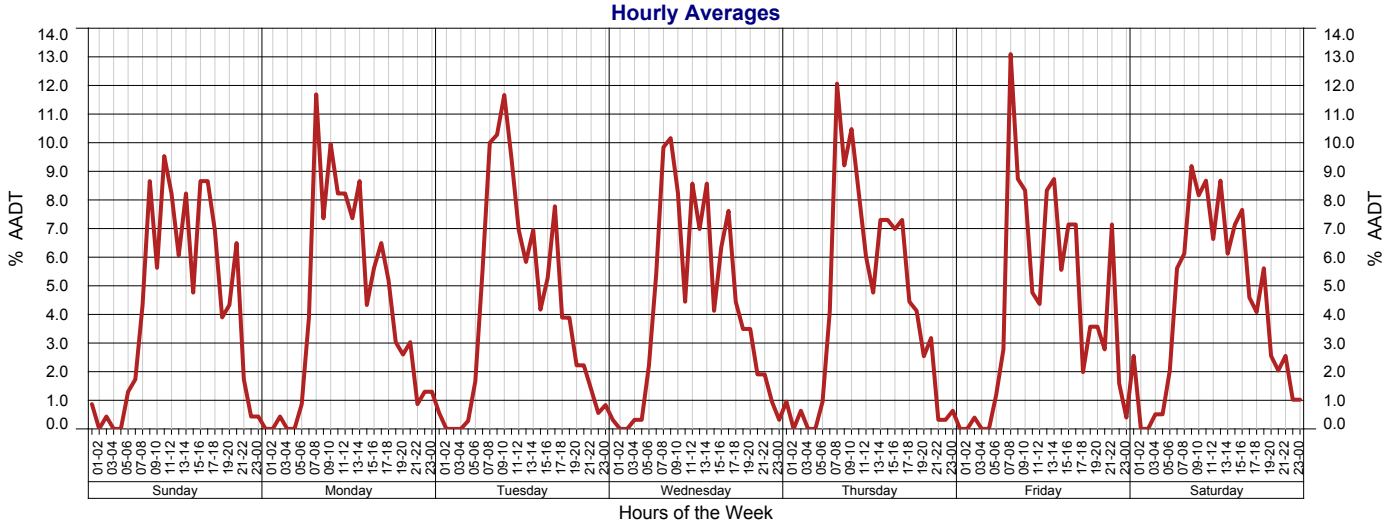
AADT History

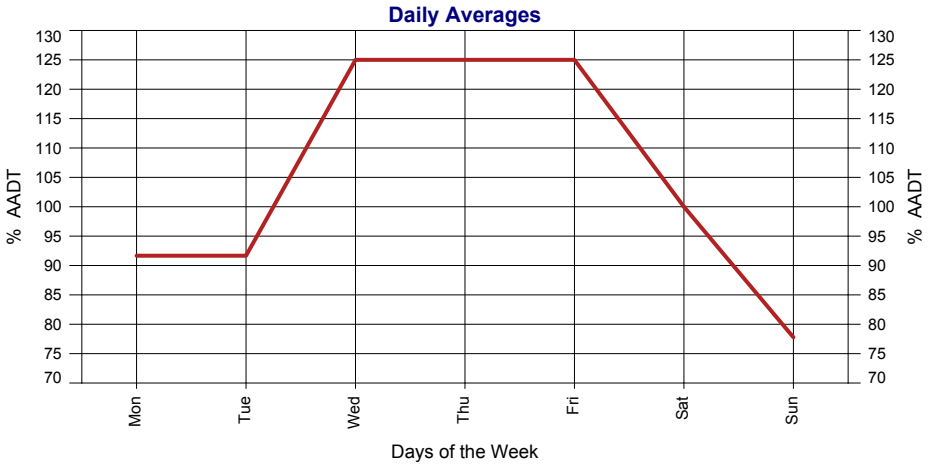


Year	AADT	1-Year Growth	5-Year Growth	10-Year Growth
2008	36	63.64%	12.23%	7.47%
2007	22	-8.33%	-0.60%	0.71%
2006	24	26.32%	1.24%	
2005	19	-26.92%	-5.86%	
2004	26	4.00%	5.22%	
2003	25	25.00%	5.10%	
2002	20	-16.67%	0.39%	
2001	24	-4.00%		
2000	25	38.89%		
1999	18	-10.00%		
1998	20	11.11%		
1997	18			
1996				
1995				
1994				

Year	AADT	1-Year Growth	5-Year Growth	10-Year Growth
1993				
1992				
1991				
1990				
1989				
1988				
1987				
1986				
1985				
1984				
1983				
1982				
1981				
1980				
1979				

Hourly Averages

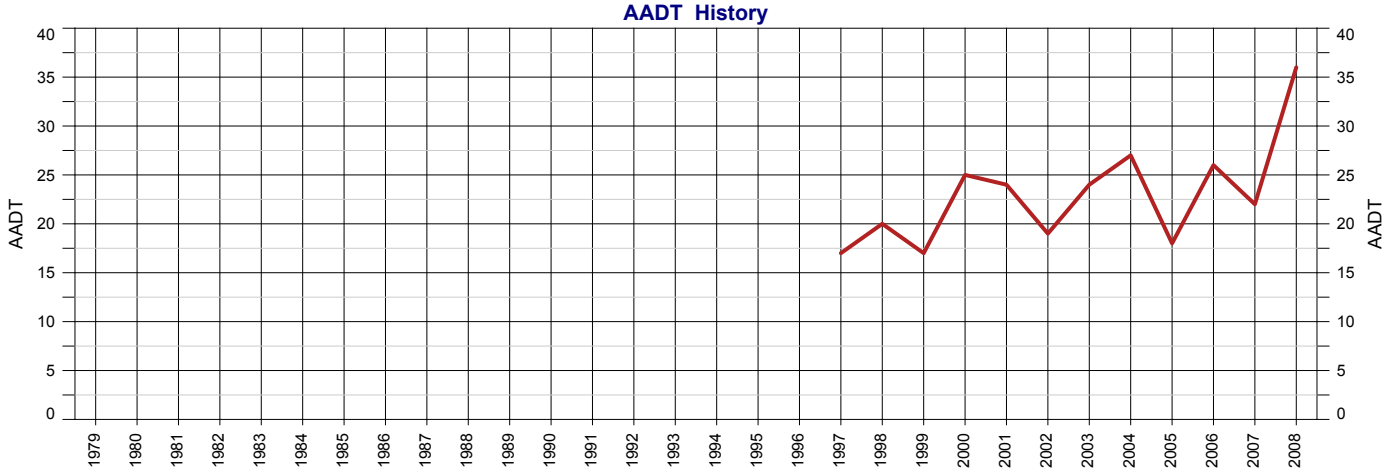



Daily Averages
130
125
120
115
110
105
100
95
90
85
80
75
70
% AADT
Mon
Tue
Wed
Thu
Fri
Sat
Sun
Days of the Week

District	15 - Central Highlands District
Road Section	5101 - Duaringa - Apis Creek Road
Site	159542 - Duaringa-Apis Ck Rd 10km N of Cap Hway
Thru Dist	10.0
Type	C - Coverage
Stream	T2 - Thru traffic in Lane 2 -against gazettal

Year	2008	Growth last Year	63.64%
AADT	36	Growth last 5 Yrs	12.34%
Avg Week Day	38	Growth last 10 Yrs	7.72%
Avg Weekend Day	34		

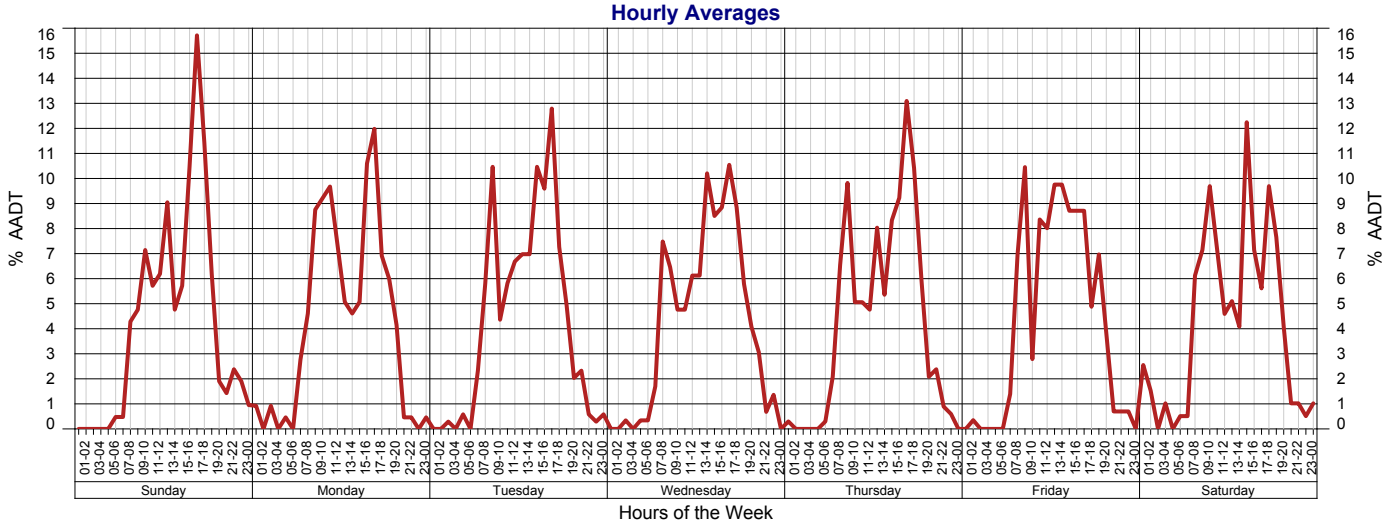
AADT History

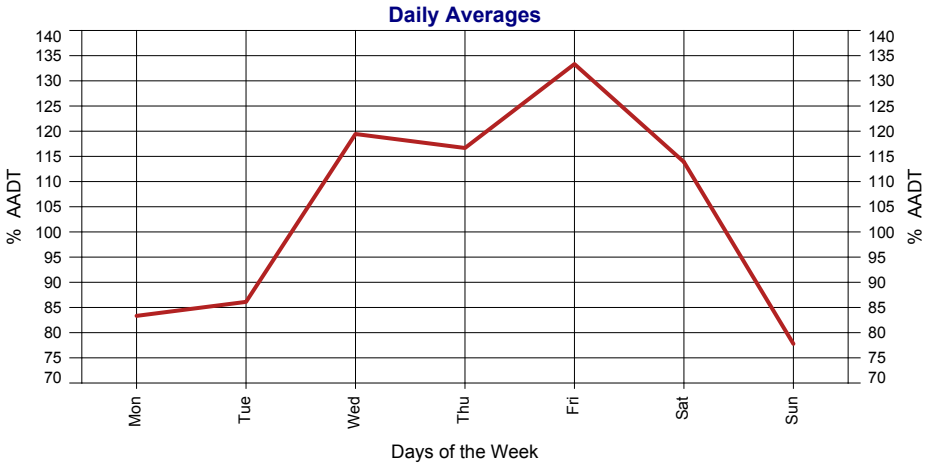


Year	AADT	1-Year Growth	5-Year Growth	10-Year Growth
2008	36	63.64%	12.34%	7.72%
2007	22	-15.38%	0.01%	1.07%
2006	26	44.44%	4.06%	
2005	18	-33.33%	-6.91%	
2004	27	12.50%	7.14%	
2003	24	26.32%	4.46%	
2002	19	-20.83%	-0.18%	
2001	24	-4.00%		
2000	25	47.06%		
1999	17	-15.00%		
1998	20	17.65%		
1997	17			
1996				
1995				
1994				

Year	AADT	1-Year Growth	5-Year Growth	10-Year Growth
1993				
1992				
1991				
1990				
1989				
1988				
1987				
1986				
1985				
1984				
1983				
1982				
1981				
1980				
1979				

Hourly Averages




Daily Averages
% AADT
140
135
130
125
120
115
110
105
100
95
90
85
80
75
70
Mon
Tue
Wed
Thu
Fri
Sat
Sun
Days of the Week

District	15 - Central Highlands District
Road Section	5101 - Duaringa - Apis Creek Road
Site	159542 - Duaringa-Apis Ck Rd 10km N of Cap Hway
Thru Dist	10.0
Type	C - Coverage
Stream	TB - Bi-directional traffic flow

No data found.

Annual Volume Report

To view AADT data by Site and Site Stream. Graphs show AADT history, plus hourly, daily and weekly averages. A table shows annual data for AADT figures with 1 year, 5 year and 10 year growth rates. Graphs shows AADT data over a variety of time periods.

District

For administration purposes Queensland is divided into 14 districts.

Road Section

This is the gazetted road section within a major road. It always starts and ends on a permanent reference point. Larger roads are broken down into sections for easier data collection and reporting, especially when the road is in more than one district.

Site

The physical location of a traffic recorder. Sites are located at a specified through distance along a road. A site must be located on a carriageway link. There are two types of sites: permanent and coverage.

Thru Dist

The distance in kilometres of a road section.

Type

The operating status of the site where the data was recorded. Sites can be:

- P - Permanent. In operation all year round.
- C - Coverage. In operation at certain times of the year.

Stream

The gazetted direction of traffic flow recorded. This can be:

- TB - Direction of traffic flow in both directions.
- TG - Traffic flowing in gazettal direction.
- TA - Traffic flowing against gazettal direction.
- T1, T3, T5, T7 - Lanes with traffic flowing in gazettal direction.
- T2, T4, T6, T8 - Lanes with traffic flowing against gazettal direction.

Year

Current year or years chosen. A separate report will be produced for each year selected.

AADT

AADT figure for the current year. AADT stands for annual average daily traffic. This is the number of vehicles passing a point on the road in a 24 hour period, averaged over a whole year.

Avg Week Day

Average daily traffic volume during the week days, Monday to Friday.

Avg Weekend Day
Average daily traffic volume during the weekend.

Growth last year and 1-Year Growth
Increase or decrease in average daily traffic volume over the last year.

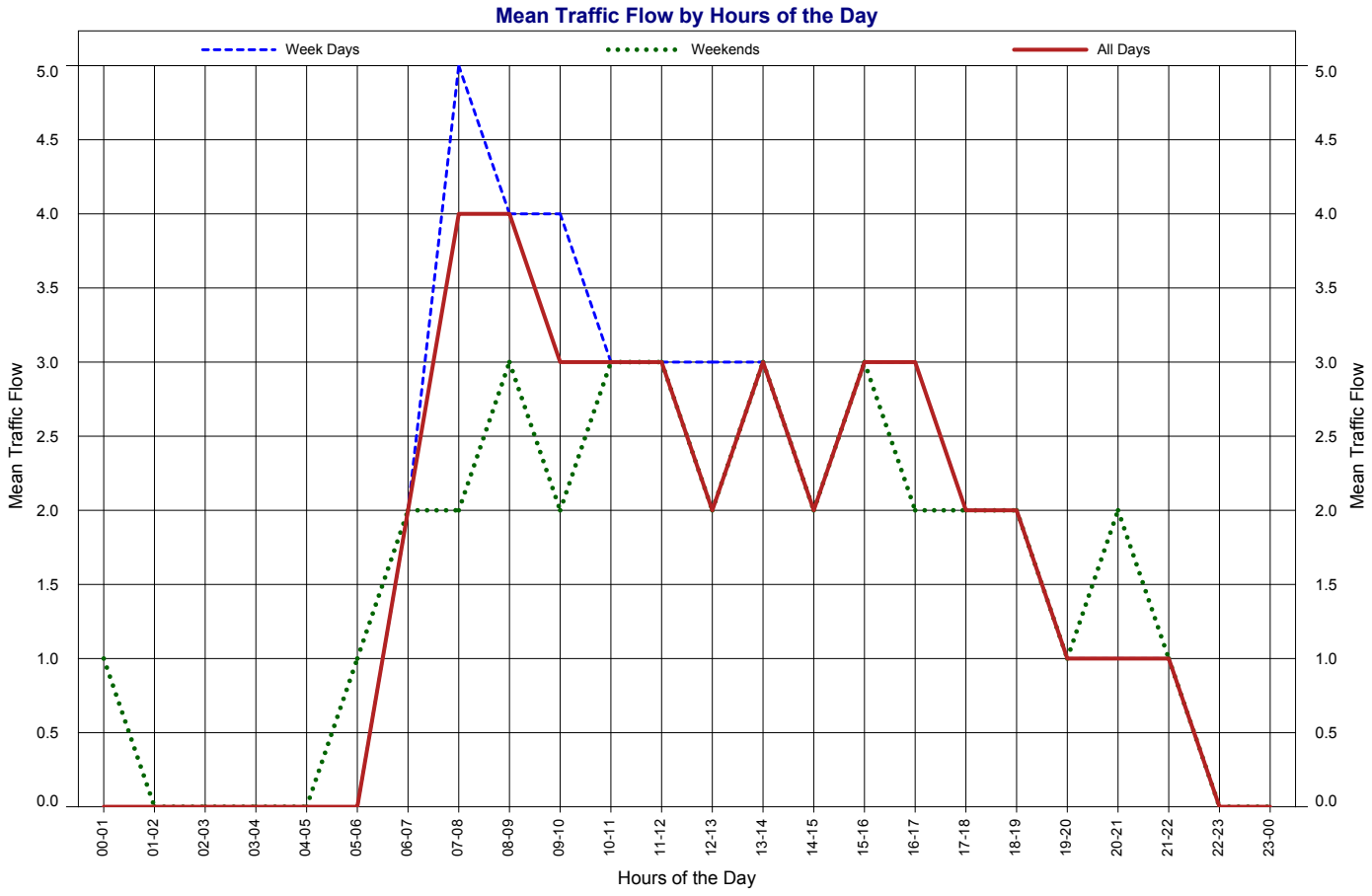
Growth last 5 Yrs and 5-Year Growth
Increase or decrease in average daily traffic volume over the last 5 years.

Growth last 10 Yrs and 10-Year Growth
Increase or decrease in average daily traffic volume over the last 10 years.

