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Department of Infrastructure, Energy & Resources

Kingston and Environs Transport Study

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INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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1 Introduction

The Kingston Bypass Action Group (KBAG) hosted a public meeting to discuss Channel Highway issues in October 2004. Over 200 members of the public attended the meeting. The Minister for Infrastructure, Energy and Resources announced that a holistic approach to investigating traffic and transport issues would be investigated, and the Kingston and Environs Transport Study was commissioned out of this meeting.

The objective of the Kingston and Environs Transport Study was to model traffic solutions for the State and local road network that improve transport efficiency on the approaches to and within the Kingston Central Area. The outcomes of the study were to contribute to the overall planning of the Kingston and Channel areas.

This document reports the findings of the Kingston and Environs Transport Study.

The major technical component of this study involved the use of Paramics traffic microsimulation modelling software. Microsimulation was chosen for the technical assessment because it can replicate the interaction between vehicles in a transport system. Microsimulation models incorporate all types of vehicles including trucks and buses that run in sequence with the public transport timetables entered into the model. These individual vehicle movements and their interactions with each other are modelled for the purpose of assessing the traffic performance of a transport system.

Microsimulation allows computer simulations of road transport networks to be constructed. Modifications can then be made to the network and the likely impacts of these changes can be viewed and measured.

Paramics also provides detailed high-resolution 3D viewing to enable models to closely resemble real life conditions. Some examples from the KETS Paramics modelling is shown in Figure 1.

Figure 1 KETS Example Paramics Images

Figure 1 (cont) KETS Example Paramics Images

2 Study Area

The KETS study area was carefully selected to include all major roads and areas in the greater Kingston area. The study area included in the Paramics modelling covered an area of 16 square kilometres and included the following suburbs:

- Kingston;
- A portion of Blackmans Bay;
- Maranoa Heights;
- Kingston Beach; and
- Huntingfield.

This study area is shown in Figure 2.

2.1.1 KETS Road Network

The Paramics modelling of the KETS study area includes the following roads. The responsible road authority for each of these roads is also indicated:

- Southern Outlet from north of Firthside overpass to the Kingston Interchange (DIER).
- Channel Highway between Kingston Interchange and south of Huntingfield Avenue (DIER);
- Huon Highway between Southern Outlet and south of Summerleas Road (DIER);
- Summerleas Road between the Huon and Channel Highways (KC);
- Maranoa Road (KC);
- Algona Road (DIER);
- Roslyn Avenue (KC);
- Channel Highway, Kingston Central area (DIER);
- Beach Road (KC);
- Mount Royal Road (KC);
- Redwood Road (KC);
- Hutchins Street (KC);
- Auburn Road (KC);
- Church Street (KC);
- Freeman Street (KC);
- Mertonvale Circuit (KC);
- John Street (KC); and

Other roads within the study area that do not provide a major through traffic function have been included as 'zone connectors' in the modelling.

Figure 2 KETS Study Area

3 Background

3.1 Development of the State Road Network in Kingston

The Hobart Transportation Study of 1964 established the basic highway framework for the Greater Hobart Area. This study recommended the development of the Southern Outlet as the primary access route to Kingston and the Huon Valley. The study also recommended that, as part of the development of the Southern Outlet, a bypass of Kingston be provided and that a future road connection be provided between the Channel Highway south of Kingston and Blackmans Bay.

Following the construction of the first carriageway of the Southern Outlet between Hobart and Kingston in the late 1960's, DIER undertook additional planning work in the Kingston area to define the corridor requirements for a future Kingston bypass and for the proposed Algona Road connection to Blackmans Bay.

In 1980, the requirements for the future Algona Road corridor were defined. In 1983, a bypass corridor for the future Channel Highway, extending from the current Interchange to the Algona Road corridor, was proclaimed.

The first stage of the Huntingfield development, which has access to the Channel Highway immediately to the south of Algona Road, commenced around 1982.

In 1986, a bypass of the Kingston Central Area was provided with the construction of a 2-lane carriageway between the Kingston Interchange and Summerleas Road, a distance of about 700 metres.

Algona Road was opened to traffic as a 2-lane road, with provision for a second carriage when required, in 1986.

Roundabouts were provided on Channel Highway at the Summerleas Road and Algona Road junctions in around 1993 to address operational and highway safety issues.

3.2 Kingston Interchange

The Kingston Interchange has recently been upgraded to address the safety problems that were associated with right turning movements at this interchange. The interchange modifications included:

- Replacement of the existing T-junction of the Southern Outlet southbound off-ramp and the Huon Highway with a roundabout;
- Provide a new on-ramp for Kingston to Hobart traffic; and
- Provide a new on-ramp for Kingston to Margate traffic.

The work to upgrade the interchange recognises future ramp requirements for ultimately providing a dual carriageway highway south of the interchange.

The new interchange is shown in Figure 3.

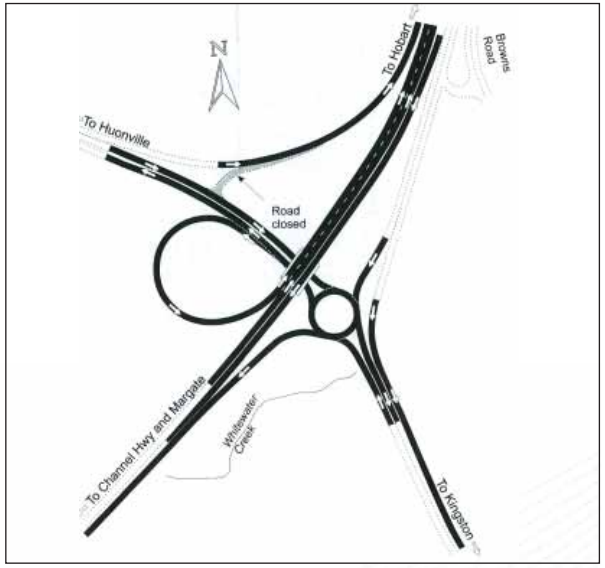


Figure 3 Southern Outlet Kingston Interchange

The new interchange has been included in all Paramics modelling of future traffic demands within the KETS study area.

3.3 Kingston Bypass

The proposed alignment for a future bypass of Kingston was proclaimed in 1983 and is shown in Figure 4. This bypass corridor was established as a "limited access" route, meaning that no property access to or from the corridor is permitted.

The 1983 proposal incorporated a full interchange at the Huon Highway, (all traffic movements), a half diamond interchange at Summerleas Road, (traffic movements to and from Hobart only) and an at grade junction at Algona Road. The original bypass corridor was intended to provide four lanes (two in each direction).

Since the 1983 proclaimation, DIER has acquired some land along the corridor. However further planning work is required to adequately resolve all property issues..

