

Economic Evaluation of Town Bypasses

Review of Literature

Prepared by Bruno Parolin
Faculty of Built Environment
University of New South Wales

August 2011

For

NSW Roads and Traffic Authority

Executive Summary

The purpose of this review was to update and review the highway bypass literature since 1994 with a view to understanding the longer-term economic impacts of highway bypass roads and how communities have adapted and changed in response to these impacts. Focus was on literature that, with one exception, has assessed impacts long after completion of a highway bypass road. The aim was to understand those factors that influence the economic impacts of highway bypasses on communities in the longer-term and to provide the proponent, and community, with more up-to-date indicators that could be considered when planning and designing bypasses. The review examined three key areas of highway bypass impacts – economic impacts, social impacts and community response and mitigation measures.

The key findings of the review are as follows:

- Overall consensus of the studies is that in the longer-term highway bypasses do not have adverse economic impacts (highway generated trade and employment) on towns that are bypassed; what economic impacts do occur tend to be minimal and of a short-term duration. The evidence suggests that in most cases highway bypasses have resulted in economic development benefits for towns which have been bypassed.
- There are three main indicators of post-bypass economic change: population size, economic base and distance from a larger economic centre.
 - The small towns (less than 2,500 population) are generally more at risk of adverse economic impacts (highway generated trade and employment) from a highway bypass than medium and larger towns; however, they continue to survive.
 - Economic base, that is the degree of dependence on highway generated trade; those towns with a higher level of dependence on highway generated trade may experience greater difficulty in managing post-bypass recovery than towns with a low level of dependence on highway generated trade.
 - Distance from a larger centre; in some studies being close to a larger centre was seen as detrimental to post bypass recovery as motorists could use the bypass to quickly access the larger centre for highway related services. In other studies it was remoteness from a larger centre that was a hindrance to economic growth in the post bypass environment.

- That the longer-term traffic levels in medium or larger bypassed towns may approach those of pre-bypass levels, with the studies indicating increased economic activity from local and regional clientele and from stopping traffic.
- Other factors such as state of the national and regional economy, rural population decline, restructuring of industry and services and the number and scale of chain retail stores may have more of an impact on the economy of a town than the introduction of a highway bypass.
- A highway bypass generally brings about positive land use and land value changes for the bypassed community and for businesses on the main street, with new land use activity generated along the bypass route (US studies only).
- The social impacts of a highway bypassed on a bypassed community are generally very positive; there is a perception on the part of residents and businesses in bypassed communities that the bypass is very important to the quality of life in their communities and to the environmental amenity of their communities.
- Increased focus on fostering pre- and post-bypass cooperative planning arrangements between a community to be bypassed and those already bypassed, and Government and road authorities, to develop mitigation measures that minimise adverse economic impacts and strengthen positive impacts. Active leadership and proactive planning on the part of the local community and Government and road authorities are important aspects of managing change in a post-bypass environment.

The literature review findings provide a strong message for bypassed communities, or those to be bypassed, that in the longer term there is “life after the bypass” and that other impacts may influence the economic prosperity of a community more so than a highway bypass. For smaller communities that may be more at risk from a highway bypass the review highlights the importance of pre- and post-bypass proactive planning to mitigate against any potential adverse losses is a necessary step in managing post-bypass change. Irrespective of the population size of a bypassed community or its distance from a larger centre, a highway bypass triggers change in the highway related sector of a town economy so that the retail landscape may be quite different in the longer-term. It is important for businesses and the community to capitalise on these changes.

For Government and road authorities, the review highlights the need to better understand the role of population size, the degree of dependence the town has on highway generated trade and the towns

distance from a larger centre in influencing economic impacts as part of planning and designing highway bypasses. The above factors, and others, are to be assessed in three case study towns on the Hume Highway (Yass, Gunning and Goulburn) as part of a research project on the “Economic Evaluation of Town Bypasses” by the University of New South Wales.

Table of Contents

1. Introduction.....	5
2. The literature: general impacts of highway bypasses.....	6
2.1 Economic impact.....	7
2.1.1 Highway generated trade.....	7
2.1.2 Land use and values.....	15
2.1.3 Industry structure.....	16
2.1.4 Employment.....	16
2.1.5 Economic impact summary.....	17
2.2 Social impacts.....	18
2.3 Community response and mitigating adverse impact.....	19
2.3.1 International studies	19
2.3.2 Australian studies.....	23
3. Conclusions.....	26
References.....	30

1. Introduction

An important role played by communities located on major highways is serving the needs of motorists who stop or stay overnight while on longer journeys. The value of the resulting highway-generated trade is typically an important component of the economic base of these communities (Parolin and Garner, 1996a). The diversion of a large part of through traffic resulting from the opening of bypass roads inevitably results in some reduction in the value of highway-generated trade and a consequential impact directly and indirectly on the economic and social well-being of the affected community. A highway bypass is generally associated with both positive and negative impacts on a town – the travel time savings for through motorists and enhanced environmental amenity for local residents of the town is contrasted with the business community that serves the needs of highway travellers, in some cases, being adversely affected by declining sales and employment losses.