District	15 - Central Highlands District
Road Section	5101 - Duaringa - Apis Creek Road
Site	159542 - Duaringa-Apis Ck Rd 10km N of Cap Hway
Thru Dist	10.0
Type	C - Coverage
Stream	T1 - Thru traffic in Lane 1 -in gazettal dirn
Traffic Class	00 - All Vehicles
Date Range	Monday 07-Apr-2008 - Sunday 25-May-2008

Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	7	7	7	7	7	7	7
Days Included	6	7	7	7	7	7	7
Calendar Events	1	0	0	0	1	0	0



Hour	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Average Week Day		Average Weekend Day		Average Day	
00-01											1	3.3%					1	2.7%		
01-02																				
02-03																				
03-04																				
04-05																				
05-06					1	2.2%					1	3.3%					1	2.7%		
06-07	1	2.9%	2	4.4%	2	4.4%	2	4.7%	1	2.6%	2	6.7%	1	3.0%	2	4.8%	2	5.4%	2	5.1%
07-08	4	11.8%	5	11.1%	4	8.9%	5	11.6%	5	13.2%	2	6.7%	1	3.0%	5	11.9%	2	5.4%	4	10.3%
08-09	3	8.8%	5	11.1%	5	11.1%	4	9.3%	3	7.9%	3	10.0%	3	9.1%	4	9.5%	3	8.1%	4	10.3%
09-10	3	8.8%	5	11.1%	4	8.9%	5	11.6%	3	7.9%	2	6.7%	2	6.1%	4	9.5%	2	5.4%	3	7.7%
10-11	3	8.8%	4	8.9%	2	4.4%	4	9.3%	2	5.3%	2	6.7%	3	9.1%	3	7.1%	3	8.1%	3	7.7%
11-12	2	5.9%	3	6.7%	4	8.9%	3	7.0%	2	5.3%	2	6.7%	3	9.1%	3	7.1%	3	8.1%	3	7.7%
12-13	2	5.9%	3	6.7%	3	6.7%	2	4.7%	3	7.9%	2	6.7%	2	6.1%	3	7.1%	2	5.4%	2	5.1%
13-14	3	8.8%	3	6.7%	4	8.9%	3	7.0%	3	7.9%	2	6.7%	3	9.1%	3	7.1%	3	8.1%	3	7.7%
14-15	2	5.9%	2	4.4%	2	4.4%	3	7.0%	2	5.3%	2	6.7%	2	6.1%	2	4.8%	2	5.4%	2	5.1%
15-16	2	5.9%	2	4.4%	3	6.7%	3	7.0%	3	7.9%	2	6.7%	3	9.1%	3	7.1%	3	8.1%	3	7.7%
16-17	2	5.9%	4	8.9%	3	6.7%	3	7.0%	3	7.9%	1	3.3%	3	9.1%	3	7.1%	2	5.4%	3	7.7%
17-18	2	5.9%	2	4.4%	2	4.4%	2	4.7%	1	2.6%	1	3.3%	2	6.1%	2	4.8%	2	5.4%	2	5.1%
18-19	1	2.9%	2	4.4%	2	4.4%	2	4.7%	1	2.6%	2	6.7%	1	3.0%	2	4.8%	2	5.4%	2	5.1%
19-20	1	2.9%	1	2.2%	2	4.4%	1	2.3%	1	2.6%	1	3.3%	1	3.0%	1	2.4%	1	2.7%	1	2.6%
20-21	1	2.9%	1	2.2%	1	2.2%	1	2.3%	1	2.6%	1	3.3%	2	6.1%	1	2.4%	2	5.4%	1	2.6%
21-22			1	2.2%	1	2.2%			3	7.9%	1	3.3%	1	3.0%	1	2.4%	1	2.7%	1	2.6%
22-23	1	2.9%							1	2.6%										
23-24	1	2.9%																		

Peaks	Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count	
AM	08:00	4	08:00	5	09:00	5	08:00	5	08:00	5	09:00	3	09:00	3	08:00	5	09:00	3	08:00	3
PM	14:00	3	17:00	4	14:00	4	14:00	3	13:00	3	13:00	2	14:00	3	13:00	3	13:00	2	14:00	3

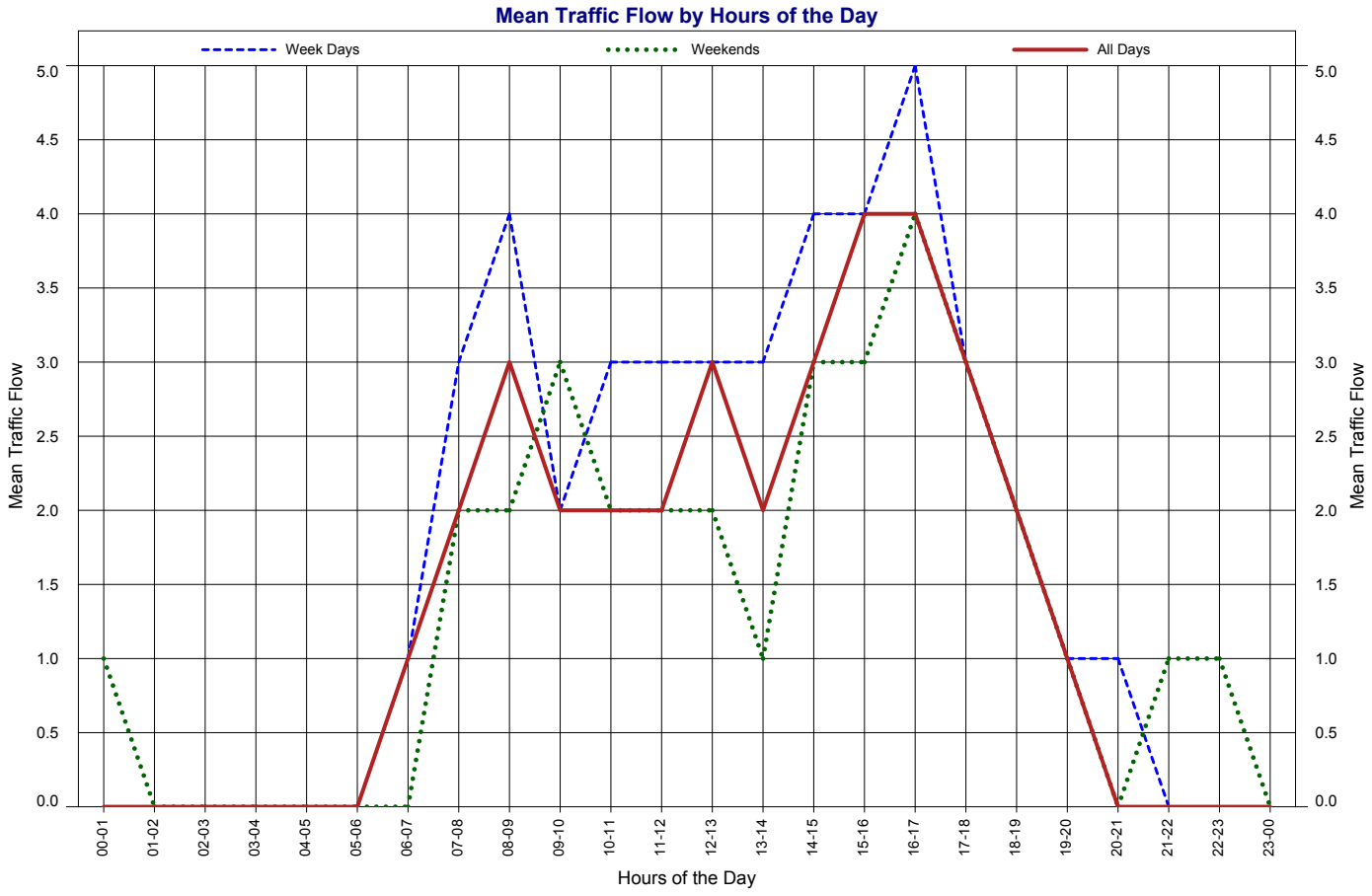
12-Hour	29	85.3%	40	88.9%	38	84.4%	39	90.7%	31	81.6%	23	76.7%	28	84.8%	37	88.1%	29	78.4%	34	87.2%
16-Hour	32	94.1%	45	100.0%	44	97.8%	43	100.0%	37	97.4%	28	93.3%	33	100.0%	42	100.0%	35	94.6%	39	100.0%
18-Hour	34	100.0%	45	100.0%	44	97.8%	43	100.0%	38	100.0%	28	93.3%	33	100.0%	42	100.0%	35	94.6%	39	100.0%
24-Hour	34	100.0%	45	100.0%	45	100.0%	43	100.0%	38	100.0%	30	100.0%	33	100.0%	42	100.0%	37	100.0%	39	100.0%

Avg Week Day		81.0%		107.1%		107.1%		102.4%		90.5%						100.0%		88.1%		92.9%
Avg Weekend Day												81.1%		89.2%		113.5%		100.0%		105.4%
Avg Day		87.2%		115.4%		115.4%		110.3%		97.4%		76.9%		84.6%		107.7%		94.9%		100.0%

District	15 - Central Highlands District
Road Section	5101 - Duaringa - Apis Creek Road
Site	159542 - Duaringa-Apis Ck Rd 10km N of Cap Hway
Thru Dist	10.0
Type	C - Coverage
Stream	T2 - Thru traffic in Lane 2 -against gazettal
Traffic Class	00 - All Vehicles
Date Range	Monday 07-Apr-2008 - Sunday 25-May-2008

Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	7	7	7	7	7	7	7
Days Included	6	7	7	7	7	7	7
Calendar Events	1	0	0	0	1	0	0



Hour	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Average Week Day		Average Weekend Day		Average Day	
00-01											1	3.8%					1	3.0%		
01-02																				
02-03																				
03-04																				
04-05																				
05-06																				
06-07	1	3.1%	1	2.3%	1	2.3%	1	2.2%	1	2.4%					1	2.4%			1	2.9%
07-08	2	6.2%	2	4.5%	3	7.0%	3	6.5%	3	7.1%	2	7.7%	1	3.3%	3	7.1%	2	6.1%	2	5.9%
08-09	3	9.4%	5	11.4%	3	7.0%	5	10.9%	4	9.5%	2	7.7%	1	3.3%	4	9.5%	2	6.1%	3	8.8%
09-10	3	9.4%	2	4.5%	2	4.7%	2	4.3%	1	2.4%	3	11.5%	2	6.7%	2	4.8%	3	9.1%	2	5.9%
10-11	3	9.4%	3	6.8%	2	4.7%	2	4.3%	3	7.1%	2	7.7%	2	6.7%	3	7.1%	2	6.1%	2	5.9%
11-12	3	9.4%	3	6.8%	3	7.0%	2	4.3%	3	7.1%	1	3.8%	2	6.7%	3	7.1%	2	6.1%	2	5.9%
12-13	2	6.2%	3	6.8%	3	7.0%	4	8.7%	4	9.5%	1	3.8%	3	10.0%	3	7.1%	2	6.1%	3	8.8%
13-14	1	3.1%	3	6.8%	4	9.3%	3	6.5%	4	9.5%	1	3.8%	1	3.3%	3	7.1%	1	3.0%	2	5.9%
14-15	1	3.1%	5	11.4%	4	9.3%	4	8.7%	4	9.5%	3	11.5%	2	6.7%	4	9.5%	3	9.1%	3	8.8%
15-16	4	12.5%	4	9.1%	4	9.3%	4	8.7%	4	9.5%	2	7.7%	3	10.0%	4	9.5%	3	9.1%	4	11.8%
16-17	4	12.5%	6	13.6%	4	9.3%	6	13.0%	4	9.5%	2	7.7%	5	16.7%	5	11.9%	4	12.1%	4	11.8%
17-18	2	6.2%	3	6.8%	4	9.3%	5	10.9%	2	4.8%	3	11.5%	3	10.0%	3	7.1%	3	9.1%	3	8.8%
18-19	2	6.2%	2	4.5%	2	4.7%	3	6.5%	3	7.1%	2	7.7%	2	6.7%	2	4.8%	2	6.1%	2	5.9%
19-20	1	3.1%	1	2.3%	2	4.7%	1	2.2%	2	4.8%	1	3.8%	1	3.3%	1	2.4%	1	3.0%	1	2.9%
20-21			1	2.3%	1	2.3%	1	2.2%							1	2.4%				
21-22													1	3.3%			1	3.0%		
22-23					1	2.3%							1	3.3%			1	3.0%		
23-24																				

Peaks	Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count	
AM	09:00	3	09:00	5	08:00	3	09:00	5	09:00	4	10:00	3	10:00	2	09:00	4	10:00	2	09:00	3
PM	16:00	4	17:00	6	14:00	4	17:00	6	13:00	4	15:00	3	17:00	5	17:00	5	17:00	3	17:00	4

12-Hour	30	93.8%	41	93.2%	38	88.4%	43	93.5%	39	92.9%	24	92.3%	27	90.0%	39	92.9%	29	87.9%	32	94.1%
16-Hour	32	100.0%	44	100.0%	42	97.7%	46	100.0%	42	100.0%	25	96.2%	29	96.7%	42	100.0%	31	93.9%	34	100.0%
18-Hour	32	100.0%	44	100.0%	43	100.0%	46	100.0%	42	100.0%	25	96.2%	30	100.0%	42	100.0%	32	97.0%	34	100.0%
24-Hour	32	100.0%	44	100.0%	43	100.0%	46	100.0%	42	100.0%	26	100.0%	30	100.0%	42	100.0%	33	100.0%	34	100.0%

Avg Week Day		76.2%		104.8%		102.4%		109.5%		100.0%						100.0%		78.6%		81.0%
Avg Weekend Day												78.8%		90.9%		127.3%		100.0%		103.0%
Avg Day		94.1%		129.4%		126.5%		135.3%		123.5%		76.5%		88.2%		123.5%		97.1%		100.0%

Weekly Volume Report

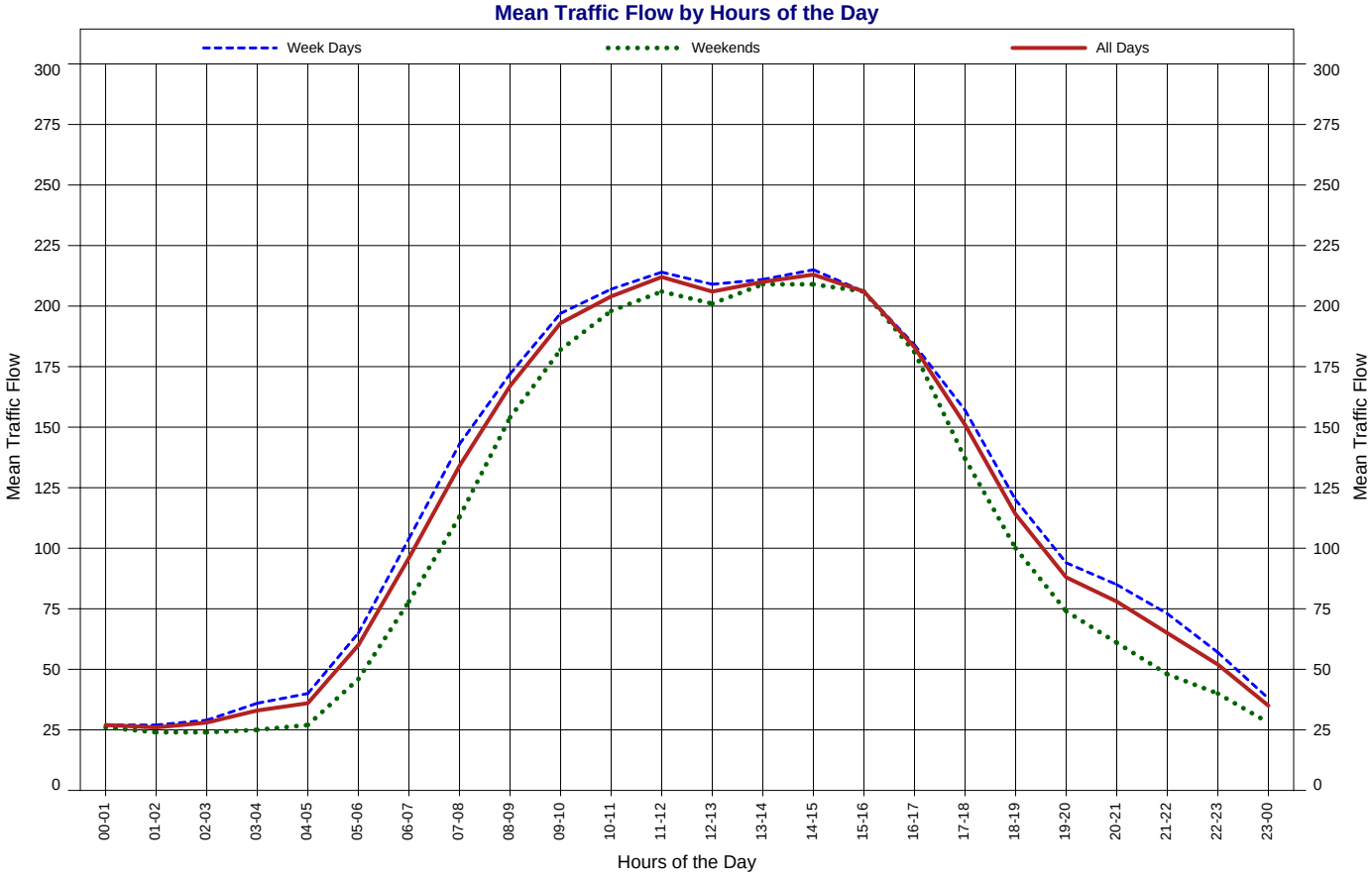
Weeks 2012-W01 - 2012-W52 (52 weeks)

Region	204 - Fitzroy
Road Section	10F - Bruce Highway (Rockhampton-st Lawrence)
Site	60003 - Bruce Hwy 40m Sth MountainCk(Kunwarara)
Thru Dist	74.4
Type	P - Permanent
Stream	TB - Bi-directional traffic flow
Traffic Class	00 - All Vehicles
Weeks	2012-W01 - 2012-W52 (52 weeks)
Date Range	Monday 02-Jan-2012 - Sunday 30-Dec-2012

Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	52	52	52	52	52	52	52
Days Included	49	47	49	50	52	52	52
Calendar Events	5	1	2	1	1	1	1

Mean Traffic Flow by Hours of the Day



Weekly Volume Report

Weeks 2012-W01 - 2012-W52 (52 weeks)

Hour	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Average Week Day		Average Weekend Day		Average Day	
00-01	20	0.7%	26	0.9%	30	1.1%	30	1.0%	31	1.0%	29	1.2%	23	0.9%	27	0.9%	26	1.0%	27	1.0%
01-02	17	0.6%	27	1.0%	29	1.0%	30	1.0%	32	1.0%	29	1.2%	19	0.7%	27	0.9%	24	0.9%	26	0.9%
02-03	17	0.6%	30	1.1%	32	1.1%	32	1.1%	36	1.1%	30	1.2%	17	0.6%	29	1.0%	24	0.9%	28	1.0%
03-04	23	0.8%	34	1.2%	39	1.4%	40	1.3%	44	1.4%	31	1.2%	18	0.7%	36	1.2%	25	1.0%	33	1.2%
04-05	30	1.1%	40	1.4%	44	1.6%	42	1.4%	45	1.4%	35	1.4%	19	0.7%	40	1.4%	27	1.0%	36	1.3%
05-06	52	1.9%	63	2.3%	71	2.5%	72	2.4%	69	2.2%	57	2.3%	34	1.3%	65	2.2%	46	1.8%	60	2.1%
06-07	89	3.2%	103	3.7%	105	3.7%	111	3.7%	111	3.5%	95	3.8%	60	2.2%	104	3.6%	78	3.0%	96	3.4%
07-08	128	4.6%	145	5.3%	145	5.1%	148	4.9%	150	4.7%	129	5.2%	96	3.6%	143	4.9%	113	4.4%	134	4.8%
08-09	162	5.9%	168	6.1%	171	6.1%	176	5.9%	184	5.7%	168	6.7%	139	5.2%	172	5.9%	154	5.9%	167	5.9%
09-10	187	6.8%	189	6.8%	197	7.0%	201	6.7%	213	6.7%	192	7.7%	171	6.4%	197	6.8%	182	7.0%	193	6.9%
10-11	205	7.4%	198	7.2%	198	7.0%	211	7.0%	221	6.9%	197	7.9%	199	7.4%	207	7.1%	198	7.6%	204	7.2%
11-12	221	8.0%	199	7.2%	208	7.4%	214	7.1%	227	7.1%	198	7.9%	214	8.0%	214	7.4%	206	7.9%	212	7.5%
12-13	215	7.8%	190	6.9%	197	7.0%	215	7.1%	226	7.1%	189	7.6%	213	7.9%	209	7.2%	201	7.7%	206	7.3%
13-14	216	7.8%	195	7.1%	200	7.1%	213	7.1%	231	7.2%	190	7.6%	228	8.5%	211	7.3%	209	8.0%	210	7.5%
14-15	220	8.0%	199	7.2%	200	7.1%	221	7.3%	236	7.4%	179	7.2%	238	8.9%	215	7.4%	209	8.0%	213	7.6%
15-16	211	7.6%	190	6.9%	193	6.8%	203	6.7%	232	7.2%	171	6.9%	241	9.0%	206	7.1%	206	7.9%	206	7.3%
16-17	178	6.4%	174	6.3%	173	6.1%	185	6.2%	211	6.6%	147	5.9%	215	8.0%	184	6.3%	181	7.0%	183	6.5%
17-18	147	5.3%	142	5.1%	144	5.1%	163	5.4%	189	5.9%	117	4.7%	157	5.8%	157	5.4%	137	5.3%	151	5.4%
18-19	110	4.0%	108	3.9%	111	3.9%	128	4.3%	145	4.5%	86	3.4%	113	4.2%	120	4.1%	100	3.9%	114	4.0%
19-20	85	3.1%	88	3.2%	89	3.2%	101	3.4%	108	3.4%	63	2.5%	85	3.2%	94	3.2%	74	2.8%	88	3.1%
20-21	72	2.6%	87	3.2%	81	2.9%	89	3.0%	95	3.0%	54	2.2%	67	2.5%	85	2.9%	61	2.3%	78	2.8%
21-22	66	2.4%	72	2.6%	72	2.5%	79	2.6%	74	2.3%	43	1.7%	52	1.9%	73	2.5%	48	1.8%	65	2.3%
22-23	54	2.0%	57	2.1%	57	2.0%	62	2.1%	54	1.7%	35	1.4%	44	1.6%	57	2.0%	40	1.5%	52	1.8%
23-24	36	1.3%	37	1.3%	39	1.4%	42	1.4%	38	1.2%	29	1.2%	27	1.0%	38	1.3%	28	1.1%	35	1.2%

