

The Karuah Highway Bypass

Economic and Social Impacts

The 1 year report

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Acronyms

BTCE	Bureau of Transport and Communication Economics
BTRE	Bureau of Transport and Regional Economics
DUAP	Department of Urban Affairs and Planning
EIS	Environmental Impact Statement
LGA	Local Government Area
NCHRP	National Cooperative Highway Research Program
NSW	New South Wales
RTA	Roads and Traffic Authority

Foreword

As part of the Conditions of Approval for the bypass of Karuah, the Roads and Traffic Authority (RTA) is working with the township of Karuah to mitigate the economic effects of the completed bypass on the community. This is being achieved through a number of strategies, including the implementation of a plan for the economic redevelopment of Karuah.

As required by Condition of Approval No 22, and in consultation with Port Stephens Council, the RTA's Pacific Highway Office engaged the University of Sydney to monitor the impacts on Karuah one year after opening of the bypass.

The following report on the findings of this study has been prepared by the University of Sydney's Urban and Regional Planning Program, on behalf of the RTA.

The majority of this report has been prepared by Hal Rowe. He undertook the field work as part of his Masters dissertation in the Urban and Regional Planning program at the University of Sydney. In addition, the section on the Traffic survey (chapter 4) has been prepared by Wannan Bao, Carliyn Cornellsisse, Frank Xiao, Wing Yee Chung and Glenn Grimshaw. The section on the social impacts (chapter 6) has been prepared by Luke Doran, Ben Holmes, Nicole Philps, Sandra Feltham and Tick Kei Chiang. The work was undertaken under the supervision of Peter Phibbs, from the Urban and Regional Planning program at the University of Sydney.

1. Introduction

The Karuah bypass on the NSW Pacific Highway was opened on September 22, 2004. The bypass was aimed at accommodating projected increases in traffic along the primary north-south transport corridor in New South Wales and alleviating a major bottleneck. As a result of the upgrade, the majority of the almost 10,500 vehicles that passed through the Karuah town centre daily now use an alternative route.

The likely effect of the bypass on Karuah businesses was identified as a 'key and problematic issue' by the Department of Urban Affairs and Planning (DUAP 2001). DUAP believed that Karuah had 'special characteristics' that would exacerbate business and employment impacts in the short-term. In particular, loss of employment was considered a particularly serious problem given that there was little opportunity for re-employment of Karuah residents in neighbouring towns. It was wryly commented that 'in order for the social benefits to the township to be realized, there needs to be a town remaining to experience them'.

A series of studies and business surveys were conducted in Karuah prior to construction of the bypass as part of the impact assessment process (Purdon Associates 1997, Purdon Associates 1998, RTA 1999). The studies identified a high level of business dependence on highway traffic – predicting business closures and substantial decreases in revenue and employment. It was estimated that 12 businesses would close and an additional 9 businesses would suffer a decrease in trade resulting in the loss of 131 jobs or 58 percent of the total employment of Karuah.

To help offset these predicted impacts DUAP stipulated prior to development approval a financial contribution of \$200,000 to fund the preparation of an economic recovery plan and a requirement that the effect of the bypass be monitored at 12 month and 5 year intervals.

This report, commissioned by the RTA, aims to address DUAP's requirement for follow-up monitoring and evaluation. The objective is to quantify the impact of the bypass on traffic volumes and businesses in the Karuah town centre, and to assess the socioeconomic changes that have occurred one year after the opening of the Karuah bypass.

The information obtained will provide the first objective assessment of the economic impacts experienced by Karuah since the opening of the bypass. In addition, the results will represent one of only several examples of a small town before-after bypass study undertaken in Australia. Small highway towns such as Karuah are particularly vulnerable to bypass impacts yet few studies have attempted to quantify these impacts.

2. Methodology

The study took the form of a direct before-and-after analysis of the Karuah business community to establish the impacts of the bypass. The 'before' data was obtained from business surveys undertaken prior to completion of the bypass (Purdon Associates 1998, University of Sydney 2003). The 'after' data was obtained from a series of surveys undertaken in the Karuah during late 2005 - almost exactly 12 months after completion of the bypass.

In summary, the method consisted of the following activities:

- A review of business and economic studies undertaken in Karuah prior to construction of the bypass.
- A survey of traffic along Karuah's main street to identify declines in traffic volume and the behaviour of travellers who passing through the town.
- Direct reconnaissance of businesses in the Karuah town centre to identify business closures, relocations and openings.
- A survey of Karuah businesses through the use of a questionnaire. The survey sought to identify changes to business revenue and employment levels and to establish business and community attitudes to the bypass more generally.
- A direct comparison of the impacts identified in the business survey with pre-bypass impact predictions given in the Environmental Impact Statement for the Karuah bypass.
- A series of informal interviews with local residents, community leaders, economic development officials and other players involved in the economic development of the town. The interviews were intended to identify broader community perceptions of how Karuah as a community is managing bypass impacts;
- An interview survey with about 100 residents of Karuah.

Hence, the study will involve a variety of qualitative and quantitative methods. Bypass impact assessment has no consistent methodology and the use of a combination of techniques is recommended (Handy *et al* 2000: 13).

An important reference for formulating the methodology was *Evaluation of the Economic Impacts of Bypass Roads on Country Towns* (Parolin and Garner 1996a, Parolin and Garner 1996b) - a series of reports, guidelines and working papers published by the RTA in 1996. The RTA papers include a set 'good practice' guidelines for bypass economic impact assessment that have helped in construction of the questionnaire.

2.1 Review of community and business literature

The review was required to establish the socioeconomic status of Karuah prior to construction of the bypass and to assess the mitigation measures adopted in response to the bypass. The information obtained also indicated the vulnerability of Karuah to economic impacts and the key challenges that would need to be overcome in instituting an economic recovery strategy.

The following references were used as the basis for the review:

- Karuah Business Survey (Purdon Associates 1997)
- Karuah Business Survey (Purdon Associates 1998)
- Working Paper No 11 – Planning, Land Use and Socioeconomic Assessment (Purdon Associates 1999)
- Karuah to Bulahdelah Upgrade Environmental Impact Statement (1999)
- Karuah Business Survey (University of Sydney 2003)
- Australian Bureau of Statistics (2001)
- The Karuah Community and Economic Development Plan (2003)

2.2 Traffic survey

The traffic survey was undertaken with the assistance of students from the University of Sydney. Traffic volumes and the number plates and times of particular cars passing through the Karuah town centre were directly recorded using two observation stations - one at the north end and one at the south end of the township (see Figures 2.1). This data collection took place on Saturday 10 September 2005 between the hours of 8.00am and 5.00 pm¹.

¹ As a result of logistical problems, data collection at the south station did not commence until 8.30am.

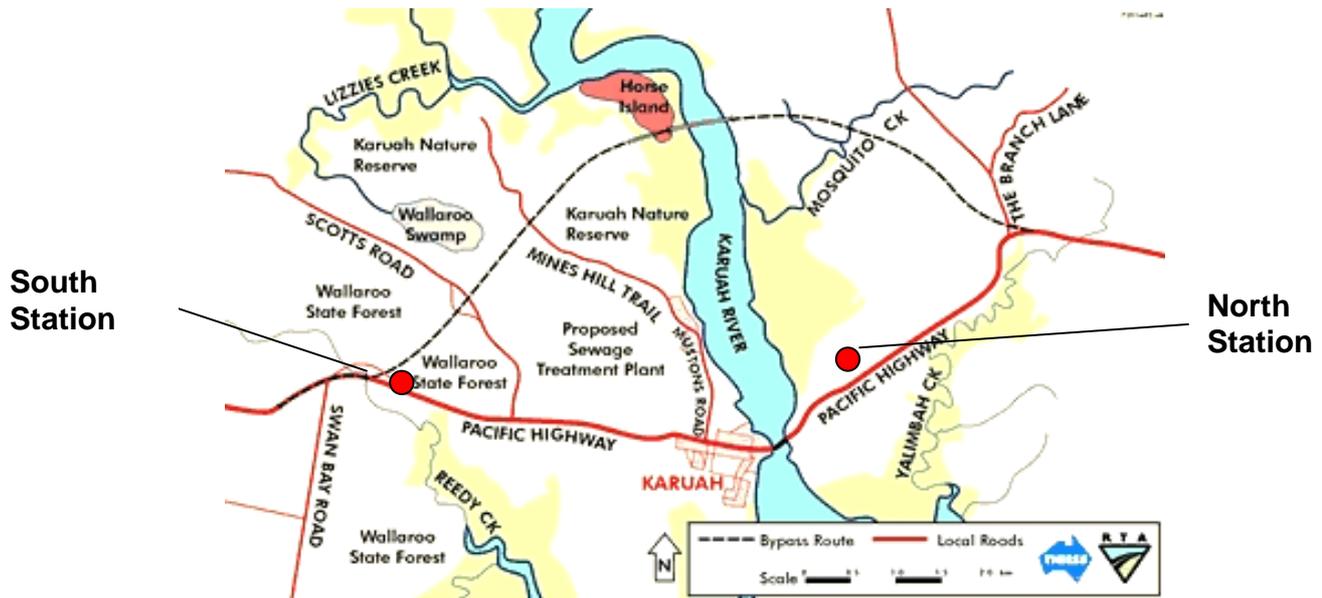


Figure 2.1: Location of the two traffic survey observation stations. The broken black line indicates the route of the bypass.

Personnel at each station were asked to record the location and direction of the traffic they were observing, the time that each vehicle was sighted, the number plate, the type and colour of the vehicle and the estimated number of people in each vehicle.

The number of vehicles driving along the bypass was also recorded in order to estimate the proportion of traffic entering Karuah from the highway. The data for bypass traffic traveling in both directions was collected from a roadway bridge which crosses the bypass near the south station (see Photo 2.1). Given resource constraints, bypass data was collected for 10 minute intervals in each direction approximately once an hour.



Photo 2.1: The bypass data collection point

On return from Karuah, students entered the recorded vehicle trips into an excel spreadsheet. The direction of the traffic and the data collection location were also noted as part of this process. To the extent possible, all number plate matches were found and highlighted. These matches were then classified into either passing traffic or residents of the township (or surrounding area) based on the behaviour of those vehicles during the day. .

2.3 Identifying business closures/openings

The Karuah town centre was inspected visually during the survey period to identify business closures. Employment losses resulting from business closures can be estimated based on pre-bypass surveys undertaken in the town (Purdon Associates 1998, University of Sydney 2003).

New businesses were surveyed normally to identify employment numbers and attitudes towards the bypass.

2.4 The business survey

The survey was conducted during business hours however business managers were approached during off-peak periods to ensure a minimum of disturbance. In addition to the set questions, business owners were encouraged to provide as much general information as they felt relevant regarding the economic impact of the bypass and the future of the town.

The intention of the survey was not to establish the precise financial status of every business remaining in Karuah but rather, to determine the *change* that has taken place in revenue and employment levels as a result of the bypass. In addition, a key goal of the survey was to establish the opinions of business owners who have a direct stake in the economic vitality of the town.

When presenting the results the businesses were grouped into 9 separate categories. These were:

- Petrol station/Motor vehicle repairs
- Food
- Restaurant/café/takeaway
- Club/Hotel
- Oyster farming
- Timber mill
- Accommodation
- General retail (including newsagent, liquor shop, hardware and gift shop)
- Professional services (including boarding kennels, real estate agent and hairdresser)

Business owners who declined to participate were simply excluded from the results. A copy of the questionnaire is provided in Appendix A.

