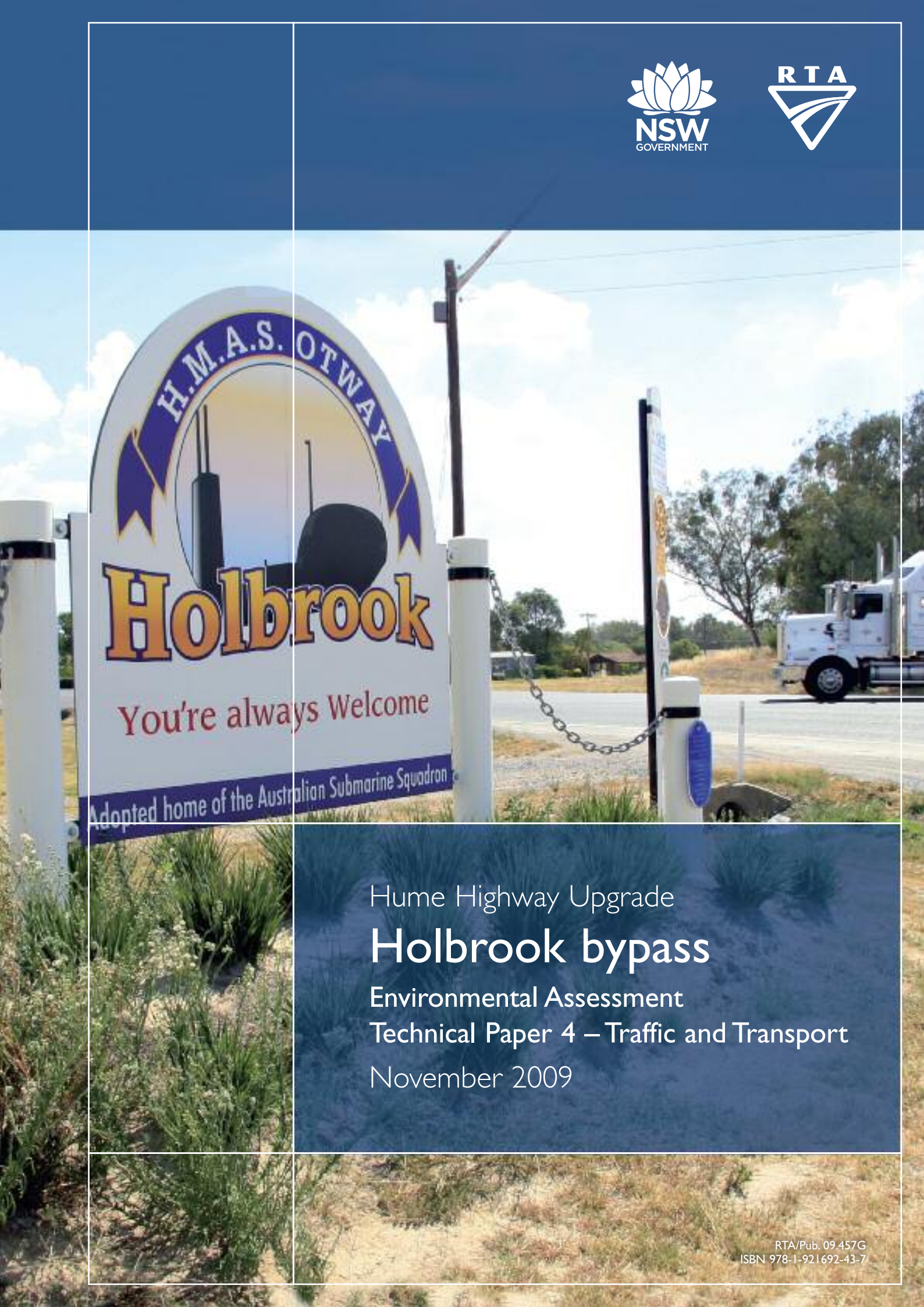

Hume Highway Upgrade

Holbrook bypass

Environmental Assessment
Technical Paper 4 – Traffic and Transport

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SH2 Hume Highway Holbrook Bypass Traffic Study

October 2009

NSW Roads and Traffic Authority

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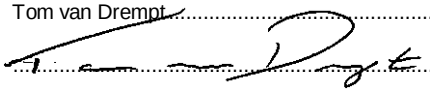
Signed: 

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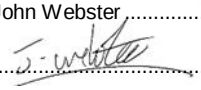
Signed: 

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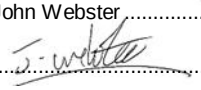
Signed: 

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Executive summary

The Federal and NSW governments have committed to the completion of the upgrading of the Hume Highway to a four lane dual carriageway by 2012. Of the 89 kilometres in NSW yet to be upgraded, 69 kilometres are currently under construction and due for completion in 2009. This will leave only 20 kilometres of single carriageway highway remaining on the Hume Highway, including the sections at Tarcutta, Holbrook and Woomargama, where bypasses are being considered. This report looks in detail at the potential traffic impacts of the proposed Holbrook bypass.

In order to understand the impact of the proposed bypass, information has been gathered on traffic flows using vehicle counts and travel pattern and time information (using an origin/destination survey). Traffic growth rates have been applied to estimate the increase in travel by the time of opening (2012) and 10 and 20 years after opening.

The traffic counts indicate that the highest volume of light vehicles occurs during business hours and in the early evening throughout the week. The weekday volume of heavy vehicles builds steadily throughout the day from a low at 4 am until the peak is reached between 11 pm and midnight.

Traffic improvements

The completion of the proposed bypass would reduce travel times along the highway from Albury to the junction with the Sturt Highway by approximately one and a half minutes, which would improve the efficiency of freight movements. The proposed bypass would provide additional overtaking opportunities.

Some drivers who currently stop in Holbrook have indicated in surveys that they would stay on the bypass and stop at another location if the bypass was built. Based on the results of these surveys, if the bypass was built between 40 per cent and 90 per cent of stopping traffic would bypass Holbrook and find a more convenient location to stop. The exact proportion of stopping traffic which would divert to the bypass is not known. Therefore, high and low scenarios for the amount of stopping traffic which diverts to the bypass have been tested. The proportions have been based on combinations of the stopper survey result and behaviour observed at other highway towns which have been bypassed in the recent past.

All through traffic, some of the existing stopping traffic and some Wagga Wagga Road traffic are forecast to use the bypass. Excluding traffic that is committed to driving into Holbrook (residents, people with business in Holbrook, Culcairn Road traffic), of the vehicles which could potentially use the bypass, the following proportions are forecast to select the bypass rather than travelling through town:

- Low diversion scenario: 80 per cent of through traffic uses the bypass, 20 per cent use the existing highway.
- High diversion scenario: 90 per cent of through traffic uses the bypass, 10 per cent use the existing highway.

The following two tables show the forecast average annual daily traffic (AADT) on the proposed bypass and existing highway in the year of opening (2012) when all traffic movements are included.

Table 0-1 2012 forecast southbound traffic north of Wagga Wagga Road, Holbrook

Scenario	Vehicle type	North of interchange	Bypass		Existing highway	
		AADT	AADT	Per cent	AADT	Per cent
High diversion to bypass scenario	Light vehicles	1,747	977	56	769	44
	Heavy vehicles	1,295	768	59	527	41
Low diversion to bypass scenario	Light vehicles	1,747	802	46	944	54
	Heavy vehicles	1,295	698	54	597	46

Table 0-2 2012 forecast northbound traffic, south of Holbrook

Scenario	Vehicle type	South of interchange	Bypass		Existing highway	
		AADT	AADT	Per cent	AADT	Per cent
High diversion to bypass scenario	Light vehicles	1,782	914	51	868	49
	Heavy vehicles	1,297	888	68	410	32
Low diversion to bypass scenario	Light vehicles	1,782	780	44	1,002	56
	Heavy vehicles	1,297	819	63	478	37

Local access would be maintained to all properties. Some changes to access would be required around Culcairn Road, Wagga Wagga Road and Tip Road, as well as to some private properties along the bypass alignment. Cyclists would be encouraged to continue to use the existing highway through Holbrook. Travelling stock routes and access to travelling stock reserves would be maintained where required.

Crash potential

The current crash rate on the Holbrook section of the Hume Highway is higher than the typical crash rate for dual carriageway sections of the Hume Highway. The crash history shows 35 crashes in the five years between 2002 and 2006, including head-on crashes and one pedestrian fatality in Holbrook town. The proposed dual carriageway highway has the potential to reduce the occurrence and severity of crashes because it creates separation between the opposing traffic flows. The provision of two lanes in each direction would create safer overtaking opportunities. The likelihood of a crash within the town would be reduced due to the reduced number of vehicles and pedestrians crossing paths.

Using NSW Roads and Traffic Authority's percentage reductions for the various crash types and applying these to the crash types recorded on the highway at Holbrook, it is anticipated that the bypass would have a crash rate 19 per cent lower than the existing highway. Projecting this reduction over a 20 year timeframe from the time of opening, the construction of the bypass is forecast to result in eight less crashes including three less injury crashes compared with not building the bypass.

Construction impacts

Construction of the bypass is expected to take two years. Construction activity is proposed between 6 am and 7 pm Monday to Friday, and between 7 am and 4 pm Saturday. However, some construction activity affecting traffic would occur outside these hours.

Excluding deliveries, most of the construction activity would be contained within the site boundary and would not affect traffic or access. The areas of construction at the northern and southern tie-ins, Wagga Wagga Road, Culcairn Road and Tip Road would affect traffic. Construction would be staged to minimise disruption.

A construction traffic management plan would be prepared, which would detail how the traffic impacts associated with the construction of the bypass would be managed. The plan would include traffic control plans documenting the proposed changes to traffic conditions and access. Some reductions in road speed limits may be required to protect the safety of construction personnel and the travelling public.

Site compounds and one or more concrete batching plants would be required to during the construction of the Project. No specific locations for compounds and concrete batching are proposed at this stage. Access to the site compounds and batching plants would be required for staff and material deliveries. Access to the work areas from the highway would be controlled. Temporary internal haul roads would be built along with creek crossings.

Construction works along the highway, including on the northern and southern tie-ins, would need to take into consideration the need for school bus stops, pedestrians and bicycles, and the travelling stock routes.

The construction activities would result in an increase in traffic volumes on the Hume Highway and on streets such as Culcairn Road, Wagga Wagga Road and Andersons Lane. Additional traffic would be associated with the transport of construction materials, the delivery of plant and equipment and staff movement. This would increase weekday volumes on the highway by 15 per cent of light vehicles and 18 per cent of heavy vehicles. The performance of the existing highway would remain within the range of Level of Service B with the additional construction traffic movements.

1. Introduction

The NSW Roads and Traffic Authority (RTA) is preparing to submit an Environmental Assessment (EA) under Part 3A (Section 75E) of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This Traffic study forms part of the EA and documents an assessment of the traffic implications of the project.

1.1 Background

The Hume Highway is the main road freight route between Sydney and Melbourne, carrying over 20 million tonnes of road freight every year. It carries interstate and intrastate traffic as well as local traffic in towns.

The Hume Highway is 807 kilometres in length from Sydney to Melbourne, with 517 kilometres in NSW and 290 kilometres in Victoria. The entire highway in Victoria is dual carriageway, while in NSW 80 per cent is dual carriageway.

Of the remaining 89 kilometres of single carriageway, the RTA is currently managing the duplication of 69 kilometres of the Hume Highway in southern NSW, due for completion by the end of 2009. This will leave only 20 kilometres of single carriageway road remaining on the Hume Highway, comprising the sections through Tarcutta, Holbrook and Woomargama, where bypasses are being considered. These three bypasses are the subject of current planning, community consultation and environmental assessment.

1.2 Study area

Holbrook is located on the Hume Highway in southern NSW approximately half-way between Sydney and Melbourne. Holbrook has a population of 1,336 (ABS 2006). It has a racetrack, golf course and public swimming pool. An industrial area is located to the west of the town which includes a large saw mill. Rural properties surround the town. Holbrook is also a rest stop for light vehicles during day and overnight stopover.

The two biggest inland regional cities in NSW are Wagga Wagga and Albury. Wagga Wagga is located on the Sturt Highway to the north of the study area, approximately 90 kilometres (1 hour 20 minutes drive) from Holbrook. Albury is located on the Hume Highway to the south of the study area, approximately 60 kilometres (50 minutes drive) away. A map showing the relative positions of the towns is shown in Figure 1-1.

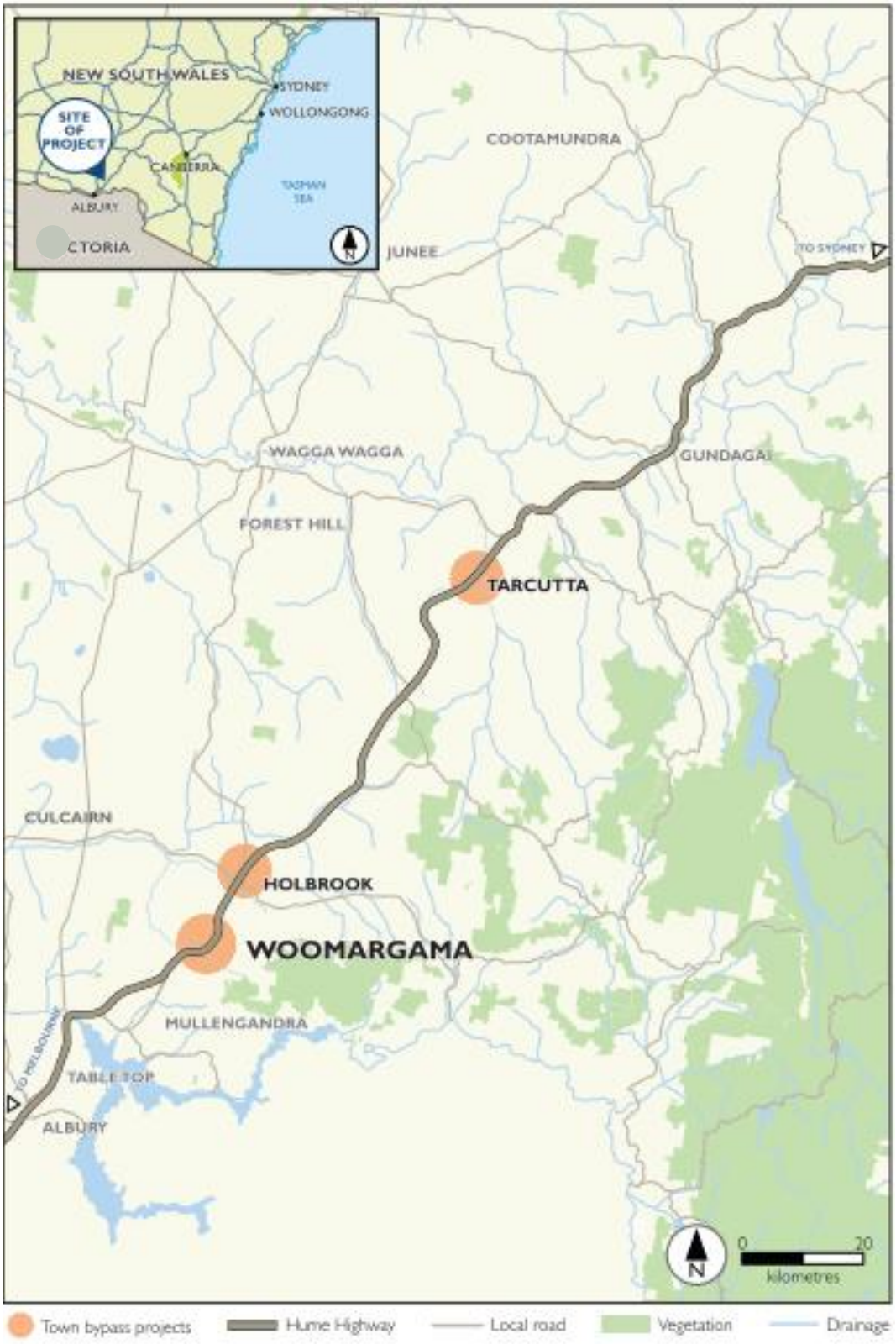


Figure 1-1 Study area

The Hume Highway through Holbrook is a single carriageway road with one lane in each direction. The speed limit in the town is 50 kilometres per hour (km/h) with a 40 km/h school speed zone covering approximately one kilometre in the centre of town.

Holbrook has the only set of traffic signals (for pedestrians) on the whole of the Hume Highway from the Melbourne's Western Ring Road to the Sydney Orbital Network.

Aside from the Hume Highway, Holbrook is connected to Wagga Wagga via Main Road (MR) 211 (Wagga Wagga Road), Culcairn via MR331 (Culcairn Road) and Wantagong, Lankeys Creek, Jingellic and Tumbarumba via MR331 (Jingellic Road).

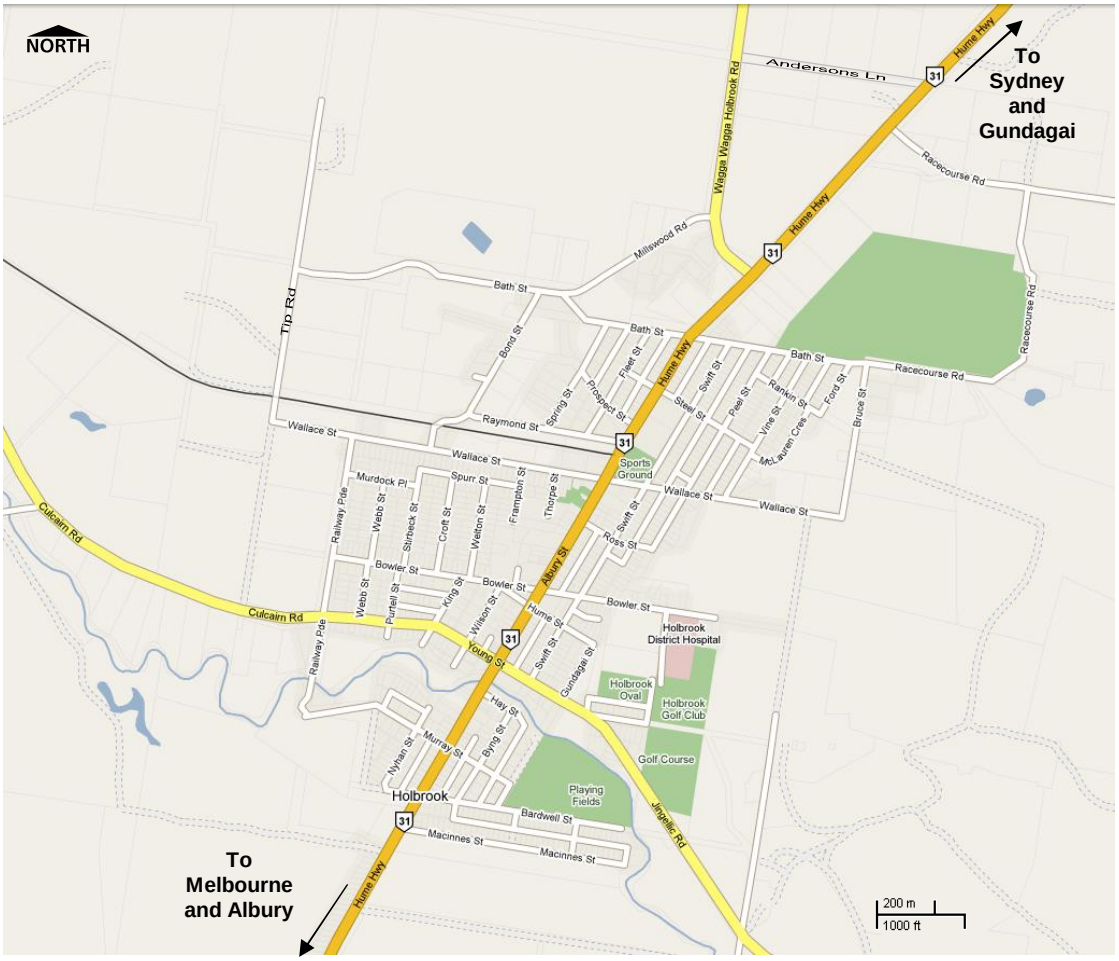


Figure 1-2 Holbrook town layout

1.3 Report contents

This report assesses the traffic and transport impacts of the proposed bypass, and is structured as follows:

- Section 2 provides information on the study methodology, data used for the traffic assessment and summarises the existing travel information. The information assessed includes traffic volumes, proportions of through traffic, mid-block level of service (LoS) and crash history.
- Section 3 provides information on the project including its objectives and the details of the proposed bypass.
- Section 4 provides an assessment of future changes in travel with the proposed bypass. It also includes a description of the construction impacts.
- Section 5 summarises the outcomes of the assessment.

2. Existing conditions

2.1 Study methodology

This section provides information on the data used for the traffic assessment and the methods of calculation used to provide the results in a consistent format. It describes the sources of the data, the data details and the limitations of the data used.

The study has collected data to answer the following key questions:

- How much traffic uses the Hume Highway and other key roads?
- What is the composition of this traffic in terms of light and heavy vehicles?
- Where is the traffic going to (i.e. does it travel all the way through town, does it turn onto another road or does it have business in town)?
- How much traffic would divert to the proposed bypass?
- What impact would the bypass have on the crash record?

The assessment has used existing data and data. The assessment methodology is summarised as follows:

- Forecast future traffic volumes by applying growth rates to existing traffic volumes.
- Estimate the proportion of traffic that has the potential to divert onto the proposed bypass.
- Determine the performance of the road network in the future.
- Estimate the impact of the bypass on the number and severity of crashes.

2.2 Traffic volume data

Data from the RTA has been used to establish patterns and trends of traffic on the highway (Appendix A). Additional traffic volume counts have been collected to provide up-to date traffic volume data in Holbrook. The additional traffic counts were taken for a period of five days and were annualised using the RTA data to be representative of traffic volumes for the whole year. These counts have also been used to estimate the future traffic volumes with and without the bypass.

2.2.1 RTA permanent and sample data

The RTA undertakes regular traffic surveys around the state road network to monitor traffic conditions. The surveys include:

- Sample counts — counts for a short duration (for example one or two weeks).
- Permanent counts — continuously counting at selected locations.

Permanent count locations are also called ‘pattern’ counts as the seasonal, weekly and hourly patterns of traffic are assumed to be representative of the traffic network around them. These patterns can be assumed to apply for nearby sample locations provided the roads perform a similar function.

Some vehicle counts are taken using equipment that counts the number of axles passing. This is then divided by two to obtain an 'axle pair' count. This type of count does not take into consideration trucks and trailers with more than two axles per vehicle.

Other vehicle surveys count the axle spacing, speed and time between axles, which allows vehicles to be classified into a set of pre-determined categories, including light vehicles, light vehicles with trailers, small trucks and buses, large rigid trucks and buses, semi-trailers and B-Doubles.

The following traffic volume counts were available from the RTA for the 2006 calendar year:

- Permanent count (axle pairs — both directions combined) on the Hume Highway, Holbrook, 1.9 kilometres north of MR331 Young Street (north of the Wagga Wagga Road) (station number 95.002).
- Permanent count (classified vehicles — separated into northbound and southbound) at the same location as the axle pair count above.
- Sample counts (axle pairs) on the Hume Highway:
  - 2.5 kilometres south of Holbrook Post Office (station number 95.036).
  - Jingellic Berrigan Road eight kilometres east of SH2 Hume Highway (station number 95.447).
  - Wagga Wagga Road south of Ralvona Lane (station number 95.437).

The sample counts have been converted to an average annual daily traffic (AADT) figure by the RTA.

Data from the classified vehicle count on the Hume Highway was not complete due to occasional failure of the counting equipment. Data was available from this counting station for the following periods:

- Northbound — 16 months from 7 February 2006 to 3 May 2007 (missing 19 weeks).
- Southbound — 13 months from 7 February 2006 to 16 February 2007 (missing one week).

The gaps in this data have been filled by factoring the available daily data by the patterns from the permanent count at the same location to obtain AADT classified into vehicles. The adjusted RTA classified vehicle counts for 2006 are included in Appendix A.

2.2.2 Seasonal variation

The adjusted classified vehicle count on the Hume Highway north of Holbrook was analysed to determine whether there is a seasonal pattern to light and heavy vehicles. The analysis showed:

- The volume of light vehicles reduces during the school holidays.
- The volume of heavy vehicles remains more constant.
- Traffic volumes on the Easter and New Years Day public holiday, the June and October long weekends and at the start and finish of the summer school holidays are higher than daily average volumes.

The analysis showed that AADT volumes are a reasonable approximation of the typical conditions on the highway.

The spike in volumes during holidays increases congestion on these days. This impact is assessed by ranking the recorded hourly volumes throughout the year from highest to lowest. A design hourly volume is selected that caters for the needs of traffic for the majority of the time. Designing for the highest recorded volume would be an over-commitment of public funds as for the rest of the year the additional capacity will not be needed.

Other studies on the Hume Highway such as the *Hume Highway Demand Modelling* (Booz Allen Hamilton, June 2004) have assessed the design hourly volume based on the 50^{th} highest (H_{50}) hourly traffic volumes. The traffic counts at the RTA permanent traffic counting site on the Hume Highway north of Holbrook (Site 95.002) indicate that H_{50} represents approximately 15 per cent of the AADT, which is a suitable level for assessment according to accepted traffic engineering practice as described in *A Policy on Geometric Design of Highways and Streets* (American Association of State Highway and Transportation Officials, 2004).

2.2.3 Temporal variation

The following observations have been made from the adjusted RTA classified vehicle count on the Hume Highway north of Holbrook:

- Weekday heavy vehicle volumes are 175 per cent higher than weekend volumes.
- Weekend light vehicle volumes are 12 per cent higher than weekdays.
- Light vehicles show a typical non-metropolitan pattern of a peak around midday and higher volumes during business hours and early evening.
- Heavy vehicles are highest during the middle of the night — volumes drop from a peak at midnight to a low at around 4 am before building back up steadily throughout the day.
- In terms of how traffic changes throughout the week, light and heavy vehicles show opposite trends. Light vehicles are highest on the weekends, Monday and Friday, whereas heavy vehicles are highest on Tuesday to Thursday. The pattern of travel throughout the week is shown in Figure 2-1.

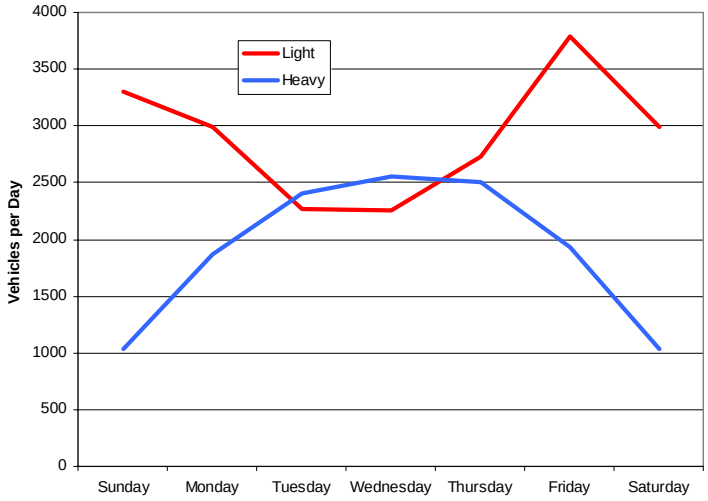


Figure 2-1 Change in daily light and heavy vehicle volumes throughout the week

Source: 2006 RTA classified count data at Holbrook 1.9 kilometres north of MR331 Young Street (north of Wagga Wagga Road).

Holbrook being a reasonably sized country town experiences the most activity coinciding with the light vehicle peak through the middle of the day.

2.2.4 Additional traffic volume surveys

Additional traffic volume information was gathered to obtain up-to-date hourly traffic data. This count also enabled cross-checking of the number plate origin/destination survey (see Section 2.4) used to assess travel patterns. The data from these counts were annualised using data from the classified vehicle survey on the Hume Highway north of Holbrook. The classified tube counts were commissioned by Wilkinson Murray Pty Ltd noise consultants and were carried out between Thursday 15 and Wednesday 21 November 2008. The survey points were on the Hume Highway as shown in Figure 2-2.

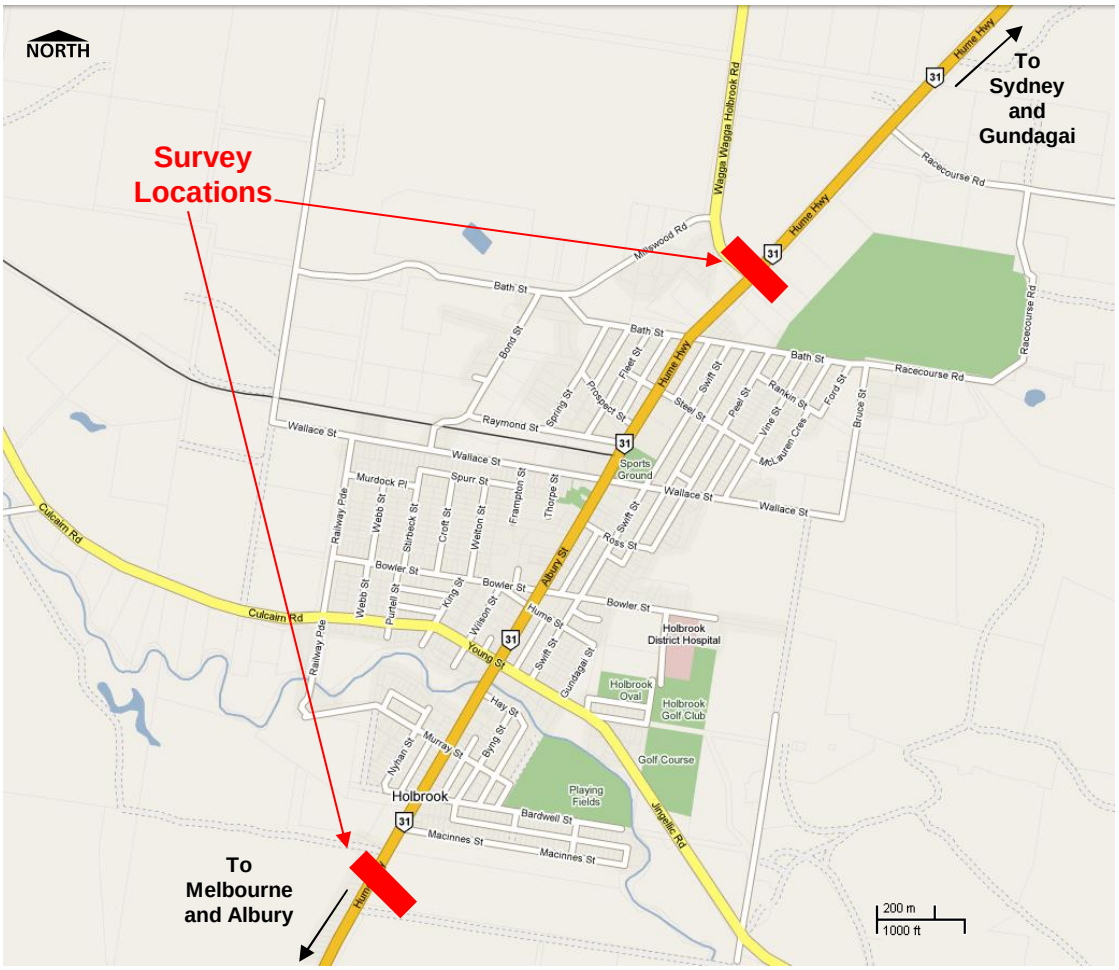


Figure 2-2 Holbrook additional vehicle count location

2.3 Existing travel conditions

2.3.1 Traffic volume

Indicative annual average traffic volumes for 2008 have been obtained by annualising the surveyed volumes at the north and south ends of Holbrook using the traffic data from the permanent count site on the Hume Highway north of Holbrook.

