



BULLI SEAM OPERATIONS

APPENDIX K
ROAD TRANSPORT ASSESSMENT



road transport assessment

relating to the proposed bulli seam operations

prepared for bhp billiton by **traffix** traffic & transport planners
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1. introduction

1.1 context

Illawarra Coal Holdings Pty Ltd (ICHPL) (a wholly owned subsidiary of BHP Billiton Pty Limited) owns and operates the Appin Mine and West Cliff Colliery. The longwall operations are supported by three pit tops (**figure 1**):

- West Cliff pit top;
- Appin East pit top; and
- Appin West pit top.

This report has been prepared for ICHPL to present the results of an assessment of the traffic implications of a proposal to continue operations at the Appin Mine and West Cliff Colliery for some 30 years and to increase run-of-mine (ROM) coal production from 7.5 million tonnes per annum (Mtpa) up to 10.5 Mtpa. The proposed development is known as the Bulli Seam Operations (the Project).

This report has been prepared by TRAFFIX for ICHPL as part of the Environmental Assessment (EA) for the Project. This study has been undertaken with reference to the Director-General's Environmental Assessment Requirements (EARs) for the Project issued by the New South Wales (NSW) Department of Planning (DoP) on 18 August 2008. In relation to road transport, the EARs require a detailed assessment, as follows:

"Transport – including a detailed assessment of the potential impacts of the Project on the safety and performance of the road network."

As part of the assessment process an environmental risk assessment (Appendix N of the EA) was undertaken. This included a facilitated, risk based workshop involving experts across a range of disciplines and experienced ICHPL personnel. The objective of the assessment was to identify key potential environmental issues for inclusion in the EA. Transport/traffic volume increases was identified as a key potential environmental issue.

This report has been compiled to address the EARs and the road transport related issue identified in the environmental risk assessment. The assessment has also been prepared with reference to the NSW Road and Traffic Authority (RTA) *Guide to Traffic Generating Developments* (2002) and the RTA *Road Design Guide* (1996), where relevant.



Mine Subsidence Engineering Consultants (MSEC) (2009) has identified key items of road infrastructure located above the Project longwall mining area, and includes predicted subsidence impacts which are described in the Subsidence Assessment (Appendix A of the EA). This report specifically assesses the potential road transport impacts associated with Project-related traffic movements.

Port Kembla Coal Terminal (PKCT) is a major coal export facility in southern NSW, located in the Inner Harbour of Port Kembla, near Wollongong, and is a destination for delivery of coal from the Appin Mine and West Cliff Colliery. The terminal is responsible for receiving, assembling and loading coal from the Southern and Western NSW coalfields, which is transported by ship to international and domestic markets. PKCT submitted an EA to DoP in 2008, which assessed increased road receivals and a change to delivery hours for coal deliveries by public road to PKCT, and is subject to separate approval.

Cardno Eppell Olsen (2008) prepared a Traffic Study for the PKCT EA, which assessed the potential road transport impacts associated with the PKCT proposal. PKCT is currently seeking approval to remove road receival restrictions and increase public road receivals to 24 hours per day, 7 days per week for a maximum of 10 Mtpa of coal received by public road. For the purposes of this assessment, it is assumed that the PKCT EA will be approved¹. The PKCT Traffic Study included assessment of coal truck movements associated with existing ICHPL operations on the route from the Appin East pit top and West Cliff pit top to PKCT, and coal deliveries associated with other companies.

However, this assessment only considers Project traffic associated with the Appin Mine and West Cliff Colliery. The Project would operate within the road receival limits specified in the PKCT EA. Data from the PKCT Traffic Study (Cardno Eppell Olsen, 2008) has been used in this report and is referenced where incorporated.

1.2 existing operations

The Appin Mine is accessed via the Appin West and Appin East pit tops. The West Cliff Colliery is accessed via the West Cliff pit top. The West Cliff and Appin East pit tops are located on Appin Road, as shown on **figure 1**. The Appin West pit top is located on Douglas Park Drive, approximately 4 kilometres (km) south of Douglas Park (**figure 1**). The Appin Mine and West Cliff Colliery currently produce up to 7.5 million tonnes (Mt) of ROM coal per year. ROM coal from the Appin Mine is brought to the surface at the Appin East pit top. The Appin West pit top currently only provides access to the underground mining operations for underground personnel and mine equipment and supplies. ROM coal is transported from the Appin East pit top to the West Cliff pit top by road.

¹ On the 12 June 2009, the Minister for Planning approved the PKCT Project.



The location of the three pit tops are shown on **figure 1** which also includes the destinations of coal as discussed below. A schematic description of the operations is provided on **figure 2**.

The majority of coal is currently delivered by truck from the West Cliff pit top to PKCT or to the BlueScope Steelworks (also at Port Kembla) for transport to domestic and overseas customers. Road haulage operations occur up to 24 hours per day, seven days per week. A small volume of ROM coal is also transported by road to the Dendrobium Washery located at the BlueScope Steelworks (product coal from Dendrobium Washery is then transported via internal roads to PKCT). Small volumes of coal for the domestic market is also transported by road to Corrimal Coke Works, Coalcliff Coke Works and other minor customers from time to time.

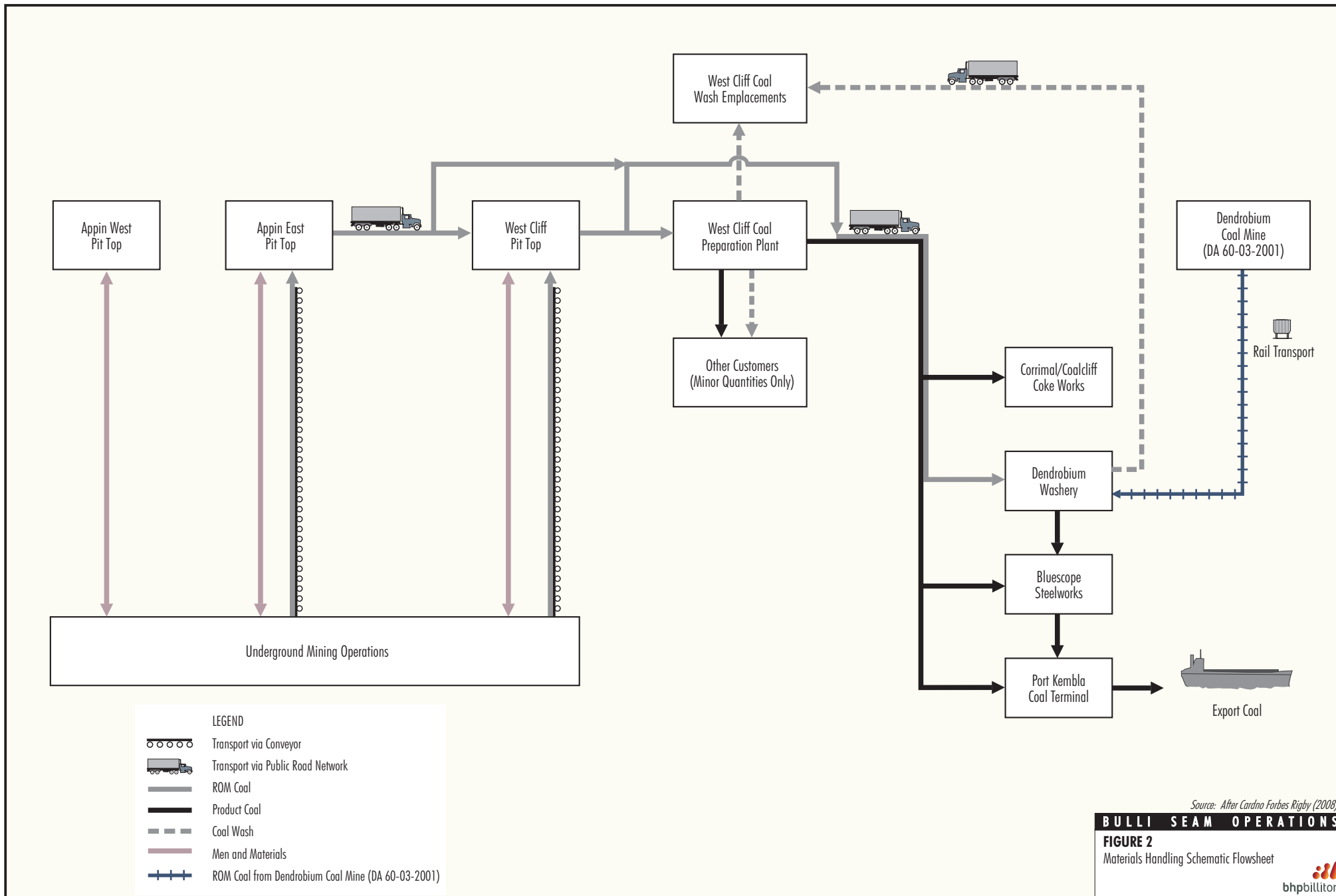
Coal wash from the West Cliff Washery is hauled by internal road to West Cliff Coal Wash Emplacement for disposal. Dendrobium Washery coal wash is also transported by road to the West Cliff Coal Wash Emplacement by loading empty coal haulage trucks that have delivered coal and would otherwise return to the West Cliff pit top empty.

The existing operational workforce at the Appin Mine and West Cliff Colliery comprises up to 875 people.

1.3 summary project description

The main activities associated with the development of the Project would include:

- continued development of underground mining operations within existing coal leases and new mining leases to facilitate a total ROM coal production rate of up to 10.5 Mtpa;
- ongoing exploration activities within existing exploration tenements;
- upgrade of the existing West Cliff Washery to support the increased ROM coal production;
- continued mine gas drainage and capture for beneficial utilisation at the West Cliff Ventilation Air Methane Project and Appin-Tower Power Project;
- continued generation of electricity by the existing Appin-Tower Power Project (owned and operated by Energy Development Limited utilising coal bed methane drained from the Bulli Seam);
- upgrade of existing surface facilities and supporting infrastructure (e.g. service boreholes, ventilation shafts, gas drainage equipment, waste water treatment and waste water disposal);
- continued and expanded placement of coal wash at the West Cliff Coal Wash Emplacement;



Source: After Cardno Forbes Rigby (2008)

BULLI SEAM OPERATIONS

FIGURE 2
Materials Handling Schematic Flowsheet





- continued road transport of ROM coal from the Appin East pit top to the West Cliff Washery;
- continued road transport of ROM coal from Appin East pit top and West Cliff pit top via the public road network to the Dendrobium Washery at Port Kembla;
- continued road transport of product coal from the West Cliff Washery via the public road network to BlueScope Steelworks, PKCT, Corrimal and Coalcliff Coke Works and other customers;
- ongoing surface monitoring and rehabilitation (including rehabilitation of mine related infrastructure areas that are no longer required) and remediation of subsidence effects; and
- other associated minor infrastructure, plant, equipment and activities.

A detailed description of the Project is provided in Section 2 in the Main Report of the EA.

The annual rate of coal delivery to PKCT and BlueScope Steelworks would increase as a result of the Project. Deliveries to Corrimal and Coalcliff Coke Works, and Dendrobium Washery would also marginally increase above current levels. Delivery of coal to PKCT and BlueScope Steelworks would be up to approximately 7.5 Mtpa and 4 Mtpa, respectively. Coal deliveries to Corrimal and Coalcliff Coke Works would be up to 0.2 Mtpa (combined), and delivery of coal to Dendrobium Washery would be up to 0.5 Mtpa. While these are maximum anticipated deliveries to any destination, the peak Project coal delivery would not be more than 9.4 Mtpa.

The annual road movements on these routes would be increased from recent maximum levels. Operations in 2007 resulted in the highest recent trucking movements to PKCT (3.4 Mtpa), BlueScope Steelworks (1.9 Mtpa), Corrimal/Coalcliff Coke Works (0.15 Mtpa) and Dendrobium Washery (0.4 Mtpa). The potential impacts of the Project with regard to traffic movements would therefore be a result of additional coal haulage primarily to PKCT and BlueScope Steelworks, and would include some additional operational workforce traffic, additional operational deliveries and the continuation of these existing haulage activities over the extended life of the Project.

There is no rail traffic associated with the existing operations or the proposed Project.

The Project construction phase would require approximately 100 short-term employees (i.e. a total of some 975 employees). The workforce for the operational phase of the Project would be increased to 1,170 people. The maximum potential traffic generation associated with the operational phase of the Project has been assessed for the purposes of this road transport assessment.



2. existing traffic conditions

2.1 road classifications

Roads are classified according to a road hierarchy, in order to determine their functional role within the road network. Changes to traffic flows on the roads can then be assessed within the context of the road hierarchy. Roads are classified according to the role they fulfil and the volume of traffic they should appropriately carry given their classification. The RTA has set down the following guidelines for the functional classification of roads as stated in Table 1.2.5 of the RTA *Road Design Guide* (1996):

- Arterial Road: typically a main road fulfilling a role as a major inter-regional link (no limit to the traffic volumes).
- Sub-arterial Road: defined as secondary inter-regional links, typically carrying volumes between 5,000 and 20,000 (max) vehicles per day (500 to 2,000 vehicles per hour).
- Collector Road: provides a link between local roads and regional roads, typically carrying between 2,000 and 10,000 vehicles per day (250 to 1,000 vehicles per hour). At volumes greater than 5,000 vehicles per day, residential amenity begins to decline noticeably.
- Local Road: provides access to individual allotments, carrying low volumes, typically less than 2,000 vehicles per day (250 vehicles per hour).

The RTA has also adopted a classification system relating to funding purposes. It defines roads as:

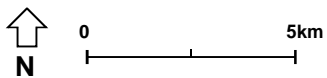
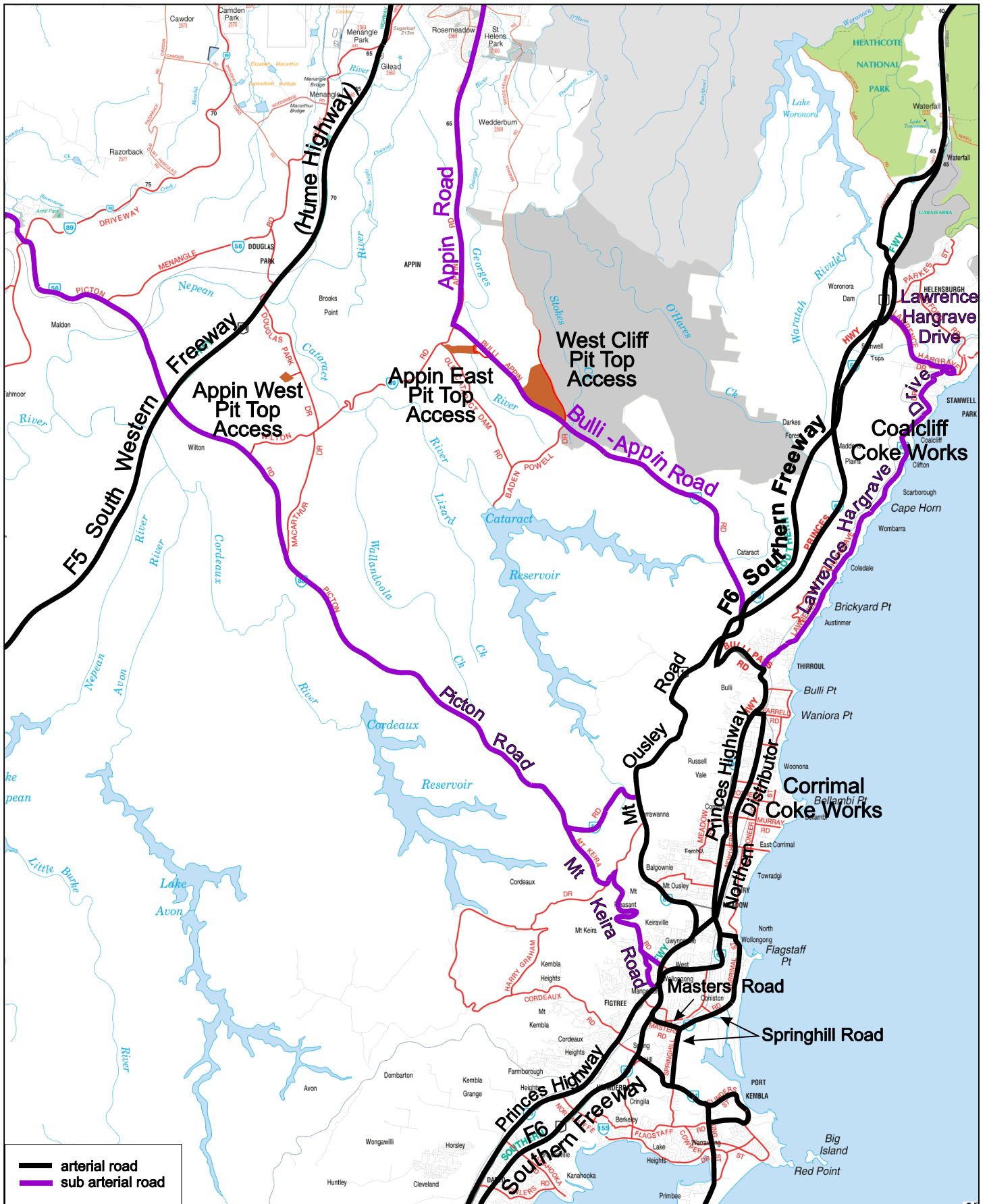
- State Roads: performing an important state function for which the RTA funds one hundred percent of the maintenance cost. State roads are essentially arterial roads.
- Regional Roads: roads performing a significant regional function and for which the RTA and relevant Council contribute fifty percent each towards maintenance. Regional roads are essentially sub-arterial roads.
- Local Roads: roads performing a local or collector function and for which the relevant Council funds one hundred percent of the maintenance cost.



2.2 road hierarchy

The road hierarchy serving the wider regional location is shown on **figure 3**. A description of key regional roads within the context of the wider Project area is provided below:

- **F6 Southern Freeway:** The F6 Southern Freeway is an arterial road, which provides the major link road between Sydney and Wollongong/Port Kembla. The freeway extends southwards from Princes Highway at Waterfall and follows the Woronora Plateau to the Bulli Tops Interchange, where it meets the Princes Highway, Appin Road and Mount Ousley Road (which forms part of the freeway itself). The F6 Southern Freeway then descends the Illawarra Escarpment and parallels the Wollongong metropolitan area for its entire length. Once on the coastal plain, the freeway continues south for a further 20 km, where it again meets Princes Highway to the north of Yallah.
- **Princes Highway:** Princes Highway (State Highway No. 1) is an arterial road which provides a major link between Sydney and Wollongong. The F6 Southern Freeway replaces the Princes Highway along much of its length, and the Princes Highway roughly parallels the freeway route. Princes Highway extends southwards from Parramatta Road at Broadway through the southern suburbs of Sydney and around the western boundary of the Royal National Park, and provides access to the F6 Southern Freeway at Waterfall. It heads south through the Illawarra region of NSW and the city of Wollongong. It continues south, along the South Coast of NSW, passing through Nowra and Batemans Bay, and finally crossing the border into Victoria, south of Eden.
- **Mount Ousley Road:** Mount Ousley Road is an arterial road, and links the two sections of the F6 Southern Freeway between Bulli Tops and Mount Ousley at the University of Wollongong. It is a state road – classified as Main Road No. 513 north of Picton Road and Main Road No. 95 south of Picton Road – and carries a majority of the road traffic between Sydney, Wollongong and the South Coast.
- **Appin Road:** Appin Road (Main Road No. 177, State Route No. 69) is a sub-arterial road which provides a transport link between Bulli Tops north of Wollongong and Campbelltown. The route continues as far north as Campbelltown Road (State Route No. 56) and joins the F5 South Western Freeway north of Campbelltown. Appin Road passes through the town of Appin.



road transport assessment: bulli seam operations project

figure 3
road hierarchy

prepared for BHP Billiton
by traffic & transport planners





- **F5 South Western Freeway:** The F5 South Western Freeway/Hume Highway is an arterial road which provides a major link between Sydney and Campbelltown, from where it continues south to Albury on the Victorian border before continuing on to Melbourne.

- **Masters Road:** Masters Road is an arterial road (Main Road No. 602) which connects Springhill Road to the F6 Southern Freeway and The Avenue further to the west.

- **Springhill Road:** Springhill Road is an arterial road (Main Road No. 581) that connects Five Islands Road to the south with Corrimal Road in the north. It primarily serves the Port Kembla industrial facilities in addition to providing an important access route to the Wollongong centre from the south.

- **Northern Distributor:** The Northern Distributor is an arterial road (Main Road No. 626) through Wollongong's northern suburbs, extending from the F6 Southern Freeway at Gwynneville to Bellambi Lane at Bellambi.

- **Lawrence Hargrave Drive:** Lawrence Hargrave Drive is a major sub-arterial route (Main Road No. 185) which generally runs along the coastline from the F6 Southern Freeway in the north to Bulli in the south.



2.3 roads on key haulage routes

The routes used for on-road haulage from the Appin Mine and the West Cliff Colliery are summarised in **table 1**, and are described further below.

table 1: key haulage routes

Route	Destination					
	West Cliff pit top (i.e. from Appin East pit top)	PKCT	BlueScope Steelworks	Dendrobium Washery	Corrimal Coke Works	Coalcliff Coke Works
Appin Road	✓	✓	✓	✓	✓	✓
Mount Ousley Road	-	✓	✓	✓	✓	-
F6 Southern Freeway (South)	-	✓	✓	✓	✓	-
Masters Road	-	✓	✓	✓	-	-
Springhill Road	-	✓	✓	✓	-	-
University Avenue/ Graham Avenue	-	-	-	-	✓	-
Northern Distributor	-	-	-	-	✓	-
Railway Street	-	-	-	-	✓	-
F6 Southern Freeway (North)	-	-	-	-	-	✓
Lawrence Hargrave Drive	-	-	-	-	-	✓
Princes Highway	-	-	-	-	-	✓



Appin Road

Appin Road provides the main vehicular access for the township of Appin. To the north of Appin, it is also known as Narellan-Appin Road. In the Campbelltown area, Appin Road is a divided road, with two or three travel lanes in each direction, and additional turn lanes at major intersections, which are signal controlled. It has a speed limit of 80 kilometres per hour (km/hr). Beyond the urban area, the speed limit is 70 km/hr, and the carriageway reduces to an undivided road with a single travel lane in each direction. In the rural area between Campbelltown and Appin, it has a speed limit of 80 km/hr, and a single travel lane in each direction. The road is undulating, with no particularly steep grades or sharp bends. In the township of Appin, the speed limit is 50 km/hr, with a 40 km/hr school zone, and some kerbside parking is permitted.

To the east of Appin, it is also known as Bulli-Appin Road. Between Appin and Bulli Tops, Appin Road has one or two travel lanes in each direction, with a 100 km/hr speed limit. This section is undulating, with no particularly steep grades or sharp bends.

Appin Road forms the primary access road between Appin East pit top and West Cliff pit top, and links to Mount Ousley Road. A private access road is located along Appin Road for accessing West Cliff pit top, whilst several public roads can be used to access Appin East pit top from Appin Road. Haulage trucks access Appin East pit top via Sheriff Road (entry) and George Street (exit). The section of Appin Road east of Appin carries haulage trucks to PKCT, BlueScope Steelworks, Dendrobium Washery and Corrimal and Coalcliff Coke Works. Appin Road also carries delivery and employee traffic coming from Wollongong via Mount Ousley Road and the Princes Highway, traffic from Sydney via the F6 Southern Freeway and local traffic from Campbelltown and northern areas.

Mount Ousley Road

Mount Ousley Road consists of many steep descents; a posted speed limit of 40 km/h applies for heavy vehicles on descent from Clive Bissell Drive to the F6 Southern Freeway. North of Picton Road, Mount Ousley Road consists of a four-lane carriageway, divided by a jersey barrier. Steep grades characterise the road, and extensive realignment works have been undertaken during the period 1970 to 1992. Noise barriers are also provided on Mount Ousley Road adjacent to the residential areas.

South of Picton Road, Mount Ousley Road commences a 6 km descent from the escarpment to the coastal plain. An additional lane for slow vehicles is provided along this section for northbound traffic, and an additional southbound lane is also provided over the first 3 km. At the foot of the escarpment, the route splits in two with most traffic heading to the right along the F6 Southern Freeway. Mount Ousley Road continues to the left to meet the Princes Highway at Fairy Meadow.



This section of the route is constructed to a good standard with a high level of traffic management and safety devices provided, these include:

- a jersey kerb median safety barrier;
- lane line and edgeline markings;
- guideposts and reflectors;
- high level of advisory and regulatory signage; and
- emergency stopping lane and arrestor beds plus a safety ramp on the Mount Ousley Road descent for southbound vehicles.

The main intersections are located at:

- Clive Bissell Drive;
- New Mount Pleasant Road; and
- Mount Ousley Road/F6 Southern Freeway.

Interchanges are provided at:

- Picton Road;
- Princes Highway; and
- Appin Road.

Mount Ousley Road carries haulage trucks to PKCT, BlueScope Steelworks, Dendrobium Washery and Corrimal Coke Works. Mount Ousley Road also carries delivery and employee traffic coming from Wollongong.

F6 Southern Freeway

The F6 Southern Freeway forms part of the arterial route linking Sydney and Wollongong, and is split into two sections; Waterfall to Bulli Tops and Mount Ousley to Yallah. It carries the name “F6” as that was both its legal classification and route number for many years.

The section of the F6 Southern Freeway between Mount Ousley Road and Masters Road is predominantly four lanes with a jersey barrier median. Two additional lanes are provided between the Northern Distributor and Princes Highway interchanges.



The speed limits are 80 km/h (Mount Ousley Road to Gipps Road), 90 km/h (Gipps Road to Princes Highway) and 100 km/h (south of Princes Highway). Access is restricted along the length of the route as is typical of a freeway. A central median jersey kerb is provided along the route with standard freeway treatments including lane line and edgeline markings, street lighting and pavement reflectors.

Interchanges or grade separations are provided at:

- Masters Road;
- Mount Keira Road;
- Princes Highway; and
- Northern Distributor.

Adjoining development and landuses along the route include the University of Wollongong, industrial and residential areas. Noise barriers are provided along residential and noise sensitive areas of the F6 Southern Freeway.

This section of road carries haulage trucks to PKCT, BlueScope Steelworks, Dendrobium Washery and Corrimal Coke Works, as well as providing a link for workforce and delivery traffic. The F6 Southern Freeway carries delivery and employee traffic coming from south of Wollongong, and traffic coming from Sydney to the north.

Masters Road

Masters Road is an arterial road connecting the F6 Southern Freeway and Springhill Road. It consists of dual carriageways with a total of six lanes with a posted speed limit of 80 km/h. Access to Masters Road is restricted to the intersection with Drummond Street with a separate interchange provided at The Avenue.

Masters Road was constructed in 1978 to provide a direct connection between the F6 Southern Freeway and Springhill Road, to eliminate heavy vehicles from the Mount St Thomas residential area. The development along Masters Road is largely industrial. At its western end, Masters Road meets the F6 Southern Freeway and The Avenue at a grade separated interchange. At its eastern end, Masters Road meets Springhill Road at an expansive signalised 'T-junction' with slip lanes (also signalised) provided for left turn movement to/from Masters Road.

This section of road carries haulage trucks to PKCT, BlueScope Steelworks and Dendrobium Washery. Masters Road is not exposed to a significant level of delivery or employee traffic associated with the existing Appin Mine and West Cliff Colliery.



Springhill Road

Springhill Road is an arterial road connecting Masters Road and PKCT, as well as being part of the main link from Wollongong to Port Kembla, Warrawong and Shellharbour. The road was purpose built as a high capacity, access restricted route as a result of port development in the period 1955-1961. It is a single carriageway with six lanes, with a posted speed limit of 80 km/h. There are four signalised intersections along the section of interest at:

- Masters Road intersection;
- Tom Thumb Road intersection;
- Port Kembla Road intersection; and
- Five Islands Road intersection.

Springhill Road north of Masters Road carries haulage trucks to PKCT. Springhill Road south of Masters Road carries haulage trucks to BlueScope Steelworks and Dendrobium Washery. Springhill Road is not exposed to a significant level of delivery or employee traffic associated with the existing Appin Mine and West Cliff Colliery.

University Avenue/Graham Avenue

University Avenue/Graham Avenue is a local road that carries a single lane of traffic in either direction. It provides a link between the F6 Southern Freeway and the Northern Distributor. This length of University Avenue/Graham Avenue is used by haulage trucks on route to the Corrimal Coke Works from the West Cliff pit top. A roundabout with left turn slip lane is provided at the grade interchange of the F6 Southern Freeway off-ramp (southbound) with University Avenue.

Northern Distributor

The Northern Distributor is an arterial road through Wollongong's northern suburbs, extending from the F6 Southern Freeway at Gwynneville to Bellambi Lane at Bellambi. Extension of the distributor to Princes Highway at Molloy Street, Bulli, is underway and due for completion in 2009, however these changes occur north of the section of the Northern Distributor that is required to access the Corrimal Coke Works.

The Northern Distributor is a dual carriageway with two lanes in each direction. Access to the Northern distributor is restricted along its length. There are four signalised intersections and three grade-separated interchanges along the route. The intersections are at Bellambi Lane, Rothery Street, Railway Street, and Towradgi Road. The interchanges are at Princes Highway, University Avenue, and the F6 Southern Freeway.



The Northern Distributor carries haulage trucks to the Corrimal Coke Works on Railway Street. The Northern Distributor is not exposed to a significant level of delivery or employee traffic associated with the existing Appin Mine and West Cliff Colliery.

Railway Street

Railway Street serves as an access road for Corrimal Coke Works. It generally carries a single lane of traffic in either direction, however two lanes are provided on approach to the Northern Distributor. Railway Street carries haulage trucks to the Corrimal Coke Works which is accessed from the southern side of Railway Street, to the east of the Northern Distributor. It is not exposed to a significant level of delivery or employee traffic associated with the existing Appin Mine and West Cliff Colliery.

Lawrence Hargrave Drive

Lawrence Hargrave Drive is a sub-arterial road linking the Princes Highway at Bulli with the Royal National Park and the Southern Freeway at Helensburgh. Lawrence Hargrave Drive is predominantly a two-lane undivided road, with a short section at Thirroul having additional lanes, in an environment that changes from urban to rural.

It provides the only vehicular access to numerous localities along the coast, such as Stanwell Park, Coalcliff and Wombarra. Its intersection with Princes Highway at Helensburgh is controlled with a roundabout. At the intersection of Lawrence Hargrave Drive with Otford Road/Lady Wakehurst Drive, Lawrence Hargrave Drive has a hairpin bend. Priority is given to northbound traffic on Lawrence Hargrave Drive, with "Stop" controls for vehicles approaching on Lawrence Hargrave Drive from the west and on Lady Wakehurst Drive from the east. Lawrence Hargrave Drive follows a steep grade down southbound to Stanwell Park. It has a 60 km/hr speed limit, and has double centre lines along most of its length, and kerbside parking is not permitted.

Lawrence Hargrave Drive carries haulage trucks to the Coalcliff Coke Works at Coalcliff. Lawrence Hargrave Drive is not exposed to a significant level of delivery or employee traffic associated with the existing Appin Mine and West Cliff Colliery.



2.4 local area roads

The following discussion provides a review of roads in the proximity of the Appin Mine and West Cliff Colliery that are not used for coal haulage¹.

F5 South Western Freeway/Hume Highway

The F5 South Western Freeway/Hume Highway is an arterial road which provides a major link between Sydney and Campbelltown/Mittagong. The F5 South Western Freeway/Hume Highway provides a link for employee and delivery traffic from the local Wollondilly area (e.g. Camden/Narellan and Mittagong) and Sydney/Newcastle. The F5 South Western Freeway/Hume Highway does not carry any coal haulage trucks associated with the existing operations or the proposed Project.

Princes Highway

The Princes Highway is an arterial route through Wollongong's northern suburbs, stretching from south of the CBD to the top of Bulli Pass. Two small sections of this road are used by haul trucks returning from the southern and northern haul routes at the interchange with Mount Ousley Road/Appin Road. A small section (approximately 600 metres [m]) of this road is used by haulage trucks returning from the south and approximately 1 km is used by haulage trucks returning from the north. The Princes Highway actually follows the Northern Distributor and Bellambi Lane from North Wollongong to Bellambi, however signage does not indicate this. It is a state road and classified as State Highway No. 1. The applicable speed limit is 60 km/h, with the exception of the 40 km/h school zone outside Bulli Primary School.

North of Bellambi Lane, the Princes Highway is a four-lane undivided road with on-street parking permitted in some locations. Peak period clearway restrictions apply to maximise available traffic capacity. The section between Bellambi Lane and Hospital Road will be bypassed by the extension of the Northern Distributor in 2009.

Princes Highway is an arterial road providing a link between Bulli and Bulli Tops over what is known as the Bulli Pass. It connects the coastal region below the escarpment, north of Wollongong, to the F6 Southern Freeway/Mount Ousley Road and Appin Road. It provides a link for employee and delivery traffic from the Wollongong area (i.e. traffic travelling up the Bulli Pass from north of Fairy Meadow) to Appin Road. Except for a small section of the interchange with Appin Road, the Princes Highway does not carry any coal haulage trucks associated with the existing operations or the proposed Project.

¹ With the exception of a 600 m (route back to Appin Road from Port Kembla) and 1 km (route back to Appin Road from F6 Southern Freeway [north]) section of Princes Highway at the Mount Ousley Road/Appin Road Interchange.



Picton Road

Picton Road provides a major link between Picton and Mount Keira Road (and on to Mount Ousley Road via Link Road). It runs south from Picton through Maldon, under the F5 South Western Freeway/Hume Highway, and past Wilton to meet Mount Ousley Road north of Clive Bissell Drive. It provides a link for employee and delivery traffic from the local Wollondilly area (e.g. Bargo, Tahmoor, Mittagong and Picton), and collects traffic coming from Remembrance Driveway, the Hume Highway and Menangle Road towards the Appin Mine and West Cliff Colliery. Picton Road does not carry any coal haulage trucks associated with the existing operations or the proposed Project.

Mount Keira Road

Mount Keira Road provides sub-arterial road function between Wollongong West and Picton Road. It runs north-west from the Princes Highway in West Wollongong and ascends the Illawarra Escarpment before it meets Picton Road. It provides a link for employee and delivery traffic from the Wollongong area via Picton Road. Mount Keira Road does not carry any coal haulage trucks associated with the existing operations or the proposed Project.

Wilton Road

Wilton Road provides a link between the rural townships of Appin and Wilton. It runs south-west from Appin to Wilton and provides a link through Wilton to Picton Road. It provides a link for employee and delivery traffic from the local Wollondilly area (e.g. Bargo, Tahmoor, Thirlmere, Picton, Campbelltown, Camden and Narellan), and Wollongong to the south-east by collecting traffic coming from Picton Road towards the Appin Mine and West Cliff Colliery. Wilton Road does not carry any coal haulage trucks associated with the existing operations or the proposed Project.

Broughtons Pass Weir is located on Wilton Road. Heavy vehicle access at Broughtons Pass Weir crossing is restricted, therefore heavy vehicle traffic only accesses the Appin West pit top from Picton Road to the west.

Macarthur Road

Macarthur Road is a rural collector road that provides a link between the Picton Road exchange and Wilton Road, bypassing the town of Wilton by allowing traffic travelling north-west on Picton Road to access Appin without travelling through Wilton. It provides a link for employee and delivery traffic from Wollongong to the south-east by collecting traffic coming from Picton Road towards the Appin Mine and West Cliff Colliery. Macarthur Road does not carry any coal haulage trucks associated with the existing operations or the proposed Project.



Douglas Park Drive

Douglas Park Drive is a rural collector road that provides a link between Douglas Park and Wilton Road between Wilton and Appin. It travels south from Camden Road in Douglas Park over the F5 South Western Freeway/Hume Highway and serves as an access road for the Appin West pit top via Wilton Road or Douglas Park. Douglas Park Drive does not carry any coal haulage trucks associated with the existing operations or the proposed Project.

2.5 recent annual average daily traffic volumes

The RTA publishes traffic volume data at selected locations on its roads. Available data on roads used by the Appin Mine and West Cliff Colliery trucks was collated, and is presented below.

The most recent data available from RTA was from surveys undertaken in 2007 (Southern Region). This data is presented in **table 2**. The traffic volumes reported at each location is the Annual Average Daily Traffic (AADT), which is assessed as the total volume of traffic recorded at the location taken over a calendar year, divided by the number of days in that year. The complete historical data set is provided in **attachment a** and is discussed further in **section 3.2** of this assessment in the context of background traffic growth rates.

The University Avenue/Graham Avenue off-ramp link from the F6 Southern Freeway to the Northern Distributor has not been included in analysis of background and future traffic volumes given its function is as an on/off-ramp between arterial roads. Increases in traffic volumes on University Avenue/Graham Avenue due to the Project are considered very minor (i.e. in the order of an additional eight truck movements per day or less than one movement per hour).

Railway Street has not been included in the analysis of background and future traffic volumes due to a lack of traffic counts and given that increases in traffic volumes on Railway Street due to the Project are also considered very minor (i.e. in the order of an additional eight truck movements per day or less than one movement per hour).

Douglas Park Drive and Macarthur Road have not been included in the analysis of background and future traffic volumes due to a lack of traffic counts and given that the increase in traffic volumes on these roads would occur during peak hour when employee traffic arrives/departs. Intersection operation for peak hour movements along these roads has been assessed in **section 2.10**. **Section 4.2** includes assessment of intersections on Douglas Park Drive and Macarthur Road in consideration of additional Project traffic.



table 2: annual average daily traffic on haulage routes

Road	Location	Year	AADT (Vehicles per day)
Route to/from PKCT			
Appin Road	Appin, West of Princes Highway	2007	9,030
Mount Ousley Road	Mount Pleasant, South of Clive Bissell Drive	2006	39,881
F6 Southern Freeway (South)	Mount Ousley, South of Mount Ousley Road	2005	42,220
	West Wollongong at Gipps Road overpass	2007	69,771
Masters Road	Mount St Thomas, West of Springhill Road	2003	25,226
Springhill Road	Mount St Thomas, North of Masters Road	2005	35,179
Route to/from BlueScope Steelworks and Dendrobium Washery			
Appin Road	Appin, West of Princes Highway	2007	9,030
Mount Ousley Road	Mount Pleasant, South of Clive Bissell Drive	2006	39,881
F6 Southern Freeway (South)	Mount Ousley, South of Mount Ousley Road	2005	42,220
	West Wollongong at Gipps Road overpass	2007	69,771
Masters Road	Mount St Thomas, West of Springhill Road	2003	25,226
Springhill Road	Mount St Thomas, North of Five Islands	2005	40,524
Route to/from Corrimal Coke Works			
Appin Road	Appin, West of Princes Highway	2007	9,030
Mount Ousley Road	Mount Pleasant, South of Clive Bissell Drive	2006	39,881
F6 Southern Freeway (South)	Mount Ousley, South of Mount Ousley Road	2005	42,220
Northern Distributor	Towradgi, South of Towradgi Road	2007	31,517
Route to/from Coalcliff Coke Works			
Appin Road	Appin, West of Princes Highway	2007	9,030
F6 Southern Freeway (North)	Bulli Tops, North of Appin Road	2006	37,941
Lawrence Hargrave Drive	Stanwell Park, West of Bald Hill Road	2003	5,546

Source: RTA Traffic Volume Data (2003, 2005, 2006, 2007, 2008).

The results in **table 2** demonstrate the variance in traffic volumes on the key routes used by the haulage contractor's trucks. The F6 Southern Freeway carries almost 70,000 vehicles per day south of Mount Ousley Road, while Lawrence Hargrave Drive carries around 5,500 vehicles per day at Stanwell Park. The historical changes to these traffic levels are discussed further in **section 3** of this report.



2.6 summary of the pkct proposal

The PKCT facility is located in Port Kembla and functions as a coal export node for a number of coal mining operations in the southern and western NSW coalfields. PKCT operates 24 hours per day, 365 days per year and exports approximately 10.8 Mtpa. Currently PKCT's deliveries are limited by a restriction on receiving hours (and therefore tonnage) for public road deliveries. Note that although PKCT receives 10.8 Mtpa currently, much of this coal is delivered from internal roads within the Port Kembla industrial area (e.g. Dendrobium Washery), so the existing amount delivered directly to PKCT by public road is much less.

PKCT is currently seeking approval to remove the restriction and increase public road receipts to 24 hours per day, 7 days per week for a maximum of 10 Mtpa of coal received by public road. As part of the EA lodged with DoP in 2008, PKCT prepared a Traffic Study to determine the effects of increased road deliveries on haulage routes (Cardno Eppell Olsen, 2008). Data from the PKCT Traffic Study has been used in this report and is referenced where incorporated.

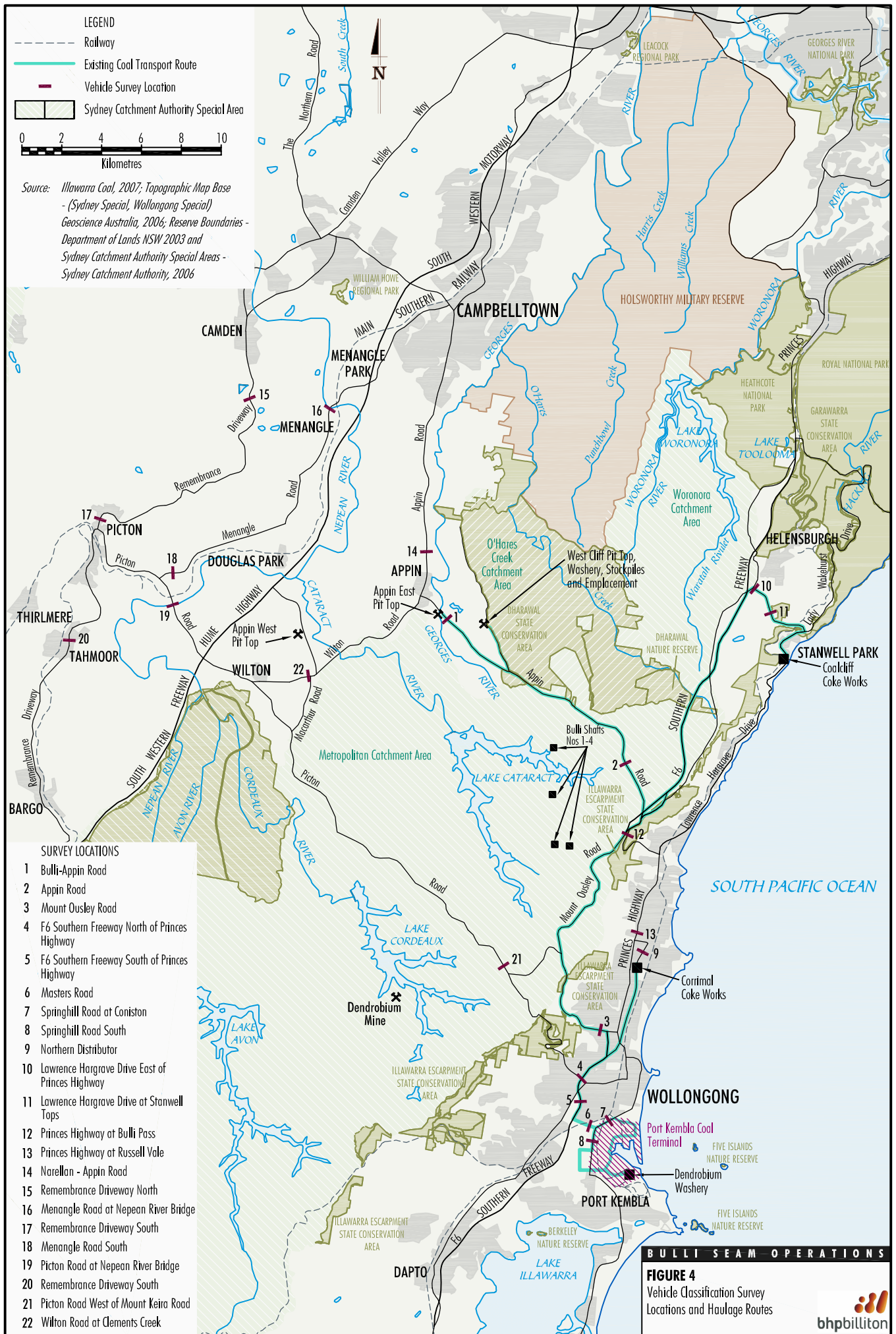


2.7 traffic surveys

A programme of traffic surveys was conducted along the routes used by the ICHPL haulage trucks for the PKCT Traffic Study (Cardno Eppell Olsen, 2008). Individual traffic surveys were also conducted along the haulage route by RTA in 2007 and Masson Wilson Twiney (2008). These surveys recorded hourly traffic volumes and vehicle classifications by direction during several periods from 2006 to 2008 at the following locations (**figure 4** and **attachment b**):

- Site 1: Bulli-Appin Road at Appin near Kings Fall Bridge (21 to 27 October 2007) (Masson Wilson Twiney, 2008).
- Site 2: Appin Road north of Princes Highway (14 to 20 August 2006) (Cardno Eppell Olsen, 2008).
- Site 3: Mount Ousley Road at Mount Pleasant (26 February to 4 March 2007) (Cardno Eppell Olsen, 2008).
- Site 4: F6 Southern Freeway, north of Princes Highway interchange at West Wollongong (23 February to 1 March 2007) (Cardno Eppell Olsen, 2008).
- Site 5: F6 Southern Freeway, south of Princes Highway near footbridge (23 February to 1 March 2007) (Cardno Eppell Olsen, 2008).
- Site 6: Masters Road at Mount St. Thomas (23 February to 1 March 2007) (Cardno Eppell Olsen, 2008).
- Site 7: Springhill Road at Coniston (8 to 21 March 2008) (Cardno Eppell Olsen, 2008).
- Site 8: Springhill Road north of Five Islands Road (Cardno Eppell Olsen, 2008)².
- Site 9: Northern Distributor, between Railway Street and Bellambi Lane (8 to 21 March 2008) (Cardno Eppell Olsen, 2008).
- Site 10: Lawrence Hargrave Drive east of Princes Highway (March 2007) (RTA, 2007).
- Site 11: Lawrence Hargrave Drive between Walker St and Stonehaven Rd, Stanwell Tops (21 to 27 October 2007) (Masson Wilson Twiney, 2008).
- Site 12: Princes Highway at Bulli Pass (21 to 27 October 2007) (Masson Wilson Twiney, 2008).
- Site 13: Princes Highway north of Bellambi Lane, Russell Vale (21 to 27 October 2007) (Masson Wilson Twiney, 2008).
- Site 14: Narellan-Appin Road north of Appin township, south of Brian Road (21 to 27 October 2007) (Masson Wilson Twiney, 2008).

² Mid-block peak hour surveys only.



LEGEND

- Railway
 - Existing Coal Transport Route
 - Vehicle Survey Location
 - Sydney Catchment Authority Special Area
- 0 2 4 6 8 10
Kilometres

Source: Illawarra Coal, 2007; Topographic Map Base - (Sydney Special, Wallongong Special) Geoscience Australia, 2006; Reserve Boundaries - Department of Lands NSW 2003 and Sydney Catchment Authority Special Areas - Sydney Catchment Authority, 2006

SURVEY LOCATIONS

- 1 Bulli-Appin Road
- 2 Appin Road
- 3 Mount Ousley Road
- 4 F6 Southern Freeway North of Princes Highway
- 5 F6 Southern Freeway South of Princes Highway
- 6 Masters Road
- 7 Springhill Road at Coniston
- 8 Springhill Road South
- 9 Northern Distributor
- 10 Lawrence Hargrave Drive East of Princes Highway
- 11 Lawrence Hargrave Drive at Stanwell Tops
- 12 Princes Highway at Bulli Pass
- 13 Princes Highway at Russell Vale
- 14 Narellan - Appin Road
- 15 Remembrance Driveway North
- 16 Menangle Road at Nepean River Bridge
- 17 Remembrance Driveway South
- 18 Menangle Road South
- 19 Picton Road at Nepean River Bridge
- 20 Remembrance Driveway South
- 21 Picton Road West of Mount Keira Road
- 22 Wilton Road at Clements Creek

BULLI SEAM OPERATIONS

FIGURE 4
Vehicle Classification Survey Locations and Haulage Routes





RTA survey results also recorded average daily traffic volumes and vehicle classifications by direction during several periods from 2007 to 2008 at the following locations along local roads:

- Site 15: Remembrance Driveway north of Finns Road (December 2008).
- Site 16: Menangle Road at Nepean River Bridge (December 2008).
- Site 17: Remembrance Driveway 0.5 km north of Regreme Road (December 2008).
- Site 18: Menangle Road east of Picton-Oakdale Road (April 2008).
- Site 19: Picton Road at Nepean River Bridge (April 2008).
- Site 20: Remembrance Driveway 0.8 km south of Tahmoor Post Office (December 2008).
- Site 21: Picton Road west of Mount Keira Road (June 2007).

Preliminary survey results by Transport and Traffic Associates (2008) for the proposed Wilton Quarry on Wilton Road also recorded average daily traffic volumes and heavy vehicles by direction at the following location:

- Site 22: Wilton Road at Clements Creek.

The traffic surveys at these 22 locations were supplemented by estimates from ICHPL including coal truck movements to and from the Appin Mine and West Cliff Colliery and estimates of existing deliveries and workforce light vehicle movements.

2.8 average weekday traffic volumes

The surveyed two-way average weekday traffic volumes at the automatic survey locations are summarised in **table 3** below. These are the average two-way daily flows over the Monday to Friday period. The table also summarises the types of vehicles at each location, being light, rigid or articulated vehicles. Light vehicles include motorcycles, cars, vans, 4WDs, and utes, including those towing a trailer or caravan. Heavy vehicles include rigid vehicles (i.e. single unit trucks and buses with two to four axles) and articulated vehicles (i.e. semi-trailers, rigid trucks with trailers and B Doubles).

It should be noted that the articulated vehicles in **table 3** represent all articulated vehicles at each location, not just those movements generated to and from the Appin Mine and West Cliff Colliery (i.e. **table 3** includes other articulated truck movements associated with deliveries to/from local and regional agricultural, industrial, retail industries, etc.). As described in **section 2.5**, University Avenue/Graham Avenue, Railway Street, Douglas Park Drive and Macarthur Road are not included in analysis of background and future traffic volumes.



table 3: two-way average weekday daily traffic volumes (veh/day)

Site	Road and Location	Light Vehicles (%)		Rigid Vehicles (%)		Articulated Vehicles		Total
		Number	Percent	Number	Percent	Number	Percent	
To/from PKCT								
1	Bulli-Appin Road, Appin near Kings Fall Bridge (2007) ¹	7,148	87.5%	689	8.4%	337	4.1%	8,174
2	Appin Road north of Princes Highway (2006) ²	7,909	82.4%	787	8.2%	897	9.4%	9,593
3	Mount Ousley Road at Mount Pleasant (2007) ²	36,997	86.3%	2,286	5.3%	3,593	8.4%	42,876
4	F6 Southern Freeway north of Princes Highway interchange at West Wollongong (2007) ²	67,728	89.4%	4,325	5.7%	3,734	4.9%	75,787
5	F6 Southern Freeway south of Princes Highway near footbridge (2007) ²	65,862	89.8%	3,727	5.1%	3,761	5.1%	73,350
6	Masters Road at Mount St. Thomas (2007) ²	22,968	86.5%	1,481	5.6%	2,090	7.9%	26,539
7	Springhill Road at Coniston (2008) ²	14,915	92.7%	617	3.8%	558	3.5%	16,090
To/from BlueScope Steelworks and Dendrobium Washery								
8	Springhill Road north of Five Islands Road	Not available (4.7% Heavy Vehicles indicatively)						1,480 ^{1 2}
Route to/from Corrimal Coke Works								
9	Northern Distributor between Railway Street and Bellambi Lane (2008) ²	21,063	92.2%	1,471	6.4%	307	1.3%	22,841
Route to/from Coalcliff Coke Works								
-	F6 Southern Freeway (North)	(Not available)						37,941*
10	Lawrence Hargrave Drive east of Princes Highway (2007) ³	3,846	95.5%	124	3.1%	58	1.4%	4,028
11	Lawrence Hargrave Drive at Stanwell Tops (2007) ¹	5,494	93.6%	300	5.1%	77	1.3%	5,871



table 3: two-way average weekday daily traffic volumes (veh/day) (continued)

Site	Road and Location	Light Vehicles (%)		Rigid Vehicles (%)		Articulated Vehicles		Total
		Number	Percent	Number	Percent	Number	Percent	
Other Local Roads								
12	Princes Highway at Bulli Pass (2007) ¹	9,948	94.6%	505	4.8%	63	0.6%	10,516
13	Princes Highway north of Bellambi Lane, Russell Vale (2007) ¹	24,061	93.3%	1,538	6.0%	181	0.7%	25,780
14	Narellan-Appin Road north of Appin township, south of Brian Road (2007) ¹	9,015	90.9%	625	6.3%	276	2.8%	9,916
15	Remembrance Driveway north of Finns Road (2008) ³	10,292	94.7%	457	4.2%	117	1.1%	10,866
16	Menangle Road at Nepean River Bridge (2008) ³	6,185	96.8%	171	2.7%	35	0.5%	6,391
17	Remembrance Driveway 0.5 km north of Regreme Road (2008) ^{3^}	3,462	94.8%	155	4.2%	35	1.0%	3,652
18	Menangle Road east of Picton-Oakdale Road (2008) ³	2,671	94.0%	135	4.8%	36	1.3%	2,842
19	Picton Road at Nepean River Bridge (2008) ³	7,170	89.6%	509	6.4%	322	4.0%	8,001
20	Remembrance Driveway 0.8 km south of Tahmoor Post Office (2008) ³	7,113	93.9%	374	4.9%	86	1.1%	7,573
21	Picton Road west of Mount Keira Road (2007) ³	9,105	85.5%	314	2.9%	1,233	11.6%	10,652
22	Wilton Road at Clements Creek (2008) ⁴	1,902	89.6%	223 Heavy Vehicles (10.4 %)				2,125

* AADT.