Peaks	Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count	
AM	12:00	221	12:00	199	12:00	208	12:00	214	12:00	227	12:00	198	12:00	214	12:00	214	12:00	206	12:00	211
PM	15:00	220	15:00	199	14:00	200	15:00	221	15:00	236	14:00	190	16:00	241	15:00	215	14:00	209	15:00	213

12-Hour	2,200	79.7%	2,097	76.0%	2,137	75.6%	2,278	75.7%	2,465	77.0%	1,963	78.7%	2,224	82.7%	2,235	76.8%	2,096	80.7%	2,193	77.8%
16-Hour	2,512	91.0%	2,447	88.6%	2,484	87.9%	2,658	88.4%	2,853	89.1%	2,218	89.0%	2,488	92.5%	2,591	89.0%	2,357	90.8%	2,520	89.5%
18-Hour	2,602	94.2%	2,541	92.0%	2,580	91.3%	2,762	91.8%	2,945	92.0%	2,282	91.5%	2,559	95.2%	2,686	92.3%	2,425	93.4%	2,607	92.5%
24-Hour	2,761	100.0%	2,761	100.0%	2,825	100.0%	3,008	100.0%	3,202	100.0%	2,493	100.0%	2,689	100.0%	2,910	100.0%	2,597	100.0%	2,817	100.0%

Avg Week Day		94.9%		94.9%		97.1%		103.4%		110.0%						100.0%		89.2%		96.8%
Avg Weekend Day												96.0%		103.5%		112.1%		100.0%		108.5%
Avg Day		98.0%		98.0%		100.3%		106.8%		113.7%		88.5%		95.5%		103.3%		92.2%		100.0%

Weekly Volume Report

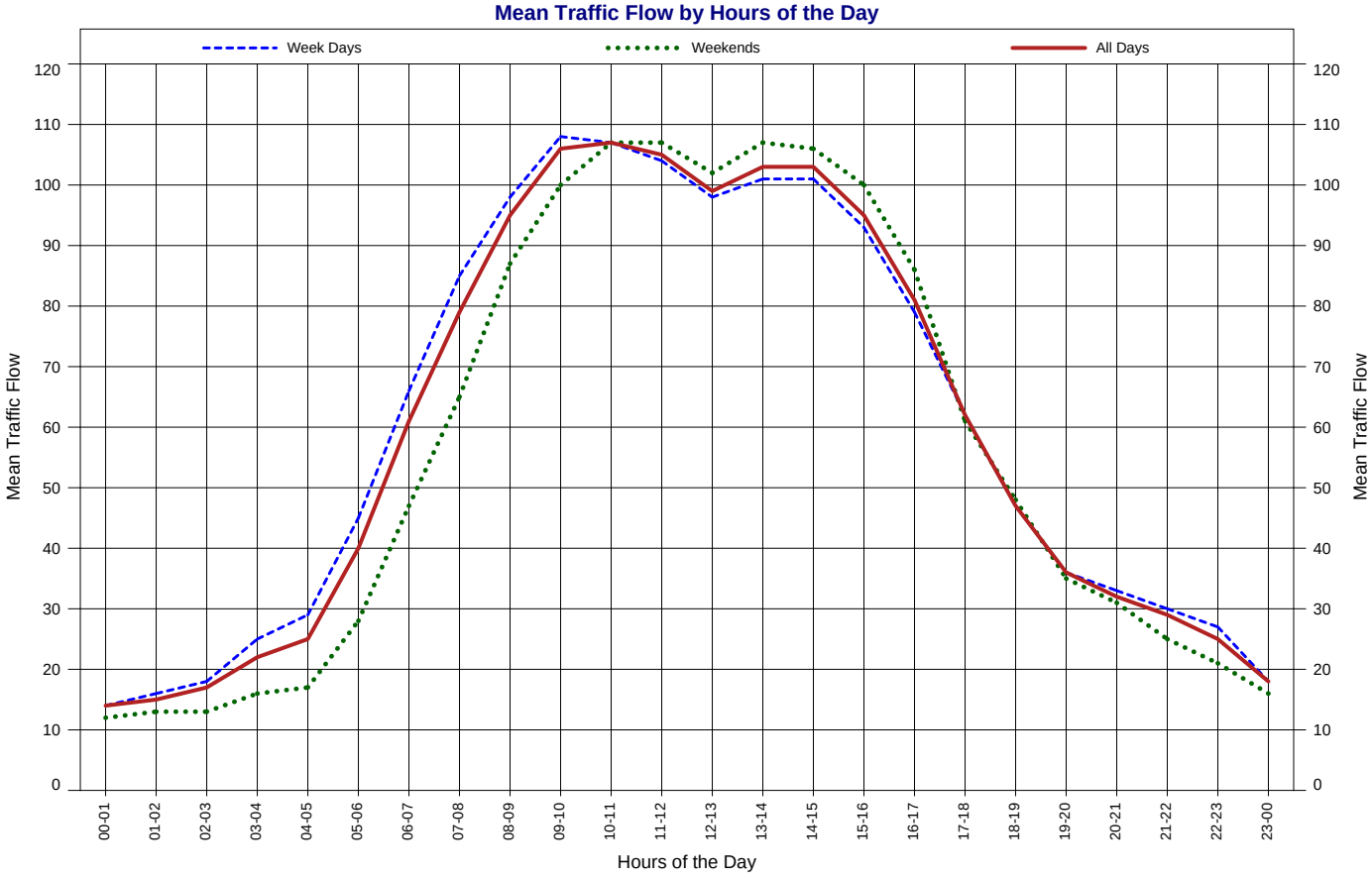
Weeks 2012-W01 - 2012-W52 (52 weeks)

Region	204 - Fitzroy
Road Section	10F - Bruce Highway (Rockhampton-st Lawrence)
Site	60003 - Bruce Hwy 40m Sth MountainCk(Kunwarara)
Thru Dist	74.4
Type	P - Permanent
Stream	TG - Thru traffic -in gazettal dirn
Traffic Class	00 - All Vehicles
Weeks	2012-W01 - 2012-W52 (52 weeks)
Date Range	Monday 02-Jan-2012 - Sunday 30-Dec-2012

Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	52	52	52	52	52	52	52
Days Included	49	47	49	50	52	52	52
Calendar Events	5	1	2	1	1	1	1

Mean Traffic Flow by Hours of the Day



Weekly Volume Report

Weeks 2012-W01 - 2012-W52 (52 weeks)

Hour	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Average Week Day		Average Weekend Day		Average Day	
00-01	12	0.8%	16	1.1%	14	1.0%	15	1.0%	15	1.0%	12	1.0%	12	0.8%	14	1.0%	12	0.9%	14	1.0%
01-02	11	0.7%	17	1.2%	17	1.2%	17	1.2%	16	1.1%	15	1.2%	11	0.8%	16	1.1%	13	1.0%	15	1.1%
02-03	12	0.8%	20	1.4%	20	1.4%	19	1.3%	20	1.4%	16	1.3%	9	0.6%	18	1.2%	13	1.0%	17	1.2%
03-04	17	1.1%	26	1.8%	27	1.9%	27	1.9%	28	1.9%	19	1.5%	12	0.8%	25	1.7%	16	1.2%	22	1.6%
04-05	23	1.6%	30	2.1%	31	2.2%	29	2.0%	30	2.1%	22	1.8%	11	0.8%	29	2.0%	17	1.3%	25	1.8%
05-06	39	2.6%	46	3.2%	48	3.4%	48	3.4%	43	2.9%	36	2.9%	20	1.4%	45	3.1%	28	2.1%	40	2.8%
06-07	61	4.1%	70	4.9%	68	4.9%	68	4.8%	63	4.3%	57	4.6%	37	2.5%	66	4.6%	47	3.5%	61	4.3%
07-08	81	5.5%	89	6.2%	88	6.3%	85	5.9%	82	5.6%	72	5.9%	58	4.0%	85	5.9%	65	4.8%	79	5.6%
08-09	98	6.6%	100	7.0%	98	7.0%	96	6.7%	99	6.8%	91	7.4%	83	5.7%	98	6.8%	87	6.4%	95	6.7%
09-10	111	7.5%	108	7.5%	107	7.6%	105	7.3%	109	7.5%	99	8.0%	101	6.9%	108	7.5%	100	7.4%	106	7.5%
10-11	112	7.6%	105	7.3%	102	7.3%	105	7.3%	112	7.7%	99	8.0%	114	7.8%	107	7.4%	107	7.9%	107	7.6%
11-12	113	7.6%	99	6.9%	101	7.2%	101	7.1%	107	7.3%	97	7.9%	117	8.0%	104	7.2%	107	7.9%	105	7.4%
12-13	107	7.2%	93	6.5%	92	6.6%	96	6.7%	101	6.9%	89	7.2%	115	7.9%	98	6.8%	102	7.6%	99	7.0%
13-14	110	7.4%	97	6.8%	96	6.9%	98	6.9%	103	7.0%	89	7.2%	125	8.5%	101	7.0%	107	7.9%	103	7.3%
14-15	112	7.6%	98	6.8%	93	6.6%	100	7.0%	104	7.1%	83	6.7%	129	8.8%	101	7.0%	106	7.9%	103	7.3%
15-16	104	7.0%	91	6.4%	82	5.9%	90	6.3%	96	6.6%	80	6.5%	120	8.2%	93	6.5%	100	7.4%	95	6.7%
16-17	82	5.5%	78	5.4%	73	5.2%	76	5.3%	85	5.8%	63	5.1%	109	7.5%	79	5.5%	86	6.4%	81	5.7%
17-18	65	4.4%	59	4.1%	57	4.1%	62	4.3%	69	4.7%	48	3.9%	74	5.1%	62	4.3%	61	4.5%	62	4.4%
18-19	48	3.2%	45	3.1%	43	3.1%	48	3.4%	49	3.4%	39	3.2%	56	3.8%	47	3.3%	48	3.6%	47	3.3%
19-20	39	2.6%	36	2.5%	34	2.4%	37	2.6%	36	2.5%	27	2.2%	43	2.9%	36	2.5%	35	2.6%	36	2.5%
20-21	35	2.4%	35	2.4%	32	2.3%	31	2.2%	31	2.1%	25	2.0%	37	2.5%	33	2.3%	31	2.3%	32	2.3%
21-22	35	2.4%	30	2.1%	30	2.1%	30	2.1%	26	1.8%	20	1.6%	29	2.0%	30	2.1%	25	1.9%	29	2.0%
22-23	31	2.1%	27	1.9%	28	2.0%	27	1.9%	22	1.5%	17	1.4%	25	1.7%	27	1.9%	21	1.6%	25	1.8%
23-24	21	1.4%	17	1.2%	20	1.4%	19	1.3%	15	1.0%	15	1.2%	16	1.1%	18	1.2%	16	1.2%	18	1.3%

Peaks	Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count	
AM	12:00	113	10:00	108	10:00	107	10:00	105	11:00	112	10:00	99	12:00	117	10:00	108	12:00	107	11:00	107
PM	15:00	112	15:00	98	14:00	96	15:00	100	15:00	104	13:00	89	15:00	129	14:00	101	14:00	107	14:00	102

12-Hour	1,143	77.3%	1,062	74.2%	1,032	73.7%	1,062	74.3%	1,116	76.4%	949	77.2%	1,201	82.1%	1,083	75.2%	1,076	79.7%	1,082	76.4%
16-Hour	1,313	88.8%	1,233	86.1%	1,196	85.4%	1,228	85.9%	1,272	87.1%	1,078	87.6%	1,347	92.1%	1,248	86.7%	1,214	89.9%	1,240	87.6%
18-Hour	1,365	92.3%	1,277	89.2%	1,244	88.8%	1,274	89.2%	1,309	89.6%	1,110	90.2%	1,388	94.9%	1,293	89.8%	1,251	92.7%	1,283	90.6%
24-Hour	1,479	100.0%	1,432	100.0%	1,401	100.0%	1,429	100.0%	1,461	100.0%	1,230	100.0%	1,463	100.0%	1,440	100.0%	1,350	100.0%	1,416	100.0%

Avg Week Day		102.7%		99.4%		97.3%		99.2%		101.5%						100.0%		93.8%		98.3%
Avg Weekend Day												91.1%		108.4%		106.7%		100.0%		104.9%
Avg Day		104.4%		101.1%		98.9%		100.9%		103.2%		86.9%		103.3%		101.7%		95.3%		100.0%

Weekly Volume Report

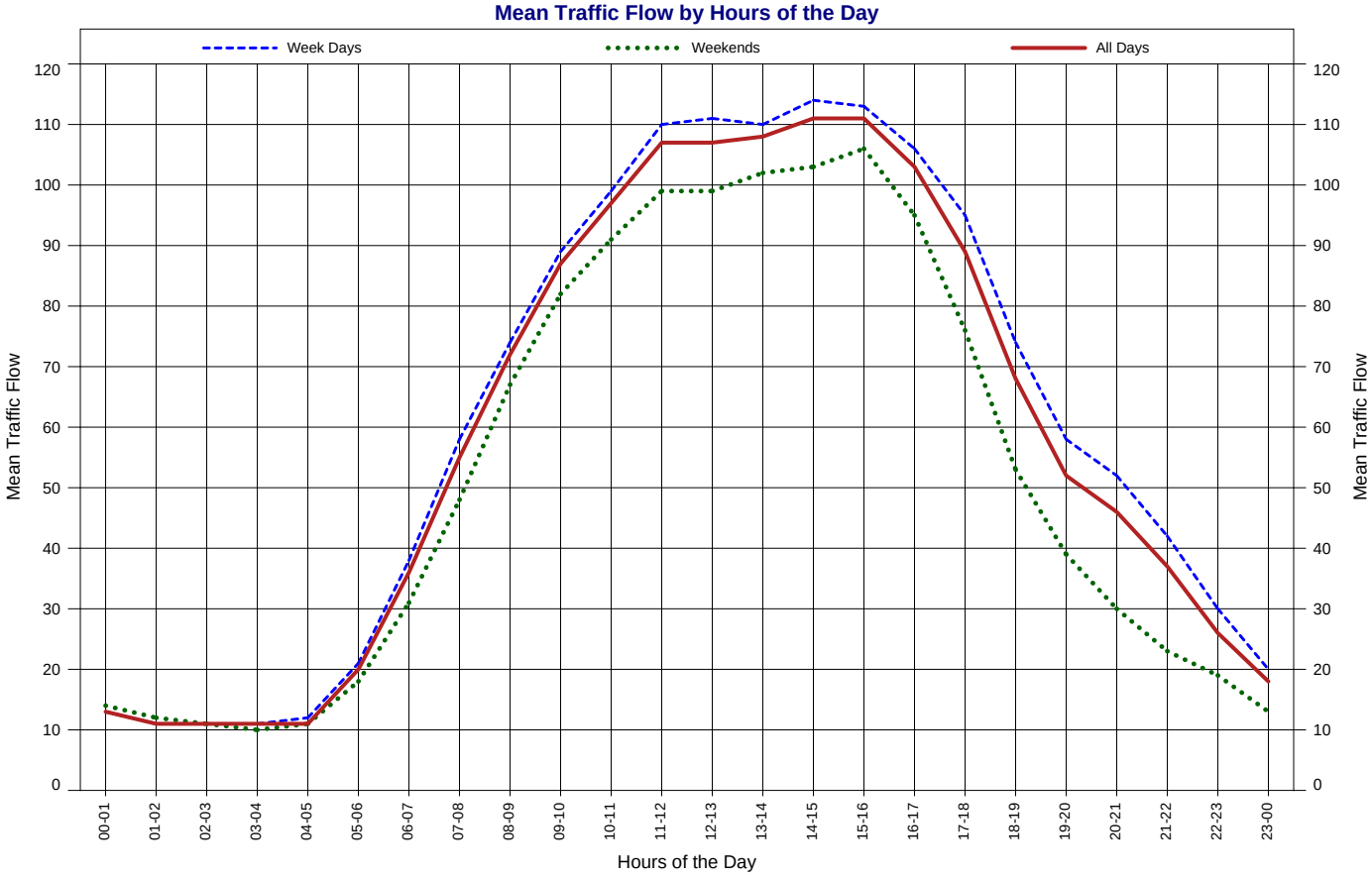
Weeks 2012-W01 - 2012-W52 (52 weeks)

Region	204 - Fitzroy
Road Section	10F - Bruce Highway (Rockhampton-st Lawrence)
Site	60003 - Bruce Hwy 40m Sth MountainCk(Kunwarara)
Thru Dist	74.4
Type	P - Permanent
Stream	TA - Thru traffic -against gazettal
Traffic Class	00 - All Vehicles
Weeks	2012-W01 - 2012-W52 (52 weeks)
Date Range	Monday 02-Jan-2012 - Sunday 30-Dec-2012

Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	52	52	52	52	52	52	52
Days Included	49	47	49	50	52	52	52
Calendar Events	5	1	2	1	1	1	1

Mean Traffic Flow by Hours of the Day



Weekly Volume Report

Weeks 2012-W01 - 2012-W52 (52 weeks)

Hour	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Average Week Day		Average Weekend Day		Average Day	
00-01	8	0.6%	10	0.8%	15	1.1%	14	0.9%	17	1.0%	17	1.3%	11	0.9%	13	0.9%	14	1.1%	13	0.9%
01-02	6	0.5%	10	0.8%	12	0.8%	13	0.8%	15	0.9%	15	1.2%	8	0.7%	11	0.7%	12	1.0%	11	0.8%
02-03	5	0.4%	10	0.8%	12	0.8%	13	0.8%	16	0.9%	14	1.1%	7	0.6%	11	0.7%	11	0.9%	11	0.8%
03-04	6	0.5%	9	0.7%	12	0.8%	13	0.8%	16	0.9%	13	1.0%	6	0.5%	11	0.7%	10	0.8%	11	0.8%
04-05	7	0.5%	10	0.8%	13	0.9%	13	0.8%	15	0.9%	13	1.0%	8	0.7%	12	0.8%	11	0.9%	11	0.8%
05-06	13	1.0%	17	1.3%	23	1.6%	24	1.5%	26	1.5%	21	1.7%	14	1.1%	21	1.4%	18	1.4%	20	1.4%
06-07	28	2.2%	34	2.6%	37	2.6%	43	2.7%	48	2.8%	38	3.0%	23	1.9%	38	2.6%	31	2.5%	36	2.6%
07-08	47	3.7%	56	4.2%	57	4.0%	63	4.0%	68	3.9%	57	4.5%	38	3.1%	58	3.9%	48	3.8%	55	3.9%
08-09	64	5.0%	68	5.1%	73	5.1%	80	5.1%	85	4.9%	78	6.2%	56	4.6%	74	5.0%	67	5.4%	72	5.1%
09-10	76	5.9%	81	6.1%	91	6.4%	95	6.0%	104	6.0%	93	7.4%	70	5.7%	89	6.0%	82	6.5%	87	6.2%
10-11	94	7.3%	92	6.9%	96	6.7%	105	6.7%	109	6.3%	97	7.7%	85	6.9%	99	6.7%	91	7.3%	97	6.9%
11-12	108	8.4%	100	7.5%	107	7.5%	113	7.2%	120	6.9%	101	8.0%	97	7.9%	110	7.5%	99	7.9%	107	7.6%
12-13	108	8.4%	98	7.4%	105	7.4%	119	7.6%	124	7.1%	100	7.9%	98	8.0%	111	7.5%	99	7.9%	107	7.6%
13-14	106	8.3%	98	7.4%	104	7.3%	115	7.3%	128	7.4%	101	8.0%	103	8.4%	110	7.5%	102	8.1%	108	7.7%
14-15	108	8.4%	101	7.6%	107	7.5%	121	7.7%	132	7.6%	96	7.6%	110	9.0%	114	7.7%	103	8.2%	111	7.9%
15-16	107	8.3%	99	7.4%	111	7.8%	113	7.2%	136	7.8%	91	7.2%	120	9.8%	113	7.7%	106	8.5%	111	7.9%
16-17	97	7.6%	96	7.2%	100	7.0%	110	7.0%	126	7.2%	83	6.6%	106	8.6%	106	7.2%	95	7.6%	103	7.3%
17-18	82	6.4%	83	6.2%	87	6.1%	101	6.4%	120	6.9%	69	5.5%	83	6.8%	95	6.5%	76	6.1%	89	6.3%
18-19	62	4.8%	64	4.8%	68	4.8%	81	5.1%	96	5.5%	47	3.7%	58	4.7%	74	5.0%	53	4.2%	68	4.8%
19-20	46	3.6%	52	3.9%	56	3.9%	64	4.1%	72	4.1%	35	2.8%	42	3.4%	58	3.9%	39	3.1%	52	3.7%
20-21	36	2.8%	52	3.9%	49	3.4%	58	3.7%	64	3.7%	30	2.4%	30	2.4%	52	3.5%	30	2.4%	46	3.3%
21-22	31	2.4%	42	3.2%	42	2.9%	49	3.1%	48	2.8%	22	1.7%	23	1.9%	42	2.9%	23	1.8%	37	2.6%
22-23	23	1.8%	30	2.3%	29	2.0%	34	2.2%	32	1.8%	18	1.4%	19	1.5%	30	2.0%	19	1.5%	26	1.8%
23-24	15	1.2%	19	1.4%	20	1.4%	22	1.4%	23	1.3%	14	1.1%	11	0.9%	20	1.4%	13	1.0%	18	1.3%

Peaks	Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count	
AM	12:00	108	12:00	100	12:00	107	12:00	113	12:00	120	12:00	101	12:00	97	12:00	110	12:00	99	12:00	106
PM	13:00	108	15:00	101	16:00	111	15:00	121	16:00	136	14:00	101	16:00	120	15:00	114	16:00	105	16:00	111

12-Hour	1,059	82.5%	1,036	77.8%	1,106	77.6%	1,216	77.2%	1,348	77.5%	1,013	80.2%	1,024	83.5%	1,153	78.3%	1,021	81.5%	1,115	79.2%
16-Hour	1,200	93.5%	1,216	91.4%	1,290	90.5%	1,430	90.7%	1,580	90.8%	1,138	90.1%	1,142	93.1%	1,343	91.2%	1,144	91.4%	1,286	91.4%
18-Hour	1,238	96.5%	1,265	95.0%	1,339	93.9%	1,486	94.3%	1,635	94.0%	1,170	92.6%	1,172	95.6%	1,393	94.6%	1,176	93.9%	1,330	94.5%
24-Hour	1,283	100.0%	1,331	100.0%	1,426	100.0%	1,576	100.0%	1,740	100.0%	1,263	100.0%	1,226	100.0%	1,472	100.0%	1,252	100.0%	1,407	100.0%

Avg Week Day		87.2%		90.4%		96.9%		107.1%		118.2%						100.0%		85.1%		95.6%
Avg Weekend Day												100.9%		97.9%		117.6%		100.0%		112.4%
Avg Day		91.2%		94.6%		101.4%		112.0%		123.7%		89.8%		87.1%		104.6%		89.0%		100.0%

Weekly Volume Report
Displays traffic volumes for a week or number of weeks at Stream level or combinations of Streams, for the hour of day for every week in the date range that data has been collected.