Table 2-1 Annual average daily traffic north of Holbrook

	Northbound			Southbound		
	Light vehicles	Heavy vehicles	Total vehicles	Light vehicles	Heavy vehicles	Total vehicles
Weekday (AAWT)	1,610	1,396	3,007	1,566	1,391	2,957
Weekend (AAWE)	1,559	575	2,135	1,558	580	2,139
Weekly (AADT)	1,596	1,162	2,758	1,564	1,159	2,723

Note: AAWT = Average Annual Weekday Traffic, AAWE = Average Annual Weekend Traffic

Table 2-2 Annual average daily traffic south of Holbrook

	Northbound			Southbound		
	Light vehicles	Heavy vehicles	Total vehicles	Light vehicles	Heavy vehicles	Total vehicles
Weekday (AAWT)	1,663	1,482	3,146	1,427	1,466	2,893
Weekend (AAWE)	1,506	609	2,115	1,350	544	1,893
Weekly (AADT)	1,618	1,233	2,851	1,405	1,202	2,607

The volumes at the sites north and south of the town show similar patterns, with the site north of the town being slightly higher. Due to the similar nature of traffic patterns north and south of Holbrook, further analysis will be presented for the north of Holbrook location only.

The change in traffic volumes throughout the day are shown in Figure 2-3. Northbound and southbound volumes have similar patterns. Both show that the bulk of light vehicle traffic occurs during the middle of the day, while heavy vehicle traffic builds steadily from a low at 4 am to a peak around midnight.

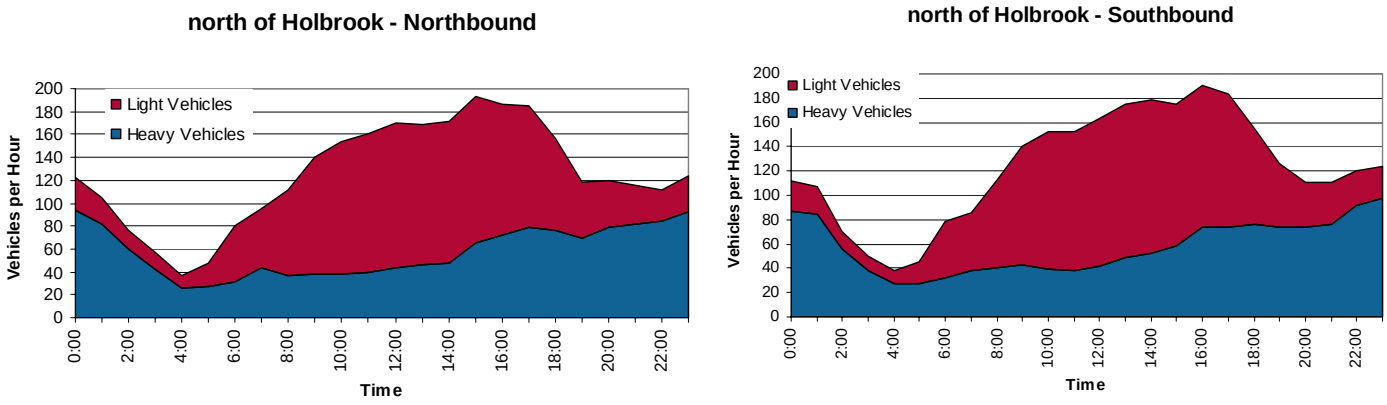


Figure 2-3 Hourly change in traffic volume on Hume Highway north of Holbrook

The peak traffic time for all vehicles was found to be between 3 pm and 4 pm on weekdays and weekends. The peak heavy vehicle volume occurred between 11 pm and midnight. Light vehicle volumes remain high from10 am until 6 pm.

Table 2-3 Peak hour traffic volumes north of Holbrook

	Northbound			Southbound		
	Light vehicles	Heavy vehicles	Total vehicles	Light vehicles	Heavy vehicles	Total vehicles
Weekday midday peak	127	66	193	117	58	175
Weekday night-time heavy vehicle peak	31	93	123	26	98	124
Weekend	145	21	166	149	22	172
Weekly	118	58	176	118	61	179

Refer to Appendix B for detailed information on traffic volumes at both sites.

The following 2003 traffic volumes (AADT) were recorded by the RTA using sample counts:

- MR331 Jingellic Road, east of SH2 Hume Highway - 415 vehicles per day (vpd)
- MR211 Wagga Wagga Road, south of Ralvona Lane – 401 vpd

These volumes are included to give an idea of the magnitude of traffic on the regional connections at Holbrook other than the Hume Highway.

2.4 Travel pattern data

A survey was undertaken to obtain data on the amount of traffic that:

- Stops in town.
- Turns onto local or regional roads.
- Travels straight through town without stopping.

This information was used to estimate the proportion of traffic that could potentially use the bypass in the future.

Hourly traffic patterns on the Hume Highway show that the majority of activity occurs during day and early evening times from 7 am until 7 pm. An origin/destination survey was undertaken during the day and early evening time on Tuesday 1 April 2008 from 11 am to 7 pm and on Wednesday 2 April 2008 from 7 am to 11 am. This licence plate matching survey recording the last three digits for all heavy vehicles, and white or red coloured light vehicles. A manual data collection technique was used. Times were recorded to the nearest minute.

The survey was undertaken at the following locations (shown in Figure 2-4).

- SH2 Hume Highway, south of MacInnes Street (locations G and H).
- SH2 Hume Highway, north of Wagga Wagga Road (A and B).
- MR211 Wagga Wagga Road, west of Hume Highway (C and D).
- MR331 Young Street (becomes Culcairn Road), west of Hume Highway (E and F).

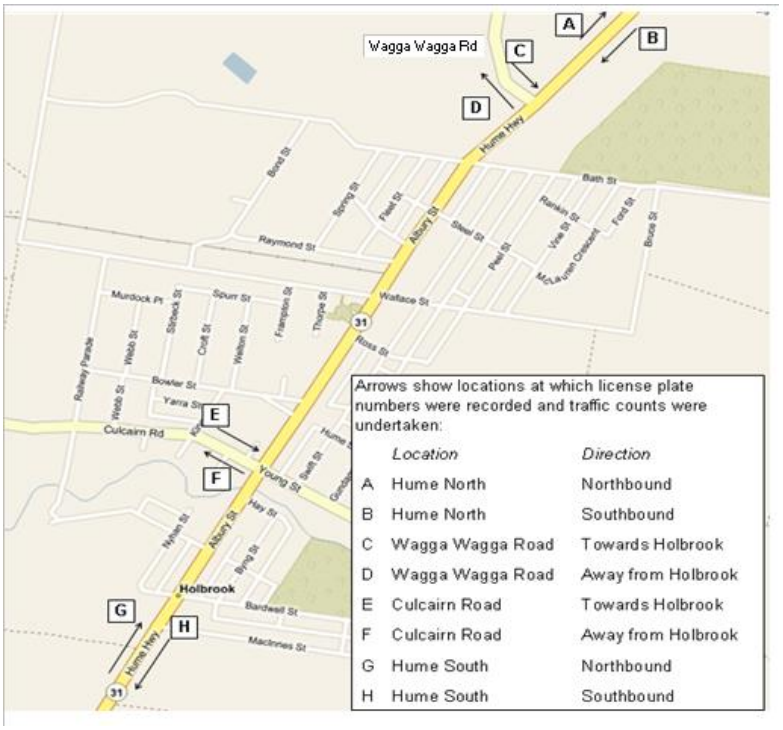


Figure 2-4 Holbrook licence plate survey locations

Traffic using Jingellic Road, Bath Street/Racecourse Road or Bath Street/Millswood Road was not recorded in the survey.

Licence plates were matched between the four survey locations and the travel time between the recordings.

Vehicles not matched were assumed to be traffic that stayed in town, originated from town or travelled out via the unsurveyed roads listed above and therefore would not be candidates for the proposed bypass. This amount may include any errors in number plate recording.

After analysis of the raw results of the survey, it was considered that the proportion of unmatched vehicles was too high. To set the proportion of 'staying' traffic at a reasonable level the results of a numberplate survey from an investigation of the impact of the opening of a bypass on the Pacific Highway at the township of Karuah in the NSW Hunter region was used. *The Economic and Social Impacts of the Karuah Bypass – The 1 year Report* (Rowe and Phibbs, University of Sydney, November 2005) included information from a numberplate origin/destination survey on the number of unmatched records. It equated these unmatched trips to traffic recorded once entering town or leaving town which were assumed to have originated from or ended in town.

As staying traffic is mainly made up of residents travelling to or from home, the number of staying trips has been set on a pro-rata basis using the relative populations of the two towns. Karuah had a population of approximately 1,200 people at the time of the opening of the bypass. Holbrook's population in 2006 was 1,336. This process assumes that people in Holbrook travel outside the town limits as much as people from Karuah.

The matched trips were scaled up to match the total number of vehicles recorded during the survey. The total number of light and heavy vehicles counted was compared to the volumes calculated for the corresponding hours on Tuesday and Wednesday from the annualised classified vehicle survey (see Section 2.3 and Appendix B for further details). It was found that the volumes were six per cent higher than the classified vehicle count (allowing for seasonal adjustment). The proportions of traffic calculated from the numberplate survey was used to estimate the types of traffic movements that would use the bypass, the existing highway and the off and on-ramps.

2.4.1 Travel times

Travel time surveys were undertaken indirectly through the licence plate origin/destination surveys. Vehicles were recorded at locations north and south of Holbrook, allowing travel times to be estimated. Plots of the distribution of travel time for light and heavy vehicles in both directions are included in Appendix C. The travel times of vehicles that stopped in town were estimated by analysing plots of the spread of travel times and comparing this to the sign-posted speed limits.

The measured travel times in Holbrook were generally consistent, although they did show a spread of travel times especially for light vehicles. The distribution of travel times for heavy vehicles gave a clearer pattern. It is assumed that light vehicles would have a similar travel time to heavy vehicles or better.

Some reasons for the variability are the pedestrian signals and school speed zone. The pedestrian traffic signals in Holbrook introduce variability in travel time of between 30 seconds and one minute. The one kilometre long school speed zone also contributes to slower travel times. Light vehicles would be more affected by the school zone as they make up more of the traffic stream at the times when the school speed zone is in force.

For the northbound direction, it was found that 70 per cent of heavy vehicles had a travel time of four minutes or less. Travel times longer than four minutes occurred less frequently and were widely distributed. For light vehicles, only 50 per cent of vehicles had a travel time of four minutes or less.

A similar pattern was shown in the southbound direction, 75 per cent of heavy vehicles had travel times less than six minutes, while for light vehicles this represented only 60 per cent.

The reason for the slower travel time in the southbound direction is not known. There is more northbound travel during the school speed zone than southbound travel.

Vehicles that stopped for only a few minutes were included as through trips. Trips with a travel time of up to 10 minutes could only have stopped for a short amount of time, and therefore it is unlikely that they would have had substantial business in Holbrook. Vehicles with travel times longer than 10 minutes were assumed to have stopped for a sufficient length of time to not be considered as through trips.

The distance between the two survey points is approximately 2,530 metres. Of the vehicles that recorded travel times within four minutes for northbound and six minutes for southbound, the average speeds were:

- Northbound: light vehicles — 64 km/h, heavy vehicles — 59 km/h
- Southbound: light vehicles — 43 km/h, heavy vehicles — 39 km/h

Even allowing for the light vehicles that slowed down for the school speed zone, the northbound speed is higher than the posted 50 km/h speed limit for both light and heavy vehicles.

The length of highway surveyed does not cover the entire length of the project. Assuming travel at the speed limit from 2.15 km north of Wagga Wagga Road to 2.54 km south of Culcairn Road, the travel time is approximately six and a half minutes.

2.4.2 Travel patterns

The results of the licence plate survey have been assessed to determine how much traffic is travelling to each of the other points, and how much is stopping in town. Due to the potential interchange location at Wagga Wagga Road, the travel patterns on the regional roads of Wagga Wagga Road (MR211) and Culcairn Road (MR331) are also important.

The results of the origin/destination survey are summarised in Figures 2-5 to 2-8. Each diagram shows:

- The total vehicles entering town.
- The number recorded leaving the town again with or without stopping (through traffic).
- The number recorded with travel times longer than 10 minutes (stopping traffic).
- The number of vehicles staying in town (entering but not leaving during the survey).
- The numbers coming to/from Wagga Wagga Road and Culcairn Road.
- The number making ‘U-turns’ i.e. vehicles that came into town, completed their business and went back out the same entry point to Holbrook as they entered.

The number of through vehicles (without stopping for a substantial amount of time) indicated in the figures is based on an assumed travel time limit of 10 minutes or less.

Trips within Holbrook were not included in the survey as the location of the surveys was outside the town limits.

Traffic using Jingellic Road, Bath Street/Racecourse Road or Bath Street/Millswood Road was not recorded in the survey.

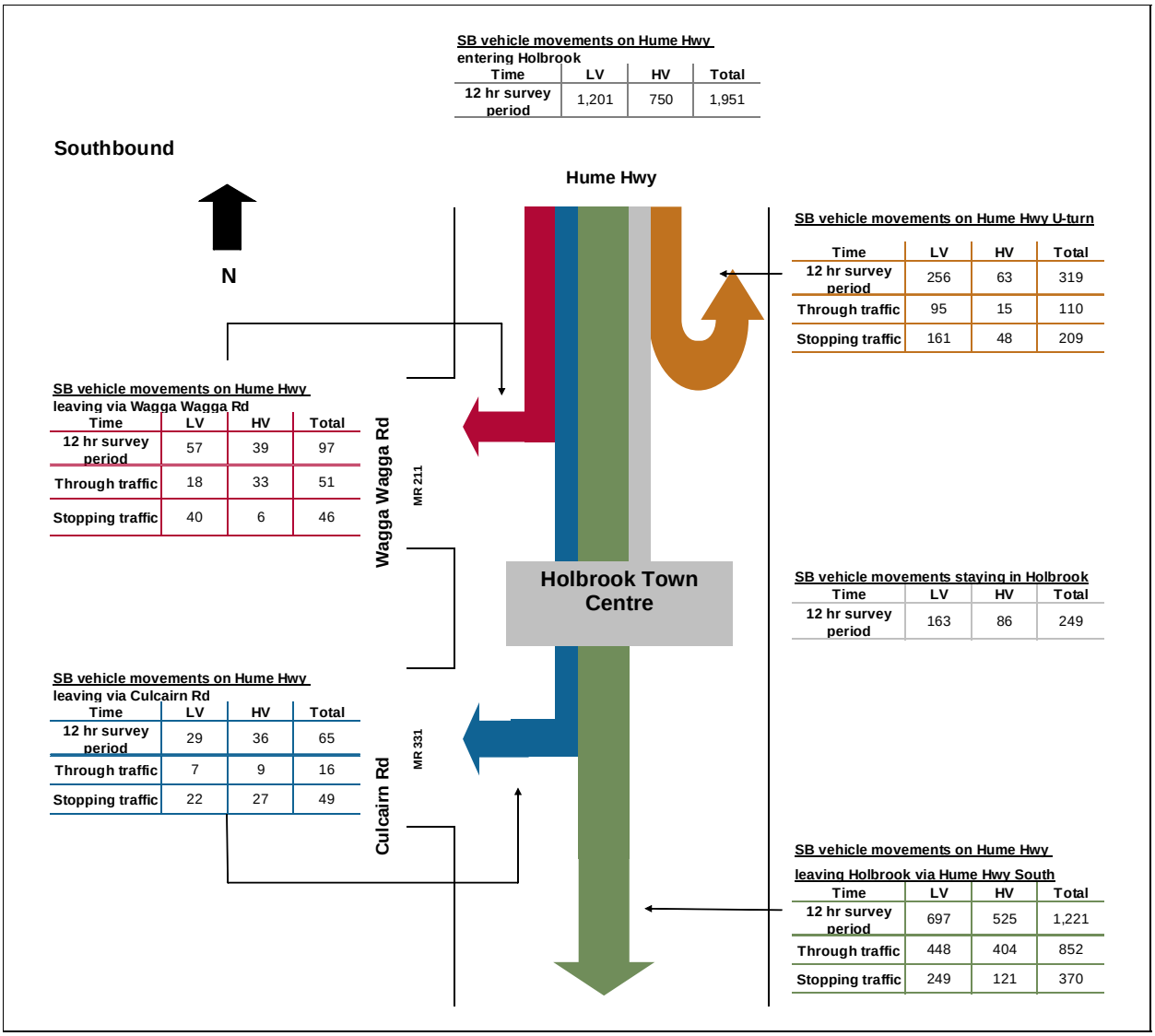


Figure 2-5 Destination of trips entering Holbrook on Hume Highway –– southbound

Figure 2-5 shows that

- Of the 1,201 light vehicles that entered the town from the north, 448 (37 per cent) drove straight through.
- Of the 750 heavy vehicles, 404 (54 per cent) travelled straight through.
- 21 per cent of light vehicles and 16 per cent of heavy vehicles entered the town, stopped and then kept going.
- Only small numbers drove straight through from the Hume Highway north of Holbrook to Wagga Wagga Road (18 light and 33 heavy vehicles) and Culcairn Road (seven light and nine heavy vehicles).

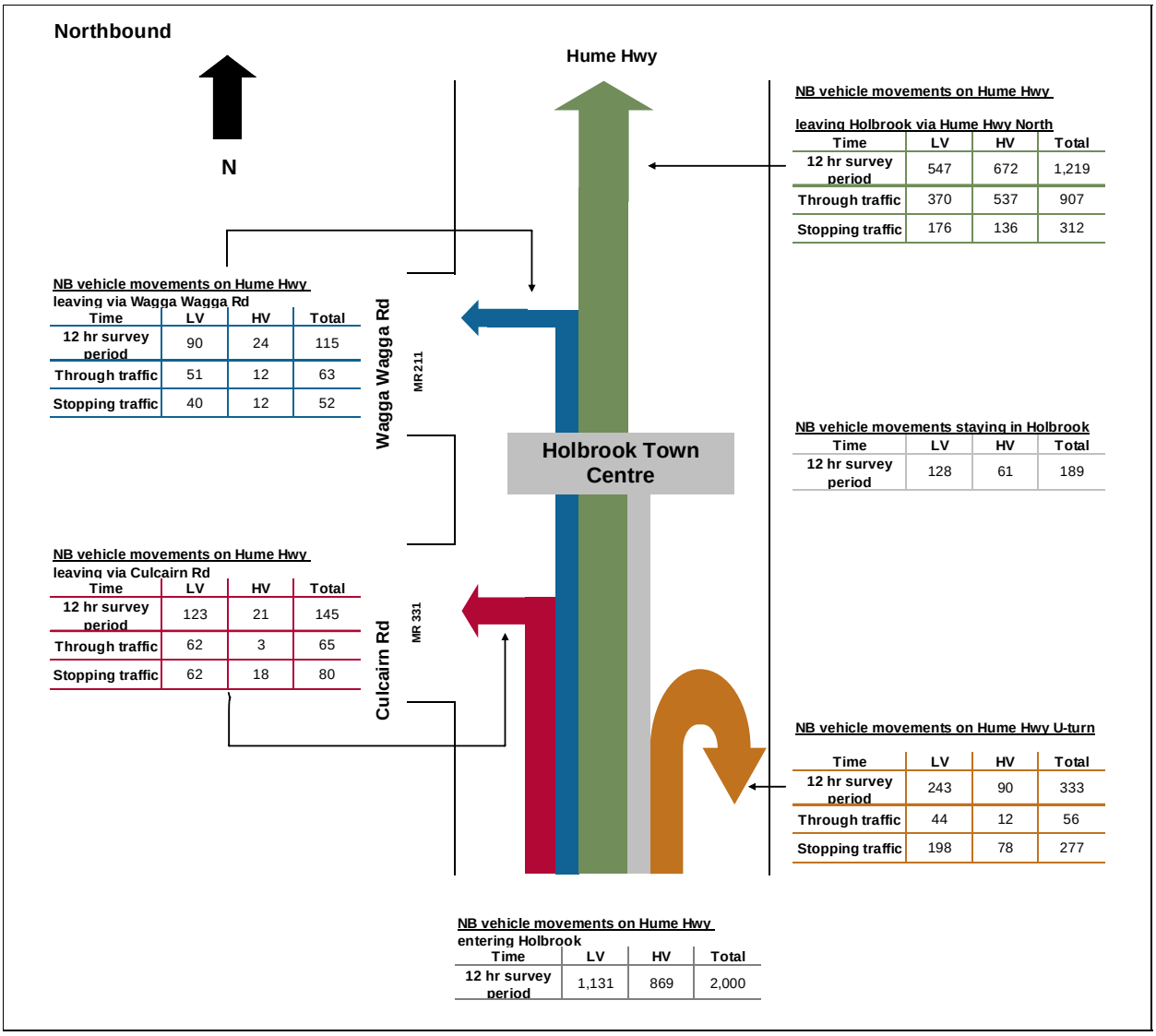


Figure 2-6 Destination of trips entering Holbrook on Hume Highway –– northbound

The southern entry into Holbrook shows a similar pattern to the northern entry:

- Of the 1,131 light vehicles that entered the town from the south, 370 (33 per cent) drove straight through.
- Of the 869 heavy vehicles, 537 (62 per cent) travelled straight through.
- 16 per cent of light and heavy vehicles entered the town, stopped and then kept going.
- Only small numbers drove straight through from the Hume Highway south of Holbrook to Wagga Wagga Road (51 light and 12 heavy vehicles) and Culcairn Road (62 light vehicles and three heavy vehicles). For light vehicles, these represent only four and five per cent of total traffic.

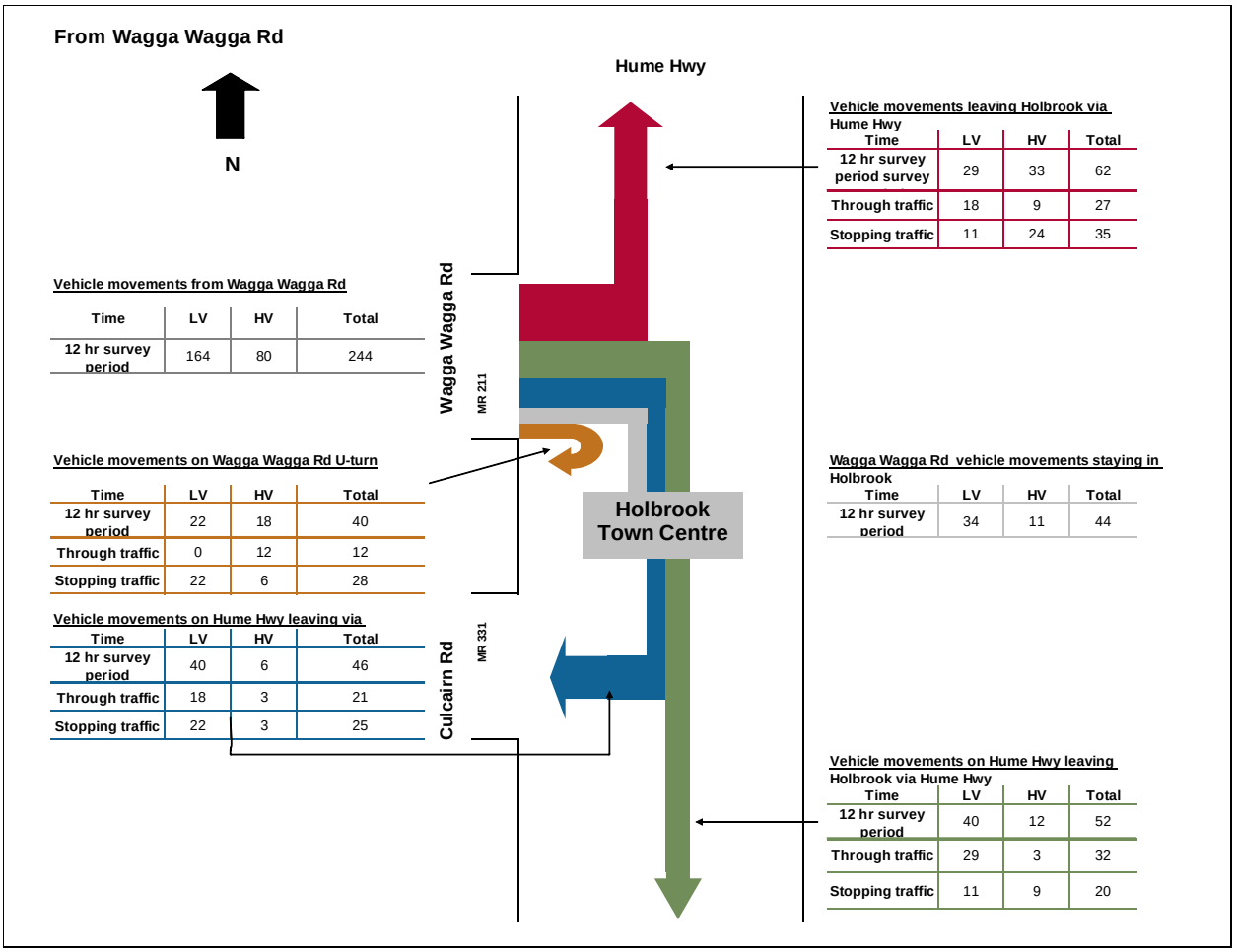


Figure 2-7 Destination of trips entering Holbrook from Wagga Wagga Road

For Wagga Wagga Road, 61 per cent of light traffic and 66 per cent of heavy traffic had business in Holbrook. Of the remaining light (through) traffic:

- 11 per cent headed north along the highway (18 vehicles).
- 18 per cent headed south along the highway (29 vehicles).
- 11 per cent drove straight out of town via Culcairn Road (18 vehicles).

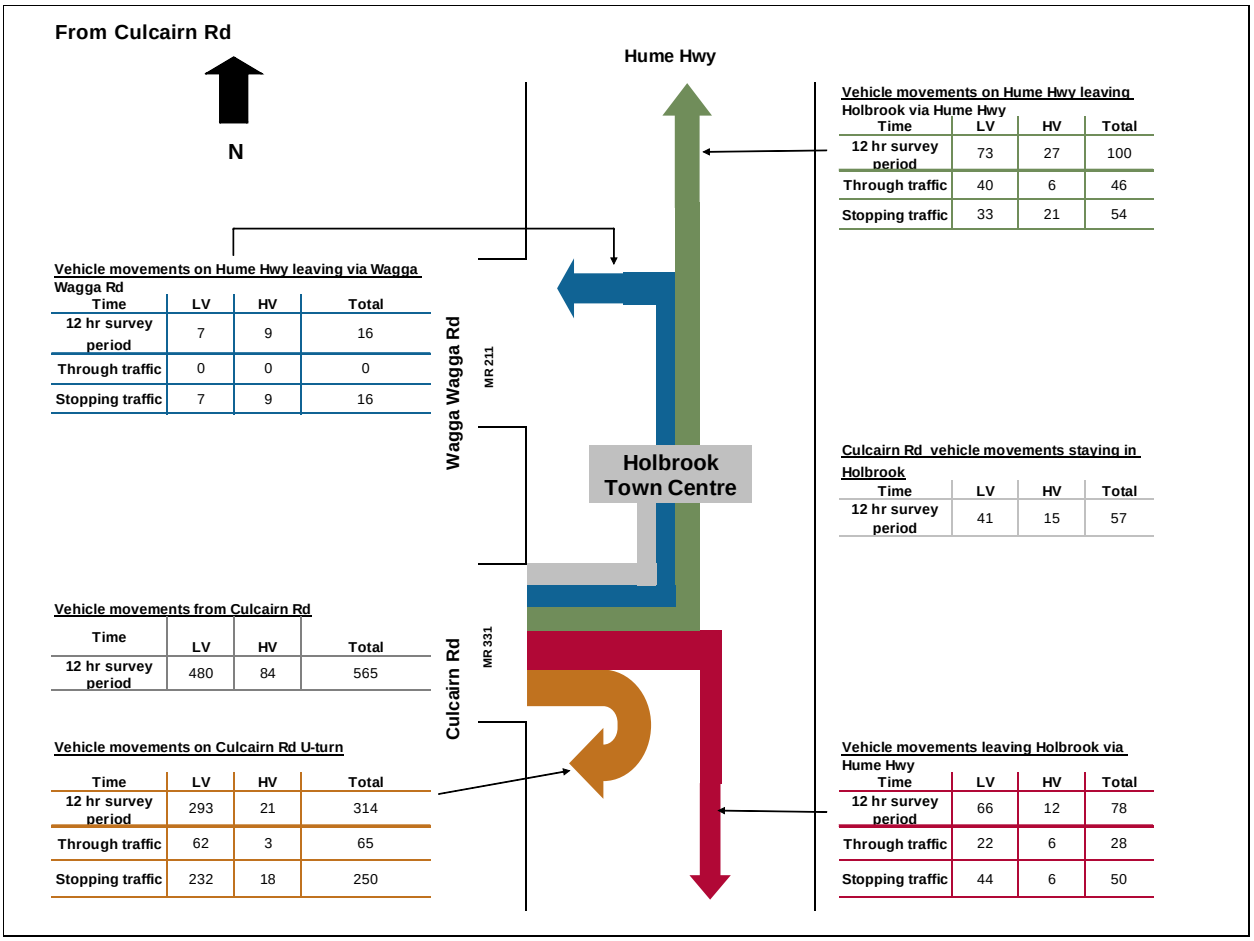


Figure 2-8 Destination of trips entering Holbrook from Culcairn Road

- The vast majority of traffic on Culcairn Road is coming to/from or has business in Holbrook.
- Of the 480 light vehicles entering town, 26 per cent drove straight through. Of these 40 vehicles headed north and 22 headed south.
- 82 per cent of heavy vehicles had business in Holbrook.

In summary:

- Of southbound traffic, 37 per cent of light vehicles and 54 per cent of heavy vehicles are considered through traffic (without stopping).
- For northbound vehicles, 31 per cent of light vehicles and 72 per cent of heavy vehicles are considered through traffic.
- For both northbound and southbound traffic, 15 per cent to 21 per cent of vehicles enter the town, stop and then keep going.
- For Wagga Wagga Road and Culcairn Road, the majority of traffic is going to/from Holbrook or has business within the town.

The surveyed numbers of vehicles for 7 am to 7 pm have been factored up to the 24 hour AADT volumes. The 24 hour numbers and proportions of vehicles making each movement are shown in Table 2-4.