^ Southbound only.

[†] Average of two-way mid-block peak hour counts.

¹ Masson Wilson Twiney (2008).

² Cardno Eppell Olsen (2008).

³ RTA class surveys. Note this is average daily data.

⁴ Transport and Traffic Associates (2008).



2.9 existing bulli seam operations traffic generation

2.9.1 appin/west cliff coal haulage

ICHPL provided data regarding coal haulage to PKCT, BlueScope Steelworks, Dendrobium Washery, Coalcliff and Corrimal for 2007, corresponding to the highest recent year of haulage from the Appin Mine and West Cliff Colliery. Number of movements has been calculated assuming an average load per truck of 36.5 tonnes (t), which was calculated from historical data and used in the PKCT Traffic Study (Cardno Eppell Olsen, 2008). Truck haulage movements are summarised in **table 4** below (two movements equates to one round trip).

table 4: coal hauling movements from west cliff/appin in 2007

Truck movements	To PKCT	To BlueScope Steelworks	To Dendrobium Washery**	To Coalcliff Coke Works	To Corrimal Coke Works	To West Cliff pit top**	Total
Total in 2007	183,974	103,202	21,564	2,894	2,894	151,196	465,724
Weekday Average*	566	318	66	9	9	465	1,433

* Data fitted from 2007 High Output Surveys in PKCT Traffic Study (i.e. 80% truck trips occur on weekdays, 20% weekends) (Cardno Eppell Olsen, 2008).

** ROM coal from Appin East pit top.

From past haulage surveys in 2007, 80% of truck trips occurred during weekdays, with 20% occurring on weekends (Cardno Eppell Olsen, 2008). This demonstrates that weekend traffic generation by the existing operations is significantly lower than that on weekdays.

2.9.2 appin/west cliff deliveries/visitor trips

ICHPL provided estimates of courier and delivery vehicle movements associated with the existing operations. This shows that at West Cliff pit top, a total of 577 delivery movements are made per week, or an average of 91 delivery movements per weekday (i.e. 7 heavy vehicle movements and 84 light vehicles), with the majority being couriers/visitors and deliveries to the site for parts and equipment. At Appin West pit top, a total of 519 delivery movements are made per week, or an average of 81 delivery movements per weekday (i.e. 23 heavy vehicle movements and 58 light vehicles). At Appin East pit top, a total of 130 delivery movements are made per week, or an average of 21 delivery movements per weekday (i.e. 1 heavy vehicle movement and 20 light vehicles). The majority of visitor/sale representatives/couriers/other deliveries occur on weekdays (i.e. 80 percent on weekdays), whereas heavy vehicle deliveries occur throughout the week. The type of vehicles used for these deliveries varied from utes and vans through to semi-trailers, as shown in **table 5** below.



Table 5 also incorporates approximately 20 trucking movements per weekday associated with the removal of brine from the Appin West Water Treatment Plant to Unanderra for disposal. Sludge removal from the Appin West Treatment Plant Dynasand filter also results in minor trucking movements (i.e. approximately two movements per fortnight) to Badgery Creek, Sydney and is considered in **table 5**.

table 5: courier and delivery movements

Type of Vehicle	West Cliff pit top		Appin West pit top		Appin East pit top	
	Movements	Percent of Total	Movements	Percent of Total	Movements	Percent of Total
Truck (machine parts/brine and sludge removal/other deliveries)	22 /week	4%	152 /week	29%	3 /week	2%
Truck (fuel)	24 /week	4%	2 /week	1%	1 /week	1%
Truck (oversize loads)	6 /week	1%	2 /week	1%	1 /week	1%
Small truck/light vehicles (visitors/sale representatives)	32 /weekday	35%	16 /weekday	19%	4 /weekday	19%
Small truck/vans (couriers/other deliveries)	52 /weekday	56%	42 /weekday	50%	16 /weekday	77%
Total	577 /week	100	519 /week	100	130 /week	100

Source: ICHPL data (2009).

ICHPL also provided estimates for the sources of key deliveries. Wollongong was the most common origin for delivery movements, followed by Mittagong, Newcastle/Sydney and the local Wollondilly area, as shown in **table 6**, below.

table 6: expected delivery routes

Likely Route	Percent of movements to/from West Cliff pit top	Percent of movements to/from Appin West pit top	Percent of movements to/from Appin East pit top
Princes Highway (Bulli Pass)	40%	25%	40%
Mount Ousley Road	40%	25%	40%
F6 Southern Freeway (north)	5%	10%	5%
Appin Road north of Appin	10%	10%	10%
Picton Road	5%	30%	5%

Source: ICHPL data (2009).



Table 6 assumes that from Wollongong, one half of movements would use Bulli Pass, and the remainder would use Mount Ousley Road (i.e. travelling from south of Fairy Meadow). For deliveries coming from the local Wollondilly area, the main access is assumed to be split between Appin Road north of Appin and Picton Road/Wilton Road. Road deliveries from the Sydney/Newcastle area are assumed to be split between the inland highways (i.e. Hume Highway/Appin Road) and the coastal F6 Southern Freeway.

2.9.3 appin/west cliff employee traffic

Total movements generated by employees, on-site contractors, etc. were observed from ICHPL data to comprise approximately 520 movements per day to/from West Cliff pit top and approximately 800 movements per day to/from Appin East/Appin West pit tops. Approximately 80% of the Appin Mine traffic (employee and deliveries) services Appin West pit top, with the remainder going to Appin East pit top. Therefore approximately 160 movements are generated per day to/from Appin East pit top and approximately 640 movements are generated to/from Appin West pit top. The above employee movements were compared to the total number of employees at each pit top to determine the car pooling factor for respective pit tops. The distribution of employees between pit tops for the existing operations and the Project is described in Section 2 in the Main Report of the EA. A car pooling factor of 1.5 people per car at West Cliff pit top and 1.2 people per car at Appin East and Appin West pit tops was determined from observed ICHPL data.

Details of the approximate distribution of these employee/contractor movements were provided by ICHPL. Employee distribution to/from West Cliff/Appin East pit tops (i.e. access via Appin Road) and Appin West pit top (access via Douglas Park Drive) were very similar (+/- 5% difference in employee residence for each location below):

- 50 percent to/from the south (i.e. Wollongong south of Fairy Meadow using F6 Southern Freeway and Appin Road).
- 30 percent to/from the south (north of Fairy Meadow to Scarborough using Princes Highway up Bulli Pass and Appin Road).
- 15 percent from local areas (i.e. Camden, Campbelltown, Douglas Park, Mittagong, Picton and Wilton), using Picton Road, Hume Highway, Remembrance Driveway, Menangle Road, Appin Road north of Appin and Wilton Road.
- 5 percent from the north (i.e. Sydney), using the Hume Highway and F6 Southern Freeway.



2.9.4 coal wash haulage

During the life of the Project, Dendrobium Washery would produce in the order of up to 27.2 Mt of coal wash (Cardno Forbes Rigby, 2008) which would require emplacement at the West Cliff Coal Wash Emplacement. Trucks delivering coal to PKCT/BlueScope Steelworks would continue to backhaul coal wash to the West Cliff Coal Wash Emplacement and as such, no additional truck trips would be required as a result of coal wash haulage from Dendrobium Washery.

2.9.5 contribution of appin/west cliff to traffic on haulage routes and local roads

Based on the data provided by ICHPL, the typical contribution of the Appin Mine and West Cliff Colliery traffic to the total traffic on the surveyed routes was estimated. This includes courier and delivery vehicles, coal haulage trucks and employee/contractor vehicles.

The assessment presented in **table 7** assumes that the destinations of the employee, courier and delivery vehicle movements when they leave the pit tops are the same as their origins as estimated by ICHPL. Heavy vehicles include rigid and articulated vehicles as described in **section 2.8**.

Due to access for heavy vehicles travelling to Appin West pit top being restricted by Broughtons Pass Weir, it is assumed that all heavy vehicles travelling to Appin West pit top from Wollongong gain access via Picton Road west of Mount Keira Road, approaching Appin West pit top from south-east of Wilton. Heavy vehicles from the north (e.g. Campbelltown) would use the F5 South Western Freeway/Hume Highway and Picton Road. Due to travel distances, light vehicles from Wollongong (south of Fairy Meadow) are also assumed to gain access to the Appin West pit top via Picton Road west of Mount Keira Road.



table 7 estimated recent average weekday appin/west cliff traffic movements on haulage routes and local roads

Site	Road and Location	Courier/Deliveries		Coal Haulage	Employee/Contractor	Total ICHPL Vehicle Movements		All Vehicles*	Appin/West Cliff (%)
		Light	Heavy	Heavy	Light	Light	Heavy		
To/from PKCT									
1	Bulli-Appin Road, Appin near Kings Fall Bridge	50	2	465	431	481	467	8,174	11.6%
2	Appin Road north of Princes Highway	109	8	968	769	878	976	9,593	19.3%
3	Mount Ousley Road at Mount Pleasant	42	4	959	340	382	963	42,876	3.1%
4	F6 Southern Freeway north of Princes Highway interchange at West Wollongong	42	4	950	340	382	954	75,787	1.8%
5	F6 Southern Freeway south of Princes Highway near footbridge	42	4	950	340	382	954	73,350	1.8%
6	Masters Road at Mount St. Thomas	0	0	950	0	0	950	26,539	3.6%
7	Springhill Road at Coniston	0	0	566	0	0	566	16,090	3.5%
To/from BlueScope SteelWorks and Dendrobium Washery									
8	Springhill Road north of Five Islands Road**	0	0	384	0	0	384	40,524	0.9%
Route to/from Corrimal Coke Works									
-	Northern Distributor, Towradgi, south of Towradgi Road^	0	0	9	0	0	9	31,517	0.0%
Route to/from Coalcliff Coke Works									
-	F6 Southern Freeway (North)	11	3	9	33	44	12	37,941	0.1%
10^^	Lawrence Hargrave Drive east of Princes Highway	0	0	9	0	0	9	4,028	0.2%



table 7 estimated recent average weekday appin/west cliff traffic movements on haulage routes and local roads (continued)

Site	Road and Location	Courier/ Deliveries		Coal Haulage	Employee/ Contractor	Total ICHPL Vehicle Movements		All Vehicles	Appin/ West Cliff (%)
		Light	Heavy	Heavy	Light	Light	Heavy		
Local Roads									
12	Princes Highway at Bulli Pass	56	4	0	396	452	4	10,516	4.3%
13	Princes Highway north of Bellambi Lane, Russell Vale	56	4	0	396	452	4	25,780	1.8%
14	Narellan-Appin Road north of Appin township, south of Brian Road	16	1	0	132	148	1	9,916	1.5%
15	Remembrance Driveway north of Finns Road	8	2	0	33	41	2	10,866	0.4%
16	Menangle Road at Nepean River Bridge	8	2	0	33	41	2	6,391	0.7%
17	Remembrance Driveway 0.5 km north of Regreme Road	8	2	0	33	41	2	3,652	1.2%
18	Menangle Road east of Picton-Oakdale Road	8	2	0	33	41	2	2,842	1.5%
19	Picton Road at Nepean River Bridge	23	7	0	99	122	7	8,001	1.6%
20	Remembrance Driveway 0.8 km south of Tahmoor Post Office	8	2	0	33	41	2	7,573	0.6%
21	Picton Road west of Mount Keira Road	14.5	14	0	320	335	14	10,652	3.3%
22	Wilton Road at Clements Creek	23	7	0	99	122	7	2,125	6.1%

* Two-way survey data unless specified - sources presented in **section 2.7**.

** Only two-way peak hour data is available at Site 8. Therefore, a nearby indicative AADT count has been used for 'All Vehicles'.

^ Average Annual Daily Traffic (AADT).

^^ Site 11 was removed from further assessment as Lawrence Hargrave Drive is covered under Site 10.



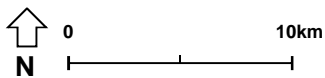
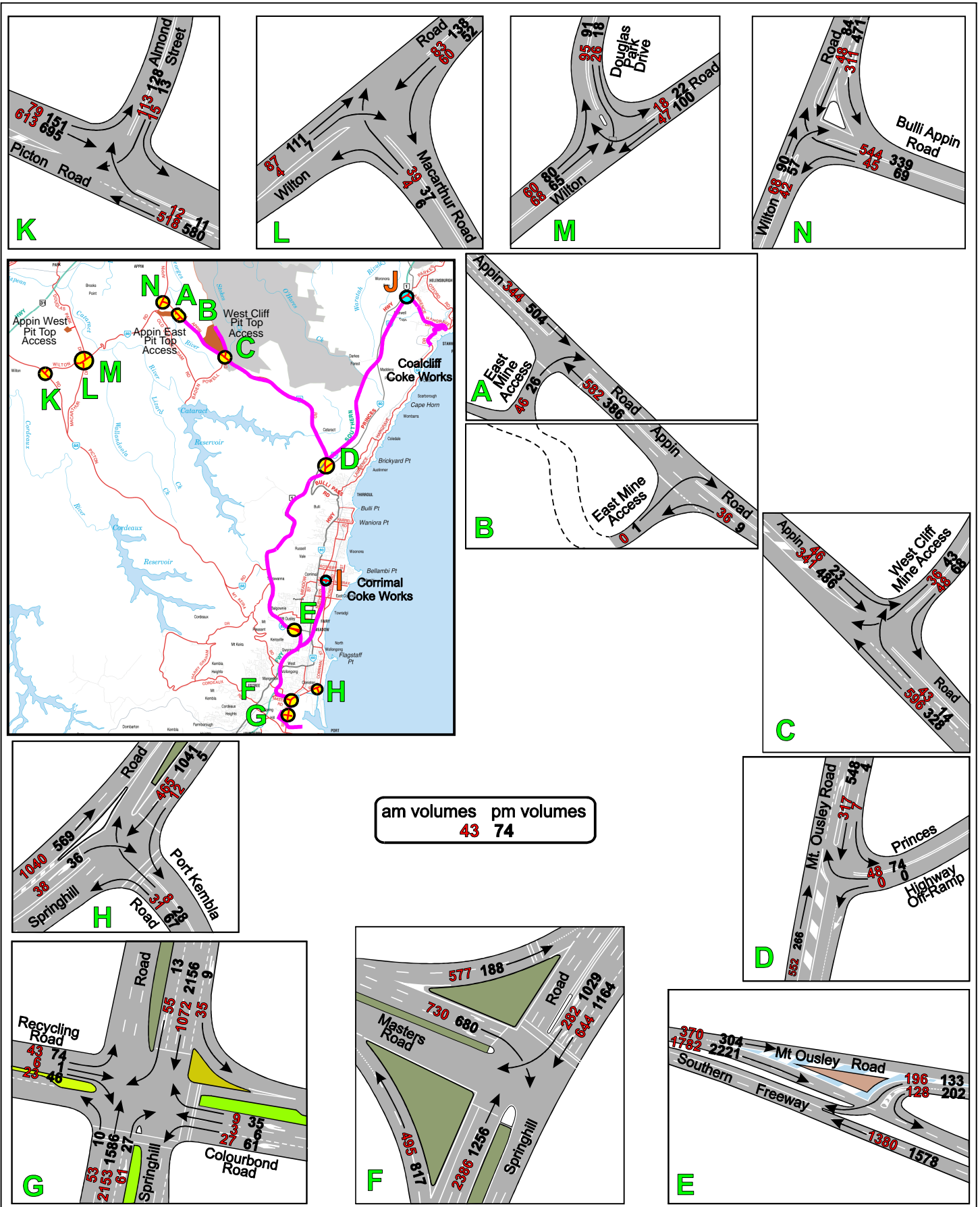
2.10 existing peak hour traffic conditions

A number of peak hour turning count surveys were undertaken on Thursday 9th April 2009 in order to determine the performance of critical intersections that are likely to be impacted upon by the Project. The results of the peak hour surveys are presented on **figure 5**. The results of the turning count surveys are provided in **attachment c**.

The results of these surveys were analysed using the SIDRA computer program to determine their performance characteristics under existing traffic conditions. The SIDRA model produces a range of outputs, including Degree of Saturation (DOS) and Average Vehicle Delay per vehicle (AVD). The AVD is in turn related to a Level of Service (LOS) criteria. These performance measures can be interpreted using the following explanations:

Degree of Saturation (DOS) - the DOS is a measure of the operational performance of individual intersections. As both queue length and delay increase rapidly as DS approaches 1, it is usual to attempt to keep DS to less than 0.9. When DS exceeds 0.9 residual queues can be anticipated, as occurs at many major intersections throughout the metropolitan area during peak periods. In this regard, a practical limit at 1.1 can be assumed. For intersections controlled by roundabout or give way/stop control, satisfactory intersection operation is generally indicated by a DOS of 0.8 or less.

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



road transport assessment: bulli seam operations project

figure 5
 existing am and pm peak traffic volumes

prepared for BHP Billiton
 by traffix traffic & transport planners





Level of Service (LOS) - this is a comparative measure which provides an indication of the operating performance of an intersection as shown below:

Level of Service (LOS)	Average Vehicle Delay (AVD) (s/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation.	Good operation.
B	15 to 28	Good with acceptable delays and spare capacity.	Acceptable delays and spare capacity.
C	29 to 42	Satisfactory.	Satisfactory but accident study required.
D	43 to 56	Operating near capacity.	Near capacity and accident study required.
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode.	At capacity and requires other control mode.
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

Source: Adapted from RTA Guide to Traffic Generating Developments, 2002.

A summary of the modelled results are provided below in **table 8**. The SIDRA outputs are provided in **attachment d** which includes detailed results for individual lanes and approaches.



table 8: existing intersection performance: am and pm peak hour

Site	Intersection Description	Control Type	Period	DOS	AVD (s/veh)	LOS
HAULAGE ROUTES						
A	Appin Road/George Street (Appin East pit top exit)	signals	AM	0.557	16.3	B
			PM	0.684	19.5	B
B	Appin Road/Sheriff Road (Appin East pit top entry)	priority	AM	0.180	14.5	B
			PM	0.157	14.8	B
C	Appin Road/West Cliff pit top access	priority	AM	0.339	32.3	C
			PM	0.336	24.9	B
D	Appin Road/Princes Highway off-ramp	priority	AM	0.312	18.5	B
			PM	0.278	22.3	B
E	Mount Ousley Road/F6 Southern Freeway	priority	AM	1.776	467.0	F
			PM	2.333	544.0	F
F	Springhill Road/Masters Road ¹	signals	AM	0.844	30.1	C
			PM	0.880	39.6	C
G	Springhill Road/Recycling Road	signals	AM	0.908	28.4	B
			PM	0.857	23.7	B
H	Springhill Road/Port Kembla Road ¹	signals	AM	0.267	7.2	A
			PM	0.447	10.5	A
I	Railway Street/Corrimal Coke Works gate ²	priority	AM	0.17	8.3	A
			PM	-	-	-
J	Princes Highway/Lawrence Hargrave Drive ²	priority	AM	0.23	11.6	A
			PM	0.14	15.5	B
LOCAL ROADS						
K	Picton Road/Almond Street	priority	AM	0.400	26.6	B
			PM	0.500	31.0	C
L	Wilton Road/Macarthur Road	priority	AM	0.068	16.3	B
			PM	0.075	15.6	B
M	Wilton Rd/Douglas Park Drive	priority	AM	0.168	14.7	B
			PM	0.170	15.6	B
N	Appin Road/Wilton Road	priority	AM	0.338	21.9	B
			PM	0.446	15.8	B

¹ 2008 Survey data from Cardno Eppell Olsen (2008).

² 2007 Survey data from Metropolitan Traffic Study (Masson Wilson Twiney, 2008).

Note: No turning vehicles in PM peak at Corrimal Coke Works intersection.

s/veh = seconds per vehicle.



It can be seen from **table 8** that the majority of the above intersections have an overall LOS of A, B or C and operate satisfactorily under the existing 'base case' scenario, with moderate delays. The notable exception is the intersection of Mount Ousley Road with the F6 Southern Freeway, which operates at LOS F due to delays to traffic turning right out of Mount Ousley Road (**figure 5**). It should be noted that the existing operations contribute a low 3.1% of surveyed traffic movements along Mount Ousley Road, all of which is through traffic to the F6 Southern Freeway. No haulage trucks use the right turn across Mount Ousley Road. ICHPL have indicated that a negligible proportion of employee traffic use the right turn across Mount Ousley Road because it has a poor performance and therefore significant delays can result. It is recommended that the RTA make improvements to this intersection now as a matter of priority due to the existing low LOS.

Nevertheless, it should be noted that the most relevant use of this analysis is to compare the relative change in the performance parameters as a result of the proposed Project.

Previous intersection analysis (Masson Wilson Twiney, 2008) has also indicated that intersections at Railway Street/Corrimal Coke Works entry (i.e. Corrimal Coke Works haul route) and Princes Highway/Lawrence Hargrave Drive (i.e. Coalcliff Coke Works haul route) operate at a good LOS (**table 8**).

The detailed SIDRA outputs are provided in **attachment d1**.



3. future traffic conditions

3.1 planned changes to the surrounding road network

A number of minor road works are currently proposed within the road network used by the Appin Mine and West Cliff Colliery. These generally include maintenance programs and other minor works. Road safety measures including shoulder widening to Picton Road are also under review and implementation by the RTA.

The RTA's Northern Distributor extension to Molly Street is expected to be completed in 2009. This will result in a decrease in traffic from the Princes Highway, in the vicinity of Bellambi Road, as traffic redistributes onto the Northern Distributor. As this will primarily affect flows between Bellambi Road and Molloy Street (i.e. to the north of the Corrimal Coke Works haulage route) it is not expected to significantly impact on Project haulage routes.

Similarly, the RTA's Oak Flats to Dunmore upgrade of the Princes Highway to a four-lane divided carriageway (due for completion in late 2009) lies outside of the primary haul routes and will have minimal impact on the Project with the exception of potentially reduced travel times for a limited number of employees and deliveries from the south.

For safety reasons, the intersection between the Princes Highway and Lawrence Hargrave Drive in Bulli is to be reconstructed by the RTA with a single northbound lane from George Avenue to the intersection. It is scheduled for completion in 2011. The works include the removal of the right turn from the Princes Highway to Lawrence Hargrave Drive in Bulli in addition to restricting a number of surrounding intersections to left-in/left-out arrangements.

None of the abovementioned planned works by the RTA are expected to significantly affect the proposed Project. **Section 4.3** of this report discusses other additional road changes as a result of the Project and future traffic growth.

3.2 traffic growth

Traffic volumes are expected to continue to increase on the haulage routes, regardless of the operations at the Appin Mine and West Cliff Colliery. This background traffic growth is associated with population growth in the local/regional area and growth in surrounding industry (e.g. agricultural, manufacturing, building/construction, etc.). The average daily volumes have varied considerably over time from route to route. It is expected that growth rates on the different routes would continue to vary in the future, due to the varying roles and linkages provided by each of the roads.



The Sydney-Wollongong Corridor Strategy (SWCS) provides an estimate of likely background traffic growth for Mount Ousley Road and the F6 Southern Freeway, which was also used in the PKCT Traffic Study (Cardno Eppell Olsen, 2008). The SWCS stated that total traffic volume is projected to grow by two percent a year until 2025, with heavy vehicle traffic growing at a slightly faster rate of 2.7 percent per annum.

Background growth data for the remainder of the haulage routes was compiled from RTA AADT data, the PKCT Traffic Study (Cardno Eppell Olsen, 2008) and the Metropolitan Colliery Traffic Assessment (Masson Wilson Twiney, 2008). A summary of the assumed traffic growth rates for background traffic levels are provided in **table 9**.



table 9: assumed background traffic growth rates

Site	Road and Location	Source	Percent per annum*	
			Light Vehicles	Heavy Vehicles
To/from PKCT				
1	Bulli-Appin Road, Appin near Kings Fall Bridge	Metropolitan Colliery Traffic Assessment ¹	0.95	0.95
2	Appin Road north of Princes Highway	PKCT Traffic Study ²	2.1	2.8
3	Mount Ousley Road at Mount Pleasant	AADT (2000 – 2005)	4.0	4.0
4	F6 Southern Freeway north of Princes Highway interchange at West Wollongong	SWCS ³	2.0	2.7
5	F6 Southern Freeway south of Princes Highway near footbridge		2.0	2.7
6	Masters Road at Mount St. Thomas	AADT (2000 – 2003)	0	0
7	Springhill Road at Coniston	AADT (2000 – 2005)	0.5	0.5
To/from BlueScope SteelWorks and Dendrobium Washery				
8	Springhill Road north of Five Islands Road	AADT (2000 – 2005)	0.9	0.9
Route to/from Corrimal Coke Works				
-	Northern Distributor, Towradgi, south of Towradgi Road	AADT (2000 – 2007)	1.5	1.5
Route to/from Coalcliff Coke Works				
-	F6 Southern Freeway (North)	AADT (2000 – 2006)	4.0	4.0
10 [^]	Lawrence Hargrave Drive east of Princes Highway	Metropolitan Colliery Traffic Assessment ¹	5.0	5.0



table 9: assumed background traffic growth rates (continued)

Site	Road and Location	Source	Percent per annum*	
			Light Vehicles	Heavy Vehicles
Local Roads				
12	Princes Highway at Bulli Pass	Metropolitan Colliery Traffic Assessment ¹	2.7	2.7
13	Princes Highway north of Bellambi Lane, Russell Vale	Metropolitan Colliery Traffic Assessment ¹	1.0	1.0
14	Narellan-Appin Road north of Appin township, south of Brian Road	AADT(2000 – 2007)	0.4	0.4
15	Remembrance Driveway north of Finns Road	AADT(2000 – 2006)	3.0	3.0
16	Menangle Road at Nepean River Bridge	AADT(1999 – 2005)	3.8	3.8
17	Remembrance Driveway 0.5 km north of Regreme Road	AADT(2000 – 2006)	0	0
18	Menangle Road east of Picton-Oakdale Road	AADT(2000 – 2003)	5.2	5.2
19	Picton Road at Nepean River Bridge	AADT(2000 – 2003)	3.5	3.5
20	Remembrance Driveway 0.8 km south of Tahmoor Post Office	AADT(2000 – 2003)	0	0
21	Picton Road west of Mount Keira Road	AADT(2000 – 2003)	2.6	2.6
22	Wilton Road at Clements Creek	AADT(2000 – 2003)	0	0

* AADT data can show a decline in traffic. Where applicable, a 0% growth rate was assumed.

^ Site 11 was removed from further assessment as Lawrence Hargrave Drive is covered under Site 10.

¹ Masson Wilson Twiney (2008).

² Cardno Eppell Olsen (2008).

³ Department of Transport and Regional Services (2007).



The time periods of particular interest to the Project with regard to traffic conditions are:

- Year 1 (i.e. approximately 2011), existing operations plus construction traffic;
- Year 3 (i.e. approximately 2013), being the indicative worst-case operational period which could include a shift of significant components of the workforce from West Cliff pit top to the Appin West pit top, combining maximum Project operational traffic, longwall machine relocation/upgrade traffic and growth in background traffic; and
- Year 10 (i.e. approximately 2019), combining Project operational traffic and growth in background traffic.

Given the high likelihood of changes to the road network beyond the next 10 years, it is not considered appropriate to forecast traffic conditions more than 10 years in advance. As the existing traffic contributions would remain static and background traffic would continue to rise, the relative contribution of the Appin Mine and West Cliff Colliery traffic would continue to fall over time. The operation of the road network is more appropriately assessed based on the performance of key intersections in the locality, as discussed in **section 3.3**.

Although a period of increased activity, only an additional 100 employees and minor movements associated with construction deliveries would be required for the construction phase of the Project. Therefore the construction period creates a lesser traffic impact when compared to Year 3 (i.e. 2013) when approximately 295 additional employees and an associated increase in deliveries of approximately 100% would be required (i.e. 975 employees including construction workforce against 1,170 employees at Project peak – Year 3). Also, coal haulage during the initial construction phase is much lower than during the later years when production increases. As such, it is considered that construction traffic impacts (including construction deliveries) would not result in impacts greater than those associated with Project Year 3 (2013) or Year 10 (2019) and therefore a construction scenario is not specifically assessed.

It should be noted that depending on the mine development sequence over the life of the Project (as described in Section 2 in the Main Report of the EA), there may be a period toward the end of the Project life (i.e. post 2030) when the Project underground workforce and deliveries are centred around the West Cliff pit top. As this scenario is not expected to occur within the next 10 years, a specific assessment has not been undertaken at this time given the variability in predicted future traffic growth. Consideration should be given to conducting a specific traffic assessment, should this scenario occur later in the Project life. Notwithstanding, improvements are recommended at the Appin Road and West Cliff pit top access road (**section 4.4.1**).

The future daily traffic volumes on key roads assuming that the Appin Mine and West Cliff Colliery would continue to operate as they do at present (i.e. no change in traffic generation) are shown in **table 10** below.



table 10: existing and future average weekday traffic with existing operations (veh/day)

Site	Road and Location	Average Weekday Two Way Traffic			Appin/West Cliff	Appin/West Cliff Percent of Total		
		Existing	2013	2019	ICHPL Vehicle movements	Existing	2013	2019
To/from PKCT								
1	Bulli-Appin Road, Appin near Kings Fall Bridge	8,330	8,651	9,156	948	11.4%	11.0%	10.4%
2	Appin Road north of Princes Highway	10,247	11,191	12,771	1,853	18.1%	16.6%	14.5%
3	Mount Ousley Road at Mount Pleasant	46,348	54,158	68,409	1,344	2.9%	2.5%	2.0%
4	F6 Southern Freeway north of Princes Highway interchange at West	78,964	85,727	96,979	1,335	1.7%	1.6%	1.4%
5	F6 Southern Freeway south of Princes Highway near footbridge	76,421	82,957	93,829	1,335	1.7%	1.6%	1.4%
6	Masters Road at Mount St. Thomas	26,539	26,539	26,539	950	3.6%	3.6%	3.6%
7	Springhill Road at Coniston	16,172	16,504	17,014	566	3.5%	3.4%	3.3%
To/from BlueScope SteelWorks and Dendrobium Washery								
8	Springhill Road north of Five Islands Road*	42,025	43,581	46,025	384	0.9%	0.9%	0.8%
Route to/from Corrimal Coke Works								
-	Northern Distributor, Towradgi, south of Towradgi Road	32,452	34,405	37,557	9	0.0%	0.0%	0.0%



table 10: existing and future average weekday traffic with existing operations (veh/day) (continued)

Site	Road and Location	Average Weekday Two Way Traffic			Appin/West Cliff	Appin/West Cliff Percent of Total		
		Existing	2013	2019	ICHPL Vehicle movements	Existing	2013	2019
Route to/from Coalcliff Coke Works								
-	F6 Southern Freeway (North)	42,709	50,012	63,373	56	0.1%	0.1%	0.1%
10	Lawrence Hargrave Drive east of Princes Highway^	4,443	5,404	7,250	9	0.2%	0.2%	0.1%
Local Roads								
12	Princes Highway at Bulli Pass	11,096	12,353	14,511	456	4.1%	3.7%	3.1%
13	Princes Highway north of Bellambi Lane, Russell Vale	26,288	27,333	28,981	456	1.7%	1.7%	1.6%
14	Narellan-Appin Road north of Appin township, south of Brian Road	10,003	10,181	10,453	150	1.5%	1.5%	1.4%
15	Remembrance Driveway north of Finns Road	11,191	12,590	15,025	43	0.4%	0.3%	0.3%
16	Menangle Road at Nepean River Bridge	6,631	7,684	9,586	43	0.6%	0.6%	0.4%
17	Remembrance Driveway 0.5 km north of Regreme Road	3,652	3,652	3,652	43	1.2%	1.2%	1.2%
18	Menangle Road east of Picton-Oakdale Road	2,991	3,667	4,979	43	1.4%	1.2%	0.9%
19	Picton Road at Nepean River Bridge	8,282	9,507	11,692	129	1.6%	1.4%	1.1%



table 10: existing and future average weekday traffic with existing operations (veh/day) (continued)

Site	Road and Location	Average Weekday Two Way Traffic			Appin/West Cliff	Appin/West Cliff Percent of Total		
		Existing	2013	2019	ICHPL Vehicle movements	Existing	2013	2019
20	Remembrance Driveway 0.8 km south of Tahmoor Post Office	7,573	7,573	7,573	43	0.6%	0.6%	0.6%
21	Picton Road west of Mount Keira Road	11,213	12,426	14,494	348	3.1%	2.8%	2.4%
22	Wilton Road at Clements Creek	2,125	2,125	2,125	129	6.1%	6.1%	6.1%

* AADT data used to supplement survey data at Site 8.

^ Site 11 was removed as Lawrence Hargrave Drive is covered under Site 10.



3.3 future peak hour traffic conditions

The performance of the road system is typically assessed based on a 10 year growth scenario in background traffic levels. This therefore establishes a 'base case' against which the potential impacts of the Project can then be measured. The growth rates discussed above in the context of daily volumes have therefore been applied to the existing surveyed intersection (turning movement) volumes to establish the future peak hour base case scenario for all intersections.

Application of these rates to the existing survey volumes results in future intersection performances as shown in **table 11** below. It is emphasised that these results include existing traffic associated with the Appin Mine and West Cliff Colliery, but do not account for additional movements associated with the proposed Project.

The analysis excludes intersections that are not expected to be impacted by the Project. Therefore, intersections along the haulage route to Coal Cliff and Corrimal Coke Works, which would each be associated with an additional eight heavy vehicle movements per day due to the Project, are not considered further in this assessment due to the negligible increases in Project-related traffic. Although some minor employee traffic would make use of these intersections, they are more than approximately 30 km away from the nearest pit top and employee contributions to traffic volumes at this distance are expected to be negligible.



table 11: future (2019) intersection performance: am and pm peak hour (without Project)

Site	Intersection Description	Control Type	Period	DOS	AVD (s/veh)	LOS
HAULAGE ROUTES						
A	Appin Road/George Sreet (Appin East pit top exit)	signals	AM	0.613	16.5	B
			PM	0.750	20.5	B
B	Appin Road/Sheriff Road (Appin East pit top entry)	priority	AM	0.196	14.5	B
			PM	0.172	14.8	B
C	Appin Road/West Cliff pit top access	priority	AM	0.369	34.7	C
			PM	0.346	28.6	C
D	Appin Road/Princes Highway off-ramp	priority	AM	0.343	19.0	B
			PM	0.305	24.7	B
E	Mount Ousley Road/F6 Southern Freeway	priority	Not relevant as existing intersection fails			F
F	Springhill Road/Masters Road	signals	AM	0.847	31.3	C
			PM	0.863	40.4	C
G	Springhill Road/Recycling Road	signals	AM	0.942	32.4	C
			PM	0.911	27.0	B
H	Springhill Road/Port Kembla Road	signals	AM	0.280	7.2	A
			PM	0.470	10.5	A
LOCAL ROADS						
K	Picton Road/Almond Street	priority	AM	0.628	40.7	C
			PM	0.833	63.3	E
L	Wilton Road/Macarthur Road	priority	AM	0.068	16.3	B
			PM	0.075	15.9	B
M	Wilton Rd/Douglas Park Drive	priority	AM	0.168	14.7	B
			PM	0.170	15.6	B
N	Appin Road/Wilton Road	priority	AM	0.372	25.3	B
			PM	0.489	16.9	B

Note: No turning vehicles in PM peak at Corrimal Coke Works intersection.

It can be seen from **table 11** above that all intersections will experience increased delays as a result of significant increases in traffic volumes predicted in the next 10 years. These delays will occur independent of the Project and in this regard, this scenario forms an appropriate 'base case' scenario with which to assess the relative impact of Project related traffic increases. The SIDRA output summaries are provided in **attachment d2** for reference purposes. It is emphasised that the 2019 scenario discussed in the following sections represents a worst case for intersection performance due to background traffic growth; while conditions in 2013 relate to smaller, short term impacts.



3.3.1 picton road and almond street (wilton road)

The LOS at this intersection has decreased with background traffic growth from C to E in the PM peak hour. The existing operations contributions to this intersection are minor (i.e. 1.6%). Picton Road and Almond Street would require additional capacity in the future as it is currently congested under existing conditions, particularly to safely cater for right turn movements from Almond Street onto Picton Road. The RTA has already committed to improving road safety along Picton Road and it is expected that this intersection will form part of those works in the future (RTA, 2009). The opportunity could also be taken to implement additional safety measures. This is considered highly beneficial to the surrounding road users considering the relative frequency of accidents at or in the vicinity of this intersection.



4. potential impacts of the project

4.1 additional traffic generation

4.1.1 project haulage

The annual rate of coal delivery to PKCT and BlueScope Steelworks would increase as a result of the Project. Deliveries to Corrimal and Coalcliff Coke Works, and Dendrobium Washery would also marginally increase above current levels. Delivery of coal to PKCT and BlueScope Steelworks would be up to approximately 7.5 Mtpa and 4 Mtpa, respectively. Coal deliveries to Corrimal and Coalcliff Coke Works would be up to 0.2 Mtpa (combined), and delivery of coal to Dendrobium Washery would be up to 0.5 Mtpa. While these are maximum anticipated deliveries to any destination, the peak Project coal delivery would not be more than 9.4 Mtpa. An average Project trucking capacity of 36.5 t has been taken for all haulage trucks after Cardno Eppell Olsen (2008).

4.1.2 visitors and deliveries

As shown in **table 12**, the Project is expected to generate additional vehicle movements to and from the pit tops each day, as a result of increased replacement/consumption of machine parts, fuel and other consumables. Delivery movements are expected to double as a result of the Project.



table 12: project courier and delivery movements

Type of Vehicle	West Cliff pit top		Appin West pit top		Appin East pit top	
	Movements	Percent of Total	Movements	Percent of Total	Movements	Percent of Total
Truck (machine parts/brine and sludge removal/other deliveries)	36 /week	4%	302 /week	29%	6 /week	2%
Truck (fuel)	40 /week	4%	4 /week	1%	1 /week	1%
Truck (oversize loads)	12 /week	1%	3 /week	1%	1 /week	1%
Small truck/light vehicles (visitors/sale representatives)	56 /weekday	35%	32 /weekday	19%	8 /weekday	19%
Small truck/vans (couriers/other deliveries)	88 /weekday	56%	83 /weekday	50%	32 /weekday	77%
Total	988 /week	100	1,028 /week	100	258 /week	100

The source of traffic for deliveries is assumed not to have changed from those outlined in **section 2**. During Year 2013, it is likely that approximately 250 trucks would deliver longwall parts to the Appin West pit top over a six week period, to facilitate the movement of longwall mining operations from the West Cliff Area 5 domain to Appin West (Area 9) or an alternate domain (refer to Section 2 in the Main Report of the EA). This is a short-term increase and is therefore not considered appropriate for assessment purposes.

4.1.3 employee movements

Total movements generated by employees to/from the West Cliff pit top reduces during Year 2013 due to underground operations moving from the West Cliff Area 5 domain to Appin West (Area 9) or an alternate domain. For the purposes of this assessment, it is assumed approximately 343 underground employees would be moved from West Cliff pit top to Appin West pit top during Year 2013 (i.e. 80% of the West Cliff underground workforce moves to Appin West pit top and 20% moves to the Appin East pit top), bringing the total underground workforce accessing Appin West pit top to 866. The West Cliff Washery workforce is slightly increased to 88. Approximately 216 employees would access underground operations from Appin East. A car pooling factor of 1.5 people per car at West Cliff pit top and 1.2 people per car at Appin East and Appin West pit tops was applied to the Project workforce numbers to calculate the total number of movements.

Total movements generated by employees, on-site contractors, and others were estimated to comprise approximately 118 movements per day to/from West Cliff pit top, approximately 360 movements per day to/from Appin East pit top and approximately 1,444 movements to/from Appin West pit top.



Details of the approximate distribution of these employee/contractor movements are provided in **section 2.9.3** and are repeated below:

- 50 percent to/from the south (i.e. Wollongong south of Fairy Meadow using F6 Southern Freeway and Appin Road).
- 30 percent to/from the south (north of Fairy Meadow to Scarborough using Princes Highway up Bulli Pass and Appin Road).
- 15 percent from local areas (i.e. Camden, Campbelltown, Douglas Park, Mittagong, Picton and Wilton) using Picton Road, Hume Highway, Remembrance Driveway, Menangle Road, Appin Road north of Appin and Wilton Road.
- 5 percent from the north (i.e. Sydney), using the F5 South Western Freeway/Hume Highway and F6 Southern Freeway.

This traffic assessment assumes that the destinations of the courier and delivery vehicle movements when they leave the pit tops are the same as their origins as estimated by ICHPL. The assessment has also assumed that 1/3 of the workforce leaves the site between 8am and 9am (i.e. night crew leaving for three shift option), and 1/2 of the workforce arrives at the site between 5pm and 6pm (i.e. night crew arriving for two shift option).

Due to access for heavy vehicles travelling to Appin West pit top being restricted by Broughtons Pass Weir, it is assumed that all heavy vehicles travelling to Appin West pit top from Wollongong gain access via Picton Road west of Mount Keira Road, approaching Appin West pit top from south-east of Wilton. Heavy vehicles from the north (e.g. Campbelltown) would use the F5 South Western Freeway and Picton Road. Due to travel distances, light vehicles from Wollongong (south of Fairy Meadow) are also assumed to gain access to the Appin West pit top via Picton Road, west of Mount Keira Road.

Based on the above assumptions, the estimated Project traffic movements per weekday are provided in **table 13**.



table 13: project movements per weekday

Site	Road and Location	Existing (refer to table 10)			Year 2013			Year 2019		
		Total	ICHPL Vehicle movements	ICHPL Percent of Total	Total	ICHPL Vehicle Movements	ICHPL Percent of Total	Total	ICHPL Vehicle Movements	ICHPL Percent of Total
To/from PKCT										
1	Bulli-Appin Road, Appin near Kings Fall Bridge	8,330	948	11.4%	9,516	1,813	19.1%	10,021	1,813	18.1%
2	Appin Road north of Princes Highway	10,247	1,853	18.1%	11,996	2,658	22.2%	13,576	2,658	19.6%
3	Mount Ousley Road at Mount Pleasant	46,348	1,344	2.9%	54,717	1,904	3.5%	68,968	1,904	2.8%
4	F6 Southern Freeway north of Princes Highway interchange at West Wollongong	78,964	1,335	1.7%	86,296	1,904	2.2%	97,547	1,904	2.0%
5	F6 Southern Freeway south of Princes Highway near footbridge	76,421	1,335	1.7%	83,525	1,904	2.3%	94,397	1,904	2.0%
6	Masters Road at Mount St. Thomas	26,539	950	3.6%	27,174	1,585	5.8%	27,174	1,585	5.8%
7	Springhill Road at Coniston	16,172	566	3.5%	17,202	1,264	7.4%	17,712	1,264	7.1%
To/from BlueScope Steelworks and Dendrobium Washery										
8	Springhill Road north of Five Islands Road	42,025	384	0.9%	43,872	674	1.5%	46,315	674	1.5%
Route to/from Corrimal Coke Works										
-	Northern Distributor, Towradgi, south of Towradgi Road	32,452	9	0.0%	34,413	17	0.0%	37,565	17	0.0%



table 13: project movements per weekday (continued)

Site	Road and Location	Existing (refer to table 10)			Year 2013			Year 2019		
		Total	ICHPL Vehicle movements	ICHPL Percent of Total	Total	ICHPL Vehicle Movements	ICHPL Percent of Total	Total	ICHPL Vehicle Movements	ICHPL Percent of Total
Route to/from Coalcliff Coke Works										
-	F6 Southern Freeway (North)	42,709	56	0.1%	50,047	91	0.2%	63,408	91	0.1%
10	Lawrence Hargrave Drive east of Princes Highway	4,443	9	0.2%	5,412	17	0.3%	7,258	17	0.2%
Local Roads										
									0	
12	Princes Highway at Bulli Pass	11,096	456	4.1%	12,583	685	5.4%	14,741	685	4.6%
13	Princes Highway north of Bellambi Lane, Russell Vale	26,288	456	1.7%	27,563	685	2.5%	29,210	685	2.3%
14	Narellan-Appin Road north of Appin township, south of Brian Road	10,003	150	1.5%	10,256	224	2.2%	10,527	224	2.1%
15	Remembrance Driveway north of Finns Road	11,191	43	0.4%	12,615	67	0.5%	15,049	67	0.4%
16	Menangle Road at Nepean River Bridge	6,631	43	0.6%	7,708	67	0.9%	9,610	67	0.7%
17	Remembrance Driveway 0.5 km north of Regreme Road	3,652	43	1.2%	3,676	67	1.8%	3,676	67	1.8%
18	Menangle Road east of Picton-Oakdale Road	2,991	43	1.4%	3,691	67	1.8%	5,003	67	1.3%
19	Picton Road at Nepean River Bridge	8,282	129	1.6%	9,579	202	2.1%	11,765	202	1.7%



table 13: project movements per weekday (continued)

Site	Road and Location	Existing (refer to table 10)			Year 2013			Year 2019		
		Total	ICHPL Vehicle movements	ICHPL Percent of Total	Total	ICHPL Vehicle Movements	ICHPL Percent of Total	Total	ICHPL Vehicle Movements	ICHPL Percent of Total
20	Remembrance Driveway 0.8 km south of Tahmoor Post Office	7,573	43	0.6%	7,597	67	0.9%	7,597	67	0.9%
21	Picton Road west of Mount Keira Road	11,213	348	3.1%	12,854	777	6.0%	14,923	777	5.2%
22	Wilton Road at Clements Creek	2,125	129	6.1%	2,198	202	9.2%	2,198	202	9.2%



It is evident from **table 13** that in most cases, the main contributor to future traffic levels is due to growth in background traffic volumes and not specifically the Project. The notable exception is Appin Road where the Project presently accounts for 11.4% of existing traffic at King's Fall Bridge and 18.1% of existing traffic north of the Princes Highway. Based on the estimates in **table 13**, the proportion of Project traffic would increase by 7.7% and 4.1% during Year 2013, respectively. At these traffic levels, the operation of the road network would be dictated by intersection performances rather than mid-block capacities.

The distribution of the additional vehicle movements associated with the Project relative to that of the existing operations are shown in the turning count spreadsheet included in **attachment e**. This assumes a distribution as discussed previously for each of the separate pit tops for employee and visitor arrivals/departures.

For the purposes of assessment it has been assumed that on average 65% of road haulage occurs during the day and 35% of road haulage occurs during the night (i.e. day is 7.00 am to 6.00 pm and nights are 6.00 pm to 7.00 am) with an average truck load of 36.5 t per truck (Cardno Eppell Olsen, 2008).

4.2 impact on peak hour intersection performance

The potential impacts of the Project are evident by the relative increase in delays at critical intersections along key roads utilised by haulage trucks, employees and visitors/deliveries. These are summarised in **table 14** below, and the SIDRA outputs are provided in **attachment d3**. For the purposes of assessment conservatism, all visitor and delivery movements have been assumed to be heavy vehicles. In practice however, a high proportion of these traffic movements are undertaken by smaller vehicles.



table 14: future (2019) plus project intersection performance: am and pm peak hour

Site	Intersection Description	Control Type	Period	DOS	AVD (s/veh)	LOS
HAULAGE ROUTES						
A	Appin Road/George Sreet (Appin East pit top exit)	signals	AM	0.639	16.7	B
			PM	0.827	21.9	B
B	Appin Road/Sheriff Road (Appin East pit top entry)	priority	AM	0.219	32.5	C
			PM	0.218	21.7	B
C	Appin Road/West Cliff pit top access	priority	AM	0.697	65.8	E
			PM	0.849	103.1	F
D	Appin Road/Princes Highway off-ramp	priority	AM	0.365	19.7	B
			PM	0.328	26.8	B
E	Mount Ousley Road/F6 Southern Freeway	priority	Not relevant as intersection fails			F
F	Springhill Road/Masters Road	signals	AM	0.862	33.0	C
			PM	0.885	41.5	C
G	Springhill Road/Recycling Road	signals*	AM	0.974	44.2	D
			PM	0.918	29.4	C
H	Springhill Road/Port Kembla Road	signals	AM	0.280	8.5	A
			PM	0.470	11.2	A
LOCAL ROADS						
K	Picton Road/Almond Street	priority	AM	0.692	44.3	D
			PM	0.938	85.6	F
L	Wilton Road/Macarthur Road	priority	AM	0.188	16.6	B
			PM	0.285	18.4	B
M	Wilton Rd/Douglas Park Drive	priority	AM	0.388	16.4	B
			PM	0.545	20.0	B
N	Appin Road/Wilton Road	priority	AM	0.394	27.5	B
			PM	0.517	20.3	B

* LOS 'D' is considered satisfactory with a signals control type.

It can be seen that the majority of key intersections relied upon by the Project would continue to operate efficiently. However, some intersections would require improvements in order to provide sufficient capacity. Recommended improvements to these intersections are discussed further in **section 4.4**. It should be noted that the majority of this capacity is taken up by existing traffic volumes and future growth and not as a direct result of the Project. This is evident from a comparison between **tables 11 and 14**.



4.3 consideration of cumulative impacts

There are several proposals in the locality that will require the relevant Councils and the RTA to examine cumulative traffic impacts, in the context of their strategic planning responsibilities. These include the following:

- Wilton Quarry, Wilton Road;
- BlueScope Steel – Steel Injection Station Project, Port Kembla (major works to be completed 2010 [CH2MHILL, 2008]);
- other Southern Coalfield mining operations (e.g. Metropolitan Colliery, Tahmoor Colliery and NRE No. 1 Colliery); and
- Leaf's Gully Power Station.

In so far as the Project is concerned, it is common to assess impacts generated by the Project itself, with accommodation for growth in background traffic over a 10 year period being the normal approach. This growth, which is substantial in relative terms, takes account of these projects to a significant extent and the inclusion of additional traffic to account for specific projects introduces a potential for 'double counting' which is inappropriate. In addition, the growth factors applied have been derived from strategic modelling based on several strategic reports as referenced in this report, which would reasonably be expected to take account of the above projects.

4.4 required capacity changes to the surrounding road network

The following intersections would require additional capacity in the future in order to accommodate both Project related traffic and background future traffic growth.

4.4.1 appin road and west cliff pit top access road

The right turn from the West Cliff pit top access westwards onto Appin Road would experience unacceptable delays during the PM peak period (**table 14**). As such, improvements would be required to safely accommodate the increased traffic associated with the Project. ICHPL have recently consulted with the RTA design team with regard to potential recommendations/improvements to the intersection.

It is recommended that the intersection upgrade should involve signals installation or an alternative design determined in consultation with the RTA. This upgrade should be consistent with the RTA's *Road Design Guide* (1996). The performance of the modified intersection arrangement at the Appin Road/West Cliff pit top access is shown in **table 15** below. Roundabout control is not considered a suitable solution for the West Cliff pit top access as this would require significant land-take in order to accommodate movements by heavy vehicles.



table 15: future (2019) plus project intersection performance: am and pm peak hour

Intersection Description	Control Type	Period	Degree of Saturation (DOS)	Intersection Delay (s/veh)	Level of Service (LOS)
Appin Road/West Cliff pit top access	Signals	AM	0.715	9.4	A
		PM	0.629	9.8	A

The SIDRA output summaries are provided in **attachment d4**.

4.4.2 picton road and almond street (wilton road)

Both the existing operations and proposed Project contributions to this intersection are minor (i.e. 1.6% and 2.1% in Year 2013, respectively). As described in **section 3.3.1**, Picton Road and Almond Street would require additional capacity in the future as it is currently congested under existing conditions, particularly to safely cater for right turn movements from Almond Street onto Picton Road. The RTA has already committed to improving road safety along Picton Road and it is expected that this intersection will form part of those works in the future (RTA, 2009). The opportunity could also be taken to implement additional safety measures. This is considered highly beneficial to the surrounding road users considering the relative frequency of accidents at or in the vicinity of this intersection.

4.4.3 mount ousley road and the F6 southern freeway

This intersection would require an alternate intersection treatment in the future and is currently congested under existing conditions. This is therefore considered a matter for the RTA to address separately, whether or not the Project proceeds. It is likely that a grade separated right turn movement turning onto Mount Ousley Road would be required in order to maintain the free flow conditions between Mount Ousley Road (west) and the F6 Southern Freeway.

Both the existing operations and proposed Project contributions to this intersection are minor (i.e. 2.9% and 3.5% in Year 2013, respectively). This level of Project traffic is very minor in the context of existing traffic flows and would be accounted for within the typical background growth factor that would be adopted by the RTA when planning for future changes at this intersection.



5. consideration of alternative haulage routes

Current planning laws require consideration be given to the existing haulage routes used by the existing operations to determine if these routes are the most acceptable with regard to general environmental impacts, taking into consideration the distance travelled and amenity in built up areas. No changes to the existing routes are proposed as a result of the Project and these are discussed in more detail for each route below.

5.1 to/from pkct, dendrobium washery & bluescope steelworks

The existing route from the Appin Mine and West Cliff Colliery (i.e. Appin Road, F6 Southern Freeway and Mount Ousley Road) to the industrial facilities surrounding Port Kembla is considered the most appropriate route. Masters Road was specifically constructed in order to service traffic from the Port Kembla area and reliance on this route is appropriate.