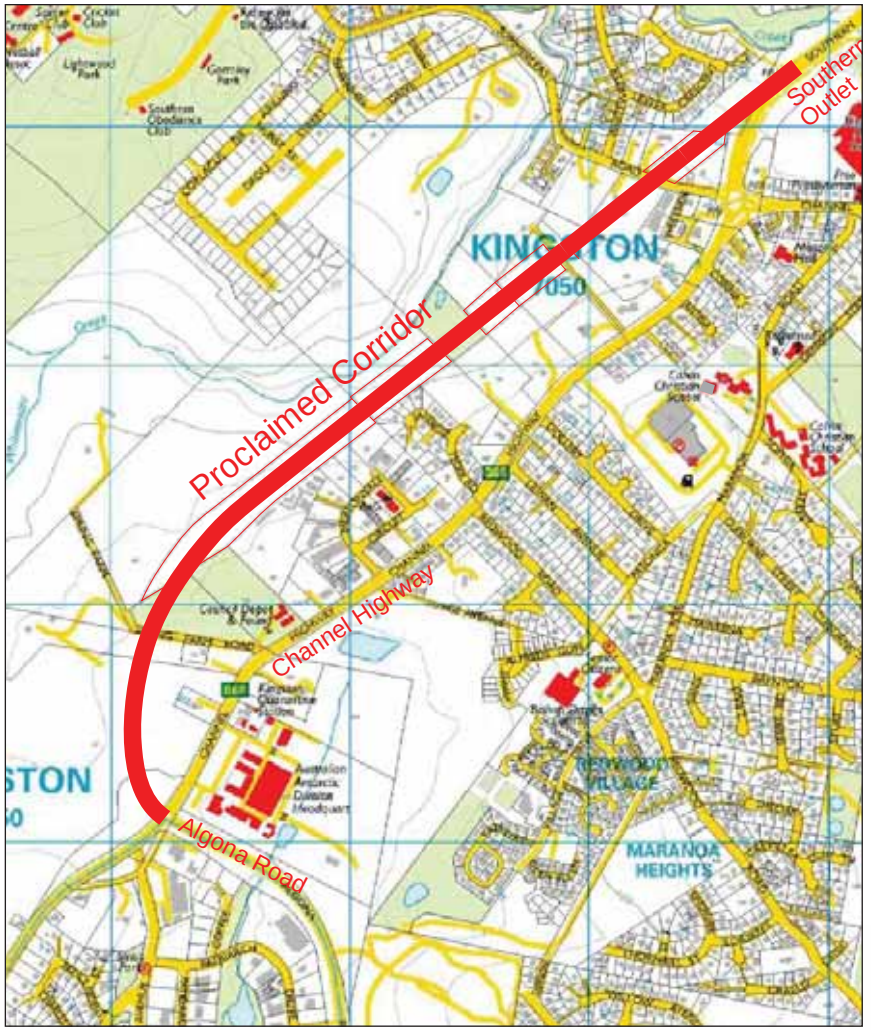


Figure 4 Proclaimed Bypass Corridor

4 Existing Conditions

4.1 Overview

This section details the current operating conditions relating to the transport network, its crash history and the level of public transport provided.

4.2 Traffic Volumes

Approximate average daily traffic volumes on the KETS road network are shown in Figure 5.

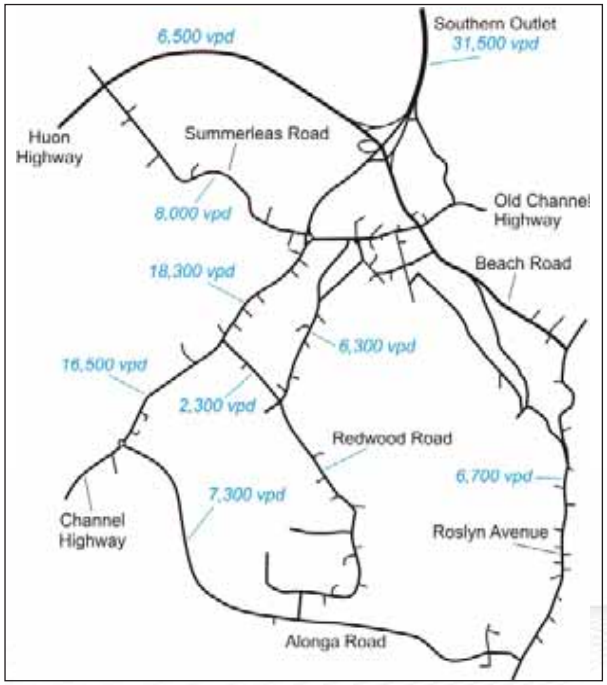


Figure 5 Existing Average Daily Traffic Volumes

The Southern Outlet carries the highest traffic volume of the study area, with an average of 31,500 vehicles per day. The Channel Highway carries between 16,500 and 18,300 vehicles per day between Summerleas Road and Algona Road. Algona Road carries approximately 7,300 vehicles per day, Roslyn Avenue approximately 6,700 vehicles per day and Summerleas Road approximately 8,000 vehicles per day.

4.3 Crashes in Kingston

Crash data for the study area was sourced from DIER for all crashes reported to the Police within a five year period from the end of 1999 to the end of 2004. Some major findings from the crash data analysis include:

- A total of 299 crashes were reported;
- Two fatalities occurred within the study area, one involving a pedestrian;
- A total of 64 hospitalisation injury crashes occurred during this time, 10 of which involved serious injury (detained in hospital overnight or longer);
- Minor property damage was the highest reported crash severity, accounting for 47.8% of all crashes;
- Multiple vehicle accidents made up 65.9% of all accidents and 34.1% were single vehicle accidents.
- Of the 34.1% single vehicle crashes, 8% involved the vehicle leaving the road.

The Channel Highway had the largest number of reported crashes of any road within the study area. A total of 120 crashes were reported on the Channel Highway, this figure includes all crashes reported on the Channel Highway intersections, but not including the crashes reported at the Kingston interchange. The crashes that occurred on the Channel Highway can be further broken down into two separate sections:

- Channel Highway between Huntingfield and the Kingston Interchange; and
- Channel Highway between Summerleas roundabout and Browns Road.

The crashes occurring on the section of Channel Highway between Huntingfield and the Kingston Interchange includes crashes reported at the Algona and Summerleas roundabouts but excludes the crashes reported at the Kingston Interchange.

The following major findings from this section of the Channel Highway include:

- A total of 71 crashes occurred on this section of the Channel Highway;
- 43.1% of crashes were rear-end crashes, and 27.8% were angle crashes;
- A total of 11 injury crashes were reported, with minor and serious injuries sustained; and
- No fatalities were recorded on this section of the Channel Highway.

Major findings from the crash data reported on the Channel Highway, east of the Summerleas roundabout to Browns Road, including all intersections along this road link but excluding the Summerleas roundabout include:

- There were 49 reported crashes on this section of the Channel Highway;
- 36.7% of these crashes were angle collisions;
- A total of 4 pedestrian accidents occurred (8.2% of crashes along this section of Channel Highway);
- 14.3% of all crashes involved injury; and
- There were no fatalities recorded on this section of the Channel Highway.

The ten worst crash locations within the KETS study area are summarised in Table 1.

The crashes in Table 1 are ranked from highest to lowest economic costs to society based on the DoTaRS methodology.

It can be seen from Table 1 that the links of Algona Road between Channel Highway and Scarborough Avenue, and Southern Outlet immediately north of the Kingston Interchange were ranked the worst crash locations in the KETS study area. This is due to the occurrence of fatalities at these locations (one recorded at each location), as fatalities have a substantially higher economic cost associated with them compared to other crash types according to the DoTaRS methodology.

Location	Total Number of Crashes	Number of Fatalities	Number of Injury Crashes	Property Damage Crashes
Algona Rd between Channel Hwy and Scarborough Ave	**3**	1	1	1
Southern outlet, immediately north of Kingston Interchange	**2**	1	0	1
Summerleas roundabout	**27**	0	6	21
Intersection of Roslyn Ave and Beach Rd	**11**	0	4	7
Summerleas Rd between Whitewater Cres and Willowbend Rd	**8**	0	3	5
Kingston Interchange	**11**	0	5	6
Channel Hwy between Hutchins St and John St	**14**	0	2	12
Beach Rd between Channel Hwy and Church St	**8**	0	3	5
Roslyn Ave between Beach Rd and James Ave	**7**	0	2	5
Intersection of Roslyn Avenue and Mt Royal Rd	**8**	0	1	7

Table 1 KETS 10 Worst Crash Locations

[1] Information available online at - http://www.dotars.gov.au/transprog/downloads/MATRIX%202000.doc

The Summerleas Road/ Channel Highway roundabout had the highest number of recorded crashes of all intersections within the KETS study area. The Summerleas roundabout also had the highest recorded number of crashes resulting in the occupants being admitted to hospital for injuries.

The Kingston Interchange had the next highest number of injury related crashes, with 5 recorded during this timeframe. These crashes occurred prior to the modifications to the Interchange, and it is likely that many of the crash issues at this location have now been resolved.

4.4 Public Transport:

4.4.1 Bus Services in Kingston

Public transport services operate in Kingborough on a regular basis. The existing peak hour bus services were included within the Paramics modelling. This incorporated Hobart Coach and Metro bus services within the study area based on timetables sourced from Metro Tasmania.

4.4.2 Park and Ride

There are no existing formal 'park and ride' bus facilities in the KETS study area. Park and ride is defined as a facility that enables patrons to park their vehicle in a purpose built car park adjacent to a public transport facility, and commute to Hobart.