A brief discussion is provided below about the purpose of each question:

1. Describe your Business (Please tick)

- Restaurant/café/takeaway.....*
- Accommodation.....*
- Food.....*
- Club/Hotel.....*
- Petrol Station/Motor vehicle services*
- General retail.....*
- Timber Mill.....*
- Professional Services.....*
- OysterFarm.....*

This question divides the businesses into separate categories. The business category is based on the dominant business type for a particular establishment (eg. A club located inside a service station is still considered part of the ‘petrol station/motor vehicle services’ business category)

2. *Were you the owner of this business BEFORE the opening of the Karuah bypass on September 22, 2004?*

Yes.....
No.....

This question establishes whether the individual filling out the application form is in a position to identify the changes that have occurred in Karuah’s business community as a result of bypass construction. If the individual answers ‘no’ he may elect not to proceed with the questionnaire or may make informed guesses for the remaining questions.

3. *How many employees worked here BEFORE the opening of the bypass, including you?*

	<i>Male</i>	<i>Female</i>
<i>Full-time</i>	_____	_____
<i>Part-time/casual</i>	_____	_____

4. *How many employees work here NOW?*

	<i>Male</i>	<i>Female</i>
<i>Full-time</i>	_____	_____
<i>Part-time/casual</i>	_____	_____

These two questions identified the loss of full-time and part-time jobs. It was important to establish the gender of the lost workers to determine whether employment impacts have affected females disproportionately (see Parolin and Garner 1996a).

5. *How has the bypass affected your business revenue?*

No effect.....
Decrease (please estimate %).....
Increase (please estimate %).....

This question provided a figure identifying changes to business turnover. It was hoped that expressing this change as a percentage will reduce the natural reluctance on the part of business owners to provide specific financial information. This will help provide a higher response rate.

6. *Do you believe the bypass has had a bad affect on the ECONOMY of the town as a whole?*

- Strongly Agree*.....
- Agree*.....
- Don't Know*.....
- Disagree*.....
- Strongly Disagree*.....

This question assessed the business owners' perception of the economic impact experienced by the town more generally. The combined responses provided a good indicator of how the bypass is viewed as having changed the town from a purely economic standpoint.

7. *Do you believe the bypass has made Karuah a better place to live?*

- Strongly Agree*.....
- Agree*.....
- Don't Know*.....
- Disagree*.....
- Strongly Disagree*.....

This question was closely related to question 6. Previous studies have found that economic impacts generated by highway bypasses are often offset by the improved environment and ambience in the town centre due to the removal of traffic. This question analysed the degree of community satisfaction with these intangible impacts and may provide some clues as to whether they are viewed as being of greater significance than the purely economic impacts.

8. *Has your business made any adjustments in response to the bypass?*

- No adjustments*.....
- Increased advertising/promotion*.....
- Changes to products/ services offered*.....
- Other (please specify)*

This question identified the mitigation measures that have been undertaken at the business scale. The question is significant because many authors have stated that a high degree of community motivation is necessary to help offset bypass impacts. A large number of business adjustments by businesses who have suffered as a result of the bypass will indicate a high degree of motivation.

9. *Are you satisfied with the steps taken by local authorities in response to the bypass?*

Yes..... No.....

No opinion.....

This question identified the degree of community satisfaction with mitigation strategies taken by official bodies at the community scale. The question helped determine whether the local economic strategy and its implementation have been well received. The results from this question were used along with interviews to determine the effectiveness of the strategy and suggest possible improvements for other similar strategies in the future.

10. *What additional steps would you recommend that local authorities make in response to the bypass? (please specify)*

.....
.....
.....
.....
.....

This question will follow on from question 9 – allowing business owners to suggest bypass mitigation measures and economic strategies for improving Karuah’s economy.

Question 11 allows for further miscellaneous comments.

2.5 The interviews with key stakeholders

This part of the study consisted of a series of informal interviews with community leaders, local government officials and other key players involved with enhancing the socioeconomic health of Karuah and mitigating any negative impacts resulting from the bypass. The interviews took place from August to October 2005 at the convenience of the participants.

Some of the information obtained in these interviews supplemented the results obtained from the questionnaire. In addition, the interviews were used to establish prevailing community attitudes and provided valuable background information.

The interviews were not formally structured but were based on the following talking points:

- How the bypass has affected Karuah;
- The socioeconomic health of Karuah today;
- The main issues associated with Karuah’s future economic development;
- The strategies adopted in response to the bypass;
- The future of Karuah, which direction it should go from here etc

The following people were interviewed as part of the study:

- Stacey Diemar, Community Development and Planning Officer, Port Stephens Council (economic development officer)
- Ian Mackey, Karuah Town Coordinator, Cr8ing growth (economic development officer)
- Bev Manton, Manager, Karuah Aboriginal Land Council (community leader²)
- Hope Simpson, Secretary, Karuah Tidy Towns (community leader)
- Christine Offord, Karuah Progress Association (community leader)
- Gordon Latimore, Oyster Growers Association (community leader)

Briefer interviews were undertaken with individuals who had already elected to take part in the business survey and approximately 20 other Karuah residents who were approached informally in public settings. Informal interviews were also conducted with staff at the local primary school and the local RSL Club – both of which are located on Karuah’s main street.

While responses obtained during interviews are by nature subjective, it was still possible to identify common themes running through the public discourse, to broadly determine areas of community agreement and disagreement and to form an idea as to the perceptions held by key stakeholders on issues of interest.

2.6 The social survey

The social survey was a short interview survey with the residents of the Karuah. The main purpose of the survey was to find out what the attitudes were in relation to the bypass and what residents thought about life after the bypass in Karuah.

A copy of the survey form is contained in Appendix 1.

The survey was administered over a 2-day period (from 9th to 10th September - Friday afternoon and Saturday morning). About six interviewers were involved.

The main street of Karuah was the primary place of survey collection with the best locations outside the fast food shop near the primary school and the nearby liquor shop. Many residents stopped in these locations. The primary school was also targeted on the Friday afternoon and several interviews were gathered from parents picking up students.

2.7 Constraints and assumptions

Economic analyses of small towns occasionally run into methodological difficulties. A few of the issues and assumptions that could prove to be problematic are briefly discussed below:

² A ‘community leader’ refers to a Karuah resident who plays a substantive role in a local community organization and is directly involved with efforts to improve Karuah’s economy

- Many bypass impact studies have been sharply criticized for failing to include a control town in their statistical analyses (Burruss 1996). It is argued that the impacts of a bypass cannot be separated from broader regional economic trends unless another town is used to control for these variations. For this study, it was decided not to use a control town because:
 - a) Karuah has a range of special characteristics that distinguish it from other towns in the region, both socially and economically. There is no other town that can readily be used as the basis of a control-impact study.
 - b) Karuah is a small town and an economically distinct entity with few major linkages to industries in the surrounding area. In such towns, bypass impacts are more clear-cut and less ambiguous, reducing the need for a control town.
 - c) RTA best practice guidelines for bypass impact assessment do not require the use of a control town (see Parolin and Garner 1996b).
 - d) All the fieldwork for this study was undertaken after construction of the bypass. Figures from before construction of the bypass were obtained from previous Karuah studies and used as the basis for comparison. Hence, there is no reliable 'before' data for a control town.
 - e) Time and financial constraints make identifying and analyzing a control town difficult - especially given the lack of census data at a small enough scale.
 - f) In the twelve months since construction of the bypass there has been no other major source of economic disruption to the town. The spike in petrol prices during 2005 would likely have had some economic impact related to tourist numbers, however most of the economic impacts generated by the bypass occurred well before this period.
- The business survey identified the impacts experienced by Karuah almost exactly one year after completion of the bypass. It is important to have due consideration for the time-scale involved as it is very likely that the full impacts of the bypass will not yet have been felt. Similarly, local economic development programs will only have been partially developed and the success or otherwise of these initiatives will probably not be fully known for a number of years.

3. Karuah before the bypass

This chapter provides an overview of Karuah's economy prior to construction of the bypass and discusses the vulnerability of Karuah to bypass impacts. A review of the studies undertaken prior to bypass construction will also serve to highlight the issues associated with the impact assessment process for bypass developments.

The data in this section is sourced from the ABS (2001) and two economic impact assessment studies undertaken by Purdon Associates that formed the basis for the EIS predictions (1997, 1998). In addition, the *Karuah Community Economic Redevelopment Plan (KCERP)* (2004) compiled by the University of Sydney and the Karuah Community and Economic Redevelopment Committee provides a comprehensive profile of Karuah's pre-bypass economic status. Some data is also obtained from a series of business surveys undertaken by the University of Sydney (2003) although these did not include all Karuah businesses. Interviews with community members were another source of information.

3.1 Karuah's pre-bypass economy

2001 census data gives Karuah's population as 1,070. Port Stephens Council's Urban Settlement Strategy has identified a total capacity in the Karuah/Swan Bay area of 2,000 people, although this is unlikely to be reached before 2021.

KCERP (2004) and Purdon Associates (1998) note that Karuah's population and economy is characterised by the following features:

- A higher than average proportion of people over 60 years of age; 22.2 percent of the total compared to a state-wide average of 16.6 percent. This reflects the increasing immigration of retirees to coastal areas as well as the general ageing of the population nationwide.
- A significantly higher than average proportion of people from Aboriginal and Torres Strait Islander backgrounds; approximately 14.2 percent compared to a state-wide average of 0.12 percent. The majority of the local indigenous population in Karuah is housed in a geographically distinct area – to the west of the highway in an area of land previously used as a mission. The area is administered by a local land council.
- An unemployment rate of 12.9 percent – nearly double the national average.
- 90 percent of employed Karuah residents earn less than the state average of \$610 a week and 80 percent earn less than \$400 per week.

Figure 3.1: Karuah population pyramid

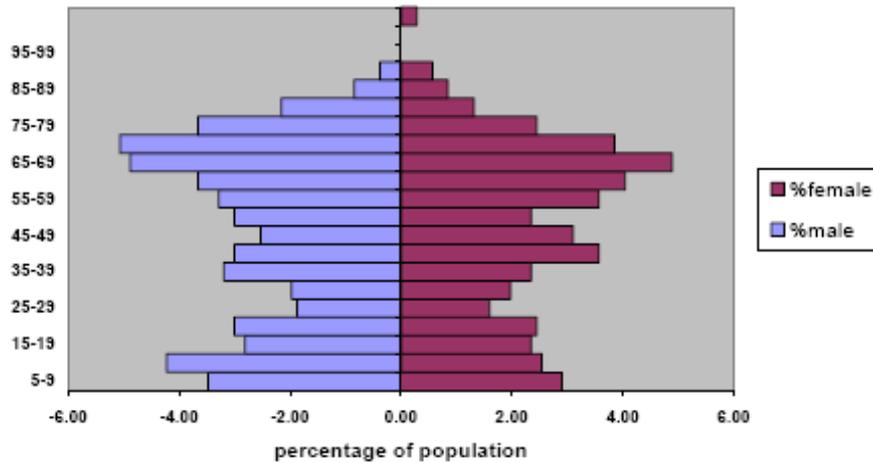


Figure 3.1: Karuah population pyramid. *Note: Data sourced from KCERP (2004) based on 2001 ABS data*

The number of employed Karuah residents totals 270 persons (ABS 2001), however total employment in Karuah prior to bypass construction was estimated at 227 full and part-time jobs (Purdon Associates 1998). Karuah's location 3 hours from Sydney, 30 minutes from Newcastle and 20 minutes from Raymond Terrace makes commuting relatively easy; however it is unlikely that the town could sustain increased reliance on employment outside of the town (DUAP 2001).



PHOTO 3.1: Karuah oyster farm near the foreshore, facing west. Oyster farms in Karuah are clustered along the river, separate from the town centre.

The main sources of revenue in Karuah derive from oyster farming and the servicing of passing motorists. In addition, 2 sawmills on the outskirts of town provide additional employment and several small-scale employment programs are conducted in the local aboriginal community with the help of grant money – including artefact manufacturing and boat building. These industries represent the ‘basic’ or town-forming component of Karuah’s economy (Klosterman 1990). The remaining businesses in Karuah are non-basic; existing to serve the local community.