Table 2-4 AADT and proportion of stopping, through and U-turn vehicles

Traffic movement	Northbound				Southbound			
	Light vehicles	Per cent	Heavy vehicles	Per cent	Light vehicles	Per cent	Heavy vehicles	Per cent
Straight through town – no stopping for a substantial length of time	523	33	717	62	583	37	625	54
Through town with stop for any length up to 12 hours	249	16	181	16	324	21	186	16
Stopped in town for longer than 12 hours (staying)	180	11	82	7	212	14	134	12
To Wagga Wagga Road	128	8	32	3	75	5	61	5
To Culcairn Road	174	11	28	2	37	2	56	5
Came into town, completed their business and went back out ('U-turn')	342	21	121	10	333	21	98	8
Total	1,596	100	1,162	100	1,564	100	1,159	100

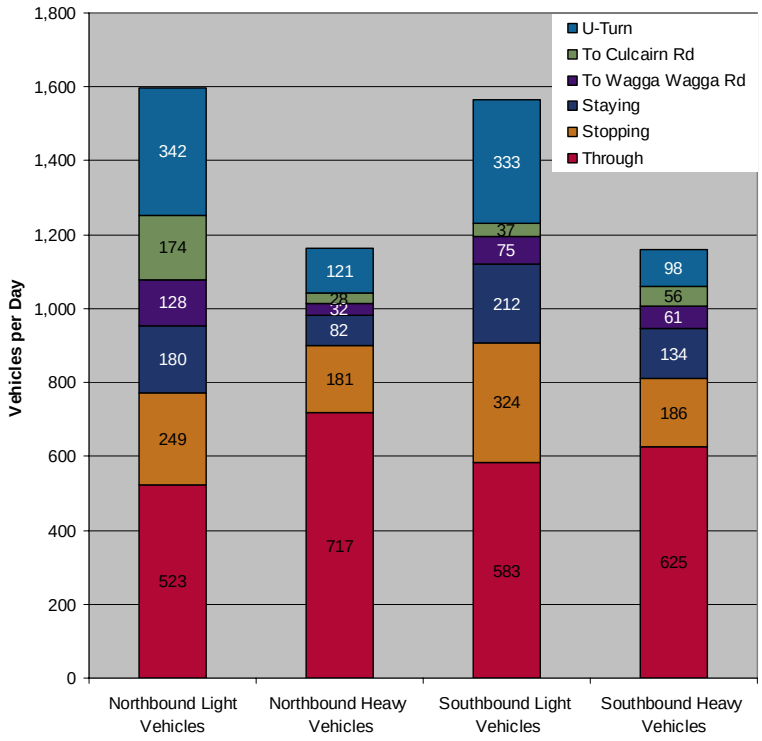


Figure 2-9 Composition of existing traffic on Hume Highway entering Holbrook

These proportions will be considered when estimating how much traffic would divert to the proposed bypass. It has been assumed that the travel patterns measured during the day are applicable during the night.

2.5 Road network performance

The amount of congestion is related to the volume of traffic, the characteristics of the road and the composition of the traffic stream. The mid-block LoS is a qualitative measure used to describe the potential for delay during traffic operation, usually in peak demand situations. Mid-block LoS is designated by assigning the letters A-F, with LoS A representing the best and F the worst. LoS ratings of E and F are commonly considered unacceptable. The LoS are described in the *Guide to Traffic Engineering Practice Part 2 Roadway Capacity,* (Austroads, 1988) as follows:

- LoS A is a condition of free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent.
- LoS B is in the zone of stable flow and drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream, although the general level of comfort and convenience is a little less than with LoS A.
- LoS C is also in the zone of stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience declines noticeably at this level.
- LoS D is close to the limit of stable flow and is approaching unstable flow. All drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is poor, and small increases in traffic flow will generally cause operational problems.
- LoS E occurs when traffic volumes are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Flow is unstable and minor disturbances within the traffic stream will cause break-down.
- LoS F is in the zone of forced flow. With it, the amount of traffic approaching the point under consideration exceeds that which can pass it. Flow break-down occurs, and queuing and delays result.

This Austroads Guide has been used to estimate the volume to road capacity ratio, which is used to classify the LoS. The following characteristics have been assumed for these calculations:

- Level terrain.
- Approximately equal volumes of traffic in each direction.
- 3.3 metres wide lanes with wide shoulders.
- 34 per cent heavy vehicles for weekday peak, 77 per cent heavy vehicles during the night-time heavy vehicle peak and 42 per cent heavy vehicles during the highest hourly volumes.

Table 2-5 Road LoS at peak times

Annual highest hourly volumes	Northbound	Southbound	Volume/ capacity ratio	LoS
50th highest hourly volume (H_{50})*	349	442	0.46	D
Weekday peak hour	193	175	0.20	B
Weekday night-time heavy vehicle peak	123	124	0.18	B

Note: 50th highest hourly volume = the 50th largest hourly traffic volume recorded across the entire year, ranked from highest to lowest. This measure is often used as an upper bound for road design. See Section 2.2.2.

Traffic conditions on the highway through Holbrook are acceptable (LoS D or better). Conditions are worse during the busiest times of the year, such as long weekends, but are still acceptable.

2.6 Crash history

Crash records were provided by the RTA for the two 5-year periods from 1997 to 2002 and from 2002 to 2006. These records and the estimated traffic volume were used to calculate an average crash rate per 100 million vehicle kilometres travelled (100 MVKT[1]). These were compared to average rates for the NSW road network from the *Road Environment Study Update 22 - Rural Road Crash Rates by Road Stereotype* (RTA, 2004).

Crash records were provided by the RTA for the five year period from 2002 to 2006 which indicate:

- 35 total crashes, including 15 crashes resulting in injury and one crash resulting in a fatality.
- Driver fatigue (23.3 per cent) is the most contributing factor for these, followed by speeding (13.3 per cent).
- Weather only contributed minor effects on those crashes as most of crashes occurred in fine weather on a dry road surface.
- Most of crashes occurred during daylight hours (63.3 per cent).
- The primary crash types were ‘off-road on straight’ (43.3 per cent), and ‘rear-end’ (30 per cent).
- Two were head-on crashes.
- The fatal crash involved a pedestrian being hit by a vehicle in the 50 km/h section of town.
- 56.7 per cent of crashes occurred in the 100 km/h speed zone.
- 20 crashes occurred on two-way undivided road while 11 crashes occurred at T-junction or cross-intersection. The remaining four involved vehicles hitting people, animals or parked vehicles.

[1] Vehicle Kilometres Travelled (VKT) a measure of exposure to a crash event. One VKT is equivalent to one vehicle travelling a distance of one kilometre or alternatively, two vehicles travelling for a distance of half a kilometre. The reported crash rate was per 100 million vehicle kilometres travelled.

- The crash rate was 28.3 crashes per MVKT. It is noted that this is lower than the state-wide crash rate of 32.8 per 100 MVKT for rural two-lane undivided roads in NSW.
- Crash rates on the undivided sections elsewhere on the Hume Highway in this region were approximately 15 per cent higher than on divided sections.
- The severity of crashes on undivided sections was also approximately 85 per cent higher than on the divided sections.
- For the 5 year period from 1997 to 2002, 29 crashes were recorded. 10 of these involved injuries but none of them were fatal.

Table 2-6 shows that the crash rate on the highway around Holbrook is higher than the divided carriageway sections of the Hume Highway between the Sturt Highway and the Olympic Highway, and similar to the stereotypical crash rates for two lane rural main roads.

Table 2-6 Crash rate comparison 2002–2006

Location	Rate per 100 MVKT			
	Fatal	Injury	Tow-away	Total
Single carriageway section, Holbrook	1	12	15	28.3
Divided carriageway sections, Sturt Highway to Olympic Highway[1]	1.1	7.9	15.6	24.6
Typical 2-lane rural main roads	1.4	14.2	17.2	32.8

Source: RTA (2008)

Note: 1. Crash data between October 1997 and September 2002 from *Hume Highway Strategic Planning Study Final Report* (Connell Wagner, 2004)

3. Bypass project

The proposed bypass of Holbrook, as well as those of Tarcutta and Woomargama, represents the final stages of the upgrading of the Hume Highway to dual carriageway between Melbourne and Sydney. This chapter provides information on the proposed project including its objectives and details of the proposed bypass and its potential connection locations.

3.1 Project objectives

The proposed bypass would potentially have travel benefits for both the local community and interstate traffic. These are consistent with the project objectives and include:

- Increased infrastructure handling capacity and efficiency.
- Improved safety and security.
- Improved transport productivity on its nationally strategic and export-oriented freight corridors.
- Improved reliability of travel on interstate and inter-regional corridors.
- Are consistent with viable and long-term economic and social outcomes, and with the obligation to current and future generations to sustain the environment.

3.2 Proposed design

The proposed design of the bypass has been developed through stages of analysis and community consultation. The community consultation to date has covered issues such as route alignment and interchange locations.

The preferred option bypasses Holbrook to the west and starts five kilometres north of Holbrook and ties back to the current highway alignment three kilometres south of Holbrook. The proposed alignment is shown in Figure 3-1.

The bypass would have the following connections and impacts on the local road network:

- Northern end:
  - No access between upgraded highway and the existing highway alignment;
- MR221 Wagga Wagga Road:
  - Grade-separated – Wagga Wagga Road raised over the proposed bypass
  - Full-diamond interchange.
- MR331 Culcairn Road:
  - Grade-separated – Culcairn Road lowered under the proposed bypass;
  - No access between the proposed bypass and Culcairn Road.

- Southern end:
  - Full-diamond interchange;
  - Connection to northbound ramps raised over the proposed bypass.
- Changes to some private property access at the following locations:
  - At the northern end;
  - At the western end of Andersons Lane;
  - Near the Wagga Wagga Road interchange and on Wagga Wagga Road;
  - Tip Road connected to Culcairn Road on the western side of the bypass;
  - On Culcairn Road; and
  - At the southern end.

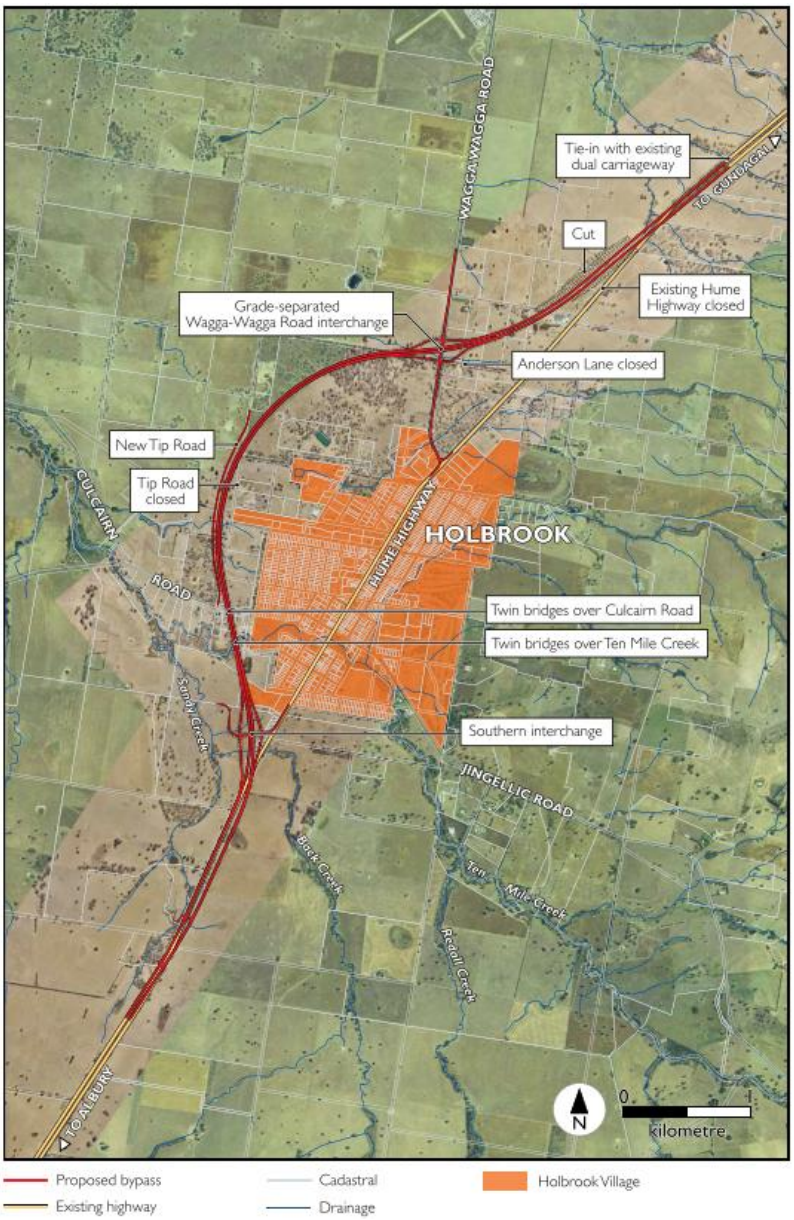


Figure 3-1 Proposed bypass at Holbrook

4. Traffic impact

This chapter includes the assessment of traffic volumes, proportions of through traffic, travel times, mid-block LoS and crashes. It also includes a description of the construction impacts.

4.1 Traffic forecasts

4.1.1 Historic trends

RTA AADT traffic volume data was obtained for various years from 1982 to 2006 to determine the historic trends of traffic on the Hume Highway. Two locations were used in the analysis.

- South of SH14 Sturt Highway (station number 95.029).
- North of Holbrook approximately 1.9 kilometres north of MR331 Young Street (north of Wagga Wagga Road) (station number 95.002).

The data between 1982 and 1997 showed a high growth rate of between four and six per cent per annum.

The more recent growth between 1997 and 2006 showed a linear growth in traffic for the two sites:

- South of SH14 Sturt Highway: 2.1 per cent growth per annum.
- North of Holbrook: 3.4 per cent growth per annum.

4.1.2 Forecasts

Forecasts of growth in traffic on the Hume Highway are available from several sources including:

- Future volumes on the Hume Highway, south of the Sturt Highway were forecast in the *Hume Highway Strategic Planning Study Final Report* (Connell Wagner, June 2004). The maximum growth rate forecast between 2006 and 2021 was 2.8 per cent per annum (linear).
- The *Hume Highway Demand Modelling Report* (Booz Allen Hamilton, June 2004) assessed the potential growth in road and rail freight between the Sturt Highway/Hume Highway interchange and Albury. This report assumed a 3.4 per cent per annum average annual growth rate for non-bulk freight between Sydney and Melbourne of 3.4 per cent per annum, split between road and rail. It forecast a growth in total traffic on the Hume Highway of between 2.4 per cent and 2.8 per cent per annum from 2006 to 2021 depending on the policy option for stimulating rail versus road freight.
- *Working Paper 66* (Bureau of Transport and Regional Economics, 2006) projected an average annual growth in traffic on the Gundagai to Holbrook section of the highway between the years of 1999 and 2025 of 1.47 per cent, with lower growth for light vehicles than heavy vehicles.

All three studies were produced before 2008, when the price of petrol rose sharply, only to drop again. Increasing fuel prices could reduce the amount of light vehicle traffic and push more freight traffic from road to rail. The studies above also do not take into consideration the recent global economic downturn, which could reduce the growth in total freight between Melbourne and Sydney. If gross domestic product reduces, the need for truck transport will reduce also.

This study will look at long-term growth (i.e. greater than 10 years from the present). It is considered that by this time the effects of the global economic downturn will have dissipated, and that a move to more fuel efficient vehicles will allow people to continue travelling by vehicles rather than switching modes or stopping travelling altogether. The growth rate of 2.8 per cent per annum is recommended for the estimation of future traffic volumes. Changes in these assumptions may change the future traffic volume forecasts.

The study has looked at three design years. As the upgrading of the Hume Highway is due for completion in 2012, traffic forecasts have been made for this year. The future years of 2022 and 2032 were chosen to assess the impacts 10 and 20 years from the date of opening.

4.2 Future travel changes

The proposed bypass at Holbrook would change travel patterns by moving some of the traffic travelling along the highway through town onto the proposed bypass. The interchange at Wagga Wagga Road with no northbound access from the existing highway to the proposed bypass at the northern end would increase the function of Wagga Wagga Road between the existing highway and the new interchange.

4.2.1 Travel times

The travel time along the highway, if the proposed bypass is not undertaken, will depend on the volume of traffic and the amount of turning traffic that could delay through traffic. The level of congestion is estimated in Section 4.3.1. For the purposes of comparison, the existing travel time on the highway is used.

Based on the surveyed travel times through Holbrook on the existing highway and the posted speed limit, it has been estimated that the travel time for vehicles to get off the bypass, travel through town and rejoin the bypass would be around six and a half minutes. The travel time on the bypass has been estimated as just over five minutes using the posted speed limit of 110 km/h, meaning that through traffic would receive a travel time advantage if they use the bypass.

Compared to the travel time on the existing highway without the bypass (six and a half minutes), through traffic will receive a minute and a half saving if the bypass is built.

4.2.2 Local access

The main northern access to Holbrook would be via the interchange at MR221 Wagga Wagga Road. This would increase the travel distance for traffic travelling to/from the Hume Highway north of Holbrook by around 500 metres. Assuming travel at the speed limit, this equates to an increase in travel time of approximately 30 seconds. No access to the bypass is proposed for MR331 Culcairn Road.

Andersons Lane would be at its western end near Wagga Wagga Road. This would require all traffic for Andersons Lane to gain access via the bypassed section of the Hume Highway. Traffic volumes along this section are expected to be low, and hence delays would be negligent.

Tip Road would be connected to Culcairn Road and would be realigned to run along the western side of the bypass. This would create a longer travel distance for some people in Holbrook, but would place the access to Tip Road on a main road, away from residential areas. The design of the new intersection of Culcairn Road and Tip Road will require consideration of the sight distance given the proximity of the new grade separated overpass for the bypass.

There would be some other impacts from property accesses being closed and replaced with local access roads at several locations along the proposed bypass. All access would be maintained. The exact details of the alternative access arrangements would be developed during the detailed design process.

4.2.3 Travel patterns

Hume Highway

The proposed bypass would provide a shorter travel time than travelling through town. Therefore, it has been assumed that the traffic movements that would have a quicker travel time on the bypass would divert onto the bypass. It is also possible that some of the through vehicles that stopped for a short amount of time may divert to the bypass because it may be easier to keep moving and stop at a more convenient location.

The exact amount of stopping traffic that would switch onto the bypass is not known. Therefore an upper and lower bound for how much of the stopping traffic would divert to the bypass has been provided. This represents the likely range of traffic change that would be influenced by other factors such as the convenience of alternative stopping locations and driver's stopping patterns for fuel and food. For this assessment:

- Traffic travelling straight through without stopping has been assigned to the bypass where it provides the quickest route.
- Traffic stopping in town has been split using the method described below.
- Traffic staying in town uses the ramps to get into town.
- U-turning traffic uses the ramps to get into and back out of town.

For each scenario, different diversion factors are assumed for light and heavy vehicles. This is because light and heavy vehicles are influenced by different factors (e.g. heavy vehicles have guidelines about taking rests and are likely to be set in a pattern whereas light vehicles are freer to use the most convenient stop).

The assumptions are based on the results of two studies. The economic analysis report for the Holbrook Bypass was presented in the *Economic impact study of highway related businesses - Hume Hwy, Phase 1 Holbrook*, (Parolin, University of New South Wales, June 2009). This study included a survey of light and heavy vehicle drivers conducted in Holbrook at various locations. They were questioned on their reason for travel; origin and destination; previous stop location; length of stop and expenditure patterns. The survey was

conducted during day-time hours. It is noted that the sample size for heavy vehicles was small. The results of the survey are shown in Table 4-1.

Table 4-1 Economic analysis stopper survey

Type of vehicle	Will you stop in Holbrook after the bypass opens?			Total
	Yes	No	Unsure	
Light vehicle	167 38.1 per cent	183 41.8 per cent	88 20.1 per cent	438 100.0 per cent
Heavy vehicle	37 56.9 per cent	22 33.8 per cent	6 9.2 per cent	65 100.0 per cent
Total	204 40.6 per cent	205 40.8 per cent	94 18.7 per cent	503 100.0 per cent

The results show:

- 41.8 per cent of through stopping motorist survey respondents travelling in light vehicles indicated they would not stop in Holbrook after the bypass opens.
- 33.8 per cent of through stopping motorist survey respondents travelling in heavy vehicles indicated they would not stop in Holbrook after the bypass opens.

The 'unsure' respondents have been grouped with the people who indicated that they would continue to stop in Holbrook to produce a conservative estimate of the potential bypass traffic.

The second study is the post-opening report on the Karuah bypass of the Pacific Highway *The Economic and Social Impacts of the Karuah Bypass – The 1 year Report* (Rowe and Phibbs, University of Sydney, November 2005). The traffic analysis for this study showed that there was a large drop in traffic stopping in Karuah after the opening of the bypass, with 90 per cent of traffic diverting to the proposed bypass. While Karuah and Holbrook perform different roles in their region, they have similar populations. The results in Karuah could be considered as an upper bound for the potential situation in Holbrook.

The results of these two surveys have been used to provide the upper and lower bounds for the forecasts. The assumptions are:

Low diversion scenario forecasts:

- For light vehicles the results of Parolin's stopper survey for people who said that they would no longer stop in town when the bypass is built has been used (42 per cent diversion of stopping traffic to the bypass).
- For heavy vehicles it has been assumed that there would be no change to the proportion that stop.

High diversion scenario forecasts:

- For light vehicles the results from the bypass of Karuah have been assumed to apply for Holbrook (i.e. that when the bypass is built there would be a 90 per cent reduction in stopping traffic). The diversion proportion has been applied to stopping traffic only, not the total number of vehicles. As the proportion of staying and U-turn traffic was higher than the remaining proportion on the existing highway.

- For heavy vehicles the results of Parolin's stopper survey for truck drivers who said that they would no longer stop in town when the bypass is built have been used (34 per cent diversion of stopping traffic to the bypass).

Wagga Wagga Road

Through traffic travelling between Wagga Wagga Road and the southern entry of the Hume Highway could potentially use the bypass as it would save over two minutes travel time. It has been assumed that stopping traffic using Wagga Wagga Road would continue to stop in Holbrook, as they would have fewer alternative stopping locations. It is noted that the numbers of vehicles making this movement is small – only four per cent of traffic on the highway.

Culcairn Road

There is less chance that traffic travelling from the Hume Highway north of Holbrook travelling to Culcairn Road will use the bypass, loop around the town and use the southern interchange. The route using the Wagga Wagga Road interchange and the existing highway is approximately 30 seconds faster when the school speed limit is not in operation. When it is in operation the travel times are comparable. For this analysis, it has been assumed that traffic for Culcairn Road would continue to use the existing highway. The proportion of traffic from the northern entry of the Hume Highway to Culcairn Road is only one per cent.

Traffic assignment

Based on the assumptions made above, traffic movements during each of the design years (2012, 2022 and 2032) have been assigned to the bypass, the existing highway and the relevant ramps. The following traffic has been assumed to use the bypass between the northern (Wagga Wagga Road) and southern interchanges:

- Hume Highway northbound and southbound traffic that does not stop.
- Hume Highway northbound and southbound traffic that used to stop but is forecast to choose a different stopping location once the bypass is built.
- Traffic travelling between the Hume Highway south of Holbrook and Wagga Wagga Road that does not stop in town.

Traffic movements that would continue to use the existing highway includes:

- Hume Highway northbound and southbound traffic that continues to stop in Holbrook.
- Traffic staying in Holbrook (e.g. residents).
- Traffic coming into Holbrook to do business and then leaving via the same road they came in.
- Traffic travelling to/from Wagga Wagga Road which continues to stop in Holbrook.
- Traffic travelling to/from Culcairn Road.

4.2.4 Traffic volumes

Traffic volumes are forecast to increase in the future. The 2008 volumes have been factored up using the 2.8 per cent per annum factor discussed in Section 4.1.2 for the design years of 2012, 2022 and 2032. The volumes on the Hume Highway with no bypass are shown in Table 4-2.

Table 4-2 Future AADT volumes with no bypass

`Year	Northbound (south of Holbrook)			Southbound (north of Holbrook)		
	Light vehicles	Heavy vehicles	Total vehicles	Light vehicles	Heavy vehicles	Total vehicles
2012	1,782	1,297	3,080	1,747	1,295	3,041
2022	2,349	1,710	4,059	2,302	1,706	4,009
2032	3,096	2,254	5,350	3,034	2,249	5,283

If the bypass is constructed the traffic volume would be shared between the highway and the proposed bypass. The bypass would create additional capacity for future growth. The forecast volumes on the existing highway and the bypass for the southbound direction approaching Holbrook are shown in Table 4-3. A map showing the location of the future year traffic forecasts is shown in Figure 4-1.

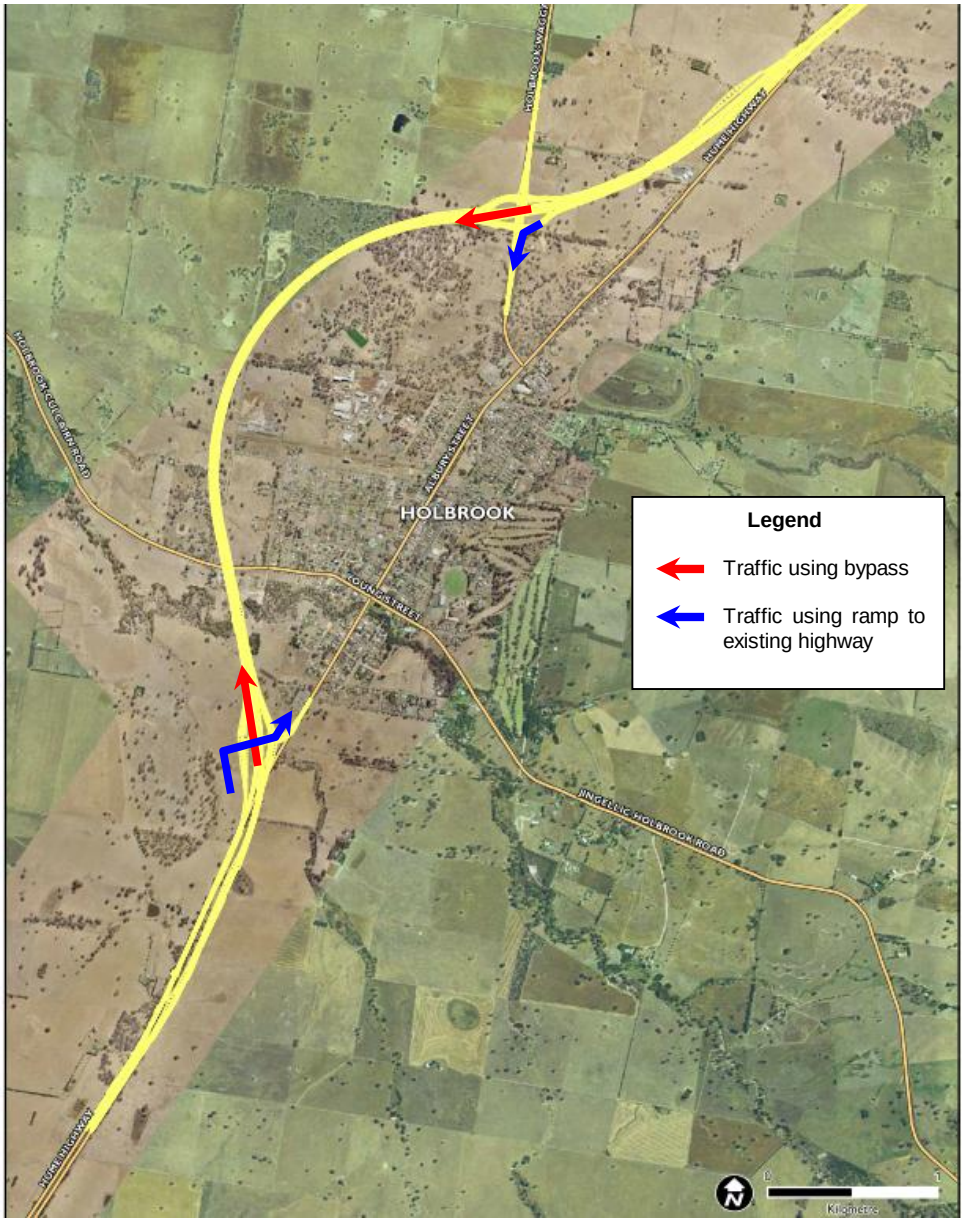


Figure 4-1 Location of future traffic forecasts

Table 4-3 Future southbound AADT volumes on existing highway north of Holbrook with bypass constructed

Year	Scenario	Vehicle type	North of interchange	Bypass		Existing highway	
			Total AADT	AADT	Per cent	AADT	Per cent
2012	High diversion to bypass scenario	Light	1,747	977	56	769	44
		Heavy	1,295	768	59	527	41
	Low diversion to bypass scenario	Light	1,747	802	46	944	54
		Heavy	1,295	698	54	597	46
2022	High diversion to bypass scenario	Light	2,302	1,288	56	1,014	44
		Heavy	1,706	1,012	59	694	41
	Low diversion to bypass scenario	Light	2,302	1,057	46	1,245	54
		Heavy	1,706	919	54	787	46
2032	High diversion to bypass scenario	Light	3,034	1,698	56	1,336	44
		Heavy	2,249	1,334	59	915	41
	Low diversion to bypass scenario	Light	3,034	1,394	46	1,641	54
		Heavy	2,249	1,212	54	1,037	46

The forecast volumes on the existing highway and the bypass for the northbound direction approaching Holbrook are shown in Table 4-4.

Table 4-4 Future northbound AADT volumes on existing highway south of Holbrook with bypass constructed

Year	Scenario	Vehicle type	North of interchange	Bypass		Existing highway	
			Total AADT	AADT	Per cent	AADT	Per cent
2012	High diversion to bypass scenario	Light	1,782	914	51	868	49
		Heavy	1,297	888	68	410	32
	Low diversion to bypass scenario	Light	1,782	780	44	1,002	56
		Heavy	1,297	819	63	478	37
2022	High diversion to bypass scenario	Light	2,349	1,205	51	1,144	49
		Heavy	1,710	1,170	68	540	32
	Low diversion to bypass scenario	Light	2,349	1,028	44	1,321	56
		Heavy	1,710	1,080	63	630	37
2032	High diversion to bypass scenario	Light	3,096	1,588	51	1,508	49
		Heavy	2,254	1,542	68	712	32
	Low diversion to bypass scenario	Light	3,096	1,355	44	1,741	56
		Heavy	2,254	1,423	63	831	37

In general, through traffic and traffic for Wagga Wagga Road will use the bypass, while Culcairn Road traffic and traffic starting or finishing in Holbrook will use the existing highway. The through traffic which currently makes a stop in town is assumed to be split, either keep going to use another stopping location or continue to stop in town based on the assumptions mentioned earlier.

The predicted traffic volumes shown in Tables 4-3 and 4-4 indicate that:

- For the low diversion scenario, 45 per cent of all light vehicles and 59 per cent of all heavy vehicles would use the project.
- For the high diversion scenario, 54 per cent of all light vehicles and 64 per cent of all heavy vehicles would use the project.

The assumptions made about stopping traffic only affect a small proportion (around 17%) of the total traffic stream.

If the traffic that is committed to entering Holbrook (residents, people with business in Holbrook, Culcairn Road traffic) is excluded from the assessment, of the vehicles that could potentially use the bypass:

- Low diversion scenario: 80 per cent of through traffic uses the bypass, 20 per cent use the existing highway.
- High diversion scenario: 90 per cent of through traffic uses the bypass, 10 per cent use the existing highway.