4.4.3 Ferry Transport

There are no existing regular commuter ferry services operating between Kingston and Hobart.

5 Consultation

5.1 Consultation Process

The KETS Steering Committee comprising of members from the Kingston Bypass Action Group (KBAG), Kingborough Council representatives, DIER representatives and GHD consultants provided a direction for the consultation process.

The consultation activities included public meetings, focus group meetings and Kingborough News articles.

5.2 Issues Raised Through Consultation

Issues raised in the consultation phase of the project were considered by the Steering Committee and used to gain an overall appreciation of the existing issues within the Kingston area. Some key issues that came out of the consultation phase include:

- Travel Delays on the Channel Highway;
- The existence of 'rat runs' (particularly on Roslyn Avenue and Maranoa Road);
- Access issues from driveways and side roads along the Channel Highway;
- Issues arising from delays in Davey Street and Macquarie Street in the Hobart City Council municipality (external to and remote from the study area);
- Access to adequate public transport, particularly during off peak times; and
- Access from Summerleas Road to the Channel Highway.

A number of other issues have been raised within the consultation phase and the KETS has attempted to address or acknowledge all of these as part of the study. A full list of issues raised through consultation is provided in Appendix A.

5.3 Principal Traffic Issues

The main traffic related issues raised repeatedly through consultation and confirmed by observations and traffic data included the following:

- Travel delays on the Channel Highway;
- Unnecessary through traffic ("rat runs") along Maranoa Road and Roslyn Avenue;
- Access issues from driveways and side roads along the Channel Highway; and
- Access from Summerleas Road to the Channel Highway.

The Paramics modelling conducted in KETS therefore focussed primarily on these principal issues.

6 Population and Traffic Growth

Microsimulation is to some extent limited by the ability to forecast future driver behaviours, origins and destinations. Many assumptions must be made in order to build accurate models under future conditions.

6.1 Residential Growth

In order to model the road network within the Kingston study area under future conditions, development and population growth had to be assessed.

Land use planning information, sourced from Kingborough Council, provided information and data of the potential for residential and commercial land to be developed. This was based on known and potential land development within the study area, as well as development external to the study area that may result in additional traffic passing through the study area (from areas such as Margate).

Australian Bureau of Statistics (ABS) data and existing traffic growth trends were also used to gain an appreciation for the future traffic volumes to be incorporated into the modelling.

This land use growth is broadly summarised in Figure 6.

6.2 Traffic Growth

Historic DIER traffic data indicates that Southern Outlet, Huon Highway and Channel Highway road corridors have experienced 3.5% to 4.0% compound traffic growth per annum consistently over an 18-year period, reflecting the relatively high population growth in the Channel and Huon areas.

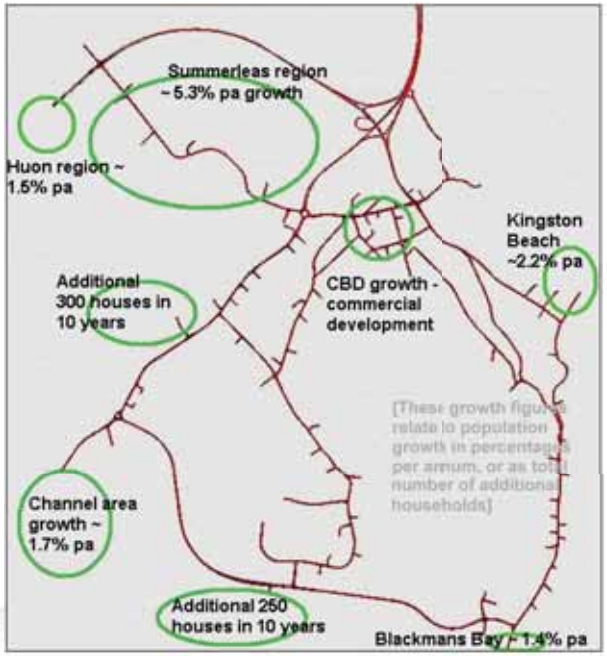


Figure 6 Generalised Population and Land Use Development Growth

6.3 Future Traffic Demands

The future traffic demands were developed for 2016 by incorporating known and likely land use development and traffic growth.

7 Development of Base Models

7.1 Overview

Two base models were developed using Paramics traffic microsimulation modelling software to replicate as closely as possible existing conditions. The layouts of the existing road network within the Kingston study area were used to develop morning and afternoon peak hour models[2].

Microsimulation is a numerical technique for conducting experiments to the transport system using a computer by developing a mathematical model that describes the behaviour of a transport system over extended periods of real time. Microsimulation models simulate individual vehicle movements and their interactions with each other for the purpose of assessing the traffic performance of a transport system.

The process undertaken to develop the base models is broadly shown in Figure 7.

7.2 Data Collection

Comprehensive data and information was collected in order to build the morning and afternoon base models. This data included:

- Aerial photograph of the study area, onto which the physical model was developed (supplied by LIST Map, DPIWE);
- Traffic network data (including speed limits, lane configuration, intersection control, etc), collected during various site inspections;
- Origin Destination Surveys – these surveys 'traced' vehicle movements through the roads within the study area;
- Traffic volumes and vehicle speeds – this data provided information on the number of vehicles on key roads in the study area, the change in vehicle numbers over a typical day, and the prevailing vehicle speeds on these roads;
- Turning movement counts – this data provided information on the turning movements from each approach of key intersections (including major car park accesses) within the study area;
- Queue length surveys – These surveys provided information on the typical queuing at key intersections in the study area.
- Travel time surveys – Provided data on actual travel times along main road corridors during morning and afternoon peak times; and
- Observational surveys – qualitative information on general traffic behaviour within the KETS study area.

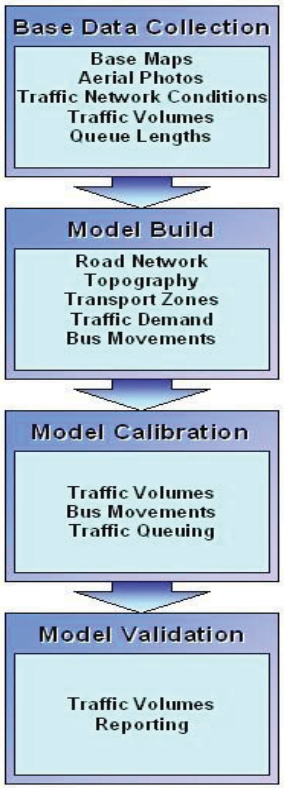


Figure 7 Base Modelling Development Process

[2] Note that at time of data collection and when preparing base models, the Kingston interchange at Huon Highway and Southern Outlet was not yet complete.

7.2.1 Traffic Surveys

In order to build accurate base models, a substantial amount of traffic data collection was required. Two major surveys were undertaken for the morning and afternoon peaks. These were turning movement surveys and origin-destination surveys. These were conducted in February 2005 when school and university traffic had resumed after the Christmas holiday period.

Origin-destination surveys provide information on driver route selection through an area. Vehicles are identified entering and exiting a study area by recording number plate information. Internal recording stations were also utilised to assist in determining routes selected by individual vehicles through the study area.

The survey comprised of 50 recording stations with 28 external stations and 22 internal stations. These surveys were conducted on Thursday 24th February 2005 between 7:00am – 9:00am and 3:00pm – 6:00pm. A total of 120 Field Staff and supervisors were involved in the origin-destination surveys.

Approximately 23,000 number plates recorded over the two survey time periods. Data was entered into the origin-destination software. All entered data was separately verified to check data entry accuracy.

The outputs of the origin-destination surveys comprised trip tables for both light vehicle and heavy vehicle classes and was used as a primary input into the development of the traffic demands for the base models.

7.3 Model Build

The first stage of building the base models involved the "construction" of the physical road network. The network provides the physical framework for the simulation, both visually and analytically. The various important physical attributes of the model needed to be coded such as intersection types and turn lanes. This step also involved the coding of the various intersection signals throughout the area. The phasing length of time for green, red and amber for all movements at these intersections were needed to be accurately coded and were based on information supplied by DIER.