In summary, the existing transport routes are considered the most appropriate for adoption given the majority of the route is high capacity and no reasonable alternative route exists. This could be reviewed periodically if required to take account of changes to the road network system that could influence the most appropriate route choice for haulage vehicles.

5.2 to/from coalcliff coke works

The existing route to the Coalcliff Coke Works is approximately 32 km in length. An alternative option includes using the Princes Highway (Bulli Pass) and Lawrence Hargrave Drive to access the Coalcliff Coke Works which would reduce the travelling distance to some 27 km. However, this is not considered appropriate due to reduced speed limits and the additional number of residential and built up areas through which this route would be required to traverse, given the increased safety and environmental amenity impacts.

5.3 to/from corrimal coke works

The existing route to the Corrimal Coke Works is also approximately 32 km in length. A number of shorter alternative routes are available including the use of the Princes Highway (Bulli Pass). The shorter travel distance is offset however by the reduced vehicle speeds along the alternative routes.



6. road safety review

6.1 pkct road safety audit

The PKCT Traffic Study (Cardno Eppell Olsen, 2008) conducted a road safety audit of key portions of the coal haulage route that would be used by the Project. The findings of the audit are summarised below. In general the PKCT Traffic Study road safety audit revealed that the road sections were in good condition with no significant safety issues. However, the following issues on various sections of the haulage routes were noted:

- Appin Road between the Appin East pit top access road and West Cliff pit top access road:
 - Some linemarking is in poor condition or obliterated;
 - The guardrail safety barrier at the Appin East pit top entry access road is too low and unsafe; and
 - The pavement is badly rutted at the West Cliff pit top entry access road.
- Appin Road between West Cliff pit top and Mount Ousley Road:
 - The major bridge over Lodden River does not meet the required safety standards for the volume of heavy vehicles now using the road.
- Mount Ousley Road between Appin Road and F6 Southern Freeway:
 - The number of pit lids on the outer lane northbound, approximately 2.5 km south of Picton Road, which have settled causing unsafe conditions for traffic.

It is recommended that the deficiencies identified along Appin Road between the Appin East pit top and West Cliff pit top, be addressed as part of routine maintenance works.

The issues raised in the road safety audit conducted as part of the PKCT Traffic Study (Cardno Eppell Olsen, 2008) relating to the bridge over Lodden River and the settling of pit lids on Mount Ousley Road between Appin Road and F6 Southern Freeway raises general concerns that are largely independent of the Project and should be addressed in that context (i.e. as an existing deficiency).



6.2 project road safety

The road accident history of the haulage routes and local roads was undertaken by analysing validated data provided by the RTA for the period January 2003 to December 2007. The data is recorded in the event that a traffic incident/crash meets all of the following criteria:

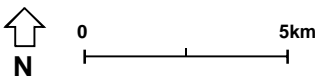
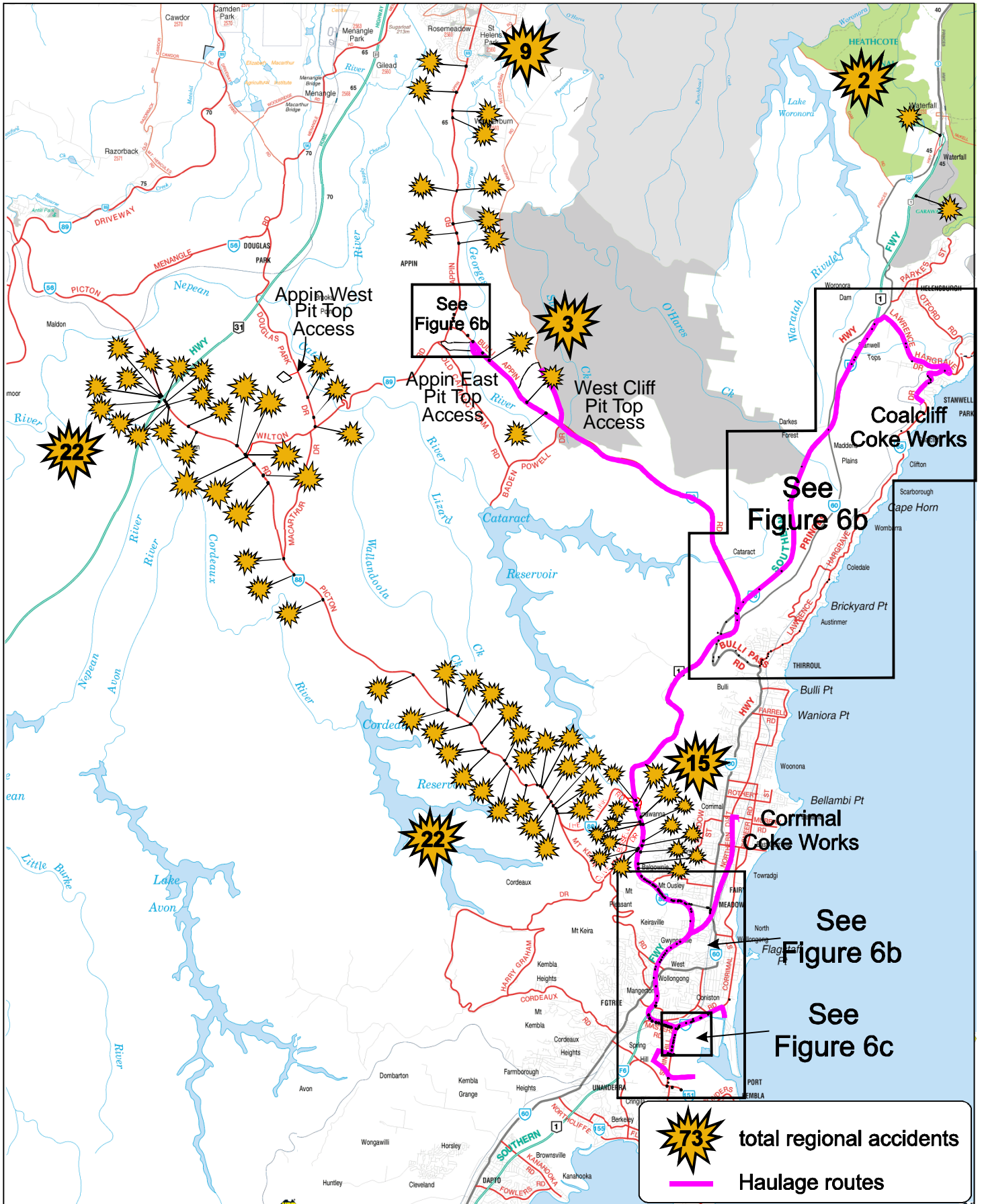
- was reported to the Police; and
- occurred on a road open to the public; and
- involved at least one moving vehicle; and
- involved at least:
 - one person being killed or injured; or
 - one vehicle being towed away.

Over the five year period of data reviewed there have been 1,220 reported crashes along the roads used as haulage routes for the Appin Mine and West Cliff Colliery, including 16 fatal crashes, 460 injury crashes and 744 tow-away crashes. Picton Road, recently the beneficiary of funding to implement road safety measures, has recorded a total of 168 crashes including 6 fatal crashes, 78 injury crashes and 84 tow-away crashes.

The accident data was reviewed to determine whether any accidents in the period investigated involved trucks on the key haulage routes used by ICHPL haulage contractor trucks. Over the five year period investigated, all of the heavy vehicle accidents along the haulage routes used by the haulage contractor were either injury or tow-away accidents. Of the 236 heavy vehicle accidents along these haulage routes, 87 were injury crashes with the remaining 149 crashes involving the tow-away of one or more vehicles. The location of all accidents involving heavy vehicles are shown in **figures 6a to 6c**. It is evident that only nine heavy vehicle crashes occurred along Appin Road between Wilton Road and the Princes Highway, which is considered moderate over a five year period having regard for the length of this road (approximately 18 km).

Based on **figures 6a to 6c**, the following areas have been identified as potential locations for further consideration by the RTA in the context of its ongoing road safety programme (it should be noted that these sections of road have been identified based on existing safety conditions):

- intersection of Masters Road with Drummond Street, particularly right turn from Drummond Street;
- section of Lawrence Hargrave Drive between Chellow Dene Avenue and Otford Road;
- intersection of Picton Road with Almond Street, particularly right turn from Almond Street; and

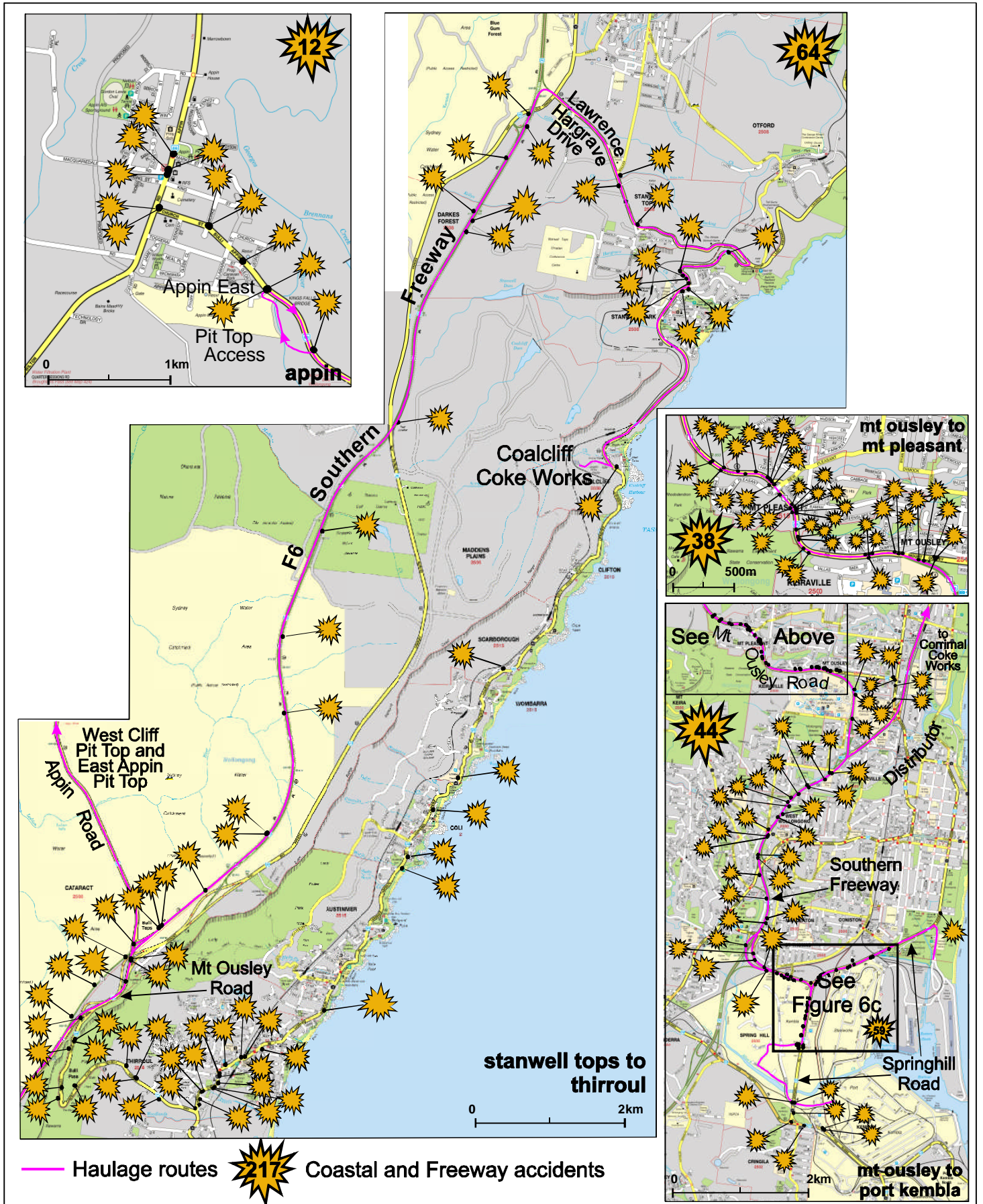


road transport assessment: bulli seam operations project

figure 6a
heavy vehicle accidents

prepared for BHP Billiton
by traffic & transport planners





road transport assessment: bulli seam operations project

figure 6b
heavy vehicle accidents

prepared for BHP Billiton
by traffix traffic & transport planners





290 Total number of accidents
 — Haulage routes



road transport assessment: bulli seam operations project

figure 6c
 heavy vehicle accidents

prepared for BHP Billiton
 by traffix traffic & transport planners





➤ Picton Road and the F5 South Western Freeway/Hume Highway (northbound) on-ramp.

It should also be noted that the Project results in minimal additional vehicle traffic along these sections of road and the safety of these roads is not expected to reduce by any significant extent as a result of the Project. Despite the larger proportion of Project-related traffic movements on Appin Road, there is no adverse crash history that warrants special attention, based either on the analysis of the accident data or the road safety audit undertaken separately by Cardno Eppell Olsen (2008).

Generally the identified areas are associated with right turn movements from minor roads onto roads with relatively high through-traffic volumes. It is expected that the above areas along Picton Road will be addressed within the current improvements planned for Picton Road by the RTA.

The 300 m section of Lawrence Hargrave Drive of potential concern primarily relates to a number of heavy vehicles travelling off the carriageway due to excessive speed. Five of the six accidents involving heavy vehicles in this location involved excessive speed factors. Additional recommended speed signage would assist in informing drivers of the conditions and increased shoulder width could be provided, subject to RTA funding and priority constraints, to reduce the potential for additional injury crashes along this length of road. It is emphasised that these accidents included all vehicles on the public road system of which the Project-related traffic is a minor proportion. For example, the existing operations traffic on Lawrence Hargrave Drive represents 0.2% of the existing traffic volumes, which increases to 0.3% in Year 2013 and reduces back to 0.2% (including additional Project traffic) in 10 years when growth in background traffic is taken into account (at 5% per annum based on the Metropolitan Colliery Traffic Assessment [Masson Wilson Twiney, 2008]).



7. conclusions

In summary:

- The relative increase in road haulage volumes are minor particularly considering the total existing and future background traffic levels of roads along the Project haulage routes.
- The assessment is based on a 'worst case' scenario, where the Project traffic has been included as additional to the background growth volumes over a 10 year period.
- Some minor changes to three intersections would require additional treatment to ensure that sufficient capacity and adequate safety is provided. It should be noted that the majority of the capacity of these intersections is taken up by existing background traffic volumes and future growth over the next 10 years and not by Project-related traffic. These intersections are:
 - Appin Road and West Cliff pit top access road (an upgrade to this intersection is recommended and should involve a signals installation or an alternative design determined in consultation with the RTA). This upgrade should be consistent with the RTA's *Road Design Guide* (1996);
 - Picton Road and Almond Street (Wilton Road) (the RTA has already committed to improving road safety along Picton Road [RTA, 2009]); and
 - Mount Ousley Road and the F6 Southern Freeway (this intersection is considered a matter for the RTA to address separately, as the Project contributes minimal additional through traffic at this intersection).
- Road haulage occurs primarily on arterial and other RTA controlled roads. This reduces the potential for other impacts on surrounding land owners and residents. Furthermore, this road network includes a number of roads that are provided primarily to facilitate access to the Port Kembla facilities.
- It is recommended that the deficiencies identified along Appin Road between the Appin East pit top and West Cliff pit top described in the PKCT Traffic Study road safety audit (Cardno Eppell Olsen, 2008) be addressed as part of routine maintenance works. Any upgrades undertaken should be consistent with the RTA's *Road Design Guide* (1996).
- There have been a number of crashes in the past along roads that would continue to be used as the haulage routes for the Project in the future. However, the Project results in minimal additional vehicle traffic along these sections of road, and the safety of these roads is not expected to reduce by any significant extent as a result of the Project.



8. references

Cardno Eppell Olsen (2008) *Existing Operations and Increased Road Reveal Hours for Port Kembla Coal Terminal Traffic Study*. Prepared for Port Kembla Coal Terminal.

Cardno Forbes Rigby (2008) *Environmental Assessment for Modification to Dendrobium Area 3*. Report Prepared for ICHPL.

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Roads and Traffic Authority (2 February 2009) *Picton Road to Receive \$12 Million Funding Boost*.

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attachment a

summary of AADT data

Historic Annual Average Daily Traffic Data 1999 to 2007

Road	Location	1999	2000	2001	2002	2003	2004	2005	2006	2007
Northern Distributor	Towradgi, South of Towradgi Road		28453	29114	30033	30260	30619	30901	27909	31517
	Northern Distributor south of Old Princes Highway		43108			38314				
Route to/from Coalcliff										
Appin Road	Appin, West of Princes Highway		8463	7911	8969	9008	9081	10991	9528	9,030
F6 Freeway (North)	Bulli Tops, North of Appin Road		29942	34202	35370	36459	38098	36897	37941	
Lawrence Hargrave Dr	Stanwell Park, West of Bald Hill Road		4620			5,546				
OTHER ROADS										
Remembrance Driveway	Camden, 500 m south of Burragorang Road	14289			15247			17377		
	North of Finns Road		8912	9694		11084			10635	
	Picton, 0.5 km north of Regreme Road		7704	7317		8564			7460	
	0.8 km south of Tahmoor Post Office		10705	6260		10121				
Menangle Road	Menangle Park at Nepean River Bridge	4571			5041			5858		
	Nepean River Bridge		4764	4928		5604			5943	
	East of Picton-Oakdale Road		2421	2475		2821				
	Menangle Road east of Gilchrist Drive				5173			7192		
	Menangle Road East of Tailby Street	10118			10236			8983		
Menangle Street	Picton, south of Prince Street		7167			8149				
Argyle Street	South of Menangle Street		12019	12912		14153				
Picton Road	West of Mt Keira Rd		12430			12145		10953		11084
	East of Mount Keira Road		11428			11705		13639		
	At Nepean River Bridge		7074	6991		7845				
	East of Hume Highway		10674	11082	11781	12068	12818	13015	11659	14426
	South of Appin Road		11493			11172				
	East of Cordeaux Dam Road		11296			11699				
Hume Highway	Hume Highway at Menangle		31324	31877	33787	35359	38080	36887	35531	37594
	Hume Highway at Pheasants Nest		27040	27098	29284	29798	26595	30042	29912	31110
	North of Narellan Road Interchange	43514			47641			50514		

Historic Annual Average Daily Traffic Data 1999 to 2007

Road	Location	1999	2000	2001	2002	2003	2004	2005	2006	2007
Wilton Road	Wilton Road at Broughtons Pass		1835	1670		1775				
Appin Road	Appin Road north of Maldon Road		8906	9144	9288	9255	9435	9243	9121	9184
Mt Keira Road	South of Picton Road		1576			682**		701		
	West of Abercrombie Road		6840			7108		6589		
	West Wollongong, West of F6 Freeway		12548			13078		12192		
Princes Highway	Bulli Pass, east of Mt Ousley Rd		10138	10017	10525	11135	12340		10024	10282
Mt Ousley Road	Mount Ousley Road west of Old Princes Highway		10691			10719		10987		
Lawrence Hargrave Drive	East of Old Princes Highway		3559			5070		4166		4602
	West of Bald Hill Road		4620			5546				

Source: RTA Traffic Volume Data (2003, 2005, 2006, 2007, 2008). PKCT Traffic Assessment (Cardno, 2008).

** Coal trucks not using this road during survey.



attachment b

photographic record



View looking south along Douglas Park Drive towards its intersection with the Appin West pit top access.



View looking north along Wilton Road at its intersection with Douglas Park Drive.





View looking south along Macarthur Road from its intersection with Wilton Road.



View looking south along Almond Street towards its intersection with Picton Road.





View looking east along Picton Road at its intersection with Almond Street.



View looking east along Wilton Road on approach to the bridge at Broughtons Pass Weir.





View looking east north along Wilton Road on approach to Appin Road.



View looking east along Bulli-Appin Road from its intersection with Wilton Road.





View looking east along Bulli-Appin Road towards its intersection with the Appin East pit top egress road.



View looking west along Bulli-Appin Road towards the Appin East pit top entry.





View looking south along Bulli-Appin Road towards its interchange with Mount Ousley Road and the Princes Highway.



View looking south at the interchange of southbound lanes of Appin Road and Mount Ousley Road.





View looking south along Mount Ousley Road at the Bulli Pass off-ramp.



View looking south along Mount Ousley Road at the Picton Road off-ramp.





View looking south along Mount Ousley Road that indicates the bus and truck speed limit on this section of road.



View looking west along Mount Ousley Road towards its interchange with the F6 Southern Freeway.





View looking east along Masters Road on approach to Springhill Road.



View looking north along Springhill Road at its intersection with Recycling Road.





View looking west along Railway Street towards its intersection with the Northern Distributor.



View looking east along Railway Street in the vicinity of the Corrimal Coke Works access.





attachment c

survey results



R.O.A.R. DATA PTY. LTD.

Reliable, Original & Authentic Results

83 Church St, Ryde NSW 2112.

Ph.88196847, Fax 88196849, Mob.0418-239019

Email: roardata@optusnet.com.au, Website: www.roardata.com.au

FIELD SURVEY REPORT

Day / date : Thursday 9th April 2009
Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Counts
ATTENTION : Tim Lewis

Firstly the counts went well with the exception of TC 12 it was counted but we could only get 1 surveyor there in the afternoon. This in itself apparently was not enough it needed 2 I am informed. We prioritised it and counted the Bluescope Steel access and not worry about the Colourbond site across the road. I am told no heavy vehicles accessed the Colourbond site and there was a minimum number of cars. I think this site has offices only my apologies as you know it was short notice but we did manage to get data. The Mt. Ousley Rd and Southern Freeway site in the afternoon had longish queues westbound towards the freeway. These lasted from 4pm to 5pm and I am not sure if this added to the left turn or not. All other sites went well and we were only able to get the turning movements for the eastern access at the un signalised location. TC 04 to difficult to do through on both for 1 person.

I do hope that the results are useful to you and if you have any questions please contact me.

REGARDS

GREG HILL
Director



Appin Rd & East Mine Access

TC-04
Unsignalised

To

Tim Lewis

at *Traffic*

your results for

Wollongong Area Traffic Counts

supplied by

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Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.

Mobile.0418239019

Client : Traffix
 Job No/Name : 2654 Wollongong Area Traffic Surveys
 Day/Date : Thursday 9th April 2009

TC - 04
 Unsignalised

PEDS				
	WEST	SOUTH	EAST	
Time Per	Appin Rd	East Mine	Appin Rd	TOT
0700 - 0715				0
0715 - 0730				0
0730 - 0745		NOT		0
0745 - 0800		REQUIRED		0
0800 - 0815				0
0815 - 0830				0
0830 - 0845				0
0845 - 0900				0
0900 - 0915				0
0915 - 0930				0
Per End	0	0	0	0

PEDS				
	WEST	SOUTH	EAST	
Peak Per	Appin Rd	East Mine	Appin Rd	TOT
0700 - 0800	0	0	0	0
0715 - 0815	0	0	0	0
0730 - 0830	0	0	0	0
0745 - 0845	0	0	0	0
0800 - 0900	0	0	0	0
0815 - 0915	0	0	0	0
0830 - 0930	0	0	0	0
PEAK HR	0	0	0	0

Time Per	Lights		WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd				
	I	R	L	R	L	I			
0630 - 0645		0	0	0	0	0	0	0	0
0645 - 0700		0	0	0	0	0	0	0	0
0700 - 0715		0	0	0	0	2	0	0	2
0715 - 0730		0	0	0	0	0	0	0	0
0730 - 0745		0	0	0	0	0	0	0	0
0745 - 0800		0	0	0	0	0	0	0	0
0800 - 0815		0	0	0	0	0	0	0	0
0815 - 0830		0	0	0	0	0	0	0	0
0900 - 0915		0	0	0	0	0	0	0	0
0915 - 0930		0	0	0	0	0	0	0	0
Per End	0	0	0	0	2	0	0	0	2

Time Per	Heavies		WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd				
	I	R	L	R	L	I			
0630 - 0645		0	0	0	12	0	0	0	12
0645 - 0700		0	0	0	7	0	0	0	7
0700 - 0715		0	0	0	8	0	0	0	8
0715 - 0730		0	0	0	7	0	0	0	7
0730 - 0745		0	0	0	5	0	0	0	5
0745 - 0800		1	0	0	7	0	0	0	8
0800 - 0815		0	0	0	0	0	0	0	0
0815 - 0830		1	0	0	0	0	0	0	1
0900 - 0915		0	0	0	0	0	0	0	0
0915 - 0930		0	0	0	0	0	0	0	0
Per End	0	2	0	0	46	0	0	0	48

Time Per	Combined		WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd				
	I	R	L	R	L	I			
0630 - 0645	0	0	0	0	12	0	0	0	12
0645 - 0700	0	0	0	0	7	0	0	0	7
0700 - 0715	0	0	0	0	10	0	0	0	10
0715 - 0730	0	0	0	0	7	0	0	0	7
0730 - 0745	0	0	0	0	5	0	0	0	5
0745 - 0800	0	1	0	0	7	0	0	0	8
0800 - 0815	0	0	0	0	0	0	0	0	0
0815 - 0830	0	1	0	0	0	0	0	0	1
0900 - 0915	0	0	0	0	0	0	0	0	0
0915 - 0930	0	0	0	0	0	0	0	0	0
Per End	0	2	0	0	48	0	0	0	50

Peak Per	Lights		WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd				
	I	R	L	R	L	I			
0700 - 0800	0	0	0	0	2	0	0	0	2
0715 - 0815	0	0	0	0	2	0	0	0	2
0730 - 0830	0	0	0	0	2	0	0	0	2
0745 - 0845	0	0	0	0	0	0	0	0	0
0800 - 0900	0	0	0	0	0	0	0	0	0
0815 - 0915	0	0	0	0	0	0	0	0	0
0830 - 0930	0	0	0	0	0	0	0	0	0

Peak Per	Heavies		WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd				
	I	R	L	R	L	I			
0700 - 0800	0	0	0	0	34	0	0	0	34
0715 - 0815	0	0	0	0	27	0	0	0	27
0730 - 0830	0	1	0	0	27	0	0	0	28
0745 - 0845	0	1	0	0	19	0	0	0	20
0800 - 0900	0	2	0	0	12	0	0	0	14
0815 - 0915	0	2	0	0	7	0	0	0	9
0830 - 0930	0	1	0	0	0	0	0	0	1

Peak Per	Combined		WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd				
	I	R	L	R	L	I			
0700 - 0800	0	0	0	0	36	0	0	0	36
0715 - 0815	0	0	0	0	29	0	0	0	29
0730 - 0830	0	1	0	0	29	0	0	0	30
0745 - 0845	0	1	0	0	19	0	0	0	20
0800 - 0900	0	2	0	0	12	0	0	0	14
0815 - 0915	0	2	0	0	7	0	0	0	9
0830 - 0930	0	1	0	0	0	0	0	0	1

PEAK HR	0	0	0	0	2	0	0	2
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PEAK HR	0	0	0	0	34	0	0	34
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PEAK HR	0	0	0	0	36	0	0	36
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R.O.A.R. DATA

Reliable, Original & Authentic Results

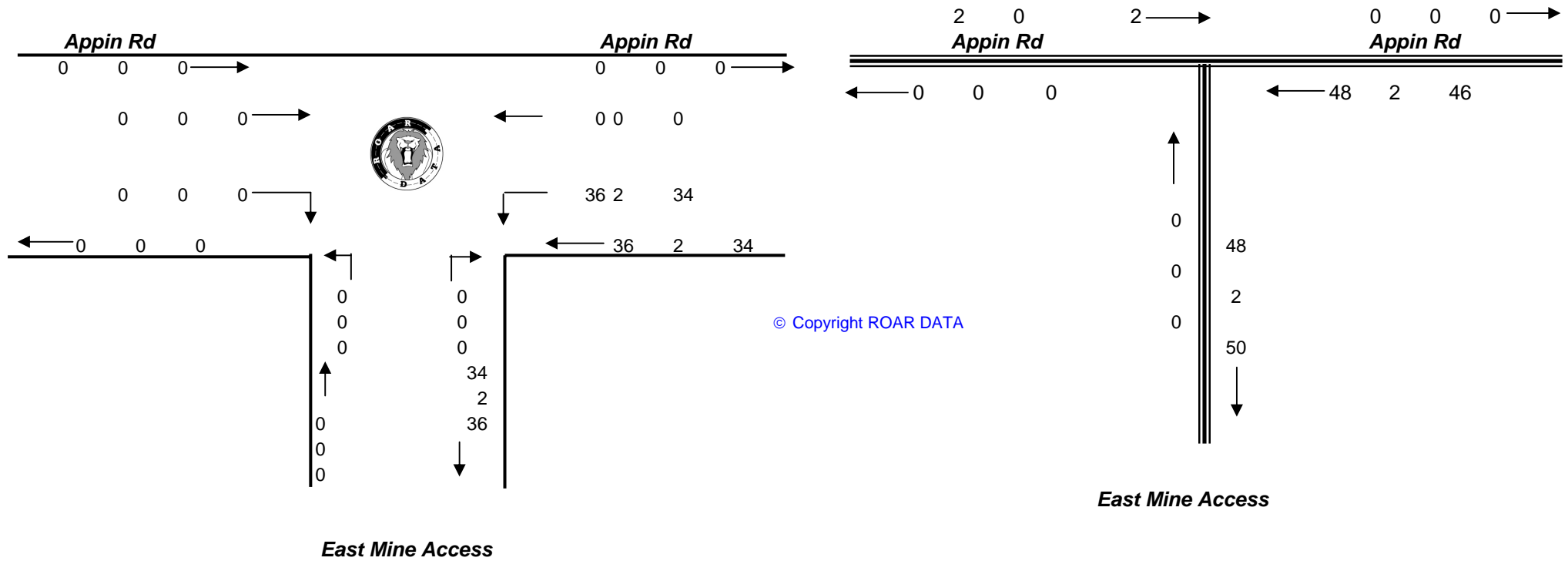
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

AM PEAK
0700 - 0800



TOTAL VOLUMES FOR COUNT PERIOD





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.

Mobile.0418239019

Client : Traffix
 Job No/Name : 2654 Wollongong Area Traffic Surveys
 Day/Date : Thursday 9th April 2009

TC - 04

Unsignalised

PEDS			
	WEST	SOUTH	EAST
Time Per	Appin Rd	East Mine	Appin Rd
1600 - 1615			0
1615 - 1630			0
1630 - 1645		NOT	0
1645 - 1700		REQUIRED	0
1700 - 1715			0
1715 - 1730			0
1730 - 1745			0
1745 - 1800			0
1800 - 1815			0
1815 - 1830			0
Per End	0	0	0

PEDS				
	WEST	SOUTH	EAST	
Peak Per	Appin Rd	East Mine	Appin Rd	TOT
0700 - 0800	0	0	0	0
0715 - 0815	0	0	0	0
0730 - 0830	0	0	0	0
0745 - 0845	0	0	0	0
0800 - 0900	0	0	0	0
0815 - 0915	0	0	0	0
0830 - 0930	0	0	0	0

PEAK HR	0	0	0	0
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Lights	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
Time Per	I	R	L	R	L	I	
1600 - 1615	0	0	0	0	0	0	0
1615 - 1630	0	0	0	0	0	0	0
1630 - 1645	0	0	0	0	0	0	0
1645 - 1700	0	0	0	1	0	0	1
1700 - 1715	0	0	0	0	0	0	0
1715 - 1730	0	0	0	0	0	0	0
1730 - 1745	0	0	0	0	0	0	0
1745 - 1800	0	0	0	0	0	0	0
1800 - 1815	0	0	0	0	0	0	0
1815 - 1830	0	0	0	0	0	0	0
Per End	0	0	0	1	0	0	1

Heavies	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
Time Per	I	R	L	R	L	I	
1600 - 1615	0	0	0	0	3	0	3
1615 - 1630	0	0	0	0	3	0	3
1630 - 1645	0	0	0	0	3	0	3
1645 - 1700	0	0	0	0	0	0	0
1700 - 1715	0	0	0	0	0	0	0
1715 - 1730	0	0	0	0	0	0	0
1730 - 1745	0	0	0	0	0	0	0
1745 - 1800	0	0	0	0	0	0	0
1800 - 1815	0	0	0	0	1	0	1
1815 - 1830	0	0	0	0	0	0	0
Per End	0	0	0	0	10	0	10

Combined	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
Time Per	I	R	L	R	L	I	
1600 - 1615	0	0	0	0	3	0	3
1615 - 1630	0	0	0	0	3	0	3
1630 - 1645	0	0	0	0	3	0	3
1645 - 1700	0	0	0	1	0	0	1
1700 - 1715	0	0	0	0	0	0	0
1715 - 1730	0	0	0	0	0	0	0
1730 - 1745	0	0	0	0	0	0	0
1745 - 1800	0	0	0	0	0	0	0
1800 - 1815	0	0	0	0	1	0	1
1815 - 1830	0	0	0	0	0	0	0
Per End	0	0	0	1	10	0	11

Lights	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
Peak Per	I	R	L	R	L	I	
1600 - 1700	0	0	0	1	0	0	1
1615 - 1715	0	0	0	1	0	0	1
1630 - 1730	0	0	0	1	0	0	1
1645 - 1745	0	0	0	1	0	0	1
1700 - 1800	0	0	0	0	0	0	0
1715 - 1815	0	0	0	0	0	0	0
1730 - 1830	0	0	0	0	0	0	0

Heavies	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
Peak Per	I	R	L	R	L	I	
1600 - 1700	0	0	0	0	9	0	9
1615 - 1715	0	0	0	0	6	0	6
1630 - 1730	0	0	0	0	3	0	3
1645 - 1745	0	0	0	0	0	0	0
1700 - 1800	0	0	0	0	0	0	0
1715 - 1815	0	0	0	0	1	0	1
1730 - 1830	0	0	0	0	1	0	1

Combined	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
Peak Per	I	R	L	R	L	I	
1600 - 1700	0	0	0	1	9	0	10
1615 - 1715	0	0	0	1	6	0	7
1630 - 1730	0	0	0	1	3	0	4
1645 - 1745	0	0	0	1	0	0	1
1700 - 1800	0	0	0	0	0	0	0
1715 - 1815	0	0	0	0	1	0	1
1730 - 1830	0	0	0	0	1	0	1

PEAK HR	0	0	0	1	0	0	1
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PEAK HR	0	0	0	0	9	0	9
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PEAK HR	0	0	0	1	9	0	10
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R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Traffix

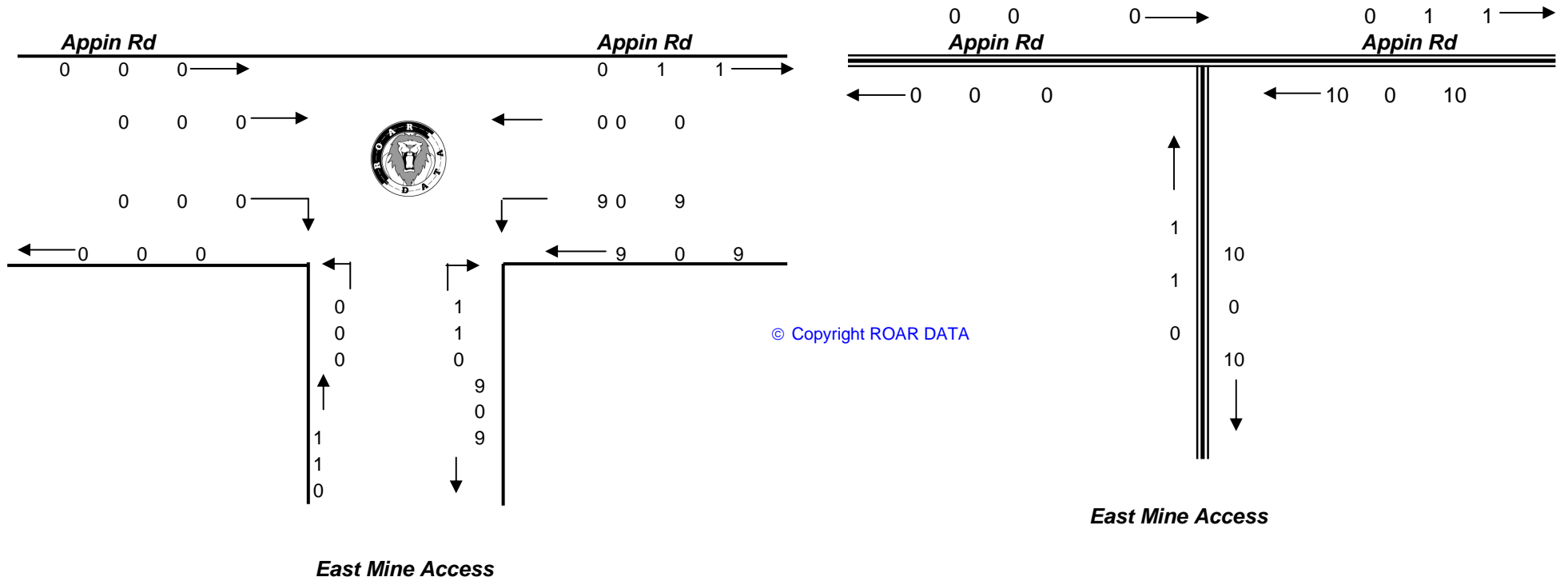
Job No/Name : 2654 Wollongong Area Traffic Surveys

Day/Date : Thursday 9th April 2009

PM PEAK
1600 - 1700



TOTAL VOLUMES
FOR COUNT
PERIOD





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

Intersection Details

Obtained via satellite

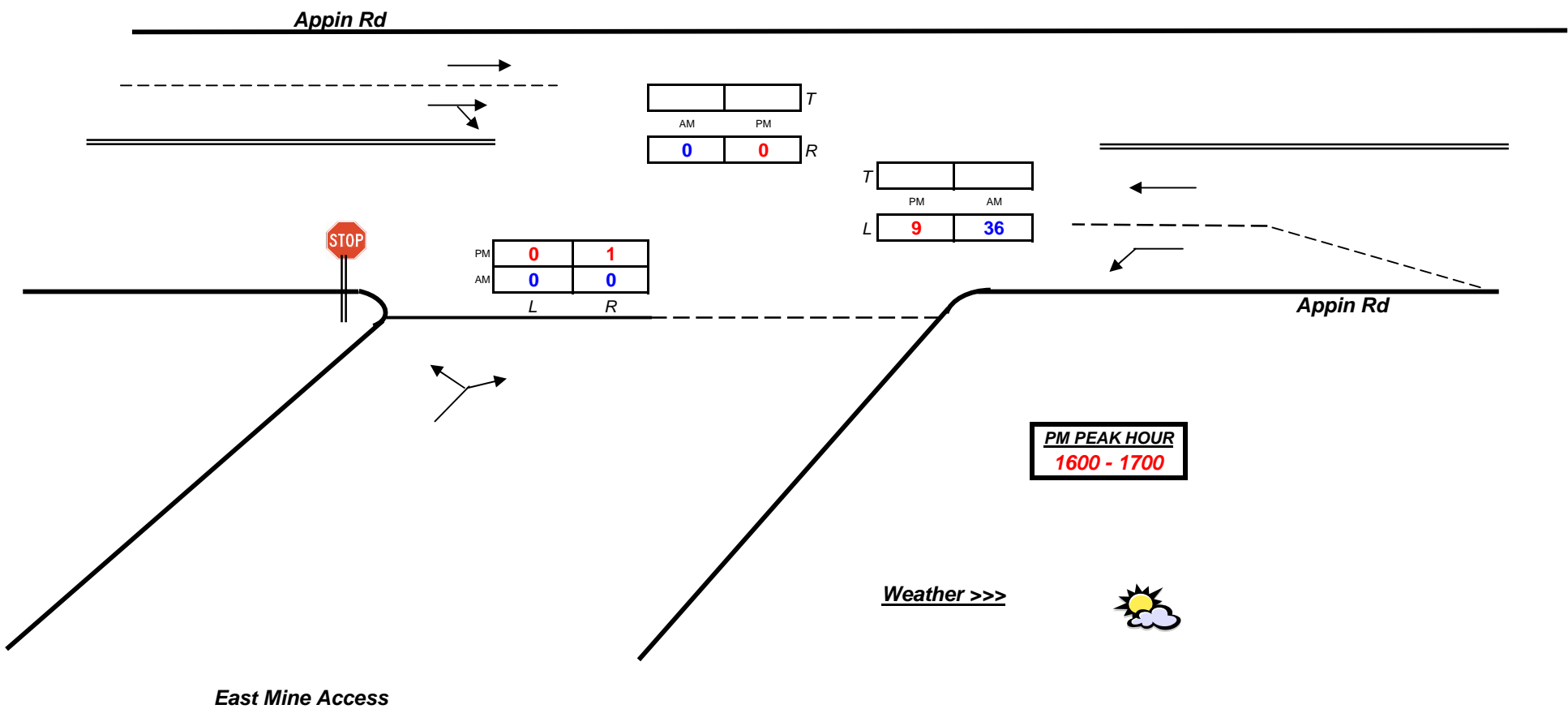
May be incorrect



AM PEAK HOUR
0700 - 0800

Combined figures only

TC - 04



Weather >>>



East Mine Access



Appin Rd & East Mine Access

TC - 04
Signals

To

Tim Lewis

at *Traffix*

your results for

Wollongong Area Traffic Counts

supplied by

R.O.A.R. DATA Pty. Ltd.

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R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.

Mobile.0418239019

Client : Traffix
 Job No/Name : 2654 Wollongong Area Traffic Surveys
 Day/Date : Thursday 9th April 2009

TC - 04 - Signals

PEDS				
	WEST	SOUTH	EAST	
Time Per	Appin Rd	East Mine	Appin Rd	TOT
0700 - 0715				0
0715 - 0730				0
0730 - 0745		NOT		0
0745 - 0800		REQUIRED		0
0800 - 0815				0
0815 - 0830				0
0830 - 0845				0
0845 - 0900				0
0900 - 0915				0
0915 - 0930				0
Per End	0	0	0	0

PEDS				
	WEST	SOUTH	EAST	
Peak Per	Appin Rd	East Mine	Appin Rd	TOT
0700 - 0800	0	0	0	0
0715 - 0815	0	0	0	0
0730 - 0830	0	0	0	0
0745 - 0845	0	0	0	0
0800 - 0900	0	0	0	0
0815 - 0915	0	0	0	0
0830 - 0930	0	0	0	0
PEAK HR	0	0	0	0

Lights	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
	I	R	L	R	L	I	
0700 - 0715	55	0	0	0	0	85	140
0715 - 0730	77	0	0	0	0	122	199
0730 - 0745	100	0	0	6	0	140	246
0745 - 0800	76	0	0	8	0	149	233
0800 - 0815	78	0	0	0	0	139	217
0815 - 0830	66	0	0	0	0	110	176
0830 - 0845	41	0	0	0	0	64	105
0845 - 0900	60	0	0	1	0	73	134
0900 - 0915	45	0	0	1	0	49	95
0915 - 0930	54	0	1	1	0	55	111
Per End	652	0	1	17	0	986	1656

Heavies	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
	I	R	L	R	L	I	
0700 - 0715	3	0	0	13	0	13	29
0715 - 0730	2	0	0	11	0	11	24
0730 - 0745	4	0	0	9	0	9	22
0745 - 0800	3	0	0	7	0	7	17
0800 - 0815	4	0	0	5	0	5	14
0815 - 0830	7	0	0	9	0	9	25
0830 - 0845	0	0	0	4	0	4	8
0845 - 0900	4	0	0	1	0	1	6
0900 - 0915	1	0	0	1	0	1	3
0915 - 0930	4	0	0	0	0	0	4
Per End	32	0	0	60	0	60	152

Combined	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
	I	R	L	R	L	I	
0700 - 0715	58	0	0	13	0	98	169
0715 - 0730	79	0	0	11	0	133	223
0730 - 0745	104	0	0	15	0	149	268
0745 - 0800	79	0	0	15	0	156	250
0800 - 0815	82	0	0	5	0	144	231
0815 - 0830	73	0	0	9	0	119	201
0830 - 0845	41	0	0	4	0	68	113
0845 - 0900	64	0	0	2	0	74	140
0900 - 0915	46	0	0	2	0	50	98
0915 - 0930	58	0	1	1	0	55	115
Per End	684	0	1	77	0	1046	1808

Lights	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
	I	R	L	R	L	I	
0700 - 0800	308	0	0	14	0	496	818
0715 - 0815	331	0	0	14	0	550	895
0730 - 0830	320	0	0	14	0	538	872
0745 - 0845	261	0	0	8	0	462	731
0800 - 0900	245	0	0	1	0	386	632
0815 - 0915	212	0	0	2	0	296	510
0830 - 0930	200	0	1	3	0	241	445

Heavies	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
	I	R	L	R	L	I	
0700 - 0800	12	0	0	40	0	40	92
0715 - 0815	13	0	0	32	0	32	77
0730 - 0830	18	0	0	30	0	30	78
0745 - 0845	14	0	0	25	0	25	64
0800 - 0900	15	0	0	19	0	19	53
0815 - 0915	12	0	0	15	0	15	42
0830 - 0930	9	0	0	6	0	6	21

Combined	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
	I	R	L	R	L	I	
0700 - 0800	320	0	0	54	0	536	910
0715 - 0815	344	0	0	46	0	582	972
0730 - 0830	338	0	0	44	0	568	950
0745 - 0845	275	0	0	33	0	487	795
0800 - 0900	260	0	0	20	0	405	685
0815 - 0915	224	0	0	17	0	311	552
0830 - 0930	209	0	1	9	0	247	466

PEAK HR	331	0	0	14	0	550	895
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PEAK HR	13	0	0	32	0	32	77
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PEAK HR	344	0	0	46	0	582	972
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R.O.A.R. DATA

Reliable, Original & Authentic Results

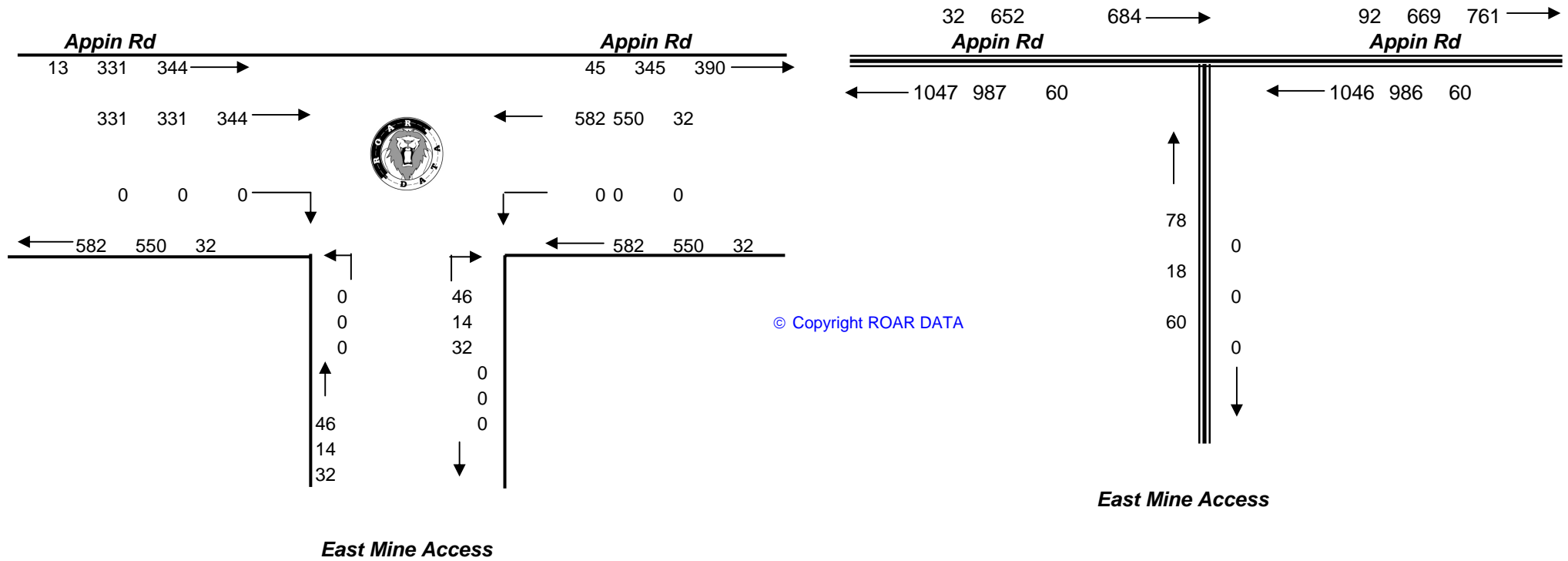
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

AM PEAK
0715 - 0815



TOTAL VOLUMES FOR COUNT PERIOD





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.