Detailed forecast future traffic volumes are included in Appendix D.

The forecasts of the future traffic volumes have assumed a future growth rate of 2.8 per cent per annum as described in Section 4.1.2. The distribution of traffic to the existing highway or the bypass has assumed a uniform allocation of this growth traffic. This implies that traffic to and from Holbrook will grow at the same rate as traffic along the Hume Highway. Should the growth in traffic on the highway be greater than this rate, it is likely that the additional growth would be in interstate and intrastate traffic and hence would mainly use the bypass as opposed to the existing highway.

4.3 Transport impact

Benefits of the proposed bypass of Holbrook would include:

- Through traffic would be given a quicker, high quality road with overtaking opportunities.
- Less traffic in town and lower congestion.
- It would be easier to cross the existing highway for pedestrians.
- Less delay waiting for a gap to cross or join the highway at intersections or from properties.
- Less noise from traffic in Holbrook town centre, especially at night as a large proportion of heavy vehicles would be moved onto the bypass.

4.3.1 Road network performance

If the proposed bypass is not built then traffic volumes on the highway will increase. This is shown in the LoS experienced on the highway. The LoS has been assessed for the 'do nothing scenario' as well as for the scenario with the bypass built, for the bypass and the existing highway. The results from the high diversion scenario have been used to show the maximum likely conditions on the bypass.

Table 4-5 shows that the LoS will worsen if the highway is not upgraded, by 2022 the conditions on the highway are forecast to have just slipped into the unacceptable range (LoS E or F) during the highest traffic times through the year (e.g. long weekends and school holidays). Traffic under average conditions would remain within the acceptable range.

Table 4-5 Future Level of Service with and without upgrade and bypass

	Do nothing		With bypass			
	Hume Highway		Hume Highway		Bypass	
	vol/cap ratio	LoS	vol/cap ratio	LoS	vol/cap ratio	LoS
2008						
50th highest hourly volume (H_{50})	0.43	D	-	-	-	-
Weekday midday peak	0.20	B	-	-	-	-
Weekday night-time heavy vehicle peak	0.18	B	-	-	-	-
2012						
50th highest hourly volume (H_{50})	0.48	D	0.22	C	0.18	A
Weekday midday peak	0.22	B	0.09	A	0.09	A
Weekday night-time heavy vehicle peak	0.20	B	0.07	A	0.08	A
2022						
50th highest hourly volume (H_{50})	0.64	E	0.29	C	0.24	A
Weekday midday peak	0.29	C	0.11	B	0.11	A
Weekday night-time heavy vehicle peak	0.27	C	0.10	A	0.09	A
2032						
50th highest hourly volume (H_{50})	0.89	E	0.36	D	0.32	A
Weekday midday peak	0.41	C	0.16	B	0.14	A
Weekday night-time heavy vehicle peak	0.37	C	0.13	B	0.12	A

With the bypass, traffic volumes would be split between the two roads. Traffic conditions on the proposed bypass would be acceptable during the time periods tested. The traffic conditions on the existing highway improve from LoS C to the borderline of LoS A/B.

4.4 Crash potential

With the construction of the dual carriageway bypass, a large proportion of traffic would be moved from the existing highway to the new road, which is anticipated to have a lower crash

rate. This is because the dual carriageway road would create a separation between the two traffic flows. The provision of two lanes in each direction will create safer overtaking opportunities, reducing the chance of a head-on collision. The removal of traffic from the town would also reduce the likelihood of a crash at an intersection as there should be larger gaps in traffic.

The *Accident Reduction Guide, Part 1: Accident Investigation and Prevention* (RTA, March 2004) publication provides a list of percentage reductions for crashes when different treatments are used. A 'Duplicate Road' project is estimated to have the following percentage reductions. These have been summarised for the crash types recorded between 2002 and 2006 in Table 4 6.

Table 4-6 Duplication of roadway crash reductions

Crash type	2002-2006 crashes	Per cent reduction
Intersection, adjacent approaches	1	30
Head-on	2	100
Opposing vehicles; turning	2	0
Rear-end	6	30
Hit parked vehicle	1	15
Hit pedestrian	1	50
Hit animal	2	0
Off carriageway; straight	6	10
Off straight; hit object	10	10
Off curve, hit object	1	10
Other	2	0

Applying these reductions, the duplication of the highway would result in a 19 per cent reduction in crashes based on the recent crash history.

As traffic volumes, and therefore, the vehicle kilometres of travel are forecast to increase, the total number of crashes is expected to increase as well.

The crash rate for the existing highway through Holbrook calculated in Section 2.6 was 28.3 crashes per 100 MVKT. Assuming a 19 per cent reduction in this rate, the proposed bypass is expected to have an accident rate of 23.0 crashes per 100 MVKT.

Using the recorded rate for the existing alignment; the reduced rate for the proposed bypass and the forecast AADT volumes for 2012, 2022 and 2032, the anticipated reduction in accidents for each of these years is shown in Table 4-7.

Table 4-7 Comparison of forecast future annual crashes

Year	Do nothing	With bypass		Difference
	Existing highway	Existing highway	Proposed bypass	
2012	5.3	2.3	2.7	-0.3
2022	7.0	3.0	3.6	-0.4
2032	9.2	3.9	4.8	-0.5

Across the 20 year period from 2012 to 2032 the proposed bypass is anticipated to save eight crashes, including three injury crashes.

4.5 Cycle facilities

Due to the large distances between towns and the small population surrounding Holbrook, the number of cyclists using the bypass would be low. Long distance cyclists may want to stop in the town to rest and use the facilities. The distance through town is 600 metres shorter than proposed bypass. Also, the reduction in traffic through Holbrook will create safer and more pleasant riding conditions.

Cyclists would be encouraged to continue to use the existing highway through Holbrook by the erection of signs before the off-ramps at the start of the bypass in each direction.

There is still the chance that cyclists would use the proposed bypass. To enable this, the road shoulder should be made suitable for use by cyclists. A shoulder width of 2.5 metres would provide a 1.5 metre separation between a bicycle and the traffic lane, which is suitable for a vehicle speed of 100 km/h *Guide to Traffic Engineering Part 14 Bicycles* (Austroads, 1999). No value is given for speeds higher than 100 km/h. This does not allow for side clearances to obstructions.

4.6 Travelling stock routes and reserves

Travelling stock routes are used by farmers to transport livestock by foot between properties or to market. Travelling stock reserves are generally located intermittently along stock routes (at approximately 10 kilometre intervals) and provide overnight shelter and containment for livestock herds being moved along stock routes. Existing travelling stock routes and reserves near Holbrook are shown in Figure 4-1.

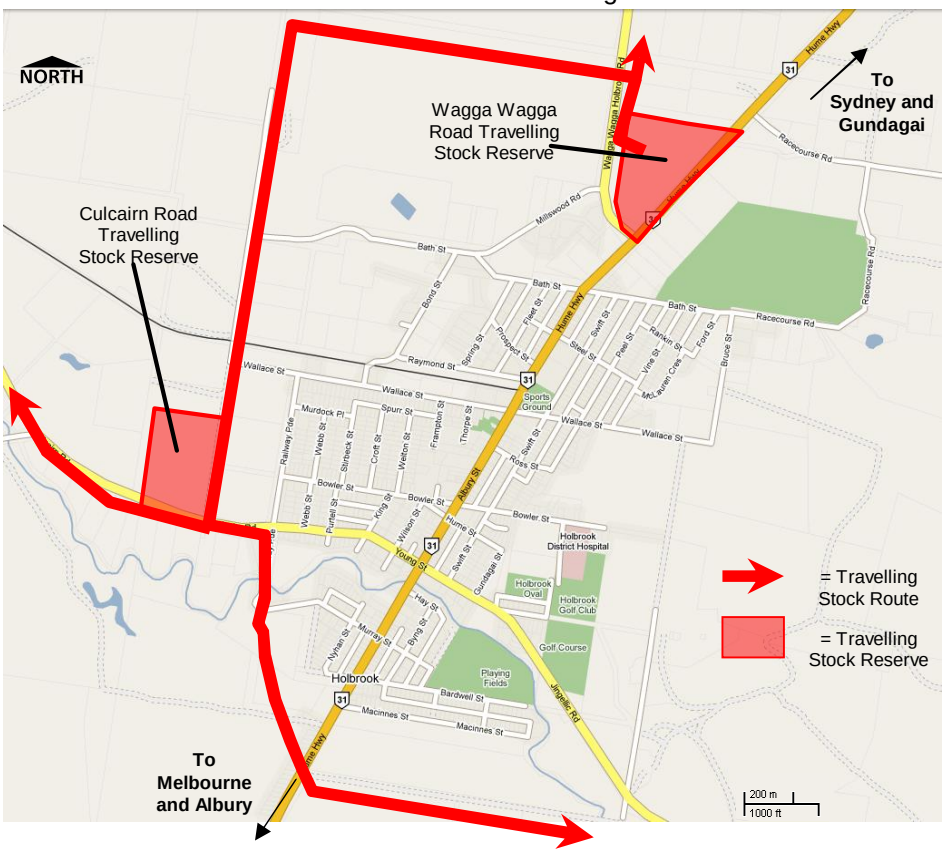


Figure 4-2 Travelling stock routes and reserves around Holbrook

There are two existing travelling stock reserves in Holbrook located at:

- Corner of Wagga Wagga Road and Hume Highway (northern travelling stock route); and
- Culcairn Road, northern side, west of town (southern travelling stock route).

Travelling stock routes in and around Holbrook include the Wagga Wagga Road and Culcairn Road travelling stock routes, which direct livestock to their respective travelling stock reserves. There is also a travelling stock route connecting the two stock reserves that runs along the northern and western boundary of the former Town Common and along Tip Road. The travelling stock route between the two travelling stock reserves is used around six times per year.

To provide connectivity with properties to the east of Holbrook, the Culcairn Road travelling stock route continues along Culcairn Road and Railway Parade and crosses Ten Mile Creek and heading towards the existing highway, crossing the highway south of MacInnes Street and continuing east along a reserve road and out of town via Jingellic Road.

The travelling stock routes would need to be provided for when the proposed bypass is built. The proposed bypass passes over Culcairn Road, however travels through the old sale yards on Culcairn Road. Culcairn Road would continue to be used as a travelling stock route, providing a safe crossing underneath the proposed bypass.

The proposed bypass would sever the connection between the two travelling stock reserves. It is proposed to realign Tip Road alongside the bypass alignment which would provide an alternate stock route.

The project would sever the connection of the Wagga Wagga Road travelling stock route to the Wagga Wagga Road travelling stock reserve. Through discussions with the Livestock Health and Pest Authorities it is not necessary to provide an alternate travelling stock route for access to this stock reserve. However this stock reserve would need to be relocated to a suitable location on the western side of the proposed bypass. This would be undertaken in consultation with the Livestock Health and Pest Authorities and any potentially affected landowners.

The traffic volume using existing highway would be reduced with the bypass. This would mean reduced impact during times when stock is moved across the existing highway.

4.7 Construction impact

Construction of the upgrade is anticipated to take two years. A site compound and concrete batching plant would be required adjacent to the new road alignment with access to the existing highway.

4.7.1 Construction times

The proposed hours of construction are between 6 am and 7 pm Monday to Friday, and between 7 am and 4 pm Saturday. Some construction activities may be required outside these hours, but would require prior discussion with and/or notification of local residents and the Department of Environment, Climate Change and Water. Out-of-hours work may be required for:

- Concrete paving.
- Concrete saw cutting.
- Concrete batch plant deliveries.

Approval for out-of-hours work would be required. Traffic control arrangements would need to take into consideration the requirements of heavy vehicles to avoid delaying interstate freight transport.

4.7.2 Staging

The majority of the bypass can be constructed without affecting the movement of traffic on the existing highway. Temporary roadworks would be required during construction to tie the existing road network into the construction works.

Traffic would be switched between the existing and newly constructed sections of road to facilitate the continual flow of traffic through and around Holbrook. These works may result in some short-term traffic impacts to users of the existing road network. Locations at which temporary roadworks are likely to be required include the northern tie-in to the existing highway, Andersons Lane, the intersection of Wagga Wagga Road, Tip Road and the southern interchange.

There may need to be temporary diversion of traffic to facilitate construction. For example, Wagga Wagga Road would be diverted onto a side track or traffic would be diverted via Andersons Lane (a combination of these may be used depending on requirements).

4.7.3 Traffic management

The types of traffic management required during construction includes: introduction of roadwork speed zones, diversion of traffic onto temporary or newly constructed roads, closure of auxiliary overtaking lanes, short-term one lane alternate operations, haulage operations, haulage road crossing and over-dimension vehicle movements.

A construction traffic management plan would be prepared at the beginning of the construction phase. The plan would detail how the traffic impacts associated with the construction of the project would be managed.

Site specific traffic control plans will be developed for both long and short-term works, with the aim to maximise safety for workers and road users. These plans will be based on the relevant sections of the construction traffic management plan. The traffic control plans will be prepared in accordance with the *Traffic Control at Worksites* manual (RTA, March 2006), *Australian Standard 1742.3*, and *RTA's QA Specification G10*. The traffic control plans will be developed with the aim to:

- Warn drivers of changes to the usual road conditions.
- Inform drivers about changed conditions.
- Guide drivers through the work site.
- Ensure safety for workers, motorists, pedestrians and cyclists.

Temporary roadwork speed limits may be required to reduce traffic speeds to suitable levels near construction activities for the protection of construction workers and the travelling public. Applications for temporary alterations to road speed limits would be made to the

RTA, with notification of approved changes to the NSW Police and local council (if required).

A list of the proposed mitigation measures during construction is provided in Table 4-8.

Table 4-8 Measures for management of construction traffic impacts

Mitigation
Design Traffic impacts to the users of the local and regional road network would be considered when developing the preferred design arrangement, such as: ▪ Limiting the number of points where new alignments cross the existing road network. ▪ Limiting the need to occupy areas of the existing road.
Individual construction worksites At the individual construction worksites, the objective is to minimise traffic impacts by adopting the following guiding principles: ▪ Planning construction through the use of construction staging and temporary roadworks to minimise interaction with the existing road network and night time freight vehicle movements. ▪ Minimising the road space occupied by works, and the time of construction. ▪ Minimising the impacts of construction works on local and regional traffic by using the new carriageway, as far as practical, for construction traffic. ▪ Implementing traffic control measures only when necessary. ▪ Maintaining property access for the duration of the construction, and where reasonable and feasible, provide alternative access in consultation with affected landowners.
Coordinating works The objective is to ensure that road users do not experience excessive delays on their journeys, due to frequent road works. This can be achieved through: ▪ Coordinating the delivery of construction materials, and the movement of construction plant and equipment to and from construction sites. ▪ Coordinating all RTA works, and any works by other agencies that affect traffic flow. ▪ Coordinating with transport operators regarding schedules, abnormal loads and other events. ▪ Identifying, evaluating, and documenting other routes (in consultation with local councils). ▪ Coordinating with emergency services and managing incidents.
Adequate information The objective is to ensure that the highway users and local communities are provided with timely, accurate, relevant and accessible information about changed traffic arrangements and delays owing to construction activities. This is to be achieved through: ▪ Suitable signage at work sites. ▪ Selection of appropriate information (type and format), and the appropriate locations for information dissemination.

4.7.4 Vehicle numbers

The number of vehicles associated with the construction activities would change with different phases of construction.

The number of construction personnel will change during the course of construction. A maximum workforce of 300 people is anticipated on site at any one time. It is anticipated that the average number of staff and site vehicles across the two year construction timeframe would be around 200. These vehicles would be parked at the site compound. Some of these vehicles may be driven to and from Wagga Wagga or Albury.

An indicative list of vehicles involved in construction activities are described in Table 4-10. This list covers the main types of construction vehicles but is not a complete list of all vehicles required.

Table 4-9 Construction vehicles used on site

Phase/task	Vehicles on site	Duration	Comment on vehicle movements
Earthworks	Trucks, scrapers, water carts, graders, excavators, compaction equipment, bulldozer	~12 months	Most movements would occur within construction footprint, along haul roads and on access roads. Some fill material to be transported from nearby quarries (locations to be determined).
Select materials	Grader, compactor, compaction equipment, flat drum, water cart	~3 months	Most movements would occur within construction footprint, along haul roads and on access roads.
Drainage	Excavators, various small tools, compaction equipment	~9 months	Most movements would occur within construction footprint, along haul roads and on access roads.
Structural concrete	Transit mixers, concrete pump, various small tools, crane	~9 months (cranes on-site for 2 years), (concrete pump on-site for 3 months)	Most movements would occur within construction footprint, along haul roads and on access roads.
Concrete paving	Loader, trucks, various small tools	~3 months	Most movements would occur within construction footprint, along haul roads and on access roads.
Materials delivery	Trucks for earthworks	Would occur across 2-year program	Movements from regional and local road network to work compound sites, batching plant using construction access roads and haul roads.

Haulage of externally-sourced select fill from quarry sites would involve additional truck movements on local and regional roads. Based on indicative fill requirements, haulage needs would equate to approximately 80,000 truck movements, if this was to occur over a 12 month period this would equate to approximately 270 movements per day.

An estimate has been made of the number of vehicle trips per day on the public road system. For the purposes of this calculation a trip is counted as an in or an out movement, hence a sand delivery would be counted as two trips.

- Staff vehicles — 470 trips per day.
- Delivery of equipment — 40 truck trips per day.
- Delivery of materials — 90 truck trips per day.

- Movement of Earthworks — 270 truck trips per day
- Construction movements outside site boundaries — 100 truck trips per day.

The construction activities are estimated to generate 470 light vehicle and 500 heavy vehicle trips per day on public roads. This represents an increase of approximately 16 per cent of daily traffic and 22 per cent of weekend volume. These increases would be perceptible above normal daily fluctuations in traffic. However, during the weekday and weekend midday peak, traffic levels would remain within the capacity of the road with road performance remaining at a LoS of B. There would be a small increase in delay at intersections.

4.7.5 Access impacts

Site compound

Site compounds and one or more concrete batching plants would be required during the construction of the Project. No specific locations for compounds and concrete batching are proposed at this stage. Siting of these facilities will be considered at the detailed design stage and will be determined based on impact on amenity and other environmental constraints.

Access from the site compound to the existing road network will be required. The location of this access will have regard to the capacity and safety of the surrounding intersections. Vehicles arriving at the site in the morning would do so during a time of lower traffic volumes than later in the day. Vehicles leaving the site compound during the early evening are likely to experience higher traffic volumes on the highway.

A number of smaller work compounds would be located across the site with access from within the construction area.

Construction access

Access points at the northern and southern tie-ins would be required to facilitate construction activities. At the site compound entry, and where construction turning volumes are likely to be high or where adverse geometry exists, right turn lanes and widened shoulders would be provided. All access points would:

- Have safe intersection sight distance.
- Accommodate the turning movements of the largest heavy vehicle.
- Be constructed of suitable materials.

A number of temporary roads and creek crossings would be required to provide alternative access to the construction area.

A major haul road would be constructed along the length of the bypass and would be required specifically to access cut and excavated areas. The major haul road would also provide an alternative access when carriageways are unavailable for trafficking (eg after paving). Minor haul roads would be required to access certain key areas of the project. Generally the temporary roads would be all weather access and would be up to 15 metres in width.

Two creek crossings would be required over Ten Mile Creek. These crossings would be located either side of the bridge construction area and would be up to ten metres in width to cater for a two-way heavy haul road.

Heavy vehicles

The Hume Highway plays a vital role in the transport of goods by road from NSW to Victoria. To reduce the impact of construction on road freight, construction activities that impact on the existing road network would be kept to a minimum and/or completed during the night (when heavy vehicle volumes are at their highest).

Public transport

School bus services operate on the Hume Highway in the morning between 7.30 am and 8.30 am and in the afternoon between 3 pm and 4:30 pm. Buses stop at selected locations along the Hume Highway and along Culcairn Road. Local bus operators and families would need to be contacted to ensure that safe alternative arrangements are made for school bus stops around the northern and southern tie-in works, and around Culcairn Road and Wagga Wagga Road. Widened shoulders may be provided at property entrances to cater for school bus stops

Pedestrians and bicycles

Access for pedestrians and cyclists in and around Holbrook would be maintained throughout construction. Any temporary changes to these access arrangements would be undertaken in accordance with RTA requirements.

Properties

The impact of construction activities would be minimised by maintaining access where possible or by providing an access track when property entrances are affected. Fences and gates would be adjusted as required. Residents would be consulted regarding all changes to the access of their property.

Stock route

As discussed in Section 4.6, travelling stock routes run along Culcairn Road, Wagga Wagga Road, around the former Town Common, the laneway running to the west of Railway Parade and Tip Road. The temporary access arrangements at the bridge on Culcairn Road, the works at Wagga Wagga Road and the construction of the bypass between these roads would need to take into consideration the requirements of these stock routes. Depending on the timing of these works and the times when stock need to be moved there may not be any need for special provisions. Liaison with the Rural Lands Protection Board will be continued throughout the design and construction phases.

4.7.6 Materials handling

Some vehicle movements associated with the project would occur within the site boundary and would not affect the public road system. Where possible, material generated by excavations would be reused to reduce the need for transportation. Importation of fill material will be required

Any materials required for construction are likely to require transportation to the site via the Hume Highway. Some materials may need to be delivered from Wagga Wagga.

It is anticipated that the concrete batching plant would be contained within the site boundary near an access point to the existing road network. The access point would need to consider the impact of late night truck deliveries of materials required for the concrete batching process.

Materials to be transported include fill; concrete components, including aggregate, sand and cement; and manufactured items, including reinforcing steel, precast bridge components, stormwater pipes and pits.

Water would be required for concrete batching, dust suppression, plant and equipment washing, staff amenities, landscape watering and compaction and pavement stabilisation. Stormwater would be retained and used where possible.

At the current stage of the design and project development process, cut and fill requirements are not balanced, with approximately 400,000 cubic metres to be excavated and 1.5 million cubic metres of fill material required (assuming some suitable material retained on site as road base). Because large volumes of select fill would be required to be brought into the site over a relatively small timeframe, existing quarries are unlikely to be able to provide the required quantities or quality of this select fill. Potential quarry locations within the region are being investigated to supply the select fill material for the project.

Small amounts of waste would require transporting to a suitably licensed facility. The fill material would be transported using various scrapers, dump trucks, and truck and dog combinations.

Fill transportation would be required across the Ten Mile Creek floodplain. A temporary haul road would be constructed for this. It would be located to minimise the impact on trees. A second temporary construction access road would be required for the construction of the twin bridges over Ten Mile Creek.

5. Conclusions

The project includes the construction of a bypass of Holbrook on the Hume Highway in south-western NSW. The Federal and NSW governments have committed to the completion of the upgrading of the Hume Highway to four lane dual carriageways by 2012. The upgrading of the sections of the highway through Tarcutta, Holbrook and Woomargama would see the completion of the conversion of the highway to dual carriageway.

5.1 Transport improvements

The proposed bypass would reduce travel times along the highway from Albury to the junction with the Sturt Highway by approximately one and a half minutes, which would improve the efficiency of freight movements. It would also provide additional overtaking opportunities.

In terms of road capacity, the bypass would create additional capacity for the busiest times of the year, including long weekends, such as Easter, and the school holidays. If the bypass does not proceed, traffic conditions on the highway would reach unacceptable levels during the night-time heavy vehicle peaks by 2012 and during the regular weekday peak by 2032.

5.2 Traffic impacts

The proposed bypass would provide a shorter travel time, attracting through traffic from the existing highway through town. It is considered that some of the vehicles that currently stop in town do so only because they are driving past and it is convenient to do so. Based on the results of surveys, if the bypass was built between 40 per cent and 90per cent of stopping traffic would stay on the bypass and no longer stop in town.

Through traffic, some of the existing stopping traffic and some Wagga Wagga Road traffic are forecast to use the bypass. High and low diversion ranges have been used to show the likely bounds of traffic diversion. The numbers and proportions of vehicles forecast to use the bypass and the existing highway in the year of opening (2012) are shown in Tables 5-1 and 5-2.

Table 5-1 2012 forecast southbound traffic, north of Wagga Wagga Road, Holbrook

Scenario	Vehicle type	North of interchange	Bypass		Existing highway	
		AADT	AADT	Per cent	AADT	Per cent
High diversion to bypass scenario	Light vehicles	1,747	977	56	769	44
	Heavy vehicles	1,295	768	59	527	41
Low diversion to bypass scenario	Light vehicles	1,747	802	46	944	54
	Heavy vehicles	1,295	698	54	597	46

Table 5-2 2012 forecast northbound traffic, south of Holbrook

Scenario	Vehicle Type	South of Interchange	Bypass		Existing highway	
		AADT	AADT	Per cent	AADT	Per cent
High diversion to bypass scenario	Light vehicles	1,782	914	51	868	49
	Heavy vehicles	1,297	888	68	410	32
Low diversion to bypass scenario	Light vehicles	1,782	780	44	1,002	56
	Heavy vehicles	1,297	819	63	478	37

The high diversion scenario forecasts that 54 per cent of light vehicles and 64 per cent of heavy vehicles would use the bypass, while for the low diversion scenario, 45 per cent of light vehicles and 59 per cent of heavy vehicles are forecast to use the bypass. The difference between the scenarios is the amount of stopping traffic that switches to the bypass.

If the traffic that is committed to entering Holbrook (residents, people with business in Holbrook, Culcairn Road traffic) is excluded from the assessment, the vehicles which could potentially use the bypass are as follows:

- Low diversion scenario: 80 per cent of through traffic uses the bypass, 20 per cent use the existing highway
- High diversion scenario: 90 per cent of through traffic uses the bypass, 10 per cent use the existing highway.

If future growth in traffic occurs at a rate higher than that assumed in this report, it is likely that the majority of this additional growth would use the bypass as opposed to the existing highway.

Local access would be maintained to all properties. Some changes to access would be required around Culcairn Road, Wagga Wagga Road and Tip Road, as well as to some private properties along the bypass alignment. The realigning of Tip Road and connection to Culcairn Road, as well as the closure of Anderson Lane at Wagga Wagga Road would change access to these roads but would. Anderson Lane would be closed at its western end. Cyclists would be encouraged to continue to use the existing highway through Holbrook. Further investigation is required into the location of future travelling stock routes to connect the travelling stock reserves.

5.3 Crash potential

With the construction of the dual carriageway bypass, some traffic would be moved from the existing highway to the new road, which is anticipated to have a lower crash rate.

Typically, dual carriageway roads experience lower crash rates than single carriageway roads because they create separation between the two traffic flows. On single carriageway roads, crossing the road centreline could mean a head-on crash. The provision of two lanes each way would create safe overtaking opportunities. It is anticipated that the proposed bypass would be designed to a higher safety level than the existing highway. The removal of traffic from the town would create larger gaps in traffic, allowing easier and safer turns at intersections.

Using RTA percentage reductions for the various crash types and applying these to the crash types recorded on the highway at Holbrook, it is anticipated that the proposed bypass would have a crash rate 19 per cent lower than the existing highway. Projecting this reduction over a 20 year timeframe from the time of opening, the construction of the upgrade is forecast to result in eight less crashes including three less injury crashes compared to the 'do nothing' scenario.

5.4 Construction impacts

Construction of the bypass is expected to take two years. Construction activity is proposed between 6 am and 7 pm Monday to Friday, and between 7 am and 4 pm Saturday. However, some construction activity affecting traffic would occur outside these hours.

Most of the construction activity would be contained within the site boundary and would not affect traffic or access. The areas of construction at the northern and southern tie-ins, Wagga Wagga Road, Culcairn Road and Tip Road would affect traffic. Construction would be staged to minimise disruption.

A construction traffic management plan would be prepared, which would detail how the traffic impacts associated with the construction of the bypass would be managed. Temporary construction traffic arrangements would have short-term impacts on general traffic and may involve temporary diversions. Some reductions in road speed limits may be required to protect the safety of construction personnel and the travelling public.

Site compounds and one or more concrete batching plants would be required to during the construction of the Project. No specific locations for compounds and concrete batching are proposed at this stage. Access to the site compounds and batching plants would be required for staff and material deliveries. Temporary internal haul roads would be built along the alignment, including creek crossings.

Construction works along the highway on the northern and southern tie-ins would need to take into consideration the need for school bus stops, pedestrians and bicycles, and the travelling stock routes.

The construction activities would result in an increase in traffic volumes on the Hume Highway and on streets such as Culcairn Road, Wagga Wagga Road and Andersons Lane. Additional traffic would be associated with the transport of construction materials, the delivery of plant and equipment, staff movement and construction activities outside the site boundary. This would increase weekday volumes on the highway by 15 per cent of light vehicles and 18 per cent of heavy vehicles. The performance of the existing highway would remain within the range of Level of Service B with the additional construction traffic movements.