Transport zones were also coded into the base models during this element of the process. Transport zones are the locations in the model that 'generate' or 'attract' vehicle trips. Transport zones coded into this model were placed on each 'external' road and at a number of locations around the model where trips would be loaded onto the road network.

Bus movements determined from timetables were coded as fixed route vehicles in the traffic model for those buses servicing the area and for those passing through.

7.4 Calibration and Validation of Base Models

A number of processes had to be carried out to eventually reach the calibration and validation phase of the model development.

Calibration is the adjustment of model parameters to improve the model's ability to reproduce local driver behaviour and observed traffic performance characteristics. The calibration process is performed after all the input data and model coding have been thoroughly checked.

The calibration of the base model was vital to produce a robust model from which the predictions and assessments could be conducted. The calibration involved adjustments to a number of parameters in the model to ensure:

- Vehicle behaviour was representative of actual behaviour as much as possible;
- Traffic volumes recorded in the model on links matched those observed on site, within an acceptable tolerance; and
- Any queuing or congestion that was known to occur on site was replicated, as much as possible, within the model.

Calibration to the traffic turning movements and queue lengths was important to ensure that actual movements and queues match those observed on site, as much as possible, so that future changes, given the traffic loadings, could be realistically assessed.

It was noted that exact matching of turning movements and queue lengths is extremely difficult and considered unwarranted. The nature of traffic is that it varies from day-to-day at a single site, which affects volumes and queues. Calibration and subsequent validation should achieve a close fit to observed activity to allow for this inherent variation that occurs within the real world.

Approximately 200 calibration runs were conducted on the morning peak base model, and approximately 80 for the afternoon base model before they were deemed to closely represent existing conditions. Modifications were made to the base models between each calibration run, thereby providing a more accurate representation to existing conditions.

The morning and afternoon base models were calibrated and validated to industry accepted levels[3].

Separate traffic counts were used for validation of the base models. The travel times between defined points in the model were also checked in the validation phase to ensure the times were within a set tolerance of travel times recorded on site.

Once calibrated and validated, the base models form the starting point for testing modifications to the transport network and traffic demands.

[3] Base models were calibrated to modelling statistical coefficients, GEH<5 values of 97% and 96% for the morning and afternoon peak hours respectively. These result indicate that the models closlely represent observed traffic conditions across the whole road network.

8 Options Development and Discussion

A Technical Group, comprising representatives from DIER, Council and consultants was established by the Steering Committee to develop options to address the principal issues raised. Modelling options were separated into bypass and non-bypass options through consultation with the KETS Steering Committee.

19 options were formally tested for both the morning and afternoon peaks under future traffic loading. All were tested with predicted traffic demands in ten years (2016) with the inclusion of the new Kingston Interchange. Some non-bypass options were tested with five-year traffic demands. This resulted in around 60 Paramics models being tested (including the two peak periods). These are outlined in Table 2.

8.1 Future Base Models

The traffic data indicated that many key links in the base models under existing conditions were approaching saturation flows at some intersections. This means that small increases in traffic volumes on these links will result in large impacts in terms of queues and delays.

Future base models (Do Nothing scenarios) were developed to determine the impact of future traffic on the

Option	Description
Do Nothing	Future demands – minimal modifications to the road network.
NB1	Non-bypass Option – Two-lane roundabout at Summerleas Road/ Channel Highway.
NB2	Non-bypass Option – Traffic signal metering of Summerleas Road/ Channel Highway roundabout.
NB3	Non-bypass Option – Replace Summerleas Rd/ Channel Highway roundabout with traffic signals.
NB4	Non-bypass Option – Road connection between Dollery Drive and Maranoa Road.
NB5	Non-bypass Option – Installation of a roundabout at Channel Hwy/ Redwood Rd intersection.
NB6	Non-bypass Option – Park and Ride bus facility situated opposite Huntingfield in Channel Highway.
NB7	Non-bypass Option – Left turn slip lane from Summerleas Rd to Channel Hwy (bypassing roundabout).
NB8	Non-bypass Option – Configuration same as Option NB7, with additional lane on Southern Outlet on northern approach to Summerleas Roundabout and left turn lane from Channel Hwy CBD approach to Channel Hwy.
BP1	Bypass – direction connection to Algona Road along original bypass corridor
BP2	Bypass – Channel Hwy realigned south of Huntingfield. Old alignment of Channel Hwy south of Huntingfield severed so that Huntingfield becomes southern leg of Algona Rd roundabout. Algona Rd extends to form a t-junction with new bypass road.
BP3	Bypass – Configuration same as Option BP2, except that the extension of Algona Rd meets the bypass at a roundabout rather than a t-junction.
BP4	Bypass – Configuration same as Option BP2, except that the extension of Algona Rd meets the bypass at a signalised intersection rather than a t-junction.
BP5	Bypass – Configuration same as Option BP2, except that the extension of Algona Rd meets the bypass at a grade separated interchange rather than a t-junction.
BP6	Bypass – Configuration same as Option BP5, but with the addition of an off-ramp from bypass to Summerleas Road.
BP7	Bypass – Configuration same as Option BP5 with the addition of an on-ramp to the bypass on the southern side of Summerleas Rd.
BP8	Bypass – Configuration same as Option BP5 with the addition of on and off ramps between the bypass and Summerleas Road.
BP9	Bypass with roundabouts at Summerleas Road and Algona Road.
BP10	Bypass Option – Configuration same as BP1 with a dedicated left turn slip lane from Channel Highway south of Algona Road to bypass, and on & off ramps at Summerleas Road.

Table 2 Paramics Options Modelling Summary

existing roads infrastructure, with no major modifications to the transport network. Future base models incorporated the recent Kingston Interchange upgrade. Both morning and afternoon peak hour future base models showed large increases in delays and queues, particularly along the Channel Highway corridor and through Kingston CBD.

Whilst severe delays and queuing was noted throughout most of the road network, the critical intersection appeared to be the Summerleas Road/ Channel Highway roundabout. Flow-on effects from this roundabout (traffic avoiding the junction, queued traffic blocking other intersections, etc) tended to generate much of the congestion experienced within the remaining road network (for example, queues extended from the Summerleas roundabout past the Algona roundabout along the Channel Highway during the morning peak hour).

8.2 Non-Bypass Options

A total of eight non-bypass options were tested. These options typically revolved around improving the intersection of Summerleas Road and Channel Highway, as this location caused the largest delays and queues along the Channel Highway corridor.

Some non-bypass option examples included:

- Removal of existing roundabout and installation of traffic signals at Summerleas/Channel;
- Installation of additional through and turning lanes on the Summerleas Road/ Channel Highway roundabout;
- Provision of a road link between Dollery Drive and Maranoa Road;
- Provision of a separated left turn slip lane from Summerleas Road to Channel Highway;
- Installation of a roundabout at the intersection of Redwood Road and Channel Highway;
- Installation of a bus Park and Ride facility near Algona Road.
- Combinations of the above.

None of the non-bypass options tested had any significant impacts on reducing delays and queues throughout the Kingston road network during the morning and afternoon peaks.

It was noted however that some of the non-bypass options appeared to improve localised traffic issues, such as improving access to specific side roads.

8.2.1 Upgrade Existing Option

The non-bypass option (Option NB8) that provided the greatest benefits for the KETS transport network involved the combination of the following components:

- Provision of a separated left turn slip lane from Summerleas Road to Channel Highway;
- Provision of two approach lanes from the northern approach to the Channel Highway/ Summerleas Road roundabout (Southern Outlet approach);
- Provision of a left turn lane from Channel Highway (CBD approach) to Channel Highway (southern approach);

This option has some positive effects for Summerleas access issues and Channel Highway queues and delays during the afternoon peak only, and began to break down after approximately 5 years by (2011). This non-bypass option did not address general Channel Highway queues, delays and Channel Highway access issues however.

8.2.2 Redwood Road/ Channel Highway Roundabout

A roundabout at Redwood Road was modelled on its own, as well as in combination with other non-bypass options. In all cases noticeable queues and delays were observed in Channel Highway as a result. These delays exceeded those experienced in the 'do nothing' future scenarios.