Mobile.0418239019

Client : Traffix
 Job No/Name : 2654 Wollongong Area Traffic Surveys
 Day/Date : Thursday 9th April 2009

TC - 04 - Signals

PEDS			
	WEST	SOUTH	EAST
Time Per	Appin Rd	East Mine	Appin Rd
1600 - 1615			0
1615 - 1630			0
1630 - 1645		NOT	0
1645 - 1700		REQUIRED	0
1700 - 1715			0
1715 - 1730			0
1730 - 1745			0
1745 - 1800			0
1800 - 1815			0
1815 - 1830			0
Per End	0	0	0

PEDS				
	WEST	SOUTH	EAST	
Peak Per	Appin Rd	East Mine	Appin Rd	TOT
0700 - 0800	0	0	0	0
0715 - 0815	0	0	0	0
0730 - 0830	0	0	0	0
0745 - 0845	0	0	0	0
0800 - 0900	0	0	0	0
0815 - 0915	0	0	0	0
0830 - 0930	0	0	0	0

PEAK HR	0	0	0	0
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Lights	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
Time Per	I	R	L	R	L	I	
1600 - 1615	143	0	0	4	0	88	235
1615 - 1630	121	0	0	3	0	81	205
1630 - 1645	102	0	0	2	0	101	205
1645 - 1700	133	0	0	1	0	107	241
1700 - 1715	125	0	0	1	0	77	203
1715 - 1730	99	0	0	1	0	89	189
1730 - 1745	131	0	0	0	0	81	212
1745 - 1800	104	0	0	0	0	76	180
1800 - 1815	91	0	0	0	0	79	170
1815 - 1830	117	0	0	0	0	53	170
Per End	1166	0	0	12	0	832	2010

Heavies	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
Time Per	I	R	L	R	L	I	
1600 - 1615	1	0	0	5	0	5	11
1615 - 1630	2	0	0	4	0	1	7
1630 - 1645	1	0	0	6	0	2	9
1645 - 1700	1	0	0	1	0	1	3
1700 - 1715	0	0	0	0	0	2	2
1715 - 1730	1	0	0	0	0	1	2
1730 - 1745	0	0	0	0	0	0	0
1745 - 1800	3	0	0	0	0	1	4
1800 - 1815	1	0	0	0	0	2	3
1815 - 1830	0	0	0	1	0	2	3
Per End	10	0	0	17	0	17	44

Combined	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
Time Per	I	R	L	R	L	I	
1600 - 1615	144	0	0	9	0	93	246
1615 - 1630	123	0	0	7	0	82	212
1630 - 1645	103	0	0	8	0	103	214
1645 - 1700	134	0	0	2	0	108	244
1700 - 1715	125	0	0	1	0	79	205
1715 - 1730	100	0	0	1	0	90	191
1730 - 1745	131	0	0	0	0	81	212
1745 - 1800	107	0	0	0	0	77	184
1800 - 1815	92	0	0	0	0	81	173
1815 - 1830	117	0	0	1	0	55	173
Per End	1176	0	0	29	0	849	2054

Lights	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
Peak Per	I	R	L	R	L	I	
1600 - 1700	499	0	0	10	0	377	886
1615 - 1715	481	0	0	7	0	366	854
1630 - 1730	459	0	0	5	0	374	838
1645 - 1745	488	0	0	3	0	354	845
1700 - 1800	459	0	0	2	0	323	784
1715 - 1815	425	0	0	1	0	325	751
1730 - 1830	443	0	0	0	0	289	732

Heavies	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
Peak Per	I	R	L	R	L	I	
1600 - 1700	5	0	0	16	0	9	30
1615 - 1715	4	0	0	11	0	6	21
1630 - 1730	3	0	0	7	0	6	16
1645 - 1745	2	0	0	1	0	4	7
1700 - 1800	4	0	0	0	0	4	8
1715 - 1815	5	0	0	0	0	4	9
1730 - 1830	4	0	0	1	0	5	10

Combined	WEST		SOUTH		EAST		TOT
	Appin Rd		East Mine		Appin Rd		
Peak Per	I	R	L	R	L	I	
1600 - 1700	504	0	0	26	0	386	916
1615 - 1715	485	0	0	18	0	372	875
1630 - 1730	462	0	0	12	0	380	854
1645 - 1745	490	0	0	4	0	358	852
1700 - 1800	463	0	0	2	0	327	792
1715 - 1815	430	0	0	1	0	329	760
1730 - 1830	447	0	0	1	0	294	742

PEAK HR	499	0	0	10	0	377	886
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PEAK HR	5	0	0	16	0	9	30
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PEAK HR	504	0	0	26	0	386	916
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R.O.A.R. DATA

Reliable, Original & Authentic Results

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Client : Traffix

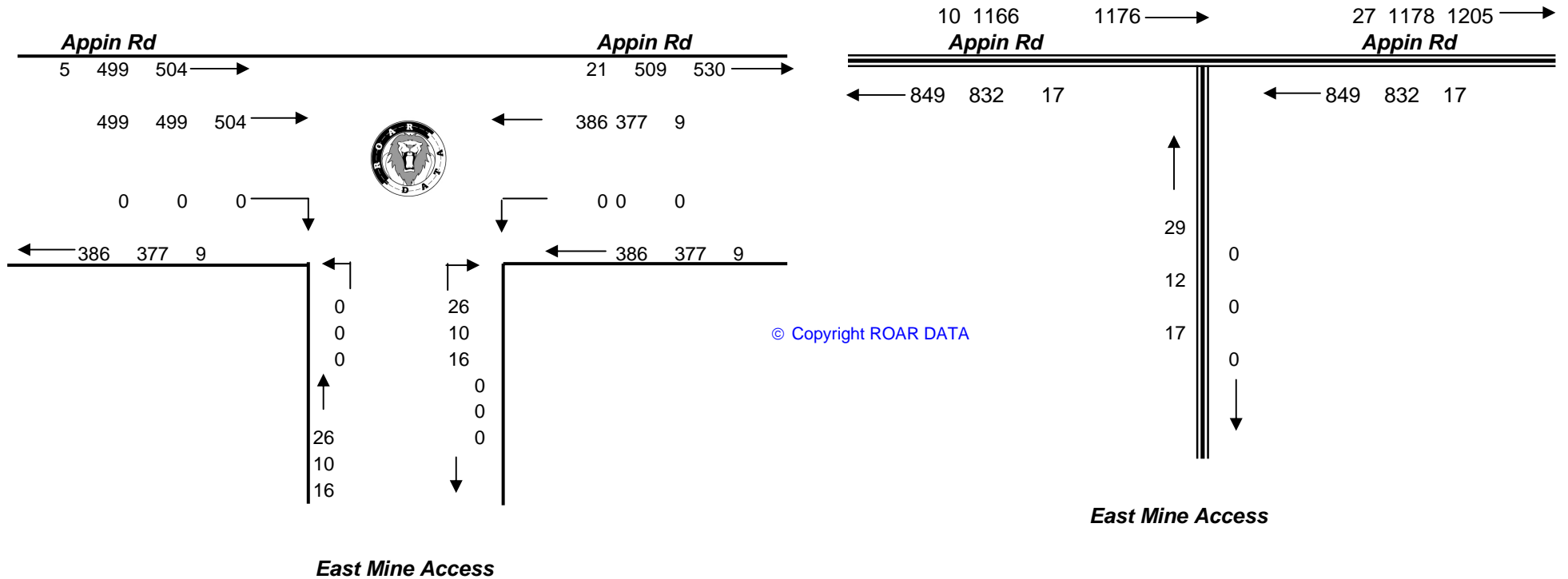
Job No/Name : 2654 Wollongong Area Traffic Surveys

Day/Date : Thursday 9th April 2009

PM PEAK
1600 - 1700



TOTAL VOLUMES
FOR COUNT
PERIOD





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

Intersection Details

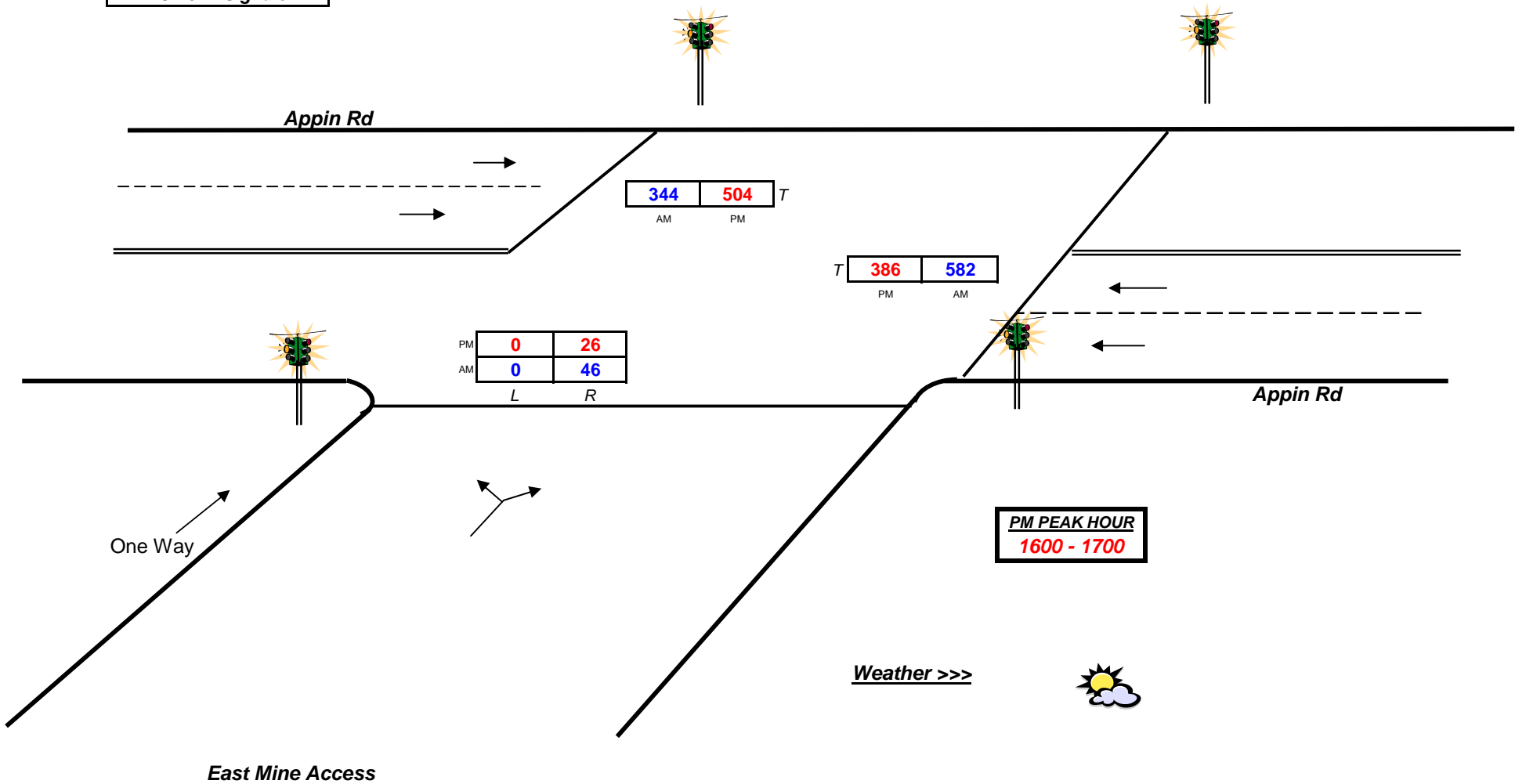
Obtained via satellite

May be incorrect

AM PEAK HOUR
0715 - 0815

Combined figures only

TC - 04 - Signals



Weather >>>



East Mine Access



Appin Rd & West Cliff Mine Access

TC - 05

To

Tim Lewis

at *Traffix*

your results for

Wollongong Area Traffic Counts

supplied by

R.O.A.R. DATA Pty. Ltd.

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R.O.A.R. DATA

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Mobile.0418239019

Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

TC - 05

<u>PEDS</u>		WEST	NORTH	EAST	
Time Per	Appin Rd	West Cliff	Appin Rd	TOT	
0700 - 0715				0	
0715 - 0730				0	
0730 - 0745			NOT	0	
0745 - 0800		REQUIRED		0	
0800 - 0815				0	
0815 - 0830				0	
0830 - 0845				0	
0845 - 0900				0	
0900 - 0915				0	
0915 - 0930				0	
Per End	0	0	0	0	

<u>PEDS</u>		WEST	NORTH	EAST	
Peak Per	Appin Rd	West Cliff	Appin Rd	TOT	
0700 - 0800	0	0	0	0	0
0715 - 0815	0	0	0	0	0
0730 - 0830	0	0	0	0	0
0745 - 0845	0	0	0	0	0
0800 - 0900	0	0	0	0	0
0815 - 0915	0	0	0	0	0
0830 - 0930	0	0	0	0	0
PEAK HR	0	0	0	0	0

<u>Lights</u>	WEST		NORTH		EAST		TOT
	Appin Rd	West Cliff	Appin Rd	West Cliff	Appin Rd	West Cliff	
Time Per	I	L	R	L	R	I	
0700 - 0715	58	4	0	4	7	72	145
0715 - 0730	73	7	0	6	9	141	236
0730 - 0745	88	0	0	5	0	148	241
0745 - 0800	84	1	4	4	2	154	249
0800 - 0815	86	1	1	1	3	145	237
0815 - 0830	54	4	1	19	5	94	177
0830 - 0845	48	2	4	5	4	63	126
0845 - 0900	59	1	2	5	8	67	142
0900 - 0915	61	2	2	4	6	65	140
0915 - 0930	40	1	2	0	3	55	101
Per End	651	23	16	53	47	1004	1794

<u>Heavies</u>	WEST		NORTH		EAST		TOT
	Appin Rd	West Cliff	Appin Rd	West Cliff	Appin Rd	West Cliff	
Time Per	I	L	R	L	R	I	
0700 - 0715	0	11	11	6	5	0	33
0715 - 0730	3	15	10	7	7	0	42
0730 - 0745	1	8	6	4	11	3	33
0745 - 0800	1	8	8	11	7	1	36
0800 - 0815	5	6	7	10	4	4	36
0815 - 0830	2	8	7	6	7	3	33
0830 - 0845	2	11	0	8	8	1	30
0845 - 0900	1	2	1	17	4	3	28
0900 - 0915	1	3	0	13	6	2	25
0915 - 0930	1	3	0	11	2	3	20
Per End	17	75	50	93	61	20	316

<u>Combined</u>	WEST		NORTH		EAST		TOT
	Appin Rd	West Cliff	Appin Rd	West Cliff	Appin Rd	West Cliff	
Time Per	I	L	R	L	R	I	
0700 - 0715	58	15	11	10	12	72	178
0715 - 0730	76	22	10	13	16	141	278
0730 - 0745	89	8	6	9	11	151	274
0745 - 0800	85	9	12	15	9	155	285
0800 - 0815	91	7	8	11	7	149	273
0815 - 0830	56	12	8	25	12	97	210
0830 - 0845	50	13	4	13	12	64	156
0845 - 0900	60	3	3	22	12	70	170
0900 - 0915	62	5	2	17	12	67	165
0915 - 0930	41	4	2	11	5	58	121
Per End	668	98	66	146	108	1024	2110

<u>Lights</u>	WEST		NORTH		EAST		TOT
	Appin Rd	West Cliff	Appin Rd	West Cliff	Appin Rd	West Cliff	
Peak Per	I	L	R	L	R	I	
0700 - 0800	303	12	4	19	18	515	871
0715 - 0815	331	9	5	16	14	588	963
0730 - 0830	312	6	6	29	10	541	904
0745 - 0845	272	8	10	29	14	456	789
0800 - 0900	247	8	8	30	20	369	682
0815 - 0915	222	9	9	33	23	289	585
0830 - 0930	208	6	10	14	21	250	509

<u>Heavies</u>	WEST		NORTH		EAST		TOT
	Appin Rd	West Cliff	Appin Rd	West Cliff	Appin Rd	West Cliff	
Peak Per	I	L	R	L	R	I	
0700 - 0800	5	42	35	28	30	4	144
0715 - 0815	10	37	31	32	29	8	147
0730 - 0830	9	30	28	31	29	11	138
0745 - 0845	10	33	22	35	26	9	135
0800 - 0900	10	27	15	41	23	11	127
0815 - 0915	6	24	8	44	25	9	116
0830 - 0930	5	19	1	49	20	9	103

<u>Combined</u>	WEST		NORTH		EAST		TOT
	Appin Rd	West Cliff	Appin Rd	West Cliff	Appin Rd	West Cliff	
Peak Per	I	L	R	L	R	I	
0700 - 0800	308	54	39	47	48	519	1015
0715 - 0815	341	46	36	48	43	596	1110
0730 - 0830	321	36	34	60	39	552	1042
0745 - 0845	282	41	32	64	40	465	924
0800 - 0900	257	35	23	71	43	380	809
0815 - 0915	228	33	17	77	48	298	701
0830 - 0930	213	25	11	63	41	259	612

PEAK HR	331	9	5	16	14	588	963
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PEAK HR	10	37	31	32	29	8	147
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PEAK HR	341	46	36	48	43	596	1110
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R.O.A.R. DATA

Client : Traffix

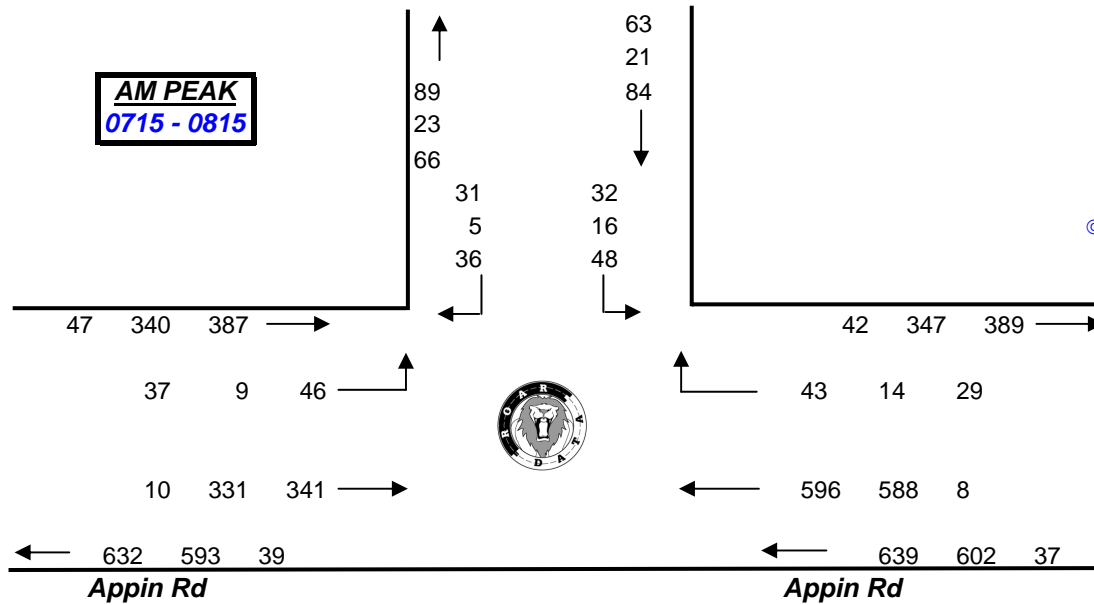


**TOTAL VOLUMES
 FOR COUNT
 PERIOD**

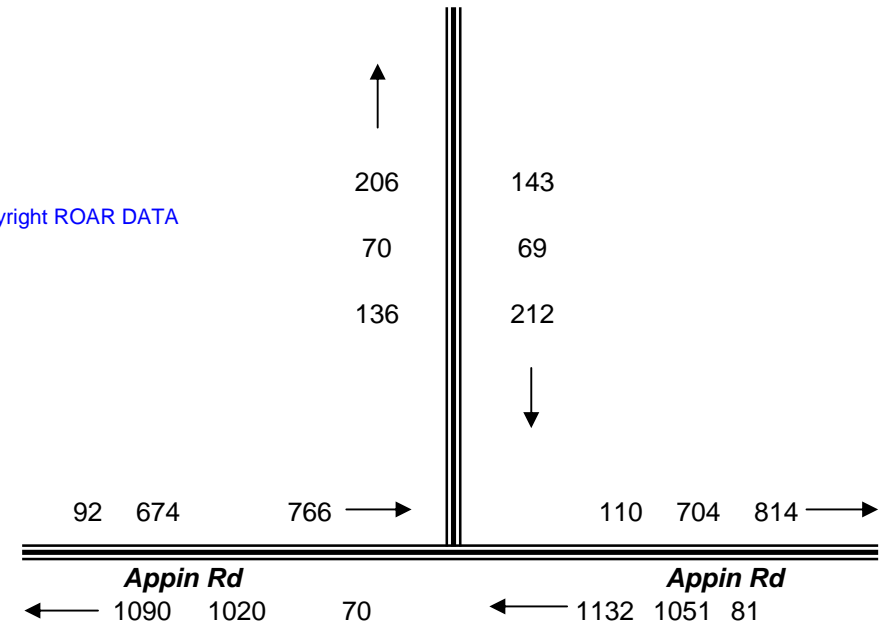


West Cliff Mine Access

**AM PEAK
 0715 - 0815**



West Cliff Mine Access





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.

Mobile.0418239019

Client : Traffix
 Job No/Name : 2654 Wollongong Area Traffic Surveys
 Day/Date : Thursday 9th April 2009

TC - 05

PEDS	WEST	NORTH	EAST	TOT
Time Per	Appin Rd	West Cliff	Appin Rd	
1600 - 1615				0
1615 - 1630				0
1630 - 1645		NOT		0
1645 - 1700		REQUIRED		0
1700 - 1715				0
1715 - 1730				0
1730 - 1745				0
1745 - 1800				0
1800 - 1815				0
1815 - 1830				0
Per End	0	0	0	0

PEDS	WEST	NORTH	EAST	TOT
Peak Per	Appin Rd	West Cliff	Appin Rd	
1600 - 1700	0	0	0	0
1615 - 1715	0	0	0	0
1630 - 1730	0	0	0	0
1645 - 1745	0	0	0	0
1700 - 1800	0	0	0	0
1715 - 1815	0	0	0	0
1730 - 1830	0	0	0	0
PEAK HR	0	0	0	0

Lights	WEST		NORTH		EAST		TOT
	Appin Rd		West Cliff		Appin Rd		
Time Per	I	L	R	L	R	I	
1600 - 1615	169	3	1	4	0	81	258
1615 - 1630	115	0	2	6	1	68	192
1630 - 1645	97	0	14	14	0	84	209
1645 - 1700	103	0	9	21	1	89	223
1700 - 1715	128	1	1	8	0	75	213
1715 - 1730	101	1	0	4	2	84	192
1730 - 1745	154	0	3	4	2	89	252
1745 - 1800	102	0	0	1	2	74	179
1800 - 1815	106	0	1	3	1	75	186
1815 - 1830	91	4	2	6	5	61	169
Per End	1166	9	33	71	14	780	2073

Heavies	WEST		NORTH		EAST		TOT
	Appin Rd		West Cliff		Appin Rd		
Time Per	I	L	R	L	R	I	
1600 - 1615	1	6	8	8	7	2	32
1615 - 1630	0	3	6	4	1	0	14
1630 - 1645	0	7	3	4	1	3	18
1645 - 1700	1	4	0	7	3	1	16
1700 - 1715	0	1	1	11	2	1	16
1715 - 1730	0	0	0	7	6	1	14
1730 - 1745	1	0	0	5	4	0	10
1745 - 1800	3	0	0	3	4	1	11
1800 - 1815	0	0	1	5	3	2	11
1815 - 1830	0	1	1	6	11	1	20
Per End	6	22	20	60	42	12	162

Combined	WEST		NORTH		EAST		TOT
	Appin Rd		West Cliff		Appin Rd		
Time Per	I	L	R	L	R	I	
1600 - 1615	170	9	9	12	7	83	290
1615 - 1630	115	3	8	10	2	68	206
1630 - 1645	97	7	17	18	1	87	227
1645 - 1700	104	4	9	28	4	90	239
1700 - 1715	128	2	2	19	2	76	229
1715 - 1730	101	1	0	11	8	85	206
1730 - 1745	155	0	3	9	6	89	262
1745 - 1800	105	0	0	4	6	75	190
1800 - 1815	106	0	2	8	4	77	197
1815 - 1830	91	5	3	12	16	62	189
Per End	1172	31	53	131	56	792	2235

Lights	WEST		NORTH		EAST		TOT
	Appin Rd		West Cliff		Appin Rd		
Peak Per	I	L	R	L	R	I	
1600 - 1700	484	3	26	45	2	322	882
1615 - 1715	443	1	26	49	2	316	837
1630 - 1730	429	2	24	47	3	332	837
1645 - 1745	486	2	13	37	5	337	880
1700 - 1800	485	2	4	17	6	322	836
1715 - 1815	463	1	4	12	7	322	809
1730 - 1830	453	4	6	14	10	299	786

Heavies	WEST		NORTH		EAST		TOT
	Appin Rd		West Cliff		Appin Rd		
Peak Per	I	L	R	L	R	I	
1600 - 1700	2	20	17	23	12	6	80
1615 - 1715	1	15	10	26	7	5	64
1630 - 1730	1	12	4	29	12	6	64
1645 - 1745	2	5	1	30	15	3	56
1700 - 1800	4	1	1	26	16	3	51
1715 - 1815	4	0	1	20	17	4	46
1730 - 1830	4	1	2	19	22	4	52

Combined	WEST		NORTH		EAST		TOT
	Appin Rd		West Cliff		Appin Rd		
Peak Per	I	L	R	L	R	I	
1600 - 1700	486	23	43	68	14	328	962
1615 - 1715	444	16	36	75	9	321	901
1630 - 1730	430	14	28	76	15	338	901
1645 - 1745	488	7	14	67	20	340	936
1700 - 1800	489	3	5	43	22	325	887
1715 - 1815	467	1	5	32	24	326	855
1730 - 1830	457	5	8	33	32	303	838

PEAK HR	484	3	26	45	2	322	882
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PEAK HR	2	20	17	23	12	6	80
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PEAK HR	486	23	43	68	14	328	962
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R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

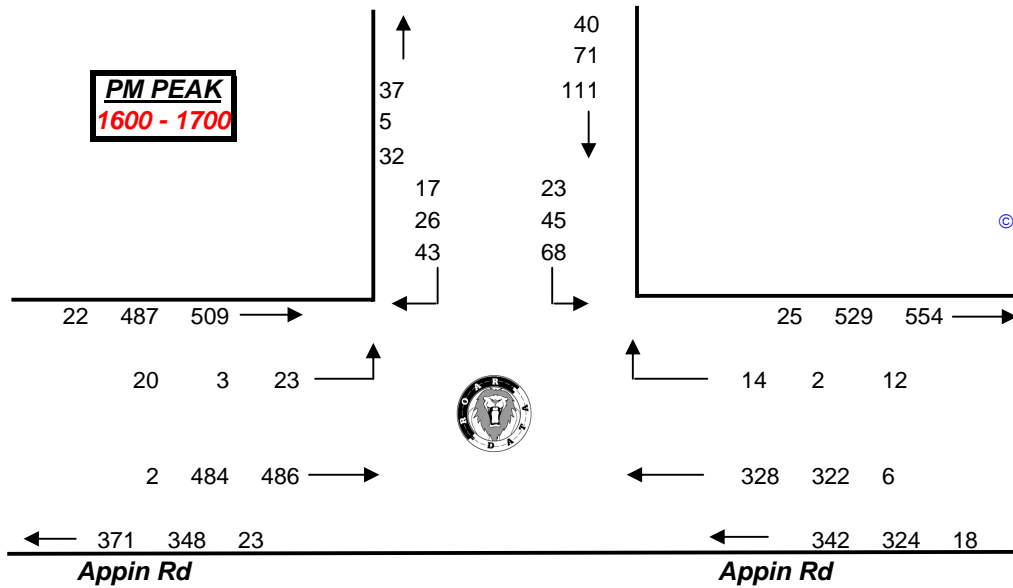
Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

**TOTAL VOLUMES
FOR COUNT
PERIOD**

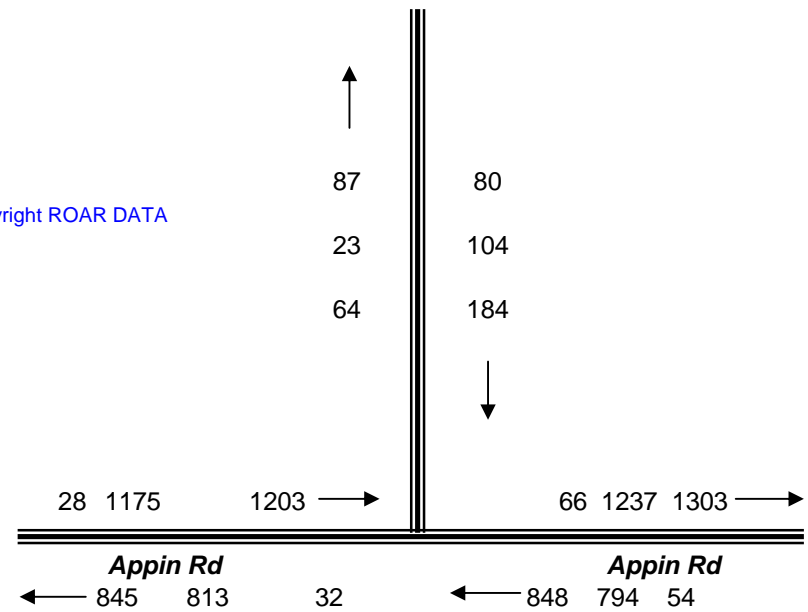


West Cliff Mine Access

**PM PEAK
1600 - 1700**



West Cliff Mine Access





R.O.A.R. DATA

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Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

Intersection Details

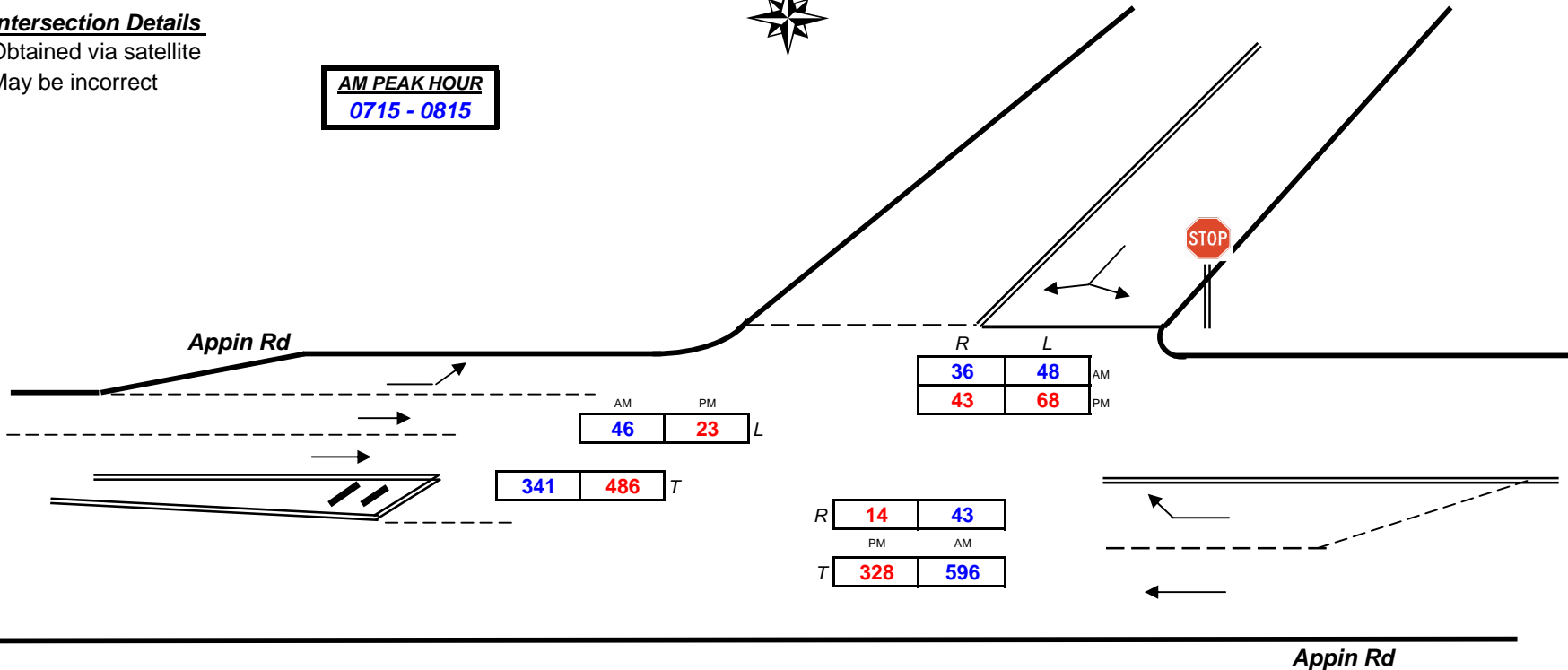
Obtained via satellite

May be incorrect



West Cliff Mine Access

AM PEAK HOUR
0715 - 0815



TC - 05

Combined figures only

PM PEAK HOUR
1600 - 1700

Weather >>>





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.

Mobile.0418239019

Client : Traffix
 Job No/Name : 2654 Wollongong Area Traffic Surveys
 Day/Date : Thursday 9th April 2009

TC - 06

PEDS		WEST	SOUTH	EAST	TOT
Time Per	Mt. Ousley Rd	Southern	Mt. Ousley Rd		
0700 - 0715					0
0715 - 0730					0
0730 - 0745			NOT		0
0745 - 0800			REQUIRED		0
0800 - 0815					0
0815 - 0830					0
0830 - 0845					0
0845 - 0900					0
0900 - 0915					0
0915 - 0930					0
Per End	0	0	0	0	0

PEDS		WEST	SOUTH	EAST	TOT
Peak Per	Mt. Ousley Rd	Southern Freeway	Mt. Ousley Rd		
0700 - 0800	0	0	0	0	0
0715 - 0815	0	0	0	0	0
0730 - 0830	0	0	0	0	0
0745 - 0845	0	0	0	0	0
0800 - 0900	0	0	0	0	0
0815 - 0915	0	0	0	0	0
0830 - 0930	0	0	0	0	0
PEAK HR	0	0	0	0	0

Lights	WEST		SOUTH		EAST		TOT
	Mt. Ousley Rd		Southern		Mt. Ousley Rd		
	I	R	L	R	L	R	
0700 - 0715	50	228	363	0	17	82	740
0715 - 0730	69	225	345	0	21	70	730
0730 - 0745	75	340	359	0	32	64	870
0745 - 0800	80	420	293	0	33	38	864
0800 - 0815	98	471	311	0	23	42	945
0815 - 0830	107	409	247	0	39	48	850
0830 - 0845	92	377	219	0	58	44	790
0845 - 0900	99	355	245	0	48	43	790
0900 - 0915	53	351	207	0	25	42	678
0915 - 0930	64	282	249	0	37	50	682
Per End	787	3458	2838	0	333	523	7939

Heavies	WEST		SOUTH		EAST		TOT
	Mt. Ousley Rd		Southern		Mt. Ousley Rd		
	I	R	L	R	L	R	
0700 - 0715	3	32	29	0	0	2	66
0715 - 0730	1	28	35	0	0	1	65
0730 - 0745	2	31	51	0	0	0	84
0745 - 0800	3	29	30	0	0	1	63
0800 - 0815	3	48	42	0	0	0	93
0815 - 0830	2	34	47	0	1	3	87
0830 - 0845	2	35	49	0	3	2	91
0845 - 0900	4	42	38	0	4	0	88
0900 - 0915	2	42	37	0	0	2	83
0915 - 0930	2	31	50	0	0	1	84
Per End	24	352	408	0	8	12	804

Combined	WEST		SOUTH		EAST		TOT
	Mt. Ousley Rd		Southern		Mt. Ousley Rd		
	I	R	L	R	L	R	
0700 - 0715	53	260	392	0	17	84	806
0715 - 0730	70	253	380	0	21	71	795
0730 - 0745	77	371	410	0	32	64	954
0745 - 0800	83	449	323	0	33	39	927
0800 - 0815	101	519	353	0	23	42	1038
0815 - 0830	109	443	294	0	40	51	937
0830 - 0845	94	412	268	0	61	46	881
0845 - 0900	103	397	283	0	52	43	878
0900 - 0915	55	393	244	0	25	44	761
0915 - 0930	66	313	299	0	37	51	766
Per End	811	3810	3246	0	341	535	8743

Lights	WEST		SOUTH		EAST		TOT
	Mt. Ousley Rd		Southern		Mt. Ousley Rd		
	I	R	L	R	L	R	
0700 - 0800	274	1213	1360	0	103	254	3204
0715 - 0815	322	1456	1308	0	109	214	3409
0730 - 0830	360	1640	1210	0	127	192	3529
0745 - 0845	377	1677	1070	0	153	172	3449
0800 - 0900	396	1612	1022	0	168	177	3375
0815 - 0915	351	1492	918	0	170	177	3108
0830 - 0930	308	1365	920	0	168	179	2940

Heavies	WEST		SOUTH		EAST		TOT
	Mt. Ousley Rd		Southern		Mt. Ousley Rd		
	I	R	L	R	L	R	
0700 - 0800	9	120	145	0	0	4	278
0715 - 0815	9	136	158	0	0	2	305
0730 - 0830	10	142	170	0	1	4	327
0745 - 0845	10	146	168	0	4	6	334
0800 - 0900	11	159	176	0	8	5	359
0815 - 0915	10	153	171	0	8	7	349
0830 - 0930	10	150	174	0	7	5	346

Combined	WEST		SOUTH		EAST		TOT
	Mt. Ousley Rd		Southern		Mt. Ousley Rd		
	I	R	L	R	L	R	
0700 - 0800	283	1333	1505	0	103	258	3482
0715 - 0815	331	1592	1466	0	109	216	3714
0730 - 0830	370	1782	1380	0	128	196	3856
0745 - 0845	387	1823	1238	0	157	178	3783
0800 - 0900	407	1771	1198	0	176	182	3734
0815 - 0915	361	1645	1089	0	178	184	3457
0830 - 0930	318	1515	1094	0	175	184	3286

PEAK HR	360	1640	1210	0	127	192	3529
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PEAK HR	10	142	170	0	1	4	327
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PEAK HR	370	1782	1380	0	128	196	3856
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R.O.A.R. DATA

Reliable, Original & Authentic Results

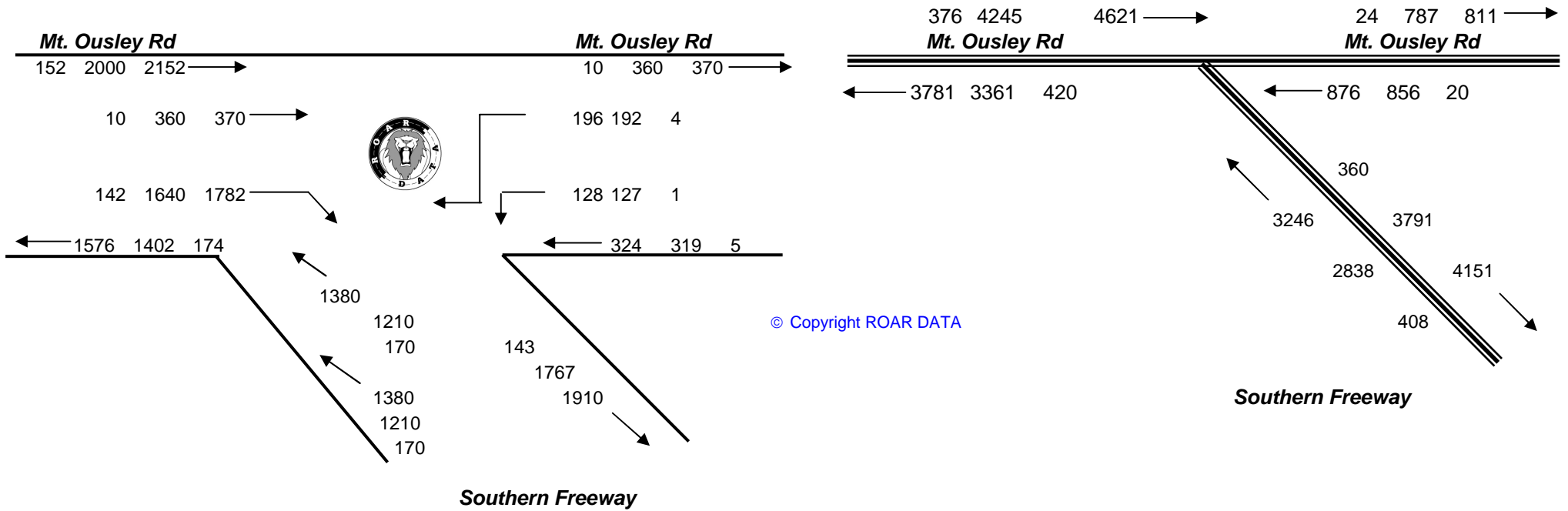
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Traffic
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

AM PEAK
0730 - 0830



TOTAL VOLUMES
FOR COUNT
PERIOD





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.

Mobile.0418239019

Client : Traffix
 Job No/Name : 2654 Wollongong Area Traffic Surveys
 Day/Date : Thursday 9th April 2009

TC - 06

<u>PEDS</u>			
	WEST	SOUTH	EAST
Time Per	Mt. Ousley	Southern	Mt. Ousley
1600 - 1615			0
1615 - 1630			0
1630 - 1645		NOT	0
1645 - 1700		REQUIRED	0
1700 - 1715			0
1715 - 1730			0
1730 - 1745			0
1745 - 1800			0
1800 - 1815			0
1815 - 1830			0
Per End	0	0	0

<u>PEDS</u>			
	WEST	SOUTH	EAST
Peak Per	Mt. Ousley	Southern	Mt. Ousley
0700 - 0800	0	0	0
0715 - 0815	0	0	0
0730 - 0830	0	0	0
0745 - 0845	0	0	0
0800 - 0900	0	0	0
0815 - 0915	0	0	0
0830 - 0930	0	0	0
PEAK HR	0	0	0

<u>Lights</u>	WEST		SOUTH		EAST		TOT
	Mt. Ousley		Southern		Mt. Ousley		
Time Per	I	R	L	R	L	R	
1600 - 1615	71	576	405	0	48	17	1117
1615 - 1630	87	548	384	0	55	32	1106
1630 - 1645	58	477	374	0	54	36	999
1645 - 1700	86	552	358	0	45	47	1088
1700 - 1715	55	529	348	0	54	36	1022
1715 - 1730	71	519	342	0	48	20	1000
1730 - 1745	75	501	342	0	69	49	1036
1745 - 1800	75	512	287	0	28	36	938
1800 - 1815	72	520	247	0	32	31	902
1815 - 1830	68	523	201	0	38	32	862
Per End	718	5257	3288	0	471	336	10070

<u>Heavies</u>	WEST		SOUTH		EAST		TOT
	Mt. Ousley		Southern		Mt. Ousley		
Time Per	I	R	L	R	L	R	
1600 - 1615	0	22	17	0	0	0	39
1615 - 1630	2	20	16	0	0	0	38
1630 - 1645	0	16	13	0	0	1	30
1645 - 1700	0	10	11	0	0	0	21
1700 - 1715	1	14	16	0	0	0	31
1715 - 1730	0	21	14	0	0	0	35
1730 - 1745	1	24	8	0	1	0	34
1745 - 1800	1	12	15	0	0	0	28
1800 - 1815	0	15	14	0	0	0	29
1815 - 1830	1	17	15	0	0	0	33
Per End	6	171	139	0	1	1	318

<u>Combined</u>	WEST		SOUTH		EAST		TOT
	Mt. Ousley		Southern		Mt. Ousley		
Time Per	I	R	L	R	L	R	
1600 - 1615	71	598	422	0	48	17	1156
1615 - 1630	89	568	400	0	55	32	1144
1630 - 1645	58	493	387	0	54	37	1029
1645 - 1700	86	562	369	0	45	47	1109
1700 - 1715	56	543	364	0	54	36	1053
1715 - 1730	71	540	356	0	48	20	1035
1730 - 1745	76	525	350	0	70	49	1070
1745 - 1800	76	524	302	0	28	36	966
1800 - 1815	72	535	261	0	32	31	931
1815 - 1830	69	540	216	0	38	32	895
Per End	724	5428	3427	0	472	337	10388

<u>Lights</u>	WEST		SOUTH		EAST		TOT
	Mt. Ousley		Southern		Mt. Ousley		
Peak Per	I	R	L	R	L	R	
1600 - 1700	302	2153	1521	0	202	132	4310
1615 - 1715	286	2106	1464	0	208	151	4215
1630 - 1730	270	2077	1422	0	201	139	4109
1645 - 1745	287	2101	1390	0	216	152	4146
1700 - 1800	276	2061	1319	0	199	141	3996
1715 - 1815	293	2052	1218	0	177	136	3876
1730 - 1830	290	2056	1077	0	167	148	3738
PEAK HR	302	2153	1521	0	202	132	4310

<u>Heavies</u>	WEST		SOUTH		EAST		TOT
	Mt. Ousley		Southern		Mt. Ousley		
Peak Per	I	R	L	R	L	R	
1600 - 1700	2	68	57	0	0	1	128
1615 - 1715	3	60	56	0	0	1	120
1630 - 1730	1	61	54	0	0	1	117
1645 - 1745	2	69	49	0	1	0	121
1700 - 1800	3	71	53	0	1	0	128
1715 - 1815	2	72	51	0	1	0	126
1730 - 1830	3	68	52	0	1	0	124
PEAK HR	2	68	57	0	0	1	128

<u>Combined</u>	WEST		SOUTH		EAST		TOT
	Mt. Ousley		Southern		Mt. Ousley		
Peak Per	I	R	L	R	L	R	
1600 - 1700	304	2221	1578	0	202	133	4438
1615 - 1715	289	2166	1520	0	208	152	4335
1630 - 1730	271	2138	1476	0	201	140	4226
1645 - 1745	289	2170	1439	0	217	152	4267
1700 - 1800	279	2132	1372	0	200	141	4124
1715 - 1815	295	2124	1269	0	178	136	4002
1730 - 1830	293	2124	1129	0	168	148	3862
PEAK HR	304	2221	1578	0	202	133	4438

PEAK HR	302	2153	1521	0	202	132	4310
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PEAK HR	2	68	57	0	0	1	128
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PEAK HR	304	2221	1578	0	202	133	4438
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R.O.A.R. DATA

Reliable, Original & Authentic Results

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Client : Traffix

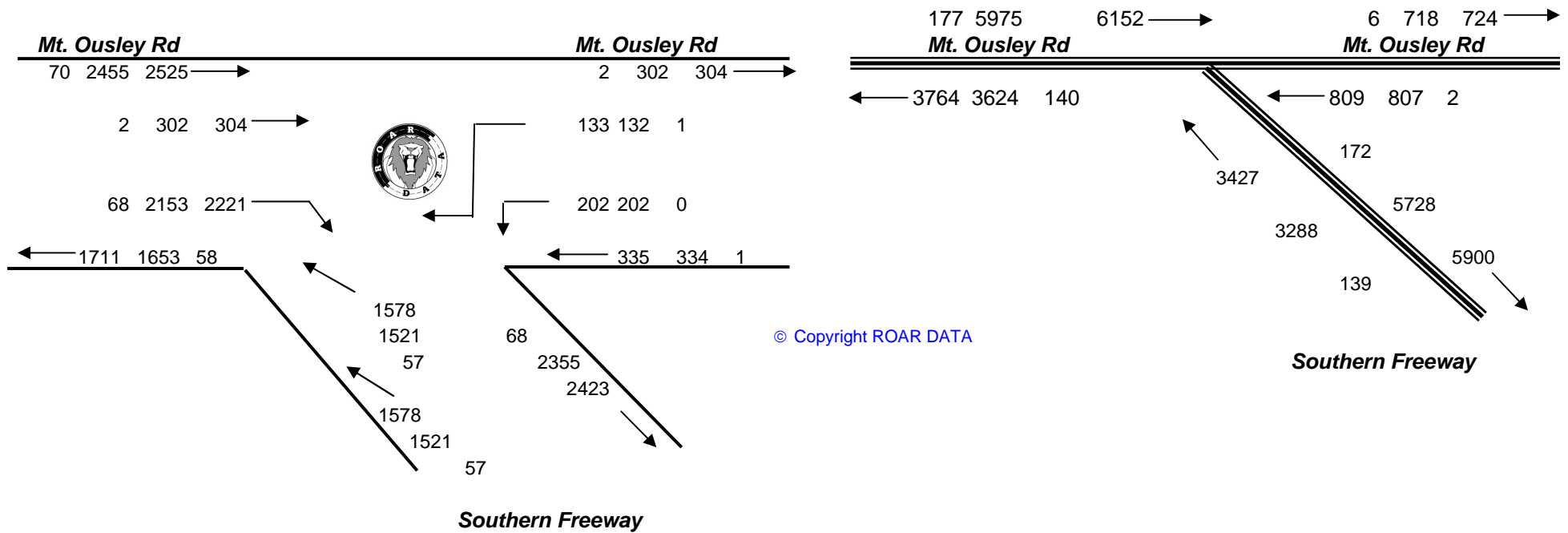
Job No/Name : 2654 Wollongong Area Traffic Surveys

Day/Date : Thursday 9th April 2009

PM PEAK
1600 - 1700



TOTAL VOLUMES
FOR COUNT
PERIOD





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

Intersection Details

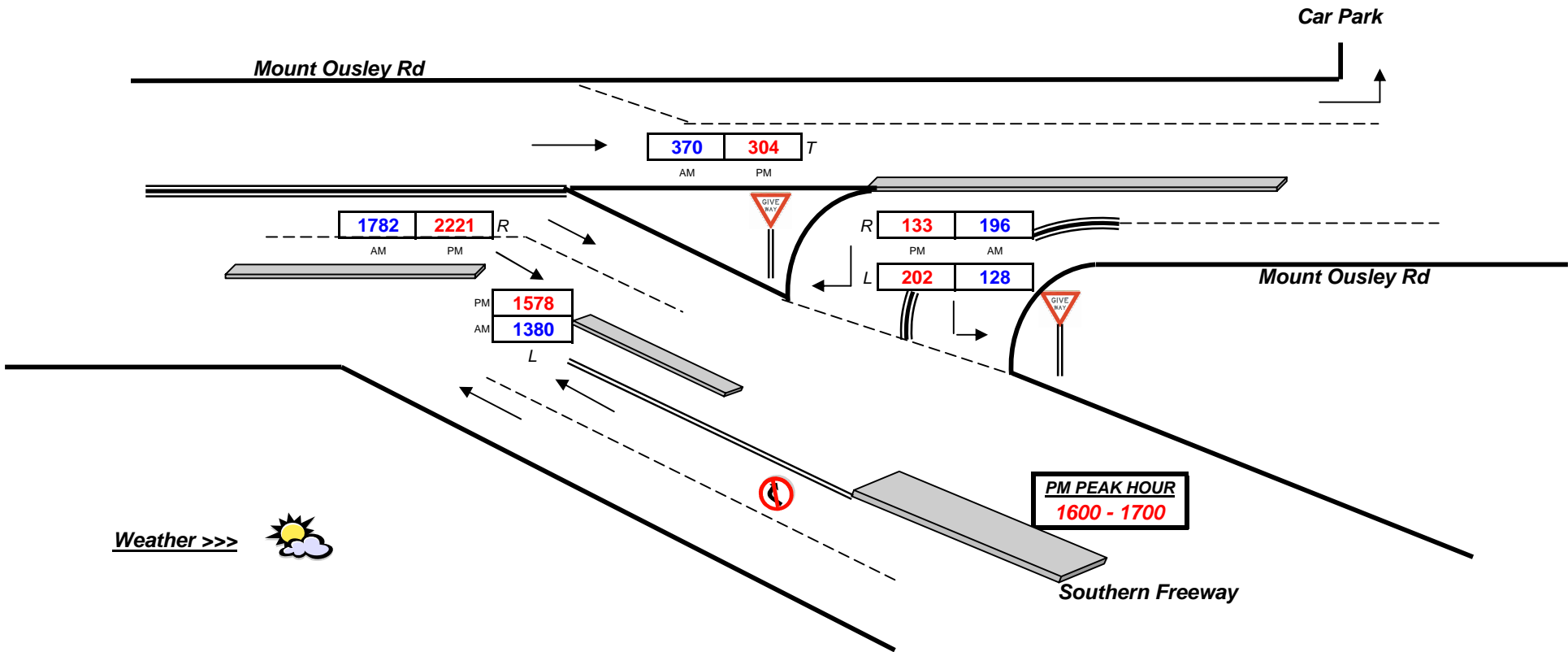
Obtained via satellite

May be incorrect

AM PEAK HOUR
0730 - 0830

Combined figures only

TC - 06





Springhill Rd & Bluescope

TC - 12

To

Tim Lewis

at *Traffix*

your results for

Wollongong Area Traffic Counts

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TC - 12

Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

Lights

Time Per	NORTH			WEST			SOUTH			EAST			TOT
	Springhill Rd			Bluescope Steel			Springhill Rd			Colourbond			
	L	T	R	L	T	R	L	T	R	L	T	R	
1600 - 1615		456	2	9	0	11	0	394					872
1615 - 1630		462	3	12	0	13	1	448					939
1630 - 1645		447	2	6	0	11	3	419					888
1645 - 1700		511	3	18	1	11	3	378					925
1700 - 1715		541	2	21	0	14	0	392					970
1715 - 1730		546	0	9	0	4	4	410					973
1730 - 1745		522	2	19	0	14	1	382					940
1745 - 1800		457	0	9	0	3	4	352					825
1800 - 1815		372	5	1	0	1	1	331					711
1815 - 1830		321	3	3	0	3	4	308					642
Period End	0	4635	22	107	1	85	21	3814	0	0	0	0	8685

Lights

Peak Time	NORTH			WEST			SOUTH			EAST			TOT
	Springhill Rd			Bluescope Steel			Springhill Rd			Colourbond			
	L	T	R	L	T	R	L	T	R	L	T	R	
1600 - 1700	0	1876	10	45	1	46	7	1639	0	0	0	0	3624
1615 - 1715	0	1961	10	57	1	49	7	1637	0	0	0	0	3722
1630 - 1730	0	2045	7	54	1	40	10	1599	0	0	0	0	3756
1645 - 1745	0	2120	7	67	1	43	8	1562	0	0	0	0	3808
1700 - 1800	0	2066	4	58	0	35	9	1536	0	0	0	0	3708
1715 - 1815	0	1897	7	38	0	22	10	1475	0	0	0	0	3449
1730 - 1830	0	1672	10	32	0	21	10	1373	0	0	0	0	3118
PEAK HOUR	0	2120	7	67	1	43	8	1562	0	0	0	0	3808

N-C

Not Counted

Heavies

Time Per	NORTH			WEST			SOUTH			EAST			TOT
	Springhill Rd			Bluescope Steel			Springhill Rd			Colourbond			
	L	T	R	L	T	R	L	T	R	L	T	R	
1600 - 1615		12	1	5	0	1	2	5					26
1615 - 1630		10	1	4	0	0	1	7					23
1630 - 1645		11	2	1	0	0	1	7					22
1645 - 1700		9	1	1	0	0	0	5					16
1700 - 1715		8	0	5	0	1	1	6					21
1715 - 1730		9	0	1	0	1	0	7					18
1730 - 1745		10	5	0	0	1	1	6					23
1745 - 1800		7	2	3	0	1	1	6					20
1800 - 1815		4	6	2	0	0	0	3					15
1815 - 1830		3	1	7	0	0	0	0					11
Period End	0	83	19	29	0	5	7	52	0	0	0	0	195

Heavies

Peak Per	NORTH			WEST			SOUTH			EAST			TOT
	Springhill Rd			Bluescope Steel			Springhill Rd			Colourbond			
	L	T	R	L	T	R	L	T	R	L	T	R	
1600 - 1700	0	42	5	11	0	1	4	24	0	0	0	0	87
1615 - 1715	0	38	4	11	0	1	3	25	0	0	0	0	82
1630 - 1730	0	37	3	8	0	2	2	25	0	0	0	0	77
1645 - 1745	0	36	6	7	0	3	2	24	0	0	0	0	78
1700 - 1800	0	34	7	9	0	4	3	25	0	0	0	0	82
1715 - 1815	0	30	13	6	0	3	2	22	0	0	0	0	76
1730 - 1830	0	24	14	12	0	2	2	15	0	0	0	0	69
PEAK HOUR	0	36	6	7	0	3	2	24	0	0	0	0	78

N-C

Not Counted

Combined

Time Per	NORTH			WEST			SOUTH			EAST			TOT
	Springhill Rd			Bluescope Steel			Springhill Rd			Colourbond			
	L	T	R	L	T	R	L	T	R	L	T	R	
1600 - 1615	0	468	3	14	0	12	2	399	0	0	0	0	898
1615 - 1630	0	472	4	16	0	13	2	455	0	0	0	0	962
1630 - 1645	0	458	4	7	0	11	4	426	0	0	0	0	910
1645 - 1700	0	520	4	19	1	11	3	383	0	0	0	0	941
1700 - 1715	0	549	2	26	0	15	1	398	0	0	0	0	991
1715 - 1730	0	555	0	10	0	5	4	417	0	0	0	0	991
1730 - 1745	0	532	7	19	0	15	2	388	0	0	0	0	963
1745 - 1800	0	464	2	12	0	4	5	358	0	0	0	0	845
1800 - 1815	0	376	11	3	0	1	1	334	0	0	0	0	726
1815 - 1830	0	324	4	10	0	3	4	308	0	0	0	0	653
Period End	0	4718	41	136	1	90	28	3866	0	0	0	0	8880