TABLE 3.1: Employment Numbers

	Male	Female	Total	
Full-Time	61	37	98	43%
Part-Time/Casual	29	100	129	57%
	90	137	227	100%
Total	40%	60%	100%	

Source: Purdon Associates (1998)

The oyster farming industry is clustered along the banks of the Karuah River. The seasonal, family-based and informal nature of this industry makes total employment difficult to accurately measure. Purdon Associates (1998) and the Karuah Oyster Growers Association estimate that between 30 and 40 people are employed in oyster farming. A visual inspection identified 7 oyster farms along the Karuah foreshore.

TABLE 3.2: Businesses in Karuah prior to bypass construction

Business Type	No. of Businesses
Petrol Station/Motor Vehicle Repairs	4
Food	3
Restaurant/café/takeaway	3
Accommodation	4
Club/Hotel	3
Oyster Farming	7
Liquor Shop	1
Hardware	1
Newsagent/Post Office	1
Pharmacist	1
Timber mill	2
Boarding Kennels	1
Medical Centre	1
Hairdresser	1
Gift Shop	1
Other retail	4
Total	38

Source: Purdon Associates (1998), with oyster farm information added.

Note: Business categories based on the dominant business type.

Employment resulting from motorist revenue is also difficult to measure accurately since different businesses have reported varying degrees of reliance on highway-related trade. The most reliable pre-bypass figures indicated that 41 percent of all businesses in Karuah were totally or substantially reliant on passing motorists – accounting for approximately 60 percent of total employment in Karuah (Purdon Associates 1998). These businesses are concentrated in the Karuah town centre along Tarean Street.

TABLE 3.3: Traffic flow along Tarean Street prior to bypass construction

Period	Two way combined vehicles per day
Annual average daily traffic	10 336 (13 329)
Annual average daily weekday	9 724 (12 539)
Annual average daily weekend day	11 209 (14 459)
Christmas Day	23 277 (30 017)
Boxing Day	22 159 (28 176)

Source: KCERP (2004) based on 1995 RTA data. Figures in brackets indicate projected 2003 traffic volumes based on an increase of 3.7 percent per annum.

One aspect of Karuah’s economy overlooked in the various pre-bypass studies was the sex-ratio of full and part-time jobs. Table 3.4 demonstrate that prior to bypass construction full-time jobs in Karuah were male-dominated while part-time and casual jobs were female dominated. As employment impacts resulting from the bypass typically affect mainly part-time and casual jobs (Parolin and Garner 1996a), this would indicate that the bypass is likely to disproportionately affect females.

Table 3.4: Proportion of males and females in full and part-time jobs in Karuah

	Male	Female	Total	
Full-Time	61	37	98	43%
Part-time/casual	29	100	129	57%
	90	137	227	100%
Total	40%	60%	100%	

Source: Purdon Associates(1998)

Interviews with Council officials and community leaders have made it clear that Karuah has been beset with a variety of social problems for some time. Karuah’s small population and its role as a highway service centre have also led to a distinct shortage of basic community and retail facilities. The town centre is dominated by businesses catering to passing motorists rather than the local community - most local residents appear to do all shopping in regional centres such as Raymond Terrace.

3.2 Vulnerability of Karuah to bypass impacts

DUAP noted in 2001 that Karuah has ‘special characteristics’ that set it apart from other towns and increase the likelihood of serious, long-term economic impacts as a result of the bypass. DUAP did not specify what these characteristics were but a cursory analysis of Karuah’s demographic and economic attributes make its’ vulnerability readily apparent.

Specifically, the following factors would have made Karuah particularly vulnerable to bypass impacts:

- *Low population:* studies have consistently found that bypass impacts become more severe as the population of the town decreases. Towns with populations below 5000 people appear to be particularly vulnerable. Karuah’s 2001 population was 1,070 (ABS 2001).
- *Remoteness:* While a number of residents are employed outside of the town, Karuah essentially acts as an independent economic entity with no major linkages to industries outside of the locality. DUAP (2001) noted that ‘opportunities for re-employment in neighbouring towns do not appear highly promising’.
- *A high level of dependency on passing traffic:* Purdon Associates (1998) found that 41 percent of businesses – accounting for approximately 60 percent of total employment - regarded themselves as totally or substantially reliant on highway trade. The 2003 Sydney University survey found that 50 percent of all employees in the town centre were employed in the ‘petrol’ business category.
- *Low urban design quality:* Although Karuah is situated along a river and encompasses areas of scenic beauty, the town centre itself is of low aesthetic quality – consisting primarily of detached and semi-detached retail/residential buildings of minimal heritage significance. The bypassed town ‘success stories’ such as Berrima (BTCE 1994) and Yass (Parolin and Garner 1996a) have well-defined town centres of high architectural quality which contributed to the growth of the local tourism industry following the diversion of highway traffic.
- *Existing community issues:* Before construction of the bypass Karuah was already characterised by above-average levels of unemployment and a low paid workforce. Any decrease in revenue or employment would exacerbate these pre-existing problems. In addition, poor local quality of life and ‘liveability’ would potentially discourage investment and the opening of new businesses (Blakely and Bradshaw 2002: 180).

3.3 Predicted impacts

Motorists stopping and spending money in Karuah generate business revenue and support local jobs. Highway generated trade will be reduced as the number of motorists stopping at the town decreases, leading to associated reductions in revenue and employment both directly and indirectly.

There are a wide variety of methodologies for predicting these impacts and a number of approaches are possible depending on the specific local conditions (see Section 2). Some studies estimate lost revenue using surveys of motorists stopping in town before estimating lost employment through a revenue-employment multiplier; however this approach is overly simplistic and can result in inflated estimates (Garner 1998).

The small size of Karuah facilitated a direct approach. Both pre-bypass studies directly surveyed Karuah business owners to determine the perceived degree of reliance on passing motorists and the likelihood of business closures or reduction of employment following bypass construction.

3.3.1 The Karuah to Bulahdelah Bypass EIS (1999)

The EIS for the Karuah bypass contained a section and a working paper outlining the likely employment and business effects that would be felt in the township. The section was based on studies undertaken by Purdon Associates in 1997 and 1998.

Purdon Associates estimated losses in business revenue and employment through a direct survey of every business in town. Businesses were asked to assess the degree of dependency on highway traffic – on a scale from ‘totally reliant’ to ‘no reliance’. Business owners were then asked to predict the effect of the bypass on the business and the resulting change in employee numbers.

Purdon Associates successfully surveyed almost every business in town but did not survey any oyster farms, relying instead on data from NSW Fisheries. The data obtained in the study formed the basis for the Karuah EIS’s assessment that 12 businesses would close following bypass construction with a decline in business at a further 9. The total number of affected jobs was estimated at 131 (see Table 3.5). This represents 57 percent of the total employment in Karuah.

TABLE 3.5: Predicted effect on businesses from bypass

Effect on Business				
No effect	8	24%		
Closure	12	35%		
Decrease	9	26%		
Increase	5	15%		
Total Responses	34	100%		
Size of Change	Decrease		Increase	
10% or less	1	13%	2	67%
11-20%	1	13%		
21-30%	3	38%		
31-40%	1	13%	1	33%
41-50%	1	13%		
50-99%	1	13%		
Total responses	8	100%	3	100%
Not stated	1		2	
Change in Employees				
No change	15	45%		
Decrease	16	48%		
Increase	2	6%		
Total Responses	33	100%		
Not Stated	1			
Change in Number of Employees				
Decrease	-133			
Increase	2			
Total	-131			

Source: Purdon Associates (1998)

Purdon Associates noted that the bypass would most severely affect highway dependant businesses such as service stations, takeaway shops and food stores. The EIS also mentions in passing that the majority of highway-reliant jobs are part-time or casual and staffed by females.

3.3.2 The Sydney University Study (2003)

The 2003 study undertaken by students from the University of Sydney provided an additional chance to assess business optimism immediately prior to the opening of the bypass. The study was never used as part of the formal assessment process but assisted with the completion of the *Karuah Community Economic Redevelopment Plan (KCERP)* (2003).

A limitation of this study was its lack of completeness, being focused almost exclusively on the businesses clustered in the town centre along Tarean Street – 23 in all. However,

as the majority of highway dependant businesses were located in this part of Karuah anyway the study still provided a useful additional source of data.

Businesses were asked to assess the degree of dependency on highway traffic – on a scale from ‘totally reliant’ to ‘no reliance’. Other survey questions aimed to identify employment numbers for business categories and business perceptions as to whether the bypass would have a ‘positive’ or ‘negative’ economic impact.

The most important findings of the Sydney University study were the following:

- 15 business managers or 65 percent of those surveyed considered themselves totally or substantially reliant on highway-derived revenue.
- Almost all of the ‘totally reliant’ businesses were in the food, petrol, restaurant/takeaway or accommodation business categories.
- 39 percent of business owners believed the bypass would have a negative effect on their business.
- 50 percent of the employment in the town centre was in the ‘petrol’ business category. This business category as a group also had the greatest degree of reliance on highway traffic.

The study also provided employment figures for various industry sectors in the town, which were later used to estimate employment losses in Chapter 5.

3.3.3 Summary

The reports undertaken prior to the opening of the bypass identified a high level of dependency on passing traffic and agreed that the bypass would have a significant impact.

TABLE 3.6: Comparison of pre-bypass studies undertaken in Karuah

	Karuah to Bulahdelah Bypass EIS (1999)	Sydney University Study (2003)
Methodology	Direct survey	Direct survey
No. Businesses Surveyed	34	23
Results:		
Number of businesses 'totally' or 'substantially' reliant on highway trade	14	13
Percentage of businesses 'totally' or 'substantially' reliant on highway trade	41	56.45
Other significant findings	Predicted closure of 12 businesses and reduction in trade in another 9 - affecting up to 131 jobs.	39 percent of business owners believed the bypass would have a negative impact

The methodologies adopted for the studies were appropriate for the circumstances; in the absence of hard economic data for individual businesses a direct survey of business owners was the simplest and most cost-effective method of arriving at an estimate of likely revenue and employment loss. However as with other techniques this methodology also stands a high risk of reaching an inflated estimate; numerous studies have shown that widespread community concern for bypass impacts is often misplaced and exaggerated (eg NCHRP 1996). Where impacts do occur they are usually lower than those expected by business owners and the general public (see Section 3).

For this reason it is necessary to view the 'worst-case' scenario adopted in the studies with some reservation. Of perhaps greater concern is precisely *how* these impacts will be distributed throughout the community. A recurring theme in the pre-bypass studies was the dependency of females in Karuah on casual and part-time employment. This is significant as bypass employment impacts predominantly affect part-time and casual jobs in the service industries. The potential for disproportionate impact on females adds an extra dimension to the potential social impact of the bypass; however this was never explicitly discussed at any point in the assessment process.

Hence, short-term economic impacts in Karuah were acknowledged as a serious issue in every pre-bypass study. It is now possible to test these predictions and assess the impact of the bypass 12 months after its' opening. This is the subject of Chapter 5.

The next chapter focuses on an examination of the traffic changes in Karuah after the opening of the bypass.

4. Impacts of the Bypass – Traffic

This Chapter reports the findings traffic counts taken at Karuah Bridge before and after the bypass and of a traffic survey which describes the stopping behaviour of motorists using the old highway route.

4.1 Traffic Volumes

An RTA traffic count station is located at the Karuah River Bridge (station No 05.006). Traffic travelling in both a north and south direction is listed. This station remained operational after the bypass was opened so it is possible to obtain accurate before and after bypass traffic data. The traffic counts immediately before and after the bypass (week 38 and week 39) of 2004 are listed in Table 4.1.