8.2.3 Summerleas Road/ Huon Highway Intersection

Whilst not formally tested, it was noted that improvements to the junction of Summerleas Road/Huon Highway had the potential to reduce the loading on Summerleas Road/Channel Highway roundabout by providing a more accessible exit for Summerleas traffic. However any junction improvements to this intersection would need to be planned and assessed carefully to ensure that operational and safety issues are fully investigated due to the moderate slope and high vehicle speeds on the Huon Highway at this junction.

8.2.4 Upgrade Summerleas Roundabout

Traffic signal metering of the roundabout at Summerleas Road/Channel Highway was considered. However the results indicated that delaying Channel Highway flow to allow Summerleas traffic an opportunity to exit would cause significant delays for Channel Highway traffic.

8.2.5 Bus Park and Ride Facility

Public transport was a key community issue throughout the study. Public transport, in a general sense, was beyond the scope of this project. However a "park and ride" (PAR) facility was tested for this study. Basic (and reasonably unrealistic) assumptions were made with a PAR facility located opposite the Huntingfield junction, south of Algona Road on Channel Highway (Option NB6). This involved the installation of a 500-space car park, with 10 buses operating during the peak hour (outward in morning, inward in evening). These bus services were in addition to the existing bus services during the morning and afternoon peaks.

No significant benefits to the transport network were noted during both peaks with future traffic loading. This does not suggest that a PAR facility is not appropriate for Kingston. The consultation feedback suggests that more work should be conducted to determine a suitable location, working arrangement and infrastructure requirements for such a facility. The results of the modelling suggests that PAR as a solution on its own does not provide significant benefits to the transport network, but would be complementary transport system. A separate working group, comprising of relevant government agencies and Metro, who are investigating public transport issues in the Kingborough municipality.

8.3 Bypass Options

A total of ten bypass options were tested using Paramics under future traffic loading. All bypass options were two-lane, two-way configuration, predominantly along the proclaimed bypass corridor.

Bypass options varied in their southern junction configuration, as well as the nature of the on and off ramps at Summerleas Road. In general the various bypass options that were tested performed better than future base options and non-bypass options.

It was evident that the junction treatments for Algona Road/ Bypass and provision of on and off ramps at Summerleas Road were critical to overall road network. The very high future traffic volumes on both the bypass and Algona Rd meant that most junction treatments did not handle these high and unbalanced traffic flows efficiently. This can be outlined as follows:

- **Option BP1** – Bypass connects to existing Algona Roundabout. The bypass had the impact of attracting a significant volume of traffic from Blackmans Bay and eastern areas along Algona Road. The Algona Road traffic has priority over Channel Highway (northbound) traffic, hence causing extensive queues and delays for Channel Highway southern approach during the morning peak. Generally, the queues and

delays are worse than the existing situation at Channel Highway/ Summerleas Road roundabout due to the higher volumes involved.

- **Option BP2** – Bypass connects to Channel Highway south of Huntingfield Avenue. Algona Road connects to a t-junction at bypass. This option performed well for Channel Highway traffic, but created extensive delays and queues for the Algona Road approach. Algona Road traffic had difficulty finding suitable gaps in Channel Highway traffic due to high speeds and volumes. As a result of this, more traffic tended to utilise Roslyn Avenue and Beach Road.

- **Option BP3** - Bypass same as BP2, but Algona Road connects to the bypass with a roundabout. This option was similar in performance to Option BP1.

- **Option BP4** - Bypass same as BP2, with bypass connecting to Alonga Road at a signalised intersection. This option was similar in performance to Option BP3.

- **Option BP5** - Extension of Channel Highway to form new bypass, Algona Road meets new bypass at a grade separated interchange. This option performed better than Options BP1, BP2 and BP3. A relatively lengthy left turn off-ramp from the bypass to Algona Road was required to ensure that afternoon peak exiting traffic did not interfere with southbound through traffic on the bypass .

- **Option BP8** - Extension of Channel Highway to form new bypass, Algona Road meets new bypass at a grade separated interchange and on and off-ramps at Summerleas Road. This option was the best performing option of all tested. Whilst some localised congestion was noted at some locations within the road network, this congestion was considered acceptable for typical morning and afternoon peak hour performance.

- **Option BP10** - The provision of a dedicated left turn slip lane from Channel Highway south of Algona Road worked reasonably well with up to 5 years of traffic loading. The configuration at the Algona Road end is shown in Figure 9. The configuration for the northern end was identical to Option BP8 at Summerleas Road.

The most effective bypass option in terms of performance, included grade separated interchange connecting the bypass to Algona Road as well as on and off ramps at Summerleas Rd (Option BP6). The interchange arrangements at each end of this bypass configuration are shown in Figure 8. Bypass Option BP10 operated satisfactorily with 5 year traffic loading.

8.4 Kingston High School Relocation

The Education Department is currently investigating the suitability of relocating the Kingston High School from its current location at John Street to Kingston View Drive, accessed from Summerleas Road.

This will have the impact of modifying traffic flows in the area due to relocation of the major transport ‘zone’. The option of relocating the school has not been tested using Paramics. However, modelling of this scenario could be undertaken if further investigations indicate that the school relocation is feasible.

8.5 Hobart Traffic Issues

Throughout the consultation phase of KETS, issues relating to traffic delays and queues in the Davey Street/Macquarie Street couplet in Hobart were raised, especially AM delays and queuing at the northern end of the Southern Outlet where it crosses Davey Street.

Whilst this is external to the study area (and the scope of this study), it is acknowledged that these Hobart traffic issues will continue to worsen in time due to the traffic growth along the Southern Outlet.

There are currently two working groups investigating greater Hobart traffic issues including Macquarie Street/ Davey Street issues.

The first group is the Southern Outlet Working Group consisting of representatives from Metro Tasmania, Hobart City Council, Kingborough Council and DIER. To date, the group has been investigating various broad solutions to the congestion issues at the northern end of the Southern Outlet, as well as the general congestion issues in Macquarie Street during the morning peak hour.

The second working group is responsible for the Southern Regional Transport Plan and consists of representatives from RACT, DIER, and the southern metropolitan councils. This group is investigating broader transportation issues for the greater Hobart area. The issue of congestion along the Davey Street/Macquarie Street couplet, and access from Southern Outlet has been identified within this group. Potential solutions are aligned with ones identified by the Southern Outlet Working Group.

Potential improvements identified through KETS (such as the construction of a Channel Highway bypass) may have the impact of reducing delays through Kingston. However, these potential solutions are not expected to have any significant detrimental impacts on Southern