Appendix A

RTA 2006 traffic volume data

DAILY TRAFFIC VOLUMES Year 2006

HUME HWY,SH2 HOLBROOK-1.9K N OF MR331,YOUNG ST Station No. 95.002.C

Week	Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Total	Percent	GW	FW	F'W
1	2/01/06	11915 p	10969	12418	12651	11851	8405	9155	77364	2.2274	0.8748	0.7970	0.8943
2	9/01/06	10876	11397	10669	11764	10999	7659	7954	71318	2.0533	0.9366	0.8565	0.9610
3	16/01/06	9772	11050	11266	11855	11136	7644	7286	70009	2.0156	0.9541	0.8662	0.9720
4	23/01/06	9939	11593	11219	9800 p	8258	6637	8714	66160	1.9048	1.0158	0.9307	1.0444
5	30/01/06	9825	10793	10933	11217	10040	5857	6601	65266	1.8791	1.0234	0.9035	1.0138
6	6/02/06	4338	4802	11333	11579	10831	6425	6779	56087	1.6148	1.1909	1.1126	1.2484
7	13/02/06	9600	10533	11003	11143	10299	6233	6911	65722	1.8922	1.0163	0.9074	1.0182
8	20/02/06	9338	10517	11119	11536	10743	6195	7310	66758	1.9220	1.0005	0.8959	1.0053
9	27/02/06	9349	11253	11265	11688m	10902	6158	7011	67626m	1.9470	0.9877	0.8761	0.9831
10	6/03/06	9653	11161	11424	12042	11579	7455	6740	70054	2.0169	0.9535	0.8541	0.9584
11	13/03/06	9573	10314	11753	12015	11400	6913	7381	69349	1.9966	0.9632	0.8666	0.9724
12	20/03/06	10827	11480	11657	12240	11111	6993	7819	72127	2.0766	0.9261	0.8324	0.9340
13	27/03/06	10253	11264	11944	11776	11224	6631	7151	70243	2.0224	0.9509	0.8450	0.9482
14	3/04/06	10479	11673	11686	11806	11086	6631	7390	70751	2.0370	0.9441	0.8410	0.9437
15	10/04/06	8803	11016	13468	15478	12821 p	3781	4484	69851	2.0111	1.0039	0.7827	0.8783
16	17/04/06	13370 p	12530	12396	12376	11986	7929	7645	78232	2.2524	0.8827	0.7744	0.8689
17	24/04/06	8141	9261 p	9749	11752	10697	6931	7253	63784	1.8364	1.0501	0.9462	1.0617
18	1/05/06	9358	10669	10742	11110	10223	6003	6105	64210	1.8487	1.0402	0.9157	1.0275
19	8/05/06	8591	10378	10804	10867	9595	5573	5925	61733	1.7773	1.0820	0.9497	1.0657
20	15/05/06	8885	10392	10489	10743	9881	5598	5987	61975	1.7843	1.0778	0.9468	1.0624
21	22/05/06	8697	10128	10533	10639	9544	5379	6176	61096	1.7590	1.0933	0.9630	1.0806
22	29/05/06	8466	9707	10321	10471	9675	5670	5768	60078	1.7297	1.1118	0.9809	1.1006
23	5/06/06	8681	10348	10516	11001	11749	6573	2987	61855	1.7809	1.0798	0.9123	1.0237
24	12/06/06	8362 p	8597	9950	10180	9218	5743	5650	57700	1.6612	1.1604	1.0059	1.1287
25	19/06/06	8474	10148	10411	11084	9794	5567	6072	61550	1.7721	1.0852	0.9559	1.0726
26	26/06/06	8361	9873	10324	10471	9885	6653	7046	62613	1.8027	1.0668	0.9754	1.0945
27	3/07/06	8976	10470	10659	11483	10430	7000	6931	65949	1.8987	1.0128	0.9172	1.0292
28	10/07/06	8964	10492	10336	10703	9705	6154	6539	62893	1.8107	1.0620	0.9504	1.0664
29	17/07/06	7862	9689	9997	10113	9642	5612	6512	59427	1.7110	1.1240	1.0086	1.1317
30	24/07/06	8170	9748	10084	9729	9309	5410	6137	58587	1.6868	1.1401	1.0142	1.1381
31	31/07/06	8730	10049	10107	10493	9340	5300	5743	59762	1.7206	1.1177	0.9793	1.0989
32	7/08/06	8333	10057	10405	10500	9436	5448	5803	59982	1.7269	1.1136	0.9790	1.0986
33	14/08/06	8457	9913	10041	10271	9502	5482	5947	59613	1.7163	1.1205	0.9902	1.1111
34	21/08/06	8636	10099	10400	10291	9426	5657	5987	60496	1.7417	1.1041	0.9766	1.0959
35	28/08/06	8691	10221	10428	11120	10232	6057	6274	63023	1.8145	1.0598	0.9412	1.0561
36	4/09/06	9122	10496	10401	10942	10082	6000	6536	63579	1.8305	1.0506	0.9347	1.0488
37	11/09/06	9034	10689	10781	11438	10753	6883	6795	66373	1.9109	1.0063	0.9054	1.0159
38	18/09/06	10441	11253	11436	12053	11057	6999	6653	69892	2.0123	0.9557	0.8483	0.9519
39	25/09/06	9484	11239	11903	12829	13572	8221	6692	73940	2.1288	0.9034	0.8083	0.9070
40	2/10/06	11010 p	11069	12367	12559	11856	6965	7566	73392	2.1130	0.9178	0.7976	0.8950
41	9/10/06	11607	11863	11800	12013	11470	6953	7293	72999	2.1017	0.9150	0.8120	0.9112
42	16/10/06	9571	10983	11383	11590	9040	6642	6637	65846	1.8958	1.0144	0.9076	1.0184
43	23/10/06	9356	10945	11407	11535	10798	6154	6847	67042	1.9302	0.9963	0.8828	0.9906
44	30/10/06	9254	11119	11470	11835	12173	7497	6846	70194	2.0209	0.9516	0.8542	0.9585
45	6/11/06	9006	10612	10526	11753	10680	6566	7268	66411	1.9120	1.0058	0.9074	1.0182
46	13/11/06	9437	11155	11881	12077	11326	7053	7405	70334	2.0250	0.9497	0.8539	0.9581
47	20/11/06	9761	11301	11691	12071	11562	6676	7281	70343	2.0252	0.9495	0.8461	0.9494
48	27/11/06	10206	11648	11776	12195	11350	6605	7407	71187	2.0495	0.9383	0.8345	0.9363
49	4/12/06	10031	11646	12192	12569	11212	7009	6908	71567	2.0605	0.9333	0.8276	0.9286
50	11/12/06	10308	11787	12351	12292	11349	7818	7242	73147	2.1060	0.9131	0.8214	0.9216
51	18/12/06	10483	12615	13107	13920	15560	14725	5863	86273	2.4839	0.7742	0.7263	0.8150
52	25/12/06	2616 p	10023 p	13314	13249	12317	10584	5455	67558	1.9451	0.8687	0.7363	0.8262
										AADT	AAWT	AAWE	AAPH
Annual Averages:		9238	10675	11185	11590	10723	6706	6690	66795	9542	10707	6698	9909

p indicates Public Holiday

2006 RTA classified count for Hume Highway, North of Holbrook

Table 1. Northbound (adjusted) traffic volume

	Sun			Mon			Tue			Wed			Thu			Fri			Sat			Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
Time	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehic	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	6	8	14	7	32	39	6	88	94	7	95	102	9	102	111	12	95	107	14	56	70	8	84	92	10	32	42	9	68	77
1:00	5	8	13	6	24	30	5	67	72	4	73	77	6	75	80	8	76	84	11	44	55	6	64	70	8	26	34	6	52	59
2:00	4	5	9	6	15	21	4	43	46	4	47	51	5	51	56	10	49	58	10	30	40	6	42	48	7	18	25	6	34	40
3:00	5	5	10	7	11	18	5	27	31	4	29	33	5	32	37	10	30	40	10	20	31	6	27	33	8	13	20	7	22	29
4:00	6	4	10	10	11	21	7	19	27	7	20	27	8	23	31	13	20	33	15	14	28	9	21	30	10	9	19	9	16	25
5:00	11	4	15	19	11	30	15	18	33	15	20	34	16	21	36	22	19	41	22	12	34	17	22	39	17	8	25	17	15	32
6:00	21	5	25	33	14	47	26	21	46	26	22	48	30	22	51	40	22	62	38	13	51	31	27	58	29	9	38	30	17	47
7:00	39	7	46	53	17	71	43	24	67	46	24	70	51	25	76	67	25	92	64	13	77	52	34	86	52	10	62	52	19	71
8:00	65	9	74	79	18	97	62	25	86	60	25	84	71	26	97	99	22	121	98	15	113	74	39	113	81	12	93	76	20	96
9:00	99	11	111	112	20	133	84	27	110	84	26	110	92	25	116	133	23	156	128	16	144	101	46	147	114	14	128	105	21	126
10:00	133	16	149	135	23	158	94	27	121	92	26	118	111	29	140	153	24	178	140	17	158	117	53	170	137	17	153	123	23	146
11:00	151	17	169	137	26	163	92	29	122	88	29	117	103	29	132	149	27	176	131	18	149	114	55	169	141	18	159	122	25	147
12:00	163	22	185	136	25	161	88	30	118	89	30	119	101	30	132	147	28	175	131	21	151	112	56	168	147	21	168	122	27	149
13:00	171	25	196	144	29	173	94	32	127	91	33	124	103	31	134	149	25	174	124	19	143	116	59	175	148	22	170	125	28	153
14:00	169	29	198	139	36	175	94	38	132	90	37	127	105	34	139	133	26	159	111	17	128	112	62	174	140	23	163	120	31	151
15:00	152	37	188	121	42	163	82	46	128	78	45	123	92	42	134	126	28	154	90	16	105	100	65	165	121	26	147	106	36	142
16:00	119	45	164	92	49	140	66	54	121	66	54	120	80	49	129	116	30	145	70	18	88	84	66	150	94	32	126	87	43	130
17:00	89	52	142	70	56	126	49	58	107	52	61	114	65	54	118	96	31	127	54	18	72	66	66	132	72	35	107	68	47	115
18:00	62	56	118	43	63	106	32	71	103	30	68	98	45	61	105	71	32	103	37	16	53	44	68	112	49	36	85	46	52	98
19:00	45	57	102	28	71	100	22	76	98	22	76	98	33	70	103	48	31	79	26	16	42	31	70	101	36	37	72	32	57	89
20:00	34	58	91	20	78	98	18	78	96	17	84	102	28	74	102	35	37	72	20	15	35	24	74	98	27	36	63	24	61	85
21:00	24	48	71	16	81	98	14	90	104	15	90	105	22	82	104	30	42	72	14	14	28	19	80	100	19	31	50	19	64	83
22:00	15	42	58	12	89	101	10	99	110	12	103	115	19	95	113	21	50	70	11	11	22	15	89	104	13	27	40	14	70	84
23:00	9	38	47	9	96	105	9	105	115	11	108	120	15	100	115	17	53	70	8	10	18	12	94	107	9	24	32	11	73	84
Total	**1597**	**609**	**2206**	**1435**	**937**	**2372**	**1021**	**1193**	**2214**	**1009**	**1224**	**2233**	**1213**	**1180**	**2393**	**1706**	**842**	**2548**	**1375**	**461**	**1836**	**1277**	**1362**	**2639**	**1486**	**535**	**2021**	**1337**	**921**	**2258**

Summary of northbound volume

Day	Light	Heavy	Total
Sunday	1597	609	2206
Monday	1435	937	2372
Tuesday	1021	1193	2214
Wednesday	1009	1224	2233
Thursday	1213	1180	2393
Friday	1706	842	2548
Saturday	1375	461	1836

AAWT	1277	1362	2639
AAWE	1486	535	2021
AADT	1337	921	2258

Table 2. Southbound traffic volume

	Sun			Mon			Tue			Wed			Thu			Fri			Sat			Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
Time	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehic	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	8	9	17	11	21	32	10	85	95	10	99	109	10	102	112	17	101	118	18	62	80	11	84	95	13	36	49	12	69	81
1:00	7	8	15	7	17	25	9	79	88	8	90	98	9	96	105	14	95	109	16	58	73	9	77	86	11	33	44	10	63	73
2:00	6	6	12	7	15	22	6	60	65	6	69	75	6	73	79	11	74	85	13	53	66	7	59	67	9	29	39	8	50	58
3:00	7	5	12	6	13	20	5	45	50	6	48	54	6	50	56	11	52	62	11	42	53	7	43	50	9	23	32	7	37	44
4:00	7	4	11	8	13	22	7	33	41	7	37	44	8	38	45	10	36	47	10	30	41	8	33	41	8	17	26	8	27	36
5:00	7	5	12	15	13	28	11	27	38	10	29	39	11	31	42	17	32	49	14	22	36	13	29	42	11	13	24	12	22	35
6:00	14	5	19	22	14	35	18	26	44	19	29	48	21	29	51	27	28	55	23	20	44	21	30	51	18	13	31	21	22	42
7:00	24	6	30	36	15	51	35	27	61	34	29	64	38	32	72	51	31	81	44	21	65	39	34	73	34	14	48	38	23	61
8:00	49	9	58	61	18	79	54	25	80	58	31	89	66	29	96	85	27	112	77	20	97	65	38	103	63	15	77	64	23	87
9:00	87	11	98	93	21	114	80	26	105	81	28	109	98	29	127	129	28	157	122	21	143	96	45	141	104	16	120	98	23	122
10:00	119	13	132	129	24	153	108	26	133	99	28	128	127	29	156	167	28	196	153	19	172	126	53	179	136	16	152	129	24	153
11:00	148	16	164	152	25	177	119	27	146	121	31	152	141	31	172	187	28	215	171	19	190	144	59	203	160	17	177	148	26	174
12:00	162	17	179	156	27	184	122	29	151	116	33	149	135	33	168	177	30	206	157	18	175	141	62	203	160	18	177	146	27	173
13:00	161	19	180	153	30	184	111	33	144	110	37	147	126	36	162	167	32	199	147	18	165	134	64	198	154	18	172	140	29	169
14:00	166	22	188	155	39	193	116	39	155	112	44	156	128	42	171	171	37	208	138	19	157	136	71	208	152	20	173	141	35	175
15:00	162	25	187	148	51	199	109	49	158	111	52	162	124	51	175	170	41	212	125	18	143	133	78	211	143	21	165	136	41	177
16:00	151	27	178	123	60	183	97	57	153	96	63	159	114	57	171	154	43	196	107	17	124	117	80	197	129	22	151	120	46	166
17:00	126	31	157	94	67	161	73	61	135	78	67	145	99	67	166	136	48	184	88	18	105	96	81	177	107	24	131	99	51	150
18:00	98	33	131	62	71	133	53	65	118	54	73	126	74	69	143	113	48	161	62	18	80	71	78	149	80	25	106	74	54	128
19:00	72	35	107	44	74	118	34	70	104	36	75	111	53	74	126	88	49	137	42	15	57	51	77	128	57	25	82	53	56	109
20:00	50	33	83	29	71	101	23	73	96	25	79	104	42	75	116	70	49	119	28	16	44	38	75	113	39	24	64	38	56	95
21:00	35	32	67	20	72	92	18	77	95	18	81	99	32	77	109	50	52	102	21	13	35	28	76	104	28	22	51	28	58	86
22:00	26	28	54	15	76	91	14	84	98	14	87	101	25	84	109	36	52	87	15	11	26	21	79	100	20	19	40	21	60	81
23:00	15	26	41	13	80	93	11	85	96	12	91	103	21	88	109	26	56	81	10	11	21	16	82	99	13	18	31	15	62	78
Total	**1707**	**424**	**2131**	**1559**	**928**	**2487**	**1242**	**1208**	**2450**	**1241**	**1329**	**2570**	**1515**	**1323**	**2838**	**2084**	**1095**	**3179**	**1613**	**578**	**2192**	**1528**	**1488**	**3017**	**1660**	**501**	**2161**	**1566**	**984**	**2550**

Summary of southbound volume

Day	Light	Heavy	Total
Sunday	1707	424	2131
Monday	1559	928	2487
Tuesday	1242	1208	2450
Wednesday	1241	1329	2570
Thursday	1515	1323	2838
Friday	2084	1095	3179
Saturday	1613	578	2192

AAWT	1528	1488	3017
AAWE	1660	501	2161
AADT	1566	984	2550

Appendix B

2008 traffic volumes

2008 Traffic volume on Hume Highway, south of Holbrook

Table 1. Northbound traffic volume

	Sun			Mon			Tue			Wed			Thu			Fri			Sat			Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
Time	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	5	4	9	14	29	43	36	108	144	36	107	143	45	115	159	40	96	136	32	73	105	34	91	125	19	38	57	30	76	106
1:00	6	10	16	11	26	37	27	93	120	26	84	110	23	86	108	29	79	108	20	59	79	23	74	97	13	34	48	20	62	83
2:00	5	6	11	9	23	32	22	56	78	19	58	77	23	56	79	25	55	80	18	38	56	20	50	69	12	22	34	17	42	59
3:00	5	3	9	11	15	26	11	42	53	14	47	61	12	30	43	14	37	51	12	21	33	13	34	47	9	12	21	11	28	39
4:00	5	3	8	16	14	30	11	24	35	12	24	36	9	26	35	17	28	45	22	15	37	13	23	36	14	9	23	13	19	32
5:00	9	6	16	41	19	60	41	26	68	41	34	75	47	27	74	40	34	74	25	17	42	42	28	70	17	12	29	35	23	58
6:00	14	4	18	116	37	153	114	54	167	118	59	177	103	58	161	99	49	148	38	12	50	110	51	161	26	8	34	86	39	125
7:00	33	7	40	65	42	107	64	60	125	59	54	113	69	49	118	72	47	119	54	16	70	66	51	116	43	12	55	59	39	99
8:00	50	15	65	75	52	127	65	58	122	58	52	111	66	59	125	95	35	129	82	18	100	72	51	123	66	17	83	70	41	111
9:00	80	15	95	108	39	147	92	58	150	99	52	150	115	51	166	133	43	176	105	17	122	109	48	158	93	16	108	105	39	144
10:00	133	18	150	141	53	194	102	55	157	101	57	158	128	52	180	156	34	190	132	15	148	126	50	176	133	17	149	128	41	168
11:00	173	21	194	147	57	204	112	53	165	106	52	158	121	48	170	152	34	186	112	21	133	128	49	177	143	21	164	132	41	173
12:00	166	27	193	136	57	193	101	51	152	102	59	161	117	55	172	142	36	178	114	23	137	120	52	171	140	25	165	126	44	170
13:00	182	30	212	153	69	222	124	59	183	101	53	154	132	49	180	157	36	193	103	21	124	133	53	187	142	25	168	136	45	181
14:00	173	42	215	148	62	209	109	74	183	97	66	163	106	53	159	146	32	178	91	17	108	121	57	178	132	30	162	124	49	174
15:00	166	41	207	136	76	212	87	80	168	102	73	175	89	70	158	124	38	162	78	21	99	108	67	175	122	31	153	112	57	169
16:00	155	55	210	102	77	179	80	82	162	88	77	166	96	70	166	119	41	160	64	21	85	97	69	167	109	38	147	101	60	161
17:00	105	56	161	89	96	185	68	77	145	68	73	141	80	81	161	106	37	142	58	28	86	82	73	155	81	42	124	82	64	146
18:00	81	60	141	72	82	154	58	93	151	53	84	138	79	79	158	85	33	118	50	24	74	69	74	144	65	42	108	68	65	133
19:00	57	63	120	43	76	119	36	87	123	42	82	123	40	80	120	48	35	83	26	16	42	42	72	114	41	40	81	42	63	104
20:00	41	57	98	32	86	118	31	80	111	36	89	125	26	88	114	46	38	84	30	16	46	34	76	110	35	36	72	35	65	99
21:00	35	52	88	31	93	124	31	98	130	33	89	122	31	84	114	31	46	77	16	13	30	32	82	114	26	33	59	30	68	98
22:00	16	45	61	30	106	136	26	102	128	35	115	150	38	115	153	39	70	110	7	12	20	34	102	135	12	28	40	27	81	108
23:00	16	34	50	33	104	138	33	119	152	39	117	156	51	113	164	33	67	100	9	9	18	38	104	142	12	22	34	31	80	111
Total	**1715**	**673**	**2388**	**1757**	**1392**	**3149**	**1481**	**1691**	**3172**	**1485**	**1657**	**3142**	**1442**	**1528**	**2970**	**2003**	**1183**	**3186**	**1296**	**545**	**1842**	**1663**	**1482**	**3146**	**1506**	**609**	**2115**	**1618**	**1233**	**2851**

Table 2. Southbound traffic volume

	Sun			Mon			Tue			Wed			Thu			Fri			Sat			Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
Time	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	5	12	17	13	17	30	11	106	118	9	93	102	10	104	114	16	119	135	22	59	81	12	88	100	14	35	49	12	73	85
1:00	7	15	22	12	20	32	7	100	107	10	113	123	8	108	116	10	113	124	23	82	105	10	91	100	15	48	64	11	79	90
2:00	5	4	9	6	14	20	5	74	78	8	71	78	9	84	93	7	63	70	9	63	72	7	61	68	7	34	41	7	53	60
3:00	5	5	10	8	17	25	6	53	59	4	45	49	5	57	62	4	37	41	8	42	50	5	42	47	7	23	30	6	37	42
4:00	3	6	9	4	7	11	7	37	43	7	36	42	4	32	36	8	32	40	11	33	45	6	28	34	7	20	27	6	26	32
5:00	5	5	9	9	18	27	9	28	37	7	36	43	4	30	34	14	27	40	10	24	34	8	28	36	7	14	22	8	24	32
6:00	4	5	9	20	23	42	15	32	47	14	33	47	22	32	54	21	29	50	16	25	41	18	30	48	10	15	25	16	25	41
7:00	11	5	16	26	19	46	34	52	86	30	41	71	33	37	70	32	38	70	32	20	52	31	37	69	22	12	34	28	30	59
8:00	29	5	33	56	22	78	48	51	99	42	45	86	49	49	98	54	33	87	47	20	66	50	40	90	38	12	50	46	32	78
9:00	54	10	64	69	41	110	68	48	116	64	50	114	76	56	132	84	35	119	80	23	102	72	46	118	67	16	83	71	38	108
10:00	83	12	96	100	49	149	71	55	126	76	47	123	101	49	150	106	36	142	104	18	122	91	47	138	94	15	109	92	38	130
11:00	113	21	134	114	46	160	87	54	142	93	48	141	122	52	175	145	46	191	128	23	151	112	49	162	120	22	143	115	42	156
12:00	126	21	147	142	55	197	93	49	142	98	53	151	129	54	183	181	44	225	124	18	142	129	51	180	125	19	145	128	42	170
13:00	132	18	150	126	57	183	108	67	174	87	56	143	115	65	180	165	45	210	135	20	155	120	58	178	133	19	152	124	47	171
14:00	141	19	160	118	65	184	98	63	162	103	51	155	113	58	170	156	49	205	102	16	118	118	57	175	122	17	139	119	46	165
15:00	145	24	169	130	82	212	110	80	190	106	81	187	120	85	205	150	52	202	108	20	128	123	76	199	127	22	149	124	61	185
16:00	133	26	160	117	89	206	103	93	196	101	81	182	127	71	198	154	59	213	88	14	102	120	79	199	111	20	131	118	62	180
17:00	115	36	152	135	94	229	133	85	218	157	102	259	137	92	229	152	60	213	76	17	93	143	87	230	96	27	122	129	70	199
18:00	90	40	129	103	87	190	77	80	157	84	84	167	89	97	186	108	54	162	72	16	89	92	80	172	81	28	109	89	65	154
19:00	75	35	110	46	85	131	40	85	125	35	74	109	63	75	138	90	50	141	36	15	51	55	74	129	55	25	80	55	60	115
20:00	50	35	85	32	85	116	31	78	109	24	84	107	38	82	120	73	46	119	32	17	50	39	75	114	41	26	67	40	61	101
21:00	33	41	75	26	74	99	23	84	106	15	73	87	37	91	128	57	53	110	17	15	32	31	75	106	25	28	53	30	61	91
22:00	17	30	47	13	81	94	16	86	102	13	84	97	25	83	108	28	45	73	10	14	24	19	76	95	13	22	35	17	60	78
23:00	11	36	47	11	95	106	13	94	107	10	102	113	15	98	113	25	62	88	14	10	24	15	90	105	12	23	35	14	71	85
Total	**1394**	**463**	**1857**	**1434**	**1243**	**2677**	**1213**	**1634**	**2847**	**1197**	**1581**	**2778**	**1427**	**1536**	**2963**	**1983**	**1189**	**3172**	**1305**	**624**	**1930**	**1427**	**1466**	**2893**	**1350**	**544**	**1893**	**1405**	**1202**	**2607**

Table 3. Combination

	Sun			Mon			Tue			Wed			Thu			Fri			Sat			Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
Time	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	11	16	26	27	46	74	48	214	262	45	200	245	54	219	273	56	216	272	54	132	186	46	185	231	33	74	106	42	149	191
1:00	14	24	38	23	47	69	34	193	227	36	197	233	30	194	225	39	193	232	43	141	185	32	169	202	29	83	111	31	141	173
2:00	10	10	21	14	37	51	27	130	157	27	129	156	32	140	172	31	118	149	27	101	128	26	114	140	19	56	74	24	95	119
3:00	11	8	19	18	33	51	17	95	112	19	92	110	17	87	105	18	74	92	20	63	83	18	80	98	16	35	51	17	65	82
4:00	9	9	17	20	21	40	18	61	78	19	60	78	12	58	71	25	59	85	33	48	82	19	56	74	21	28	50	19	45	65
5:00	14	11	25	50	37	87	50	54	104	48	70	119	51	57	108	53	60	114	35	40	76	51	66	116	25	26	50	43	47	90
6:00	18	9	27	136	59	195	129	86	214	131	92	223	125	90	215	120	78	198	54	37	91	128	108	236	36	23	59	102	64	166
7:00	44	11	55	91	62	153	98	112	211	90	94	184	102	86	188	104	85	189	86	36	122	97	106	203	65	24	89	88	70	157
8:00	79	20	98	131	74	205	112	109	221	100	97	197	115	108	223	149	68	216	129	38	167	121	117	239	104	29	133	116	73	190
9:00	135	24	159	177	80	257	160	106	266	162	102	264	191	107	298	217	78	295	185	39	224	181	130	311	160	32	191	175	77	252
10:00	216	30	246	241	102	343	173	110	283	177	104	281	229	101	330	262	70	332	236	33	270	216	146	362	226	32	258	219	79	298
11:00	286	42	328	260	103	364	200	107	307	199	100	299	244	101	345	297	80	378	240	44	284	240	150	390	263	43	306	247	83	329
12:00	293	47	340	278	112	390	194	100	294	200	112	312	246	109	355	323	80	403	238	41	279	248	158	406	265	44	310	253	86	339
13:00	314	47	361	278	127	405	232	126	357	188	109	297	247	114	360	322	82	403	238	40	278	253	167	420	276	44	320	260	92	352
14:00	314	61	375	266	127	393	207	137	345	201	117	318	218	111	329	301	81	382	193	33	226	239	168	407	253	47	300	243	95	338
15:00	312	65	377	266	158	424	197	160	357	208	154	362	209	155	364	274	90	364	186	41	227	231	197	427	249	53	302	236	118	354
16:00	289	81	370	219	166	385	183	175	358	189	158	348	223	141	364	273	100	373	152	35	187	217	192	409	220	58	278	218	122	341
17:00	220	93	313	224	191	414	201	162	363	225	175	400	217	173	390	258	97	355	134	45	179	225	204	429	177	69	246	211	134	345
18:00	171	100	271	175	169	344	135	173	308	137	168	305	168	177	345	193	87	280	122	40	162	161	190	351	147	70	217	157	131	288
19:00	131	98	230	89	161	250	77	172	249	77	155	232	103	155	257	139	85	224	62	31	93	97	163	260	97	65	161	97	123	219
20:00	91	92	182	64	170	234	62	158	220	60	172	232	65	169	234	119	84	202	62	33	96	74	164	237	76	63	139	75	126	200
21:00	68	94	162	57	166	223	54	182	236	48	162	210	68	175	242	88	99	187	33	28	62	63	168	231	51	61	112	59	129	189
22:00	33	74	108	43	188	230	42	188	231	48	199	247	63	198	261	67	115	182	17	27	44	53	186	239	25	50	76	45	141	186
23:00	27	70	97	44	200	243	46	213	259	49	219	269	66	211	276	59	129	188	23	19	42	53	203	256	25	44	69	45	152	196
Total	**3109**	**1136**	**4244**	**3192**	**2635**	**5826**	**2694**	**3325**	**6019**	**2682**	**3238**	**5920**	**3096**	**3234**	**6330**	**3787**	**2309**	**6097**	**2602**	**1169**	**3771**	**3090**	**3587**	**6677**	**2855**	**1153**	**4008**	**3023**	**2435**	**5458**

Daily

	Northbound			Southbound		
	Light Vehicles	Heavy Vehicles	Total Vehicles	Light Vehicles	Heavy Vehicles	Total Vehicles
AAWT	1,663	1,482	3,146	1,427	1,466	2,893
AAWE	1,506	609	2,115	1,350	544	1,893
AADT	1,618	1,233	2,851	1,405	1,202	2,607

2008 Traffic volume on Hume Highway, north of Holbrook

Table 1. Northbound traffic volume

	Sun			Mon			Tue			Wed			Thu			Fri			Sat			Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
Time	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	8	5	13	15	23	38	25	111	136	30	107	138	31	115	146	40	116	156	26	65	91	28	94	123	17	35	52	25	77	102
1:00	8	12	20	10	22	31	30	98	128	25	100	124	23	98	121	25	90	116	26	71	97	23	82	104	17	42	59	21	70	91
2:00	5	4	9	8	14	22	16	72	88	21	68	89	20	73	93	17	74	91	19	56	75	16	60	77	12	30	42	15	52	67
3:00	5	4	10	7	20	27	15	47	61	14	47	61	12	47	59	23	52	75	10	30	40	14	42	57	8	17	25	12	35	48
4:00	7	5	13	7	10	17	10	35	45	13	26	38	14	31	45	15	26	41	17	21	38	12	25	37	12	13	26	12	22	34
5:00	4	5	10	22	14	37	20	25	45	19	34	52	20	31	51	23	31	55	20	19	39	21	27	48	12	12	24	18	23	41
6:00	13	7	21	51	23	74	49	33	82	52	35	86	47	39	86	48	28	76	29	17	46	49	32	81	21	12	33	41	26	67
7:00	21	4	25	54	31	85	51	49	100	44	47	91	58	44	102	54	45	99	52	20	72	52	43	96	37	12	49	48	34	82
8:00	38	12	50	74	25	99	69	51	120	69	34	103	69	40	109	92	34	126	74	17	91	75	37	112	56	15	71	69	31	100
9:00	75	19	93	102	27	129	80	41	121	88	45	132	113	44	157	125	36	160	103	20	123	101	38	140	89	19	108	98	33	131
10:00	129	16	144	124	37	161	97	42	139	97	37	134	129	39	168	131	36	167	127	15	142	116	38	154	128	15	143	119	32	151
11:00	141	23	164	134	38	173	92	39	131	94	40	134	132	45	177	155	34	189	131	20	151	121	39	161	136	21	157	126	34	160
12:00	171	29	200	143	44	188	105	40	145	95	39	135	132	51	183	159	40	200	121	18	139	127	43	170	146	24	170	132	38	170
13:00	159	20	179	148	48	196	100	59	159	86	47	133	128	50	179	149	30	178	130	23	153	122	47	169	145	21	166	129	40	168
14:00	171	28	200	128	50	178	107	53	160	101	40	141	122	55	177	162	38	200	103	19	122	124	47	171	137	23	161	128	40	168
15:00	175	38	213	154	75	228	105	68	173	108	72	180	117	72	189	151	42	193	98	16	114	127	66	193	137	27	164	130	55	184
16:00	161	31	192	120	77	196	94	75	169	95	83	178	131	77	208	134	46	180	92	18	110	115	71	186	127	24	151	118	58	176
17:00	108	50	157	106	95	202	83	82	165	96	88	184	108	81	189	137	48	185	73	20	93	106	79	185	90	35	125	101	66	168
18:00	97	51	148	83	82	165	63	88	151	66	85	151	74	88	162	111	41	152	66	20	86	79	77	156	82	35	117	80	65	145
19:00	64	50	114	48	70	118	41	88	129	41	73	114	48	75	123	70	41	111	38	16	55	50	69	119	51	33	84	50	59	109
20:00	49	47	96	38	93	131	36	77	112	22	86	108	42	90	132	63	49	112	29	19	48	40	79	119	39	33	72	40	66	106
21:00	40	49	89	42	79	121	30	97	127	18	86	103	40	91	131	41	57	98	15	14	29	34	82	116	27	32	59	32	68	100
22:00	17	40	57	20	85	105	23	96	118	30	105	136	26	89	115	34	47	82	16	9	25	27	84	111	17	24	41	24	67	91
23:00	14	35	49	24	98	122	37	103	139	31	101	131	33	98	131	29	65	93	22	4	26	31	93	123	18	20	37	27	72	99
Total	**1682**	**582**	**2264**	**1661**	**1180**	**2841**	**1377**	**1568**	**2945**	**1355**	**1524**	**2879**	**1442**	**1528**	**2970**	**2003**	**1183**	**3186**	**1436**	**569**	**2005**	**1610**	**1396**	**3007**	**1559**	**575**	**2135**	**1596**	**1162**	**2758**