Content includes:
- Volume data at Stream level, for every hour of the day for every week in 60 minute intervals.
- When more than one week is selected the report averages data across the selected date range.
- Average traffic flow per hour of the day across the date range.
- Data is displayed by 1, 12, 16, 18 and 24 hour time frames.
- AM and PM peak times are highlighted.

The report can be run for specific Traffic Classes.

Important Information
The figures in this report are an Average Daily Traffic (ADT) for the date range chosen and not an Annual Average Daily Traffic (AADT).

Annual Average Daily Traffic (AADT)
Annual Average Daily Traffic (AADT) is the number of vehicles passing a point on a road in a 24 hour period, averaged over a calendar year.

Average Daily Traffic (ADT)
Is determined by summing the total traffic flow, at Stream level, for the days within a date range, divided by the number of days collected. Missing days or incomplete days are excluded from the calculation.

Calendar Events
Is an event that has a temporary effect on the traffic volumes at one or more sites in the Region.

For example:
- Public holidays
- Local shows
- Natural disasters
- Long term road closures

Averages derived for such days will generally be different from the usual averages.

Date Range
The period for which the report was run.

Days in Range
Are the number of days for each day of the week across the date range selected.

Days Included
Days that do not have a value for every time interval or are incomplete are excluded from the calculations in this report. ie. when the data collected at lane/Stream level has missing values, those days are not included.

Gazettal Direction
The Gazettal Direction is the direction of the traffic flow. It can be easily recognised by referring to the name of the road eg. Road Section: 10A Brisbane - Gympie denotes that the gazettal direction is from Brisbane to Gympie.

G	Traffic flowing in Gazettal Direction
A	Traffic flowing against Gazettal Direction
B	The combined traffic flow in both Directions

No Data Found
Indicates that there is no data for the week or the data for each day of the week is incomplete. A report will only be produced when there is a record for each time interval of the day.

Region
For administration purposes the Department of Transport and Main Roads has divided Queensland into 12 Regions.

Road Section
Is the Gazetted road from which the traffic data is collected. Each Road Section is given a code, allocated sequentially in Gazettal Direction. Larger roads are broken down into sections and identified by an ID code with a suffix for easier data collection and reporting (eg. 10A, 10B, 10C). Road Sections are then broken into AADT Segments which are determined by traffic volume.

Site
The physical location of a traffic counting device. Sites are located at a specified Through Distance along a Road Section.

Stream or Site Stream
The lane number in which the vehicles are travelling.

TB	Traffic flow in both directions
TG	Traffic flow in gazettal direction
TA	Traffic flow against gazettal direction
T1, T3, T5, T7...	Traffic flow in gazettal direction at lane level
T2, T4, T6, T8...	Traffic flow against gazettal direction at lane level

Thru Dist or TDist
The distance from the beginning of the Road Section, in kilometres.

Type
There are two types of traffic counting sites, Permanent and Coverage. Permanent means the traffic counting device is in place 24/7. Coverage means the traffic counting device is in place for a specified period of time.

Peak Hours
The time for the AM and PM peak traffic flow.

Time Periods
Four different time periods are defined.

12-hour	Traffic flow time period from 0700 to 1900
16-hour	Traffic flow time period from 0600 to 2200
18-hour	Traffic flow time period from 0600 to 2400
24-hour	Traffic flow time period from 0000 to 2400

Traffic Class
Is the 12 Austroads vehicle categories or classes into which vehicles are placed or binned. Traffic classes are formed in a hierarchical format.

Volume or All Vehicles
00 = 0A + 0B

Light Vehicles
0A = 1A
1A = 2A + 2B

Heavy Vehicles
0B = 1B + 1C + 1D
1B = 2C + 2D + 2E
1C = 2F + 2G + 2H + 2I
1D = 2J + 2K + 2L

The following classes are the categories for which data can be captured:

Volume
00 All vehicles.

2-Bin
0A Light vehicles
0B Heavy vehicles

4-Bin
1A Short vehicles
1B Truck or bus
1C Articulated vehicles
1D Road train

12-Bin
2A Short 2 axle vehicles
2B Short vehicles towing
2C 2 axle truck or bus
2D 3 axle truck or bus
2E 4 axle truck
2F 3 axle articulated vehicle
2G 4 axle articulated vehicle
2H 5 axle articulated vehicle
2I 6 axle articulated vehicle
2J B double
2K Double road train
2L Triple road train

Weekly Volume Report

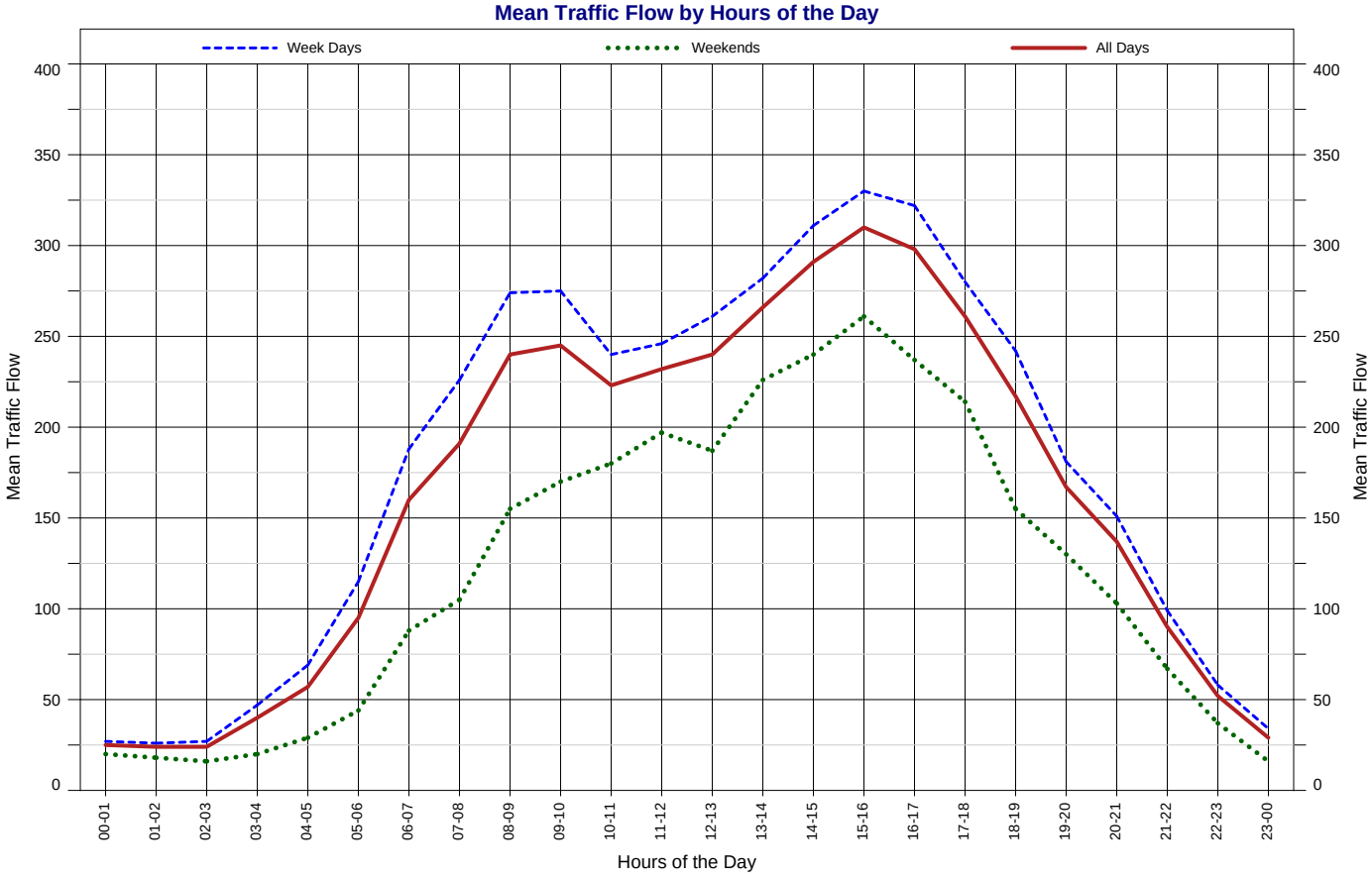
Weeks 2012-W01 - 2012-W52 (52 weeks)

Region	204 - Fitzroy
Road Section	16A - Capricorn Highway (Rockhampton - Duaringa)
Site	60045 - Capricorn Hwy at 41 Mile Ck
Thru Dist	64.0
Type	C - Coverage
Stream	TB - Bi-directional traffic flow
Traffic Class	00 - All Vehicles
Weeks	2012-W01 - 2012-W52 (52 weeks)
Date Range	Monday 02-Jan-2012 - Sunday 30-Dec-2012

Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	52	52	52	52	52	52	52
Days Included	2	2	2	2	2	2	2
Calendar Events	5	1	2	1	1	1	1

Mean Traffic Flow by Hours of the Day



Hour	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Average Week Day		Average Weekend Day		Average Day	
00-01	18	0.4%	23	0.5%	39	0.9%	26	0.6%	31	0.7%	23	0.9%	16	0.5%	27	0.6%	20	0.7%	25	0.6%
01-02	20	0.5%	25	0.6%	28	0.7%	25	0.6%	34	0.8%	22	0.9%	14	0.4%	26	0.6%	18	0.6%	24	0.6%
02-03	21	0.5%	27	0.6%	40	1.0%	26	0.6%	19	0.4%	19	0.7%	13	0.4%	27	0.6%	16	0.5%	24	0.6%
03-04	65	1.5%	46	1.1%	43	1.0%	34	0.8%	49	1.1%	26	1.0%	14	0.4%	47	1.1%	20	0.7%	40	1.0%
04-05	90	2.1%	65	1.5%	70	1.7%	51	1.2%	69	1.5%	41	1.6%	16	0.5%	69	1.6%	29	1.0%	57	1.5%
05-06	139	3.3%	116	2.7%	127	3.1%	98	2.2%	97	2.1%	60	2.3%	27	0.8%	115	2.7%	44	1.5%	95	2.4%
06-07	197	4.7%	166	3.9%	184	4.4%	204	4.6%	190	4.2%	103	4.0%	73	2.2%	188	4.4%	88	3.0%	160	4.1%
07-08	260	6.2%	217	5.1%	227	5.5%	217	4.9%	207	4.6%	137	5.3%	72	2.2%	226	5.2%	105	3.6%	191	4.9%
08-09	257	6.1%	255	6.0%	305	7.3%	259	5.9%	293	6.5%	196	7.6%	113	3.5%	274	6.4%	155	5.3%	240	6.1%
09-10	242	5.7%	289	6.8%	270	6.5%	259	5.9%	314	6.9%	190	7.4%	150	4.6%	275	6.4%	170	5.8%	245	6.3%
10-11	214	5.1%	243	5.7%	246	5.9%	276	6.3%	223	4.9%	178	6.9%	182	5.6%	240	5.6%	180	6.2%	223	5.7%
11-12	243	5.8%	247	5.8%	223	5.4%	259	5.9%	259	5.7%	190	7.4%	204	6.3%	246	5.7%	197	6.8%	232	5.9%
12-13	239	5.7%	241	5.6%	264	6.4%	271	6.2%	292	6.5%	154	6.0%	219	6.7%	261	6.1%	187	6.4%	240	6.1%
13-14	270	6.4%	277	6.5%	263	6.3%	280	6.4%	321	7.1%	193	7.5%	259	8.0%	282	6.5%	226	7.8%	266	6.8%
14-15	270	6.4%	305	7.1%	313	7.5%	321	7.3%	346	7.7%	176	6.8%	304	9.4%	311	7.2%	240	8.2%	291	7.4%
15-16	310	7.4%	316	7.4%	306	7.4%	333	7.6%	383	8.5%	193	7.5%	329	10.1%	330	7.7%	261	9.0%	310	7.9%
16-17	323	7.7%	289	6.8%	273	6.6%	315	7.2%	412	9.1%	166	6.5%	307	9.4%	322	7.5%	237	8.1%	298	7.6%
17-18	265	6.3%	251	5.9%	246	5.9%	315	7.2%	322	7.1%	160	6.2%	268	8.2%	280	6.5%	214	7.3%	261	6.7%
18-19	259	6.1%	250	5.8%	216	5.2%	255	5.8%	230	5.1%	107	4.2%	203	6.2%	242	5.6%	155	5.3%	217	5.5%
19-20	167	4.0%	204	4.8%	154	3.7%	210	4.8%	172	3.8%	79	3.1%	180	5.5%	181	4.2%	130	4.5%	167	4.3%
20-21	151	3.6%	191	4.5%	125	3.0%	175	4.0%	114	2.5%	70	2.7%	135	4.2%	151	3.5%	103	3.5%	137	3.5%
21-22	105	2.5%	114	2.7%	88	2.1%	110	2.5%	78	1.7%	45	1.8%	88	2.7%	99	2.3%	67	2.3%	90	2.3%
22-23	51	1.2%	78	1.8%	66	1.6%	52	1.2%	44	1.0%	26	1.0%	48	1.5%	58	1.3%	37	1.3%	52	1.3%
23-24	37	0.9%	43	1.0%	36	0.9%	34	0.8%	22	0.5%	16	0.6%	15	0.5%	34	0.8%	16	0.5%	29	0.7%

Peaks	Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count	
AM	08:00	260	10:00	289	09:00	305	11:00	276	10:00	314	09:00	196	12:00	204	10:00	275	12:00	197	10:00	244
PM	17:00	323	16:00	316	15:00	313	16:00	333	17:00	412	14:00	193	16:00	329	16:00	330	16:00	261	16:00	310

12-Hour	3,152	74.8%	3,180	74.3%	3,152	75.9%	3,360	76.3%	3,602	79.7%	2,040	79.4%	2,610	80.3%	3,289	76.3%	2,327	79.8%	3,014	77.0%
16-Hour	3,772	89.5%	3,855	90.1%	3,703	89.2%	4,059	92.1%	4,156	91.9%	2,337	90.9%	3,086	95.0%	3,908	90.7%	2,715	93.1%	3,568	91.2%
18-Hour	3,860	91.6%	3,976	92.9%	3,805	91.6%	4,145	94.1%	4,222	93.4%	2,379	92.6%	3,149	96.9%	4,000	92.8%	2,768	95.0%	3,649	93.2%
24-Hour	4,213	100.0%	4,278	100.0%	4,152	100.0%	4,405	100.0%	4,521	100.0%	2,570	100.0%	3,249	100.0%	4,311	100.0%	2,915	100.0%	3,914	100.0%

Avg Week Day		97.7%		99.2%		96.3%		102.2%		104.9%						100.0%		67.6%		90.8%
Avg Weekend Day												88.2%		111.5%		147.9%		100.0%		134.3%
Avg Day		107.6%		109.3%		106.1%		112.5%		115.5%		65.7%		83.0%		110.1%		74.5%		100.0%

Weekly Volume Report

Weeks 2012-W01 - 2012-W52 (52 weeks)

Region	204 - Fitzroy
Road Section	16A - Capricorn Highway (Rockhampton - Duaringa)
Site	60045 - Capricorn Hwy at 41 Mile Ck
Thru Dist	64.0
Type	C - Coverage
Stream	TG - Thru traffic -in gazettal dirn
Traffic Class	00 - All Vehicles
Weeks	2012-W01 - 2012-W52 (52 weeks)
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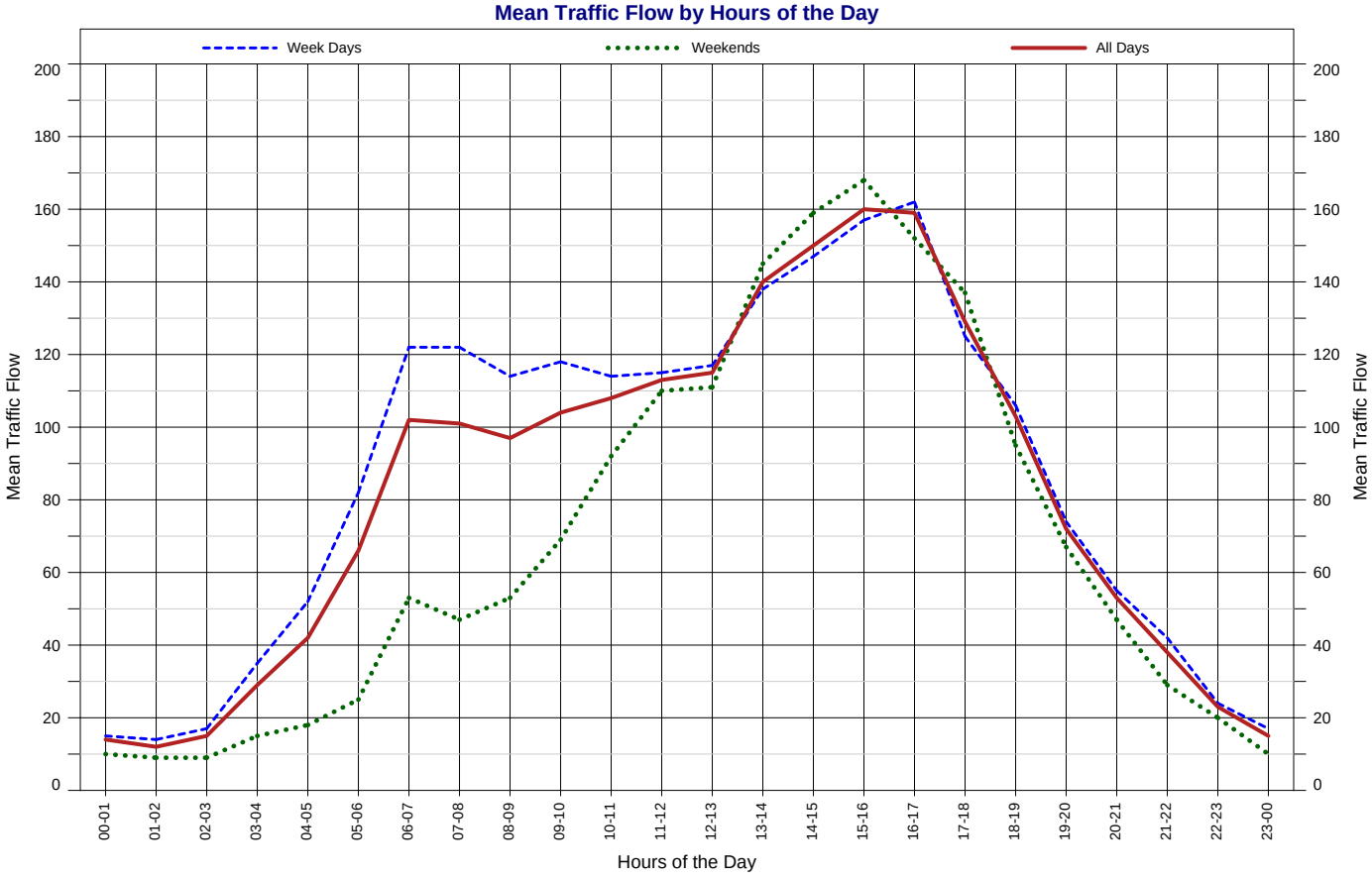
Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	52	52	52	52	52	52	52
Days Included	2	2	2	2	2	2	2
Calendar Events	5	1	2	1	1	1	1