Algona Road Interchange

Summerleas Road Interchange

Figure 8 Interchange Arrangements for Bypass

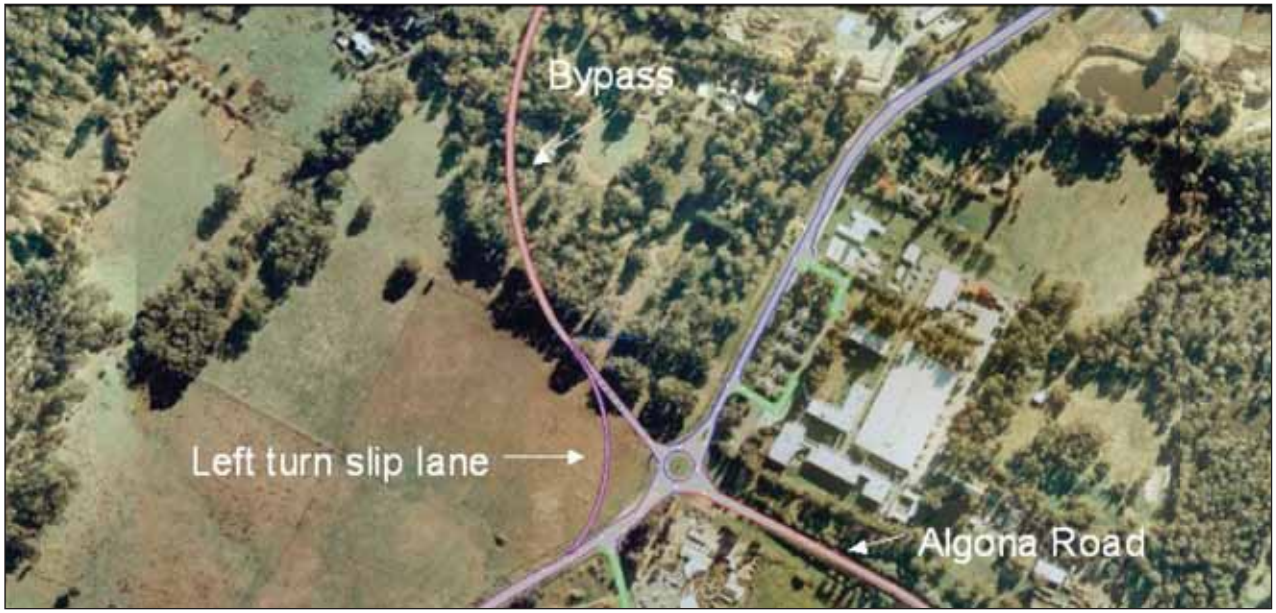


Figure 9 Bypass Option BP10 with Left Turn Slip lane at Algona Road

Outlet traffic at the Davey Street/Macquarie Street intersections for the following reasons:

- Essentially the same traffic volume will travel to the Davey/ Macquarie couplet regardless of whether a bypass or other traffic solution is constructed in Kingston. Whilst it could be argued that the reduced impediment to traffic flow may increase volumes on the Southern Outlet, it is considered that the constraint at the Couplet end of the Southern Outlet would subdue this latent demand;
- The Davey Street/Macquarie Street Couplet is separated by 10km from the KETS study area. This physical separation would tend to diminish any traffic flow effects caused by traffic improvements in the KETS study area; and
- Future traffic growth of the Southern Outlet is closely linked to land use development in the Kingborough and Huon municipalities, and not specifically to potential improvements to Kingston's road network. With the continued growth in Kingborough and Huon Valley, it is likely that annual traffic growth on the Southern Outlet will continue to increase at a rate of 4% per annum, for the foreseeable future.

8.6 Travel Times

Travel times along the Channel Highway between Huntingfield and Firthside were examined for each of the options modelled. Travel times provide a reasonable indication of comparative delays between various options modelled. The results of the average travel times for selected options are shown in Figures 10 and 11 for the morning and afternoon peak hours respectively.

In calculating the travel times it, the modelling has assumed that:

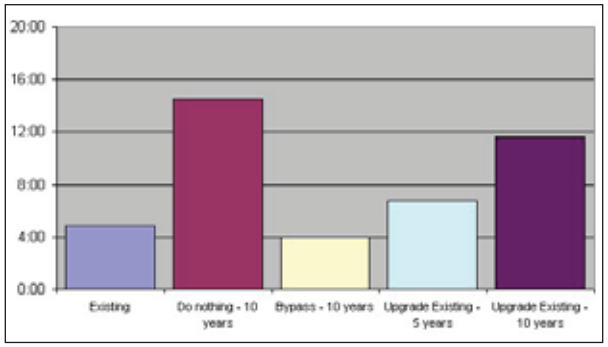
- All peak hour traffic growth will travel within the same timeframe as existing peak hour times;
- All land development occurs within a ten-year timeframe; and
- No changes to driver behaviour or modal shift (to buses) will occur as a result of increased travel delays.

While these assumptions provide a 'worst case' scenario, the results provide a comparison of the various options and may not neccessarily describe what exact traffic flows will occur in the future.

The existing travel times between Firthside and Huntingfield along the Channel Highway are in the order of 5 minutes during both the morning and afternoon peaks. If no major modifications are made to the road network, the modelling indicates that travel time may increase to 12 to 14 minutes in ten years time as a worst-case scenario.

For a bypass, the model indicated that travel times between Firthside and Huntingfieldwould be in the order of 4 minutes with traffic demands in 10 years. Travel times increased dramatically for Option BP10 with 10-year traffic demands, with afternoon peak hour travel times of 8 to 10 minutes.

The 'Upgrade Existing' option in Figures 10 and 11 refers to Option NB8, being the most effective non-bypass model. It can be seen that this option provides some travel time savings compared to the 'Do Nothing' option for the afternoon peak, but actually *increased* travel times during the morning peak. The reason for this is that the changes to the Summerleas Roundabout improves flow for all approaches *except* the Channel Highway southern approach. This slightly reduces capacity for this approach which in turn increases delays and queues. This approach is the dominant flow during the morning peak hour.



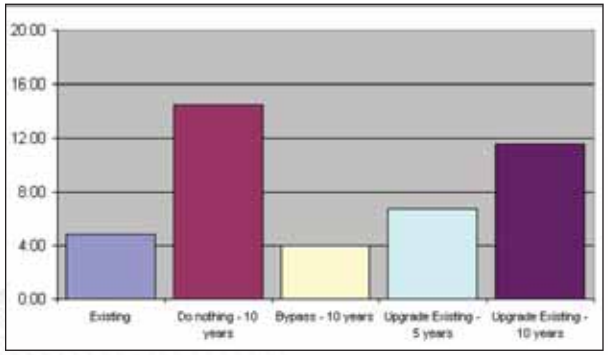


Figure 11 Afternoon Peak Hour Average Travel Times

8.7 Traffic Volumes

Inspection of the link traffic volumes from the modelling in their own right can be deceptive. Extensive delays and queues experienced within some of the options means that not all traffic can physically get through during the timeframe modelled, hence under-reporting of traffic volumes was noted during the peak hours.

The morning and afternoon peak hour models for selected options were used to estimate average daily traffic volumes on key road links. These volumes should be treated with caution as they represent estimates only for reasons outlined above. The general trends of increased or decreased traffic volumes on road corridors can be used as a guide to assist in determining changes in traffic flows across the network.

A comparison of estimated average daily traffic volumes on selected road links for several main options is provided in Table 3.

8.7.1 Channel Highway Traffic Volumes

It can be seen that the volumes on the existing Channel Highway are dramatically reduced with the two bypass options, where traffic volumes reduce from 18,300 vehicles per day under existing demands to 6,000 to 8,000 vehicles per day under future traffic demands.

With the Do Nothing and upgrade existing (Option NB7) options, traffic volumes on the existing Channel Highway continue to increase.

8.7.2 Algona Road Traffic Volumes

Both bypass options have the effect of making Algona Road a more attractive route compared to the Roslyn Avenue route. Traffic volumes increase from approximately 7,300 vehicles per day under existing conditions to 12,300 vehicles per day under future traffic demands. Algona Road is constructed as a high level arterial route, so this increase in traffic may be seen as preferable to an increase in Roslyn Avenue.

Similarly, an increase in traffic volume in Algona Road was observed for non-bypass options ('do nothing' and upgrade existing infrastructure – Option NB8). This increase was much less dramatic than the bypass options.

8.7.3 Roslyn Avenue Traffic Volumes

Traffic volumes in Roslyn Avenue were reduced with both bypass options under future traffic loading compared to existing conditions. This was due to the bypass attracting more traffic along Algona Road rather than utilising Roslyn Avenue.

	Channel Hwy - Summerleas Rd to Redwood Rd	Algona Rd east of Channel Hwy	Roslyn Ave - south of Mt Royal Rd	Channel Hwy – through CBD
Existing Volumes	18,300 vpd	7,300 vpd	6,700 vpd	9,900 vpd
Do nothing – 10 years	25,900 vpd	9,500 vpd	7,200 vpd	11,000 vpd
Upgrade existing – 5 years	22,200 vpd	8,950 vpd	6,900 vpd	12,300 vpd
Bypass Option BP10 – 5 years	6,100 vpd	12,300 vpd	4,100 vpd	11,100 vpd
Bypass Option BP6 – 10 years	7,950 vpd	12,100 vpd	5,700 vpd	12,400 vpd

Table 3 Road Link Two-Way Traffic Volume Summary

The 'do nothing' scenarios resulted in an increase in traffic volume on Roslyn Avenue, and the best non-bypass option resulted in a slight decrease in traffic volume in Roslyn Avenue.