Combined

Peak Per	NORTH			WEST			SOUTH			EAST			TOT
	Springhill Rd			Bluescope Steel			Springhill Rd			Colourbond			
	L	T	R	L	T	R	L	T	R	L	T	R	
1600 - 1700	0	1918	15	56	1	47	11	1663	0	0	0	0	3711
1615 - 1715	0	1999	14	68	1	50	10	1662	0	0	0	0	3804
1630 - 1730	0	2082	10	62	1	42	12	1624	0	0	0	0	3833
1645 - 1745	0	2156	13	74	1	46	10	1586	0	0	0	0	3886
1700 - 1800	0	2100	11	67	0	39	12	1561	0	0	0	0	3790
1715 - 1815	0	1927	20	44	0	25	12	1497	0	0	0	0	3525
1730 - 1830	0	1696	24	44	0	23	12	1388	0	0	0	0	3187
PEAK HOUR	0	2156	13	74	1	46	10	1586	0	0	0	0	3886



R.O.A.R DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Traffic
 Job No/Name : 2654 Wollongong Area Traffic Surveys
 Day/Date : Thursday 9th April 2009

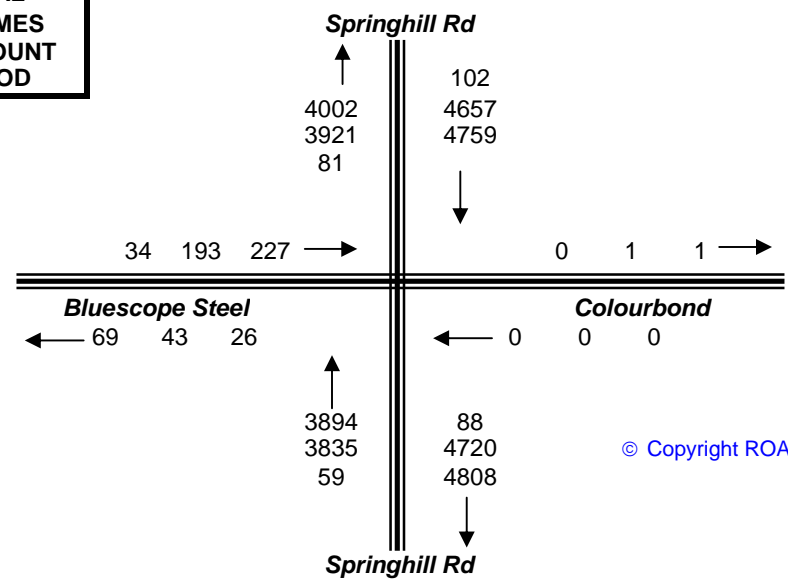
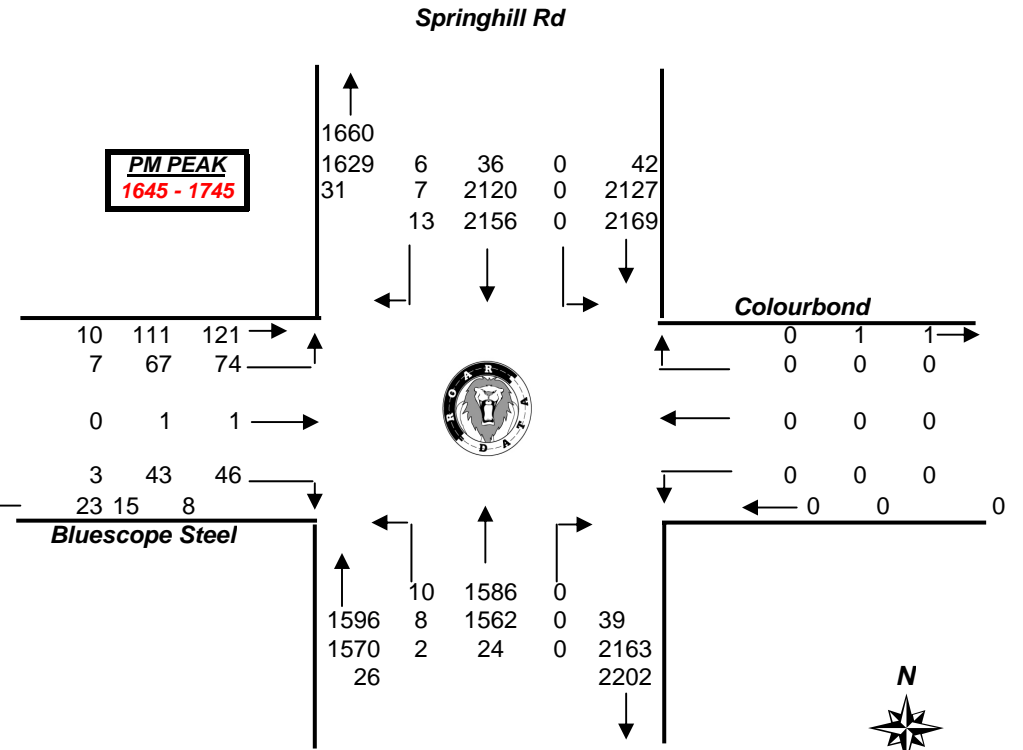
TC - 12

Peds	NORTH	WEST	SOUTH	EAST	TOT
	Springhill Rd	Bluescope Steel	Springhill Rd	Colourbond	
Time Per	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	
1600 - 1615					0
1615 - 1630					0
1630 - 1645		NOT	REQUIRED		0
1645 - 1700					0
1700 - 1715					0
1715 - 1730					0
1730 - 1745					0
1745 - 1800					0
1800 - 1815					0
1815 - 1830					0
Period End	0	0	0	0	0

Peds	NORTH	WEST	SOUTH	EAST	TOT
	Springhill Rd	Bluescope Steel	Springhill Rd	Colourbond	
Peak Per	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	
1600 - 1700	0	0	0	0	0
1615 - 1715	0	0	0	0	0
1630 - 1730	0	0	0	0	0
1645 - 1745	0	0	0	0	0
1700 - 1800	0	0	0	0	0
1715 - 1815	0	0	0	0	0
1730 - 1830	0	0	0	0	0

PEAK HR	0	0	0	0	0
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TOTAL VOLUMES FOR COUNT PERIOD





R.O.A.R. DATA

Reliable, Original & Authentic Results

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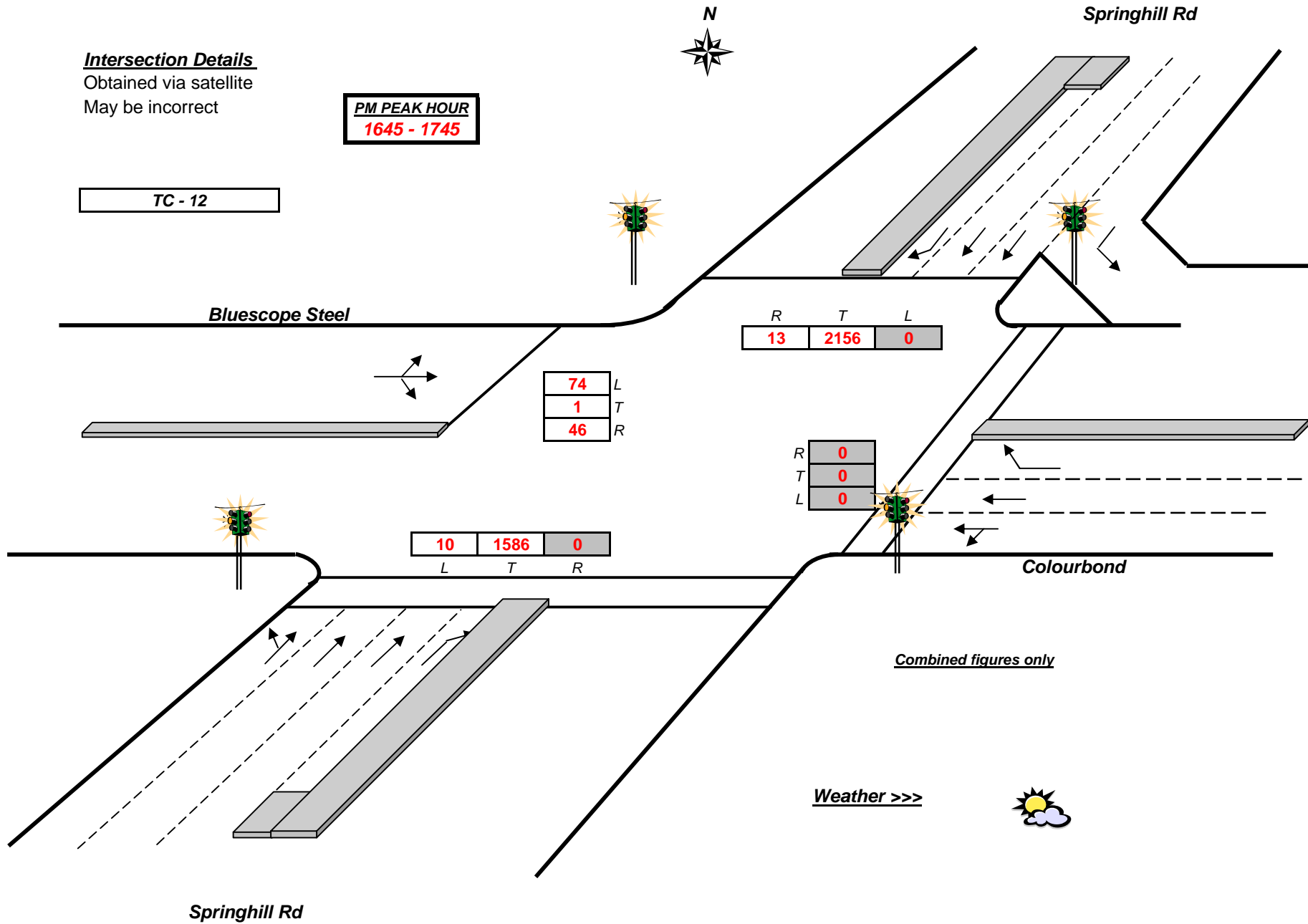
Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

Intersection Details

Obtained via satellite
May be incorrect

PM PEAK HOUR
1645 - 1745

TC - 12



R	T	L
13	2156	0

74	L
1	T
46	R

R	0
T	0
L	0

10	1586	0
L	T	R

Combined figures only

Weather >>>



Springhill Rd



Wilton Rd & Douglas Park Dr

TC - 20

To

Tim Lewis

at *Traffix*

your results for

Wollongong Area Traffic Counts

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Mobile.0418239019

Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

TC - 20

<u>PEDS</u>				
	WEST	NORTH	EAST	
Time Per	Wilton Rd	Douglas Parl	Wilton Rd	TOT
0700 - 0715				0
0715 - 0730				0
0730 - 0745		NOT		0
0745 - 0800		REQUIRED		0
0800 - 0815				0
0815 - 0830				0
0830 - 0845				0
0845 - 0900				0
0900 - 0915				0
0915 - 0930				0
Per End	0	0	0	0

<u>PEDS</u>				
	WEST	NORTH	EAST	
Peak Per	Wilton Rd	Douglas Parl	Wilton Rd	TOT
0700 - 0800	0	0	0	0
0715 - 0815	0	0	0	0
0730 - 0830	0	0	0	0
0745 - 0845	0	0	0	0
0800 - 0900	0	0	0	0
0815 - 0915	0	0	0	0
0830 - 0930	0	0	0	0
PEAK HR	0	0	0	0

Time Per	<u>Lights</u>		WEST		NORTH		EAST		TOT
			Wilton Rd		Douglas Parl		Wilton Rd		
	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	
0700 - 0715	6	9	14	2	3	15			49
0715 - 0730	19	14	10	4	2	11			60
0730 - 0745	14	12	20	3	6	13			68
0745 - 0800	16	15	36	11	6	11			95
0800 - 0815	17	14	24	7	4	12			78
0815 - 0830	14	15	16	4	0	6			55
0830 - 0845	12	10	11	6	2	15			56
0845 - 0900	8	12	14	4	5	24			67
0900 - 0915	13	6	20	7	5	12			63
0915 - 0930	9	5	9	3	2	12			40
Per End	128	112	174	51	35	131			631

Time Per	<u>Heavies</u>		WEST		NORTH		EAST		TOT
			Wilton Rd		Douglas Parl		Wilton Rd		
	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	
0700 - 0715	0	1	1	0	0	0	0	0	2
0715 - 0730	0	1	1	0	0	0	0	0	2
0730 - 0745	1	1	1	1	0	0	0	0	4
0745 - 0800	1	1	2	0	0	0	0	0	4
0800 - 0815	0	2	1	0	0	0	0	0	3
0815 - 0830	0	1	3	0	0	0	0	0	4
0830 - 0845	0	0	0	0	0	0	0	0	0
0845 - 0900	0	0	0	0	0	0	0	0	0
0900 - 0915	0	0	0	0	0	1	0	0	1
0915 - 0930	0	1	0	0	0	0	0	0	1
Per End	2	8	9	1	0	1			21

Time Per	<u>Combined</u>		WEST		NORTH		EAST		TOT
			Wilton Rd		Douglas Parl		Wilton Rd		
	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	
0700 - 0715	6	10	15	2	3	15			51
0715 - 0730	19	15	11	4	2	11			62
0730 - 0745	15	13	21	4	6	13			72
0745 - 0800	17	16	38	11	6	11			99
0800 - 0815	17	16	25	7	4	12			81
0815 - 0830	14	16	19	4	0	6			59
0830 - 0845	12	10	11	6	2	15			56
0845 - 0900	8	12	14	4	5	24			67
0900 - 0915	13	6	20	7	5	13			64
0915 - 0930	9	6	9	3	2	12			41
Per End	130	120	183	52	35	132			652

Peak Per	<u>Lights</u>		WEST		NORTH		EAST		TOT
			Wilton Rd		Douglas Parl		Wilton Rd		
	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	
0700 - 0800	55	50	80	20	17	50			272
0715 - 0815	66	55	90	25	18	47			301
0730 - 0830	61	56	96	25	16	42			296
0745 - 0845	59	54	87	28	12	44			284
0800 - 0900	51	51	65	21	11	57			256
0815 - 0915	47	43	61	21	12	57			241
0830 - 0930	42	33	54	20	14	63			226
PEAK HR	66	55	90	25	18	47			301

Peak Per	<u>Heavies</u>		WEST		NORTH		EAST		TOT
			Wilton Rd		Douglas Parl		Wilton Rd		
	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	
0700 - 0800	2	4	5	1	0	0	0	0	12
0715 - 0815	2	5	5	1	0	0	0	0	13
0730 - 0830	2	5	7	1	0	0	0	0	15
0745 - 0845	1	4	6	0	0	0	0	0	11
0800 - 0900	0	3	4	0	0	0	0	0	7
0815 - 0915	0	1	3	0	0	1	0	0	5
0830 - 0930	0	1	0	0	0	1	0	0	2
PEAK HR	2	5	5	1	0	0			13

Peak Per	<u>Combined</u>		WEST		NORTH		EAST		TOT
			Wilton Rd		Douglas Parl		Wilton Rd		
	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	
0700 - 0800	57	54	85	21	17	50			284
0715 - 0815	68	60	95	26	18	47			314
0730 - 0830	63	61	103	26	16	42			311
0745 - 0845	60	58	93	28	12	44			295
0800 - 0900	51	54	69	21	11	57			263
0815 - 0915	47	44	64	21	12	58			246
0830 - 0930	42	34	54	20	14	64			228
PEAK HR	68	60	95	26	18	47			314



R.O.A.R. DATA

Client : Traffix

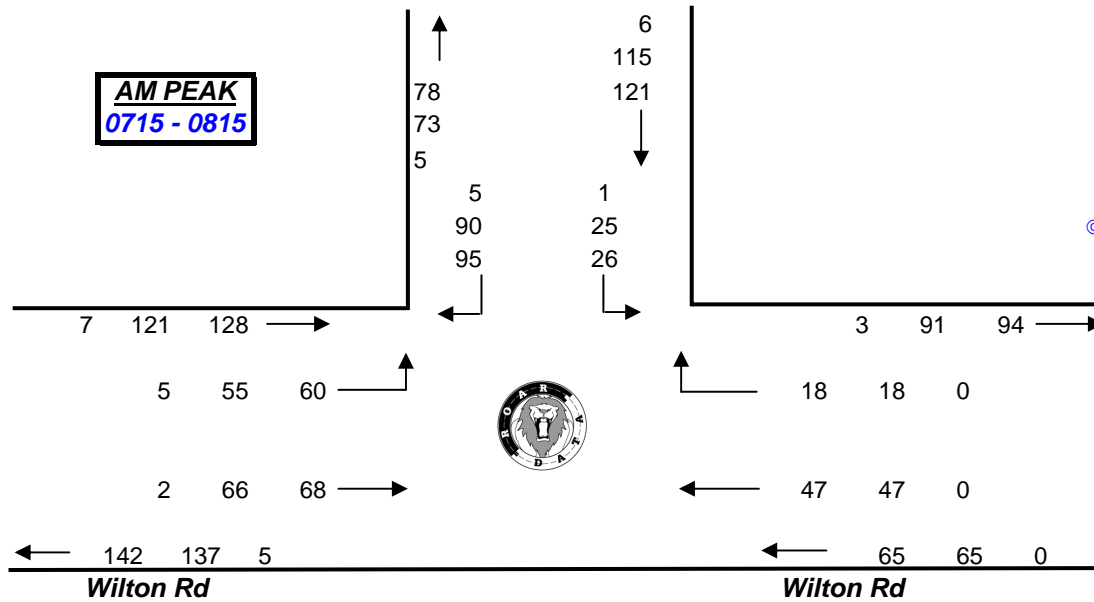


**TOTAL VOLUMES
FOR COUNT
PERIOD**

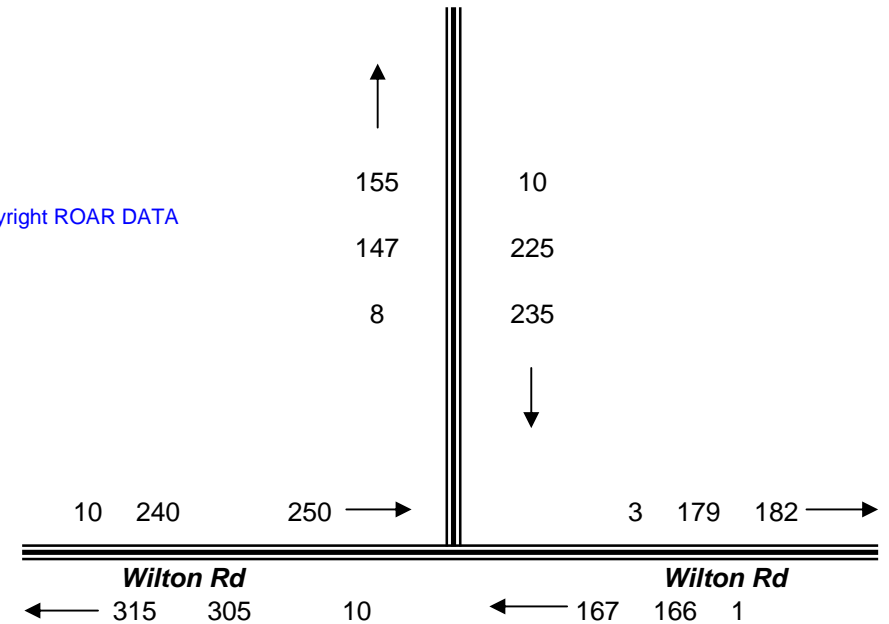


Douglas Parl Dr

**AM PEAK
0715 - 0815**



Douglas Parl Dr





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Mobile.0418239019

Client : Traffix
 Job No/Name : 2654 Wollongong Area Traffic Surveys
 Day/Date : Thursday 9th April 2009

TC - 20

PEDS	WEST	NORTH	EAST	TOT
Time Per	Wilton Rd	Douglas	Wilton Rd	
1600 - 1615				0
1615 - 1630				0
1630 - 1645		NOT		0
1645 - 1700		REQUIRED		0
1700 - 1715				0
1715 - 1730				0
1730 - 1745				0
1745 - 1800				0
1800 - 1815				0
1815 - 1830				0
Per End	0	0	0	0

PEDS	WEST	NORTH	EAST	TOT
Peak Per	Wilton Rd	Douglas	Wilton Rd	
1600 - 1700	0	0	0	0
1615 - 1715	0	0	0	0
1630 - 1730	0	0	0	0
1645 - 1745	0	0	0	0
1700 - 1800	0	0	0	0
1715 - 1815	0	0	0	0
1730 - 1830	0	0	0	0
PEAK HR	0	0	0	0

Lights	WEST		NORTH		EAST		TOT
	Wilton Rd		Douglas		Wilton Rd		
Time Per	I	L	R	L	R	I	
1600 - 1615	21	18	31	6	4	28	108
1615 - 1630	16	19	18	4	5	22	84
1630 - 1645	22	15	19	3	8	24	91
1645 - 1700	16	15	14	5	2	30	82
1700 - 1715	20	24	26	6	10	21	107
1715 - 1730	13	18	21	4	1	18	75
1730 - 1745	16	19	26	2	9	31	103
1745 - 1800	17	17	18	3	4	18	77
1800 - 1815	14	15	12	3	5	28	77
1815 - 1830	12	13	14	2	3	20	64
Per End	167	173	199	38	51	240	868

Heavies	WEST		NORTH		EAST		TOT
	Wilton Rd		Douglas		Wilton Rd		
Time Per	I	L	R	L	R	I	
1600 - 1615	0	1	0	0	0	1	2
1615 - 1630	1	0	1	0	0	1	3
1630 - 1645	0	0	0	0	0	0	0
1645 - 1700	0	2	0	1	0	0	3
1700 - 1715	0	1	2	0	0	0	3
1715 - 1730	0	1	2	0	0	0	3
1730 - 1745	0	0	0	0	0	0	0
1745 - 1800	0	0	0	0	0	1	1
1800 - 1815	0	0	0	0	0	0	0
1815 - 1830	1	0	0	0	0	0	1
Per End	2	5	5	1	0	3	16

Combined	WEST		NORTH		EAST		TOT
	Wilton Rd		Douglas		Wilton Rd		
Time Per	I	L	R	L	R	I	
1600 - 1615	21	19	31	6	4	29	110
1615 - 1630	17	19	19	4	5	23	87
1630 - 1645	22	15	19	3	8	24	91
1645 - 1700	16	17	14	6	2	30	85
1700 - 1715	20	25	28	6	10	21	110
1715 - 1730	13	19	23	4	1	18	78
1730 - 1745	16	19	26	2	9	31	103
1745 - 1800	17	17	18	3	4	19	78
1800 - 1815	14	15	12	3	5	28	77
1815 - 1830	13	13	14	2	3	20	65
Per End	169	178	204	39	51	243	884

Lights	WEST		NORTH		EAST		TOT
	Wilton Rd		Douglas		Wilton Rd		
Peak Per	I	L	R	L	R	I	
1600 - 1700	75	67	82	18	19	104	365
1615 - 1715	74	73	77	18	25	97	364
1630 - 1730	71	72	80	18	21	93	355
1645 - 1745	65	76	87	17	22	100	367
1700 - 1800	66	78	91	15	24	88	362
1715 - 1815	60	69	77	12	19	95	332
1730 - 1830	59	64	70	10	21	97	321

Heavies	WEST		NORTH		EAST		TOT
	Wilton Rd		Douglas		Wilton Rd		
Peak Per	I	L	R	L	R	I	
1600 - 1700	1	3	1	1	0	2	8
1615 - 1715	1	3	3	1	0	1	9
1630 - 1730	0	4	4	1	0	0	9
1645 - 1745	0	4	4	1	0	0	9
1700 - 1800	0	2	4	0	0	1	7
1715 - 1815	0	1	2	0	0	1	4
1730 - 1830	1	0	0	0	0	1	2

Combined	WEST		NORTH		EAST		TOT
	Wilton Rd		Douglas		Wilton Rd		
Peak Per	I	L	R	L	R	I	
1600 - 1700	76	70	83	19	19	106	373
1615 - 1715	75	76	80	19	25	98	373
1630 - 1730	71	76	84	19	21	93	364
1645 - 1745	65	80	91	18	22	100	376
1700 - 1800	66	80	95	15	24	89	369
1715 - 1815	60	70	79	12	19	96	336
1730 - 1830	60	64	70	10	21	98	323

PEAK HR	65	76	87	17	22	100	367
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PEAK HR	0	4	4	1	0	0	9
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PEAK HR	65	80	91	18	22	100	376
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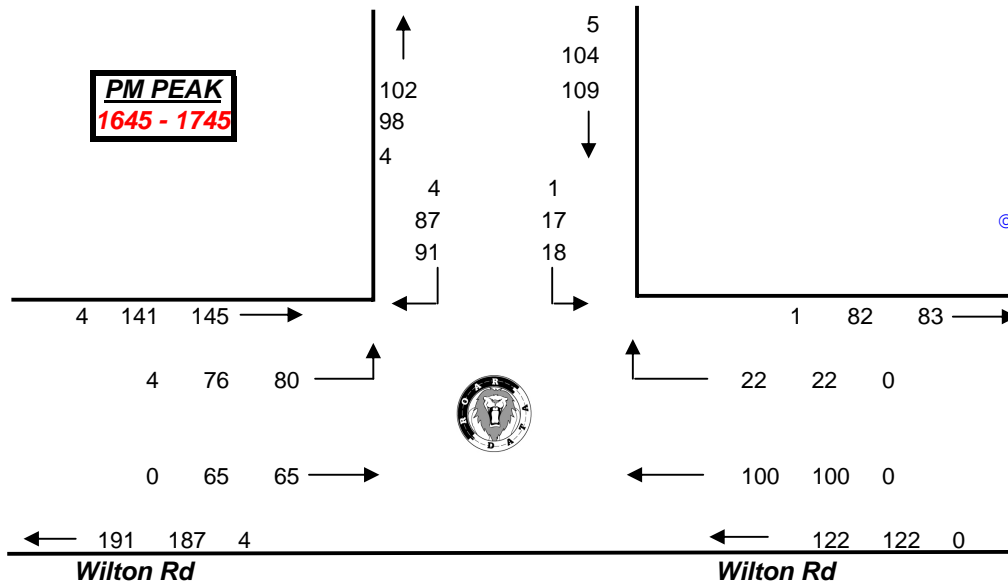
Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

**TOTAL VOLUMES
FOR COUNT
PERIOD**



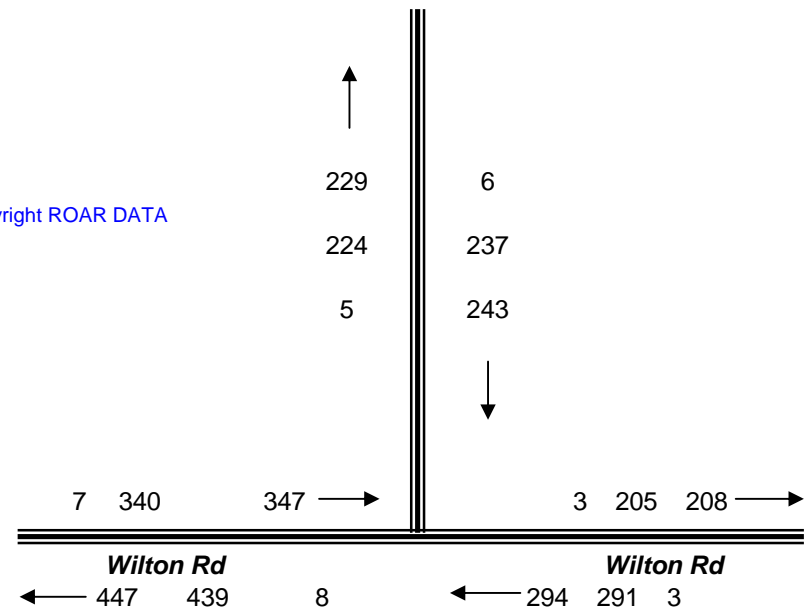
Douglas Park Dr

**PM PEAK
1645 - 1745**



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Douglas Park Dr





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Client : Traffix
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Day/Date : Thursday 9th April 2009

Intersection Details

Obtained via satellite

May be incorrect

AM PEAK HOUR
0715 - 0815



Douglas Park Dr

Wilton Rd

Wilton Rd

R	L	
95	26	AM
91	18	PM

AM	PM	
60	80	L

68	65	T
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R	22	18
	PM	AM

T	100	47
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TC - 20

Combined figures only

PM PEAK HOUR
1645 - 1745

Weather >>>





Appin Rd & Wilton Rd AM

TC - 21

To

Tim Lewis

at *Traffix*

your results for

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 Day/Date : Thursday 9th April 2009

TC - 21

<u>PEDS</u>	<u>NORTH</u>	<u>EAST</u>	<u>SOUTH</u>	
Time Per	Appin Rd	Appin Rd	Wilton Rd	TOT
0700 - 0715				0
0715 - 0730		NOT		0
0730 - 0745		REQUIRED		0
0745 - 0800				0
0800 - 0815				0
0815 - 0830				0
0830 - 0845				0
0845 - 0900				0
0900 - 0915				0
0915 - 0930				0
Per End	0	0	0	0

<u>PEDS</u>	<u>NORTH</u>	<u>EAST</u>	<u>SOUTH</u>	
Peak Per	Appin Rd	Appin Rd	Wilton Rd	TOT
0700 - 0800	0	0	0	0
0715 - 0815	0	0	0	0
0730 - 0830	0	0	0	0
0745 - 0845	0	0	0	0
0800 - 0900	0	0	0	0
0815 - 0915	0	0	0	0
0830 - 0930	0	0	0	0
PEAK HR	0	0	0	0

<u>Lights</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		TOT
	Appin Rd	Appin Rd	Appin Rd	Appin Rd	Wilton Rd	Wilton Rd	
Time Per	I	L	R	L	R	I	
0700 - 0715	8	56	69	15	5	13	166
0715 - 0730	17	76	105	11	5	18	232
0730 - 0745	9	96	159	10	11	13	298
0745 - 0800	8	60	131	13	12	15	239
0800 - 0815	7	70	139	10	12	20	258
0815 - 0830	8	52	114	7	11	20	212
0830 - 0845	12	47	77	10	5	18	169
0845 - 0900	18	51	58	14	4	21	166
0900 - 0915	20	48	51	11	8	33	171
0915 - 0930	27	50	50	5	6	14	152
Per End	134	606	953	106	79	185	2063

<u>Heavies</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		TOT
	Appin Rd	Appin Rd	Appin Rd	Appin Rd	Wilton Rd	Wilton Rd	
Time Per	I	L	R	L	R	I	
0700 - 0715	1	2	1	0	0	0	4
0715 - 0730	4	2	1	0	0	1	8
0730 - 0745	2	2	4	0	1	0	9
0745 - 0800	1	1	2	0	1	0	5
0800 - 0815	0	4	3	1	0	1	9
0815 - 0830	0	8	4	1	0	1	14
0830 - 0845	0	0	2	0	0	3	5
0845 - 0900	0	5	2	0	0	1	8
0900 - 0915	1	1	4	0	1	2	9
0915 - 0930	1	3	2	0	1	0	7
Per End	10	28	25	2	4	9	78

<u>Combined</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		TOT
	Appin Rd	Appin Rd	Appin Rd	Appin Rd	Wilton Rd	Wilton Rd	
Time Per	I	L	R	L	R	I	
0700 - 0715	9	58	70	15	5	13	170
0715 - 0730	21	78	106	11	5	19	240
0730 - 0745	11	98	163	10	12	13	307
0745 - 0800	9	61	133	13	13	15	244
0800 - 0815	7	74	142	11	12	21	267
0815 - 0830	8	60	118	8	11	21	226
0830 - 0845	12	47	79	10	5	21	174
0845 - 0900	18	56	60	14	4	22	174
0900 - 0915	21	49	55	11	9	35	180
0915 - 0930	28	53	52	5	7	14	159
Per End	144	634	978	108	83	194	2141

<u>Lights</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		TOT
	Appin Rd	Appin Rd	Appin Rd	Appin Rd	Wilton Rd	Wilton Rd	
Peak Per	I	L	R	L	R	I	
0700 - 0800	42	288	464	49	33	59	935
0715 - 0815	41	302	534	44	40	66	1027
0730 - 0830	32	278	543	40	46	68	1007
0745 - 0845	35	229	461	40	40	73	878
0800 - 0900	45	220	388	41	32	79	805
0815 - 0915	58	198	300	42	28	92	718
0830 - 0930	77	196	236	40	23	86	658

<u>Heavies</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		TOT
	Appin Rd	Appin Rd	Appin Rd	Appin Rd	Wilton Rd	Wilton Rd	
Peak Per	I	L	R	L	R	I	
0700 - 0800	8	7	8	0	2	1	26
0715 - 0815	7	9	10	1	2	2	31
0730 - 0830	3	15	13	2	2	2	37
0745 - 0845	1	13	11	2	1	5	33
0800 - 0900	0	17	11	2	0	6	36
0815 - 0915	1	14	12	1	1	7	36
0830 - 0930	2	9	10	0	2	6	29

<u>Combined</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		TOT
	Appin Rd	Appin Rd	Appin Rd	Appin Rd	Wilton Rd	Wilton Rd	
Peak Per	I	L	R	L	R	I	
0700 - 0800	50	295	472	49	35	60	961
0715 - 0815	48	311	544	45	42	68	1058
0730 - 0830	35	293	556	42	48	70	1044
0745 - 0845	36	242	472	42	41	78	911
0800 - 0900	45	237	399	43	32	85	841
0815 - 0915	59	212	312	43	29	99	754
0830 - 0930	79	205	246	40	25	92	687

PEAK HR	41	302	534	44	40	66	1027
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PEAK HR	7	9	10	1	2	2	31
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PEAK HR	48	311	544	45	42	68	1058
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R.O.A.R. DATA

Reliable, Original & Authentic Results

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Client : Traffic

Job No/Name : 2654 Wollongong Area Traffic Surveys

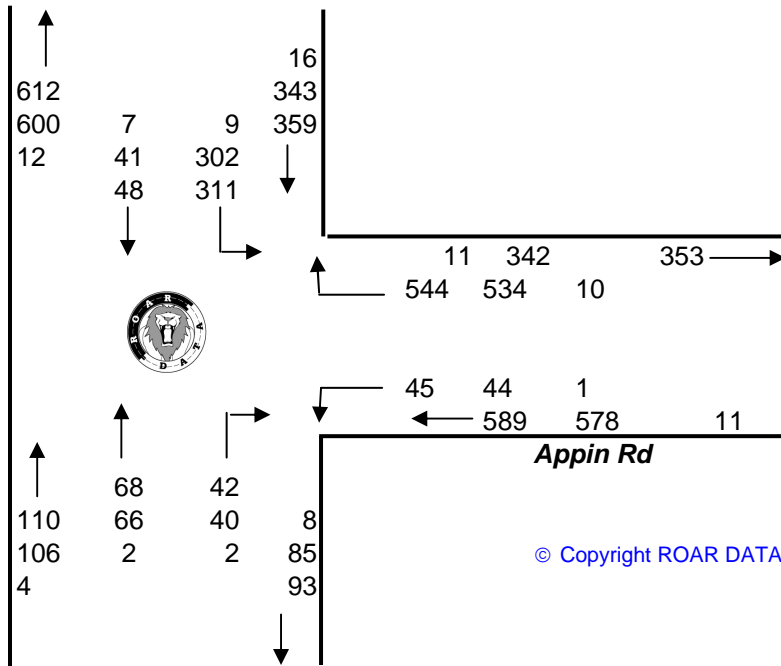
Day/Date : Thursday 9th April 2009

AM PEAK
0715 - 0815

**TOTAL VOLUMES
FOR COUNT
PERIOD**



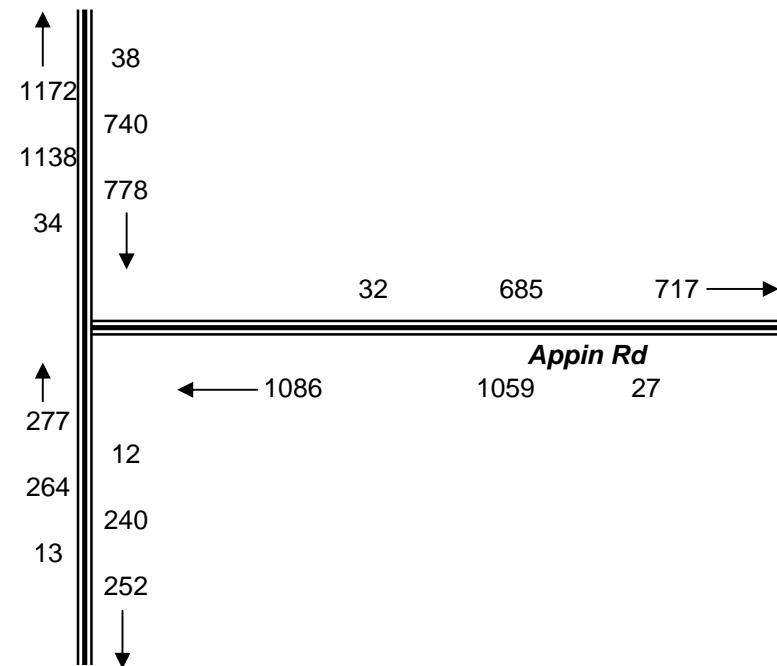
Appin Rd



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Wilton Rd

Appin Rd



Wilton Rd



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Day/Date : Thursday 9th April 2009

Intersection Details

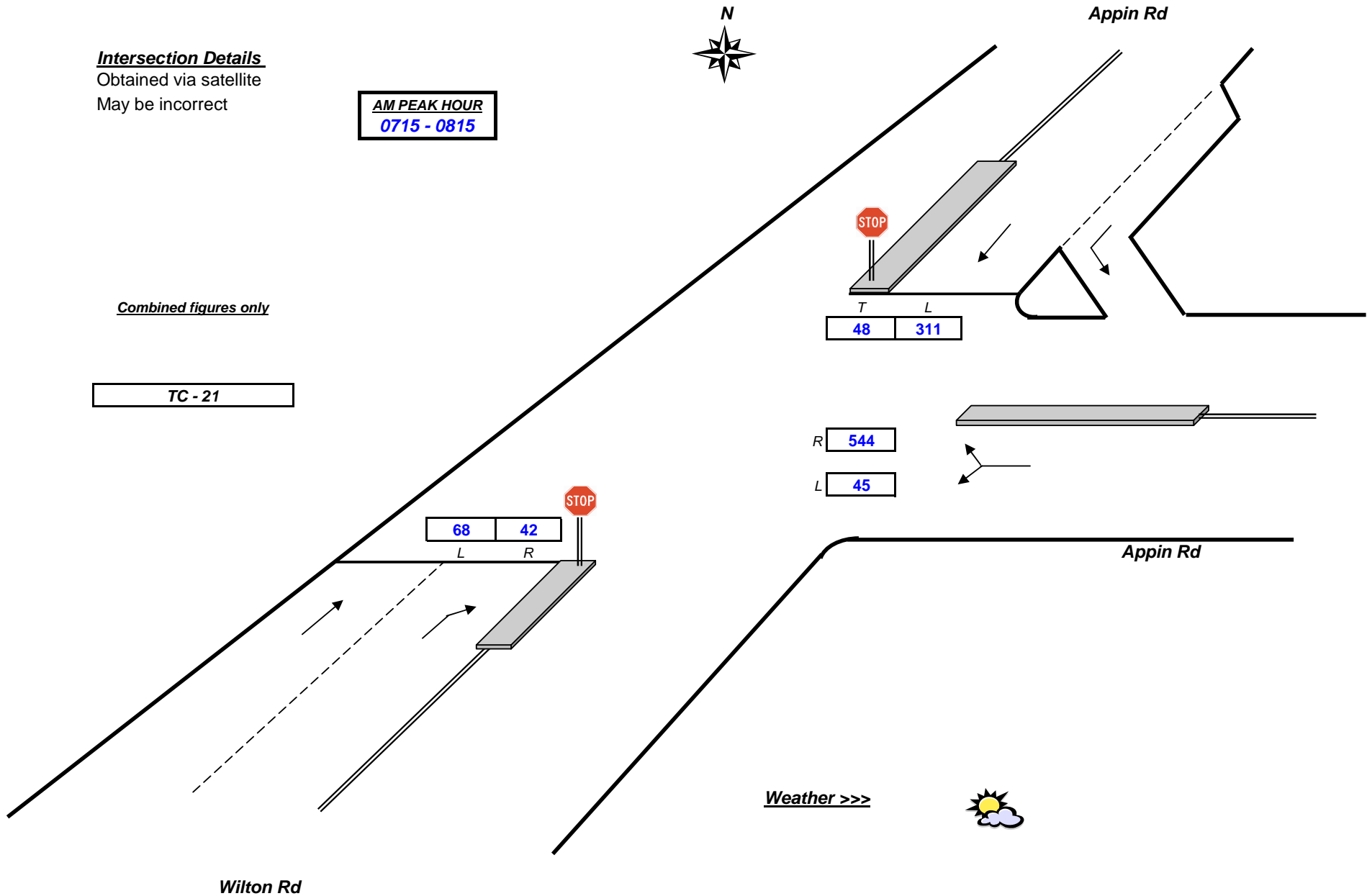
Obtained via satellite

May be incorrect

AM PEAK HOUR
0715 - 0815

Combined figures only

TC - 21





Appin Rd & Wilton Rd PM

TC - 21

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TC - 21

<u>PEDS</u>	<u>NORTH</u>	<u>EAST</u>	<u>SOUTH</u>	
<u>Time Per</u>	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Wilton Rd</u>	<u>TOT</u>
1600 - 1615				0
1615 - 1630		NOT		0
1630 - 1645		REQUIRED		0
1645 - 1700				0
1700 - 1715				0
1715 - 1730				0
1730 - 1745				0
1745 - 1800				0
1800 - 1815				0
1815 - 1830				0
Per End	0	0	0	0

<u>PEDS</u>	<u>NORTH</u>	<u>EAST</u>	<u>SOUTH</u>	
<u>Peak Per</u>	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Wilton Rd</u>	<u>TOT</u>
1600 - 1700	0	0	0	0
1615 - 1715	0	0	0	0
1630 - 1730	0	0	0	0
1645 - 1745	0	0	0	0
1700 - 1800	0	0	0	0
1715 - 1815	0	0	0	0
1730 - 1830	0	0	0	0
PEAK HR	0	0	0	0

<u>Lights</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		<u>TOT</u>
	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Wilton Rd</u>	<u>Wilton Rd</u>	
<u>Time Per</u>	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	
1600 - 1615	23	131	84	13	15	23	289
1615 - 1630	18	104	74	15	16	32	259
1630 - 1645	24	110	84	16	11	23	268
1645 - 1700	18	122	90	23	14	11	278
1700 - 1715	18	112	62	20	20	14	246
1715 - 1730	26	110	67	24	7	14	248
1730 - 1745	21	123	72	19	17	12	264
1745 - 1800	23	111	76	11	6	18	245
1800 - 1815	23	95	60	20	7	13	218
1815 - 1830	24	118	44	18	8	14	226
Per End	218	1136	713	179	121	174	2541

<u>Heavies</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		<u>TOT</u>
	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Wilton Rd</u>	<u>Wilton Rd</u>	
<u>Time Per</u>	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	
1600 - 1615	1	2	4	2	0	0	9
1615 - 1630	0	0	1	0	1	0	2
1630 - 1645	0	1	2	0	0	1	4
1645 - 1700	0	1	0	0	0	0	1
1700 - 1715	0	0	2	0	0	1	3
1715 - 1730	0	1	1	0	0	0	2
1730 - 1745	2	0	0	0	0	0	2
1745 - 1800	0	3	1	0	0	0	4
1800 - 1815	1	0	3	0	1	0	5
1815 - 1830	0	0	2	0	0	0	2
Per End	4	8	16	2	2	2	34

<u>Combined</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		<u>TOT</u>
	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Wilton Rd</u>	<u>Wilton Rd</u>	
<u>Time Per</u>	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	
1600 - 1615	24	133	88	15	15	23	298
1615 - 1630	18	104	75	15	17	32	261
1630 - 1645	24	111	86	16	11	24	272
1645 - 1700	18	123	90	23	14	11	279
1700 - 1715	18	112	64	20	20	15	249
1715 - 1730	26	111	68	24	7	14	250
1730 - 1745	23	123	72	19	17	12	266
1745 - 1800	23	114	77	11	6	18	249
1800 - 1815	24	95	63	20	8	13	223
1815 - 1830	24	118	46	18	8	14	228
Per End	222	1144	729	181	123	176	2575

<u>Lights</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		<u>TOT</u>
	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Wilton Rd</u>	<u>Wilton Rd</u>	
<u>Peak Per</u>	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	
1600 - 1700	83	467	332	67	56	89	1094
1615 - 1715	78	448	310	74	61	80	1051
1630 - 1730	86	454	303	83	52	62	1040
1645 - 1745	83	467	291	86	58	51	1036
1700 - 1800	88	456	277	74	50	58	1003
1715 - 1815	93	439	275	74	37	57	975
1730 - 1830	91	447	252	68	38	57	953

<u>Heavies</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		<u>TOT</u>
	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Wilton Rd</u>	<u>Wilton Rd</u>	
<u>Peak Per</u>	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	
1600 - 1700	1	4	7	2	1	1	16
1615 - 1715	0	2	5	0	1	2	10
1630 - 1730	0	3	5	0	0	2	10
1645 - 1745	2	2	3	0	0	1	8
1700 - 1800	2	4	4	0	0	1	11
1715 - 1815	3	4	5	0	1	0	13
1730 - 1830	3	3	6	0	1	0	13

<u>Combined</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		<u>TOT</u>
	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Appin Rd</u>	<u>Wilton Rd</u>	<u>Wilton Rd</u>	
<u>Peak Per</u>	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	
1600 - 1700	84	471	339	69	57	90	1110
1615 - 1715	78	450	315	74	62	82	1061
1630 - 1730	86	457	308	83	52	64	1050
1645 - 1745	85	469	294	86	58	52	1044
1700 - 1800	90	460	281	74	50	59	1014
1715 - 1815	96	443	280	74	38	57	988
1730 - 1830	94	450	258	68	39	57	966

PEAK HR	83	467	332	67	56	89	1094
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PEAK HR	1	4	7	2	1	1	16
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PEAK HR	84	471	339	69	57	90	1110
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R.O.A.R. DATA

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Client : Traffix

Job No/Name : 2654 Wollongong Area Traffic Surveys

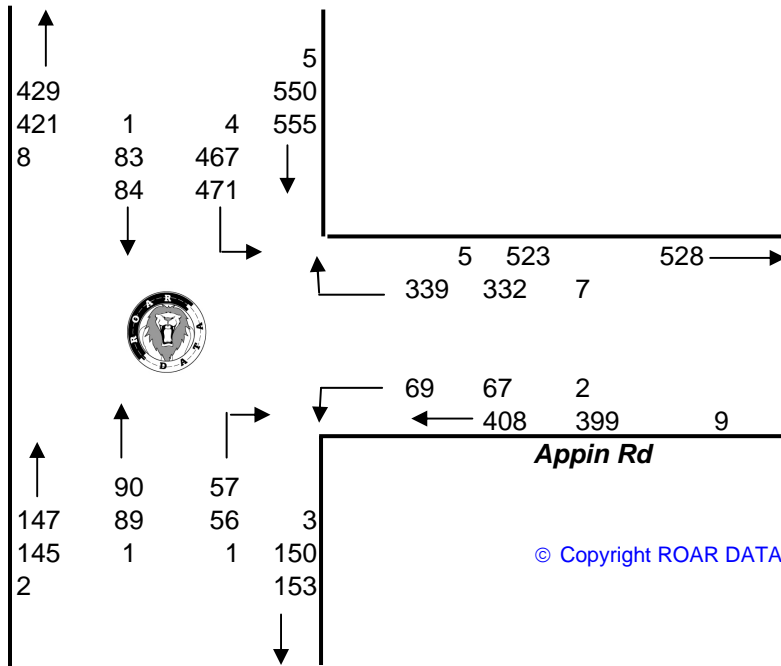
Day/Date : Thursday 9th April 2009

PM PEAK
1600 - 1700

**TOTAL VOLUMES
FOR COUNT
PERIOD**



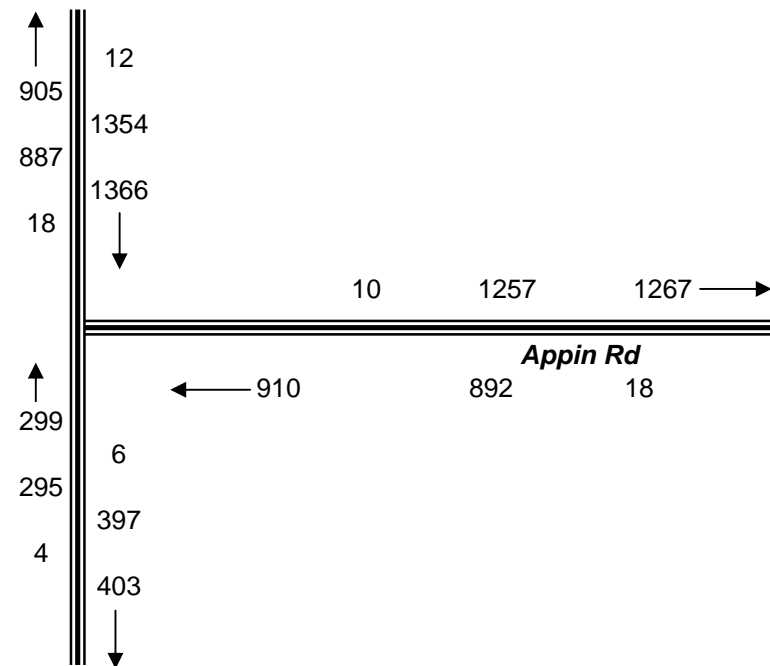
Appin Rd



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Wilton Rd

Appin Rd



Wilton Rd



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Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

Intersection Details

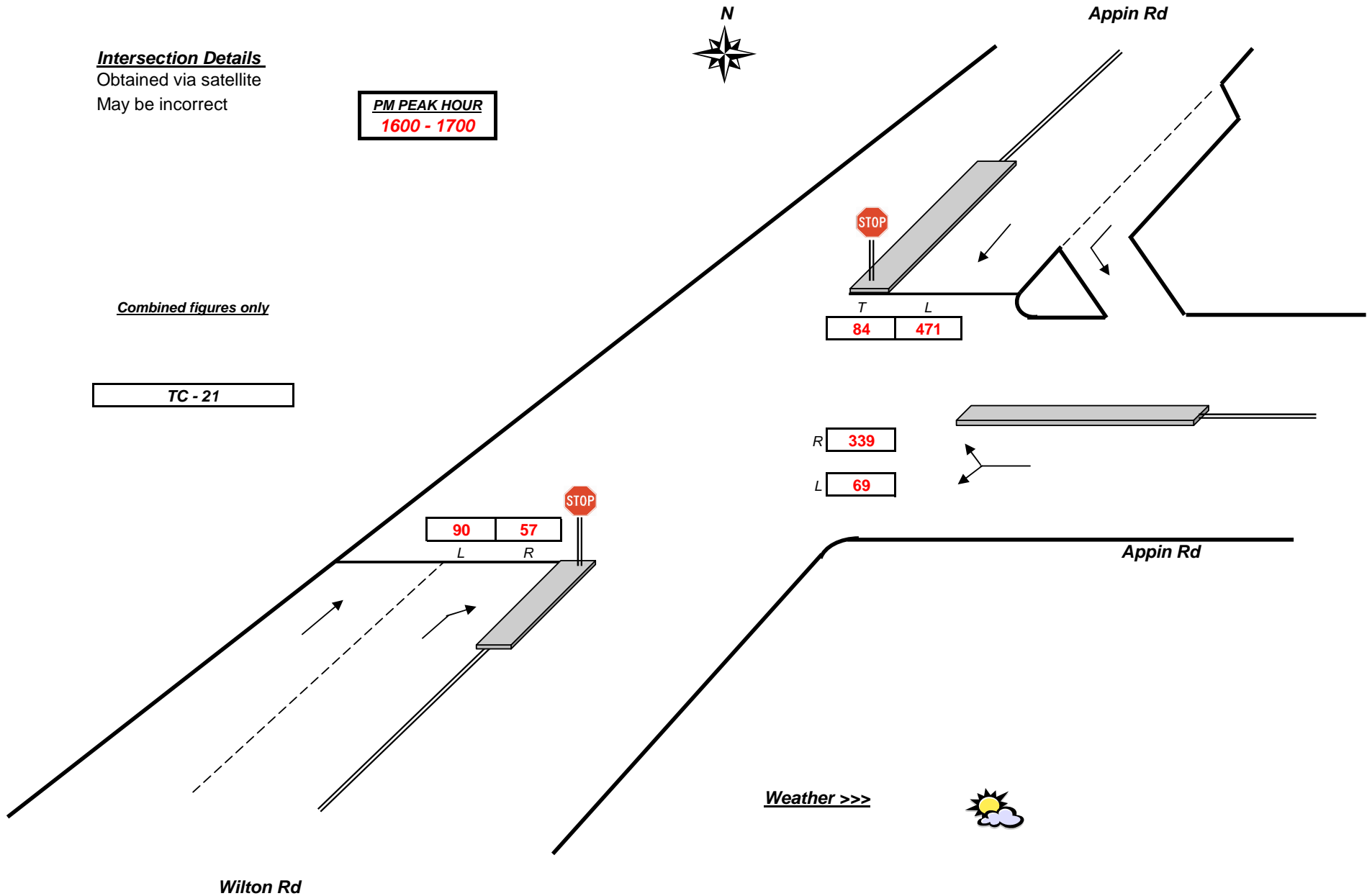
Obtained via satellite

May be incorrect

PM PEAK HOUR
1600 - 1700

Combined figures only

TC - 21





Appin Rd & Princess Hwy Off Ramp

TC - 22

To

Tim Lewis

at *Traffix*

your results for

Wollongong Area Traffic Counts

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Client : Traffix
 Job No/Name : 2654 Wollongong Area Traffic Surveys
 Day/Date : Thursday 9th April 2009