Mean Traffic Flow by Hours of the Day



Hour	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Average Week Day		Average Weekend Day		Average Day	
00-01	10	0.4%	16	0.7%	23	1.2%	14	0.7%	14	0.9%	13	1.1%	6	0.3%	15	0.7%	10	0.6%	14	0.7%
01-02	15	0.6%	14	0.6%	11	0.6%	13	0.7%	16	1.0%	9	0.7%	8	0.4%	14	0.7%	9	0.5%	12	0.6%
02-03	15	0.6%	18	0.8%	26	1.3%	12	0.6%	13	0.8%	12	1.0%	6	0.3%	17	0.8%	9	0.5%	15	0.8%
03-04	53	2.1%	35	1.5%	30	1.5%	24	1.3%	34	2.1%	19	1.6%	10	0.5%	35	1.7%	15	0.9%	29	1.5%
04-05	78	3.0%	47	2.0%	49	2.5%	40	2.1%	44	2.7%	25	2.1%	10	0.5%	52	2.5%	18	1.1%	42	2.1%
05-06	119	4.6%	82	3.5%	88	4.5%	63	3.3%	58	3.6%	34	2.8%	15	0.7%	82	3.9%	25	1.5%	66	3.4%
06-07	155	6.0%	116	5.0%	129	6.6%	110	5.7%	101	6.2%	66	5.5%	39	1.9%	122	5.9%	53	3.2%	102	5.2%
07-08	164	6.4%	137	5.9%	125	6.3%	105	5.5%	80	4.9%	60	5.0%	33	1.6%	122	5.9%	47	2.8%	101	5.2%
08-09	124	4.8%	126	5.4%	123	6.2%	116	6.1%	82	5.0%	58	4.8%	48	2.3%	114	5.5%	53	3.2%	97	4.9%
09-10	120	4.7%	162	6.9%	116	5.9%	101	5.3%	90	5.5%	57	4.7%	80	3.9%	118	5.7%	69	4.2%	104	5.3%
10-11	125	4.8%	135	5.8%	108	5.5%	119	6.2%	83	5.1%	76	6.3%	108	5.2%	114	5.5%	92	5.6%	108	5.5%
11-12	135	5.2%	132	5.7%	107	5.4%	102	5.3%	98	6.0%	85	7.0%	134	6.5%	115	5.5%	110	6.7%	113	5.8%
12-13	132	5.1%	123	5.3%	119	6.0%	118	6.2%	95	5.8%	71	5.9%	150	7.2%	117	5.6%	111	6.7%	115	5.9%
13-14	178	6.9%	157	6.7%	127	6.4%	118	6.2%	109	6.7%	106	8.8%	183	8.8%	138	6.6%	145	8.8%	140	7.1%
14-15	175	6.8%	166	7.1%	146	7.4%	135	7.1%	111	6.8%	93	7.7%	224	10.8%	147	7.1%	159	9.6%	150	7.7%
15-16	208	8.1%	169	7.2%	138	7.0%	138	7.2%	134	8.2%	115	9.5%	220	10.6%	157	7.5%	168	10.2%	160	8.2%
16-17	220	8.5%	157	6.7%	136	6.9%	153	8.0%	142	8.7%	94	7.8%	209	10.1%	162	7.8%	152	9.2%	159	8.1%
17-18	158	6.1%	140	6.0%	105	5.3%	120	6.3%	103	6.3%	83	6.9%	191	9.2%	125	6.0%	137	8.3%	129	6.6%
18-19	152	5.9%	133	5.7%	85	4.3%	100	5.2%	59	3.6%	50	4.1%	139	6.7%	106	5.1%	95	5.8%	103	5.3%
19-20	81	3.1%	88	3.8%	59	3.0%	68	3.6%	73	4.5%	28	2.3%	106	5.1%	74	3.6%	67	4.1%	72	3.7%
20-21	62	2.4%	76	3.3%	46	2.3%	59	3.1%	34	2.1%	20	1.7%	74	3.6%	55	2.6%	47	2.8%	53	2.7%
21-22	55	2.1%	49	2.1%	30	1.5%	46	2.4%	28	1.7%	13	1.1%	45	2.2%	42	2.0%	29	1.8%	38	1.9%
22-23	23	0.9%	33	1.4%	24	1.2%	24	1.3%	16	1.0%	10	0.8%	30	1.4%	24	1.2%	20	1.2%	23	1.2%
23-24	21	0.8%	21	0.9%	19	1.0%	16	0.8%	9	0.6%	10	0.8%	9	0.4%	17	0.8%	10	0.6%	15	0.8%

Peaks	Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count	
AM	08:00	164	10:00	162	07:00	129	11:00	119	07:00	101	12:00	85	12:00	134	07:00	122	12:00	109	12:00	113
PM	17:00	220	16:00	169	15:00	146	17:00	153	17:00	142	16:00	115	15:00	224	17:00	162	16:00	167	16:00	160

12-Hour	1,891	73.4%	1,737	74.5%	1,435	72.9%	1,425	74.5%	1,186	72.9%	948	78.5%	1,719	82.8%	1,535	73.7%	1,338	81.1%	1,479	75.5%
16-Hour	2,244	87.0%	2,066	88.6%	1,699	86.3%	1,708	89.2%	1,422	87.5%	1,075	89.1%	1,983	95.5%	1,828	87.7%	1,534	93.0%	1,744	89.0%
18-Hour	2,288	88.8%	2,120	90.9%	1,742	88.5%	1,748	91.3%	1,447	89.0%	1,095	90.7%	2,022	97.4%	1,869	89.7%	1,564	94.8%	1,782	90.9%
24-Hour	2,578	100.0%	2,332	100.0%	1,969	100.0%	1,914	100.0%	1,626	100.0%	1,207	100.0%	2,077	100.0%	2,084	100.0%	1,650	100.0%	1,960	100.0%

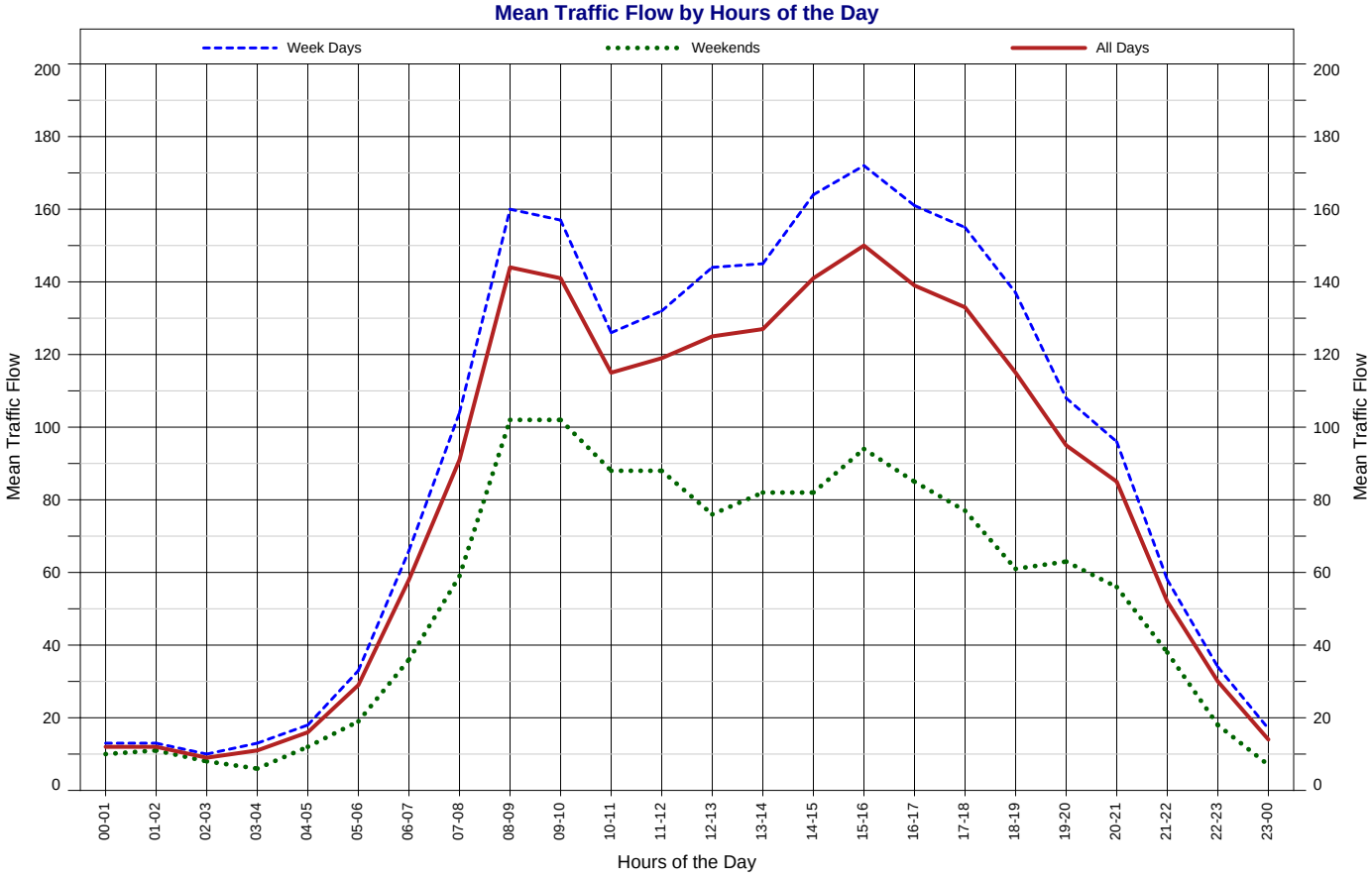
Avg Week Day		123.7%		111.9%		94.5%		91.8%		78.0%						100.0%		79.2%		94.0%
Avg Weekend Day												73.2%		125.9%		126.3%		100.0%		118.8%
Avg Day		131.5%		119.0%		100.5%		97.7%		83.0%		61.6%		106.0%		106.3%		84.2%		100.0%

Region	204 - Fitzroy
Road Section	16A - Capricorn Highway (Rockhampton - Duaringa)
Site	60045 - Capricorn Hwy at 41 Mile Ck
Thru Dist	64.0
Type	C - Coverage
Stream	TA - Thru traffic -against gazettal
Traffic Class	00 - All Vehicles
Weeks	2012-W01 - 2012-W52 (52 weeks)
Date Range	Monday 02-Jan-2012 - Sunday 30-Dec-2012

Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	52	52	52	52	52	52	52
Days Included	2	2	2	2	2	2	2
Calendar Events	5	1	2	1	1	1	1

Mean Traffic Flow by Hours of the Day



Weekly Volume Report

Weeks 2012-W01 - 2012-W52 (52 weeks)

Hour	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Average Week Day		Average Weekend Day		Average Day	
00-01	9	0.5%	7	0.4%	16	0.7%	13	0.5%	18	0.6%	10	0.7%	10	0.8%	13	0.6%	10	0.8%	12	0.6%
01-02	5	0.3%	12	0.6%	17	0.8%	12	0.5%	18	0.6%	14	1.0%	7	0.6%	13	0.6%	11	0.9%	12	0.6%
02-03	6	0.4%	9	0.5%	14	0.6%	14	0.6%	6	0.2%	8	0.6%	7	0.6%	10	0.4%	8	0.6%	9	0.5%
03-04	12	0.7%	12	0.6%	14	0.6%	10	0.4%	16	0.6%	7	0.5%	4	0.3%	13	0.6%	6	0.5%	11	0.6%
04-05	12	0.7%	18	0.9%	21	1.0%	12	0.5%	26	0.9%	16	1.2%	7	0.6%	18	0.8%	12	0.9%	16	0.8%
05-06	20	1.2%	34	1.7%	39	1.8%	35	1.4%	39	1.3%	26	1.9%	12	1.0%	33	1.5%	19	1.5%	29	1.5%
06-07	42	2.6%	50	2.6%	56	2.6%	95	3.8%	89	3.1%	38	2.8%	34	2.9%	66	3.0%	36	2.8%	58	3.0%
07-08	96	5.9%	81	4.1%	102	4.7%	112	4.5%	128	4.4%	77	5.6%	40	3.4%	104	4.7%	59	4.6%	91	4.6%
08-09	134	8.2%	129	6.6%	183	8.4%	144	5.8%	212	7.3%	138	10.1%	65	5.5%	160	7.2%	102	8.0%	144	7.3%
09-10	122	7.4%	127	6.5%	154	7.0%	158	6.3%	225	7.7%	134	9.8%	70	5.9%	157	7.0%	102	8.0%	141	7.2%
10-11	89	5.4%	108	5.5%	138	6.3%	157	6.3%	140	4.8%	102	7.5%	74	6.3%	126	5.6%	88	6.9%	115	5.9%
11-12	108	6.6%	115	5.9%	117	5.3%	158	6.3%	162	5.6%	105	7.7%	70	5.9%	132	5.9%	88	6.9%	119	6.1%
12-13	107	6.5%	119	6.1%	145	6.6%	153	6.1%	197	6.8%	83	6.1%	69	5.9%	144	6.4%	76	5.9%	125	6.4%
13-14	93	5.7%	120	6.1%	136	6.2%	162	6.5%	212	7.3%	87	6.4%	76	6.5%	145	6.5%	82	6.4%	127	6.5%
14-15	95	5.8%	139	7.1%	167	7.6%	186	7.4%	235	8.1%	83	6.1%	80	6.8%	164	7.3%	82	6.4%	141	7.2%
15-16	102	6.2%	148	7.6%	168	7.7%	195	7.8%	249	8.6%	78	5.7%	109	9.3%	172	7.7%	94	7.3%	150	7.6%
16-17	104	6.3%	132	6.8%	137	6.3%	162	6.5%	270	9.3%	72	5.3%	98	8.3%	161	7.2%	85	6.6%	139	7.1%
17-18	107	6.5%	111	5.7%	141	6.4%	196	7.8%	220	7.6%	77	5.6%	77	6.5%	155	6.9%	77	6.0%	133	6.8%
18-19	107	6.5%	117	6.0%	132	6.0%	155	6.2%	172	5.9%	57	4.2%	65	5.5%	137	6.1%	61	4.8%	115	5.9%
19-20	87	5.3%	116	5.9%	95	4.3%	142	5.7%	99	3.4%	51	3.7%	74	6.3%	108	4.8%	63	4.9%	95	4.8%
20-21	89	5.4%	116	5.9%	80	3.7%	117	4.7%	80	2.8%	50	3.7%	61	5.2%	96	4.3%	56	4.4%	85	4.3%
21-22	50	3.0%	65	3.3%	59	2.7%	65	2.6%	50	1.7%	33	2.4%	43	3.7%	58	2.6%	38	3.0%	52	2.6%
22-23	28	1.7%	45	2.3%	42	1.9%	29	1.2%	28	1.0%	16	1.2%	19	1.6%	34	1.5%	18	1.4%	30	1.5%
23-24	17	1.0%	22	1.1%	17	0.8%	18	0.7%	13	0.4%	7	0.5%	6	0.5%	17	0.8%	7	0.5%	14	0.7%

Peaks	Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count	
AM	09:00	134	09:00	129	09:00	183	10:00	158	10:00	225	09:00	138	11:00	74	09:00	160	10:00	102	09:00	143
PM	13:00	107	16:00	148	16:00	168	18:00	196	17:00	270	14:00	87	16:00	109	16:00	172	16:00	93	16:00	149

12-Hour	1,264	77.0%	1,446	74.1%	1,720	78.5%	1,938	77.5%	2,422	83.4%	1,093	79.8%	893	75.9%	1,757	78.6%	996	77.8%	1,540	78.5%
16-Hour	1,532	93.4%	1,793	91.9%	2,010	91.8%	2,357	94.3%	2,740	94.4%	1,265	92.4%	1,105	93.9%	2,085	93.2%	1,189	92.9%	1,830	93.2%
18-Hour	1,577	96.1%	1,860	95.3%	2,069	94.5%	2,404	96.2%	2,781	95.8%	1,288	94.1%	1,130	96.0%	2,136	95.5%	1,214	94.8%	1,874	95.5%
24-Hour	1,641	100.0%	1,952	100.0%	2,190	100.0%	2,500	100.0%	2,904	100.0%	1,369	100.0%	1,177	100.0%	2,236	100.0%	1,280	100.0%	1,963	100.0%

Avg Week Day		73.4%		87.3%		97.9%		111.8%		129.9%						100.0%		57.2%		87.8%
Avg Weekend Day												107.0%		92.0%		174.7%		100.0%		153.4%
Avg Day		83.6%		99.4%		111.6%		127.4%		147.9%		69.7%		60.0%		113.9%		65.2%		100.0%

Weekly Volume Report
Displays traffic volumes for a week or number of weeks at Stream level or combinations of Streams, for the hour of day for every week in the date range that data has been collected.

Content includes:
- Volume data at Stream level, for every hour of the day for every week in 60 minute intervals.
- When more than one week is selected the report averages data across the selected date range.
- Average traffic flow per hour of the day across the date range.
- Data is displayed by 1, 12, 16, 18 and 24 hour time frames.
- AM and PM peak times are highlighted.

The report can be run for specific Traffic Classes.

Important Information
The figures in this report are an Average Daily Traffic (ADT) for the date range chosen and not an Annual Average Daily Traffic (AADT).

Annual Average Daily Traffic (AADT)
Annual Average Daily Traffic (AADT) is the number of vehicles passing a point on a road in a 24 hour period, averaged over a calendar year.

Average Daily Traffic (ADT)
Is determined by summing the total traffic flow, at Stream level, for the days within a date range, divided by the number of days collected. Missing days or incomplete days are excluded from the calculation.

Calendar Events
Is an event that has a temporary effect on the traffic volumes at one or more sites in the Region.

For example:
- Public holidays
- Local shows
- Natural disasters
- Long term road closures

Averages derived for such days will generally be different from the usual averages.

Date Range
The period for which the report was run.

Days in Range
Are the number of days for each day of the week across the date range selected.

Days Included
Days that do not have a value for every time interval or are incomplete are excluded from the calculations in this report. ie. when the data collected at lane/Stream level has missing values, those days are not included.

Gazettal Direction
The Gazettal Direction is the direction of the traffic flow. It can be easily recognised by referring to the name of the road eg. Road Section: 10A Brisbane - Gympie denotes that the gazettal direction is from Brisbane to Gympie.

G	Traffic flowing in Gazettal Direction
A	Traffic flowing against Gazettal Direction
B	The combined traffic flow in both Directions

No Data Found
Indicates that there is no data for the week or the data for each day of the week is incomplete. A report will only be produced when there is a record for each time interval of the day.

Region
For administration purposes the Department of Transport and Main Roads has divided Queensland into 12 Regions.

Road Section
Is the Gazetted road from which the traffic data is collected. Each Road Section is given a code, allocated sequentially in Gazettal Direction. Larger roads are broken down into sections and identified by an ID code with a suffix for easier data collection and reporting (eg. 10A, 10B, 10C). Road Sections are then broken into AADT Segments which are determined by traffic volume.