8.7.4 Channel Highway CBD Traffic Volumes

Little change to traffic volumes was observed on Channel Highway through the CBD area of Kingston. This is likely due to the fact that the CBD is a destination in its own right, with little unnecessary through traffic. The slight increase in traffic volume under future traffic loading would be due to general CBD commercial growth.

Some of the non-bypass options attracted more traffic past the CBD to the Summerleas roundabout.

8.7.5 Bypass Traffic Volumes

Traffic volumes on the bypass corridor were in the order of 16,000 to 18,000 vehicles per day.

8.8 Side Road Access Issues

Delay and queuing analysis was undertaken on the side roads connecting to Channel Highway. The roads assessed in detail included Summerleas Road, Dollery Drive, Mertonvale Circuit, and Redwood Road.

It was noted that delays and queues progressively deteriorated for these side roads under 'do nothing' scenarios under future traffic loading.

It was noted that some of the non-bypass options improved side road access. Specific examples include:

- **Option NB5,** installation of a roundabout at Redwood Road/Channel Highway intersection. This option also provided an opportunity for traffic to undertake U-turns at the roundabout rather than a right hand turn from properties fronting onto the Channel Highway. This option also improved access for Redwood Road traffic, thus increasing traffic volumes on this approach, particularly during the morning peak hour. This improvement was to the detriment of Channel Highway traffic;
- **Options NB7 and NB8,** which both involved the installation of a dedicated slip lane from Summerleas Road to Channel Highway, bypassing the roundabout. These options provided reasonable improvements for Summerleas Road traffic. A more significant reduction in queuing and delays did not occur due to the high volume of traffic travelling through or turning right at the roundabout; and
- **Option NB4,** which involved the connection of Dollery Drive to Maranoa Road. This provided an alternative exit for Dollery Drive traffic so that heavy traffic on Channel Highway could be avoided.

A reasonable increase in traffic volume was noted in Dollery Drive as a result. This option doesn't address Channel Highway delays.

All bypass options reduced delays and queues for side roads connecting to Channel Highway due to the reduction of through traffic in Channel Highway.

9 Summary and Conclusions

9.1 Existing Conditions

Traffic delays and queues are real issues for the Kingston area under existing conditions. Continuing land use development and subsequent traffic growth is expected to compound the problem.

9.2 Modelling Results

The results of the modelling should be interpreted with a degree of caution as future models represent worst-case scenarios where all development has occurred over a ten-year period, driver behaviour remains unchanged in terms of commuter travel time selection and car occupancy, and no changes in public transport patronage has occurred. It should also be noted that several assumptions have been made throughout the modelling process and that the models themselves are dependant on the accuracy of the input information.

9.3 Addressing Principal Issues

The principal traffic issues identified throughout KETS were as follows:

- Travel delays on the Channel Highway;
- Unnecessary through traffic ("rat runs") along Maranoa Road and Roslyn Avenue;
- Access issues from driveways and side roads along the Channel Highway; and
- Access from Summerleas Road to the Channel Highway.

Whilst several of the non-bypass options addressed some of these principal issues, only two bypass options addressed all these principal issues. These were Option BP10 with 5 year traffic loading and Option BP6 under 10 year traffic loading.

It should be noted that these traffic issues are related to peak hour travel times. At other times the issues are not as pronounced, but will increase as traffic volumes increase.

9.4 Non-Bypass Options

Upgrading Summerleas roundabout increases the capacity of intersection and therefore 'attracts' more traffic to it due to the high demand. This tends to increase CBD traffic as well as traffic along Channel Highway. In general, the non-bypass options did not address the principal issues raised.

The most effective non-bypass option involved provision of a separated left turn slip lane from Summerleas Road to Channel Highway, and provision of additional lanes on other approaches to the roundabout. This option provided some improvement for Summerleas access issues and Channel Highway queues and delays during the afternoon peak only. However after approximately 5 years of demand queues and delays again increased. Moreover this non-bypass option did not address all the principal Channel Highway issues, especially queues, delays and access issues.

9.5 Bypass Options

The impacts of a bypass can be measured throughout the road network as a whole. The attractiveness of the bypass corridor helps to reduce unnecessary through traffic in roads such as Roslyn Avenue and Maranoa Road ('rat run' routes) and allows better utilisation of Algona Road.

The bypass options modelled, demonstrated that the design of the connections of the bypass to the existing road network would be critical to the success of the bypass. Many bypass options failed to work effectively, with lengthy queues and delays along the bypass

corridor and on Channel Highway and Algona Road. The construction of these bypass options would result in 'shifting' the traffic issues currently experienced at the Summerleas Road roundabout to the Algona Road roundabout.

Bypass options BP10 and BP8 worked well for 5 year and 10 year traffic loadings respectively. Both these options included provision for on and off ramps at Summerleas Road (as shown in Figure 8, Summerleas Road interchange). Failure to provide the off-ramp at Summerleas Road increased traffic on Channel Highway accessing Kingston CBD. This had a detrimental impact on southbound traffic on the new bypass at the Algona Road roundabout, causing lengthy queuing and delays.

The proclaimed bypass corridor did not make provision for an off-ramp at Summerleas Road, or provision for a road corridor outside the area connecting directly to Algona Road roundabout. It should be noted that utilising the existing proclaimed corridor for a bypass would not result in an efficient solution to the principal issues raised and would not provide substantial improvements beyond upgrading existing infrastructure (ie. the best non-bypass solution, Option NB8) for the medium to long term.

To address the principal traffic issues, the modelling indicated that northbound on and off ramps be provided at Summerleas Road. At Algona Road, a slip lane from Channel Highway, south of Algona Road onto the new bypass (as shown in Figure 9) would address traffic issues initially. A grade separated interchange could then be considered west of Algona Road (as shown in Figure 8) at a later stage to address any queuing and delay issues that may occur at the Algona Road roundabout.

9.6 Non-ModellingTraffic Management Recommendations

Many issues identified through consultation did not require modelling as the potential solutions would not impact on the broader road network.

Some of the issues that could be investigated separately include:

- A southbound left-turn slip lane from the Channel Highway to Beach Road at the traffic signals;
- Pedestrian and cyclist infrastructure improvements within network; and
- Parking improvements within the CBD and School areas.

9.7 Conclusions

The modelling conducted throughout KETS indicated that:

- A two lane bypass is the most effective method to address the capacity issues associated with the Channel Highway through Kingston; and
- The interchange arrangements at Summerleas Road and ultimately at Alonga Road are critical to providing a long term solution.

The study has also indicated that there is insufficient space within the proclaimed corridor to develop the required interchanges. To establish the additional land requirements, detailed planning investigations which are outside the scope of KETS would need to be undertaken.