TABLE 4.1: Weekly Traffic Volumes before and after the opening of the bypass

Time period	Number of cars - Bypass north direction	Number of cars - Bypass south direction	Total traffic
Week 38	48,527	49,956	98,483
Week 39	5,216	4,534	9,750

Source: RTA Traffic counts

Not surprisingly the table shows the very large drop in traffic using the old highway route (SH10) immediately after the bypass was opened. The traffic levels were only about 10% of the pre-bypass traffic. Traffic has remained at these reduced levels

4.2 Proportion of vehicles coming to Karuah from bypass

As discussed above, the number of cars travelling along the Karuah bypass was recorded in 10 minute intervals throughout the day. The table below summarises this data.

TABLE 4.2: Number of cars on bypass

Time period	Number of cars - Bypass north direction	Number of cars - Bypass south direction
8:45 - 8:55	89	64
9:26 - 9:36	85	87
11:30 - 11:40	87	93
12:01 -12:11	83	102
13:15 -13:25	92	87
14:50 - 15:00	83	65
16:15 -16:25	62	75

Based on this information, the following table estimates the traffic flowing in each direction along the by-pass per hour. This was estimated by multiplying the number of vehicles counted for each 10 minute interval by six. Where data was not collected within a specific hourly period, this was extrapolated through averaging the two surrounding data points.

This data clearly demonstrates that there was a peak in traffic volumes driving in both the northern and southern directions along the bypass between 12pm and 2pm. The total number of vehicles driving north along the bypass between the hours of 8am and 5pm is estimated to be 4527 vehicles, whereas the total number of vehicles driving south is estimated at 4434.

The proportion of vehicles driving along the bypass that drove into Karuah can be calculated using the data and traffic information collected by students from the north and south stations.

TABLE 4.3: Estimated number of cars per hour travelling along the bypass

Hour	Estimated number of cars – North	Estimated number of cars – South
8am-9am	534	384
9am-10am	510	522
10am-11am	516	540
11am-12pm	522	558
12pm-1pm	498	612
1pm-2pm	552	522
2pm-3pm	525	456
3pm-4pm	498	390
4pm-5pm	372	450
Total	4527	4434

The southern data collection station was located about one minute north of the bypass bridge where the freeway traffic was counted throughout the day. Given this, the number of cars driving north into Karuah associated with each of the bypass recording periods can be determined by measuring the traffic flows along the Old Pacific Highway during the same recording period, plus one minute. For example, a car travelling north along the bypass that was recorded travelling north along the freeway at 8:45am would have passed the southern data collection station going in a northern direction at approximately 8:46am.

The calculation of data for the traffic going south was slightly more complex. As discussed, traffic driving south along the bypass was also measured from the overpass bridge at the southern end of the freeway. The time required to travel the full length of the bypass between the southern exit and northern exit points was determined to be about 6 minutes (driving at the speed limit), while the time between the northern data collection station and the northern bypass entrance was measured to be about 2 minutes. Bypass traffic heading south counted at the southern data station would therefore be associated with traffic driving past the northern data station approximately 4 minutes earlier. For example, a car recorded driving south along the bypass at 9am would have travelled past the northern exit at 8.54 am. Had that car turned off into Karuah, it would therefore have travelled past the northern data station at approximately 8.56am.

Using this logic, table 4.3 illustrates the proportion of cars driving north along the bypass that are estimated to have driven into Karuah instead of continuing ahead along the freeway and table 4.4 illustrates the proportion of cars driving south along the bypass that are estimated to have driven into Karuah. As the tables demonstrate, on average *about 14 percent* of cars travelling north on the Pacific Highway drove into the Karuah township while about *7 percent of cars driving south along the Pacific highway exited into Karuah*. This result is consistent with the findings of a stopper survey that was completed in September 2003, which found that the majority of stoppers in Karuah originated from Sydney.³

Based on this data, it appears that a significant proportion of the vehicles travelling along the Pacific Highway are still choosing to visit Karuah following the completion of the bypass. However, this result does not take into account those vehicles entering and or leaving Karuah that are actually residents of the township, or people visiting residents or local businesses. In order to determine what proportion of traffic is actually made up of through traffic choosing to stop over in the township, further information is required. This information is discussed in detail in the following sections.

³ *Karuah Community Economic Redevelopment Plan*, July 2004, p. 9.

TABLE 4.4: Proportion of cars driving north into Karuah from bypass

Time period	Number of cars driving north along Bypass	Number of cars driving north into Karuah	Proportion
8:45 – 8:55	89	8	9%
9:26 – 9:36	85	8	9%
11:30 - 11:40	87	18	21%
12:01 -12:11	83	9	11%
13:15 -13:25	92	13	14%
14:50 - 15:00	83	15	18%
16:15 -16:25	62	10	16%
Total	581	81	14%

TABLE 4.5: Proportion of cars driving south into Karuah from bypass

Time period	Number of cars driving south along Bypass	Estimated Number of cars driving south into Karuah	Proportion
8.45 – 8.55	64	7	11%
9.40 -9.50	87	8	9%
11.20 -11.30	93	4	4%
11.50 -12.00	102	9	9%
13:26 - 13:36	87	3	3%
14:40 - 14:50	65	5	8%
16:05 - 16:15	75	6	8%
Total	573	42	7%

4.3 Behaviour of vehicles in Karuah

a) Total number of trips recorded in Karuah

As noted in section three above, data measurement stations were set-up at both the southern and northern ends of the township. At both of these stations between the hours of 8am and 5pm a total of *1611 trips were recorded*.

Of these trips, the south station registered the most traffic activity. Specifically, 936 trips were registered at the south station (or 58 percent of total traffic) while 674 trips were recorded at the north station (or 42 percent of total traffic). This pattern may be explained by the fact that Karuah residents travelled south to Raymond Terrace and Newcastle during the day to access services in these townships. There was almost an even split between traffic going north and south during the day from both stations: 805 vehicles were recorded going north versus 806 vehicles going south.

The distribution of total trips by direction and time period (irrespective of measurement station) is presented in table 4.5 and figure 4.1 below. From this analysis, it can be concluded that:

- the peak hour along the road through Karuah occurred between 1pm and 2pm.

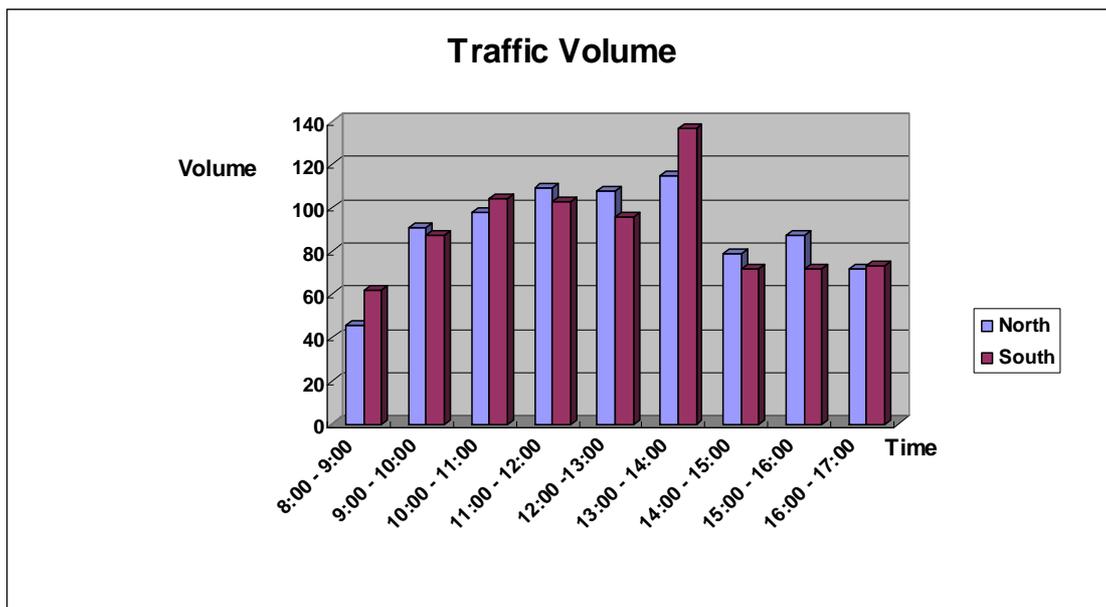
During that period, 115 Vehicles traveled in a northern direction and 137 vehicles traveled in a southern direction (calculated for both data stations).

- average traffic volume going north was 89.4 vehicles per hour throughout the day and average traffic volumes going south was 89.5 vehicles per hour (calculated for both data stations).

TABLE 4.6: All Traffic recorded in Karuah – by time period and direction

Time		8:00 – 9:00	9:00 – 10:00	10:00–11:00	11:00–12:00	12:00-13:00
Direction	North	46	91	98	109	108
	South	62	87	104	103	96
Time		13:00-14:00	14:00-15:00	15:00-16:00	16:00-17:00	Total
Direction	North	115	79	87	72	805
	South	137	72	72	73	806

FIGURE 4.1: All traffic recorded in Karuah – by time period and direction



b) Classification of total trips recorded in Karuah

After a detailed assessment of the data and the resulting number plate matches, it was decided to categorise the trips recorded in Karuah into three main groups:

- *Vehicles driving through Karuah* – these are the vehicles that drove in a single direction through the township. For example, a car that drove north through the south measuring station and then north through the north measuring station only once would fall into this category. These vehicles are of particular interest as they represent travellers driving along the Pacific Highway that decided to stop over in Karuah (thus generating business) as opposed to driving along the bypass.
- *Resident vehicles* – these vehicles were also sighted more than once during the day but were found to travel in a variety of directions. Specifically, resident vehicles included: those cars that left Karuah and then re-entered Karuah past one station; those vehicles that entered Karuah and then subsequently left Karuah also through the one data collection station; and those vehicles registered as making multiple trips through the town. These vehicles are of less interest as it can be assumed that they would make trips through the town irrespective of Karuah's specific attributes.
- *Unmatched vehicles* – these are the vehicles that were only registered once during the day by either of the data collection stations. It is assumed for the purposes of this analysis that these vehicles were also residents of the township that travelled in and/or out of Karuah once but did not return during the data collection period.

Using this classification framework, analysis of the data found that 362 of the 1611 trips recorded were made by vehicles driving one way in either a northern or southern direction through the township. That is, *there were 181 vehicles that drove through Karuah as opposed to taking the new bypass.*

Of the remaining 1249 trips, 448 were classified as being made by 'resident' vehicles – that is – cars that entered and left Karuah past the one station or made multiple trips along the Old Pacific Highway throughout the day. The average number of trips made by each of these vehicles was calculated to be 2.45, meaning that there were about 189 'residents' travelling through the township that day.

The remaining 801 trips were single trips that did not register a number plate match from either the opposite station or the same counting station. It is unclear what generated these trips and why the proportion of these trips was so high. Since there are only about 1,200 residents in the Karuah region and that 181 vehicles were identified as likely residents, it is plausible to suggest that a proportion of these recordings are the result of data entry or collection errors.

This information is summarised in table 4.6 and figure 4.2 below. As the table and graph demonstrate, about 68 percent of all vehicles registered at both data stations were recorded only once during the data collection period. Of these, 33 percent drove into

Karuah, while the balance of 35 percent drove out of Karuah in either a northern or southern direction.

In contrast, only 16 percent of vehicles drove through the township past both data collection stations in either a northern or southern direction. Of these, about 6% did not stop or stopped in Karuah for less than 15 minutes, while the remaining 10% stayed for longer than 15 minutes in the township. The remaining 16.5% of vehicles that were recorded in Karuah that day made multiple trips through the township and have been classified as local residents (or individuals visiting local residents).