Site
The physical location of a traffic counting device. Sites are located at a specified Through Distance along a Road Section.

Stream or Site Stream
The lane number in which the vehicles are travelling.

TB	Traffic flow in both directions
TG	Traffic flow in gazettal direction
TA	Traffic flow against gazettal direction
T1, T3, T5, T7...	Traffic flow in gazettal direction at lane level
T2, T4, T6, T8...	Traffic flow against gazettal direction at lane level

Thru Dist or TDist
The distance from the beginning of the Road Section, in kilometres.

Type
There are two types of traffic counting sites, Permanent and Coverage. Permanent means the traffic counting device is in place 24/7. Coverage means the traffic counting device is in place for a specified period of time.

Peak Hours
The time for the AM and PM peak traffic flow.

Time Periods
Four different time periods are defined.

12-hour	Traffic flow time period from 0700 to 1900
16-hour	Traffic flow time period from 0600 to 2200
18-hour	Traffic flow time period from 0600 to 2400
24-hour	Traffic flow time period from 0000 to 2400

Traffic Class
Is the 12 Austroads vehicle categories or classes into which vehicles are placed or binned. Traffic classes are formed in a hierarchical format.

Volume or All Vehicles
00 = 0A + 0B

Light Vehicles
0A = 1A
1A = 2A + 2B

Heavy Vehicles
0B = 1B + 1C + 1D
1B = 2C + 2D + 2E
1C = 2F + 2G + 2H + 2I
1D = 2J + 2K + 2L

The following classes are the categories for which data can be captured:

Volume
00 All vehicles.

2-Bin
0A Light vehicles
0B Heavy vehicles

4-Bin
1A Short vehicles
1B Truck or bus
1C Articulated vehicles
1D Road train

12-Bin
2A Short 2 axle vehicles
2B Short vehicles towing
2C 2 axle truck or bus
2D 3 axle truck or bus
2E 4 axle truck
2F 3 axle articulated vehicle
2G 4 axle articulated vehicle
2H 5 axle articulated vehicle
2I 6 axle articulated vehicle
2J B double
2K Double road train
2L Triple road train

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VEHICLE VOLUME SUMMARY SHEETS
(CLASSIFIED HOURLY)

Main Roads

LOCATION: INTERSECTION OF BRUCE HWY & ATKINSON ROAD
ROAD No: 10F @ Tdist 47.566 (Int 605)
DATE: Wednesday June 9,1999
TIME: 7 am to 7 pm
RECORDER : Con Gianopoulos

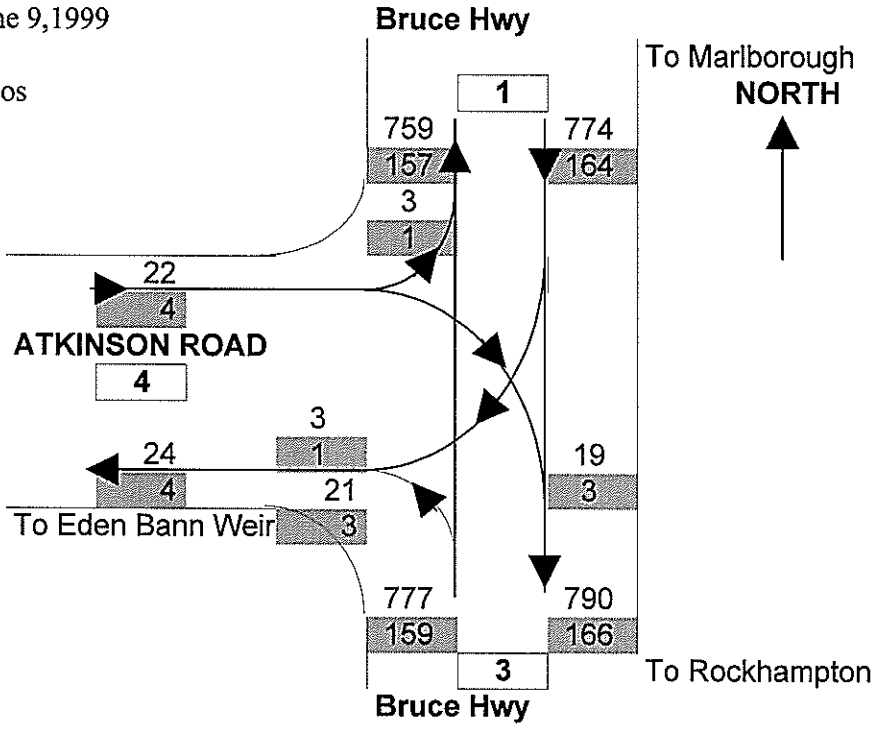
WEATHER:
COMPILER: Ken Ah Quee

Percentage Commercial Vehicle For:

1 20.9%
3 20.7%
4 17.4%

Notes : 1

Commercial Vehicles in Grey



VEHICLES COUNTED FOR 12 HOURS													
	LIGHT		**HEAVY**		**LIGHT**		**HEAVY**		**LIGHT**		**HEAVY**		
	From	**1 To**	From	**1 To**	From	**3 To**	From	**3 To**	From	**4 To**	From	**4 To**	
TIME	**3**	**4**	**3**	**4**	**4**	**1**	**4**	**1**	**1**	**3**	**1**	**3**	TOTAL
7:00-8:00am	23	0	6	0	1	53	0	26	0	2	0	0	111
8:00-9:00am	31	0	13	0	0	74	0	13	0	1	0	0	132
9:00-10:00am	47	0	13	0	4	74	0	14	0	0	0	0	152
10:00-11:00am	39	1	14	1	2	55	1	12	0	0	0	0	125
11:00-12noon	64	0	9	0	2	71	0	10	0	3	0	0	159
12:00-1:00pm	52	1	14	0	2	42	2	7	0	2	0	0	122
1:00-2:00pm	51	0	16	0	2	44	0	13	1	0	0	0	127
2:00-3:00pm	81	0	9	0	1	51	0	7	0	1	0	3	153
3:00-4:00pm	59	0	18	0	1	46	0	12	0	2	0	0	138
4:00-5:00pm	64	0	15	0	1	43	0	14	1	2	0	0	140
5:00-6:00pm	55	0	22	0	1	31	0	8	0	1	0	0	118
6:00-7:00pm	42	0	14	0	1	16	0	20	0	2	1	0	96
TOTAL	608	2	163	1	18	600	3	156	2	16	1	3	1573

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VEHICLE VOLUME
SUMMARY SHEETS
(CLASSIFIED 1/4 HOURLY)

Main Roads

LOCATION: INTERSECTION OF BRUCE HWY & ATKINSON ROAD
ROAD No: 10F @ Tdist 47.566 (Int 605)
DATE: Wednesday June 9,1999
TIME: 7 am to 7 pm
Mark Kershaw

WEATHER:
COMPILER:

	LIGHT		HEAVY		LIGHT		HEAVY		LIGHT		HEAVY		
	From	1 To	From	1 To	From	3 To	From	3 To	From	4 To	From	4 To	
TIME	3	4	3	4	4	1	4	1	1	3	1	3	TOTAL
7:00-7:15am	8	0	1	0	0	7	0	7	0	1	0	0	24
7:15-7:30am	6	0	1	0	0	17	0	8	0	0	0	0	32
7:30-7:45am	3	0	1	0	0	14	0	9	0	1	0	0	28
7:45-8:00am	6	0	3	0	1	15	0	2	0	0	0	0	27
8:00-8:15am	11	0	4	0	0	21	0	4	0	0	0	0	40
8:15-8:30am	6	0	4	0	0	19	0	5	0	0	0	0	34
8:30-8:45am	6	0	2	0	0	20	0	2	0	0	0	0	30
8:45-9:00am	8	0	3	0	0	14	0	2	0	1	0	0	28
9:00-9:15am	14	0	3	0	1	10	0	0	0	0	0	0	28
9:15-9:30am	12	0	1	0	2	12	0	3	0	0	0	0	30
9:30-9:45am	15	0	2	0	0	30	0	7	0	0	0	0	54
9:45-10:00am	6	0	7	0	1	22	0	4	0	0	0	0	40
10:00-10:15am	10	0	0	0	0	13	0	2	0	0	0	0	25
10:15-10:30am	11	0	6	0	0	14	1	3	0	0	0	0	35
10:30-10:45am	8	0	3	0	2	13	0	2	0	0	0	0	28
10:45-11:00am	10	1	5	1	0	15	0	5	0	0	0	0	37
11:00-11:15am	17	0	4	0	1	21	0	3	0	0	0	0	46
11:15-11:30am	16	0	3	0	0	10	0	4	0	2	0	0	35
11:30-11:45am	12	0	0	0	0	23	0	1	0	0	0	0	36
11:45-12:00am	19	0	2	0	1	17	0	2	0	1	0	0	42
AM TOTAL	204	1	55	1	9	327	1	75	0	6	0	0	679
PM TOTAL	404	1	108	0	9	273	2	81	2	10	1	3	894
12Hr/TOTAL	608	2	163	1	18	600	3	156	2	16	1	3	1573

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VEHICLE VOLUME
SUMMARY SHEETS
(CLASSIFIED 1/4 HOURLY)

Main Roads

LOCATION: INTERSECTION OF BRUCE HWY & ATKINSON ROAD
ROAD No: 10F @ Tdist 47.566 (Int 605)
DATE: Wednesday June 9,1999
TIME: 7 am to 7 pm
Mark Kershaw

WEATHER:
COMPILER:

	LIGHT		HEAVY		LIGHT		HEAVY		LIGHT		HEAVY		
	From	1 To	From	1 To	From	3 To	From	3 To	From	4 To	From	4 To	
TIME	3	4	3	4	4	1	4	1	1	3	1	3	TOTAL
12:00-12:15pm	7	0	1	0	0	11	0	1	0	0	0	0	20
12:15-12:30pm	17	0	4	0	0	7	0	3	0	2	0	0	33
12:30-12:45pm	10	1	5	0	0	9	2	1	0	0	0	0	28
12:45-1:00pm	18	0	4	0	2	15	0	2	0	0	0	0	41
1:00-1:15pm	11	0	2	0	0	16	0	4	0	0	0	0	33
1:15-1:30pm	8	0	3	0	0	10	0	3	0	0	0	0	24
1:30-1:45pm	15	0	4	0	1	9	0	3	1	0	0	0	33
1:45-2:00pm	17	0	7	0	1	9	0	3	0	0	0	0	37
2:00-2:15pm	14	0	4	0	1	16	0	3	0	0	0	0	38
2:15-2:30pm	19	0	0	0	0	13	0	2	0	1	0	2	37
2:30-2:45pm	23	0	2	0	0	13	0	0	0	0	0	0	38
2:35-3:00pm	25	0	3	0	0	9	0	2	0	0	0	1	40
3:00-3:15pm	16	0	5	0	1	7	0	4	0	1	0	0	34
3:15-3:30pm	15	0	4	0	0	18	0	1	0	1	0	0	39
3:30-3:45pm	12	0	6	0	0	12	0	3	0	0	0	0	33
3:45-4:00pm	16	0	3	0	0	9	0	4	0	0	0	0	32
4:00-4:15pm	12	0	1	0	0	6	0	7	0	0	0	0	26
4:15-4:30pm	19	0	5	0	1	19	0	2	0	1	0	0	47
4:30-4:45pm	20	0	5	0	0	10	0	3	1	1	0	0	40
4:45-5:00pm	13	0	4	0	0	8	0	2	0	0	0	0	27
5:00-5:15pm	16	0	5	0	0	14	0	5	0	0	0	0	40
5:15-5:30pm	17	0	4	0	0	8	0	1	0	0	0	0	30
5:30-5:45pm	14	0	5	0	0	3	0	0	0	1	0	0	23
5:45-6:00pm	8	0	8	0	1	6	0	2	0	0	0	0	25
6:00-6:15pm	11	0	1	0	1	1	0	4	0	2	1	0	21
6:15-6:30pm	14	0	4	0	0	7	0	6	0	0	0	0	31
6:30-6:45pm	10	0	5	0	0	5	0	5	0	0	0	0	25
6:45-7.00pm	7	0	4	0	0	3	0	5	0	0	0	0	19
PM TOTAL	404	1	108	0	9	273	2	81	2	10	1	3	894

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VEHICLE VOLUME SUMMARY SHEETS
(CLASSIFIED 1 HOURLY)

Main Roads

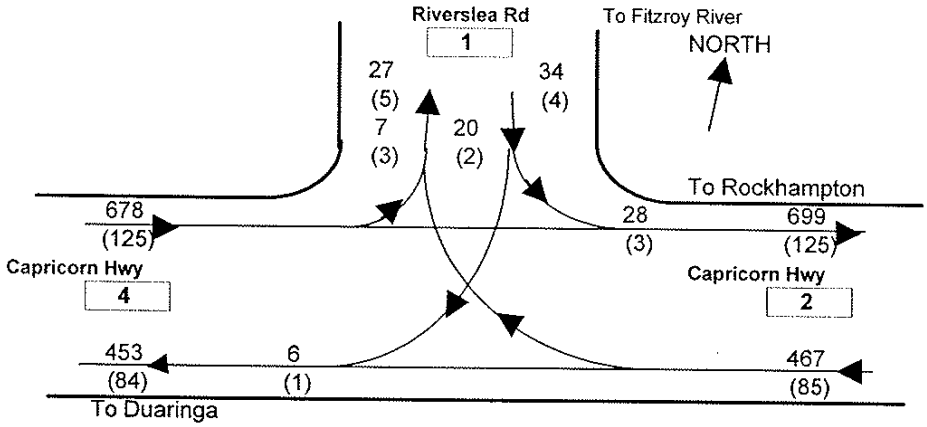
LOCATION: Intersection of Capricorn Hwy & Riverslea Road
ROAD No: 16A (Int. 733 @ Tdist 60.439)
DAY: Thursday
DATE: 11/11/99
TIME: 7am - 7pm
RECORDER : Ted Mooney

WEATHER:
COMPILER: K Ah Quee

Percentage Commercial Vehicles for:

1. 14.8%
2. 18.0%
4. 18.5%

NOTES:]



Commerical Vehicles Numbers Shown in Brackets ( )

VEHICLES COUNTED FOR 12 HOURS

	LIGHT		HEAVY		LIGHT		HEAVY		LIGHT		HEAVY		
	From 1 To		From 1 To		From 2 To		From 2 To		From 4 To		From 4 To		
TIME	2	4	2	4	4	1	4	1	1	2	1	2	TOTAL
7:00-8:00am	1	2	0	1	33	0	14	0	0	17	0	7	75
8:00-9:00am	4	1	0	0	45	1	12	0	0	35	0	11	109
9:00-10:00am	1	1	0	0	31	3	8	0	0	58	0	6	108
10:00-11:00am	5	0	0	0	24	1	4	0	0	56	0	4	94
11:00-12noon	0	0	0	0	25	1	10	0	1	45	0	12	94
12:00-1:00pm	1	0	1	0	32	1	8	0	1	52	1	13	110
1:00-2:00pm	4	0	1	0	19	1	4	0	2	52	1	8	92
2:00-3:00pm	4	0	0	0	43	2	2	0	0	53	0	12	116
3:00-4:00pm	1	0	0	0	36	2	5	0	0	55	1	17	117
4:00-5:00pm	3	1	0	0	32	4	3	2	0	49	0	13	107
5:00-6:00pm	0	0	1	0	26	1	5	0	0	43	0	8	84
6:00-7:00pm	1	0	0	0	18	1	8	0	0	34	0	11	73
TOTAL	25	5	3	1	364	18	83	2	4	549	3	122	1179

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VEHICLE VOLUME SUMMARY SHEETS
(CLASSIFIED 1/4 HOURLY)

Main Roads

LOCATION: Intersection of Capricorn Hwy & Riverslea Road
ROAD No: 16A (Int. 733 @ Tdist 60.439)
DAY: Thursday
DATE: 11/11/99
TIME: 7am - 7pm
RECORDER : Ted Mooney

WEATHER:
COMPILER: K Ah Quee

	LIGHT		HEAVY		LIGHT		HEAVY		LIGHT		HEAVY		
	From 1 To		From 1 To		From 2 To		From 2 To		From 4 To		From 4 To		
TIME	2	4	2	4	4	1	4	1	1	2	1	2	TOTAL
7:00-7:15am	0	0	0	0	5	0	5	0	0	3	0	2	15
7:15-7:30am	0	0	0	0	6	0	4	0	0	6	0	2	18
7:30-7:45am	1	1	0	1	9	0	4	0	0	4	0	3	23
7:45-8:00am	0	1	0	0	13	0	1	0	0	4	0	0	19
8:00-8:15am	0	0	0	0	11	0	4	0	0	7	0	2	24
8:15-8:30am	3	0	0	0	12	1	6	0	0	10	0	6	38
8:30-8:45am	0	1	0	0	10	0	0	0	0	9	0	2	22
8:45-9:00am	1	0	0	0	12	0	2	0	0	9	0	1	25
9:00-9:15am	0	0	0	0	9	1	0	0	0	24	0	0	34
9:15-9:30am	0	0	0	0	4	0	2	0	0	13	0	3	22
9:30-9:45am	0	1	0	0	10	1	1	0	0	15	0	2	30
9:45-10:00am	1	0	0	0	8	1	5	0	0	6	0	1	22
10:00-10:15am	2	0	0	0	5	0	0	0	0	15	0	0	22
10:15-10:30am	0	0	0	0	4	1	3	0	0	15	0	2	25
10:30-10:45am	1	0	0	0	5	0	0	0	0	7	0	2	15
10:45-11:00am	2	0	0	0	10	0	1	0	0	19	0	0	32
11:00-11:15am	0	0	0	0	7	1	4	0	0	14	0	2	28
11:15-11:30am	0	0	0	0	4	0	2	0	0	10	0	3	19
11:30-11:45am	0	0	0	0	6	0	3	0	1	9	0	4	23
11:45-12:00am	0	0	0	0	8	0	1	0	0	12	0	3	24
AM TOTAL	11	4	0	1	158	6	48	0	1	211	0	40	480

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VEHICLE VOLUME SUMMARY SHEETS
(CLASSIFIED 1/4 HOURLY)

Main Roads

LOCATION: Intersection of Capricorn Hwy & Riverslea Road
ROAD No: 16A (Int. 733 @ Tdist 60.439)
DAY: Thursday
DATE: 11/11/99
TIME: 7am - 7pm
RECORDER : Ted Mooney

WEATHER:
COMPILER: K Ah Quee

	LIGHT		HEAVY		LIGHT		HEAVY		LIGHT		HEAVY		
	From 1 To		From 1 To		From 2 To		From 2 To		From 4 To		From 4 To		
TIME	2	4	2	4	4	1	4	1	1	2	1	2	TOTAL
12:00-12:15pm	1	0	0	0	15	0	5	0	0	19	1	4	45
12:15-12:30pm	0	0	0	0	7	0	2	0	0	9	0	3	21
12:30-12:45pm	0	0	0	0	8	1	0	0	0	14	0	6	29
12:45-1:00pm	0	0	1	0	2	0	1	0	1	10	0	0	15
1:00-1:15pm	1	0	0	0	5	0	0	0	0	16	0	3	25
1:15-1:30pm	0	0	0	0	5	1	1	0	2	14	0	1	24
1:30-1:45pm	0	0	0	0	1	0	2	0	0	7	1	3	14
1:45-2:00pm	3	0	1	0	8	0	1	0	0	15	0	1	29
2:00-2:15pm	0	0	0	0	13	1	1	0	0	18	0	2	35
2:15-2:30pm	2	0	0	0	14	1	1	0	0	10	0	3	31
2:30-2:45pm	1	0	0	0	6	0	0	0	0	12	0	3	22
2:45-3:00pm	1	0	0	0	10	0	0	0	0	13	0	4	28
3:00-3:15pm	1	0	0	0	7	0	2	0	0	12	0	6	28
3:15-3:30pm	0	0	0	0	9	1	1	0	0	9	0	3	23
3:30-3:45pm	0	0	0	0	10	0	2	0	0	16	0	2	30
3:45-4:00pm	0	0	0	0	10	1	0	0	0	18	1	6	36
4:00-4:15pm	0	0	0	0	11	1	1	0	0	13	0	4	30
4:15-4:30pm	1	0	0	0	7	1	2	2	0	12	0	2	27
4:30-4:45pm	2	0	0	0	12	1	0	0	0	15	0	3	33
4:45-5:00pm	0	1	0	0	2	1	0	0	0	9	0	4	17
5:00-5:15pm	0	0	0	0	7	0	0	0	0	15	0	3	25
5:15-5:30pm	0	0	1	0	2	0	1	0	0	8	0	0	12
5:30-5:45pm	0	0	0	0	8	1	1	0	0	16	0	4	30
5:45-6:00pm	0	0	0	0	9	0	3	0	0	4	0	1	17
6:00-6:15pm	0	0	0	0	6	1	1	0	0	10	0	3	21
6:15-6:30pm	0	0	0	0	4	0	3	0	0	12	0	3	22
6:30:6:45pm	1	0	0	0	5	0	2	0	0	8	0	2	18
6:45-7:00pm	0	0	0	0	3	0	2	0	0	4	0	3	12
PM TOTAL	14	1	3	0	206	12	35	2	3	338	3	82	699

Appendix B – Extract from Chapter 13: Intersection at Grade, Road Planning Design Manual, DTMR 2006

- Traffic regulations, which can be augmented by signs to clarify priority. This is one type of unsignalised control.
- Priority signage, by using signs such as "give way" or "stop" to over-ride regulations. This is often required to give priority to the major movement. This is another type of unsignalised control.
- Traffic signals.
- Roundabouts (which are a specialised form of channelised intersection having their own set of regulations) - see Chapter 14.