TC - 22

PEDS				
	WEST	NORTH	EAST	
Time Per	Appin Rd	Princess Hwy	Appin Rd	TOT
0700 - 0715				0
0715 - 0730				0
0730 - 0745		NOT		0
0745 - 0800		REQUIRED		0
0800 - 0815				0
0815 - 0830				0
0830 - 0845				0
0845 - 0900				0
0900 - 0915				0
0915 - 0930				0
Per End	0	0	0	0

PEDS				
	WEST	NORTH	EAST	
Peak Per	Appin Rd	Princess Hwy	Appin Rd	TOT
0700 - 0800	0	0	0	0
0715 - 0815	0	0	0	0
0730 - 0830	0	0	0	0
0745 - 0845	0	0	0	0
0800 - 0900	0	0	0	0
0815 - 0915	0	0	0	0
0830 - 0930	0	0	0	0
PEAK HR	0	0	0	0

Lights	WEST		NORTH		EAST		TOT
	Appin Rd		Princess Hwy		Appin Rd		
	I	L	R	L	R	I	
0700 - 0715	48	0	7	0	0	93	148
0715 - 0730	59	1	14	0	0	123	197
0730 - 0745	68	1	9	0	0	154	232
0745 - 0800	93	2	12	0	0	147	254
0800 - 0815	63	1	8	0	0	89	161
0815 - 0830	74	3	14	0	0	78	169
0830 - 0845	63	2	8	0	0	62	135
0845 - 0900	52	0	12	0	0	49	113
0900 - 0915	46	1	12	0	0	48	107
0915 - 0930	39	1	9	0	0	54	103
Per End	605	12	105	0	0	897	1619

Heavies	WEST		NORTH		EAST		TOT
	Appin Rd		Princess Hwy		Appin Rd		
	I	L	R	L	R	I	
0700 - 0715	10	0	0	0	0	4	14
0715 - 0730	5	1	1	0	0	10	17
0730 - 0745	8	0	4	0	0	10	22
0745 - 0800	12	0	0	0	0	10	22
0800 - 0815	9	1	0	0	0	9	19
0815 - 0830	5	0	0	0	0	10	15
0830 - 0845	9	1	1	0	0	6	17
0845 - 0900	11	0	2	0	0	9	22
0900 - 0915	13	0	2	0	0	2	17
0915 - 0930	16	0	0	0	0	6	22
Per End	98	3	10	0	0	76	187

Combined	WEST		NORTH		EAST		TOT
	Appin Rd		Princess Hwy		Appin Rd		
	I	L	R	L	R	I	
0700 - 0715	58	0	7	0	0	97	162
0715 - 0730	64	2	15	0	0	133	214
0730 - 0745	76	1	13	0	0	164	254
0745 - 0800	105	2	12	0	0	157	276
0800 - 0815	72	2	8	0	0	98	180
0815 - 0830	79	3	14	0	0	88	184
0830 - 0845	72	3	9	0	0	68	152
0845 - 0900	63	0	14	0	0	58	135
0900 - 0915	59	1	14	0	0	50	124
0915 - 0930	55	1	9	0	0	60	125
Per End	703	15	115	0	0	973	1806

Lights	WEST		NORTH		EAST		TOT
	Appin Rd		Princess Hwy		Appin Rd		
	I	L	R	L	R	I	
0700 - 0800	268	4	42	0	0	517	831
0715 - 0815	283	5	43	0	0	513	844
0730 - 0830	298	7	43	0	0	468	816
0745 - 0845	293	8	42	0	0	376	719
0800 - 0900	252	6	42	0	0	278	578
0815 - 0915	235	6	46	0	0	237	524
0830 - 0930	200	4	41	0	0	213	458

Heavies	WEST		NORTH		EAST		TOT
	Appin Rd		Princess Hwy		Appin Rd		
	I	L	R	L	R	I	
0700 - 0800	35	1	5	0	0	34	75
0715 - 0815	34	2	5	0	0	39	80
0730 - 0830	34	1	4	0	0	39	78
0745 - 0845	35	2	1	0	0	35	73
0800 - 0900	34	2	3	0	0	34	73
0815 - 0915	38	1	5	0	0	27	71
0830 - 0930	49	1	5	0	0	23	78

Combined	WEST		NORTH		EAST		TOT
	Appin Rd		Princess Hwy		Appin Rd		
	I	L	R	L	R	I	
0700 - 0800	303	5	47	0	0	551	906
0715 - 0815	317	7	48	0	0	552	924
0730 - 0830	332	8	47	0	0	507	894
0745 - 0845	328	10	43	0	0	411	792
0800 - 0900	286	8	45	0	0	312	651
0815 - 0915	273	7	51	0	0	264	595
0830 - 0930	249	5	46	0	0	236	536

PEAK HR	283	5	43	0	0	513	844
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PEAK HR	34	2	5	0	0	39	80
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PEAK HR	317	7	48	0	0	552	924
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R.O.A.R. DATA

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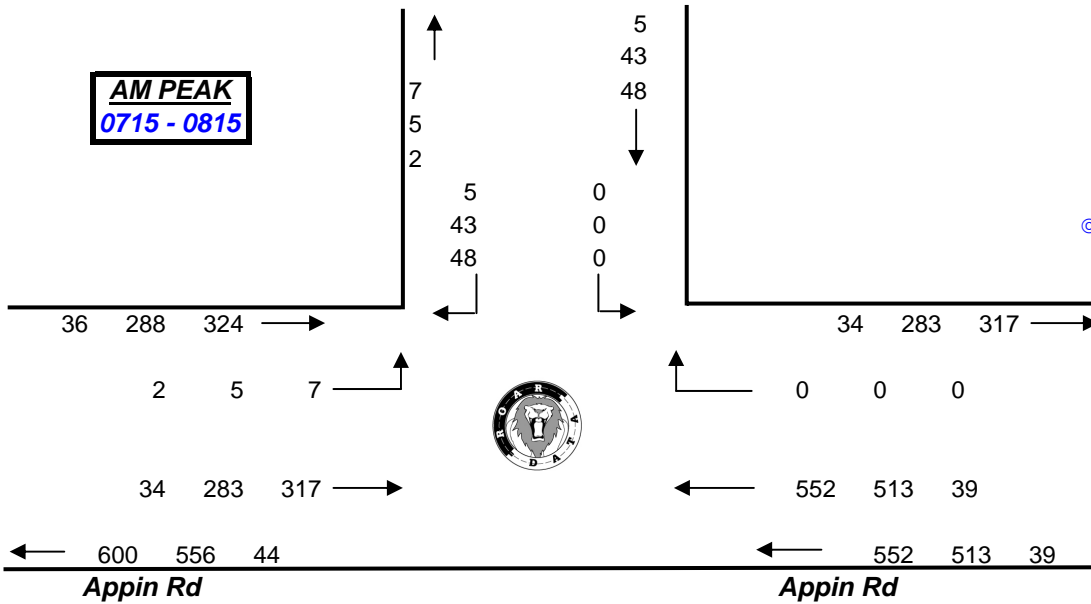
Client : Traffic
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

**TOTAL VOLUMES
FOR COUNT
PERIOD**

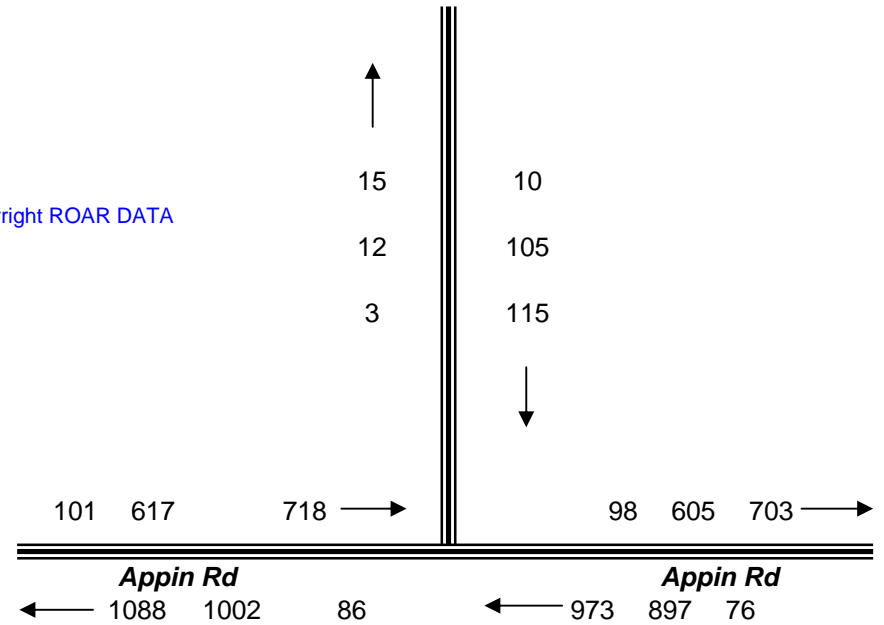


Princess Hwy Off Ramp

**AM PEAK
0715 - 0815**



Princess Hwy Off Ramp





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Mobile.0418239019

Client : Traffix
 Job No/Name : 2654 Wollongong Area Traffic Surveys
 Day/Date : Thursday 9th April 2009

TC - 22

PEDS	WEST		NORTH		EAST		TOT
	Appin Rd		Princess		Appin Rd		
1600 - 1615							0
1615 - 1630							0
1630 - 1645				NOT			0
1645 - 1700				REQUIRED			0
1700 - 1715							0
1715 - 1730							0
1730 - 1745							0
1745 - 1800							0
1800 - 1815							0
1815 - 1830							0
Per End	0	0	0	0	0	0	0

PEDS	WEST		NORTH		EAST		TOT
	Appin Rd		Princess		Appin Rd		
1600 - 1700	0		0		0		0
1615 - 1715	0		0		0		0
1630 - 1730	0		0		0		0
1645 - 1745	0		0		0		0
1700 - 1800	0		0		0		0
1715 - 1815	0		0		0		0
1730 - 1830	0		0		0		0
PEAK HR	0	0	0	0	0	0	0

Lights	WEST		NORTH		EAST		TOT
	Appin Rd		Princess		Appin Rd		
	I	L	R	L	R	I	
1600 - 1615	153	2	14	0	0	64	233
1615 - 1630	120	1	17	0	0	65	203
1630 - 1645	115	0	24	0	0	63	202
1645 - 1700	138	0	19	0	0	59	216
1700 - 1715	116	1	27	0	0	54	198
1715 - 1730	106	0	24	0	0	53	183
1730 - 1745	110	0	19	0	0	64	193
1745 - 1800	112	1	24	1	0	43	181
1800 - 1815	87	1	18	0	0	45	151
1815 - 1830	71	0	17	1	0	47	136
Per End	1128	6	203	2	0	557	1896

Heavies	WEST		NORTH		EAST		TOT
	Appin Rd		Princess		Appin Rd		
	I	L	R	L	R	I	
1600 - 1615	8	0	0	0	0	3	11
1615 - 1630	5	1	0	0	0	3	9
1630 - 1645	4	0	0	0	0	5	9
1645 - 1700	5	0	0	0	0	4	9
1700 - 1715	10	0	0	0	0	3	13
1715 - 1730	10	0	0	0	0	5	15
1730 - 1745	3	0	1	0	0	7	11
1745 - 1800	5	0	0	0	0	3	8
1800 - 1815	6	0	0	0	0	6	12
1815 - 1830	5	0	0	0	0	5	10
Per End	61	1	1	0	0	44	107

Combined	WEST		NORTH		EAST		TOT
	Appin Rd		Princess		Appin Rd		
	I	L	R	L	R	I	
1600 - 1615	161	2	14	0	0	67	244
1615 - 1630	125	2	17	0	0	68	212
1630 - 1645	119	0	24	0	0	68	211
1645 - 1700	143	0	19	0	0	63	225
1700 - 1715	126	1	27	0	0	57	211
1715 - 1730	116	0	24	0	0	58	198
1730 - 1745	113	0	20	0	0	71	204
1745 - 1800	117	1	24	1	0	46	189
1800 - 1815	93	1	18	0	0	51	163
1815 - 1830	76	0	17	1	0	52	146
Per End	1189	7	204	2	0	601	2003

Lights	WEST		NORTH		EAST		TOT
	Appin Rd		Princess		Appin Rd		
	I	L	R	L	R	I	
1600 - 1700	526	3	74	0	0	251	854
1615 - 1715	489	2	87	0	0	241	819
1630 - 1730	475	1	94	0	0	229	799
1645 - 1745	470	1	89	0	0	230	790
1700 - 1800	444	2	94	1	0	214	755
1715 - 1815	415	2	85	1	0	205	708
1730 - 1830	380	2	78	2	0	199	661

Heavies	WEST		NORTH		EAST		TOT
	Appin Rd		Princess		Appin Rd		
	I	L	R	L	R	I	
1600 - 1700	22	1	0	0	0	15	38
1615 - 1715	24	1	0	0	0	15	40
1630 - 1730	29	0	0	0	0	17	46
1645 - 1745	28	0	1	0	0	19	48
1700 - 1800	28	0	1	0	0	18	47
1715 - 1815	24	0	1	0	0	21	46
1730 - 1830	19	0	1	0	0	21	41

Combined	WEST		NORTH		EAST		TOT
	Appin Rd		Princess		Appin Rd		
	I	L	R	L	R	I	
1600 - 1700	548	4	74	0	0	266	892
1615 - 1715	513	3	87	0	0	256	859
1630 - 1730	504	1	94	0	0	246	845
1645 - 1745	498	1	90	0	0	249	838
1700 - 1800	472	2	95	1	0	232	802
1715 - 1815	439	2	86	1	0	226	754
1730 - 1830	399	2	79	2	0	220	702

PEAK HR	526	3	74	0	0	251	854
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PEAK HR	22	1	0	0	0	15	38
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PEAK HR	548	4	74	0	0	266	892
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R.O.A.R. DATA

Reliable, Original & Authentic Results

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Client : Traffix

Job No/Name : 2654 Wollongong Area Traffic Surveys

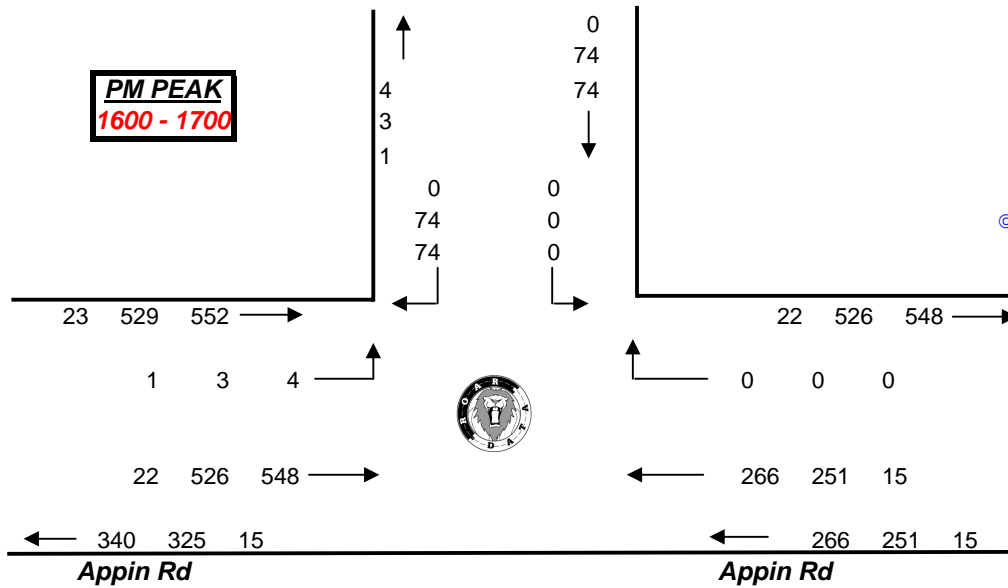
Day/Date : Thursday 9th April 2009

**TOTAL VOLUMES
FOR COUNT
PERIOD**

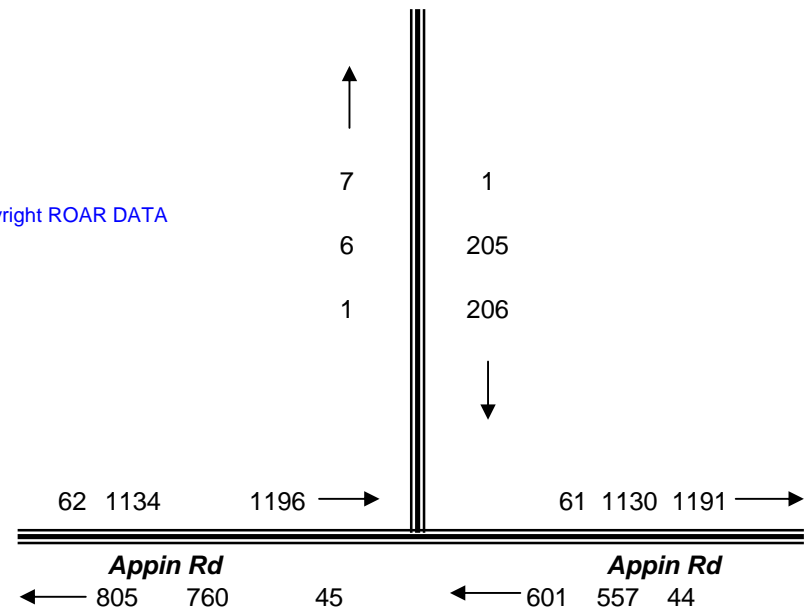


Princess Hwy Off Ramp

**PM PEAK
1600 - 1700**



Princess Hwy Off Ramp





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Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

Intersection Details

Obtained via satellite

May be incorrect

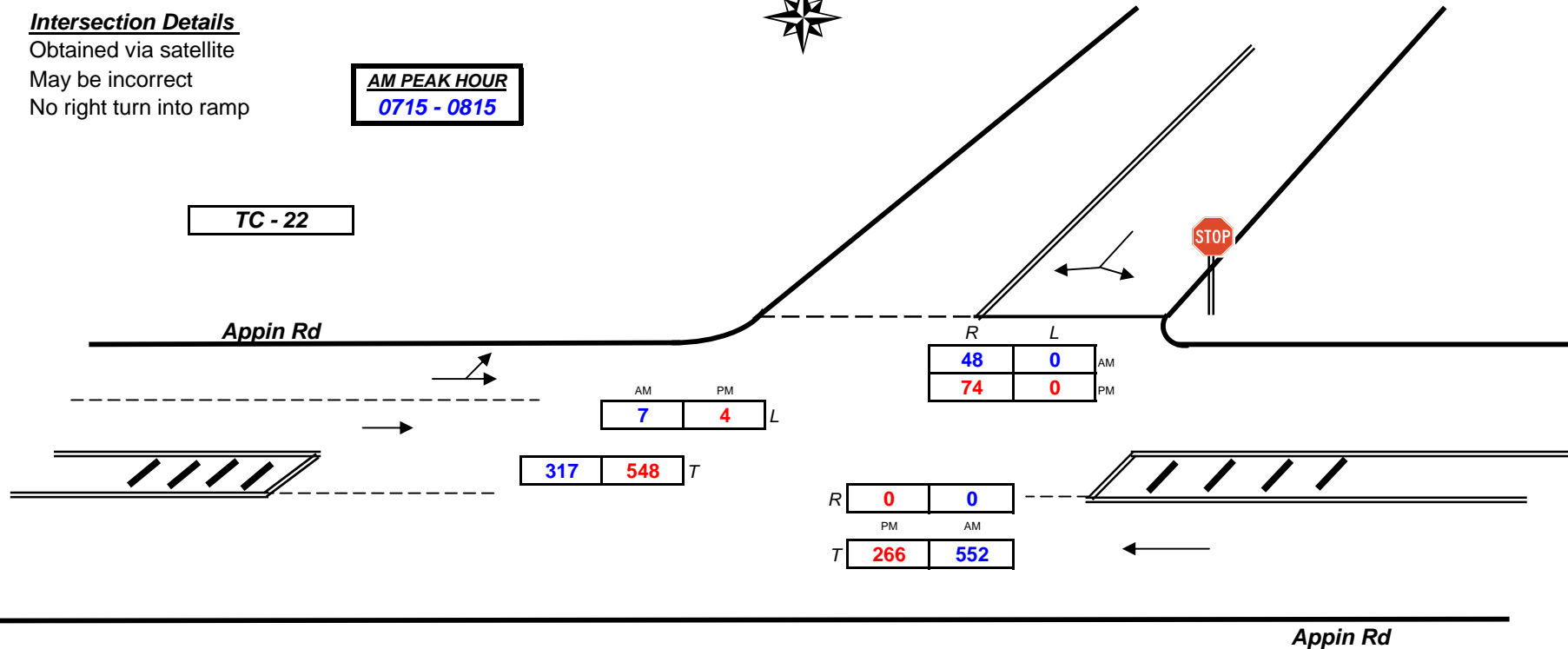
No right turn into ramp

AM PEAK HOUR
0715 - 0815

TC - 22



Princess Hwy Off Ramp



TC - 22

Combined figures only

PM PEAK HOUR
1600 - 1700

Weather >>>





Wilton Rd & Macarthur Rd

TC - 23

To

Tim Lewis

at *Traffic*

your results for

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Client : Traffix
 Job No/Name : 2654 Wollongong Area Traffic Surveys
 Day/Date : Thursday 9th April 2009

TC - 23

<u>PEDS</u>		<u>WEST</u>		<u>SOUTH</u>		<u>EAST</u>		
<u>Time Per</u>		<u>Wilton Rd</u>		<u>Macarthur Rd</u>		<u>Wilton Rd</u>		<u>TOT</u>
0700 - 0715								0
0715 - 0730								0
0730 - 0745					<i>NOT</i>			0
0745 - 0800					<i>REQUIRED</i>			0
0800 - 0815								0
0815 - 0830								0
0830 - 0845								0
0845 - 0900								0
0900 - 0915								0
0915 - 0930								0
Per End		0		0		0		0

<u>PEDS</u>		<u>WEST</u>		<u>SOUTH</u>		<u>EAST</u>		
<u>Peak Per</u>		<u>Wilton Rd</u>		<u>Macarthur Rd</u>		<u>Wilton Rd</u>		<u>TOT</u>
0700 - 0800		0		0		0		0
0715 - 0815		0		0		0		0
0730 - 0830		0		0		0		0
0745 - 0845		0		0		0		0
0800 - 0900		0		0		0		0
0815 - 0915		0		0		0		0
0830 - 0930		0		0		0		0
PEAK HR		0		0		0		0

<u>Lights</u>	<u>WEST</u>		<u>SOUTH</u>		<u>EAST</u>		<u>TOT</u>
	<u>Wilton Rd</u>		<u>Macarthur Rd</u>		<u>Wilton Rd</u>		
	<u>I</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>I</u>	
0700 - 0715	9	1	0	6	7	18	41
0715 - 0730	23	0	0	7	8	16	54
0730 - 0745	21	0	1	4	10	22	58
0745 - 0800	17	3	1	15	30	19	85
0800 - 0815	23	0	1	8	11	23	66
0815 - 0830	25	3	1	4	8	11	52
0830 - 0845	14	2	2	8	12	16	54
0845 - 0900	16	0	1	4	10	25	56
0900 - 0915	16	2	3	2	12	18	53
0915 - 0930	13	0	0	1	6	15	35
Per End	177	11	10	59	114	183	554

<u>Heavies</u>	<u>WEST</u>		<u>SOUTH</u>		<u>EAST</u>		<u>TOT</u>
	<u>Wilton Rd</u>		<u>Macarthur Rd</u>		<u>Wilton Rd</u>		
	<u>I</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>I</u>	
0700 - 0715	0	0	0	1	0	1	2
0715 - 0730	1	0	0	1	0	1	3
0730 - 0745	1	1	1	1	0	1	5
0745 - 0800	1	0	0	1	1	1	4
0800 - 0815	0	0	0	2	0	0	2
0815 - 0830	1	0	0	0	3	1	5
0830 - 0845	0	2	0	0	0	0	2
0845 - 0900	0	0	0	0	0	0	0
0900 - 0915	0	0	0	0	0	1	1
0915 - 0930	1	0	2	0	0	0	3
Per End	5	3	3	6	4	6	27

<u>Combined</u>	<u>WEST</u>		<u>SOUTH</u>		<u>EAST</u>		<u>TOT</u>
	<u>Wilton Rd</u>		<u>Macarthur Rd</u>		<u>Wilton Rd</u>		
	<u>I</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>I</u>	
0700 - 0715	9	1	0	7	7	19	43
0715 - 0730	24	0	0	8	8	17	57
0730 - 0745	22	1	2	5	10	23	63
0745 - 0800	18	3	1	16	31	20	89
0800 - 0815	23	0	1	10	11	23	68
0815 - 0830	26	3	1	4	11	12	57
0830 - 0845	14	4	2	8	12	16	56
0845 - 0900	16	0	1	4	10	25	56
0900 - 0915	16	2	3	2	12	19	54
0915 - 0930	14	0	2	1	6	15	38
Per End	182	14	13	65	118	189	581

<u>Lights</u>	<u>WEST</u>		<u>SOUTH</u>		<u>EAST</u>		<u>TOT</u>
	<u>Wilton Rd</u>		<u>Macarthur Rd</u>		<u>Wilton Rd</u>		
	<u>I</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>I</u>	
0700 - 0800	70	4	2	32	55	75	238
0715 - 0815	84	3	3	34	59	80	263
0730 - 0830	86	6	4	31	59	75	261
0745 - 0845	79	8	5	35	61	69	257
0800 - 0900	78	5	5	24	41	75	228
0815 - 0915	71	7	7	18	42	70	215
0830 - 0930	59	4	6	15	40	74	198
PEAK HR	84	3	3	34	59	80	263

<u>Heavies</u>	<u>WEST</u>		<u>SOUTH</u>		<u>EAST</u>		<u>TOT</u>
	<u>Wilton Rd</u>		<u>Macarthur Rd</u>		<u>Wilton Rd</u>		
	<u>I</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>I</u>	
0700 - 0800	3	1	1	4	1	4	14
0715 - 0815	3	1	1	5	1	3	14
0730 - 0830	3	1	1	4	4	3	16
0745 - 0845	2	2	0	3	4	2	13
0800 - 0900	1	2	0	2	3	1	9
0815 - 0915	1	2	0	0	3	2	8
0830 - 0930	1	2	2	0	0	1	6
PEAK HR	3	1	1	5	1	3	14

<u>Combined</u>	<u>WEST</u>		<u>SOUTH</u>		<u>EAST</u>		<u>TOT</u>
	<u>Wilton Rd</u>		<u>Macarthur Rd</u>		<u>Wilton Rd</u>		
	<u>I</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>I</u>	
0700 - 0800	73	5	3	36	56	79	252
0715 - 0815	87	4	4	39	60	83	277
0730 - 0830	89	7	5	35	63	78	277
0745 - 0845	81	10	5	38	65	71	270
0800 - 0900	79	7	5	26	44	76	237
0815 - 0915	72	9	7	18	45	72	223
0830 - 0930	60	6	8	15	40	75	204
PEAK HR	87	4	4	39	60	83	277



R.O.A.R. DATA

Reliable, Original & Authentic Results

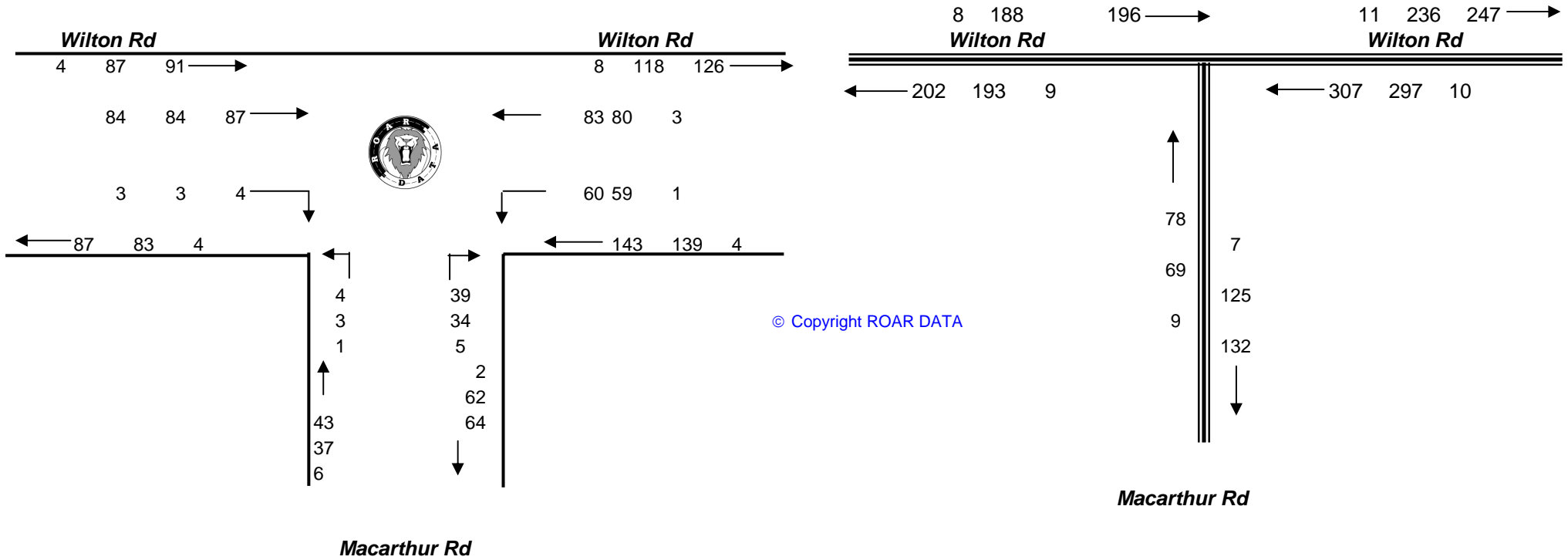
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

AM PEAK
0715 - 0815



TOTAL VOLUMES FOR COUNT PERIOD





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.

Mobile.0418239019

Client : Traffix
 Job No/Name : 2654 Wollongong Area Traffic Surveys
 Day/Date : Thursday 9th April 2009

TC - 23

PEDS			
WEST	SOUTH	EAST	TOT
Wilton Rd	Macarthur	Wilton Rd	
1600 - 1615			0
1615 - 1630			0
1630 - 1645			0
1645 - 1700	NOT		0
1700 - 1715	REQUIRED		0
1715 - 1730			0
1730 - 1745			0
1745 - 1800			0
1800 - 1815			0
1815 - 1830			0
Per End	0	0	0

PEDS			
WEST	SOUTH	EAST	TOT
Wilton Rd	Macarthur	Wilton Rd	
0700 - 0800	0	0	0
0715 - 0815	0	0	0
0730 - 0830	0	0	0
0745 - 0845	0	0	0
0800 - 0900	0	0	0
0815 - 0915	0	0	0
0830 - 0930	0	0	0
PEAK HR	0	0	0

Lights	WEST		SOUTH		EAST		TOT
	Wilton Rd		Macarthur		Wilton Rd		
Time Per	I	R	L	R	L	I	
1600 - 1615	31	0	1	11	20	40	103
1615 - 1630	25	0	2	7	7	33	74
1630 - 1645	27	4	1	10	17	27	86
1645 - 1700	23	1	2	9	7	36	78
1700 - 1715	28	1	1	15	7	37	89
1715 - 1730	29	0	0	6	9	31	75
1730 - 1745	22	0	0	10	15	43	90
1745 - 1800	24	1	2	9	6	30	72
1800 - 1815	21	4	1	8	9	33	76
1815 - 1830	20	1	1	5	8	28	63
Per End	250	12	11	90	105	338	806

Heavies	WEST		SOUTH		EAST		TOT
	Wilton Rd		Macarthur		Wilton Rd		
Time Per	I	R	L	R	L	I	
1600 - 1615	1	0	0	0	0	1	2
1615 - 1630	1	0	0	0	1	1	3
1630 - 1645	0	1	0	0	0	0	1
1645 - 1700	3	1	0	0	0	0	4
1700 - 1715	0	0	0	0	0	2	2
1715 - 1730	1	0	0	0	1	1	3
1730 - 1745	0	0	0	0	0	0	0
1745 - 1800	1	0	0	0	0	0	1
1800 - 1815	0	0	0	0	0	0	0
1815 - 1830	1	0	1	1	0	0	3
Per End	8	2	1	1	2	5	19

Combined	WEST		SOUTH		EAST		TOT
	Wilton Rd		Macarthur		Wilton Rd		
Time Per	I	R	L	R	L	I	
1600 - 1615	32	0	1	11	20	41	105
1615 - 1630	26	0	2	7	8	34	77
1630 - 1645	27	5	1	10	17	27	87
1645 - 1700	26	2	2	9	7	36	82
1700 - 1715	28	1	1	15	7	39	91
1715 - 1730	30	0	0	6	10	32	78
1730 - 1745	22	0	0	10	15	43	90
1745 - 1800	25	1	2	9	6	30	73
1800 - 1815	21	4	1	8	9	33	76
1815 - 1830	21	1	2	6	8	28	66
Per End	258	14	12	91	107	343	825

Lights	WEST		SOUTH		EAST		TOT
	Wilton Rd		Macarthur		Wilton Rd		
Peak Per	I	R	L	R	L	I	
1600 - 1700	106	5	6	37	51	136	341
1615 - 1715	103	6	6	41	38	133	327
1630 - 1730	107	6	4	40	40	131	328
1645 - 1745	102	2	3	40	38	147	332
1700 - 1800	103	2	3	40	37	141	326
1715 - 1815	96	5	3	33	39	137	313
1730 - 1830	87	6	4	32	38	134	301

Heavies	WEST		SOUTH		EAST		TOT
	Wilton Rd		Macarthur		Wilton Rd		
Peak Per	I	R	L	R	L	I	
1600 - 1700	5	2	0	0	1	2	10
1615 - 1715	4	2	0	0	1	3	10
1630 - 1730	4	2	0	0	1	3	10
1645 - 1745	4	1	0	0	1	3	9
1700 - 1800	2	0	0	0	1	3	6
1715 - 1815	2	0	0	0	1	1	4
1730 - 1830	2	0	1	1	0	0	4

Combined	WEST		SOUTH		EAST		TOT
	Wilton Rd		Macarthur		Wilton Rd		
Peak Per	I	R	L	R	L	I	
1600 - 1700	111	7	6	37	52	138	351
1615 - 1715	107	8	6	41	39	136	337
1630 - 1730	111	8	4	40	41	134	338
1645 - 1745	106	3	3	40	39	150	341
1700 - 1800	105	2	3	40	38	144	332
1715 - 1815	98	5	3	33	40	138	317
1730 - 1830	89	6	5	33	38	134	305

PEAK HR	106	5	6	37	51	136	341
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PEAK HR	5	2	0	0	1	2	10
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PEAK HR	111	7	6	37	52	138	351
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R.O.A.R. DATA

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Client : Traffix

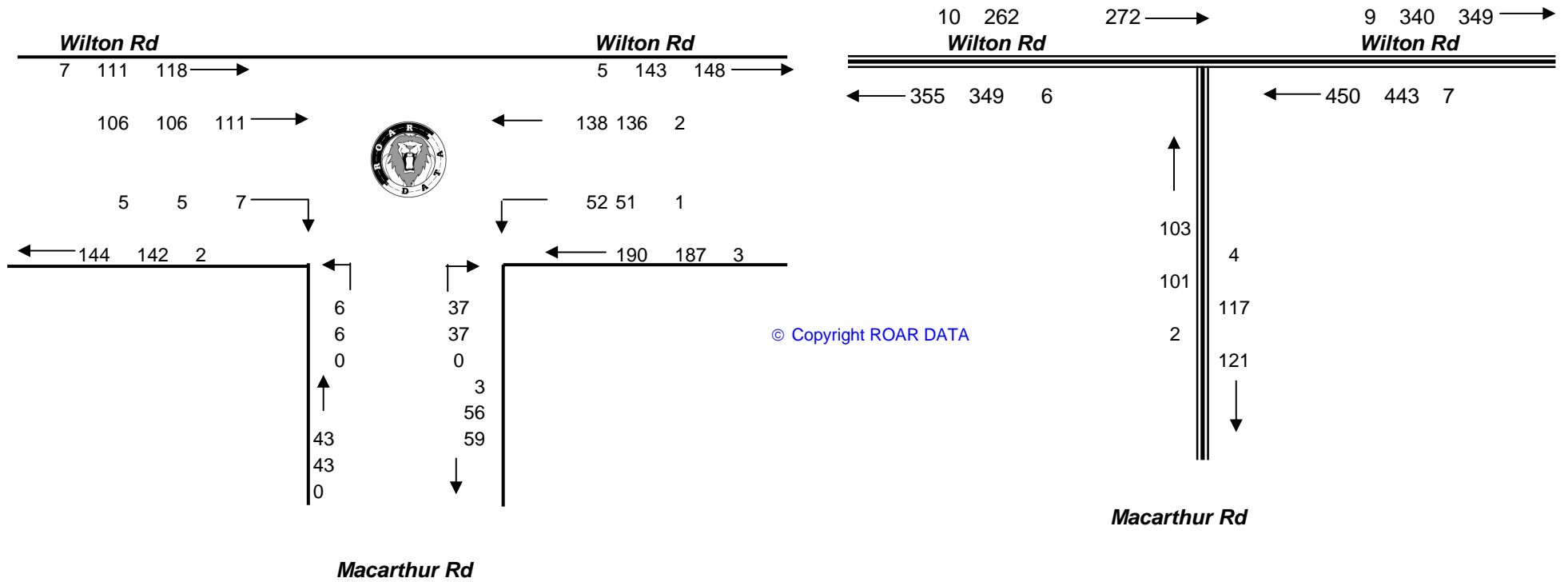
Job No/Name : 2654 Wollongong Area Traffic Surveys

Day/Date : Thursday 9th April 2009

PM PEAK
1600 - 1700



TOTAL VOLUMES
FOR COUNT
PERIOD





R.O.A.R. DATA

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Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

Intersection Details

satellite via satellite

May be incorrect

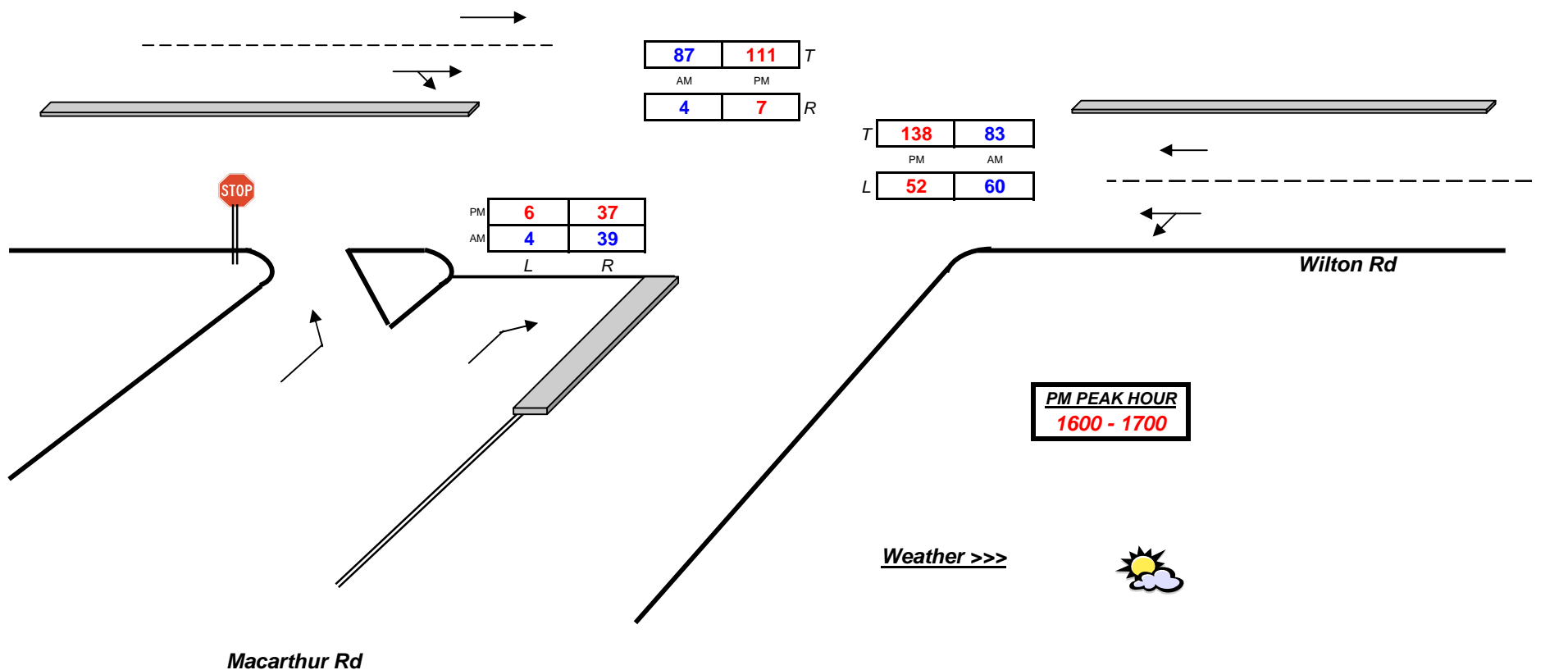


AM PEAK HOUR
0715 - 0815

Combined figures only

TC - 23

Wilton Rd



Macarthur Rd

Wilton Rd



Picton Rd & Almond St

TC - 24

To

Tim Lewis

at *Traffix*

your results for

Wollongong Area Traffic Counts

supplied by

R.O.A.R. DATA Pty. Ltd.

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Mobile.0418239019

Client : Traffic
 Job No/Name : 2654 Wollongong Area Traffic Surveys
 Day/Date : Thursday 9th April 2009

TC - 24

<u>PEDS</u>				
	WEST	NORTH	EAST	
Time Per	Picton Rd	Almond St	Picton Rd	TOT
0700 - 0715				0
0715 - 0730				0
0730 - 0745		NOT		0
0745 - 0800		REQUIRED		0
0800 - 0815				0
0815 - 0830				0
0830 - 0845				0
0845 - 0900				0
0900 - 0915				0
0915 - 0930				0
Per End	0	0	0	0

<u>PEDS</u>				
	WEST	NORTH	EAST	
Peak Per	Picton Rd	Almond St	Picton Rd	TOT
0700 - 0800	0	0	0	0
0715 - 0815	0	0	0	0
0730 - 0830	0	0	0	0
0745 - 0845	0	0	0	0
0800 - 0900	0	0	0	0
0815 - 0915	0	0	0	0
0830 - 0930	0	0	0	0
PEAK HR	0	0	0	0

Time Per	<u>Lights</u>		WEST		NORTH		EAST		TOT
	Picton Rd		Almond St		Picton Rd		Picton Rd		
	I	L	R	L	R	I	R	I	
0700 - 0715	100	13	28	5	1	86	233		
0715 - 0730	118	23	18	2	1	95	257		
0730 - 0745	140	19	24	3	1	111	298		
0745 - 0800	137	10	31	6	1	121	306		
0800 - 0815	131	28	30	2	5	127	323		
0815 - 0830	131	15	24	4	1	89	264		
0830 - 0845	119	12	28	4	2	103	268		
0845 - 0900	97	9	22	1	1	83	213		
0900 - 0915	90	15	29	0	1	76	211		
0915 - 0930	100	23	25	0	0	71	219		
Per End	1163	167	259	27	14	962	2592		

Time Per	<u>Heavies</u>		WEST		NORTH		EAST		TOT
	Picton Rd		Almond St		Picton Rd		Picton Rd		
	I	L	R	L	R	I	R	I	
0700 - 0715	24	1	2	0	0	17	44		
0715 - 0730	23	2	0	0	0	10	35		
0730 - 0745	22	1	1	0	0	14	38		
0745 - 0800	20	3	2	0	0	13	38		
0800 - 0815	10	1	1	0	3	28	43		
0815 - 0830	22	2	0	0	1	15	40		
0830 - 0845	24	1	3	0	0	11	39		
0845 - 0900	18	0	0	0	0	27	45		
0900 - 0915	17	0	1	0	0	27	45		
0915 - 0930	19	3	1	0	0	16	39		
Per End	199	14	11	0	4	178	406		

Time Per	<u>Combined</u>		WEST		NORTH		EAST		TOT
	Picton Rd		Almond St		Picton Rd		Picton Rd		
	I	L	R	L	R	I	R	I	
0700 - 0715	124	14	30	5	1	103	277		
0715 - 0730	141	25	18	2	1	105	292		
0730 - 0745	162	20	25	3	1	125	336		
0745 - 0800	157	13	33	6	1	134	344		
0800 - 0815	141	29	31	2	8	155	366		
0815 - 0830	153	17	24	4	2	104	304		
0830 - 0845	143	13	31	4	2	114	307		
0845 - 0900	115	9	22	1	1	110	258		
0900 - 0915	107	15	30	0	1	103	256		
0915 - 0930	119	26	26	0	0	87	258		
Per End	1362	181	270	27	18	1140	2998		

Peak Per	<u>Lights</u>		WEST		NORTH		EAST		TOT
	Picton Rd		Almond St		Picton Rd		Picton Rd		
	I	L	R	L	R	I	R	I	
0700 - 0800	495	65	101	16	4	413	1094		
0715 - 0815	526	80	103	13	8	454	1184		
0730 - 0830	539	72	109	15	8	448	1191		
0745 - 0845	518	65	113	16	9	440	1161		
0800 - 0900	478	64	104	11	9	402	1068		
0815 - 0915	437	51	103	9	5	351	956		
0830 - 0930	406	59	104	5	4	333	911		

Peak Per	<u>Heavies</u>		WEST		NORTH		EAST		TOT
	Picton Rd		Almond St		Picton Rd		Picton Rd		
	I	L	R	L	R	I	R	I	
0700 - 0800	89	7	5	0	0	54	155		
0715 - 0815	75	7	4	0	3	65	154		
0730 - 0830	74	7	4	0	4	70	159		
0745 - 0845	76	7	6	0	4	67	160		
0800 - 0900	74	4	4	0	4	81	167		
0815 - 0915	81	3	4	0	1	80	169		
0830 - 0930	78	4	5	0	0	81	168		

Peak Per	<u>Combined</u>		WEST		NORTH		EAST		TOT
	Picton Rd		Almond St		Picton Rd		Picton Rd		
	I	L	R	L	R	I	R	I	
0700 - 0800	584	72	106	16	4	467	1249		
0715 - 0815	601	87	107	13	11	519	1338		
0730 - 0830	613	79	113	15	12	518	1350		
0745 - 0845	594	72	119	16	13	507	1321		
0800 - 0900	552	68	108	11	13	483	1235		
0815 - 0915	518	54	107	9	6	431	1125		
0830 - 0930	484	63	109	5	4	414	1079		

PEAK HR	539	72	109	15	8	448	1191
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PEAK HR	74	7	4	0	4	70	159
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PEAK HR	613	79	113	15	12	518	1350
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R.O.A.R. DATA

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Client : Traffic
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

**TOTAL VOLUMES
FOR COUNT
PERIOD**

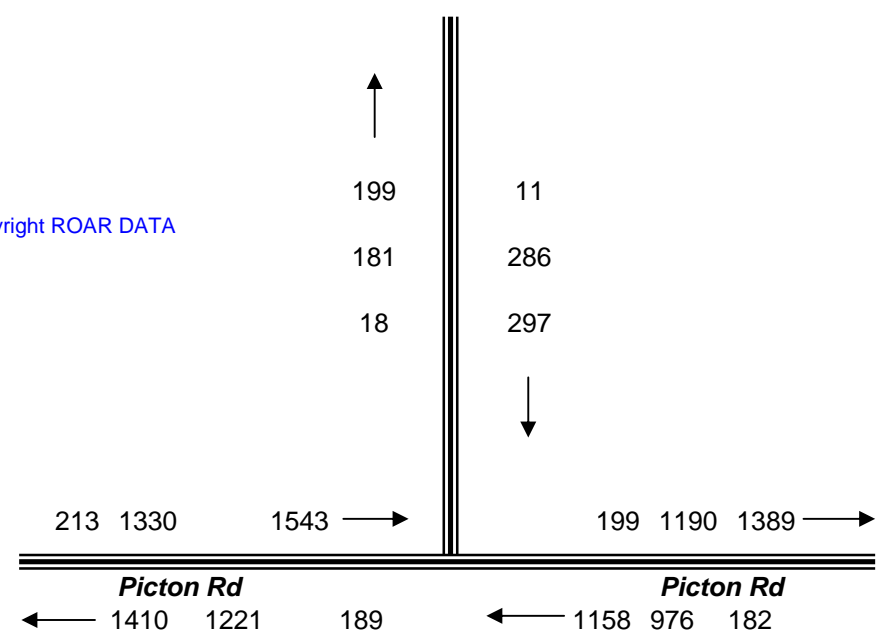
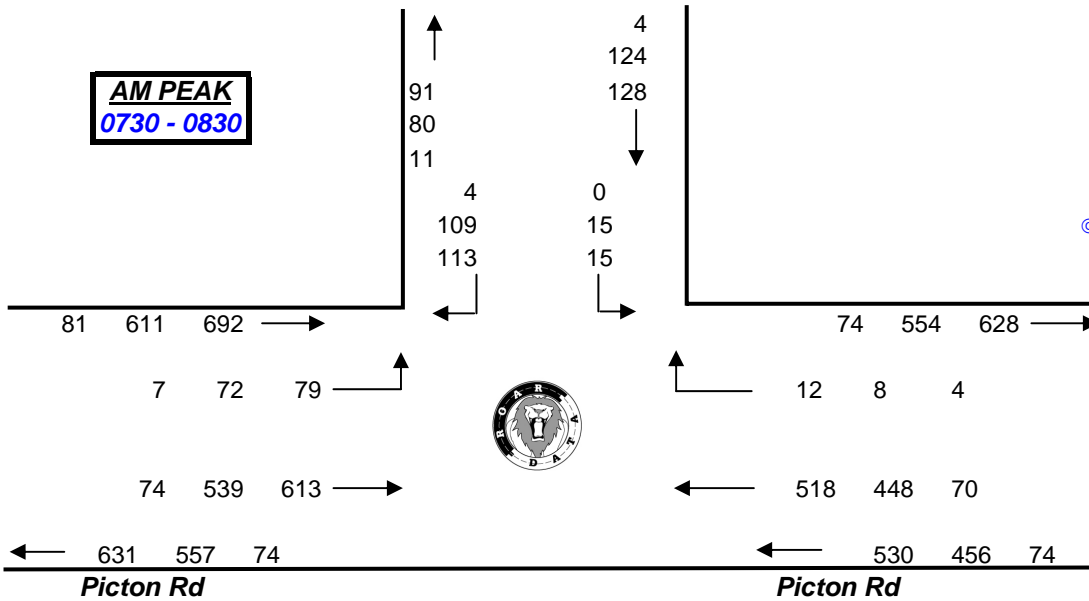


Almond St

Almond St

**AM PEAK
0730 - 0830**

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Client : Traffix
 Job No/Name : 2654 Wollongong Area Traffic Surveys
 Day/Date : Thursday 9th April 2009

TC - 24

PEDS	WEST	NORTH	EAST	TOT
Time Per	Picton Rd	Almond St	Picton Rd	
1600 - 1615				0
1615 - 1630				0
1630 - 1645		NOT		0
1645 - 1700		REQUIRED		0
1700 - 1715				0
1715 - 1730				0
1730 - 1745				0
1745 - 1800				0
1800 - 1815				0
1815 - 1830				0
Per End	0	0	0	0

PEDS	WEST	NORTH	EAST	TOT
Peak Per	Picton Rd	Almond St	Picton Rd	
1600 - 1700	0	0	0	0
1615 - 1715	0	0	0	0
1630 - 1730	0	0	0	0
1645 - 1745	0	0	0	0
1700 - 1800	0	0	0	0
1715 - 1815	0	0	0	0
1730 - 1830	0	0	0	0
PEAK HR	0	0	0	0

Lights	WEST		NORTH		EAST		TOT
	Picton Rd		Almond St		Picton Rd		
Time Per	I	L	R	L	R	I	
1600 - 1615	171	38	37	5	3	150	404
1615 - 1630	164	32	35	5	4	135	375
1630 - 1645	183	37	28	6	2	151	407
1645 - 1700	164	37	33	4	1	144	383
1700 - 1715	160	35	29	1	1	141	367
1715 - 1730	164	34	35	2	6	111	352
1730 - 1745	148	25	34	4	2	125	338
1745 - 1800	164	35	35	2	9	136	381
1800 - 1815	140	22	33	4	2	114	315
1815 - 1830	159	29	31	2	2	83	306
Per End	1617	324	330	35	32	1290	3628

Heavies	WEST		NORTH		EAST		TOT
	Picton Rd		Almond St		Picton Rd		
Time Per	I	L	R	L	R	I	
1600 - 1615	7	1	3	0	0	9	20
1615 - 1630	5	0	2	0	0	15	22
1630 - 1645	4	3	0	0	0	10	17
1645 - 1700	3	2	0	0	0	13	18
1700 - 1715	7	2	2	0	1	3	15
1715 - 1730	10	1	1	0	0	7	19
1730 - 1745	4	0	0	0	0	8	12
1745 - 1800	5	1	0	0	0	9	15
1800 - 1815	5	1	0	0	0	5	11
1815 - 1830	8	2	0	0	0	4	14
Per End	58	13	8	0	1	83	163