TABLE 4.7: Components of Total Traffic

Category	No match found		Drive through the town (DT)		Resident vehicles (multiple trips)
	Drove into Karuah	Drove out of Karuah	Length of stay <15min	Length of stay >15min	
Vehicle	374	405	71	110	189
Proportion	33%	35.30%	6%	9.60%	16.50%

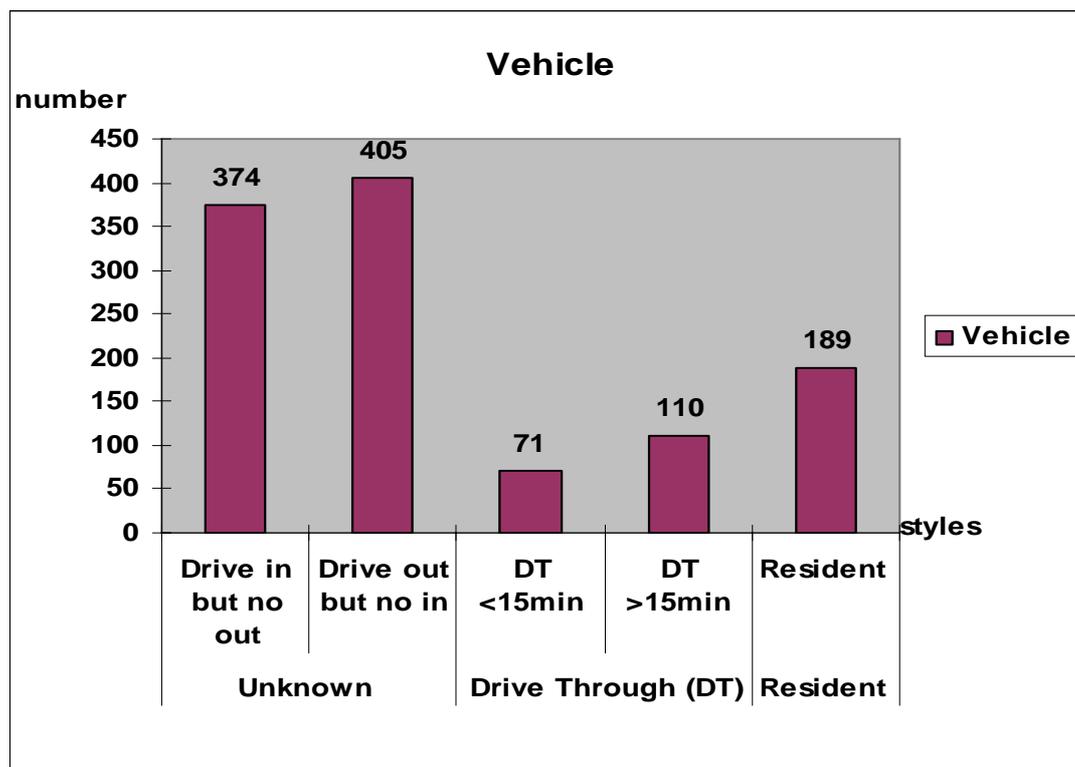


FIGURE 4.2: Classification of vehicles driving through Karuah

This analysis suggests that while the proportion of traffic entering Karuah from the bypass was significant, it appears that the majority of this traffic was actually generated by local residents as opposed to coastal travellers visiting the township on the way to Sydney/Newcastle or to the north coast. These findings are discussed in further detail in the following section.

4.4 Vehicles passing through Karuah

a) Analysis of vehicles driving through Karuah

As discussed above, only 362 trips or 181 vehicles were registered as driving through Karuah during the data collection period, or about 16 percent of total recorded vehicle movements. Of these, 95 vehicles drove north through Karuah (or 52 percent of the total), while 86 vehicles drove through the township in a southern direction towards Sydney (or 48 percent of the total).

The following table disaggregates these trips by direction and time period (for both data stations). As this data illustrates, there was a clear peak in the amount of traffic heading south along the Old Pacific Highway between 1pm and 2pm. Traffic volumes heading north were more constant throughout the day, with a slight peak between 12pm and 1pm and also between 4 and 5pm.

TABLE 4.8: Traffic driving through Karuah by time period and direction

Direction/time	8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00
South	7	12	19	24	23
North	4	16	19	21	29
Direction/time		13:00-14:00	14:00-15:00	15:00-16:00	16:00-17:00
South		36	21	15	16
North		24	26	24	26

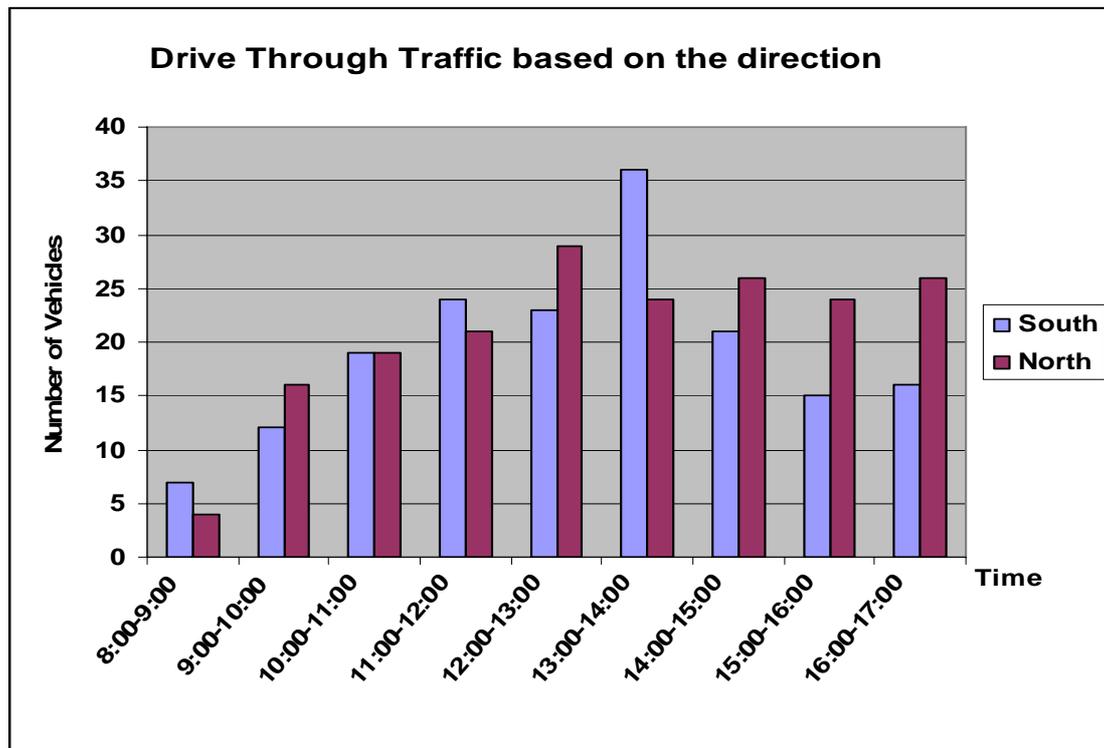


FIGURE 4.3: Traffic driving through Karuah by time period and direction

Using this data and estimates of bypass traffic which were calculated above, it is possible to determine the proportion of vehicles driving along the Pacific Highway bypass that visited Karuah.⁴ These estimates are summarised in tables 4.8 and 4.9 below.

TABLE 4.9: Proportion of bypass traffic driving through Karuah – north direction

Hour	Estimated number of cars traveling north on bypass	Estimated number of vehicles traveling north through Karuah	Proportion
8am-9am	534	2	1%
9am-10am	510	8	2%
10am-11am	516	10	2%
11am-12pm	522	11	2%
12pm-1pm	498	15	3%
1pm-2pm	552	12	2%
2pm-3pm	525	13	2%
3pm-4pm	498	12	2%
4pm-5pm	372	12	3%
Total/Average	4527	81	2%

⁴ Since some vehicles driving through Karuah entered the town in one hour and left during another hour, vehicle numbers within each hourly period have been estimated by dividing the registered trip count within that hour by two.

TABLE 4.10: Proportion of bypass traffic driving through Karuah – south direction

Hour	Estimated number of cars traveling south on bypass	Estimated number of vehicles traveling south through Karuah	Proportion
8am-9am	384	4	1%
9am-10am	522	6	1%
10am-11am	540	9	2%
11am-12pm	558	12	2%
12pm-1pm	612	12	2%
1pm-2pm	522	18	3%
2pm-3pm	456	10	2%
3pm-4pm	390	8	2%
4pm-5pm	450	8	2%
Total/Average	4434	95	2%

As the above tables illustrate, *only about 2 percent of total traffic flows along the bypass visited Karuah throughout the day.* This holds for traffic travelling both north and south along the bypass. This is in contrast to the 14 percent of vehicles that entered Karuah going north along the bypass and the 7 percent going south, which included residents of Karuah or people specifically visiting Karuah residents or businesses.

These tables also illustrate that there was a peak in the proportion of traffic coming into Karuah from the bypass between 12 and 2 pm. This suggests that a proportion of vehicles travelling along the Pacific Highway drove into Karuah at that time in order to stop for lunch or midday driving break. .

b) Amount of time that visitors spent in Karuah

Table 4.10 below summarises the amount of time it took for through traffic to pass between the data collection stations located at either end of Karuah. This table clearly illustrates that of the time periods analysed, most vehicles spent between 5-15 minutes in Karuah, and that a relatively large proportion of cars also stopped in Karuah for between 15 minutes and 1 hour.

The time required to travel between the two data collection points driving at the speed limited was estimated to be about 5 minutes. Accordingly, it can be deduced that:

- Vehicles that took between 0 and 5 minutes to drive through the town did not stop over;
- Vehicles that took between 5 and 15 minutes most likely stopped for petrol, a toilet break, or to purchase take away food;
- Vehicles that took between 15 to 30 minutes most likely purchased take away food but consumed it in the township;
- Vehicles that stayed for more than 30 minutes stopped for a more substantial meal, spent time at one of Karuah’s parks or visited friends or relatives.

Table 4.11: Length of stay of traffic driving through Karuah

Traffic driving through	0-5 min	5-15min	15-30 min	30min to 1 hour	>1hour
	9	60	44	46	23

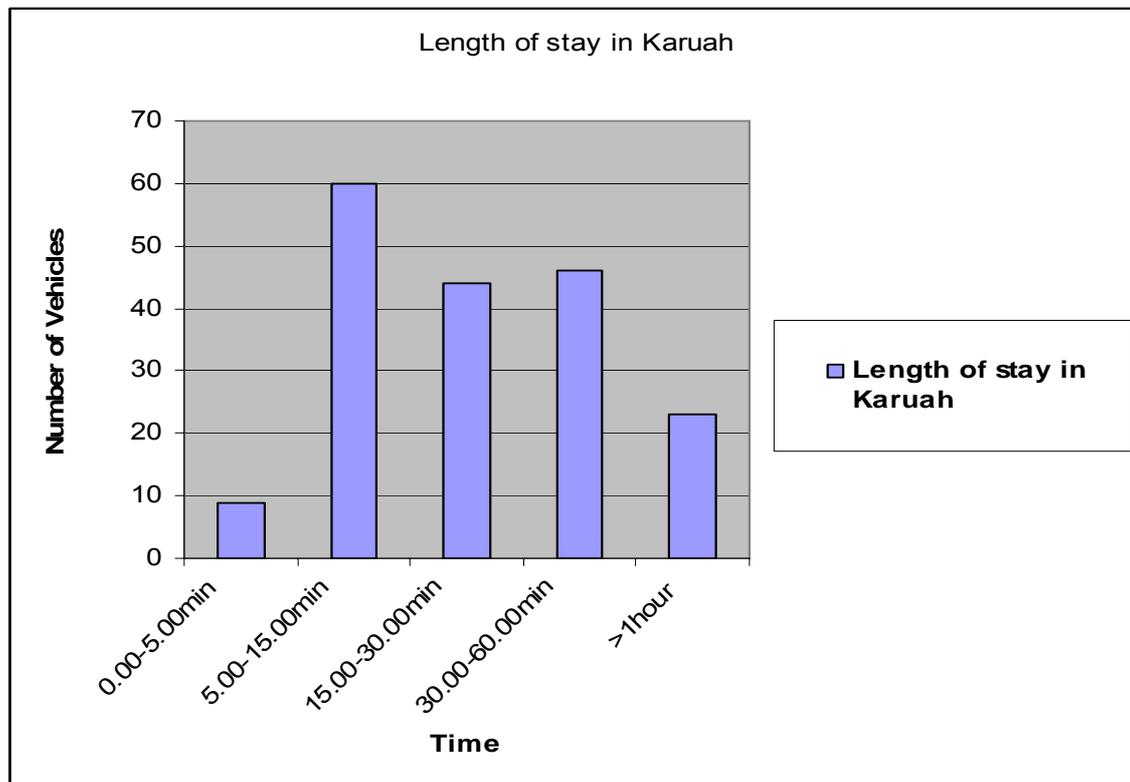


FIGURE 4.4: Length of stay in Karuah

4.5 Implications

The above analysis has highlighted that only a very small proportion of traffic travelling along the Pacific Highway bypass actually drives through or stops off into Karuah, and of those vehicles the majority stay for only a short period of time, if at all. This is in stark contrast to the situation just over one year ago, when all of the traffic driving along this part of the coast passed through the township. Of course, not all of the traffic previously driving along the Pacific Highway actually stopped in Karuah, although it can be hypothesised that the proportion would have been somewhat higher than it is today.