Table 2. Southbound traffic volume

	Sun			Mon			Tue			Wed			Thu			Fri			Sat			Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
Time	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	8	10	19	12	29	40	29	95	124	30	102	131	27	108	135	29	103	131	23	64	87	25	87	112	16	37	53	23	73	95
1:00	7	10	17	11	25	36	18	102	120	31	95	126	26	101	127	27	100	127	29	64	93	23	84	107	18	37	55	21	71	92
2:00	7	5	11	7	17	24	14	65	79	17	69	85	18	67	85	17	61	78	17	50	66	15	56	70	12	27	39	14	48	61
3:00	5	5	10	7	15	22	13	53	66	18	47	64	12	46	59	9	29	37	14	37	51	12	38	49	9	21	30	11	33	44
4:00	4	1	5	8	10	18	10	29	39	11	37	48	11	27	38	13	34	46	15	30	45	10	27	38	10	16	25	10	24	34
5:00	9	9	17	24	15	38	16	29	45	15	34	48	16	30	46	20	30	51	14	26	39	18	28	46	11	17	28	16	25	41
6:00	13	5	18	47	26	73	46	31	77	44	37	82	48	33	81	50	34	84	27	27	53	47	32	79	20	16	35	39	28	67
7:00	28	8	36	43	29	72	47	49	96	48	39	87	45	35	80	56	36	92	42	13	55	48	38	85	35	10	46	44	30	74
8:00	42	5	47	78	24	102	71	42	113	69	50	119	69	47	116	81	37	119	85	18	103	74	40	114	63	12	75	71	32	103
9:00	85	10	94	93	39	132	93	46	139	82	41	123	98	48	146	116	43	159	111	20	131	97	43	140	98	15	113	97	35	132
10:00	114	8	123	124	36	160	85	44	129	92	45	137	118	46	164	144	27	171	128	14	142	113	39	152	121	11	132	115	31	146
11:00	155	19	174	129	37	166	96	45	141	93	38	131	119	36	156	131	36	166	139	22	161	114	38	152	147	21	168	123	33	156
12:00	151	26	178	122	39	161	109	43	152	97	43	140	99	42	141	177	42	219	131	19	151	121	42	163	141	23	164	127	36	163
13:00	165	26	191	129	51	180	125	57	181	91	47	137	115	58	173	171	34	205	134	18	152	126	49	175	149	22	172	133	42	174
14:00	147	33	180	146	59	205	116	62	178	102	46	147	117	48	166	151	45	197	108	16	124	126	52	179	127	25	152	127	44	171
15:00	156	29	185	131	59	190	92	70	162	112	63	174	103	59	162	147	41	188	105	20	126	117	58	175	131	25	155	121	49	169
16:00	145	39	185	116	79	195	100	81	181	91	80	171	115	78	193	161	51	212	97	20	116	117	74	190	121	29	150	118	61	179
17:00	132	45	177	108	79	187	109	78	187	93	79	172	102	84	186	138	48	186	84	22	106	110	74	184	108	34	141	109	62	172
18:00	81	53	134	75	81	156	68	83	151	68	84	152	72	89	161	108	45	154	67	22	89	78	76	155	74	38	112	77	65	142
19:00	69	46	115	51	86	137	42	82	125	38	74	112	60	81	141	72	46	118	41	19	60	53	74	126	55	32	87	53	62	115
20:00	46	49	95	29	94	123	33	81	115	28	80	109	36	80	116	53	37	90	29	17	46	36	74	110	38	33	70	36	63	99
21:00	35	48	83	30	86	116	26	91	117	32	81	113	35	80	115	50	43	92	18	16	34	34	76	111	26	32	58	32	64	96
22:00	18	36	54	19	91	110	25	97	122	22	97	120	39	110	149	37	63	100	10	15	25	28	92	120	14	26	39	24	73	97
23:00	16	34	51	21	97	118	25	111	136	22	112	135	29	99	128	33	69	103	12	12	24	26	98	124	14	23	37	23	77	99
Total	**1638**	**562**	**2199**	**1559**	**1201**	**2760**	**1407**	**1565**	**2972**	**1347**	**1520**	**2867**	**1427**	**1536**	**2963**	**1983**	**1189**	**3172**	**1479**	**599**	**2078**	**1566**	**1391**	**2957**	**1558**	**580**	**2139**	**1564**	**1159**	**2723**

Table 3. Combination

	Sun			Mon			Tue			Wed			Thu			Fri			Sat			Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
Time	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	16	16	32	27	51	78	55	205	260	60	209	269	59	223	281	68	218	287	49	129	178	54	187	240	33	72	105	48	150	198
1:00	16	22	37	21	46	67	48	200	248	56	195	251	49	199	248	52	190	243	55	135	190	45	170	215	35	79	114	42	141	183
2:00	12	8	21	14	32	46	30	137	167	37	137	175	38	140	178	35	135	170	36	106	142	31	119	150	24	57	81	29	99	128
3:00	10	9	20	13	35	49	28	99	127	32	93	125	24	93	118	32	81	113	24	67	91	26	83	109	17	38	55	23	68	92
4:00	11	7	18	15	20	35	20	63	83	24	63	87	24	59	83	28	59	87	32	51	84	22	56	78	22	29	51	22	46	68
5:00	13	14	27	46	29	75	36	54	90	33	67	101	36	61	97	44	62	105	33	45	78	39	64	103	23	29	53	34	48	82
6:00	26	12	38	98	49	146	95	64	159	96	72	168	95	72	167	98	62	160	56	44	99	96	83	180	41	28	69	80	54	134
7:00	50	11	61	97	60	157	98	98	196	93	86	178	103	79	182	110	81	191	95	33	128	100	100	200	72	22	94	92	64	156
8:00	80	17	98	152	49	201	140	93	233	139	84	223	138	87	225	173	72	245	159	35	194	148	107	256	119	26	146	140	62	203
9:00	160	28	188	195	66	261	173	87	260	170	86	256	211	92	303	241	79	320	214	40	254	198	121	319	187	34	221	195	68	263
10:00	243	24	267	248	73	320	182	87	269	189	83	271	247	85	332	275	62	337	255	29	284	228	127	356	249	26	275	234	63	297
11:00	296	42	338	264	75	339	188	83	271	187	78	266	251	82	332	285	70	355	270	42	312	235	130	365	283	42	325	249	67	316
12:00	322	56	378	265	83	348	214	84	298	193	83	275	231	93	324	336	82	418	252	37	290	248	138	386	287	47	334	259	74	333
13:00	324	46	370	277	99	376	224	116	340	177	93	270	243	108	352	319	64	383	264	41	305	248	151	400	294	43	338	261	81	342
14:00	318	62	380	274	109	383	223	115	338	203	85	288	239	103	343	313	83	397	211	34	246	251	154	404	265	48	313	255	85	339
15:00	331	67	398	284	133	418	196	138	335	220	135	354	220	132	351	298	83	381	203	36	240	244	181	425	267	52	319	250	103	354
16:00	307	70	377	236	155	391	194	156	350	186	163	349	246	155	401	296	97	392	189	37	226	231	192	424	248	54	301	236	119	355
17:00	239	95	334	214	175	389	192	160	352	189	167	356	210	165	375	275	96	371	157	42	199	216	195	411	198	69	267	211	129	339
18:00	178	104	282	158	163	321	131	171	301	134	169	303	146	177	323	219	86	305	133	42	175	158	185	342	155	73	228	157	130	287
19:00	133	96	228	99	156	255	84	170	254	79	147	226	108	156	264	141	87	229	80	35	115	102	163	265	106	65	172	103	121	224
20:00	95	95	191	67	187	254	69	158	227	50	167	217	78	170	248	116	86	201	58	36	94	76	167	243	76	66	142	76	128	204
21:00	75	98	172	72	165	237	56	188	244	50	167	217	75	171	246	91	100	191	33	30	63	69	173	241	54	64	118	65	131	196
22:00	35	76	110	39	176	215	48	193	241	53	203	255	65	199	264	71	111	182	26	24	50	55	184	239	30	50	80	48	140	188
23:00	30	69	99	45	195	240	61	214	275	53	213	266	62	197	259	62	134	196	33	16	50	57	200	256	32	43	75	50	148	198
Total	**3320**	**1143**	**4464**	**3220**	**2381**	**5601**	**2784**	**3134**	**5917**	**2702**	**3044**	**5746**	**3199**	**3097**	**6296**	**3978**	**2280**	**6258**	**2916**	**1168**	**4083**	**3177**	**3431**	**6608**	**3118**	**1156**	**4274**	**3160**	**2321**	**5481**

Daily

	Northbound			Southbound		
	Light Vehicles	Heavy Vehicles	Total Vehicles	Light Vehicles	Heavy Vehicles	Total Vehicles
AAWT	1,610	1,396	3,007	1,566	1,391	2,957
AAWE	1,559	575	2,135	1,558	580	2,139
AADT	1,596	1,162	2,758	1,564	1,159	2,723

Peak Hours

	Northbound			Southbound		
	Light Vehicles	Heavy Vehicles	Total Vehicles	Light Vehicles	Heavy Vehicles	Total Vehicles
Weekday midday peak	127	66	193	117	58	175
Weekday night-time truck peak	31	93	123	26	98	124
Weekend	145	21	166	149	22	172
Weekly	118	58	176	118	61	179

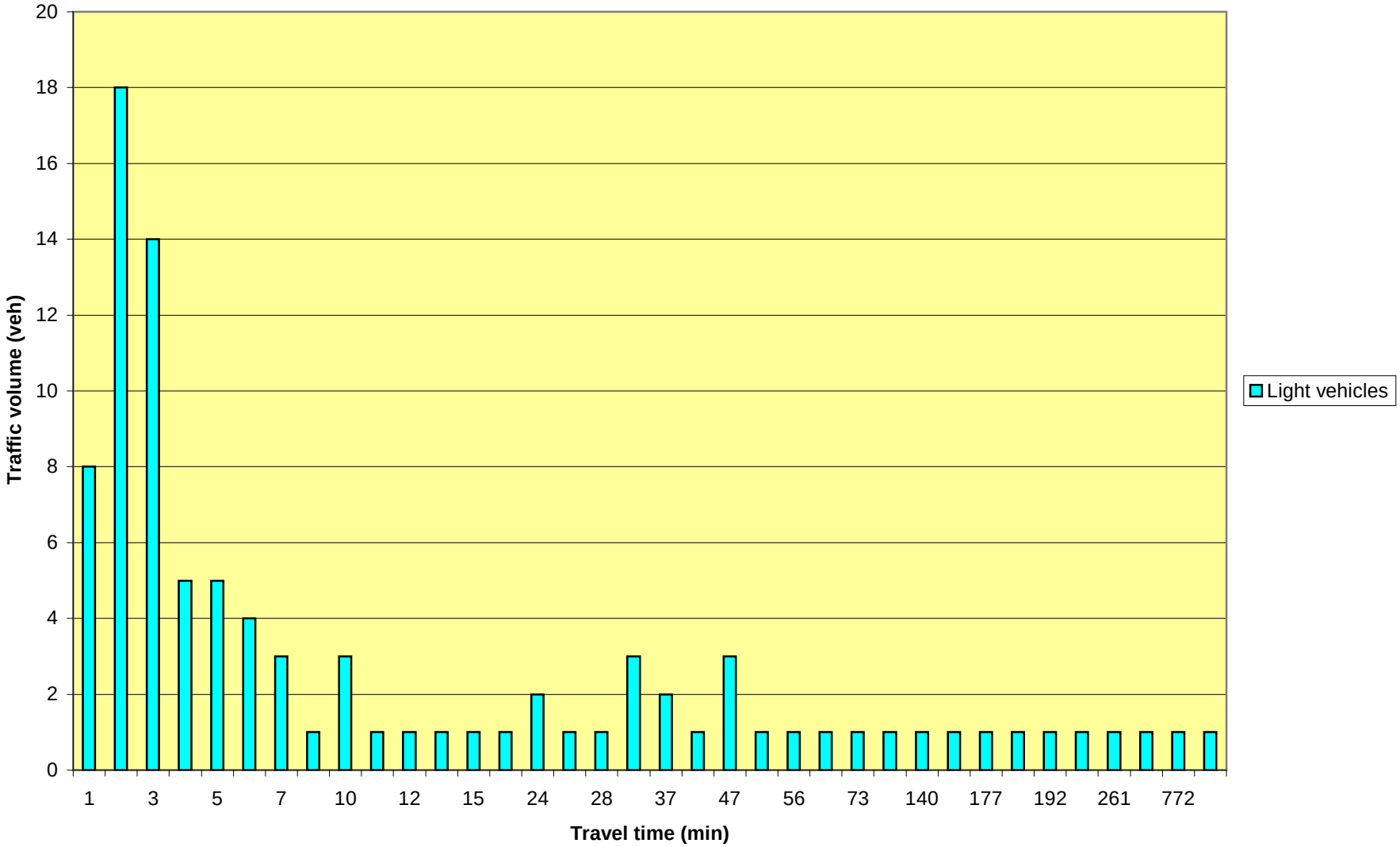
Peak Hours

	Northbound			Southbound		
	Light Vehicles	Heavy Vehicles	Total Vehicles	Light Vehicles	Heavy Vehicles	Total Vehicles
H30	232	169	401	285	211	496
H50	202	147	349	254	188	442
H100	173	126	299	211	156	367

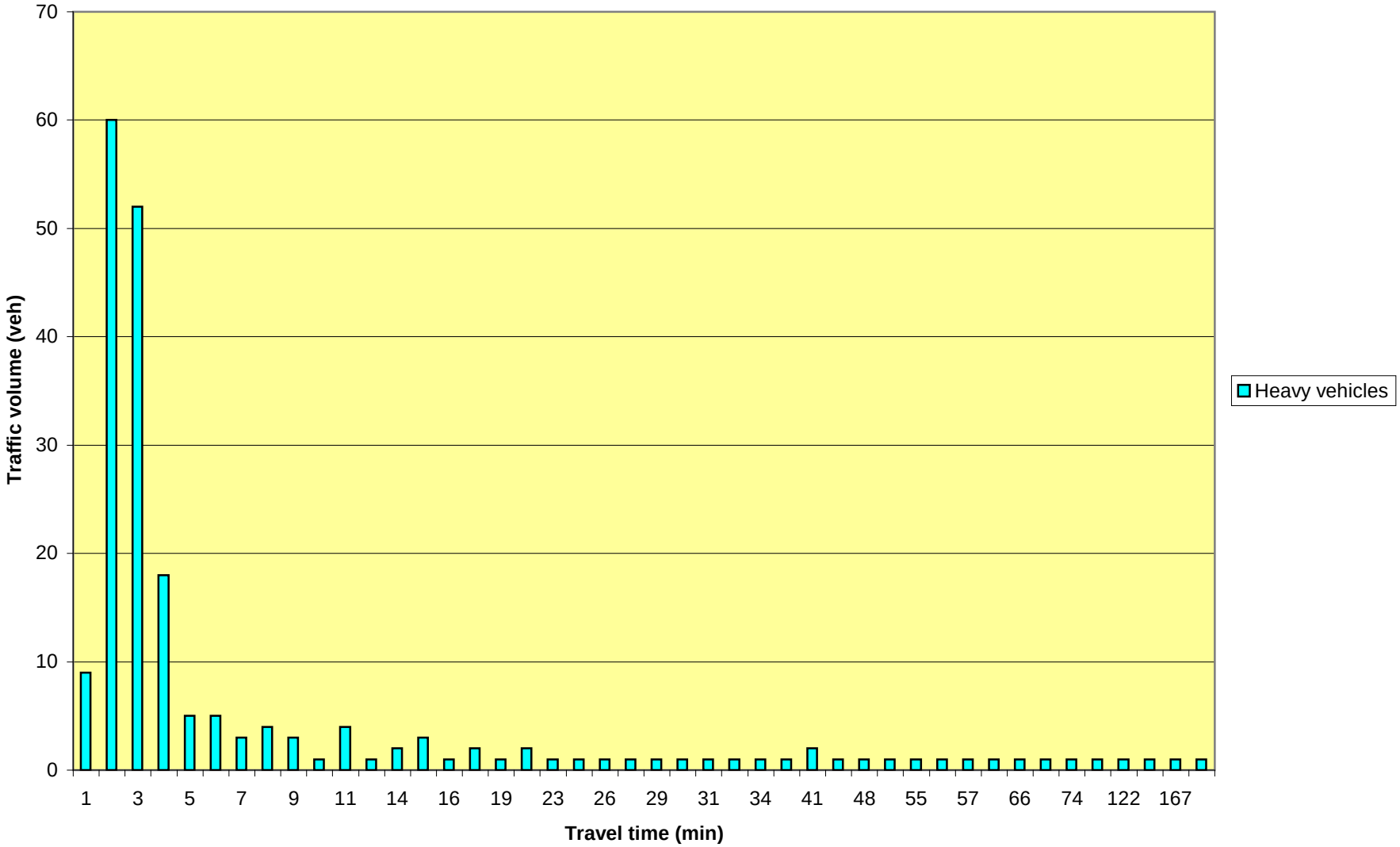
Appendix C

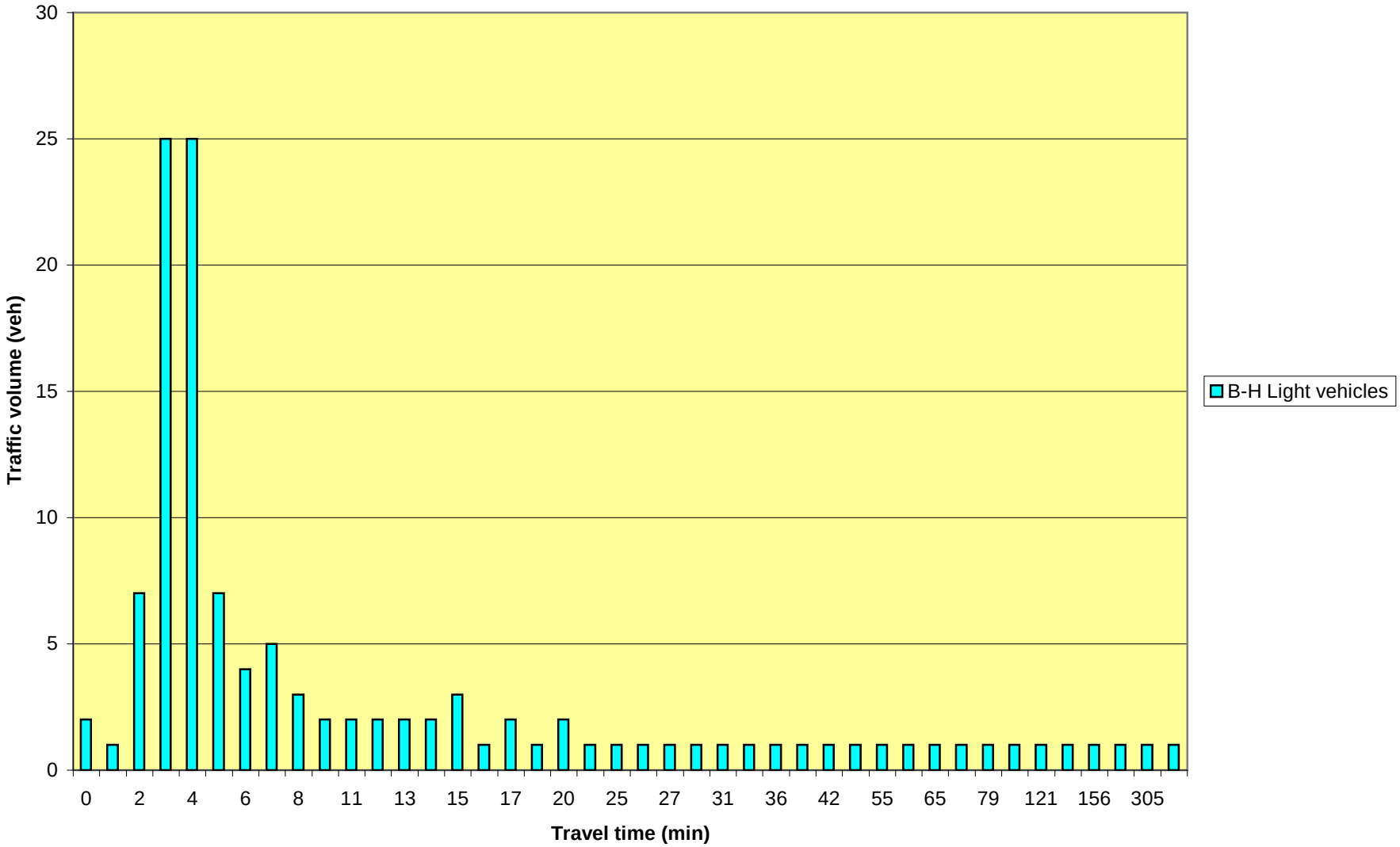
Travel time distribution on Hume Highway in Holbrook

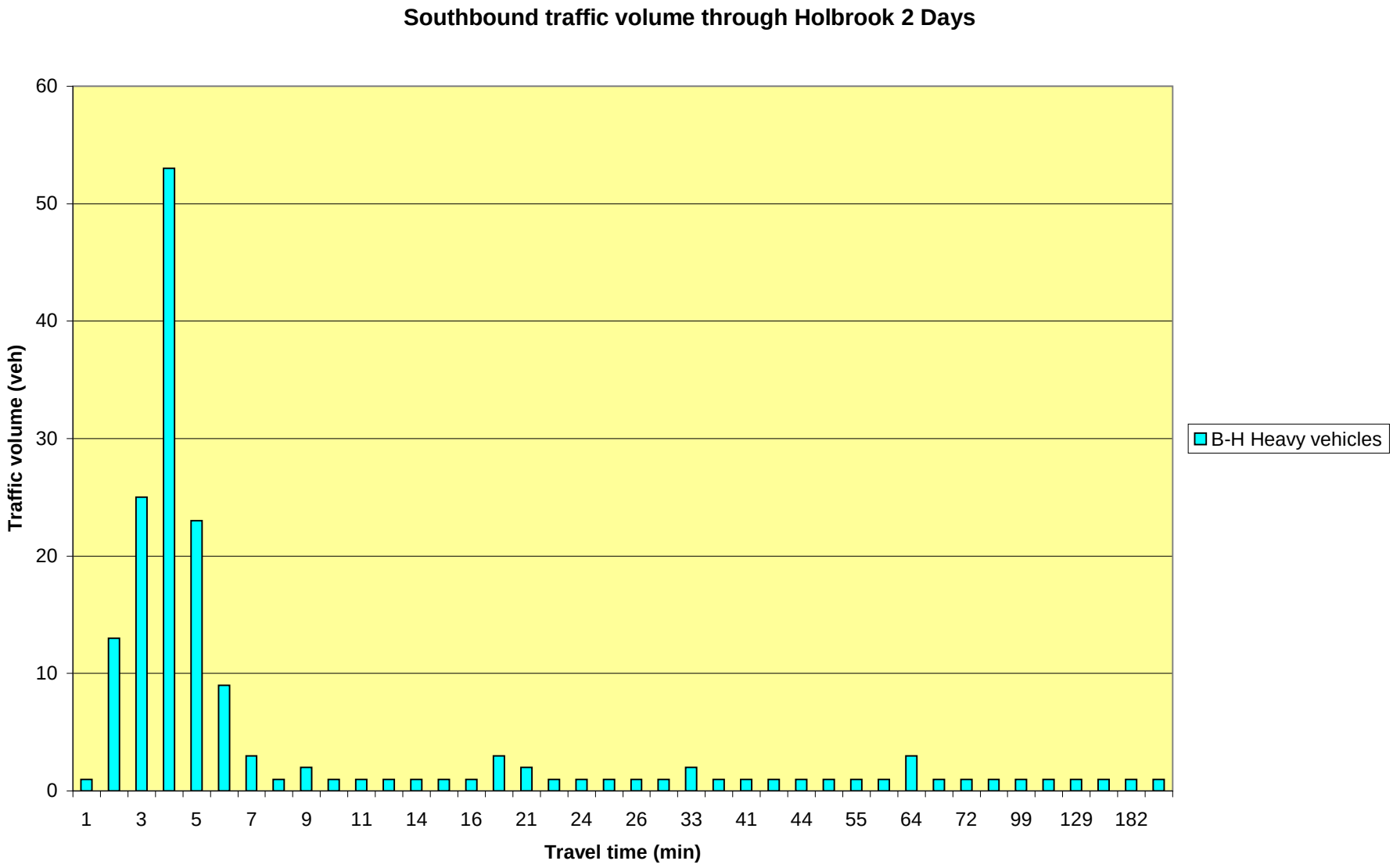
Northbound traffic volume through Holbrook 2 Days



Northbound traffic volume through Holbrook 2 Days




Southbound traffic volume through Holbrook 2 Days
Traffic volume (veh)
30
25
20
15
10
5
0
0
2
4
6
8
11
13
15
17
20
25
27
31
36
42
55
65
79
121
156
305
Travel time (min)
B-H Light vehicles


Southbound traffic volume through Holbrook 2 Days
Traffic volume (veh)
60
50
40
30
20
10
0
1
3
5
7
9
11
14
16
21
24
26
33
41
44
55
64
72
99
129
182
Travel time (min)
B-H Heavy vehicles

Appendix D

Forecast future traffic volumes

Hume Highway Forecast Traffic Volumes north of Holbrook, 2012

2012 Do Nothing - Hume Highway

South of Town Northbound

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	32	105	137	19	39	58	28	86	114
1:00	25	91	116	19	46	65	23	78	102
2:00	18	67	86	14	33	47	17	58	75
3:00	16	47	63	9	19	28	14	39	53
4:00	13	28	42	14	15	29	13	25	38
5:00	23	30	54	13	14	27	20	26	46
6:00	55	35	90	24	14	37	46	29	75
7:00	58	48	107	41	13	54	53	38	92
8:00	83	41	125	63	16	79	78	34	112
9:00	113	43	156	99	21	121	109	37	146
10:00	129	43	172	143	17	160	133	35	168
11:00	136	44	179	152	24	176	140	38	178
12:00	142	48	190	163	26	189	148	42	190
13:00	136	52	189	162	24	185	144	44	188
14:00	139	53	191	153	26	180	143	45	188
15:00	142	74	215	152	30	183	145	61	206
16:00	128	80	208	142	27	168	132	65	197
17:00	118	88	206	101	39	140	113	74	187
18:00	89	86	174	91	39	130	89	72	162
19:00	56	77	133	57	37	94	56	66	122
20:00	45	88	133	43	37	80	44	74	118
21:00	38	91	130	31	35	66	36	75	112
22:00	30	94	124	18	27	46	27	75	102
23:00	34	104	138	20	22	42	30	80	110
Total	1,798	1,559	3,358	1,741	642	2,384	1,782	1,297	3,080

South of Town Southbound

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	28	97	126	18	41	59	25	81	107
1:00	25	94	120	20	41	62	24	79	103
2:00	16	62	79	13	30	43	15	53	69
3:00	13	42	55	10	23	34	12	37	49
4:00	12	31	42	11	18	28	11	27	38
5:00	20	31	51	13	19	32	18	28	46
6:00	52	36	88	22	18	40	44	31	74
7:00	53	42	95	39	11	51	49	33	83
8:00	82	45	127	71	13	84	79	36	115
9:00	108	48	156	109	17	126	108	39	148
10:00	126	44	170	135	12	148	129	35	164
11:00	127	43	170	164	23	187	138	37	175
12:00	135	47	182	158	25	183	141	41	182
13:00	141	55	196	167	25	192	148	46	195
14:00	141	58	199	142	27	170	141	49	191
15:00	130	65	196	146	28	173	135	54	189
16:00	130	82	213	135	33	168	132	68	200
17:00	123	82	205	120	38	158	122	70	192
18:00	87	85	173	82	42	125	86	73	159
19:00	59	82	141	62	36	98	60	69	129
20:00	40	83	123	42	37	79	41	70	110
21:00	39	85	124	30	36	65	36	71	107
22:00	32	103	134	15	29	44	27	81	108
23:00	29	109	138	16	26	41	25	85	111
Total	1,749	1,553	3,302	1,740	648	2,389	1,747	1,295	3,041

Combination

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	60	203	263	36	81	117	53	168	221
1:00	51	185	236	39	88	127	47	157	205
2:00	34	130	164	27	64	91	32	111	143
3:00	29	90	119	19	42	62	26	76	102
4:00	25	59	84	25	32	57	25	51	76
5:00	43	61	105	26	33	59	38	53	92
6:00	107	71	179	46	31	77	90	60	150
7:00	112	90	202	81	25	105	103	72	174
8:00	166	86	252	133	29	163	156	70	226
9:00	221	91	312	208	38	246	217	76	294
10:00	255	87	342	278	29	307	261	70	332
11:00	262	87	349	316	47	363	278	75	353
12:00	277	95	372	321	52	373	289	83	372
13:00	277	107	384	328	49	377	292	90	382
14:00	280	111	391	296	54	349	284	94	379
15:00	272	139	411	298	58	356	280	116	395
16:00	258	162	421	277	60	336	264	133	397
17:00	241	170	412	221	77	298	235	144	379
18:00	176	171	347	174	81	255	175	145	321
19:00	114	160	274	119	73	192	116	135	251
20:00	85	171	256	85	73	159	85	143	228
21:00	77	177	253	60	71	131	72	146	219
22:00	61	197	258	34	56	90	54	157	210
23:00	63	213	276	36	48	83	55	166	221
Total	3,548	3,113	6,660	3,482	1,291	4,773	3,529	2,592	6,121

2012 with Bypass - Hume Highway

South of Town Northbound

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	15	33	49	9	12	22	14	27	41
1:00	12	29	41	9	15	24	11	25	36
2:00	9	21	30	7	11	17	8	18	26
3:00	8	15	23	4	6	10	7	12	19
4:00	6	9	15	7	5	11	6	8	14
5:00	11	10	21	6	4	11	10	8	18
6:00	27	11	38	11	4	16	22	9	32
7:00	28	15	44	20	4	24	26	12	38
8:00	41	13	54	31	5	36	38	11	49
9:00	55	14	69	48	7	55	53	12	65
10:00	63	14	76	70	5	75	65	11	76
11:00	66	14	80	74	8	82	68	12	80
12:00	69	15	84	79	8	88	72	13	85
13:00	66	17	83	79	7	86	70	14	84
14:00	68	17	84	75	8	83	70	14	84
15:00	69	23	92	74	10	84	71	19	90
16:00	62	25	88	69	9	77	64	20	85
17:00	58	28	85	49	12	61	55	23	79
18:00	43	27	70	44	12	57	44	23	66
19:00	27	24	51	28	12	39	27	21	48
20:00	22	28	50	21	12	33	22	23	45
21:00	19	29	48	15	11	26	18	24	41
22:00	15	30	44	9	9	18	13	24	37
23:00	17	33	49	10	7	17	15	25	40
Total	876	492	1,368	848	203	1,051	868	410	1,278