Discussion on forms of traffic control is given in Section 13.4.3. Table 13.3 provides a summary.

13.4.2 Advantages and Disadvantages of Various Layout Options

This section discusses advantages and disadvantages of the various layout options. Whilst this section predominantly discusses layouts for unsignalised intersections, some elements are applicable to the other forms of control. The layout options given in this section are applicable to both urban and rural sites.

13.4.2.1 Basic Intersection (type BA)

This is the simplest layout. It is designed to be as compact (and inexpensive) as possible. It is most appropriately used where the volume of turning and through traffic is low.

Carriageways intersect with an appropriate corner radius and taper to suit the swept path of the design vehicle. It can be used with any wearing surface.

"BA" Turn Treatments

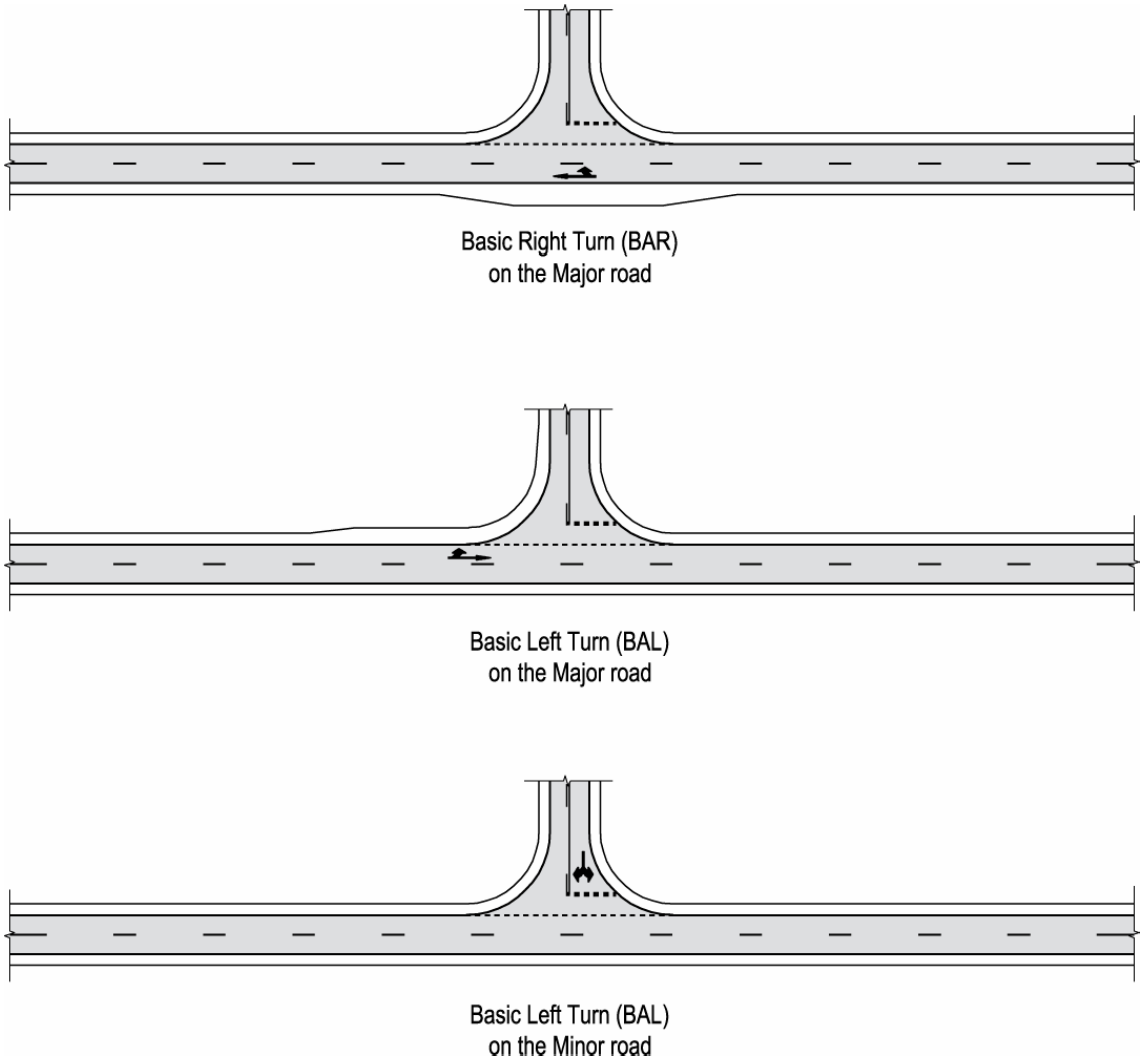
A "BA" intersection comprises the following turn treatments:

- Basic Right Turn treatment (BAR) on the major road;
- Basic Left Turn treatment (BAL) on the major road; and
- Basic Left Turn treatment (BAL) on the minor road.

These treatments are shown in Figure 13.14. Often, not all of the treatments will be used together at a single intersection.

BAR turn treatments are used on two-lane roadways only i.e. they do not apply to multi-lane roadways. A feature of the BAR turn treatment is a widened shoulder on the major road that allows through vehicles, having slowed, to pass turning vehicles. A feature of the BAL turn treatment on the major road is a widened shoulder, which assists turning vehicles to move further off the through carriageway making it easier for through vehicles to pass. Where the major road is sealed, it is preferred that the widened shoulders are sealed, unless the shoulders can be maintained with a sound and even surface in all weather conditions.

Rear-End-Major vehicle accidents are generally rear-end type accidents resulting from a through driver colliding with a driver turning right from the major road - refer to Appendix F for more details. Arndt (2004) found that Type BAR turn treatments record a Rear-End-Major vehicle accident rate 52 times higher than do CHR turn treatments (CHR turn treatments are discussed in Section 13.4.2.3). That is why BAR turn treatments are usually limited to intersections with low volumes only.



Note: Arrows indicate movements relevant to the turn type. They do not represent actual pavement markings.

Figure 13.14 Basic Intersection Turn Treatments "BA"

Arndt (2004) found that some BAR turn treatments (and AUR – refer Section 13.4.2.2) in the study comprised a narrow median. The Rear-End-Major vehicle accident rate was found to decrease substantially with median width, regardless of the type of median (painted, raised or depressed). The median enables the right turning vehicle to be positioned further away from the point of conflict in the through lane, lowering the probability of the vehicle being struck.

Providing a median at a BAR turn treatment is unlikely to be a practical design consideration in many cases. However, there may be scope at some existing BAR treatments to consider introducing such a median by reducing the shoulder width. This may be a low cost option of achieving a reduction in the Rear-End-Major vehicle accident rate.

"MNR" Turn Treatments

A basic right-turn treatment on a multi-lane undivided road is the MNR turn treatment (multi-lane undivided road with no specific right-turn facility). A layout of this type is shown in Figure 13.15.

Arndt (2004) found that MNR turn treatments record the highest Rear-End-Major vehicle accident rate of all the turn treatments (100 times higher than CHR turn treatments). This result likely reflects the fact that MNR turn treatments, unlike any other turn treatment, provide no specific facilities for through vehicles to avoid turning vehicles.

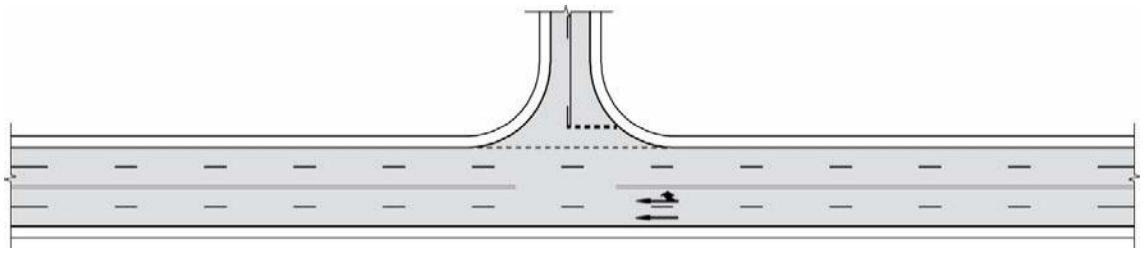
MNR turn treatments should only be retained at existing sites where no other solutions are feasible. They should not be incorporated into new unsignalised intersection designs.

13.4.2.2 Intersections with Auxiliary Lanes (type AU)

Type AU intersections comprise short lengths of auxiliary lane to improve safety, especially on high speed roads. Such layouts allow traffic to bypass a vehicle waiting to turn right, or a lane for left turning traffic, or both. This layout can only be used on legs which are sealed.

This layout can be confused with an auxiliary lane for overtaking and should only be used at locations where the driver can appreciate the purpose of the lane. Situating such intersections near auxiliary lanes used for overtaking must be avoided.

AU type layouts have been used at intersections where an arterial meets with sub-arterials, collectors, or local roads (particularly in rural areas where high speed, low volume traffic occurs and the volume of turning traffic is sufficient to make a conflict likely). They are more expensive than basic intersections, but can work out more cheaply when long term accident costs are included in the estimating. As there are pavement markings associated with this option, approach sight distance (1.15 to zero) must be obtained.



Note 1: This turn type is not to be used at new unsignalised intersections.
Note 2: Arrows indicate movements relevant to the turn type. They do not represent actual pavement markings.

Figure 13.15 Multi-lane Undivided Road with No Specific Right Turn Facility "MNR"

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"AU" Turn Treatments

An "AU" intersection comprises the following turn treatments:

- Auxiliary Right Turn treatment (AUR) on the major road;
- Auxiliary Left Turn treatment (AUL) on the major road; and
- Auxiliary Left Turn treatment (AUL) on the minor road.

These treatments are shown in Figure 13.16. Often, not all of the treatments will be used together at a single intersection.

Warrants for the various turn treatments are given in Section 13.4.4 and have been developed using the results of Arndt (2004). The warrants have been produced by identifying the location at which the benefits of providing a higher-level treatment (the reduction in estimated accident costs) are made equal to a proportion of the additional construction costs.

The new warrants show that it is not beneficial to provide AUR turn treatments. Instead, Channelised Right Turn Treatments with reduced length of right turn slots (CHR(S) – refer to Sections 13.7.9.2 and 13.7.10.2) are preferred. Basically, CHR(S) treatments offer significantly better value for money than do AUR turn treatments, in terms of safety benefits versus construction cost. Arndt (2004) found that Type AUR turn treatments record a Rear-End-Major vehicle accident rate 30 times higher than do CHR [and CHR(S)] turn treatments.

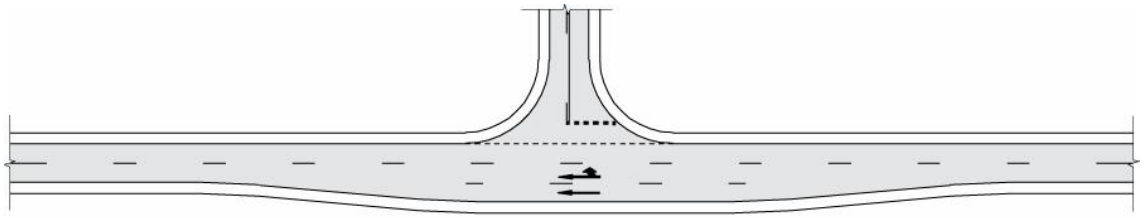
Other advantages of using CHR(S) turn treatments in lieu of AUR turn treatments include the following:

- Reduction in Overtaking-Intersection vehicle accidents (where a right turn vehicle is hit by an overtaking vehicle);
- Provision of more consistent intersection layouts;
- Increase in the average design life of turn treatments ie compared to AUR turn treatments, CHR(S) treatments will be able to function for longer periods before an upgrade is required; and
- Address concerns from the motoring public that more CHR turn treatments should be provided on high-speed roads to improve safety.

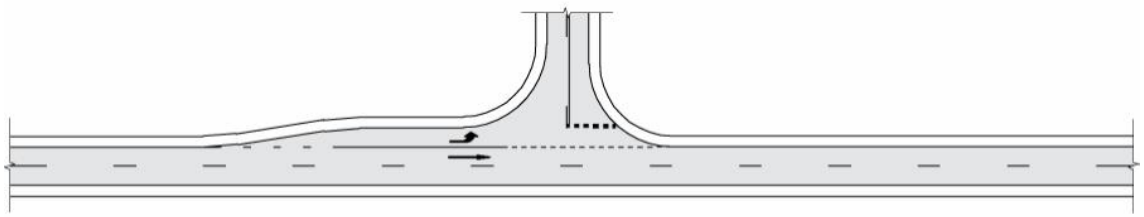
For the above reason, AUR turn treatments should not be used for the design of new unsignalised intersections. These treatments are not detailed in this chapter.

As discussed in Section 13.3.1.3, the accident rate for vehicles entering the major road from the minor road at an unsignalised intersection is significantly higher when there are two stand-up lanes on the minor road (ie when there is an auxiliary lane). An AUL turn treatment on the minor road is not preferred for this reason, particularly at four-way unsignalised intersections.

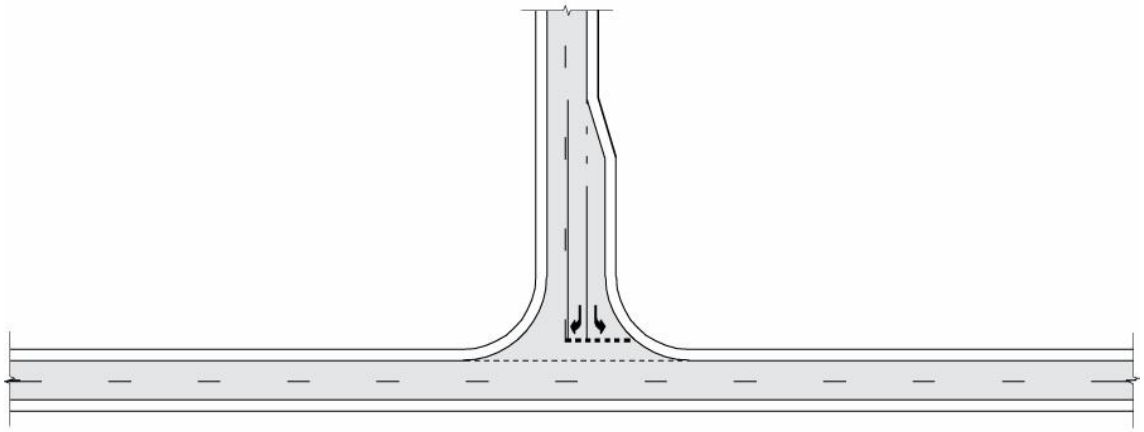
For the above reason, AUL turn treatments on the minor road should not be used for the design of new unsignalised intersections. These treatments are not detailed in this chapter. A channelised left turn treatment (CHL) or signalisation of the intersection are preferred solutions in this instance.



Auxiliary Right Turn (AUR)
on the Major road
(This turn type not to be used at unsignalised intersections)



Auxiliary Left Turn (AUL)
on the Major Road



Auxiliarly Left Turn (AUL)
on the Minor Road
(This turn type not to be used at unsignalised intersections)

Note: Arrows indicate movements relevant to the turn type. They do not represent actual pavement markings.

Figure 13.16 Auxiliary Lane Intersection Turn Treatments "AU"

13.4.2.3 Channelised Intersections (type CH)

A channelised intersection is one where conflicting vehicle travel paths are separated by raised, depressed, or painted medians and/or islands. Auxiliary lanes are often used in conjunction with channelisation.

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Channelisation has particular application in the following areas:

- Intersections at odd angles (Y-junctions, skewed cross roads), or multi leg intersections (generally only appropriate if the intersection is realigned and/or if traffic signal control is used).
- Sites where turning traffic movements are particularly heavy.
- Locations where the safety record of an intersection is shown to be susceptible to particular accident types, such as opposing side swipe and head on crashes, right turn opposing, and high speed rear end collisions.
- Sites where a refuge area for pedestrians is desirable.
- Sites where unusual manoeuvres are occurring, or where unwanted movements are to be eliminated.

A channelised layout may be the only solution appropriate at some sites. These include some multi-lane divided roads, and sites where it is necessary to provide positive protection of the furniture (signs, traffic signal posts, etc.) associated with the form of traffic control adopted.

This type of layout is the most expensive form of an at grade intersection. The associated furniture (particularly raised medians) can be regarded as a hazard, which means that the increased risk must be clearly outweighed by other advantages.

All channelised intersections with raised medians and kerbed islands must be lit in accordance with the standards set out in Chapter 17.

Channelised intersections always require good sight distance to the starting point of the median (especially raised). The median or island may have to be extended to meet this requirement. A few large islands are always preferable to a large number of small islands.

An operational problem with these layouts on two lane-two way roads can be the loss of opportunities to overtake, and this must be taken into account in the route strategy.

Drainage of raised medians and islands can be expensive. Regular sweeping may be necessary.

Where traffic volumes are high, the number of approach lanes, including auxiliary lanes, will increase and channelisation (in some form) becomes inevitable. Preliminary approach lane requirements may be assessed using "Y" values (see Appendix 13B). Verification and refinement of approach treatment can be done using computer programs. Detailed design requirements for medians and islands are given in Section 13.7.2. As urban channelised intersections are often controlled by traffic signals, the possibility of this form of control should be established early in the process so that appropriate provision can be made.

"CH" Turn Treatments

A "CH" intersection comprises the following turn treatments:

- Channelised Right Turn treatment (CHR) on the major road;
- Channelised Left Turn treatment (CHL) on the major road; and
- Channelised Left Turn treatment (CHL) on the minor road.

These treatments are shown in Figure 13.17. Often, not all of the treatments will be used together at a single intersection.

Arndt (2004) showed that CHR turn treatments record a much lower Rear-End-Major accident rate than BAR, AUR and MNR turn treatments. This is predominantly due to the separation of the turning movement from the through traffic.

Arndt (2004) also found that Rear-End-Major vehicle accident rates at CHR turn treatments with short lengths of turn lane were not significantly higher than for full length turn lanes. For this reason, Channelised Right Turn treatments with short turn lanes [CHR(S)] were developed for lower trafficked areas. This treatment is discussed in Sections 13.7.9.2 and 13.7.10.2.

There are two types of CHL turn treatments. One is the high entry angle turn treatment as shown in Figure 13.17. The other comprises a multiple radii return with a full length acceleration lane (refer Sections 13.7.12.5 and 13.7.13.6). Both of these treatments are also described as free left turn lanes.

Arndt (2004) found that all types of CHL turn treatments were associated with an increase in single vehicle accident rates, as compared to BAL turn treatments (and rear-end accident rates for CHL turn treatments on the minor road). This reduced safety performance is expected to result from the higher speeds at which left-turning drivers were observed to travel at on CHL turn treatments.