This dramatic change in circumstances is likely to have had a significant impact on the local economy. This issue is the subject of the next Chapter.

5. Impacts of the Bypass - Business

The Karuah business survey was undertaken on 4 August, 19-20 August and 4 October 2005. The people of Karuah were extremely friendly and keen to offer their point of view. A surprisingly large amount of information was obtained informally from members of the general public which has been used to enrich the discussion on community perceptions of bypass impacts. Information was also obtained from interviews with community leaders and economic development officials.

Most of the remaining businesses in the town were accessed and surveyed. Three businesses declined to take part in the survey. Of these, one in the 'food' business category stated that the bypass had had a negative effect on the business.

A pilot survey and an interview with the head of the Karuah Oyster Growers Association made it clear that the local oyster farms have been barely affected by the bypass – an assumption also made in the Karuah economic impact study (Purdon Associates 1998). In addition, the informal, seasonal nature of the industry made it difficult to secure access to many of the individuals involved. For these reasons only two business people involved in the oyster trade were surveyed and the study assumed that the Karuah oyster industry was generally unaffected.

Unless otherwise stated in the text, the data reflecting Karuah's economic condition prior to construction of the bypass is taken from Purdon Associates (1998) and University of Sydney (2003). Since neither of these studies included a survey of oyster farmers this information was added where necessary based on the assumption that the Karuah oyster industry has been unaffected by the bypass (Latimore pers.com.19/8/2005).

5.1 Business closures and openings

Six businesses have closed in the 12 months since construction of the bypass - 3 takeaway food shops, 2 petrol stations and one specialty retail store (Table 5.1). All of these businesses are located in the town centre along Tarean Street.

It is evident that the petrol station closures had been planned well in advance of bypass construction in anticipation of the loss of highway derived revenue. One closed service station is currently undergoing renovation into a restaurant – potentially mitigating some of the economic impact on the town in the long-term.



PHOTO 5.1: Closed takeaway food establishment, Tarean St.

The loss of 3 takeaway establishments was an especially severe impact, effectively wiping out this business category in the town centre. Some anecdotal evidence suggests that the closure of 2 of these businesses may also have been influenced by poor management practices; however it is plain that the highway bypass has played a major role. The only eating establishments remaining in town are secondary elements of other businesses such as a café at the gift shop and the restaurant at the local RSL club.

Two new ‘general retail’ businesses have opened since construction of the bypass – a computer shop and a gift shop/café. The relatively small-scale nature of these businesses means that they have not played a significant role in mitigating the economic impacts of the bypass. Two other businesses have changed owners since bypass construction – one ‘club/hotel’ and one ‘general retail’ business.

TABLE 5.1: Change in Karuah’s business composition

Karuah Businesses	Before bypass	After bypass	Change
Petrol station/motor vehicle repairs	4	2	-2
Food	3	3	0
Restaurant/café/takeaway	3	0	-3
Club/Hotel	3	3	0
Oyster Farming	7	7	0
Timber Mill	2	2	0
Accommodation	4	4	0
Other retail	9	10	+1
Professional services	3	3	0
Total	38	32	-5

5.2 Business Revenue

Seven of the remaining businesses in Karuah reported a decrease in revenue – ranging from 12 percent to 90 percent. All of these businesses are located in the town centre.

One of the petrol station/motor vehicle repair businesses remaining in the town reported a decrease in revenue of 50 percent; the second reported no change in revenue – attributing this to customer loyalty.

Three out of four of the accommodation businesses also reported a decrease in revenue. The three affected businesses had all derived the majority of revenue from opportunistic customers, being located directly along the highway. The unaffected business was less reliant on opportunistic customers – located away from the town centre close to the riverbank and securing revenue through marketing and the provision of high quality facilities.

The other two businesses reporting a downturn were in the ‘general retail’ category. The bypass has affected one of these businesses indirectly. This business previously sold goods to the Karuah service stations and has experienced an economic downturn as a result of service station closures and reduced numbers of highway stoppers.

There is no evidence of other indirect revenue impacts. There are simply too few economic linkages between businesses in the town for indirect impacts to play a major role. Community-based businesses appear to have been buffered from the effect of the decline in highway traffic by a base of local customers that continues to grow with Karuah’s population.

Several business managers have stated that the downturns in business revenue have resulted in personal hardship. One expressed the belief that the loss of revenue was almost sufficient to cripple the business in the long-term. Another has reduced the hours during which the business remains open and has taken a second job.

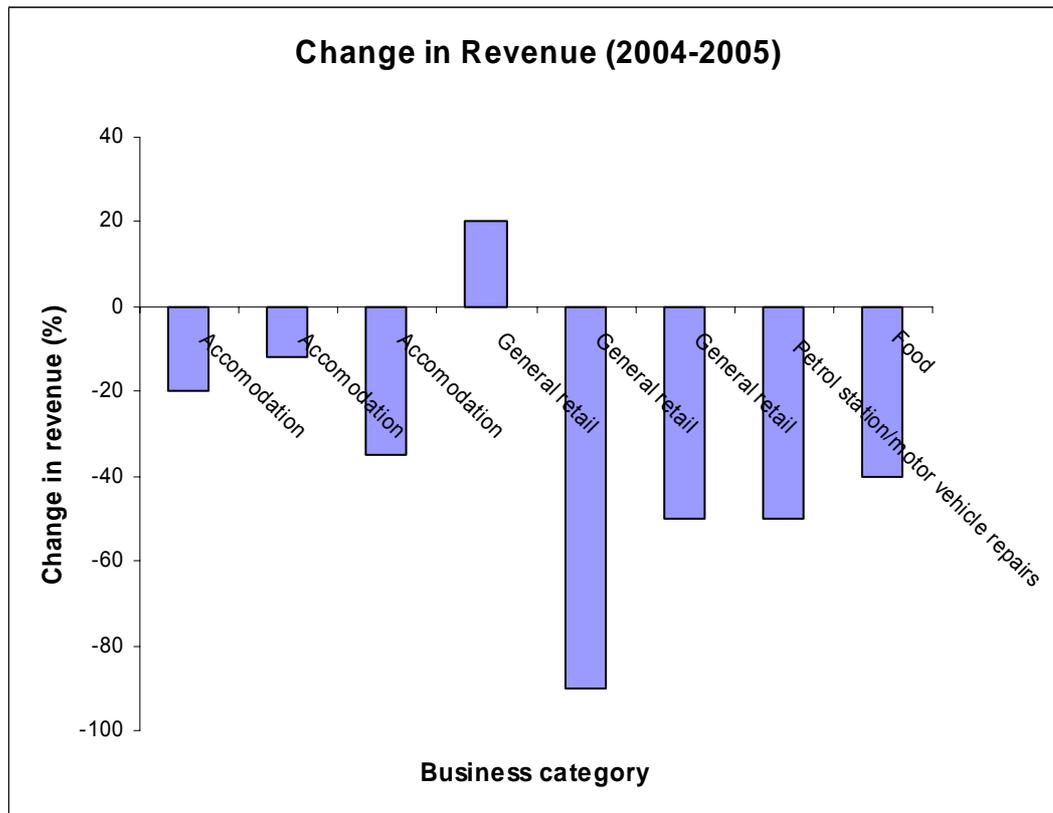


FIGURE 5.1: Changes in revenue of individual businesses in Karuah following bypass construction. The remaining businesses either closed or were unaffected.

One ‘general retail’ business recorded an increase in revenue of 20 percent. The business manager stated that the bypass had a short term negative effect but this was swiftly reversed and the costs associated with a recent renovation were far more substantial than any impact caused by the bypass. The manager attributed this to minimal dependency on highway trade and a customer base that is expanding with Karuah’s population.

Another ‘general retail’ business reported a very slight increase in revenue – attributing this to the improved ambience in the town centre and a higher number of tourists visiting the town due to its’ natural assets.

Figure 5.4 summarises the impacts experienced by businesses following construction of the bypass (including oyster farms). Thirty-four percent of all businesses in the town, 13 altogether, have been affected negatively. All of these businesses are located in the town centre along Tarean Street.

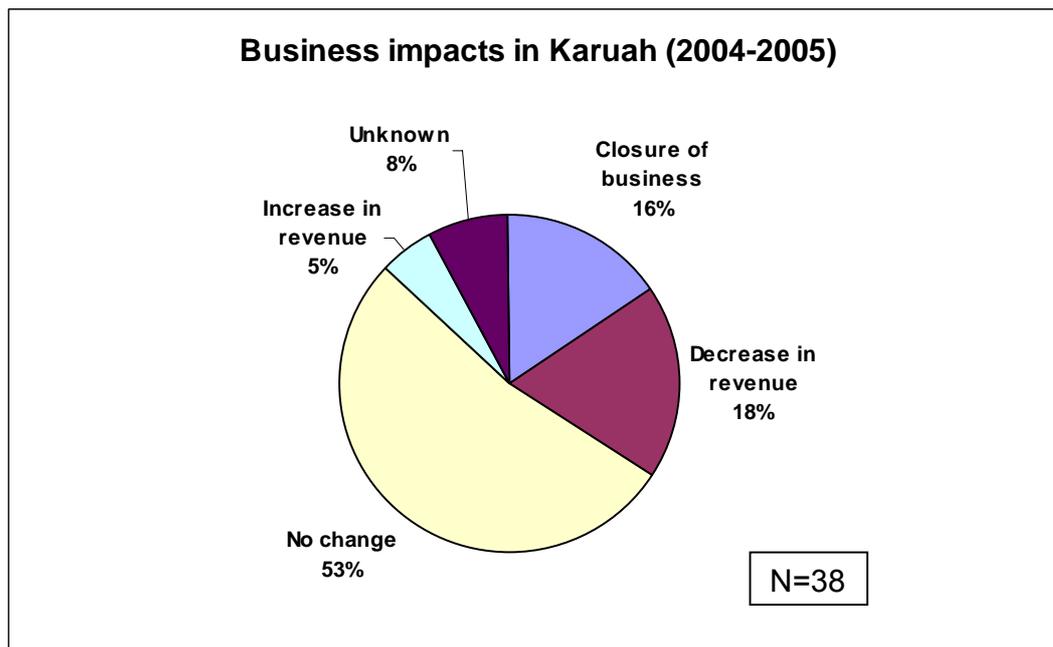


FIGURE 5.2: Impacts experienced by individual businesses in Karuah as a result of bypass (includes Oyster Farms)

5.3 Employment

A total of 48 jobs have been lost in Karuah, representing 21 percent of the total employment in the town. Most of these job losses have occurred at highway dependant businesses – in the ‘service station/motor vehicle repair’ and ‘restaurant/café/takeaway’ categories.