South of Town Southbound

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	12	40	52	8	17	25	11	33	44
1:00	11	38	49	9	17	26	10	32	43
2:00	7	25	33	6	12	18	7	22	28
3:00	6	17	23	5	10	14	5	15	20
4:00	5	12	18	5	7	12	5	11	16
5:00	9	13	21	6	8	13	8	11	19
6:00	23	15	38	10	7	17	19	13	32
7:00	23	17	41	17	5	22	22	14	35
8:00	36	18	54	31	5	37	35	14	49
9:00	47	20	67	48	7	55	48	16	64
10:00	55	18	73	60	5	65	57	14	71
11:00	56	17	73	72	9	82	61	15	76
12:00	59	19	78	70	10	80	62	17	79
13:00	62	22	84	73	10	84	65	19	84
14:00	62	24	86	63	11	74	62	20	82
15:00	57	26	84	64	11	75	59	22	82
16:00	57	33	91	60	13	73	58	28	86
17:00	54	34	88	53	15	68	54	28	82
18:00	39	35	73	36	17	53	38	30	68
19:00	26	34	59	27	15	42	26	28	54
20:00	18	34	51	18	15	33	18	28	46
21:00	17	35	52	13	15	28	16	29	45
22:00	14	42	56	7	12	18	12	33	45
23:00	13	44	57	7	10	17	11	35	46
Total	770	632	1,402	767	264	1,030	769	527	1,296

Combination

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	28	73	101	17	29	46	25	60	85
1:00	23	67	91	18	31	50	22	57	79
2:00	16	47	63	13	23	35	15	40	55
3:00	13	32	46	9	16	24	12	27	40
4:00	12	21	33	11	12	23	11	19	30
5:00	20	22	42	12	12	24	18	19	37
6:00	50	26	76	21	12	33	42	22	63
7:00	52	32	84	37	9	46	48	26	73
8:00	77	31	108	62	11	72	73	25	98
9:00	103	33	136	96	14	110	101	28	129
10:00	118	31	150	129	10	139	121	25	147
11:00	122	31	153	146	17	163	129	27	156
12:00	129	34	163	149	19	168	134	30	164
13:00	128	39	167	152	18	170	135	33	168
14:00	130	40	170	137	19	157	132	34	166
15:00	126	50	176	139	21	159	130	41	171
16:00	120	59	179	128	22	150	122	48	170
17:00	112	61	173	102	28	130	109	52	161
18:00	82	62	143	81	30	110	81	53	134
19:00	53	58	111	55	26	81	54	49	102
20:00	39	62	101	40	26	66	40	52	91
21:00	36	63	99	28	26	54	33	53	86
22:00	28	71	100	16	20	36	25	57	82
23:00	29	77	107	17	17	34	26	60	86
Total	1,646	1,124	2,770	1,615	467	2,081	1,637	936	2,574

2012 with Bypass - Bypass

South of Town Northbound

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	16	72	88	10	27	37	14	59	74
1:00	13	62	75	10	32	41	12	54	66
2:00	9	46	55	7	23	30	9	39	48
3:00	8	32	41	4	13	17	7	27	34
4:00	7	19	26	7	10	17	7	17	24
5:00	12	21	33	7	9	16	10	17	28
6:00	28	24	52	12	9	21	24	20	44
7:00	30	33	63	21	9	30	27	26	54
8:00	43	28	71	32	11	43	40	23	63
9:00	58	29	87	51	15	66	56	25	81
10:00	66	29	96	73	12	85	68	24	92
11:00	70	30	100	78	16	94	72	26	98
12:00	73	33	106	84	18	102	76	29	105
13:00	70	36	106	83	16	99	74	30	104
14:00	71	36	107	79	18	97	73	31	104
15:00	73	50	123	78	21	99	74	42	116
16:00	66	55	120	73	18	91	68	44	112
17:00	61	60	121	52	27	78	58	51	109
18:00	45	59	104	47	27	74	46	50	95
19:00	28	53	81	29	25	54	29	45	74
20:00	23	60	83	22	25	47	23	50	73
21:00	20	63	82	16	24	40	19	52	70
22:00	15	65	80	9	19	28	14	51	65
23:00	17	71	88	10	15	25	15	55	70
Total	922	1,067	1,989	893	440	1,333	914	888	1,802

South of Town Southbound

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	16	58	74	10	25	34	14	48	62
1:00	14	56	70	11	25	36	13	47	60
2:00	9	37	46	7	18	25	9	32	40
3:00	7	25	32	6	14	20	7	22	29
4:00	7	18	25	6	10	16	6	16	22
5:00	11	18	30	7	11	18	10	16	26
6:00	29	21	51	12	10	23	24	18	43
7:00	30	25	55	22	7	29	28	20	47
8:00	46	26	72	40	8	47	44	21	65
9:00	60	29	89	61	10	71	61	23	84
10:00	70	26	97	76	7	83	72	21	93
11:00	71	25	96	92	14	106	77	22	99
12:00	75	28	103	88	15	103	79	24	103
13:00	79	33	111	93	15	108	83	28	110
14:00	79	35	114	80	16	96	79	29	108
15:00	73	39	112	82	16	98	75	32	108
16:00	73	49	122	76	20	95	74	40	114
17:00	69	49	118	67	22	90	68	41	110
18:00	49	51	100	46	25	71	48	43	91
19:00	33	49	82	34	21	56	33	41	74
20:00	22	49	72	23	22	45	23	41	64
21:00	22	50	72	17	21	38	20	42	62
22:00	18	61	79	9	17	26	15	48	63
23:00	16	65	81	9	15	24	14	51	65
Total	979	921	1,900	974	385	1,359	977	768	1,745

Combination

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	32	130	162	19	51	71	29	107	136
1:00	27	118	145	21	56	77	25	101	126
2:00	18	83	102	14	41	55	17	71	88
3:00	15	57	73	10	27	37	14	49	63
4:00	13	38	51	13	21	34	13	33	46
5:00	23	39	62	14	21	35	21	34	54
6:00	57	46	103	24	20	44	48	38	86
7:00	60	58	118	43	16	59	55	46	101
8:00	89	55	144	72	19	91	84	44	128
9:00	118	58	177	112	25	137	117	49	165
10:00	137	55	192	149	19	168	140	45	185
11:00	141	55	196	170	30	200	149	48	197
12:00	148	61	209	172	33	205	155	53	208
13:00	149	68	217	176	31	207	157	58	214
14:00	150	70	221	158	34	192	152	60	213
15:00	146	89	235	160	37	197	150	74	224
16:00	139	103	242	148	38	186	141	85	226
17:00	129	109	238	119	49	168	126	92	218
18:00	94	109	204	93	52	145	94	93	187
19:00	61	102	163	64	47	110	62	86	148
20:00	45	110	155	46	47	93	46	92	137
21:00	41	113	154	32	46	78	39	94	132
22:00	33	125	158	18	36	54	29	100	128
23:00	34	136	170	19	30	49	30	106	135
Total	1,901	1,989	3,890	1,867	824	2,691	1,891	1,656	3,547

Hume Highway Forecast Traffic Volumes north of Holbrook, 2022

2022 Do Nothing - Hume Highway

South of Town Northbound

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	42	139	180	25	52	77	37	114	151
1:00	33	120	153	25	61	86	31	103	134
2:00	24	89	113	18	44	62	22	76	98
3:00	21	63	83	11	25	36	18	52	70
4:00	17	38	55	18	20	38	17	32	50
5:00	31	40	71	18	18	36	27	34	61
6:00	73	47	119	31	18	49	61	38	99
7:00	77	64	141	54	18	72	70	51	121
8:00	110	54	164	83	21	104	102	45	147
9:00	149	57	206	131	28	159	144	48	192
10:00	170	56	227	188	22	210	175	47	222
11:00	179	58	236	200	32	232	185	50	235
12:00	187	64	250	215	35	250	195	55	250
13:00	180	69	249	213	31	244	189	58	247
14:00	183	69	252	202	35	237	188	59	248
15:00	187	97	284	201	40	241	191	81	271
16:00	169	105	274	187	36	222	174	85	259
17:00	156	116	272	133	51	184	149	98	247
18:00	117	113	230	120	52	172	118	95	213
19:00	73	102	175	75	49	124	74	87	160
20:00	59	116	175	57	48	106	59	97	155
21:00	50	121	171	40	47	87	48	99	147
22:00	39	124	164	24	36	60	35	99	134
23:00	45	137	182	26	29	55	40	106	145
Total	2,370	2,055	4,426	2,295	847	3,142	2,349	1,710	4,059

South of Town Southbound

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	37	128	166	23	54	78	33	107	140
1:00	33	124	158	27	54	81	31	104	136
2:00	22	82	104	17	40	57	20	70	90
3:00	17	56	73	14	31	45	16	49	65
4:00	15	40	56	14	23	37	15	35	50
5:00	27	41	67	17	25	42	24	36	60
6:00	69	48	117	29	23	52	58	41	98
7:00	70	55	126	52	15	67	65	44	109
8:00	108	59	167	93	17	111	104	47	151
9:00	142	64	206	144	22	166	143	52	195
10:00	166	58	224	178	16	195	169	46	216
11:00	167	56	224	216	30	247	181	49	230
12:00	178	62	239	208	34	242	186	54	240
13:00	186	72	258	220	33	253	195	61	256
14:00	186	77	263	187	36	224	186	65	252
15:00	172	86	258	192	36	229	178	72	249
16:00	172	109	280	178	43	221	173	90	263
17:00	162	109	270	159	50	208	161	92	253
18:00	115	113	228	109	56	164	113	96	210
19:00	78	109	186	81	48	129	79	91	170
20:00	53	110	162	55	48	104	54	92	146
21:00	51	112	163	39	47	86	47	94	141
22:00	42	135	177	20	38	58	36	107	143
23:00	38	144	182	21	34	55	33	113	146
Total	2,305	2,047	4,353	2,294	854	3,148	2,302	1,706	4,009

Combination

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	79	267	346	48	106	154	70	221	291
1:00	67	244	311	52	116	167	62	208	270
2:00	45	171	216	36	84	119	43	146	189
3:00	38	118	156	25	56	81	34	100	135
4:00	33	78	110	32	43	75	33	68	100
5:00	57	81	138	34	43	77	51	70	121
6:00	141	94	236	60	41	101	118	79	197
7:00	147	119	266	106	33	139	135	94	230
8:00	218	113	332	176	39	215	206	92	298
9:00	291	120	412	275	50	325	287	100	387
10:00	336	115	450	367	38	405	345	93	437
11:00	346	114	460	416	62	478	366	99	465
12:00	365	125	490	423	68	491	381	109	490
13:00	365	141	507	433	64	497	385	119	504
14:00	369	146	515	390	71	460	375	124	499
15:00	359	183	541	393	76	469	369	152	521
16:00	341	214	554	365	79	444	348	175	523
17:00	318	225	542	291	101	392	310	189	500
18:00	232	225	458	229	107	336	231	192	423
19:00	151	211	361	156	96	253	152	178	330
20:00	112	226	338	113	97	209	112	189	301
21:00	101	233	334	79	94	173	95	193	288
22:00	81	260	341	45	73	118	71	206	277
23:00	83	281	364	47	63	110	73	219	291
Total	4,676	4,103	8,778	4,589	1,701	6,291	4,651	3,416	8,068

2022 with Bypass - Hume Highway

South of Town Northbound

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	20	44	64	12	16	29	18	36	54
1:00	16	38	54	12	19	31	15	33	48
2:00	12	28	40	9	14	23	11	24	35
3:00	10	20	30	5	8	13	9	16	25
4:00	8	12	20	9	6	15	8	10	19
5:00	15	13	28	9	6	14	13	11	24
6:00	35	15	50	15	6	21	30	12	42
7:00	37	20	58	26	6	32	34	16	50
8:00	54	17	71	40	7	47	50	14	64
9:00	73	18	91	64	9	73	70	15	85
10:00	83	18	101	92	7	99	85	15	100
11:00	87	18	105	97	10	107	90	16	106
12:00	91	20	111	105	11	116	95	17	112
13:00	88	22	109	104	10	114	92	18	111
14:00	89	22	111	99	11	109	92	19	110
15:00	91	31	122	98	13	110	93	25	118
16:00	82	33	116	91	11	102	85	27	112
17:00	76	37	113	65	16	81	73	31	104
18:00	57	36	93	58	16	75	57	30	87
19:00	36	32	68	37	15	52	36	27	63
20:00	29	37	65	28	15	43	29	31	59
21:00	25	38	63	20	15	34	23	31	55
22:00	19	39	58	12	11	23	17	31	48
23:00	22	43	65	13	9	22	19	33	53
Total	1,155	649	1,804	1,118	267	1,385	1,144	540	1,684

South of Town Southbound

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	16	52	69	10	22	32	15	44	58
1:00	15	51	65	12	22	34	14	42	56
2:00	9	33	43	8	16	24	9	28	37
3:00	8	23	30	6	13	19	7	20	27
4:00	7	16	23	6	9	16	7	14	21
5:00	12	17	28	7	10	18	10	15	25
6:00	30	19	50	13	9	22	25	17	42
7:00	31	22	53	23	6	29	29	18	46
8:00	48	24	72	41	7	48	46	19	65
9:00	63	26	89	63	9	72	63	21	84
10:00	73	24	97	79	7	85	75	19	93
11:00	74	23	97	95	12	108	80	20	100
12:00	78	25	103	92	14	105	82	22	104
13:00	82	29	111	97	13	110	86	25	111
14:00	82	31	113	83	15	97	82	26	109
15:00	76	35	111	85	15	99	78	29	107
16:00	76	44	120	78	18	96	76	37	113
17:00	71	44	115	70	20	90	71	37	108
18:00	51	46	97	48	23	70	50	39	89
19:00	34	44	78	36	19	55	35	37	72
20:00	23	45	68	24	20	44	24	37	61
21:00	22	46	68	17	19	36	21	38	59
22:00	18	55	73	9	15	24	16	44	59
23:00	17	59	76	9	14	23	15	46	60
Total	1,015	833	1,848	1,010	348	1,358	1,014	694	1,708

Combination

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	37	96	133	22	39	61	33	80	112
1:00	31	88	119	24	42	65	29	75	104
2:00	21	61	83	16	30	47	20	53	72
3:00	18	42	60	12	20	32	16	36	52
4:00	15	28	43	15	16	31	15	25	40
5:00	27	29	56	16	16	32	24	25	49
6:00	66	34	100	28	15	43	55	29	84
7:00	68	43	111	49	12	61	63	34	97
8:00	101	41	142	81	14	95	96	33	129
9:00	135	44	179	127	18	145	133	36	169
10:00	156	41	197	170	14	184	160	33	193
11:00	161	41	202	193	22	215	170	36	206
12:00	169	45	214	196	25	221	177	39	216
13:00	169	51	221	201	23	224	178	43	221
14:00	171	53	224	181	26	207	174	45	219
15:00	167	66	232	183	27	210	171	55	226
16:00	158	77	235	169	29	198	161	64	225
17:00	147	81	228	135	36	171	144	68	212
18:00	108	81	189	106	39	145	107	69	177
19:00	70	76	146	72	35	107	71	64	135
20:00	52	81	133	52	35	87	52	68	120
21:00	47	84	131	37	34	71	44	69	114
22:00	38	94	132	21	27	47	33	75	108
23:00	39	102	141	22	23	45	34	79	113
Total	2,170	1,482	3,652	2,128	615	2,743	2,158	1,234	3,392

2022 with Bypass - Bypass

South of Town Northbound

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	21	95	116	13	36	48	19	78	97
1:00	17	82	99	13	42	55	16	71	86
2:00	12	61	73	9	30	39	11	52	63
3:00	11	43	54	6	17	23	9	35	45
4:00	9	26	34	9	13	23	9	22	31
5:00	16	27	43	9	12	21	14	23	37
6:00	37	32	69	16	12	28	31	26	57
7:00	39	44	83	28	12	40	36	35	71
8:00	56	37	94	42	15	57	52	31	83
9:00	77	39	115	67	19	86	74	33	107
10:00	87	39	126	96	15	112	90	32	122
11:00	92	40	131	103	22	124	95	34	129
12:00	96	43	139	110	24	134	100	38	138
13:00	92	47	139	109	21	131	97	40	137
14:00	94	47	141	104	24	127	97	41	137
15:00	96	66	162	103	27	130	98	55	153
16:00	87	72	159	96	24	120	89	58	148
17:00	80	79	159	68	35	103	77	67	143
18:00	60	77	137	62	35	97	60	65	126
19:00	38	70	107	39	33	72	38	59	97
20:00	30	80	110	29	33	62	30	66	96
21:00	26	83	108	21	32	53	24	68	92
22:00	20	85	105	13	24	37	18	68	86
23:00	23	93	117	13	20	33	20	72	93
Total	1,216	1,406	2,622	1,177	579	1,757	1,205	1,170	2,375

South of Town Southbound

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	21	76	97	13	32	45	19	64	82
1:00	19	74	92	15	32	47	18	62	79
2:00	12	49	61	10	24	33	11	42	53
3:00	10	33	43	8	18	26	9	29	38
4:00	9	24	32	8	14	22	8	21	29
5:00	15	24	39	9	15	24	13	22	35
6:00	39	28	67	16	14	30	32	24	56
7:00	39	33	72	29	9	38	36	26	62
8:00	61	35	96	52	10	62	58	28	86
9:00	80	38	117	81	13	94	80	31	111
10:00	93	34	127	100	10	109	95	27	122
11:00	94	33	127	121	18	139	101	29	131
12:00	99	37	136	116	20	136	104	32	136
13:00	104	43	147	123	20	142	109	36	146
14:00	104	45	150	105	21	126	104	39	143
15:00	96	51	147	108	22	129	99	43	142
16:00	96	64	160	100	26	125	97	53	150
17:00	91	64	155	89	29	118	90	54	144
18:00	65	67	131	61	33	94	63	57	121
19:00	43	64	108	45	28	74	44	54	98
20:00	30	65	95	31	29	60	30	55	85
21:00	28	67	95	22	28	50	27	56	82
22:00	23	80	104	11	22	34	20	64	84
23:00	21	86	107	12	20	32	19	67	85
Total	1,290	1,215	2,505	1,284	507	1,791	1,288	1,012	2,301

Combination

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	42	171	213	26	68	93	38	142	179
1:00	36	156	192	28	74	102	33	133	166
2:00	24	110	134	19	54	73	23	94	116
3:00	20	76	96	14	36	49	18	64	83
4:00	17	50	67	17	27	44	17	43	61
5:00	31	51	82	18	27	46	27	45	72
6:00	76	60	136	32	26	58	63	50	114
7:00	79	76	155	57	21	78	73	61	133
8:00	117	72	189	94	25	119	111	59	169
9:00	156	77	233	148	32	180	154	64	218
10:00	180	73	253	196	25	221	185	59	244
11:00	185	73	258	224	40	263	196	63	260
12:00	195	80	275	227	44	270	204	70	274
13:00	196	90	286	232	41	273	206	76	282
14:00	198	93	291	209	45	254	201	79	280
15:00	192	117	309	211	49	259	197	98	295
16:00	183	136	319	195	50	245	186	112	298
17:00	171	144	314	157	65	221	167	121	288
18:00	124	144	268	122	68	191	124	122	246
19:00	81	134	215	84	61	145	82	113	195
20:00	60	145	204	60	62	122	60	121	181
21:00	54	149	203	42	60	102	51	124	175
22:00	43	165	209	24	47	71	38	131	169
23:00	45	179	223	25	40	65	39	139	178
Total	2,506	2,621	5,127	2,461	1,086	3,547	2,493	2,183	4,675

Hume Highway Forecast Traffic Volumes north of Holbrook, 2032

2032 Do Nothing - Hume Highway

South of Town Northbound

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	55	183	238	33	68	101	49	150	199
1:00	44	158	202	33	81	114	41	136	177
2:00	32	117	149	24	58	82	29	100	130
3:00	28	82	110	15	33	48	24	68	92
4:00	23	49	72	24	26	50	23	43	66
5:00	40	53	93	23	24	47	35	44	80
6:00	96	61	157	41	24	65	80	51	131
7:00	101	84	185	71	23	95	93	67	159
8:00	145	72	217	109	28	137	135	59	194
9:00	197	75	271	172	37	210	190	64	254
10:00	224	74	299	248	29	277	231	62	293
11:00	236	76	312	264	42	305	244	66	310
12:00	246	84	330	283	46	329	257	73	330
13:00	237	91	328	281	41	322	249	77	326
14:00	241	91	332	267	46	312	248	78	326
15:00	246	128	374	265	52	317	251	106	358
16:00	223	139	362	246	47	293	229	112	342
17:00	206	153	359	175	68	243	197	129	325
18:00	154	149	303	158	68	226	155	126	281
19:00	96	134	231	99	64	163	97	114	212
20:00	78	153	231	75	64	139	77	128	205
21:00	67	159	225	53	62	115	63	131	194
22:00	52	164	216	32	47	79	46	130	177
23:00	59	180	239	34	38	73	52	140	192
Total	3,124	2,709	5,833	3,025	1,116	4,141	3,096	2,254	5,350

South of Town Southbound

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	49	169	218	30	72	102	44	141	185
1:00	44	164	208	35	72	107	41	138	179
2:00	28	108	137	23	53	76	27	92	119
3:00	23	73	96	18	41	59	21	64	85
4:00	20	53	73	19	30	49	20	47	66
5:00	35	54	89	22	33	55	31	48	79
6:00	91	63	154	38	31	69	76	54	129
7:00	93	73	166	69	20	88	86	58	143
8:00	143	78	220	123	23	146	137	62	199
9:00	187	84	272	190	29	219	188	68	256
10:00	219	77	295	235	21	257	223	61	284
11:00	220	74	295	285	40	325	239	65	304
12:00	234	81	316	274	44	319	246	71	316
13:00	245	95	340	290	43	333	257	81	338
14:00	245	101	346	247	48	295	246	86	332
15:00	227	113	340	253	48	301	234	94	329
16:00	226	143	369	235	57	292	229	119	347
17:00	213	143	356	209	65	274	212	121	333
18:00	152	148	300	143	73	216	149	127	276
19:00	102	143	245	107	63	170	104	120	224
20:00	70	144	214	73	64	136	71	121	192
21:00	67	148	215	51	62	113	62	123	186
22:00	55	178	233	27	50	77	47	142	188
23:00	51	190	241	27	45	72	44	148	192
Total	3,039	2,698	5,737	3,024	1,126	4,150	3,034	2,249	5,283

Combination

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	104	352	456	63	140	203	93	291	384
1:00	88	322	410	68	153	221	82	274	356
2:00	60	225	285	47	111	157	56	193	249
3:00	50	156	206	33	74	107	45	132	178
4:00	43	102	145	43	56	99	43	89	132
5:00	76	106	182	45	57	102	67	92	159
6:00	186	124	311	79	54	134	156	104	260
7:00	194	157	351	140	43	183	179	124	303
8:00	288	149	437	232	51	283	272	121	393
9:00	384	159	543	362	66	428	378	132	510
10:00	443	151	594	483	51	534	454	122	577
11:00	456	151	607	549	82	631	483	131	613
12:00	481	165	646	557	90	648	503	144	646
13:00	482	186	668	571	84	655	507	157	664
14:00	486	192	678	514	93	607	494	164	658
15:00	473	241	714	518	100	619	486	201	686
16:00	449	282	731	481	104	585	458	231	689
17:00	419	296	715	384	133	517	409	250	658
18:00	306	297	603	301	141	443	305	253	557
19:00	199	278	476	206	127	333	201	234	435
20:00	147	298	445	148	127	276	148	249	397
21:00	133	307	440	105	124	228	125	254	380
22:00	107	342	449	59	97	156	93	272	365
23:00	110	370	480	62	83	145	96	288	384
Total	6,163	5,407	11,570	6,049	2,242	8,291	6,130	4,503	10,633

2032 with Bypass - Hume Highway

South of Town Northbound

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	27	58	85	16	22	38	24	47	71
1:00	21	50	71	16	26	41	20	43	63
2:00	15	37	52	12	18	30	14	32	46
3:00	13	26	39	7	10	18	12	22	33
4:00	11	16	27	12	8	20	11	13	25
5:00	20	17	36	11	8	19	17	14	31
6:00	47	19	66	20	8	27	39	16	55
7:00	49	27	76	35	7	42	45	21	66
8:00	71	23	93	53	9	62	66	19	84
9:00	96	24	119	84	12	96	92	20	113
10:00	109	24	133	121	9	130	113	19	132
11:00	115	24	139	128	13	142	119	21	140
12:00	120	26	146	138	15	152	125	23	148
13:00	115	29	144	137	13	150	122	24	146
14:00	117	29	146	130	14	144	121	25	146
15:00	120	40	160	129	17	146	122	34	156
16:00	109	44	152	120	15	135	112	36	147
17:00	100	48	148	85	21	107	96	41	136
18:00	75	47	122	77	22	99	76	40	115
19:00	47	42	89	48	20	69	47	36	83
20:00	38	48	86	37	20	57	38	40	78
21:00	32	50	83	26	19	45	31	41	72
22:00	25	52	77	16	15	31	22	41	64
23:00	29	57	86	17	12	29	25	44	69
Total	1,522	855	2,377	1,474	352	1,826	1,508	712	2,220

South of Town Southbound

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	22	69	90	13	29	43	19	57	77
1:00	19	67	86	16	29	45	18	56	74
2:00	13	44	57	10	21	31	12	38	49
3:00	10	30	40	8	17	25	9	26	35
4:00	9	22	31	8	12	21	9	19	28
5:00	15	22	37	10	14	23	14	19	33
6:00	40	26	66	17	12	29	33	22	55
7:00	41	30	70	30	8	38	38	23	61
8:00	63	32	94	54	9	63	60	25	86
9:00	82	34	117	84	12	95	83	28	111
10:00	96	31	127	104	9	112	98	25	123
11:00	97	30	127	126	16	142	105	26	132
12:00	103	33	136	121	18	139	108	29	137
13:00	108	39	147	128	18	145	113	33	146
14:00	108	41	149	109	19	128	108	35	143
15:00	100	46	146	112	19	131	103	38	142
16:00	100	58	158	103	23	127	101	48	149
17:00	94	58	152	92	27	119	93	49	143
18:00	67	60	127	63	30	93	66	52	117
19:00	45	58	103	47	26	73	46	49	94
20:00	31	59	89	32	26	58	31	49	80
21:00	29	60	90	23	25	48	28	50	78
22:00	24	72	97	12	20	32	21	58	78
23:00	22	77	100	12	18	30	19	60	80
Total	1,338	1,097	2,436	1,332	458	1,790	1,336	915	2,251

Combination

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	49	126	175	29	51	80	43	105	148
1:00	41	117	157	32	55	86	38	99	137
2:00	28	81	109	22	40	61	26	69	95
3:00	23	56	79	15	27	42	21	48	69
4:00	20	37	57	20	21	40	20	32	52
5:00	35	38	74	21	21	42	31	33	65
6:00	87	45	131	37	20	57	72	38	110
7:00	90	56	146	65	15	80	83	45	127
8:00	134	54	188	107	18	125	126	44	170
9:00	178	58	236	168	24	191	175	48	223
10:00	205	55	260	224	18	242	211	44	255
11:00	212	54	266	254	29	283	224	47	271
12:00	223	59	283	259	33	291	233	52	285
13:00	223	68	291	264	31	295	235	57	292
14:00	225	70	295	239	34	272	229	60	289
15:00	220	86	306	241	36	277	226	72	298
16:00	208	102	310	223	38	261	212	84	296
17:00	194	107	301	177	48	225	189	90	279
18:00	142	107	249	140	51	191	141	91	233
19:00	92	101	193	95	46	141	93	85	178
20:00	69	107	176	69	46	115	69	90	158
21:00	62	110	172	49	45	93	58	92	150
22:00	49	124	174	27	35	63	43	99	142
23:00	51	134	185	29	30	59	45	104	149
Total	2,860	1,953	4,813	2,805	810	3,616	2,845	1,626	4,471

2032 with Bypass - Bypass

South of Town Northbound

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	28	125	153	17	47	64	25	103	128
1:00	23	108	131	17	55	72	21	93	114
2:00	16	80	96	12	40	52	15	69	84
3:00	14	56	71	8	23	30	12	47	59
4:00	12	34	45	12	18	30	12	29	41
5:00	21	36	57	12	16	28	18	30	49
6:00	49	42	91	21	16	37	41	35	76
7:00	52	57	109	37	16	52	48	46	93
8:00	74	49	123	56	19	75	69	41	110
9:00	101	51	152	88	25	114	97	44	141
10:00	115	51	166	127	20	147	118	42	161
11:00	121	52	173	135	29	164	125	45	170
12:00	126	57	184	145	31	177	132	50	182
13:00	122	62	184	144	28	172	128	52	180
14:00	123	62	186	137	31	168	127	54	181
15:00	126	87	214	136	36	172	129	73	202
16:00	114	95	209	126	32	158	118	77	195
17:00	105	105	210	90	46	136	101	88	189
18:00	79	102	181	81	47	128	80	86	166
19:00	49	92	141	51	44	95	50	78	128
20:00	40	105	145	39	44	82	40	87	127
21:00	34	109	143	27	42	69	32	90	122
22:00	27	112	139	16	32	49	24	89	113
23:00	30	123	154	18	26	44	27	95	122
Total	1,602	1,854	3,456	1,552	764	2,315	1,588	1,542	3,130