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Appendix A

Issues Raised Through Consultation

Summary Table

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Pedestrian and Cyclist Issues:	
1 Cycle paths need to be separate from traffic lanes.	KC / DIER
2 Consider cyclists and pedestrians on Algona Rd.	KC / DIER
3 Disabled or elderly pedestrians have difficulty at the Redwood Rd roundabout, improvement required.	KC
4 Crossing Roslyn Ave at Moonya Drv is very difficult.	KC
5 Consider Kingston Primary School Pedestrians.	KC
6 Cycle path is required through the new Algona Rd subdivision.	KC / DIER
7 Student safety concern around schools	KC
8 Pedestrian mobility plan required	KC / DIER
9 Too dangerous to cross Channel Hwy near Dollery Drive	DIER
10 There is no footpath from AAD to Kingston.	KC/DIER
11 Bike lane should remain outside AAD, needs to be kept clear of gravel.	DIER
12 There is no continuos footpath between Rays Crt and the AAD, insufficient road verge to walk from these two locations given the number of heavy vehicles that use the road.	KC/DIER
13 In order to access the pathways that do exist the Channel Hwy has to be crossed twice.	KC/DIER
Traffic Management & Linemarking Issues:	
1 Linemarking required in front of Council Chambers	DIER
2 Traffic Calming has been suggested on Roslyn Ave to reduce traffic volumes	KC
Bypass Issues:	
1 Will the bypass issues be clouded and lost.	DIER
2 Bypass should be 4 lanes from the start.	DIER
3 Have the landowners who are adjacent to the bypass route been consulted as stakeholders.	DIER
4 Bypass should start south of Algona Rd.	DIER
5 A one lane bypass each way is a good start.	DIER
6 KBAG wants the Kingston bypass before the Sorell Bypass.	DIER
Public Transport Issues:	
1 Has data from Metro and Taslink been included in the model to identify public transport usage.	No Action Required
2 Public transport should be free during peak times and funded by Council and State Government.	KC / DIER / Metro
3 Why does Kingston have a rural bus service and not Metro, there should be a bus service through Willowbend Rd now. Direct service from Huonville - Kingston - City.	Metro
4 Need more bus services at night.	Metro
5 Kingston needs a community bus service.	KC
6 Hobart College access / bus service issue.	KC / DIER
7 Are transit lanes an option.	KC / DIER
8 Bus fares are subsidised 2/3 cost, availability of car parking is a detriment to whether people use buses, clearway in Macquarie St	KC / DIER
9 Park and Ride facility should be associated with shops	KC / DIER
10 Preference for Park and Ride in John St	KC / DIER
11 Bus stops are an issue outside the Australian Anarctic Division	DIER / Metro
12 Buses shouldn't be stopping in the lane that is used for decelerating into the AAD.	DIER / Metro

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Paramics Model Issues:	
1 Can growth be forecast and incorporated within the model.	No Action Required
2 Model should be upgraded to include Davey St junction of the Southern Outlet.	KC / DIER
3 The study should investigate a major retail centre located at Algona Road and Channel Highway.	KC / DIER
4 Can slip lanes onto the Huon Highway and Southern Outlets be modelled from the Willowbend and Whitewater housing development areas.	KC / DIER
5 Model ignores the bottle neck at Macquarie St with traffic banking up.	KC / DIER
6 Can traffic signals be modelled instead of roundabouts.	KC / DIER
7 Has the model allowed for trucks to the new sewer plant in Peter Murrell Reserve.	KC / DIER
8 Will the model take into account emergency vehicles.	KC / DIER
9 Will model take into account both car and bus movements, can it model park & ride facility	KC / DIER
10 Will model take into account externalities such as the Bruny Island Ferry.	KC / DIER
11 Illawarra Primary School is not in the study area.	KC / DIER
12 Concern whether study adequately addresses persons, rather than vehicles	KC / DIER
13 Need a left turn slip lane for vehicles travelling south on Channel Hwy wanting to turn left in Algona Rd so they don't have to enter the RAB, may be restrictions due to close proximity of AAD exit.	DIER
14 Summerleas RAB needs to be two lanes to cope with traffic volumes.	KC / DIER
15 Need for a Roundabout at Dollery Drv or Redwood Rd.	DIER
Final Report Issues:	
1 Will the final report of the study be made public.	KC/DIER
2 The minister advised that he would have a report ready at State Budget time, not at the end of the financial year.	SC/DIER/KC
Budget and Funding Issues:	
1 Will State Government fund the outcomes of the study.	NA
2 The federal government should be asked to fund Kingborough buses.	NA
Kingborough Council and DIER Planning and Future Development Issues:	
1 Is land acquistion still required?	DIER
2 Planning Scheme allows development that can't be sustained.	KC
3 Need forward planning, not crisis planning eg. Bottle neck at Macquarie St and Davey St.	DIER/KC/HCC
4 Willowbend Road is landlocked, slow development now until infrastructure is available.	KC
5 Planning zones should specify density ratios I.e. housing area to land area.	KC
6 Land use concern, not concern of transport study	KC
7 Only one access / egress location into Huntingfield area.	DIER / KC
8 Bus mall in Kingston, will road be closed will there be through road access for the staff coming from Taroona.	KC
9 19 km section of road from Kingston to Kettering is only single lane each way, this section of road needs at least one set of overtaking lanes.	DIER

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Other Issues:	
1 The Kingston BAG meeting in October 2004 was a community meeting on the construction of a bypass. Other issues are now included and problems south of Kingston are well known eg. at Algona Rd.	DIER
2 Will the new Kingston interchange roundabout be a problem in peak hour, need a clover leaf not a roundabout.	DIER/KC
3 The consultation is good but can there be more consultation sessions made available.	SC
4 Query regarding OD survey times	
5 McDonalds is in a bad location.	NA
6 Better use of Algona Rd	DIER
7 Emergency Services from 8am is a problem at roundabout, also Roslyn, Maranoa during school times. Appliances are not easy to manourvere in traffic	DIER/KC
8 Fruit sellers on Abetz's corner mus tbe discouraged from doing this in future (Council or DIER to provide licences for roadway stall to be set up).	KC / DIER
9 Need for emergency access into Huntingfield.	DIER
Possible Traffic and Transport Solutions:	
1 2 lanes at the Summerleas Rd roundabout would be a good start and could be done cheaply, cars do this now.	DIER
2 During peak times don't allow left turn from Maranoa Rd into Channel Hwy (and then to roundabout) to reduce congestion on the Channel Hwy.	DIER
3 Provide a roundabout or grade separation at the Huon Highway and Summerleas Rd Roundabout intersection.	DIER
4 DIER should fund the cheaper options now, but build the best option later at the greater cost.	DIER/KC
5 Jindabyne Road is wide and should be linked through.	KC
6 Should encourage the Huon Rd link to Hobart.	NA
7 Need a jetty and a ferry service to Kingston Beach.	DIER/KC
8 Encourage Car Pooling.	DIER
Comments:	
1 Bypass will get through traffic out of the Kingston urban area but will not necessarily make the trip to Hobart quicker	DIER
2 Uneducated drivers not using their indicators at roundabouts to signal their turning direction.	NA

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The following issues have each been categorised and listed in the above tables

Letter from Bernard Carter - Blackmans Bay resident

Concerns:

1. Algona Rd is only carrying 5,000 vehicles per day compared with 8,000 vehicles per day on Roslyn Avenue
2. Roslyn Avenue should be downgraded in order to reduce the volume of through traffic accessing Blackmans Bay

Solution:

1. Customise Roslyn Ave from Algona Rd to Beach Rd by reducing the width of road to one vehicle every 300m

Letter from Roger Gates - Facilities Coordinator for the Australian Antarctic Division

Concerns:

1. There is no footpath from AAD to Kingston
2. Bike lane should remain, needs to be kept clear of gravel
3. Speed limit on Channel Hwy between Algona RAB and Summerleas RAB should be reduced to 60 km/h, difficult to get out of car park when cars are travelling 80 km/h
4. Need a left turn slip lane for vehicles travelling south on Channel Hwy wanting to turn left in Algona Rd so they don'nt have to enter the RAB, may be restrictions due to close proximity of AAD exit
5. Fruit sellers on Abetz's corner mus tbe discouraged from doing this in future (Council or DIER to provide licences for roadway stall to be set up)
6. Uneducated drivers not using their indicators at roundabouts to signal their turning direction
7. Summerleas RAB needs to be two lanes to cope with traffic volumes
8. Bus stops are an issue outside AAD
9. Need for a Roundabout at Dollery Drv or Redwood Rd
10. Need for emergency access into Huntingfield
11. Only one access/egress location into Huntingfield area
12. Bus mall in Kingston, will road be closed will there be through road access for the staff coming from Taroona
13. Buses shouldn't be stopping in the lane that is used for decelerating into the Division
14. 19 km section of road from Kingston to Kettering is only single lane each way, this section of road needs at least one set of overtaking lanes
15. No Parking section at the brow of Auburn Rd
16. Reduce Algona Rd to 80 km/h as no feeder lanes are provided either from Huntingfield 3 ingress or Redwood Rd
17. There is no continuos footpath between Rays Crt and the AAD, insufficient road verge to walk from these two locations given the number of heavy vehciles that use the road
18. In order to access the pathways that do exist the Channel Highway has to be crossed twice
19. The speed limit along this stretch is 100 km/h and there have been a number of vehicle accidents along this stretch

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