TABLE 5.2: Job losses in Karuah

	JOB LOSSES					Total
	Full-time Male	Full-time Female	Part-time/casual Male	Part-time/casual Female	Unknown (due to business closures)	
Petrol station/Motor vehicle repairs	0	0	2	16	20	38
Food	1	0	0	0	0	1
Restaurant/café/takeaway	0	0	0	0	7	7
Club/Hotel	0	0	0	0	0	0
Oyster Farming	0	0	0	0	0	0
Timber Mill	0	0	0	0	0	0
Accommodation	0	0	0	1	0	1
General retail	0	0	0	0	1	1
Professional services	0	0	0	0	0	0
Total	1	0	2	17	28	48

Note: Figures for job losses due to business closures are based on employment data from Sydney University (2003).

Twenty-eight of the job losses have occurred as a result of the 6 business closures identified above. The status of these jobs is unknown; however the existing data, anecdotal evidence and previous studies (Purdon Associates 1998, Sydney University 2003) have indicated that these jobs were staffed primarily by female part-time/casual workers.

Twenty of the job losses have occurred in response to the reduction in revenue at 3 separate businesses. These businesses consisted of one food store, one petrol station/motor vehicle repair and one accommodation establishment.

The remaining 4 businesses experiencing declines in revenue have successfully absorbed these losses without reducing employment or going out of business. This is chiefly due to the family-based nature of many of the smaller businesses in Karuah.

As mentioned above, the employment losses disproportionately affected female part-time/casual workers. The lost jobs would have represented a supplemental source of income for a number of households and some families will have been badly affected; particularly if DUAP's contention that 'opportunities for re-employment in neighbouring towns do not appear highly promising' (2001) proves correct.

5.4 Business perceptions

The responses to Question 6 of the survey demonstrated that the overwhelming majority of business owners perceive the bypass as having had a negative economic impact. Nineteen respondents or 80 percent of the total business community agreed or strongly agreed that the bypass has had a bad effect on the economy of the town taken as a whole.

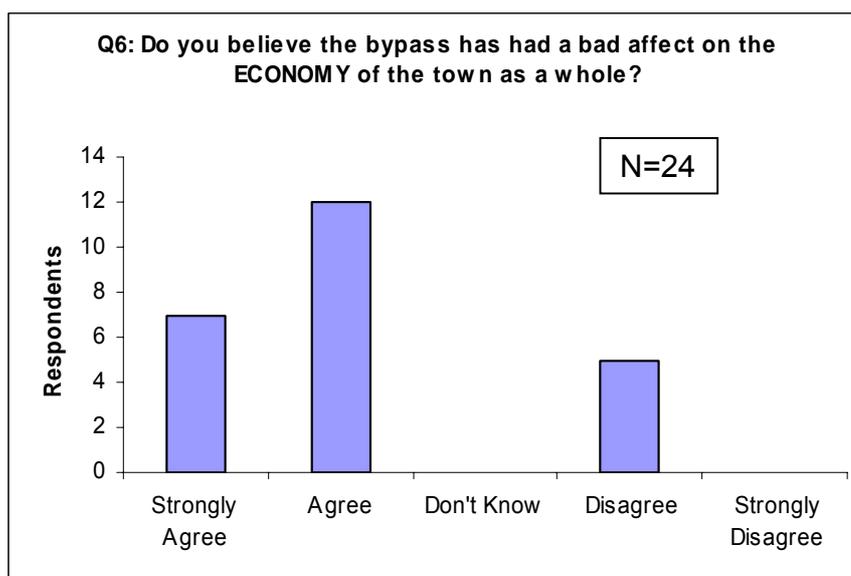


FIGURE 5.3: Business perceptions of effect of bypass on Karuah's economy

Only 4 businesses disagreed with the statement. None of these businesses have lost employees or revenue as a result of the bypass.

5.5 Impacts on local quality of life

Questions 7 of the survey demonstrated that business owners overwhelmingly believe that the bypass has improved local quality of life. Twenty-two respondents or 92 percent of the business community agreed or strongly agreed that the bypass has made Karuah a better place to live by reducing traffic and thereby improving safety and enhancing the ambient noise and air quality of the area.

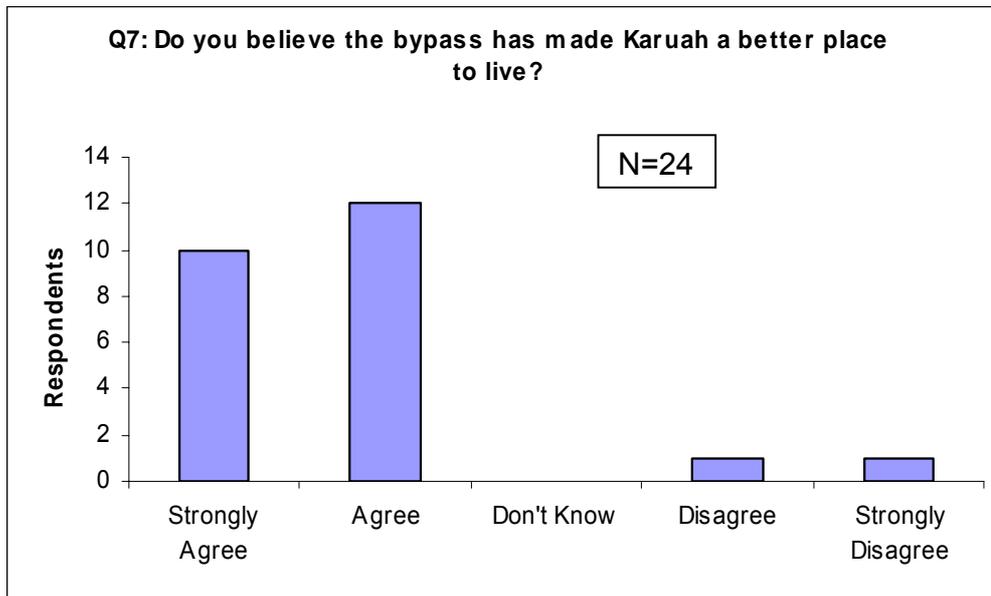


FIGURE 5.4: Business perceptions of effect of bypass on local quality of life

The notable exceptions to this general rule were two business owners – one of whom stated firmly that the bypass had ruined Karuah by turning it into a ‘ghost town’. These individuals considered the highway such an integral part of the town that the diversion of traffic has ruined the character as well as the economy of Karuah. Both of these businesses have lost revenue as a result of the bypass – comprising one ‘general retail’ shop and one ‘accommodation’ establishment.

Generally speaking, the results of questions 6 and 7 taken together demonstrate that business owners are generally positive about the role of the bypass despite a general perception that it has harmed the town’s economy.



PHOTO 5.2: Tarean Street facing north. Prior to construction of the bypass this intersection often acted as a major traffic bottleneck.

5.6 Comparison with EIS predictions

The impacts experienced by Karuah were substantially lower than those predicted in the impact assessment process undertaken prior to construction of the bypass (Table 5.3). Overestimation of bypass impacts frequently occurs during impact assessment (see Section 3) and the methodology adopted for Karuah facilitated an overly pessimistic set of predictions.

By directly asking business managers their perception of intangible concepts such as business ‘reliance’ on the highway and the likelihood of job losses, it was perhaps inevitable that the study resulted in an inflated estimate. However, although lower than expected the impacts experienced by Karuah are still serious and could potentially worsen further.

TABLE 5.3: Comparison between predicted impacts and actual impacts in Karuah

	EIS Predictions	Actual Impacts (after 12 months)
Business closures	12	6
Businesses experiencing decreases in revenue	9	7
Jobs lost in Karuah	131	48
Proportion of employment lost in Karuah	57%	21%

6. Impacts of the Bypass – Social

Whilst tracking the impact of the bypass on business is an important element of any impact study it is also critical to examine the impacts of the bypass on the broader community. This task is undertaken in this Chapter using a number of different strategies including:-

- Interviews with key community stakeholders;
- Case studies of two important institutions, the Karuah school and the RSL; and
- A social survey of about 100 Karuah residents.

The findings are described below.

6.1 Community perceptions

Interviews with business owners, Karuah residents and community leaders have demonstrated widespread optimism throughout the town. While the economic effect of the development has been severe; its social impacts are seen as overwhelmingly positive.

An often-repeated comment by the people of Karuah was that the bypass has been ‘bad for business, but good for the town’. The value-judgments implicit in this statement highlight the ambiguous role the bypass has played in the life of the town. It seems that many residents of Karuah are themselves still weighing up the costs and benefits of the development. While many residents appear disappointed with the closure of so many businesses and the associated loss of employment, widespread community satisfaction with the environmental benefits to the town was a recurring theme in the interviews.

Only one business owner commented that the economy of the town was likely to get worse over the next few years. Every other business either did not offer an opinion or stated that the economy would only improve in the long-term. Several business owners firmly expect the town to ‘boom’ in the near-future. Indeed, it was the perceived long-term economic benefit of the bypass that led one business owner to move to Karuah in the first place.

There is a strong sense that the sudden decrease in traffic has substantially improved the quality of life in a town previously cut in two by the highway. Some residents and business owners commented on the decrease in vehicle noise along Tarean Street and the improved safety and amenity for students at the local primary school – which is situated along Tarean Street. One community leader stated that the bypass has given Karuah the chance to ‘be a community again’ (pers. com 19/8/2005). Another stated that the bypass was ‘the best thing that could have happened’ (19/8/2005).

Karuah residents who do not own highway dependent businesses are particularly positive about the bypass. Reduced traffic levels are seen as a particularly beneficial development

to these individuals since they have no direct economic stake in vehicle traffic passing through the town. This high degree of business optimism demonstrates that Karuah's non-highway dependant business community views the town's future in an overwhelmingly positive light.

A high degree of optimism in the face of short-term economic impacts has been frequently demonstrated in bypassed towns. Parolin and Garner (1996a) noted that despite short-term economic downturns the response of bypassed towns along the Hume Highway was overwhelmingly positive. NCHRP (1996) also identified widespread community optimism in most bypassed towns.

However, whether this optimism can be used to help catalyse economic recovery is another question entirely. Even the most positive of Karuah residents agree that the business closures and job losses have been serious, and the abandoned buildings in the town centre are a constant reminder of the economic deterioration that has occurred. Although two new businesses have opened in Karuah following bypass construction these have been insufficient to fill the employment void left by the closures. There has as of yet been no serious compensation for the lost jobs in the Karuah town centre – although several new restaurant/takeaway developments currently in the planning phases may play an important role.

Two community leaders believed that the effects of the bypass were fairly inconsequential given the broader economic and social challenges facing Karuah. It has been noted earlier that Karuah was in many respects a disadvantaged community well before construction of the bypass – with a high unemployment rate, a high proportion of lower-paid workers and a local commercial centre geared more towards the needs of passing motorists than Karuah residents.

Given this background of social issues, it is perhaps unsurprising that the bypass is regarded by some as merely one relatively minor factor in a broader effort to improve the socioeconomic status of Karuah. A number of business owners agreed. In some instances the effect of the bypass was viewed as minor compared with other economic considerations such as rising petrol prices, however as the business closures occurred well before the spike in petrol prices during 2005 there can be little doubt that the bypass was the primary cause for these impacts.