South of Town Southbound

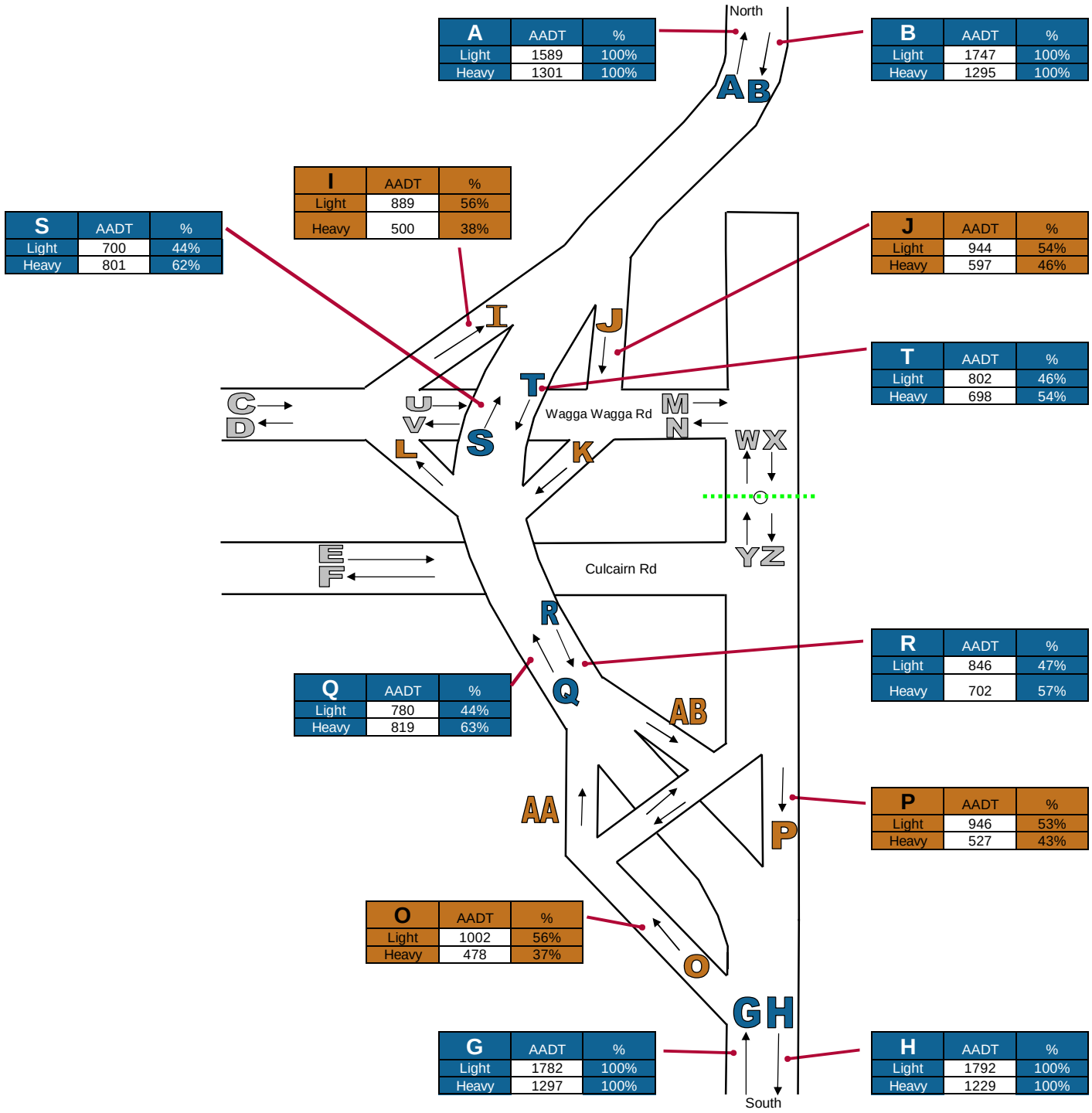
Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	28	100	128	17	43	60	25	84	108
1:00	25	97	122	20	43	62	23	82	105
2:00	16	64	80	13	31	44	15	55	70
3:00	13	43	56	10	24	34	12	38	50
4:00	11	31	43	11	18	29	11	28	39
5:00	20	32	51	12	20	32	18	28	46
6:00	51	37	88	21	18	40	42	32	74
7:00	52	43	95	38	12	50	48	34	82
8:00	80	46	126	69	14	82	77	37	113
9:00	105	50	155	106	17	123	105	41	146
10:00	122	45	168	132	13	144	125	36	161
11:00	123	44	168	160	24	183	134	38	172
12:00	131	48	179	154	26	180	138	42	179
13:00	137	57	193	162	26	188	144	48	192
14:00	137	60	197	138	28	166	138	51	188
15:00	127	67	194	142	28	170	131	56	187
16:00	127	85	211	131	34	165	128	70	198
17:00	119	85	204	117	39	156	119	72	190
18:00	85	88	173	80	43	124	84	75	159
19:00	57	85	142	60	37	97	58	71	129
20:00	39	86	125	41	38	78	39	72	111
21:00	37	88	125	29	37	66	35	73	108
22:00	31	106	137	15	30	45	26	84	110
23:00	28	113	141	15	26	42	25	88	113
Total	1,700	1,601	3,301	1,692	668	2,360	1,698	1,334	3,032

Combination

Time	Average Annual Weekday Traffic			Average Annual Weekend Traffic			Average Annual Daily Traffic		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
0:00	56	225	281	34	89	123	50	187	236
1:00	47	205	252	37	98	134	44	175	219
2:00	32	144	176	25	71	96	30	123	153
3:00	27	100	127	18	47	65	24	85	109
4:00	23	65	88	23	36	58	23	57	80
5:00	40	68	108	24	36	60	36	59	94
6:00	100	79	179	42	34	77	83	66	150
7:00	104	101	205	75	28	103	96	80	175
8:00	154	95	249	125	33	157	146	77	223
9:00	206	101	307	195	43	237	203	84	287
10:00	237	96	334	259	33	292	243	78	322
11:00	244	96	340	295	52	347	259	84	342
12:00	258	105	363	299	58	356	269	92	361
13:00	258	119	377	306	54	360	272	100	372
14:00	261	122	383	275	59	334	265	104	369
15:00	253	155	408	278	64	342	260	129	389
16:00	241	180	421	257	66	323	246	147	393
17:00	225	190	414	207	85	292	220	160	379
18:00	164	190	354	161	90	251	163	161	325
19:00	107	177	284	111	81	192	108	150	257
20:00	79	191	269	79	81	161	79	159	238
21:00	72	196	268	56	79	135	67	163	230
22:00	57	218	275	31	62	93	50	173	223
23:00	59	236	295	33	53	86	51	184	235
Total	3,303	3,455	6,757	3,244	1,432	4,675	3,286	2,877	6,163

Holbrook Bypass Forecast Future Traffic Flows

2012 Low Diversion Scenario



C	AADT
Light	248
Heavy	129

E	AADT
Light	728
Heavy	136

K	AADT
Light	43
Heavy	5

M	AADT
Light	1097
Heavy	649

U	AADT
Light	178
Heavy	110

D	AADT
Light	320
Heavy	165

F	AADT
Light	803
Heavy	162

L	AADT
Light	80
Heavy	18

N	AADT
Light	1076
Heavy	575

V	AADT
Light	1102
Heavy	632

W	AADT
Light	1076
Heavy	575

Y	AADT
Light	1687
Heavy	672

AA*	AADT
Light	30
Heavy	20

* Note: Ramp flows at AA and AB are assumed based on likely catchment

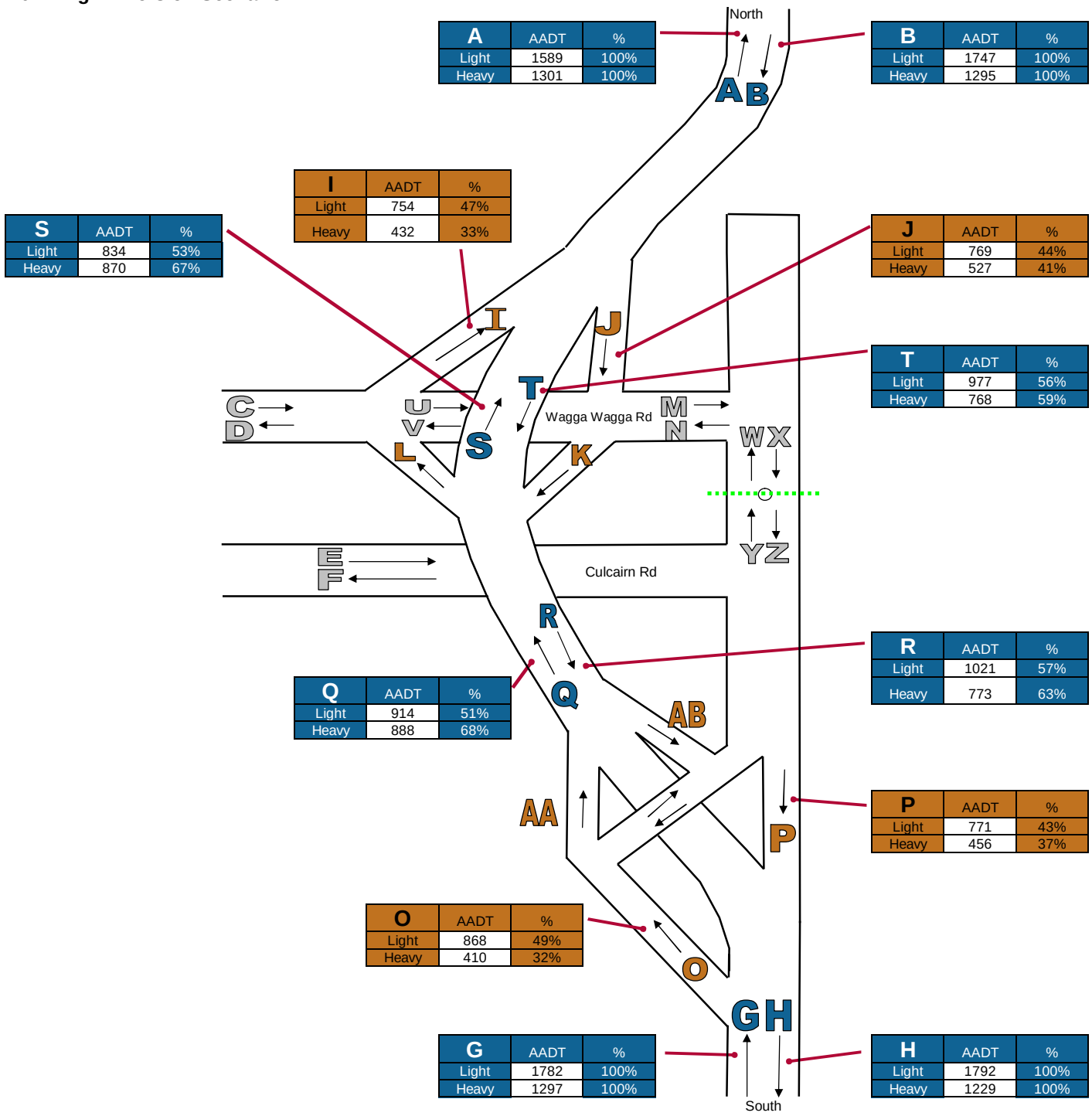
X	AADT
Light	1097
Heavy	649

Z	AADT
Light	1539
Heavy	643

AB*	AADT
Light	30
Heavy	20

Holbrook Bypass Forecast Future Traffic Flows

2012 High Diversion Scenario



A	AADT	%
Light	1589	100%
Heavy	1301	100%

B	AADT	%
Light	1747	100%
Heavy	1295	100%

I	AADT	%
Light	754	47%
Heavy	432	33%

S	AADT	%
Light	834	53%
Heavy	870	67%

J	AADT	%
Light	769	44%
Heavy	527	41%

T	AADT	%
Light	977	56%
Heavy	768	59%

R	AADT	%
Light	1021	57%
Heavy	773	63%

Q	AADT	%
Light	914	51%
Heavy	888	68%

P	AADT	%
Light	771	43%
Heavy	456	37%

O	AADT	%
Light	868	49%
Heavy	410	32%

G	AADT	%
Light	1782	100%
Heavy	1297	100%

H	AADT	%
Light	1792	100%
Heavy	1229	100%

C	AADT
Light	248
Heavy	129

E	AADT
Light	728
Heavy	136

K	AADT
Light	43
Heavy	5

M	AADT
Light	921
Heavy	579

U	AADT
Light	178
Heavy	110

D	AADT
Light	320
Heavy	165

F	AADT
Light	803
Heavy	162

L	AADT
Light	80
Heavy	18

N	AADT
Light	942
Heavy	506

V	AADT
Light	968
Heavy	564

W	AADT
Light	942
Heavy	506

Y	AADT
Light	1553
Heavy	603

AA*	AADT
Light	30
Heavy	20

* Note: Ramp flows at AA and AB are assumed based on likely catchment

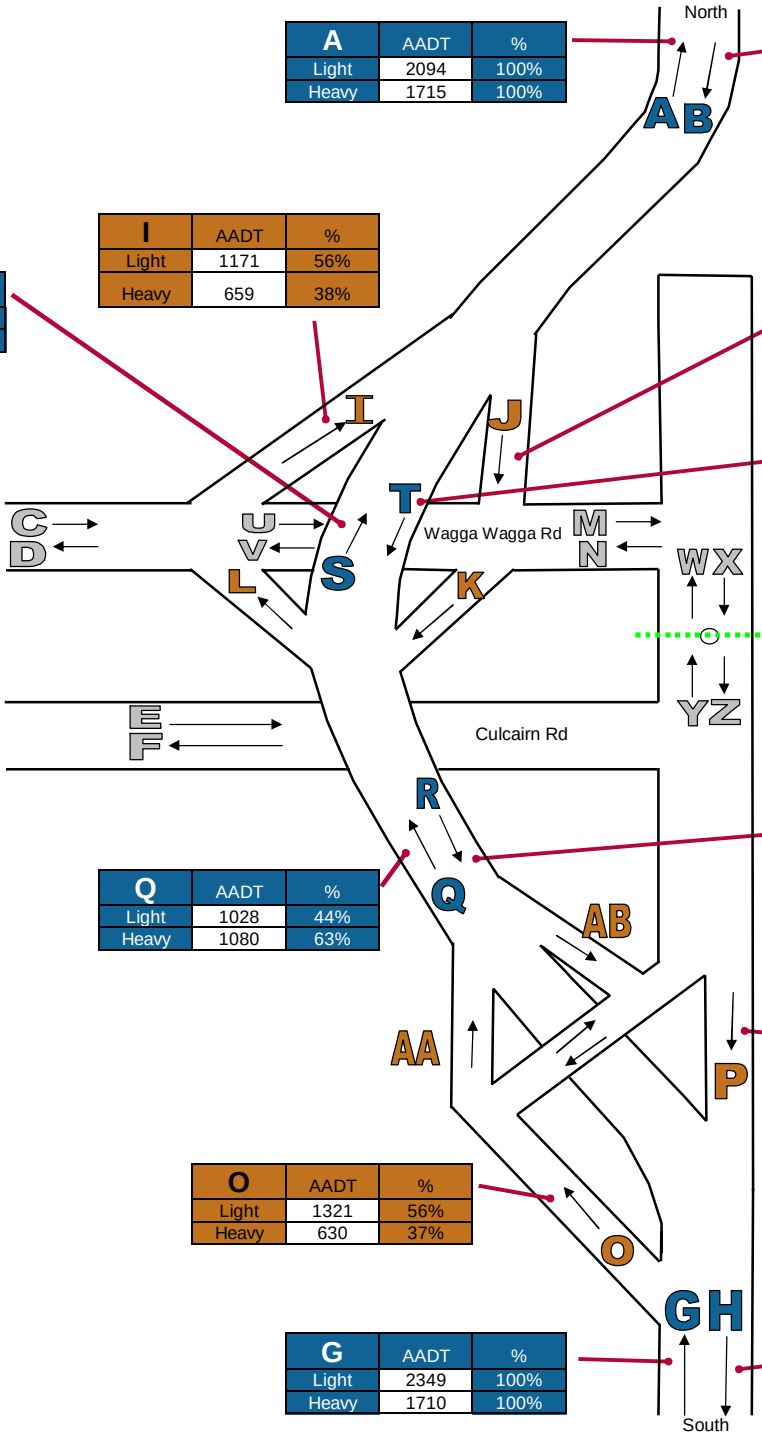
X	AADT
Light	921
Heavy	579

Z	AADT
Light	1364
Heavy	572

AB*	AADT
Light	30
Heavy	20

Holbrook Bypass Forecast Future Traffic Flows

2022 Low Diversion Scenario



A	AADT	%
Light	2094	100%
Heavy	1715	100%

B	AADT	%
Light	2302	100%
Heavy	1706	100%

I	AADT	%
Light	1171	56%
Heavy	659	38%

S	AADT	%
Light	922	44%
Heavy	1056	62%

J	AADT	%
Light	1245	54%
Heavy	787	46%

T	AADT	%
Light	1057	46%
Heavy	919	54%

R	AADT	%
Light	1115	47%
Heavy	926	57%

Q	AADT	%
Light	1028	44%
Heavy	1080	63%

P	AADT	%
Light	1248	53%
Heavy	694	43%

O	AADT	%
Light	1321	56%
Heavy	630	37%

G	AADT	%
Light	2349	100%
Heavy	1710	100%

H	AADT	%
Light	2362	100%
Heavy	1620	100%

C	AADT
Light	327
Heavy	170

E	AADT
Light	959
Heavy	179

K	AADT
Light	57
Heavy	6

M	AADT
Light	1445
Heavy	856

U	AADT
Light	234
Heavy	144

D	AADT
Light	422
Heavy	217

F	AADT
Light	1059
Heavy	214

L	AADT
Light	105
Heavy	24

N	AADT
Light	1419
Heavy	758

V	AADT
Light	1453
Heavy	833

W	AADT
Light	1419
Heavy	758

Y	AADT
Light	2224
Heavy	886

AA*	AADT
Light	30
Heavy	20

* Note: Ramp flows at AA and AB are assumed based on likely catchment

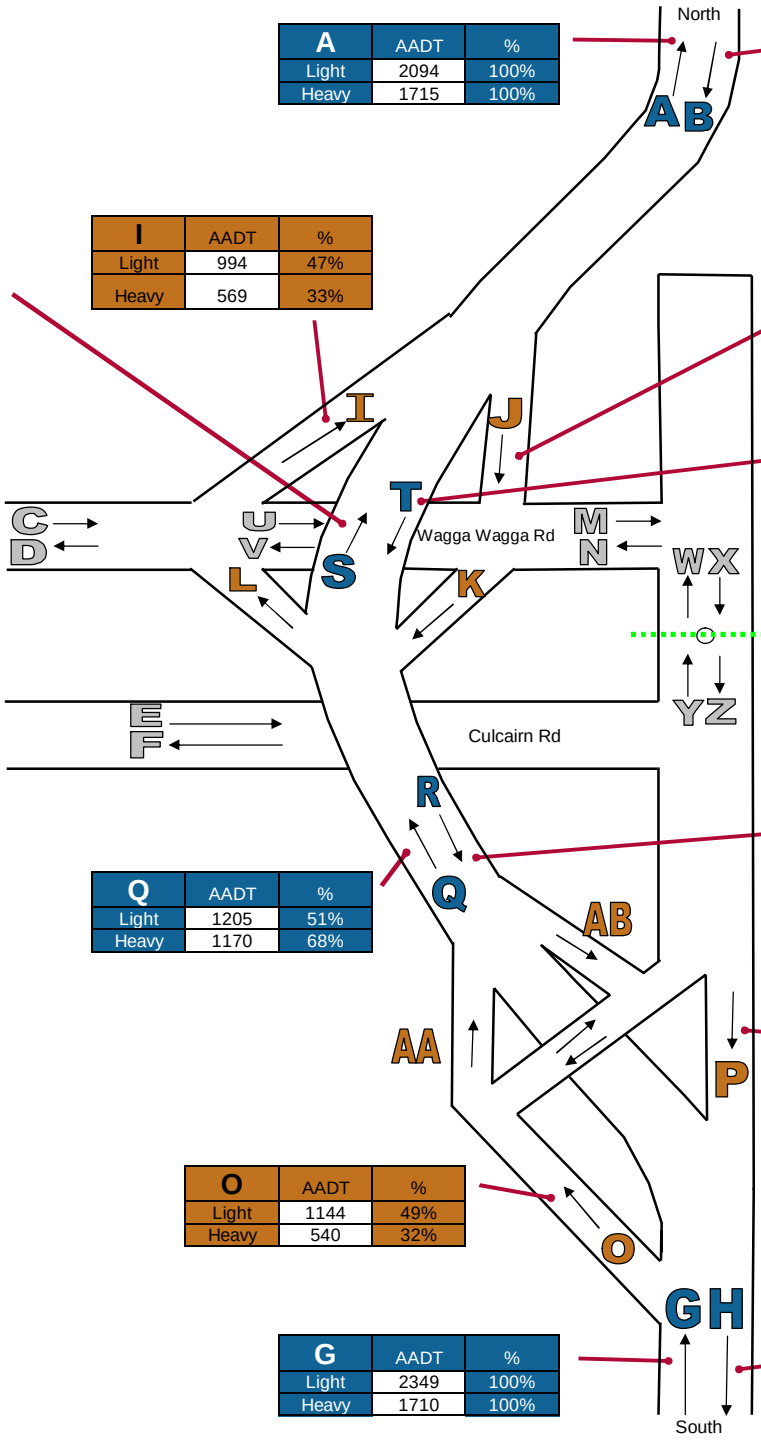
X	AADT
Light	1445
Heavy	856

Z	AADT
Light	2028
Heavy	847

AB*	AADT
Light	30
Heavy	20

Holbrook Bypass Forecast Future Traffic Flows

2022 High Diversion Scenario



A	AADT	%
Light	2094	100%
Heavy	1715	100%

B	AADT	%
Light	2302	100%
Heavy	1706	100%

I	AADT	%
Light	994	47%
Heavy	569	33%

S	AADT	%
Light	1099	53%
Heavy	1146	67%

J	AADT	%
Light	1014	44%
Heavy	694	41%

T	AADT	%
Light	1288	56%
Heavy	1012	59%

R	AADT	%
Light	1345	57%
Heavy	1019	63%

Q	AADT	%
Light	1205	51%
Heavy	1170	68%

P	AADT	%
Light	1017	43%
Heavy	601	37%

O	AADT	%
Light	1144	49%
Heavy	540	32%

G	AADT	%
Light	2349	100%
Heavy	1710	100%

H	AADT	%
Light	2362	100%
Heavy	1620	100%

C	AADT
Light	327
Heavy	170

E	AADT
Light	959
Heavy	179

K	AADT
Light	57
Heavy	6

M	AADT
Light	1215
Heavy	763

U	AADT
Light	234
Heavy	144

D	AADT
Light	422
Heavy	217

F	AADT
Light	1059
Heavy	214

L	AADT
Light	105
Heavy	24

N	AADT
Light	1242
Heavy	668

V	AADT
Light	1276
Heavy	743

W	AADT
Light	1242
Heavy	668

Y	AADT
Light	2047
Heavy	795

AA*	AADT
Light	30
Heavy	20

* Note: Ramp flows at AA and AB are assumed based on likely catchment

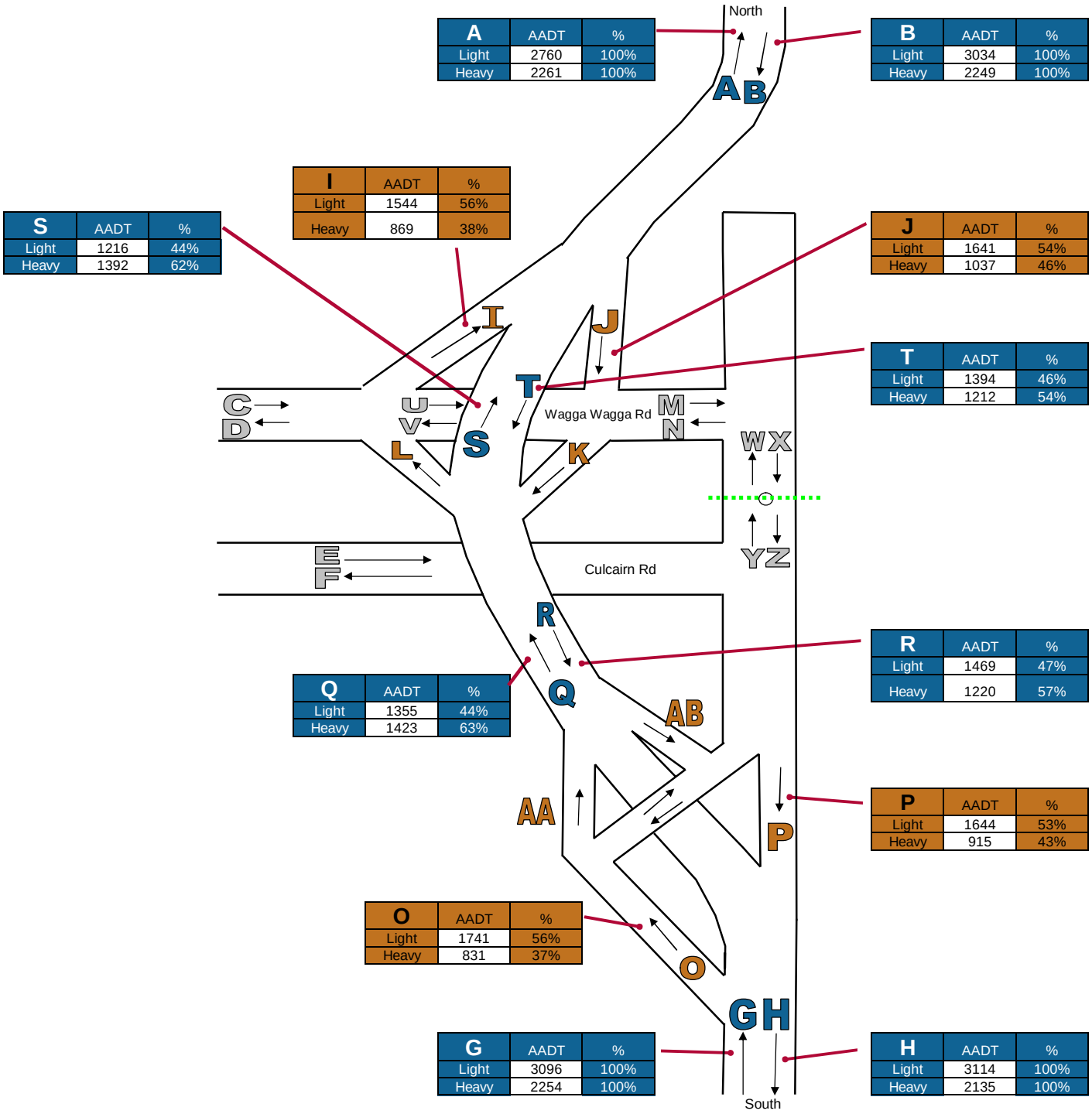
X	AADT
Light	1215
Heavy	763

Z	AADT
Light	1797
Heavy	754

AB*	AADT
Light	30
Heavy	20

Holbrook Bypass Forecast Future Traffic Flows

2032 Low Diversion Scenario



C	AADT
Light	431
Heavy	224

E	AADT
Light	1264
Heavy	236

K	AADT
Light	75
Heavy	8

M	AADT
Light	1905
Heavy	1128

U	AADT
Light	309
Heavy	190

D	AADT
Light	556
Heavy	286

F	AADT
Light	1396
Heavy	282

L	AADT
Light	139
Heavy	31

N	AADT
Light	1870
Heavy	999

V	AADT
Light	1915
Heavy	1098

W	AADT
Light	1870
Heavy	999

Y	AADT
Light	2931
Heavy	1167

AA*	AADT
Light	30
Heavy	20

* Note: Ramp flows at AA and AB are assumed based on likely catchment

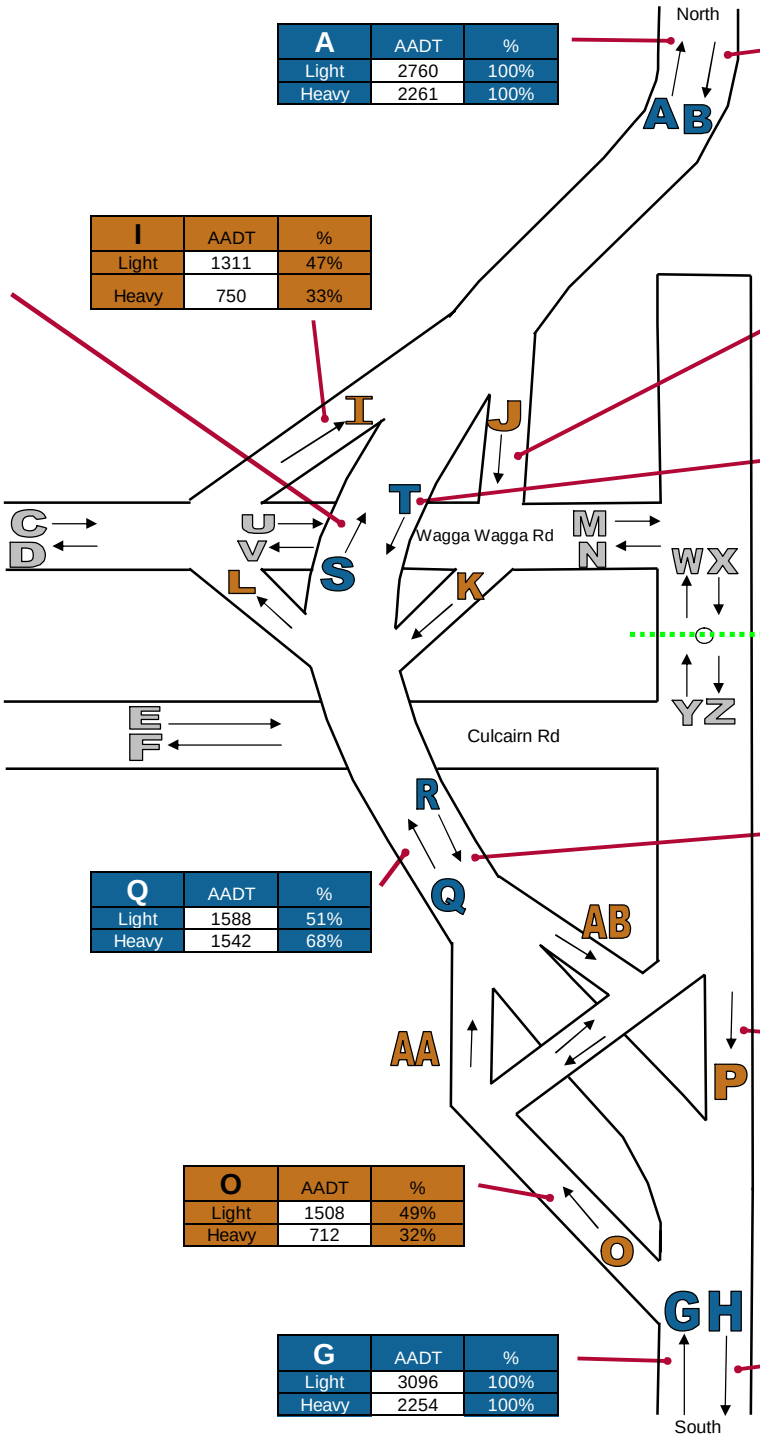
X	AADT
Light	1905
Heavy	1128

Z	AADT
Light	2673
Heavy	1116

AB*	AADT
Light	30
Heavy	20

Holbrook Bypass Forecast Future Traffic Flows

2032 High Diversion Scenario



A	AADT	%
Light	2760	100%
Heavy	2261	100%

B	AADT	%
Light	3034	100%
Heavy	2249	100%

I	AADT	%
Light	1311	47%
Heavy	750	33%

S	AADT	%
Light	1449	53%
Heavy	1511	67%

J	AADT	%
Light	1336	44%
Heavy	915	41%

T	AADT	%
Light	1698	56%
Heavy	1334	59%

R	AADT	%
Light	1773	57%
Heavy	1343	63%

Q	AADT	%
Light	1588	51%
Heavy	1542	68%

P	AADT	%
Light	1340	43%
Heavy	792	37%

O	AADT	%
Light	1508	49%
Heavy	712	32%

G	AADT	%
Light	3096	100%
Heavy	2254	100%

H	AADT	%
Light	3114	100%
Heavy	2135	100%

C	AADT
Light	431
Heavy	224

E	AADT
Light	1264
Heavy	236

K	AADT
Light	75
Heavy	8

M	AADT
Light	1601
Heavy	1006

U	AADT
Light	309
Heavy	190

D	AADT
Light	556
Heavy	286

F	AADT
Light	1396
Heavy	282

L	AADT
Light	139
Heavy	31

N	AADT
Light	1637
Heavy	880

V	AADT
Light	1681
Heavy	979

W	AADT
Light	1637
Heavy	880

Y	AADT
Light	2698
Heavy	1048

AA*	AADT
Light	30
Heavy	20

* Note: Ramp flows at AA and AB are assumed based on likely catchment

X	AADT
Light	1601
Heavy	1006

Z	AADT
Light	2369
Heavy	994

AB*	AADT
Light	30
Heavy	20