Combined	WEST		NORTH		EAST		TOT
	Picton Rd		Almond St		Picton Rd		
Time Per	I	L	R	L	R	I	
1600 - 1615	178	39	40	5	3	159	424
1615 - 1630	169	32	37	5	4	150	397
1630 - 1645	187	40	28	6	2	161	424
1645 - 1700	167	39	33	4	1	157	401
1700 - 1715	167	37	31	1	2	144	382
1715 - 1730	174	35	36	2	6	118	371
1730 - 1745	152	25	34	4	2	133	350
1745 - 1800	169	36	35	2	9	145	396
1800 - 1815	145	23	33	4	2	119	326
1815 - 1830	167	31	31	2	2	87	320
Per End	1675	337	338	35	33	1373	3791

Lights	WEST		NORTH		EAST		TOT
	Picton Rd		Almond St		Picton Rd		
Peak Per	I	L	R	L	R	I	
1600 - 1700	682	144	133	20	10	580	1569
1615 - 1715	671	141	125	16	8	571	1532
1630 - 1730	671	143	125	13	10	547	1509
1645 - 1745	636	131	131	11	10	521	1440
1700 - 1800	636	129	133	9	18	513	1438
1715 - 1815	616	116	137	12	19	486	1386
1730 - 1830	611	111	133	12	15	458	1340

Heavies	WEST		NORTH		EAST		TOT
	Picton Rd		Almond St		Picton Rd		
Peak Per	I	L	R	L	R	I	
1600 - 1700	19	6	5	0	0	47	77
1615 - 1715	19	7	4	0	1	41	72
1630 - 1730	24	8	3	0	1	33	69
1645 - 1745	24	5	3	0	1	31	64
1700 - 1800	26	4	3	0	1	27	61
1715 - 1815	24	3	1	0	0	29	57
1730 - 1830	22	4	0	0	0	26	52

Combined	WEST		NORTH		EAST		TOT
	Picton Rd		Almond St		Picton Rd		
Peak Per	I	L	R	L	R	I	
1600 - 1700	701	150	138	20	10	627	1646
1615 - 1715	690	148	129	16	9	612	1604
1630 - 1730	695	151	128	13	11	580	1578
1645 - 1745	660	136	134	11	11	552	1504
1700 - 1800	662	133	136	9	19	540	1499
1715 - 1815	640	119	138	12	19	515	1443
1730 - 1830	633	115	133	12	15	484	1392

PEAK HR	671	143	125	13	10	547	1509
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PEAK HR	24	8	3	0	1	33	69
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PEAK HR	695	151	128	13	11	580	1578
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R.O.A.R. DATA

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Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

**TOTAL VOLUMES
FOR COUNT
PERIOD**

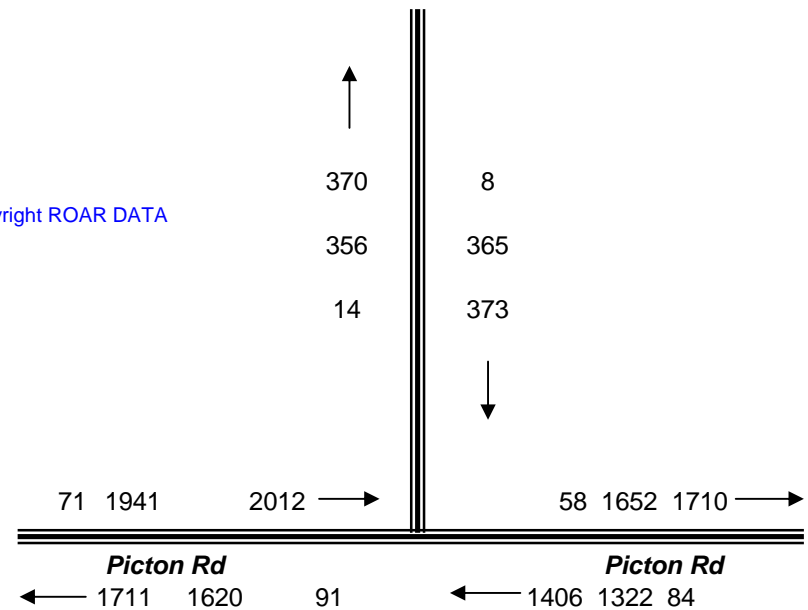
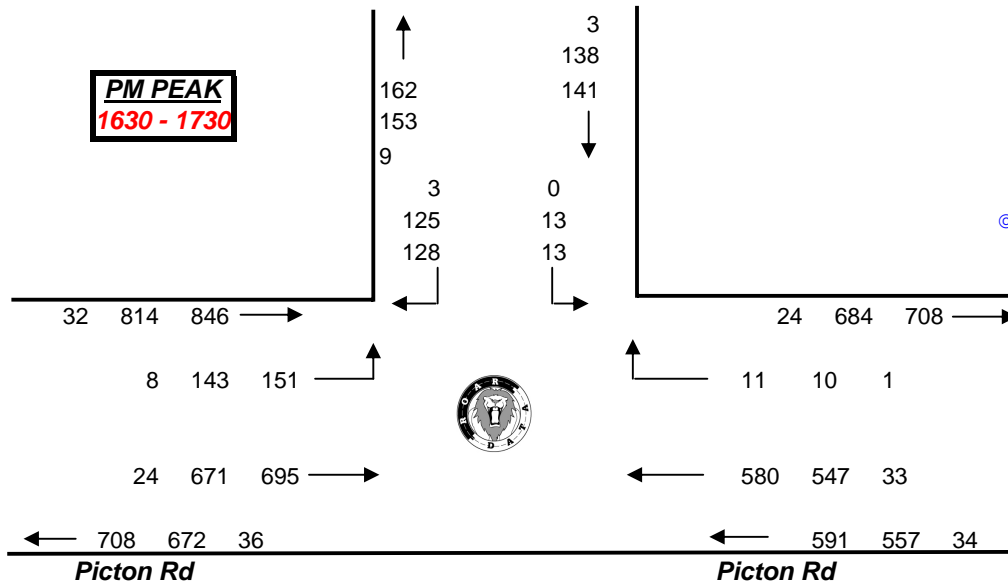


Almond St

Almond St

**PM PEAK
1630 - 1730**

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R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Traffix
Job No/Name : 2654 Wollongong Area Traffic Surveys
Day/Date : Thursday 9th April 2009

Intersection Details

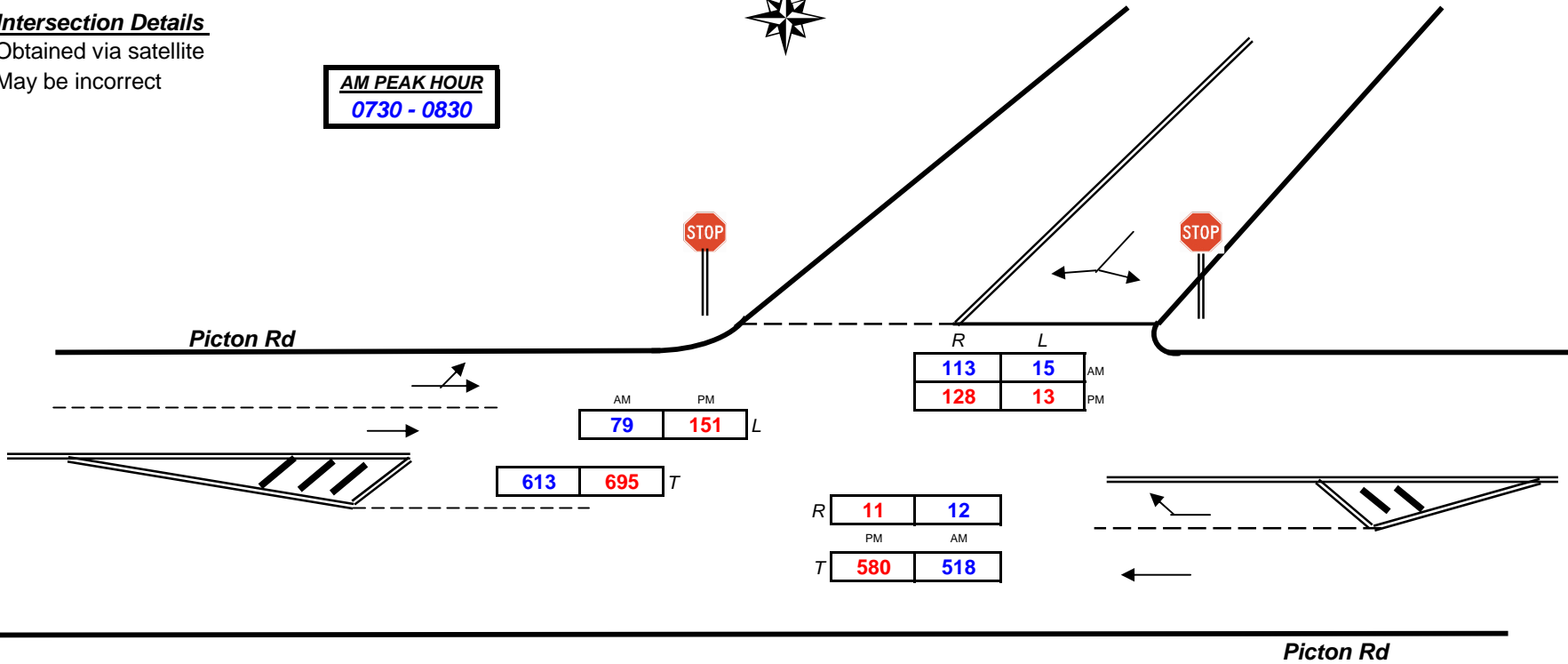
Obtained via satellite

May be incorrect

AM PEAK HOUR
0730 - 0830



Almond St



TC - 24

Combined figures only

PM PEAK HOUR
1630 - 1730

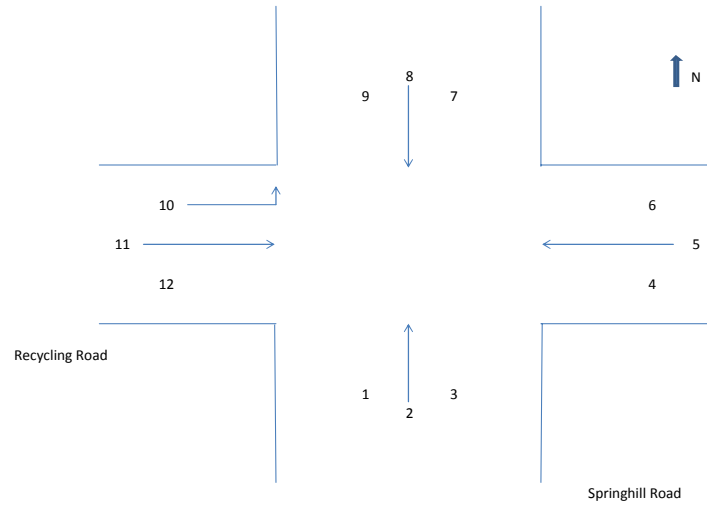
Weather >>>



Location: Signalised Intersection on Springhill Road with Recycling Road
 TCS: 938
 Date: Thursday 9th April 2009
 Conditions: Fine
 Surveyor: TL

Time Period: AM (7.00-9.00am)

Time	Movement																																			
	1			2			3			4			5			6			7			8			9			10			11			12		
	Light	Coal	Other Heavy	Light	Coal	Other Heavy	Light	Coal	Other Heavy	Light	Coal	Other Heavy	Light	Coal	Other Heavy	Light	Coal	Other Heavy	Light	Coal	Other Heavy	Light	Coal	Other Heavy	Light	Coal	Other Heavy	Light	Coal	Other Heavy	Light	Coal	Other Heavy			
7.00-7.15	13	4	4	332	2	27	28	0	5	15	0	0	0	0	0	2	0	0	10	0	0	219	1	21	5	6	2	5	4	3	0	0	1	1	5	0
7.15-7.30																																				
7.30-7.45	5	1	0	452	0	29	8	0	3	4	0	0	0	0	1	3	0	2																		
7.45-8.00																			11	0	0	311	2	25	8	3	0	1	3	2	1	0	1	1	1	0
8.00-8.15	6	4	3	585	0	18	5	0	1	2	0	0	1	0	0	2	0	0																		
8.15-8.30																			5	0	1	297	4	15	14	8	2	5	9	0	1	0	1	1	4	3
8.30-8.45	3	7	3	684	4	20	10	0	1	4	0	2	0	0	1	0	0	0																		
8.45-9.00																			7	0	1	246	9	22	3	4	0	2	7	2	1	0	0	4	1	2
Equiv Hourly	27	16	10	2053	6	94	51	0	10	25	0	2	1	0	2	7	0	2	33	0	2	1073	16	83	30	21	4	13	23	7	3	0	3	7	11	5
Combined Heavy	27	26		2053	100		51	10		25	2		1	2		7	2		33	2		1073	99		30	25		13	30		3	3		7	16	





attachment d

SIDRA outputs



attachment d1

existing intersection performance



Movement Summary

Appin Rd - George St (Appin East Colliery Exit)

Existing - AM

Signalised - Fixed time

Cycle Time = 50 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	613	5.5	0.557	18.3	LOS B	68	0.82	0.76	46.6
Approach		613	5.5	0.557	18.3	LOS B	68	0.82	0.76	46.6
Appin Rd (west)										
WT	T	362	3.9	0.264	12.5	LOS A	32	0.75	0.61	43.4
Approach		362	3.9	0.264	12.5	LOS A	32	0.75	0.61	43.4
George St (south)										
SR	R	48	69.4	0.099	18.8	LOS B	13	0.65	0.73	34.1
Approach		49	69.4	0.099	18.8	LOS B	13	0.65	0.73	34.1
All Vehicles		1024	8.0	0.557	16.3	LOS B	68	0.79	0.71	44.4

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



SIDRA SOLUTIONS

Site: EX - AM
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Movement Summary

Appin Rd - George St (Appin East Colliery Exit)

Existing - PM

Signalised - Fixed time

Cycle Time = 40 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	406	2.2	0.651	21.6	LOS B	47	0.95	0.81	43.3
Approach		406	2.2	0.651	21.6	LOS B	47	0.95	0.81	43.3
Appin Rd (west)										
WT	T	531	0.9	0.684	18.1	LOS B	49	0.98	0.88	39.7
Approach		530	0.9	0.684	18.1	LOS B	49	0.98	0.88	39.7
George St (south)										
SR	R	27	60.7	0.043	13.7	LOS A	5	0.53	0.69	36.5
Approach		28	60.7	0.043	13.7	LOS A	5	0.53	0.69	36.5
All Vehicles		964	3.2	0.684	19.5	LOS B	49	0.95	0.85	40.9

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Following Queue
 # - Density for continuous movement



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SIDRA
INTERSECTION

Movement Summary

Appin Rd / Princes Hwy Off-Ramp

Existing - AM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	581	7.1	0.312	0.0	LOS A	0	0.00	0.00	80.0
Approach		581	7.1	0.312	0.0	LOS A		0.00	0.00	80.0
Merge Lane										
Merge	T	51	10.0	0.068	13.3	LOS A	2	0.50	0.78	56.4
Approach		50	10.0	0.068	13.3	LOS A	2	0.50	0.78	56.4
Princes Hwy Off-Ramp (north)										
NR	R	51	10.0	0.104	18.5	LOS B	4	0.52	0.94	51.9
Approach		50	10.0	0.104	18.5	LOS B	4	0.52	0.94	51.9
Appin Rd (west)										
WL	L	7	28.6	0.017	12.6	LOS A	0	0.00	0.73	58.9
WT	T	334	10.8	0.171	0.0	LOS A	0	0.00	0.00	80.0
Approach		341	11.1	0.171	0.3	LOS A		0.00	0.02	79.4
All Vehicles		1022	8.7	0.312	1.6	Not Applicable	4	0.05	0.09	76.3

Symbols which may appear in this table:

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 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
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Following Queue
 # - Density for continuous movement



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Movement Summary

Appin Rd / Princes Hwy Off-Ramp

Existing - PM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	280	5.7	0.149	0.0	LOS A	0	0.00	0.00	80.0
Approach		280	5.7	0.149	0.0	LOS A		0.00	0.00	80.0
Merge Lane										
Merge	T	78	0.0	0.069	10.8	LOS A	2	0.32	0.66	58.0
Approach		78	0.0	0.069	10.8	LOS A	2	0.32	0.66	58.0
Princes Hwy Off-Ramp (north)										
NR	R	78	0.0	0.225	22.3	LOS B	8	0.67	1.01	47.5
Approach		78	0.0	0.226	22.3	LOS B	8	0.67	1.01	47.5
Appin Rd (west)										
WL	L	4	25.0	0.028	12.4	LOS A	0	0.00	0.73	58.9
WT	T	577	4.0	0.278	0.0	LOS A	0	0.00	0.00	80.0
Approach		581	4.1	0.278	0.1	LOS A		0.00	0.01	79.8
All Vehicles		1017	3.9	0.278	2.6	Not Applicable	8	0.08	0.13	74.0

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Appin Rd - Sherrif Rd (Appin East Colliery Entry)

Existing - AM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
EL	L	38	94.7	0.180	14.5	LOS B	0	0.00	0.72	57.6
ET	T	613	5.5	0.180	0.0	LOS A	0	0.00	0.00	80.0
Approach		651	10.8	0.180	0.8	LOS A		0.00	0.04	78.6
Appin Rd (west)										
WT	T	459	17.6	0.131	0.0	LOS A	0	0.00	0.00	80.0
Approach		459	17.6	0.131	0.0	LOS A		0.00	0.00	80.0
All Vehicles		1110	13.6	0.180	0.5	Not Applicable	0	0.00	0.02	79.2

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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INTERSECTION

Movement Summary

Appin Rd - Sherrif Rd (Appin East Colliery Entry)

Existing - PM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
EL	L	9	100.0	0.110	14.8	LOS B	0	0.00	0.72	52.4
ET	T	406	2.2	0.110	0.0	LOS A	0	0.00	0.00	80.0
Approach		415	4.3	0.110	0.3	LOS A		0.00	0.02	79.2
Appin Rd (west)										
WT	T	585	6.7	0.157	0.0	LOS A	0	0.00	0.00	80.0
Approach		585	6.7	0.156	0.0	LOS A		0.00	0.00	80.0
Sherrif Rd (south)										
32	R	1	0.0	0.001	8.3	LOS A	0	0.00	0.68	48.8
Approach		1	0.0	0.001	8.3	LOS A		0.00	0.68	48.8
All Vehicles		1001	5.7	0.157	0.1	Not Applicable	0	0.00	0.01	79.6

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 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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INTERSECTION

Movement Summary

Appin Rd - West Cliff Colliery Access

Existing - AM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	627	1.3	0.324	0.0	LOS A	0	0.00	0.00	100.0
ER	R	45	67.4	0.101	21.6	LOS B	6	0.56	0.83	54.7
Approach		673	5.8	0.324	1.5	LOS A	6	0.04	0.06	95.8
Median Storage										
Store	T	38	86.8	0.202	22.0	LOS B	11	0.80	0.90	27.0
Approach		38	86.8	0.202	22.0	LOS B	11	0.80	0.90	27.0
West Cliff Access (north)										
NL	L	51	66.7	0.338	30.7	LOS C	22	0.67	1.07	42.6
NR	R	38	86.8	0.339	32.3	LOS C	22	0.67	1.06	35.7
Approach		89	75.3	0.338	31.4	LOS C	22	0.67	1.07	40.1
Appin Rd (west)										
WL	L	58	15.8	0.034	13.5	LOS A	0	0.00	0.76	63.3
WT	T	359	3.1	0.094	0.0	LOS A	0	0.00	0.00	100.0
Approach		416	4.8	0.094	1.8	LOS A		0.00	0.10	94.2
All Vehicles		1216	13.1	0.339	4.4	Not Applicable	22	0.10	0.17	85.0

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Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Appin Rd - West Cliff Colliery Access

Existing - PM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	345	1.7	0.179	0.0	LOS A	0	0.00	0.00	100.0
ER	R	15	86.7	0.051	27.0	LOS B	3	0.64	0.87	49.2
Approach		360	5.3	0.179	1.1	LOS A	3	0.03	0.04	96.8
Median Storage										
Store	T	45	40.0	0.069	5.6	LOS A	3	0.48	0.57	45.4
Approach		45	40.0	0.069	5.6	LOS A	3	0.48	0.57	45.4
West Cliff Access (north)										
NL	L	72	33.8	0.316	23.5	LOS B	16	0.65	1.05	45.8
NR	R	45	40.0	0.315	24.9	LOS B	16	0.65	1.05	39.2
Approach		116	36.2	0.315	24.1	LOS B	16	0.65	1.05	43.6
Appin Rd (west)										
WL	L	24	87.5	0.021	17.5	LOS B	0	0.00	0.76	63.3
WT	T	512	0.4	0.131	0.0	LOS A	0	0.00	0.00	100.0
Approach		535	4.3	0.131	0.8	LOS A		0.00	0.03	98.1
All Vehicles		1056	9.7	0.316	3.7	Not Applicable	16	0.10	0.17	85.5

Symbols which may appear in this table:

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 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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SIDRA
INTERSECTION

Movement Summary

Appin Rd / Wilton Rd

Existing - AM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Wilton Rd (south)										
ST	T	72	2.8	0.198	18.3	LOS B	7	0.70	1.00	18.4
SR	R	44	4.5	0.146	19.9	LOS B	5	0.70	1.00	34.6
Approach		115	3.5	0.198	18.9	LOS B	7	0.70	1.00	27.8
Appin Rd (east)										
EL	L	47	2.1	0.338	6.5	LOS A	0	0.00	0.61	43.3
ER	R	573	1.9	0.338	6.6	LOS A	0	0.00	0.63	43.2
Approach		620	1.9	0.338	6.6	LOS A		0.00	0.63	43.2
Appin Rd (north)										
NL	L	327	2.8	0.295	5.9	LOS A	12	0.16	0.51	35.2
NT	T	51	14.0	0.179	21.9	LOS B	7	0.74	1.00	33.9
Approach		377	4.2	0.295	8.0	LOS A	12	0.24	0.57	34.8
All Vehicles		1112	2.9	0.338	8.4	Not Applicable	12	0.15	0.65	39.7

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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SIDRA
INTERSECTION

Movement Summary

Appin Rd / Wilton Rd

Existing - PM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Wilton Rd (south)										
ST	T	95	1.1	0.172	13.6	LOS A	6	0.56	0.96	22.0
SR	R	60	1.7	0.144	15.8	LOS B	5	0.59	1.00	36.9
Approach		155	1.3	0.172	14.4	LOS A	6	0.57	0.97	31.2
Appin Rd (east)										
EL	L	73	2.7	0.235	6.5	LOS A	0	0.00	0.61	43.3
ER	R	357	2.0	0.235	6.6	LOS A	0	0.00	0.63	43.2
Approach		429	2.1	0.234	6.6	LOS A		0.00	0.63	43.2
Appin Rd (north)										
NL	L	496	0.8	0.446	6.1	LOS A	22	0.23	0.51	34.6
NT	T	88	1.1	0.171	14.2	LOS A	6	0.58	0.98	38.0
Approach		584	0.9	0.446	7.3	LOS A	22	0.28	0.58	35.6
All Vehicles		1168	1.4	0.446	8.0	Not Applicable	22	0.22	0.65	38.8

Symbols which may appear in this table:

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 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



SIDRA SOLUTIONS

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SIDRA
INTERSECTION

Movement Summary

Masters Rd / Springhill Rd

Existing (2008) - AM

Signalised - Fixed time

Cycle Time = 100 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Springhill Rd (south)										
1	L	495	0.0	0.163	13.0	LOS A	25	0.22	0.73	56.2
2	T	2386	0.0	0.832	27.1	LOS B	248	0.93	0.89	42.8
Approach		2881	0.0	0.832	24.7	LOS B	248	0.81	0.86	44.6
Springhill Rd (north)										
8	T	644	0.0	0.337	16.6	LOS B	78	0.65	0.56	52.2
9	R	282	0.0	0.844	70.0	LOS E	47	1.00	0.91	24.4
Approach		926	0.0	0.844	32.8	LOS C	78	0.76	0.67	38.9
Masters Rd (west)										
10	L	517	0.0	0.470	34.7	LOS C	97	0.77	0.81	37.6
12	R	730	0.0	0.485	44.4	LOS D	82	0.89	0.82	32.8
Approach		1247	0.0	0.485	40.4	LOS C	97	0.84	0.82	34.7
All Vehicles		5054	0.0	0.844	30.1	LOS C	248	0.81	0.82	40.6

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P5	50	44.2	LOS E	0	0.94	0.94
All Peds	50	44.2	LOS D	0	0.94	0.94

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue

SIDRA
INTERSECTION

Movement Summary

Masters Rd / Springhill Rd

Existing (2008) - PM

Signalised - Fixed time

Cycle Time = 100 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Springhill Rd (south)										
1	L	817	0.0	0.328	18.4	LOS B	70	0.45	0.78	50.0
2	T	1256	0.0	0.631	30.0	LOS C	127	0.90	0.78	40.8
Approach		2073	0.0	0.631	25.4	LOS B	127	0.72	0.78	44.0
Springhill Rd (north)										
8	T	1164	0.0	0.878	43.6	LOS D	219	1.00	1.01	33.3
9	R	1029	0.0	0.880	63.7	LOS E	140	1.00	1.02	26.0
Approach		2193	0.0	0.879	53.0	LOS D	219	1.00	1.01	29.5
Masters Rd (west)										
10	L	188	0.0	0.127	22.9	LOS B	30	0.51	0.75	45.9
12	R	680	0.0	0.452	44.0	LOS D	76	0.88	0.82	33.0
Approach		868	0.0	0.452	39.4	LOS C	76	0.80	0.80	35.1
All Vehicles		5134	0.0	0.880	39.6	LOS C	219	0.85	0.88	35.1

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P5	50	44.2	LOS E	0	0.94	0.94
All Peds	50	44.2	LOS D	0	0.94	0.94

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue

SIDRA
INTERSECTION

Movement Summary

Mt Ousley Rd / Southern Fwy

Existing - AM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Southern Fwy (south)										
ST	T	1453	12.3	0.402	0.0	LOS A	0	0.00	0.00	80.0
Approach		1453	12.3	0.402	0.0	LOS A		0.00	0.00	80.0
Mt Ousley Rd (east)										
EL	L	135	0.7	0.073	7.6	LOS A#	2#	0.00	0.60	49.8
ER	R	206	1.9	1.776	768.1	LOS F	453	1.00	3.88	3.0
Approach		341	1.5	1.776	467.0	LOS F	453	0.60	2.58	4.7
Mt Ousley Rd (north)										
NL	L	389	2.8	0.214	11.2	LOS A#	5#	0.00	0.69	58.8
NT	T	1876	7.9	0.506	0.0	LOS A	0	0.00	0.00	80.0
Approach		2265	7.1	0.506	1.9	LOS A		0.00	0.12	75.4
All Vehicles		4059	8.5	1.776	40.3	Not Applicable	453	0.05	0.28	34.4

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Mt Ousley Rd / Southern Fwy

Existing - PM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Southern Fwy (south)										
ST	T	1661	3.6	0.436	0.0	LOS A	0	0.00	0.00	80.0
Approach		1661	3.6	0.436	0.0	LOS A		0.00	0.00	80.0
Mt Ousley Rd (east)										
EL	L	213	0.0	0.115	7.6	LOS A#	4#	0.00	0.60	49.8
ER	R	140	0.7	2.333	1360.0	LOS F	409	1.00	3.12	1.7
Approach		353	0.3	2.333	544.0	LOS F	409	0.40	1.60	4.0
Mt Ousley Rd (north)										
NL	L	320	0.6	0.173	11.1	LOS A#	4#	0.00	0.69	58.8
NT	T	2338	3.1	0.612	0.0	LOS A	0	0.00	0.00	80.0
Approach		2658	2.8	0.611	1.3	LOS A		0.00	0.08	76.7
All Vehicles		4672	2.9	2.333	41.9	Not Applicable	409	0.03	0.17	33.7

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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INTERSECTION

Movement Summary

Picton Rd / Almond St (Wilton Rd)

Existing - AM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Picton Rd (east)										
ET	T	545	13.6	0.305	0.0	LOS A	0	0.00	0.00	100.0
ER	R	13	33.3	0.030	21.8	LOS B	1	0.66	0.86	52.1
Approach		558	14.0	0.305	0.5	LOS A	1	0.01	0.02	98.5
Median Storage										
S	T	119	3.4	0.238	7.3	LOS A	7	0.58	0.76	43.5
Approach		119	3.4	0.238	7.3	LOS A	7	0.58	0.76	43.5
Almond St (north)										
NL	L	16	0.0	0.400	24.6	LOS B	17	0.77	1.08	43.4
NR	R	119	3.4	0.395	26.6	LOS B	17	0.77	1.08	36.8
Approach		135	3.0	0.395	26.3	LOS B	17	0.77	1.08	37.8
Picton Rd (west)										
WL	L	83	8.4	0.047	13.0	LOS A	0	0.00	0.76	63.3
WT	T	645	12.1	0.357	0.0	LOS A	0	0.00	0.00	100.0
Approach		728	11.7	0.357	1.5	LOS A		0.00	0.09	95.1
All Vehicles		1540	11.1	0.400	3.7	Not Applicable	17	0.12	0.20	84.7

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Picton Rd / Almond St (Wilton Rd)

Existing - PM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Picton Rd (east)										
ET	T	611	5.7	0.325	0.0	LOS A	0	0.00	0.00	100.0
ER	R	12	8.3	0.023	18.4	LOS B	1	0.63	0.83	54.8
Approach		623	5.8	0.325	0.4	LOS A	1	0.01	0.02	98.8
Median Storage										
5	T	135	2.2	0.281	8.0	LOS A	9	0.61	0.82	42.3
Approach		135	2.2	0.281	8.0	LOS A	9	0.61	0.82	42.3
Almond St (north)										
NL	L	14	0.0	0.500	29.1	LOS C	23	0.83	1.12	40.6
NR	R	135	2.2	0.500	31.0	LOS C	23	0.83	1.12	33.8
Approach		149	2.0	0.500	30.9	LOS C	23	0.83	1.12	34.6
Picton Rd (west)										
WL	L	159	5.0	0.089	12.8	LOS A	0	0.00	0.75	63.3
WT	T	732	3.4	0.383	0.0	LOS A	0	0.00	0.00	100.0
Approach		890	3.7	0.383	2.3	LOS A		0.00	0.13	92.4
All Vehicles		1797	4.2	0.500	4.4	Not Applicable	23	0.12	0.23	82.9

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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INTERSECTION

Movement Summary

Springhill Rd / Port Kembla Rd

Existing (2008) - AM

Signalised - Fixed time

Cycle Time = 50 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Port Kembla Rd (south)										
1	L	31	0.0	0.046	19.0	LOS B	5	0.68	0.71	37.9
3	R	8	0.0	0.036	29.2	LOS C	2	0.91	0.66	30.4
Approach		39	0.0	0.046	21.1	LOS B	5	0.72	0.70	36.3
Springhill Rd (east)										
4	L	12	0.0	0.204	18.2	LOS B	26	0.69	0.76	38.8
5	T	465	0.0	0.204	10.7	LOS A	26	0.69	0.56	50.3
Approach		477	0.0	0.204	10.9	LOS A	26	0.69	0.56	50.0
Sprinhill Rd (west)										
11	T	1040	0.0	0.267	4.1	LOS A#	7#	0.00	0.32	70.8
12	R	38	0.0	0.171	32.9	LOS C	10	0.93	0.73	35.1
Approach		1078	0.0	0.267	5.1	LOS A	10	0.03	0.33	68.8
All Vehicles		1594	0.0	0.267	7.2	LOS A	26	0.25	0.41	60.7

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	13.0	LOS B	0	0.72	0.72
All Peds	50	13.0	LOS A	0	0.72	0.72

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue

SIDRA
INTERSECTION

Movement Summary

Springhill Rd / Port Kembla Rd

Existing (2008) - PM

Signalised - Fixed time

Cycle Time = 50 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Port Kembla Rd (south)										
1	L	67	0.0	0.100	19.3	LOS B	12	0.69	0.74	37.8
3	R	28	0.0	0.126	29.7	LOS C	7	0.92	0.71	30.1
Approach		95	0.0	0.126	22.4	LOS B	12	0.76	0.73	35.3
Springhill Rd (east)										
4	L	5	0.0	0.446	19.5	LOS B	56	0.78	0.81	37.9
5	T	1041	0.0	0.447	12.1	LOS A	56	0.78	0.66	49.0
Approach		1046	0.0	0.447	12.1	LOS A	56	0.78	0.66	48.9
Sprinhill Rd (west)										
11	T	569	0.0	0.146	4.1	LOS A#	4#	0.00	0.32	70.8
12	R	36	0.0	0.162	32.8	LOS C	9	0.93	0.72	35.2
Approach		605	0.0	0.162	5.8	LOS A	9	0.06	0.34	67.4
All Vehicles		1746	0.0	0.447	10.5	LOS A	56	0.53	0.56	52.9

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	13.0	LOS B	0	0.72	0.72
All Peds	50	13.0	LOS A	0	0.72	0.72

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue

SIDRA
INTERSECTION

Movement Summary

Springhill Rd / Recycling Rd

Existing - AM

Signalised - Actuated isolated

Cycle Time = 90 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Springhill Rd (south)										
SL	L	56	49.1	0.908	43.5	LOS D	267	0.98	0.96	30.5
ST	T	2266	4.6	0.905	30.6	LOS C	266	0.98	0.95	40.4
SR	R	64	16.9	0.392	55.8	LOS D	28	0.95	0.76	25.3
Approach		2386	6.0	0.905	31.6	LOS C	267	0.98	0.95	39.6
Bluescope Steel (east)										
EL	L	28	7.1	0.158	49.1	LOS D	11	0.92	0.71	23.5
ET	T	3	66.7	0.022	41.7	LOS C	2	0.91	0.58	26.1
ER	R	9	22.2	0.072	51.0	LOS D	4	0.93	0.67	23.2
Approach		40	15.0	0.158	48.9	LOS D	11	0.92	0.69	23.6
Springhill Rd (north)										
NL	L	37	5.4	0.027	13.9	LOS A	2	0.17	0.96	53.8
NT	T	1234	8.4	0.488	19.2	LOS B	110	0.73	0.64	49.5
NR	R	58	44.8	0.412	57.4	LOS E	31	0.95	0.76	25.1
Approach		1328	9.9	0.488	20.7	LOS B	110	0.73	0.65	47.9
Recycling Rd (west)										
WL	L	45	69.6	0.411	53.4	LOS D	32	0.95	0.75	22.9
WT	T	6	50.0	0.411	45.4	LOS D	32	0.95	0.73	25.1
WR	R	24	70.8	0.250	54.2	LOS D	15	0.95	0.71	22.7
Approach		76	68.4	0.412	53.0	LOS D	32	0.95	0.74	23.0
All Vehicles		3830	8.7	0.908	28.4	LOS B	267	0.89	0.84	41.2

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
SP	11	46.7	LOS E	0	0.94	0.94
EP	21	39.2	LOS D	0	0.93	0.93
WP	21	39.2	LOS D	0	0.93	0.93

SIDRA
INTERSECTION

Movement Summary

Springhill Rd / Recycling Rd

Existing - PM

Signalised - Actuated isolated

Cycle Time = 83 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Springhill Rd (south)										
SL	L	11	20.0	0.642	31.0	LOS C	138	0.80	0.86	36.9
ST	T	1669	1.5	0.634	19.3	LOS B	138	0.80	0.71	49.4
SR	R	28	7.1	0.219	53.7	LOS D	11	0.95	0.72	25.9
Approach		1707	1.7	0.634	19.9	LOS B	138	0.81	0.71	48.7
Bluescope Steel (east)										
EL	L	64	16.9	0.362	46.9	LOS D	26	0.94	0.75	24.0
ET	T	6	50.0	0.038	38.0	LOS C	3	0.90	0.60	27.1
ER	R	37	5.4	0.286	49.2	LOS D	14	0.96	0.72	23.5
Approach		108	14.8	0.362	47.2	LOS D	26	0.95	0.73	24.0
Springhill Rd (north)										
NL	L	9	22.2	0.007	14.8	LOS B	0	0.16	0.95	54.0
NT	T	2269	1.7	0.857	23.9	LOS B	214	0.94	0.87	45.3
NR	R	14	46.2	0.129	55.1	LOS D	7	0.94	0.69	25.8
Approach		2292	2.0	0.857	24.0	LOS B	214	0.94	0.87	45.2
Recycling Rd (west)										
WL	L	78	9.0	0.417	46.9	LOS D	30	0.95	0.76	24.0
WT	T	1	0.0	0.419	40.6	LOS C	30	0.95	0.73	26.4
WR	R	48	6.2	0.373	49.8	LOS D	19	0.97	0.73	23.3
Approach		127	7.9	0.417	47.9	LOS D	30	0.96	0.75	23.7
All Vehicles		4234	2.4	0.857	23.7	LOS B	214	0.89	0.80	44.3

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
SP	11	43.2	LOS E	0	0.94	0.94
EP	21	35.7	LOS D	0	0.93	0.93
WP	21	35.7	LOS D	0	0.93	0.93



Movement Summary

Wilton Rd / Douglas Park Dr

Existing - AM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Wilton Rd (east)										
ET	T	49	0.0	0.039	0.3	LOS A	2	0.17	0.00	75.8
ER	R	19	0.0	0.039	11.0	LOS A	2	0.17	0.68	58.2
Approach		68	0.0	0.039	3.3	LOS A	2	0.17	0.19	70.0
Douglas Park Dr (north)										
NL	L	27	3.7	0.168	14.7	LOS B	7	0.33	0.84	55.2
NR	R	100	5.0	0.168	14.6	LOS B	7	0.33	0.90	55.4
Approach		127	4.7	0.168	14.6	LOS B	7	0.33	0.88	55.4
Wilton Rd (west)										
WL	L	63	7.9	0.051	11.5	LOS A	2	0.08	0.65	58.3
WT	T	72	2.8	0.037	0.0	LOS A	0	0.00	0.00	80.0
Approach		134	5.2	0.051	5.4	LOS A	2	0.04	0.31	68.2
All Vehicles		329	4.0	0.168	8.5	Not Applicable	7	0.18	0.51	63.0

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Wilton Rd / Douglas Park Dr

Existing - PM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Wilton Rd (east)										
ET	T	105	0.0	0.071	0.3	LOS A	3	0.18	0.00	75.8
ER	R	23	0.0	0.071	11.0	LOS A	3	0.18	0.68	58.2
Approach		128	0.0	0.071	2.2	LOS A	3	0.18	0.12	71.9
Douglas Park Dr (north)										
NL	L	19	5.3	0.170	15.6	LOS B	6	0.39	0.82	54.4
NR	R	96	4.2	0.169	15.3	LOS B	6	0.39	0.91	54.6
Approach		115	4.3	0.169	15.4	LOS B	6	0.39	0.90	54.6
Wilton Rd (west)										
WL	L	84	4.8	0.066	11.4	LOS A	2	0.09	0.65	58.3
WT	T	68	0.0	0.035	0.0	LOS A	0	0.00	0.00	80.0
Approach		152	2.6	0.066	6.3	LOS A	2	0.05	0.36	66.4
All Vehicles		395	2.3	0.170	7.6	Not Applicable	6	0.19	0.44	64.0

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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INTERSECTION

Movement Summary

Wilton Rd / Macarthur Rd

Existing - AM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macarthur Rd (south)										
SL	L	4	25.0	0.006	15.5	LOS B	0	0.22	0.86	42.7
SR	R	41	12.2	0.068	16.3	LOS B	3	0.40	0.88	54.3
Approach		45	13.3	0.068	16.3	LOS B	3	0.38	0.88	53.6
Wilton Rd (east)										
EL	L	63	1.6	0.034	11.0	LOS A	0	0.00	0.73	58.9
ET	T	87	3.4	0.046	0.0	LOS A	0	0.00	0.00	80.0
Approach		150	2.7	0.046	4.6	LOS A		0.00	0.31	69.7
Wilton Rd (west)										
WT	T	92	3.3	0.035	0.5	LOS A	2	0.21	0.00	74.9
WR	R	4	25.0	0.035	13.2	LOS A	2	0.33	0.66	57.1
Approach		95	4.2	0.035	1.1	LOS A	2	0.22	0.03	74.0
All Vehicles		290	4.8	0.068	5.3	Not Applicable	3	0.13	0.30	68.0

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Wilton Rd / Macarthur Rd

Existing - PM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macarthur Rd (south)										
SL	L	6	0.0	0.007	13.5	LOS A	0	0.26	0.86	42.8
SR	R	39	0.0	0.067	15.9	LOS B	2	0.45	0.90	53.6
Approach		45	0.0	0.067	15.6	LOS B	2	0.43	0.89	52.7
Wilton Rd (east)										
EL	L	55	1.8	0.030	11.0	LOS A	0	0.00	0.73	58.9
ET	T	145	1.4	0.075	0.0	LOS A	0	0.00	0.00	80.0
Approach		200	1.5	0.075	3.0	LOS A		0.00	0.20	72.9
Wilton Rd (west)										
WT	T	117	4.3	0.047	0.8	LOS A	3	0.25	0.00	74.1
WR	R	7	28.6	0.048	13.9	LOS A	3	0.39	0.68	56.7
Approach		124	5.6	0.047	1.5	LOS A	3	0.26	0.04	72.9
All Vehicles		369	2.7	0.075	4.1	Not Applicable	3	0.14	0.23	69.9

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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attachment d2

future (2019) intersection performance



Movement Summary

Appin Rd - George St (Appin East Colliery Exit)

Future (2019) - AM (Without Project)

Signalised - Fixed time

Cycle Time = 50 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	674	5.5	0.613	18.6	LOS B	75	0.84	0.77	46.3
Approach		674	5.5	0.613	18.6	LOS B	75	0.84	0.77	46.3
Appin Rd (west)										
WT	T	398	3.8	0.290	12.6	LOS A	35	0.75	0.62	43.3
Approach		398	3.8	0.290	12.6	LOS A	35	0.75	0.62	43.3
George St (south)										
SR	R	48	69.4	0.099	18.8	LOS B	13	0.65	0.73	34.1
Approach		49	69.4	0.099	18.8	LOS B	13	0.65	0.73	34.1
All Vehicles		1121	7.7	0.613	16.5	LOS B	75	0.80	0.72	44.3

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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SIDRA INTERSECTION

Movement Summary

Appin Rd - George St (Appin East Colliery Exit)

Future (2019) - PM (Without Project)

Signalised - Fixed time

Cycle Time = 40 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	446	2.5	0.717	22.3	LOS B	52	0.96	0.84	42.7
Approach		447	2.5	0.717	22.3	LOS B	52	0.96	0.84	42.7
Appin Rd (west)										
WT	T	582	0.9	0.750	19.4	LOS B	55	0.99	0.95	38.9
Approach		582	0.9	0.750	19.4	LOS B	55	0.99	0.95	38.9
George St (south)										
SR	R	27	60.7	0.043	13.7	LOS A	5	0.53	0.69	36.5
Approach		28	60.7	0.043	13.7	LOS A	5	0.53	0.69	36.5
All Vehicles		1057	3.1	0.750	20.5	LOS B	55	0.97	0.90	40.2

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Appin Rd / Princes Hwy Off-Ramp

FU (2019) - AM (no development)

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	639	7.0	0.343	0.0	LOS A	0	0.00	0.00	80.0
Approach		639	7.0	0.343	0.0	LOS A		0.00	0.00	80.0
Merge Lane										
Merge	T	55	9.3	0.079	13.7	LOS A	2	0.52	0.81	55.8
Approach		54	9.3	0.079	13.7	LOS A	2	0.52	0.81	55.8
Princes Hwy Off-Ramp (north)										
NR	R	55	9.3	0.118	19.0	LOS B	4	0.54	0.96	51.3
Approach		54	9.3	0.118	19.0	LOS B	4	0.54	0.96	51.3
Appin Rd (west)										
WL	L	7	28.6	0.019	12.6	LOS A	0	0.00	0.73	58.9
WT	T	366	10.7	0.187	0.0	LOS A	0	0.00	0.00	80.0
Approach		373	11.0	0.187	0.2	LOS A		0.00	0.01	79.5
All Vehicles		1120	8.6	0.343	1.7	Not Applicable	4	0.05	0.09	76.3

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Appin Rd / Princes Hwy Off-Ramp

FU (2019) - PM (without project)

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	307	5.5	0.164	0.0	LOS A	0	0.00	0.00	80.0
Approach		308	5.5	0.164	0.0	LOS A		0.00	0.00	80.0
Merge Lane										
Merge	T	85	0.0	0.077	10.9	LOS A	2	0.34	0.67	57.9
Approach		85	0.0	0.077	10.9	LOS A	2	0.34	0.67	57.9
Princes Hwy Off-Ramp (north)										
NR	R	85	0.0	0.274	24.7	LOS B	10	0.72	1.02	45.5
Approach		85	0.0	0.275	24.7	LOS B	10	0.72	1.02	45.5
Appin Rd (west)										
WL	L	4	25.0	0.031	12.4	LOS A	0	0.00	0.73	58.9
WT	T	634	3.9	0.305	0.0	LOS A	0	0.00	0.00	80.0
Approach		637	4.1	0.305	0.1	LOS A		0.00	0.00	79.8
All Vehicles		1115	3.9	0.305	2.8	Not Applicable	10	0.08	0.13	73.6

Symbols which may appear in this table:

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Following LOS

- Based on density for continuous movements

Following Queue

- Density for continuous movement



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Movement Summary

Appin Rd - Sherrif Rd (Appin East Colliery Entry)

Future (2019) - AM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
EL	L	38	94.7	0.196	14.5	LOS B	0	0.00	0.72	57.6
ET	T	674	5.5	0.196	0.0	LOS A	0	0.00	0.00	80.0
Approach		712	10.3	0.196	0.8	LOS A		0.00	0.04	78.7
Appin Rd (west)										
WT	T	505	17.6	0.144	0.0	LOS A	0	0.00	0.00	80.0
Approach		505	17.6	0.144	0.0	LOS A		0.00	0.00	80.0
All Vehicles		1217	13.3	0.196	0.5	Not Applicable	0	0.00	0.02	79.2

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Appin Rd - Sherrif Rd (Appin East Colliery Entry)

Future (2019) - PM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
EL	L	9	100.0	0.120	14.8	LOS B	0	0.00	0.72	52.4
ET	T	446	2.5	0.121	0.0	LOS A	0	0.00	0.00	80.0
Approach		456	4.4	0.121	0.3	LOS A		0.00	0.01	79.3
Appin Rd (west)										
WT	T	643	6.7	0.172	0.0	LOS A	0	0.00	0.00	80.0
Approach		643	6.7	0.172	0.0	LOS A		0.00	0.00	80.0
Sherrif Rd (south)										
32	R	1	0.0	0.001	8.3	LOS A	0	0.00	0.68	48.8
Approach		1	0.0	0.001	8.3	LOS A		0.00	0.68	48.8
All Vehicles		1100	5.7	0.172	0.1	Not Applicable	0	0.00	0.01	79.7

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Appin Rd - West Cliff Colliery Access

Future (2019) - AM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	689	1.3	0.356	0.0	LOS A	0	0.00	0.00	100.0
ER	R	45	67.4	0.108	22.3	LOS B	6	0.57	0.85	53.7
Approach		735	5.4	0.356	1.4	LOS A	6	0.04	0.05	96.0
Median Storage										
Store	T	38	86.8	0.247	28.3	LOS B	14	0.85	0.97	23.4
Approach		38	86.8	0.247	28.3	LOS B	14	0.85	0.97	23.4
West Cliff Access (north)										
NL	L	51	66.7	0.367	33.1	LOS C	24	0.71	1.09	41.2
NR	R	38	86.8	0.369	34.7	LOS C	24	0.71	1.08	34.2
Approach		89	75.3	0.368	33.8	LOS C	24	0.71	1.08	38.6
Appin Rd (west)										
WL	L	58	15.8	0.034	13.5	LOS A	0	0.00	0.76	63.3
WT	T	395	3.0	0.103	0.0	LOS A	0	0.00	0.00	100.0
Approach		452	4.6	0.103	1.7	LOS A		0.00	0.10	94.6
All Vehicles		1314	12.3	0.369	4.5	Not Applicable	24	0.09	0.16	85.0

Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue

- Density for continuous movement



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Movement Summary

Appin Rd - West Cliff Colliery Access

Future (2019) - PM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	380	1.8	0.197	0.0	LOS A	0	0.00	0.00	100.0
ER	R	15	86.7	0.056	28.6	LOS C	3	0.68	0.91	47.5
Approach		395	5.1	0.197	1.1	LOS A	3	0.03	0.03	96.9
Median Storage										
Store	T	45	40.0	0.073	6.1	LOS A	3	0.51	0.59	44.5
Approach		45	40.0	0.073	6.1	LOS A	3	0.51	0.59	44.5
West Cliff Access (north)										
NL	L	72	33.8	0.345	25.3	LOS B	18	0.70	1.06	44.6
NR	R	45	40.0	0.346	26.7	LOS B	18	0.70	1.06	37.8
Approach		116	36.2	0.345	25.8	LOS B	18	0.70	1.06	42.4
Appin Rd (west)										
WL	L	24	87.5	0.021	17.5	LOS B	0	0.00	0.76	63.3
WT	T	562	0.4	0.144	0.0	LOS A	0	0.00	0.00	100.0
Approach		586	3.9	0.144	0.7	LOS A		0.00	0.03	98.2
All Vehicles		1142	9.0	0.346	3.6	Not Applicable	18	0.10	0.16	85.9

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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INTERSECTION

Movement Summary

Appin Rd / Wilton Rd

Future (2019) - AM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Wilton Rd (south)										
ST	T	75	2.7	0.242	21.0	LOS B	9	0.75	1.02	16.8
SR	R	48	4.2	0.180	21.9	LOS B	6	0.74	1.00	33.5
Approach		123	3.3	0.242	21.3	LOS B	9	0.75	1.01	26.4
Appin Rd (east)										
EL	L	52	1.9	0.371	6.5	LOS A	0	0.00	0.61	43.3
ER	R	629	1.9	0.372	6.6	LOS A	0	0.00	0.63	43.2
Approach		682	1.9	0.372	6.6	LOS A		0.00	0.63	43.2
Appin Rd (north)										
NL	L	360	3.1	0.325	6.0	LOS A	14	0.17	0.51	35.1
NT	T	53	13.5	0.218	25.3	LOS B	8	0.79	1.02	32.1
Approach		412	4.4	0.325	8.4	LOS A	14	0.25	0.57	34.2
All Vehicles		1217	2.9	0.372	8.7	Not Applicable	14	0.16	0.65	39.4

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Appin Rd / Wilton Rd

Future (2019) - PM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Wilton Rd (south)										
ST	T	99	1.0	0.194	14.4	LOS A	7	0.59	0.99	21.3
SR	R	66	1.5	0.173	16.9	LOS B	6	0.62	1.00	36.2
Approach		165	1.2	0.194	15.4	LOS B	7	0.60	0.99	30.6
Appin Rd (east)										
EL	L	80	2.5	0.259	6.5	LOS A	0	0.00	0.61	43.3
ER	R	395	2.0	0.259	6.6	LOS A	0	0.00	0.63	43.2
Approach		474	2.1	0.259	6.6	LOS A		0.00	0.63	43.2
Appin Rd (north)										
NL	L	544	0.7	0.489	6.2	LOS A	26	0.26	0.52	34.4
NT	T	93	1.1	0.198	15.2	LOS B	7	0.61	1.00	37.4
Approach		637	0.8	0.489	7.5	LOS A	26	0.31	0.59	35.3
All Vehicles		1276	1.3	0.489	8.2	Not Applicable	26	0.23	0.65	38.6

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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INTERSECTION

Movement Summary

Masters Rd / Springhill Rd

Future (2019) - AM

Signalised - Fixed time

Cycle Time = 110 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Springhill Rd (south)										
1	L	542	0.0	0.176	13.1	LOS A	28	0.22	0.73	56.2
2	T	2613	0.0	0.847	27.4	LOS B	292	0.93	0.89	42.6
Approach		3155	0.0	0.847	24.9	LOS B	292	0.80	0.86	44.4
Springhill Rd (north)										
8	T	677	0.0	0.329	15.8	LOS B	83	0.61	0.53	53.1
9	R	296	0.0	0.835	74.4	LOS F	53	1.00	0.90	23.4
Approach		973	0.0	0.835	33.6	LOS C	83	0.73	0.64	38.4
Masters Rd (west)										
10	L	517	0.0	0.511	39.4	LOS C	110	0.80	0.82	35.1
12	R	730	0.0	0.534	50.2	LOS D	91	0.92	0.83	30.5
Approach		1247	0.0	0.534	45.7	LOS D	110	0.87	0.82	32.2
All Vehicles		5375	0.0	0.847	31.3	LOS C	292	0.81	0.81	39.8

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P5	50	49.2	LOS E	0	0.95	0.95
All Peds	50	49.2	LOS D	0	0.95	0.95