Although CHL turn treatments record increased rates of these accident types, the rates are relatively low as compared to most other accident and conflict types. Therefore, warrants for CHL turn treatments should not be selected on the basis of safety. Instead, they may be justified by circumstances such as:

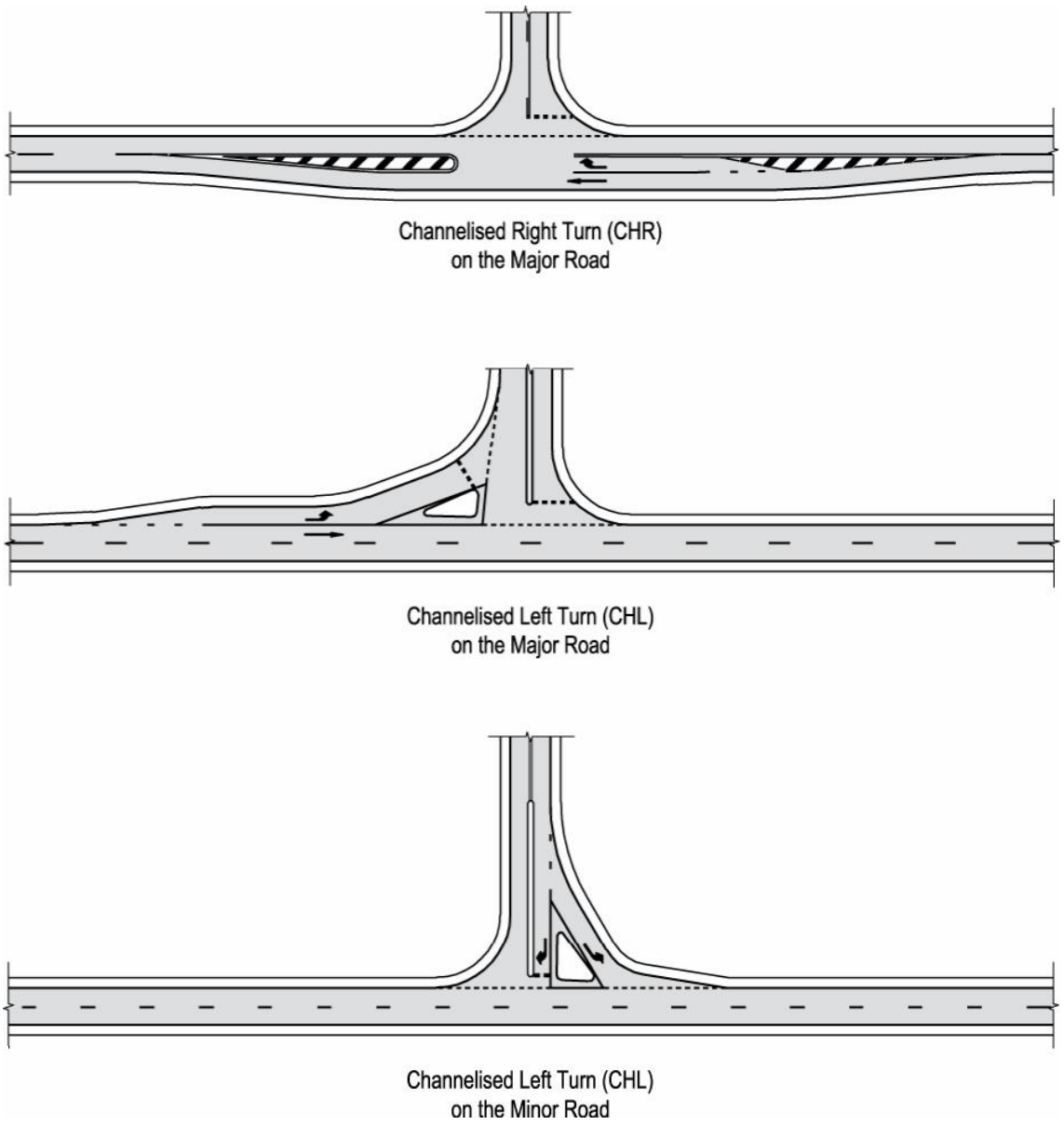
- Improving capacity and delays at the intersection.
- Improving safety for other conflict types. CHL treatments on the major road may provide greater visibility for drivers on the minor road as per Austroads (2002).
- Providing a bypass facility for left-turning vehicles at traffic signals.
- Changing the give way rule in favour of other manoeuvres at the intersection.
- Defining more appropriately the driving path by reducing the area of bitumen surfacing, especially at skewed intersections catering for large and over dimensional vehicles.

There are various types of Channelised intersections, and these are discussed in the following sections and in Section 13.7.

Two Staged Crossing

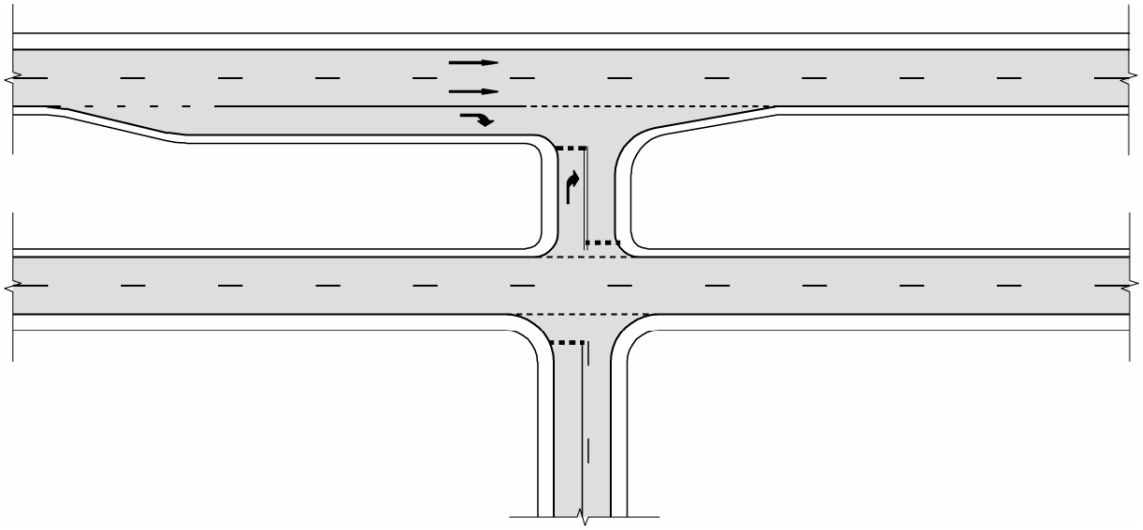
A two staged crossing allows right turning traffic from the minor road of an unsignalised intersection to undertake the manoeuvre in two stages, which has benefits when volumes on the major road are high and volumes on the minor road are low. A diagram of a two staged crossing is shown in Figure 13.18.

13



Note 1: An alternative to the high entry angle CHL turn treatments shown above is the three centred return CHL with full length acceleration lane, as shown in Sections 13.7.12 and 13.7.13.
Note 2: Arrows indicate movements relevant to the turn type. They do not represent actual pavement markings.

Figure 13.17 Channelised Intersection Turn Treatments "CH"



Note: Arrows indicate movements relevant to the turn type. They do not represent actual pavement markings.

Figure 13.18 Two Staged Crossing

Staggered T-intersection

Staggered T-intersections are used as a safer alternative to four-way unsignalised intersections. As discussed in Section 13.4.3.5, 4-way intersections with priority signage record high accidents rates for the through movements from the minor road, particularly if the minor legs are aligned.

At four-way intersections where the minor legs are fully aligned, drivers can overlook the presence of the intersection and can perceive the minor road continuing straight ahead. This can be especially true in a rural setting.

Staggered T-intersections attempt to minimise this safety problem by offsetting the minor road legs. This requires motorists travelling through from a minor leg to initially turn onto the major road followed by turning onto the opposite minor road leg. Conflict points (involving through movements from the minor legs) generated by staggered T-intersections are deemed to be safer than those generated by 4-way intersections.

There are two types of staggered T-intersections as shown in Figure 13.19. One is a Left-Right Stagger, where motorists initially turn left onto the major road, then right onto the opposite minor road leg. It is most desirable that a right turn slot be introduced for the motorists turning right from the major road.

The other type of Staggered T-intersection is the Right-Left stagger, where motorists initially turn right onto the major road, then left onto the opposite minor road leg. This treatment is often more cost effective than a Left-Right stagger if converting from a four-way cross intersection.

Arndt (2004) suggested that a Left-Right stagger may be safer than Right-Left Stagger, due to less hazardous conflict points being generated.

- To base the warrants directly on the measured safety performance of each turn type.
- To ensure that higher-order turn treatments are not warranted until higher traffic volumes on lower-speed roads. This is because turn treatments on lower speed roads record far fewer Rear-End-Major vehicle accidents (generally rear-end type accidents resulting from a through driver colliding with a driver turning right from the major road – refer to Appendix F for more details) than do turn treatments on high speed roads.
- To ensure that higher-order right-turn treatments are provided at lower traffic volumes than for higher-order left-turn treatments. This is because lower order right-turn treatments record far more Rear-End-Major vehicle accidents than lower order left-turn treatments.
- To incorporate CHR and AUL turn treatments with short length right-turn slots (refer to Figure 13.49, Figure 13.59, Figure 13.73 and Figure 13.81 for diagrams of these treatments). Such treatments have significant safety benefits over lower-order turn treatments.

The warrants have been produced by identifying the location at which the benefits of providing a higher-level treatment (the reduction in estimated accident costs) are made equal to a proportion of the additional construction costs. This proportion is the benefit cost ratio (BCR) and applies for an assumed design life. The benefits and costs of a higher-level treatment are compared to the base case (the minimum turn treatment).

For the right turn treatments, a design life of ten years and a BCR equal to one is assumed in the calculations. For the left turn treatments, however, using BCR values of one with a design life as high as 50 years, the warrants produced are such that traffic flows, on even the busiest roads, would never be high enough to justify using higher-level left-turn treatments. Omitting higher-level left turn treatments in all circumstances would not meet driver expectation and would cause operational problems, especially on the busier roads. Therefore, an alternative method of determining warrants for left-turn treatments was developed.

For the left-turn warrants, the curves produced for the right-turn treatments are adopted. As the major road traffic volume on the X-axis of the warrants is based on all relevant major road traffic flows, higher-order right-turn treatments are required at lower traffic volumes than for higher-order left-turn treatments. This process ensures that these warrants reasonably match driver expectations set through the previous warrants.

The warrants show that it is not beneficial to provide AUR turn treatments. Instead, Channelised Right Turn Treatments with reduced length of right turn slots [CHR(S)] are the preferred treatment. Basically, CHR(S) treatments offer significantly better value for money (in terms of the safety benefits versus the construction costs) than do AUR turn treatments.

Application of the Warrants

The warrants are based on the construction of intersections on new roads (ie greenfield sites). Therefore, their most appropriate application is to the selection of turn types for intersections on new roads.

The warrants may also be used as a reference for the construction of new intersections on existing roads. However, there may be occasions when a prohibitive cost dictates that the indicated turn treatment is impractical (eg right-of-way limitation, large drainage structure exists, major utility service works are involved). In this case, a documented benefit/cost analysis should show why the cost is prohibitive. The analysis should include an estimation of the safety cost, which can be calculated by Equation 13.1 given in following section titled 'Estimate of the Safety Cost of Turn Treatments'.

The warrants may also be used as a reference for intervention levels when upgrading existing intersection turn treatments. Alternatively, requirements for upgrading existing intersections may be based on a documented benefit/cost analysis, such as that discussed above.

The warrants are not intended for direct application to accesses and driveways, although they may be used as a reference for such.

Warrants for Turn Treatments

The warrants for major road turn treatments at unsignalised intersections are given in Figure 13.22 and Figure 13.23. Figure 13.22 is for the selection of turn treatments on roads with a design speed greater than or equal to 100km/h. This figure is particularly appropriate for high speed rural roads.

Figure 13.23 is for the selection of turn treatments on roads with a design speed less than 100km/h. This figure is particularly appropriate for urban roads, including those on the urban fringe, and lower speed rural roads.

If a particular turn from a major road is associated with some geometric minima (for example, limited sight distance, steep grade), consideration should be given to the adoption of a turn treatment of a higher order than that indicated by the warrants. For example, if the warrants indicate that a BAR turn treatment is acceptable for the relevant traffic volumes, but limited visibility to the right-turning vehicle is available, consideration should be given to the adoption of a CHR(S) or CHR turn treatment instead.

Another example is as follows. If a major road is on a short steep downgrade, and numerous heavy vehicles travel quickly down the grade, it would not be appropriate to adopt a BAL turn treatment. Instead, an AUL(S) or an AUL would be a preferred treatment.

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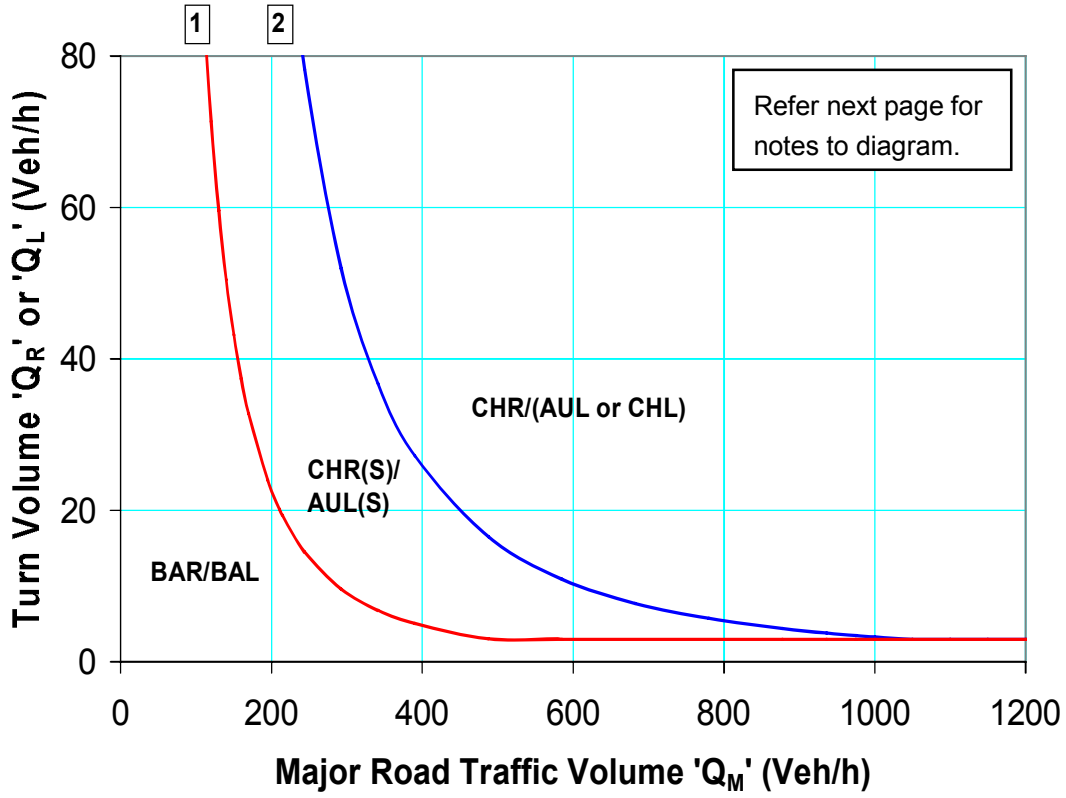


Figure 13.22 Warrants for Turn Treatments on Roads with a Design Speed ≥100km/h

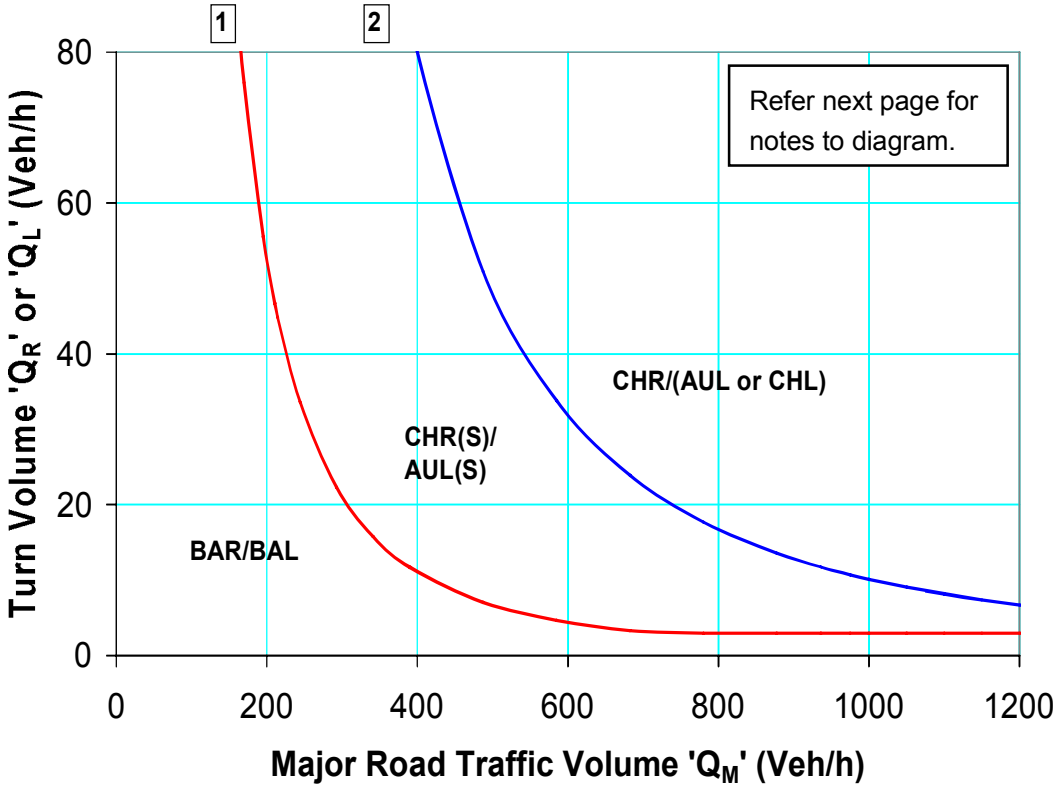


Figure 13.23 Warrants for Turn Treatments on Roads with a Design Speed < 100km/h

The following notes apply to the warrants in Figure 13.22 and Figure 13.23:

1. Curve 1 represents the boundary between a BAR and a CHR(S) turn treatment and between a BAL and an AUL(S) turn treatment.

2. Curve 2 represents the boundary between a CHR(S) and a CHR turn treatment and between an AUL(S) and an AUL or CHL turn treatment. The choice of CHL over an AUL will depend on factors such as the need to change the give way rule in favour of other manoeuvres at the intersection and the need to define more appropriately the driving path by reducing the area of bitumen surfacing.

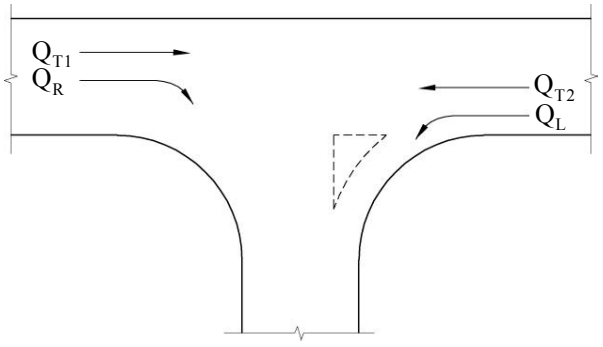
3. The warrants apply to turning movements from the major road only (the road with priority).

4. Use Figure 13.24 to calculate the value of the Major Road Traffic Volume Parameter (Q_M).

5. Traffic flows applicable to the warrants are peak hour flows, with each vehicle counted as one unit (ie do not use equivalent passenger car units [pcu's]). Where peak hour volumes or peak hour percentages are not available, assume the design peak hour volume equals 15% of the AADT for 500 hours each year, use 5% of the AADT for the rest of the year. See Chapter 5 for further details.

6. If more than 50% of the traffic approaching on a major road leg turns left or right, consideration needs to be given to possible realignment of the intersection to suit the major traffic movement. However route continuity issues must also be considered (for example, realigning a highway to suit the major traffic movement into and out of a side road would be unlikely to meet driver expectation).

7. If a turn is associated with other geometric minima, consideration should be given to the adoption of a turn treatment of a higher order than that indicated by the warrants.



Turn Type	Splitter Island	Q_M (veh/h)
Right	No	$= Q_{T1} + Q_{T2} + Q_L$
Right	Yes	$= Q_{T1} + Q_{T2}$
Left	No/Yes	$= Q_{T2}$

Figure 13.24 Calculation of the Major Road Traffic Volume Parameter 'Q_M'