In summary, the town's attitudinal response to the bypass has been generally positive. Although most residents and business owners agree that Karuah has suffered economically in the twelve months since bypass construction the environmental benefits of the decline in traffic are seen as a major compensatory effect. Many Karuah residents consider that the positive impact of the bypass far outweighs any negative impact. The bypass has been superimposed over existing social problems in the town and to some key stakeholders the development is seen as merely part of a broader long-term effort to enhance the socioeconomic status of Karuah.

6.2 Karuah Public School

Karuah Public School is situated on the corner of the Pacific Highway and Bundabah Street, on the southern edge of town. There are currently 137 children enrolled in 6 classes, with 6 teachers, including the principal and vice principal and 2 administrative assistants. While there had been a slight decrease in student numbers over the last year, this is not attributed to the bypass as enrolment numbers tend to fluctuate over time.

Staff at the school generally believe that the impact of the bypass on the school has been positive with increased safety for the students and reductions in noise cited as the most important outcomes.

The staff stated that there has been no noticeable change in the level of academic performance and student behaviour has not been altered significantly. However, it was also noted that prior to construction of the bypass the traffic outside of the school was a frequent source of distraction for students and teachers often needed to raise their voices to be heard above the traffic.

It was stated that there has been far greater use of the outdoor areas for class sessions, including parent reading sessions since construction of the bypass. Teaching modes dependent upon high levels of verbal interaction can now be more easily conducted in this low-noise environment.

Transport of students to and from the school has also been affected by the bypass. While it is now easier and safer for children to walk to school, construction of the bypass has led to Karuah's main street being downgraded in status by the RTA to a standard road, thereby reducing the number of students eligible for free bus passes, a result which has been of some concern to a number of students' parents.

6.3 Karuah RSL

From the perspective of the RSL the bypass has been 'hugely positive'. It was a major influence in their decision to invest \$2 million in renovations to upgrade and expand the RSL to provide a more open plan multi-purpose area, with glass walls at the rear, opening out onto the bowling greens. The renovations have been so popular that membership has increased by 200 or so members in the past 12 months.

The majority of the RSL membership consists of locals (80 percent) with the remaining being visitors, with many of them apparently coming from other RSLs to evaluate the success of the extensions. It was also commented that the new subdivisions being established in the south west of town were attracting many new visitors to the RSL, and potential residents have been signing up as members.

Membership numbers had been stagnant for the last five years but have increased from 1,330 to 1,570 over the last four months. Additionally, the new anti-smoking legislation, under which the RSL has set aside the large rear area of the club as smoke-free, has

resulted in an increase in patronage from local families who can now spend time together at the club rather than only the individual adult members of families as had previously been the case.

The manager indicated that employment numbers have stayed about the same since the bypass opened (16 – although the 2003 business survey indicates that there were 14 employees at that time) however there are future plans to increase employment.

Advertising for the RSL is carried out via three main mediums – word of mouth, local newspapers (*The Noter* – which covers the area north to Taree, and *The Examiner* – which extends south to Maitland and Newcastle) and a collaborative town advertisement in a north coast tourist magazine (*I-Mag*). This level of advertising has not changed considerably since the opening of the bypass, but the manager commented that he has not found the need to extend their advertising too much further as they are already operating very comfortably.

The manager indicated that once the next section north of the bypass is completed he intends to investigate further the possibilities of erecting signs at either end of the bypass on the freeway. However cost will be a major issue. Talks have been held with a major provider of highway billboards and advertising, but all the proposals so far have been too expensive, particularly in the light of the likely small return on investment. A more independent alternative is likely to be pursued in the future.

The Club is also very active in the community, providing a local shuttle bus service, banking facilities and free use of meeting spaces for all local organisations. They are currently backing the refurbishment of the local community centre in conjunction with the Council, as they recognise the importance of community facilities to the whole community and the limitations on the space they currently operate.

The club also supports two major annual festivals in the area – the Regatta, run by Port Stephens Regatta Club and the Aquatic Festival, involving oyster opening and wood chopping amongst other exciting family oriented events. No specific large-scale projects are proposed in the near-future however the manager is hoping to improve the utilization of the new multi-purpose area - including weddings, group parties and other such events.

6.4 The social survey of residents

A total of 93 surveys were collected over the 2-day period falling short of the target of 105 surveys. An overview of the demographics of the respondents is presented first.

TABLE 6.1 Age and sex of the respondents

Age	
Under 19	6.5%
20-39	15%
30-39	8.6%
40-49	20.4%
50-59	14%
60-69	15%
Over 70	20.4%
Males	54%
Females	46%

Table 6.1 shows that the respondents reflect the demographic profile of Karuah which is shown in Figure 3.1. There is a good balance in the survey between males and females. Table 6.2 shows the length of time that respondents have lived in Karuah. The table shows that the majority of respondents have lived in Karuah for more than 5 years and hence are well placed to comment on the differences in the town before and after the bypass.

TABLE 6.2 How long have you lived in Karuah

Length of time in Karuah	
Under 1 year	7.5%
1-3 years	15%
3-6 years	23.6%
7-10 years	6.5%
More than 10 years	47.3%

Table 6.3 shows the responses to the key question in the survey – what do you think will be the long term effects of the bypass on Karuah. The responses are compared to the results of a previous survey, undertaken by students from the University of Sydney in 2003.

TABLE 6.3. The long term effects of the bypass

Long-term effects	2003	2005
Negative	15%	10.7%
Positive	63%	78.4%
Nothing will change	9%	5.3%
Don't know	9%	4.3%
Town will grow	6%	Not an option

Before the bypass, there were some uncertainties amongst Karuah residents about the long term effects with 15% of the respondents stating that the effects would be negative and a further 9% unsure of the outcome. However, majority of the respondents did indicate in the 2003 survey that they feel that the bypass would be positive for Karuah in the long term.

A year after the bypass, there had been significant change with 78.4% of the residents stating that the long-term effects for Karuah would be positive. Correspondingly, the percentage of respondents feeling negative or unsure of the bypass has decreased in the 2005 survey.

From conversation with the respondents, many are happy that the bypass has taken away the heavy traffic from Karuah's main street resulting in a safer and quieter environment for both residents and students. The feedback is aligned with earlier findings that the most positive attributes of Karuah are its natural attributes. It appears that the respondents are more inclined to a quiet and relaxed setting for Karuah.

7. Conclusion

In the 2001 conditions of consent for the Karuah bypass DUAP stated: ‘on balance the economic and social impacts (in Karuah) as a result of the bypass should be positive in the long-term’. History has shown that as a rule bypass impacts are difficult to predict accurately and even harder to respond to with any degree of confidence. While the majority of towns have managed to turn the loss of vehicle traffic into a positive rather than a negative force for development it is a simple fact that some towns are uniquely vulnerable to bypass impacts and require an intensive, ongoing period of economic reorientation. In such towns economic recovery plans are often a ‘hit and miss’ affair that is dependent on the unique characteristics of the local community.

This paper has provided a snapshot of a bypassed community which had previously been defined by its’ location on the Pacific Highway. The study aimed to establish the economic impacts experienced by Karuah 12 months after construction of the bypass, the mitigation measures adopted and the success of these mitigation measures. The conclusions are as follows:

- As a town Karuah was highly vulnerable to the economic impacts of the highway bypass. With a small population, a high level of highway dependency, pre-existing socio-economic problems and a dispersed, poorly-defined town centre the prevention of serious bypass impacts in Karuah was always going to be a difficult prospect.
- As a result of the bypass traffic volumes along Karuah’s main street have declined significantly. Traffic surveys indicated that only 14 percent of northbound traffic and 7 percent of southbound traffic now enters Karuah from the new stretch of highway.
- In the twelve months since construction of the bypass, Karuah’s economy has suffered extensively from the loss of highway traffic. Six businesses have closed with another seven reporting a decrease in revenue. As a result, 48 jobs or 21 percent of the total employment in Karuah have been lost, comprising predominantly female, part-time workers. The lost jobs would have represented a supplemental source of income to a number of households and some families would have been affected.
- These impacts are serious but far less serious than originally predicted in the assessment process. The EIS for the bypass had predicted the closure of 12 businesses and the loss of 131 jobs. While it is likely that a number of impacts are still to be felt, it seems that the predicted impacts were inflated somewhat as has frequently occurred with other bypass studies.
- Despite the economic impacts, the majority of Karuah’s population view the bypass in a positive light due to the improved amenity in the town centre.
- A survey of Karuah residents indicates that about 78% of respondents considered that the long term effects of the bypass are positive.
- Benefits to the local primary school have included improved safety and reductions in noise. Benefits to the RSL have included an increase in membership

- numbers, increased ability of the club to support local community groups, higher profile in the community and ability to sustain pre-bypass employment levels.
- A number of low-key measures have been undertaken at the business level in Karuah to mitigate bypass impacts including increased marketing and increased focus on the local market rather than highway trade. However, a surprisingly large number of businesses have made no adjustments in response to the bypass. This is attributed to insufficient financial resources and a perception that the local Council is responsible for the economic recovery of the town.

The challenge is now to assemble the resources of all the stakeholders to generate effective strategies that mitigate the negative business impacts of the bypass in the long term.

Appendix 1

Karuah Community Survey SEPTEMBER 2005

Hi- I am from the University of Sydney and I am doing a survey about the Karuah bypass:

Do you live in Karuah or the surrounding region?

Yes/No

If No end survey

1. How long have you lived in the Karuah region? (circle)

Under 1 year	<input type="radio"/>
1-2 years	<input type="radio"/>
3-6 years	<input type="radio"/>
7-10years	<input type="radio"/>
Over 10	<input type="radio"/>

2. Do you intend to live in Karuah in the long-term? (circle)

Yes:

No:

3. Do you want to attract more residents to Karuah? (circle)

Yes:

No:

Don't know

4. What do you consider to be Karuah's positive attributes? (circle)

Rural setting

Sense of community (people)

River:

Fishing:

Other _____

ECONOMIC STRATEGY

5. What do you think will be the long-term effects of the bypass on you and Karuah? (circle)

- Negative
- Positive
- Nothing will change:
- Don't know
- Don't care
- Other (specify)

6. Where do you think the greatest prospects lie for the future economic development of Karuah?

Oyster Farming	<input type="radio"/>
More residents:	<input type="radio"/>
More Shops:	<input type="radio"/>
Chicken Farming:	<input type="radio"/>
Retirement Village:	<input type="radio"/>
Tourism:	<input type="radio"/>
More people stopping	<input type="radio"/>
Don't know:	<input type="radio"/>

Other: _____

7. Do you want to attract more industry or businesses to Karuah (and surrounds)? (circle)

- Yes
- No 0 Stoppers:
- Don't know
- Don't care

8. Have you heard of any plans/schemes to assist the economic development of Karuah?

- Yes**
- No**

DEMOGRAPHICS

9. Age group (circle) you estimate

Under 19	<input type="radio"/>
20-39	<input type="radio"/>
30-39	<input type="radio"/>
40-49	<input type="radio"/>
50-59	<input type="radio"/>
60-69	<input type="radio"/>
70 or older	<input type="radio"/>

10. **Sex:** (circle)

Male Female

11. **Do you have children living at home with you?**

Yes:

No:

Live alone

12. **Do you work within Karuah?** (circle)

Yes	<input type="radio"/>
No:	<input type="radio"/> Q14
Pensioner/benefit:	<input type="radio"/> Q14
Student:	<input type="radio"/> Q14
Home Duties	<input type="radio"/> Q14
Other (specify)	<input type="radio"/> Q14
.....	

If yes, what is your occupation

13. **Where do you work?**

- Karuah
- Raymond Terrace
- Newcastle
- Sydney
- Other(specify)

14. Any other comments you would like to make about the bypass?

THANKS VERY MUCH

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