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue

SIDRA
INTERSECTION

Movement Summary

Masters Rd / Springhill Rd

Future (2019) - PM

Signalised - Fixed time

Cycle Time = 110 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Springhill Rd (south)										
1	L	894	0.0	0.363	19.7	LOS B	84	0.48	0.78	48.8
2	T	1375	0.0	0.646	31.3	LOS C	147	0.89	0.78	39.9
Approach		2269	0.0	0.646	26.7	LOS B	147	0.73	0.78	43.0
Springhill Rd (north)										
8	T	1224	0.0	0.863	42.6	LOS D	238	1.00	0.98	33.8
9	R	1082	0.0	0.855	63.4	LOS E	151	1.00	0.98	26.1
Approach		2306	0.0	0.863	52.4	LOS D	238	1.00	0.98	29.7
Masters Rd (west)										
10	L	188	0.0	0.133	24.8	LOS B	34	0.53	0.75	44.3
12	R	680	0.0	0.497	49.8	LOS D	85	0.91	0.82	30.6
Approach		868	0.0	0.497	44.4	LOS D	85	0.83	0.81	32.8
All Vehicles		5443	0.0	0.863	40.4	LOS C	238	0.86	0.87	34.7

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P5	50	49.2	LOS E	0	0.95	0.95
All Peds	50	49.2	LOS D	0	0.95	0.95

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue



Movement Summary

Mt Ousley Rd / Southern Fwy

Future (2019) - AM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Southern Fwy (south)										
ST	T	2144	12.3	0.594	0.0	LOS A	0	0.00	0.00	80.0
Approach		2144	12.3	0.594	0.0	LOS A		0.00	0.00	80.0
Mt Ousley Rd (east)										
EL	L	142	0.7	0.077	7.6	LOS A#	2#	0.00	0.60	49.8
ER	R	218	1.8	3.633	3253.6	LOS F	789	1.00	4.11	0.7
Approach		360	1.4	3.633	1973.2	LOS F	789	0.61	2.73	1.2
Mt Ousley Rd (north)										
NL	L	575	2.8	0.316	11.2	LOS B#	7#	0.00	0.69	58.8
NT	T	2769	8.0	0.747	0.0	LOS A	0	0.00	0.00	80.0
Approach		3344	7.1	0.747	1.9	LOS A		0.00	0.12	75.4
All Vehicles		5848	8.7	3.633	122.6	Not Applicable	789	0.04	0.24	16.1

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Mt Ousley Rd / Southern Fwy

Future (2019) - PM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Southern Fwy (south)										
ST	T	2452	3.6	0.643	0.0	LOS A	0	0.00	0.00	80.0
Approach		2451	3.6	0.643	0.0	LOS A		0.00	0.00	80.0
Mt Ousley Rd (east)										
EL	L	224	0.0	0.121	7.6	LOS A#	4#	0.00	0.60	49.8
ER	R	147	0.7	2.450	46281.5	LOS F	962	1.00	9.75	0.1
Approach		371	0.3	2.450	18342.5	LOS F	962	0.40	4.23	0.1
Mt Ousley Rd (north)										
NL	L	472	0.4	0.254	11.1	LOS A#	6#	0.00	0.69	58.8
NT	T	3451	3.0	0.902	0.0	LOS A	0	0.00	0.00	80.0
Approach		3921	2.7	0.902	1.3	LOS A		0.00	0.08	76.7
All Vehicles		6743	2.9	2.450	1010.0	Not Applicable	962	0.02	0.28	2.4

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Picton Rd / Almond St (Wilton Rd)

Future (2019) - AM (Without Project)

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Picton Rd (east)										
ET	T	704	13.5	0.393	0.0	LOS A	0	0.00	0.00	100.0
ER	R	14	30.8	0.044	25.3	LOS B	2	0.75	0.94	47.9
Approach		717	13.8	0.393	0.5	LOS A	2	0.01	0.02	98.5
Median Storage										
S	T	131	3.1	0.354	11.5	LOS A	12	0.74	0.96	37.0
Approach		130	3.1	0.355	11.5	LOS A	12	0.74	0.96	37.0
Almond St (north)										
NL	L	18	0.0	0.621	38.7	LOS C	30	0.90	1.19	35.7
NR	R	131	3.1	0.628	40.7	LOS C	30	0.90	1.18	28.9
Approach		148	2.7	0.629	40.4	LOS C	30	0.90	1.18	29.9
Picton Rd (west)										
WL	L	93	8.7	0.053	13.1	LOS A	0	0.00	0.76	63.3
WT	T	835	12.1	0.462	0.0	LOS A	0	0.00	0.00	100.0
Approach		927	11.8	0.462	1.3	LOS A		0.00	0.07	95.7
All Vehicles		1922	11.2	0.628	4.7	Not Applicable	30	0.12	0.20	82.7

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Picton Rd / Almond St (Wilton Rd)

Future (2019) - PM (Without Project)

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Picton Rd (east)										
ET	T	789	5.7	0.420	0.0	LOS A	0	0.00	0.00	100.0
ER	R	13	7.7	0.033	21.0	LOS B	1	0.73	0.91	51.3
Approach		802	5.7	0.420	0.3	LOS A	1	0.01	0.01	98.8
Median Storage										
S	T	148	2.0	0.430	13.1	LOS A	15	0.78	1.04	35.0
Approach		148	2.0	0.431	13.1	LOS A	15	0.78	1.04	35.0
Almond St (north)										
NL	L	15	0.0	0.833	61.3	LOS E	50	0.96	1.39	27.8
NR	R	148	2.0	0.827	63.3	LOS E	50	0.96	1.38	21.4
Approach		163	1.8	0.827	63.1	LOS E	50	0.96	1.38	22.0
Picton Rd (west)										
WL	L	175	4.6	0.097	12.8	LOS A	0	0.00	0.75	63.3
WT	T	945	3.5	0.496	0.0	LOS A	0	0.00	0.00	100.0
Approach		1120	3.7	0.496	2.0	LOS A		0.00	0.12	93.4
All Vehicles		2233	4.2	0.833	6.6	Not Applicable	50	0.13	0.23	78.0

Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue

- Density for continuous movement



SIDRA SOLUTIONS

Site: FU (2019) - PM (Without Development)

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INTERSECTION

Movement Summary

Springhill Rd / Port Kembla Rd

Future (2019) - AM

Signalised - Fixed time

Cycle Time = 50 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Port Kembla Rd (south)										
1	L	31	0.0	0.046	19.0	LOS B	5	0.68	0.71	37.9
3	R	8	0.0	0.036	29.2	LOS C	2	0.91	0.66	30.4
Approach		39	0.0	0.046	21.1	LOS B	5	0.72	0.70	36.3
Springhill Rd (east)										
4	L	12	0.0	0.214	18.2	LOS B	27	0.69	0.76	38.8
5	T	489	0.0	0.214	10.8	LOS A	27	0.69	0.56	50.2
Approach		501	0.0	0.214	11.0	LOS A	27	0.69	0.57	49.9
Sprinhill Rd (west)										
11	T	1093	0.0	0.280	4.1	LOS A#	7#	0.00	0.32	70.8
12	R	38	0.0	0.171	32.9	LOS C	10	0.93	0.73	35.1
Approach		1131	0.0	0.280	5.0	LOS A	10	0.03	0.33	68.9
All Vehicles		1671	0.0	0.280	7.2	LOS A	27	0.25	0.41	60.8

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	13.0	LOS B	0	0.72	0.72
All Peds	50	13.0	LOS A	0	0.72	0.72

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue

SIDRA
INTERSECTION

Movement Summary

Springhill Rd / Port Kembla Rd

Future (2019) - PM

Signalised - Fixed time

Cycle Time = 50 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Port Kembla Rd (south)										
1	L	67	0.0	0.100	19.3	LOS B	12	0.69	0.74	37.8
3	R	28	0.0	0.126	29.7	LOS C	7	0.92	0.71	30.1
Approach		95	0.0	0.126	22.4	LOS B	12	0.76	0.73	35.3
Springhill Rd (east)										
4	L	5	0.0	0.463	19.7	LOS B	59	0.79	0.81	37.8
5	T	1094	0.0	0.470	12.2	LOS A	59	0.79	0.67	48.9
Approach		1099	0.0	0.470	12.3	LOS A	59	0.79	0.67	48.8
Sprinhill Rd (west)										
11	T	598	0.0	0.153	4.1	LOS A#	4#	0.00	0.32	70.8
12	R	36	0.0	0.162	32.8	LOS C	9	0.93	0.72	35.2
Approach		634	0.0	0.162	5.7	LOS A	9	0.05	0.34	67.6
All Vehicles		1828	0.0	0.470	10.5	LOS A	59	0.53	0.56	52.9

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	13.0	LOS B	0	0.72	0.72
All Peds	50	13.0	LOS A	0	0.72	0.72

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue

**SIDRA
INTERSECTION**

Movement Summary

Springhill Rd / Recycling Rd

Future (2019) - AM (without project)

Signalised - Actuated isolated

Cycle Time = 94 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Springhill Rd (south)										
SL	L	56	49.1	0.942	50.3	LOS D	330	1.00	1.03	27.6
ST	T	2481	4.6	0.940	37.5	LOS C	329	1.00	1.03	36.3
SR	R	64	16.9	0.369	56.8	LOS E	29	0.95	0.76	24.9
Approach		2601	5.9	0.940	38.2	LOS C	330	1.00	1.02	35.8
Bluescope Steel (east)										
EL	L	28	7.1	0.149	50.1	LOS D	11	0.92	0.71	23.2
ET	T	3	66.7	0.021	42.7	LOS D	2	0.90	0.58	25.8
ER	R	9	22.2	0.106	56.3	LOS D	5	0.96	0.66	22.0
Approach		40	15.0	0.149	51.0	LOS D	11	0.93	0.69	23.1
Springhill Rd (north)										
NL	L	37	5.4	0.027	13.9	LOS A	2	0.17	0.96	53.8
NT	T	1351	8.4	0.509	18.8	LOS B	122	0.72	0.64	49.9
NR	R	58	44.8	0.387	58.5	LOS E	32	0.95	0.76	24.7
Approach		1446	9.8	0.509	20.3	LOS B	122	0.72	0.65	48.3
Recycling Rd (west)										
WL	L	45	69.6	0.387	54.5	LOS D	33	0.95	0.75	22.7
WT	T	6	50.0	0.386	46.5	LOS D	33	0.95	0.72	24.9
WR	R	24	70.8	0.366	60.0	LOS E	17	0.98	0.71	21.5
Approach		76	68.4	0.387	55.6	LOS D	33	0.96	0.74	22.4
All Vehicles		4163	8.5	0.942	32.4	LOS C	330	0.90	0.89	38.7

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
SP	11	48.2	LOS E	0	0.94	0.94
EP	21	41.2	LOS E	0	0.94	0.94
WP	21	41.2	LOS E	0	0.94	0.94

SIDRA
INTERSECTION

Movement Summary

Springhill Rd / Recycling Rd

Future (2019) - PM (without project)

Signalised - Actuated isolated

Cycle Time = 87 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Springhill Rd (south)										
SL	L	11	20.0	0.663	31.6	LOS C	158	0.82	0.86	36.5
ST	T	1827	1.5	0.673	20.0	LOS B	158	0.82	0.73	48.8
SR	R	28	7.1	0.230	56.1	LOS D	11	0.96	0.72	25.1
Approach		1865	1.7	0.673	20.6	LOS B	158	0.82	0.73	48.1
Bluescope Steel (east)										
EL	L	64	16.9	0.341	48.0	LOS D	27	0.94	0.75	23.8
ET	T	6	50.0	0.035	39.0	LOS C	3	0.89	0.59	26.8
ER	R	37	5.4	0.300	51.6	LOS D	15	0.96	0.72	22.9
Approach		108	14.8	0.341	48.7	LOS D	27	0.94	0.73	23.6
Springhill Rd (north)										
NL	L	9	22.2	0.007	14.7	LOS B	0	0.15	0.95	54.0
NT	T	2484	1.7	0.911	29.7	LOS C	269	0.98	0.96	41.0
NR	R	14	46.2	0.135	57.5	LOS E	7	0.95	0.69	25.1
Approach		2506	2.0	0.911	29.7	LOS C	269	0.98	0.96	40.9
Recycling Rd (west)										
WL	L	78	9.0	0.393	48.0	LOS D	31	0.94	0.76	23.7
WT	T	1	0.0	0.395	41.7	LOS C	31	0.94	0.73	26.1
WR	R	48	6.2	0.391	52.2	LOS D	20	0.97	0.74	22.8
Approach		127	7.9	0.393	49.5	LOS D	31	0.95	0.75	23.4
All Vehicles		4606	2.3	0.911	27.0	LOS B	269	0.91	0.86	41.9

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
SP	11	44.7	LOS E	0	0.94	0.94
EP	21	37.7	LOS D	0	0.93	0.93
WP	21	37.7	LOS D	0	0.93	0.93

**SIDRA
INTERSECTION**

Movement Summary

Wilton Rd / Douglas Park Dr

Future (2019) - AM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Wilton Rd (east)										
ET	T	49	0.0	0.039	0.3	LOS A	2	0.17	0.00	75.8
ER	R	19	0.0	0.039	11.0	LOS A	2	0.17	0.68	58.2
Approach		68	0.0	0.039	3.3	LOS A	2	0.17	0.19	70.0
Douglas Park Dr (north)										
NL	L	27	3.7	0.168	14.7	LOS B	7	0.33	0.84	55.2
NR	R	100	5.0	0.168	14.6	LOS B	7	0.33	0.90	55.4
Approach		127	4.7	0.168	14.6	LOS B	7	0.33	0.88	55.4
Wilton Rd (west)										
WL	L	63	7.9	0.051	11.5	LOS A	2	0.08	0.65	58.3
WT	T	72	2.8	0.037	0.0	LOS A	0	0.00	0.00	80.0
Approach		134	5.2	0.051	5.4	LOS A	2	0.04	0.31	68.2
All Vehicles		329	4.0	0.168	8.5	Not Applicable	7	0.18	0.51	63.0

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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INTERSECTION**

Movement Summary

Wilton Rd / Douglas Park Dr

Future (2019) - PM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Wilton Rd (east)										
ET	T	105	0.0	0.071	0.3	LOS A	3	0.18	0.00	75.8
ER	R	23	0.0	0.071	11.0	LOS A	3	0.18	0.68	58.2
Approach		128	0.0	0.071	2.2	LOS A	3	0.18	0.12	71.9
Douglas Park Dr (north)										
NL	L	19	5.3	0.170	15.6	LOS B	6	0.39	0.82	54.4
NR	R	96	4.2	0.169	15.3	LOS B	6	0.39	0.91	54.6
Approach		115	4.3	0.169	15.4	LOS B	6	0.39	0.90	54.6
Wilton Rd (west)										
WL	L	84	4.8	0.066	11.4	LOS A	2	0.09	0.65	58.3
WT	T	68	0.0	0.035	0.0	LOS A	0	0.00	0.00	80.0
Approach		152	2.6	0.066	6.3	LOS A	2	0.05	0.36	66.4
All Vehicles		395	2.3	0.170	7.6	Not Applicable	6	0.19	0.44	64.0

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Wilton Rd / Macarthur Rd

Future (2019) - AM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macarthur Rd (south)										
SL	L	4	25.0	0.006	15.5	LOS B	0	0.22	0.86	42.7
SR	R	41	12.2	0.068	16.3	LOS B	3	0.40	0.88	54.3
Approach		45	13.3	0.068	16.3	LOS B	3	0.38	0.88	53.6
Wilton Rd (east)										
EL	L	63	1.6	0.034	11.0	LOS A	0	0.00	0.73	58.9
ET	T	87	3.4	0.046	0.0	LOS A	0	0.00	0.00	80.0
Approach		150	2.7	0.046	4.6	LOS A		0.00	0.31	69.7
Wilton Rd (west)										
WT	T	92	3.3	0.035	0.5	LOS A	2	0.21	0.00	74.9
WR	R	4	25.0	0.035	13.2	LOS A	2	0.33	0.66	57.1
Approach		95	4.2	0.035	1.1	LOS A	2	0.22	0.03	74.0
All Vehicles		290	4.8	0.068	5.3	Not Applicable	3	0.13	0.30	68.0

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Wilton Rd / Macarthur Rd

Future (2019) - PM

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macarthur Rd (south)										
SL	L	6	0.0	0.007	13.5	LOS A	0	0.26	0.86	42.8
SR	R	39	0.0	0.067	15.9	LOS B	2	0.45	0.90	53.6
Approach		45	0.0	0.067	15.6	LOS B	2	0.43	0.89	52.7
Wilton Rd (east)										
EL	L	55	1.8	0.030	11.0	LOS A	0	0.00	0.73	58.9
ET	T	145	1.4	0.075	0.0	LOS A	0	0.00	0.00	80.0
Approach		200	1.5	0.075	3.0	LOS A		0.00	0.20	72.9
Wilton Rd (west)										
WT	T	117	4.3	0.047	0.8	LOS A	3	0.25	0.00	74.1
WR	R	7	28.6	0.048	13.9	LOS A	3	0.39	0.68	56.7
Approach		124	5.6	0.047	1.5	LOS A	3	0.26	0.04	72.9
All Vehicles		369	2.7	0.075	4.1	Not Applicable	3	0.14	0.23	69.9

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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attachment d3

future (2019) scenario plus additional project traffic

SIDRA INTERSECTION

Movement Summary

Appin Rd / Wilton Rd

Future (2019) - AM (plus project)

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Wilton Rd (south)										
ST	T	86	2.3	0.292	22.5	LOS B	11	0.78	1.04	15.9
SR	R	86	2.3	0.344	26.0	LOS B	13	0.80	1.06	31.4
Approach		172	2.3	0.345	24.3	LOS B	13	0.79	1.05	26.5
Appin Rd (east)										
EL	L	89	1.1	0.394	6.4	LOS A	0	0.00	0.61	43.3
ER	R	631	2.1	0.393	6.6	LOS A	0	0.00	0.63	43.2
Approach		720	1.9	0.393	6.6	LOS A		0.00	0.63	43.2
Appin Rd (north)										
NL	L	361	3.3	0.328	6.2	LOS A	14	0.25	0.52	34.5
NT	T	64	10.9	0.283	27.5	LOS B	11	0.82	1.04	31.0
Approach		425	4.5	0.328	9.4	LOS A	14	0.33	0.60	33.3
All Vehicles		1317	2.8	0.394	9.8	Not Applicable	14	0.21	0.67	38.5

Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue

- Density for continuous movement



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SIDRA INTERSECTION

Movement Summary

Appin Rd / Wilton Rd

Future (2019) - PM (plus project)

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Wilton Rd (south)										
ST	T	116	0.9	0.242	15.3	LOS B	9	0.62	1.01	20.5
SR	R	124	0.8	0.354	20.3	LOS B	15	0.71	1.07	34.2
Approach		240	0.8	0.355	17.9	LOS B	15	0.67	1.04	30.5
Appin Rd (east)										
EL	L	137	1.5	0.291	6.5	LOS A	0	0.00	0.61	43.3
ER	R	397	2.3	0.291	6.6	LOS A	0	0.00	0.63	43.2
Approach		533	2.1	0.291	6.6	LOS A		0.00	0.62	43.2
Appin Rd (north)										
NL	L	546	0.9	0.517	6.9	LOS A	30	0.38	0.57	33.5
NT	T	109	0.9	0.263	17.3	LOS B	10	0.67	1.03	36.1
Approach		655	0.9	0.517	8.6	LOS A	30	0.43	0.65	34.4
All Vehicles		1428	1.3	0.517	9.4	Not Applicable	30	0.31	0.71	37.8

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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SIDRA INTERSECTION

Movement Summary

Appin Rd - Sherrif Rd (Appin East Colliery Entry)

Future (2019) - AM (plus project)

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
EL	L	81	62.2	0.219	13.3	LOS A	0	0.00	0.72	57.6
ET	T	704	5.3	0.219	0.0	LOS A	0	0.00	0.00	80.0
Approach		786	11.2	0.219	1.4	LOS A		0.00	0.08	77.4
Appin Rd (west)										
WT	T	579	18.1	0.186	9.4	LOS A	57	0.42	0.00	61.4
WR	R	8	0.0	0.186	32.5	LOS C	57	0.96	0.99	35.4
Approach		587	17.9	0.186	9.7	LOS A	57	0.43	0.01	60.9
All Vehicles		1373	14.1	0.219	5.0	Not Applicable	57	0.18	0.05	69.3

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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SIDRA INTERSECTION

Movement Summary

Appin Rd - Sherrif Rd (Appin East Colliery Entry)

Future (2019) - PM (plus project)

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
EL	L	66	36.4	0.151	12.3	LOS A	0	0.00	0.72	57.6
ET	T	493	2.2	0.151	0.0	LOS A	0	0.00	0.00	80.0
Approach		559	6.3	0.151	1.5	LOS A		0.00	0.09	77.1
Appin Rd (west)										
WT	T	746	7.9	0.218	4.9	LOS A	42	0.42	0.00	69.1
WR	R	12	0.0	0.218	21.7	LOS B	42	0.91	0.98	43.9
Approach		758	7.8	0.218	5.2	LOS A	42	0.42	0.02	68.6
Sherrif Rd (south)										
32	R	1	0.0	0.001	8.3	LOS A	0	0.00	0.68	48.8
Approach		1	0.0	0.001	8.3	LOS A		0.00	0.68	48.8
All Vehicles		1318	7.1	0.218	3.6	Not Applicable	42	0.24	0.05	71.9

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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SIDRA INTERSECTION

Movement Summary

Appin Rd - George St (Appin East Colliery Exit)

Future (2019) - AM (Plus Project)

Signalised - Fixed time

Cycle Time = 50 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	704	5.3	0.639	18.9	LOS B	79	0.85	0.78	46.0
Approach		704	5.3	0.639	18.9	LOS B	79	0.85	0.78	46.0
Appin Rd (west)										
WT	T	438	3.7	0.319	12.8	LOS A	39	0.76	0.63	43.2
Approach		438	3.7	0.319	12.8	LOS A	39	0.76	0.63	43.2
George St (south)										
30	L	8	0.0	0.179	16.1	LOS B	24	0.68	0.72	31.1
SR	R	91	53.3	0.178	18.6	LOS B	24	0.68	0.75	33.9
Approach		98	49.0	0.178	18.4	LOS B	24	0.68	0.75	33.7
All Vehicles		1240	8.1	0.639	16.7	LOS B	79	0.81	0.73	43.6

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Appin Rd - George St (Appin East Colliery Exit)

Future (2019) - PM (Plus Project)

Signalised - Fixed time

Cycle Time = 40 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	493	2.2	0.790	23.5	LOS B	60	0.97	0.88	41.7
Approach		493	2.2	0.790	23.5	LOS B	60	0.97	0.88	41.7
Appin Rd (west)										
WT	T	641	0.9	0.827	21.9	LOS B	64	1.00	1.05	37.4
Approach		641	0.9	0.827	21.9	LOS B	64	1.00	1.05	37.4
George St (south)										
30	L	12	0.0	0.128	11.2	LOS A	14	0.56	0.69	33.5
SR	R	83	38.1	0.128	13.2	LOS A	14	0.56	0.72	36.4
Approach		96	33.3	0.128	13.0	LOS A	14	0.56	0.72	36.0
All Vehicles		1230	4.0	0.827	21.9	LOS B	64	0.96	0.95	38.7

Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue

- Density for continuous movement



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INTERSECTION

Movement Summary

Appin Rd / Princes Hwy Off-Ramp

FU (2019) - AM (plus development)

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	669	10.0	0.365	0.0	LOS A	0	0.00	0.00	80.0
Approach		669	10.0	0.365	0.0	LOS A		0.00	0.00	80.0
Merge Lane										
Merge	T	53	7.7	0.079	13.9	LOS A	2	0.55	0.84	55.4
Approach		52	7.7	0.079	13.9	LOS A	2	0.55	0.84	55.4
Princes Hwy Off-Ramp (north)										
NR	R	53	7.7	0.122	19.7	LOS B	4	0.57	0.98	50.5
Approach		52	7.7	0.122	19.7	LOS B	4	0.57	0.98	50.5
Appin Rd (west)										
WL	L	7	28.6	0.021	12.6	LOS A	0	0.00	0.73	58.9
WT	T	397	15.4	0.208	0.0	LOS A	0	0.00	0.00	80.0
Approach		404	15.6	0.208	0.2	LOS A		0.00	0.01	79.5
All Vehicles		1177	11.7	0.365	1.6	Not Applicable	4	0.05	0.08	76.4

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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Movement Summary

Appin Rd / Princes Hwy Off-Ramp

FU (2019) - PM (plus project)

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	342	11.4	0.188	0.0	LOS A	0	0.00	0.00	80.0
Approach		342	11.4	0.188	0.0	LOS A		0.00	0.00	80.0
Merge Lane										
Merge	T	84	1.2	0.081	11.2	LOS A	2	0.38	0.69	57.6
Approach		84	1.2	0.081	11.2	LOS A	2	0.38	0.69	57.6
Princes Hwy Off-Ramp (north)										
NR	R	84	1.2	0.300	26.8	LOS B	11	0.76	1.03	43.9
Approach		84	1.2	0.300	26.8	LOS B	11	0.76	1.03	43.9
Appin Rd (west)										
WL	L	4	25.0	0.033	12.4	LOS A	0	0.00	0.73	58.9
WT	T	668	7.0	0.328	0.0	LOS A	0	0.00	0.00	80.0
Approach		672	7.1	0.328	0.1	LOS A		0.00	0.00	79.8
All Vehicles		1182	7.5	0.328	2.7	Not Applicable	11	0.08	0.12	73.7

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



SIDRA SOLUTIONS

Site: FU (2019) - PM (plus development)
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SIDRA INTERSECTION

Movement Summary

Masters Rd / Springhill Rd

Future (2019) - AM (plus project)

Signalised - Fixed time

Cycle Time = 110 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Springhill Rd (south)										
1	L	564	0.0	0.186	13.3	LOS A	31	0.23	0.73	55.9
2	T	2613	0.0	0.862	30.1	LOS C	306	0.94	0.92	40.7
Approach		3177	0.0	0.862	27.1	LOS B	306	0.82	0.89	42.7
Springhill Rd (north)										
8	T	677	0.0	0.335	16.4	LOS B	84	0.62	0.54	52.4
9	R	336	0.0	0.829	73.3	LOS F	58	1.00	0.91	23.6
Approach		1013	0.0	0.829	35.3	LOS C	84	0.75	0.66	37.4
Masters Rd (west)										
10	L	557	0.0	0.539	39.0	LOS C	117	0.81	0.82	35.3
12	R	752	0.0	0.550	50.4	LOS D	93	0.93	0.83	30.4
Approach		1309	0.0	0.550	45.6	LOS D	117	0.87	0.83	32.3
All Vehicles		5499	0.0	0.862	33.0	LOS C	306	0.82	0.83	38.8

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P5	50	49.2	LOS E	0	0.95	0.95
All Peds	50	49.2	LOS D	0	0.95	0.95

Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue

- Density for continuous movement



SIDRA SOLUTIONS

Site: FU (2019)-AM (plus project)

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SIDRA INTERSECTION

Movement Summary

Masters Rd / Springhill Rd

Future (2019) - PM (plus project)

Signalised - Fixed time

Cycle Time = 110 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Springhill Rd (south)										
1	L	916	0.0	0.377	20.3	LOS B	88	0.49	0.79	48.3
2	T	1375	0.0	0.663	32.2	LOS C	149	0.90	0.79	39.3
Approach		2291	0.0	0.663	27.4	LOS B	149	0.74	0.79	42.5
Springhill Rd (north)										
8	T	1224	0.0	0.885	46.9	LOS D	250	1.00	1.02	31.9
9	R	1122	0.0	0.852	62.5	LOS E	155	1.00	0.97	26.4
Approach		2346	0.0	0.885	54.3	LOS D	250	1.00	1.00	29.0
Masters Rd (west)										
10	L	228	0.0	0.159	24.5	LOS B	40	0.53	0.76	44.6
12	R	702	0.0	0.513	50.0	LOS D	87	0.92	0.82	30.6
Approach		930	0.0	0.513	43.7	LOS D	87	0.82	0.81	33.1
All Vehicles		5567	0.0	0.885	41.5	LOS C	250	0.86	0.88	34.2

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P5	50	49.2	LOS E	0	0.95	0.95
All Peds	50	49.2	LOS D	0	0.95	0.95

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue

- Density for continuous movement



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INTERSECTION

Movement Summary

Picton Rd / Almond St (Wilton Rd)

Future (2019) - AM (plus project)

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Picton Rd (east)										
ET	T	704	13.5	0.393	0.0	LOS A	0	0.00	0.00	100.0
ER	R	14	30.8	0.045	25.6	LOS B	2	0.76	0.94	47.6
Approach		717	13.8	0.393	0.5	LOS A	2	0.01	0.02	98.5
Median Storage										
S	T	142	3.5	0.388	11.8	LOS A	13	0.75	0.99	36.6
Approach		142	3.5	0.388	11.8	LOS A	13	0.75	0.99	36.6
Almond St (north)										
NL	L	18	0.0	0.692	42.3	LOS C	36	0.92	1.23	34.2
NR	R	142	3.5	0.689	44.3	LOS D	36	0.92	1.23	27.3
Approach		160	3.1	0.691	44.0	LOS D	36	0.92	1.23	28.3
Picton Rd (west)										
WL	L	104	8.7	0.059	13.1	LOS A	0	0.00	0.76	63.3
WT	T	835	12.1	0.462	0.0	LOS A	0	0.00	0.00	100.0
Approach		939	11.7	0.462	1.4	LOS A		0.00	0.08	95.3
All Vehicles		1958	11.2	0.692	5.3	Not Applicable	36	0.13	0.22	80.9

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



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INTERSECTION

Movement Summary

Picton Rd / Almond St (Wilton Rd)

Future (2019) - PM (plus project)

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Picton Rd (east)										
ET	T	789	5.7	0.420	0.0	LOS A	0	0.00	0.00	100.0
ER	R	13	7.7	0.034	21.3	LOS B	1	0.73	0.92	51.1
Approach		802	5.7	0.420	0.3	LOS A	1	0.01	0.01	98.8
Median Storage										
5	T	165	2.4	0.480	13.8	LOS A	17	0.79	1.09	34.3
Approach		165	2.4	0.480	13.8	LOS A	17	0.79	1.09	34.3
Almond St (north)										
NL	L	15	0.0	0.938	85.6	LOS F	76	0.98	1.66	22.4
NR	R	165	2.4	0.932	87.6	LOS F	76	0.98	1.64	16.7
Approach		180	2.2	0.932	87.4	LOS F	76	0.98	1.65	17.2
Picton Rd (west)										
WL	L	192	4.7	0.106	12.8	LOS A	0	0.00	0.75	63.3
WT	T	945	3.5	0.496	0.0	LOS A	0	0.00	0.00	100.0
Approach		1137	3.7	0.496	2.2	LOS A		0.00	0.13	92.9
All Vehicles		2284	4.2	0.938	9.1	Not Applicable	76	0.14	0.28	72.4

Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue

- Density for continuous movement



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Site: FU (2019) - PM (plus Development)

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SIDRA INTERSECTION

Movement Summary

Springhill Rd / Port Kembla Rd

Future (2019) - AM (plus project)

Signalised - Fixed time

Cycle Time = 50 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Port Kembla Rd (south)										
1	L	71	0.0	0.091	17.2	LOS B	11	0.63	0.73	39.0
3	R	8	0.0	0.036	29.2	LOS C	2	0.91	0.66	30.4
Approach		79	0.0	0.091	18.4	LOS B	11	0.66	0.72	38.0
Springhill Rd (east)										
4	L	12	0.0	0.252	20.6	LOS B	30	0.76	0.77	37.2
5	T	489	0.0	0.252	13.1	LOS A	30	0.76	0.62	48.0
Approach		501	0.0	0.252	13.3	LOS A	30	0.76	0.62	47.7
Sprinhill Rd (west)										
11	T	1093	0.0	0.280	4.1	LOS A#	7#	0.00	0.32	70.8
12	R	78	0.0	0.233	30.0	LOS C	18	0.89	0.76	36.9
Approach		1171	0.0	0.280	5.8	LOS A	18	0.06	0.35	67.4
All Vehicles		1751	0.0	0.280	8.5	LOS A	30	0.29	0.44	58.5

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	15.2	LOS B	0	0.78	0.78
All Peds	50	15.2	LOS B	0	0.78	0.78

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue

- Density for continuous movement



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Movement Summary

Springhill Rd / Port Kembla Rd

Future (2019) - PM (plus project)

Signalised - Fixed time

Cycle Time = 50 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Port Kembla Rd (south)										
1	L	107	0.0	0.160	19.7	LOS B	19	0.71	0.75	37.6
3	R	28	0.0	0.126	29.7	LOS C	7	0.92	0.71	30.1
Approach		135	0.0	0.160	21.7	LOS B	19	0.76	0.74	35.9
Springhill Rd (east)										
4	L	5	0.0	0.463	19.7	LOS B	59	0.79	0.81	37.8
5	T	1094	0.0	0.470	12.2	LOS A	59	0.79	0.67	48.9
Approach		1099	0.0	0.470	12.3	LOS A	59	0.79	0.67	48.8
Sprinhill Rd (west)										
11	T	598	0.0	0.153	4.1	LOS A#	4#	0.00	0.32	70.8
12	R	76	0.0	0.341	33.6	LOS C	19	0.96	0.76	34.7
Approach		674	0.0	0.341	7.4	LOS A	19	0.11	0.37	64.5
All Vehicles		1908	0.0	0.470	11.2	LOS A	59	0.54	0.57	52.0

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	13.0	LOS B	0	0.72	0.72
All Peds	50	13.0	LOS A	0	0.72	0.72

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue

- Density for continuous movement



SIDRA SOLUTIONS

Site: FU (2019)-PM (plus project)

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INTERSECTION

Movement Summary

Springhill Rd / Recycling Rd

Future (2019) - AM (plus project)

Signalised - Actuated isolated

Cycle Time = 108 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Springhill Rd (south)										
SL	L	56	49.1	0.974	67.0	LOS E	410	1.00	1.11	22.4
ST	T	2481	4.6	0.972	54.1	LOS D	409	1.00	1.11	29.2
SR	R	64	16.9	0.303	60.2	LOS E	32	0.92	0.76	24.0
Approach		2601	5.9	0.972	54.5	LOS D	410	1.00	1.10	29.0
Bluescope Steel (east)										
EL	L	28	7.1	0.149	53.4	LOS D	13	0.89	0.71	22.5
ET	T	3	66.7	0.017	46.0	LOS D	2	0.88	0.56	25.0
ER	R	9	22.2	0.101	62.9	LOS E	5	0.96	0.67	20.8
Approach		40	15.0	0.149	55.0	LOS D	13	0.91	0.69	22.3
Springhill Rd (north)										
NL	L	37	5.4	0.027	13.8	LOS A	2	0.14	0.97	53.9
NT	T	1351	8.4	0.526	22.9	LOS B	142	0.74	0.66	46.1
NR	R	69	54.3	0.404	63.0	LOS E	45	0.94	0.77	23.5
Approach		1458	10.6	0.526	24.6	LOS B	142	0.74	0.67	44.6
Recycling Rd (west)										
WL	L	57	75.4	0.396	58.7	LOS E	46	0.93	0.77	21.8
WT	T	6	50.0	0.396	50.5	LOS D	46	0.93	0.73	23.9
WR	R	24	70.8	0.350	66.8	LOS E	19	0.97	0.72	20.3
Approach		87	72.4	0.396	60.4	LOS E	46	0.95	0.75	21.5
All Vehicles		4186	9.0	0.974	44.2	LOS D	410	0.91	0.94	32.6

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
SP	11	53.2	LOS E	0	0.95	0.95
EP	21	48.2	LOS E	0	0.94	0.94
WP	21	48.2	LOS E	0	0.94	0.94

All Peds	53	49.2	LOS D	0	0.95	0.95
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Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue

- Density for continuous movement



SIDRA SOLUTIONS

Site: FU (2019) - AM (plus project)

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INTERSECTION

Movement Summary

Springhill Rd / Recycling Rd

Future (2019) - PM (plus project)

Signalised - Actuated isolated

Cycle Time = 92 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Springhill Rd (south)										
SL	L	11	20.0	0.669	33.1	LOS C	167	0.82	0.86	35.6
ST	T	1827	1.5	0.679	21.4	LOS B	167	0.82	0.74	47.4
SR	R	28	7.1	0.243	59.1	LOS E	12	0.96	0.72	24.2
Approach		1865	1.7	0.679	22.0	LOS B	167	0.82	0.74	46.8
Bluescope Steel (east)										
EL	L	64	16.9	0.323	47.2	LOS D	27	0.91	0.75	23.9
ET	T	6	50.0	0.029	38.4	LOS C	3	0.87	0.58	27.0
ER	R	37	5.4	0.317	54.6	LOS D	16	0.97	0.72	22.3
Approach		108	14.8	0.323	49.3	LOS D	27	0.93	0.73	23.5
Springhill Rd (north)										
NL	L	9	22.2	0.007	14.7	LOS B	0	0.14	0.96	54.0
NT	T	2484	1.7	0.918	32.6	LOS C	287	0.99	0.98	39.1
NR	R	25	72.0	0.313	62.9	LOS E	17	0.96	0.72	23.7
Approach		2518	2.4	0.918	32.8	LOS C	287	0.99	0.98	38.9
Recycling Rd (west)										
WL	L	89	21.1	0.398	48.4	LOS D	40	0.93	0.77	23.7
WT	T	1	0.0	0.393	41.8	LOS C	40	0.93	0.73	26.1
WR	R	48	6.2	0.414	55.2	LOS D	21	0.97	0.74	22.2
Approach		139	15.8	0.414	50.7	LOS D	40	0.94	0.76	23.2
All Vehicles		4630	2.8	0.918	29.4	LOS C	287	0.92	0.87	40.3

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
SP	11	45.7	LOS E	0	0.94	0.94
EP	21	40.2	LOS E	0	0.93	0.93
WP	21	40.2	LOS E	0	0.93	0.93

All Peds	53	41.3	LOS C	0	0.94	0.94
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Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue

- Density for continuous movement



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Movement Summary

Wilton Rd / Douglas Park Dr

Future (2019) - AM (plus project)

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Wilton Rd (east)										
ET	T	45	0.0	0.079	0.3	LOS A	3	0.17	0.00	76.0
ER	R	76	0.0	0.079	11.0	LOS A	3	0.17	0.69	58.3
Approach		121	0.0	0.079	7.0	LOS A	3	0.17	0.43	63.9
Douglas Park Dr (north)										
NL	L	84	1.2	0.387	16.2	LOS B	20	0.47	0.85	53.4
NR	R	187	4.8	0.388	16.4	LOS B	20	0.47	0.96	53.6
Approach		271	3.7	0.388	16.3	LOS B	20	0.47	0.93	53.5
Wilton Rd (west)										
WL	L	151	6.0	0.119	11.7	LOS A	5	0.18	0.64	57.6
WT	T	67	3.0	0.035	0.0	LOS A	0	0.00	0.00	80.0
Approach		217	5.1	0.119	8.1	LOS A	5	0.13	0.44	63.1
All Vehicles		609	3.4	0.388	11.5	Not Applicable	20	0.29	0.66	58.6

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



SIDRA SOLUTIONS

Site: FU (2019) - AM (plus project)
 T:\2007\07267\Survey Results & Modelling\SIDRA_090521\Wilton - Douglas Park.aap
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SIDRA
INTERSECTION

Movement Summary

Wilton Rd / Douglas Park Dr

Future (2019) - PM (plus project)

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Wilton Rd (east)										
ET	T	100	0.0	0.131	0.3	LOS A	6	0.17	0.00	75.9
ER	R	108	0.0	0.131	11.0	LOS A	6	0.17	0.69	58.2
Approach		208	0.0	0.131	5.8	LOS A	6	0.17	0.36	65.7
Douglas Park Dr (north)										
NL	L	104	1.0	0.545	20.0	LOS B	38	0.59	0.96	49.6
NR	R	225	3.6	0.545	20.0	LOS B	38	0.59	1.09	49.7
Approach		329	2.7	0.545	20.0	LOS B	38	0.59	1.05	49.7
Wilton Rd (west)										
WL	L	214	3.8	0.167	11.7	LOS A	7	0.23	0.64	57.3
WT	T	63	0.0	0.032	0.0	LOS A	0	0.00	0.00	80.0
Approach		276	2.9	0.167	9.0	LOS A	7	0.18	0.50	61.3
All Vehicles		813	2.1	0.545	12.7	Not Applicable	38	0.34	0.68	56.9

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



SIDRA SOLUTIONS

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attachment d4

future performance of modified intersection arrangements

**SIDRA
INTERSECTION**

Movement Summary

Appin Rd - West Cliff Colliery Access

Future (2019) - AM (plus project) - Signals

Signalised - Fixed time

Cycle Time = 40 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	760	1.4	0.715	8.4	LOS A	95	0.80	0.74	76.6
ER	R	52	100.0	0.256	24.4	LOS B	13	0.60	0.77	48.9
Approach		812	7.8	0.715	9.4	LOS A	95	0.78	0.74	74.3
West Cliff Access (north)										
NL	L	55	100.0	0.189	16.5	LOS B	7	0.44	0.75	53.9
NR	R	46	100.0	0.260	32.8	LOS C	18	0.92	0.75	44.1
Approach		101	100.0	0.260	24.0	LOS B	18	0.66	0.75	48.9
Appin Rd (west)										
WL	L	61	37.7	0.076	19.3	LOS B	8	0.49	0.77	55.8
WT	T	465	2.8	0.221	5.0	LOS A	24	0.54	0.45	82.8
Approach		527	6.8	0.221	6.7	LOS A	24	0.54	0.49	79.4
All Vehicles		1440	13.9	0.715	9.4	LOS A	95	0.68	0.65	72.5

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



SIDRA SOLUTIONS

Site: FU (2019) - AM (plus project) - Signals_v2
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SIDRA INTERSECTION

Movement Summary

Appin Rd - West Cliff Colliery Access

Future (2019) - PM (plus project) - Signals

Signalised - Fixed time

Cycle Time = 30 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Appin Rd (east)										
ET	T	485	1.6	0.629	8.5	LOS A	56	0.85	0.75	75.4
ER	R	41	100.0	0.248	27.5	LOS B	11	0.79	0.76	46.1
Approach		526	9.3	0.628	10.0	LOS A	56	0.85	0.75	72.3
West Cliff Access (north)										
NL	L	52	100.0	0.167	17.8	LOS B	8	0.61	0.76	53.0
NR	R	42	66.7	0.154	24.8	LOS B	10	0.86	0.74	44.6
Approach		94	85.1	0.167	20.9	LOS B	10	0.72	0.75	49.5
Appin Rd (west)										
WL	L	32	100.0	0.074	24.6	LOS B	6	0.64	0.75	48.7
WT	T	666	0.5	0.428	7.4	LOS A	36	0.77	0.64	77.3
Approach		698	5.0	0.428	8.2	LOS A	36	0.76	0.65	75.6
All Vehicles		1318	12.4	0.629	9.8	LOS A	56	0.79	0.70	71.2

Symbols which may appear in this table:

Following Degree of Saturation
 # x = 1.00 for Short Lane with resulting Excess Flow
 * x = 1.00 due to minimum capacity

Following LOS
 # - Based on density for continuous movements

Following Queue
 # - Density for continuous movement



SIDRA SOLUTIONS

Site: FU (2019) - PM (plus project) - Signals
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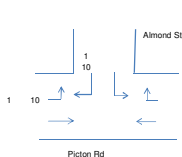
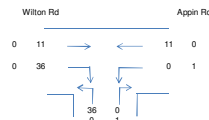
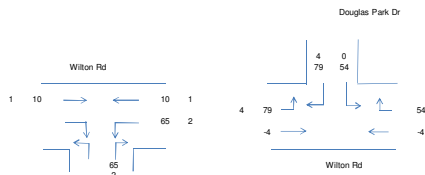
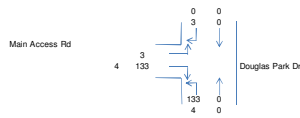


attachment e

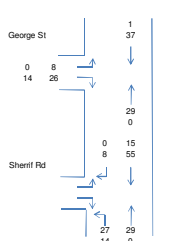
additional project traffic distribution at key intersections

AM TURNING COUNT MOVEMENTS (ADDITIONAL)

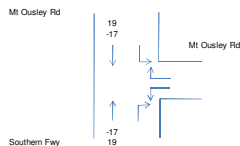
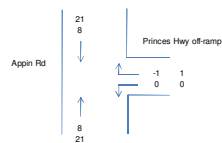
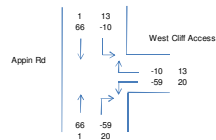
ASAT 21 MAY 2009



Macarthur Rd

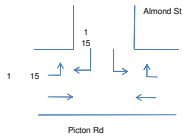
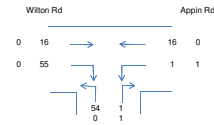
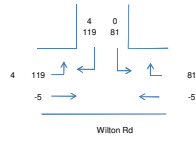
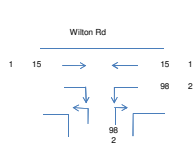
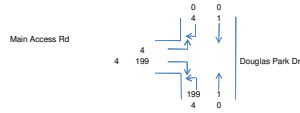


Appin Rd

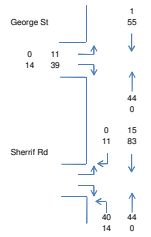


PM TURNING COUNT MOVEMENTS (ADDITIONAL)

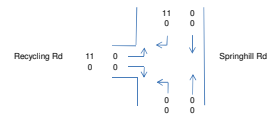
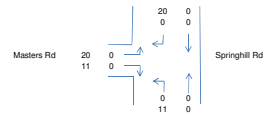
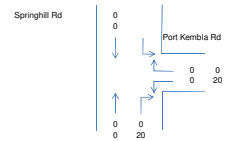
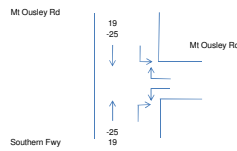
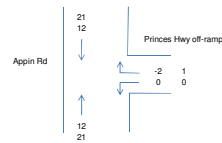
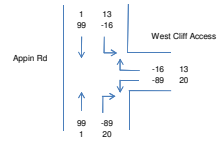
ASAT 21 MAY 2009



Macarthur Rd



Appin Rd



EXISTING

AM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.2 per car)

APPIN WEST (80% of Appin Staff)	IN	OUT	COMBINED
appin	5	5	10
Bulli pass	31	31	62
Camden	2	2	3
Campbelltown	6	6	11
Douglas Park	2	2	4
Mittagong	2	2	4
Picton	5	5	10
Sydney	2	2	4
Wgong south	50	50	100
Wilton	2	2	3
TOTAL	105	105	210

AM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.2 per car)

APPIN EAST (20% of Appin Staff)	IN	OUT	COMBINED
appin	1	1	3
Bulli pass	8	8	15
Camden	0	0	1
Campbelltown	1	1	3
Douglas Park	1	1	1
Mittagong	0	0	1
Picton	1	1	2
Sydney	0	0	1
Wgong south	12	12	25
Wilton	0	0	1
TOTAL	26	26	53

AM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.5 per car)

WEST CLIFF	IN	OUT	COMBINED
appin	1	1	2
Bulli pass	32	32	64
Camden	2	2	4
Campbelltown	2	2	3
Douglas Park	0	0	1
Mittagong	3	3	7
Picton	2	2	5
Sydney	4	4	8
Wgong south	42	42	84
Wilton	1	1	1
TOTAL	89	89	179

PM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.2 per car)

APPIN WEST (80% of Appin Staff)	IN	OUT	COMBINED
appin	8	8	15
Bulli pass	46	46	92
Camden	2	2	5
Campbelltown	9	9	17
Douglas Park	3	3	6
Mittagong	3	3	5
Picton	7	7	14
Sydney	3	3	5
Wgong south	75	75	150
Wilton	2	2	5
TOTAL	158	158	315

PM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.2 per car)

APPIN EAST (20% of Appin Staff)	IN	OUT	COMBINED
appin	2	2	4
Bulli pass	12	12	23
Camden	1	1	1
Campbelltown	2	2	4
Douglas Park	1	1	2
Mittagong	1	1	1
Picton	2	2	4
Sydney	1	1	1
Wgong south	19	19	37
Wilton	1	1	1
TOTAL	39	39	79

PM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.5 per car)

WEST CLIFF	IN	OUT	COMBINED
appin	1	1	2
Bulli pass	48	48	95
Camden	3	3	7
Campbelltown	2	2	5
Douglas Park	0	0	1
Mittagong	5	5	10
Picton	4	4	7
Sydney	6	6	12
Wgong south	63	63	126
Wilton	1	1	2
TOTAL	134	134	268

FUTURE with Project

AM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.2 per car)

APPIN WEST (80% of Appin Staff)	IN	OUT	COMBINED
appin	12	12	24
Bulli pass	71	71	141
Camden	3	3	7
Campbelltown	13	13	26
Douglas Park	5	5	10
Mittagong	4	4	8
Picton	11	11	22
Sydney	4	4	8
Wgong south	114	114	228
Wilton	3	3	7
TOTAL	241	241	481

PM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.2 per car)

APPIN WEST (80% of Appin Staff)	IN	OUT	COMBINED
appin	18	18	35
Bulli pass	106	106	212
Camden	5	5	10
Campbelltown	20	20	39
Douglas Park	7	7	15
Mittagong	6	6	12
Picton	17	17	33
Sydney	6	6	12
Wgong south	171	171	342
Wilton	5	5	10
TOTAL	361	361	722

AM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.2 per car)

APPIN EAST (20% of Appin Staff)	IN	OUT	COMBINED
appin	3	3	6
Bulli pass	18	18	35
Camden	1	1	2
Campbelltown	3	3	7
Douglas Park	1	1	2
Mittagong	1	1	2
Picton	3	3	6
Sydney	1	1	2
Wgong south	28	28	57
Wilton	1	1	2
TOTAL	60	60	120

PM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.2 per car)

APPIN EAST (20% of Appin Staff)	IN	OUT	COMBINED
appin	4	4	9
Bulli pass	26	26	53
Camden	1	1	3
Campbelltown	5	5	10
Douglas Park	2	2	4
Mittagong	2	2	3
Picton	4	4	8
Sydney	2	2	3
Wgong south	43	43	85
Wilton	1	1	3
TOTAL	90	90	180

AM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.5 per car)

WEST CLIFF	IN	OUT	COMBINED
appin	0	0	0
Bulli pass	7	7	14
Camden	0	0	1
Campbelltown	0	0	1
Douglas Park	0	0	0
Mittagong	1	1	1
Picton	1	1	1
Sydney	1	1	2
Wgong south	9	9	18
Wilton	0	0	0
TOTAL	20	20	39

PM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.5 per car)

WEST CLIFF	IN	OUT	COMBINED
appin	0	0	1
Bulli pass	10	10	21
Camden	1	1	1
Campbelltown	1	1	1
Douglas Park	0	0	0
Mittagong	1	1	2
Picton	1	1	2
Sydney	1	1	3
Wgong south	14	14	28
Wilton	0	0	0
TOTAL	29	29	59

RELATIVE CHANGE

AM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.2 per car)

APPIN WEST (80% of Appin Staff)	IN	OUT	COMBINED
appin	7	7	13
Bulli pass	40	40	79
Camden	2	2	4
Campbelltown	7	7	15
Douglas Park	3	3	5
Mittagong	2	2	5
Picton	6	6	12
Sydney	2	2	5
Wgong south	64	64	128
Wilton	2	2	4
TOTAL	135	135	271

PM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.2 per car)

APPIN WEST (80% of Appin Staff)	OUT	COMBINED
appin	10	10
Bulli pass	60	60
Camden	3	3
Campbelltown	11	11
Douglas Park	4	4
Mittagong	4	4
Picton	9	9
Sydney	4	4
Wgong south	96	96
Wilton	3	3
TOTAL	203	203

AM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.2 per car)

APPIN EAST (20% of Appin Staff)	IN	OUT	COMBINED
appin	2	2	3
Bulli pass	10	10	20
Camden	0	0	1
Campbelltown	2	2	4
Douglas Park	1	1	1
Mittagong	1	1	1
Picton	2	2	3
Sydney	1	1	1
Wgong south	16	16	32
Wilton	0	0	1
TOTAL	34	34	67

PM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.2 per car)

APPIN EAST (20% of Appin Staff)	IN	OUT	COMBINED
appin	2	2	5
Bulli pass	15	15	30
Camden	1	1	1
Campbelltown	3	3	6
Douglas Park	1	1	2
Mittagong	1	1	2
Picton	2	2	5
Sydney	1	1	2
Wgong south	24	24	48
Wilton	1	1	1
TOTAL	51	51	101

AM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.5 per car)

WEST CLIFF	IN	OUT	COMBINED
appin	-1	-1	-1
Bulli pass	-25	-25	-50
Camden	-2	-2	-3
Campbelltown	-1	-1	-3
Douglas Park	0	0	0
Mittagong	-3	-3	-5
Picton	-2	-2	-4
Sydney	-3	-3	-6
Wgong south	-33	-33	-66
Wilton	0	0	-1
TOTAL	-70	-70	-140

PM PEAK HOUR STAFF MOVEMENTS (includes car pooling of 1.5 per car)

WEST CLIFF	IN	OUT	COMBINED
appin	-1	-1	-2
Bulli pass	-37	-37	-75
Camden	-3	-3	-5
Campbelltown	-2	-2	-4
Douglas Park	0	0	-1
Mittagong	-4	-4	-8
Picton	-3	-3	-6
Sydney	-5	-5	-10
Wgong south	-49	-49	-99
Wilton	-1	-1	-1
TOTAL	-105	-105	-209