There is now a substantial body of overseas and Australian literature which documents the social and economic impacts of bypass roads on local communities – some of which goes back to the 1970s (BTCE, 1994; Parolin and Garner, 1993; Handy et.al, 2000; NCHRP, 1996; Skorpa et.al, 1974). There are also a number of reviews of the literature that synthesise the evidence on economic and social impacts and identify key factors that may affect the positive and negative impacts (Handy et al, 2000; Parolin and Garner, 1993). The general consensus from the myriad bypass literature is that a highway bypass is not associated with the death of a town, with the evidence suggesting that the impact on economic growth is positive in the long-term for the majority of the communities bypassed. However, the highway bypass must be ‘acknowledged for the changes it creates for communities and businesses’ (Yeh et al, 1998).

Despite the majority positive findings from the studies, the prospect of a highway bypass for a town remains, in some cases, a controversial proposition. The magnitude of the sensitivity is generally heightened as bypass related employment losses, or anticipated losses are added to a litany of other problems - in many cases more important problems - that may affect the viability of country towns (Parolin, Filan and Ilias, 1992). In this context, political and community debate can understandably be negative, confrontational and divisive. How this should be handled by highway bypass proponents and the community as part of pre- and post-bypass mitigation efforts is an issue of greater concern than the previous studies of the 1990s (Parolin and Garner, 1994).

A previous review of the highway bypass literature undertaken in the early 1990s (Parolin and Garner, 1994) and was completed as part of larger RTA research project on “Evaluation of the Economic Impacts

of Bypass Roads on Country Towns". The purpose of this review was to understand the approaches and methodologies used up to that time, mainly in overseas studies, to assess the economic impacts of highway bypass roads and to propose a consistent and sound methodology to be applied at selected communities along the Hume Highway as part of the then RTA project. The proposed methodology was to specifically address the *Before* and *After* economic impacts of highway bypass roads as part of a short-term monitoring of bypass impacts – an aspect that had been largely absent in the few Australian studies of highway bypass impacts up to that time.

The key findings of the 1994 review highlighted the range of methodologies used overseas to assess economic impacts of highway bypass roads; these ranged from survey based methods to use of multivariate statistical methods using census data. In addition, the review found that studies that were of the *Before* and *After* type only dealt with very short-term *After* effects – usually up to six months after the opening of a bypass. Finally, the review found that of those few overseas studies dealing with bypass mitigation measures, the approaches assessed were very general and community based – more signage and promoting tourism and economic development (Parolin and Garner, 1994).

The purpose of this review is to update and review the highway bypass literature since 1994 with a view to understanding the longer-term economic impacts of highway bypass roads and how communities have adapted and changed in response to these impacts. Focus is on literature that has assessed impacts after at least 2 years of completion of a highway bypass road to gain an understanding of the factors that influence the economic impacts of highway bypasses on communities in the longer-term and to provide the proponent, and community, with more up-to-date indicators that could be considered when planning and designing bypasses. The review is structured into sections dealing with a range of highway bypass impacts on a community. Section 1 examines economic impacts on the highway related business community. Section 2 deals with key social impacts on communities. Section 3 examines longer-term community response and mitigation measures, and how the amenity of communities has changed. Finally, the relevance of key findings for Government and road authorities are discussed.

2. The literature: general impacts of highway bypasses

The social and economic impacts of a highway bypass on a rural town reported upon in the earlier and more recent studies have generally been concerned with measuring effects on highway generated trade,

(sales and employment), land use and land value, business location and growth, social characteristics, and general community response. These studies are characterised by use of one or more of the following types of analysis (System Metrics Group, 2006):

- *Qualitative Case Studies.* Interviews and surveys are conducted with residents, community leaders, and local business leaders to gauge their opinions. This approach often involves a review of the “before and after” business mix in towns and economic changes that can be attributed to bypasses.
- *Data-Driven Case Studies.* These are “before and after” comparisons, or survey-control area comparisons, based largely on population, employment and sales records from state or federal sources such as the US Census or ABS. Bypass studies are frequently supplemented with local quantitative data collection (i.e., surveys of stopping motorists and those who stay overnight or longer, and business surveys) as well as qualitative interview data.
- *Statistical Analysis.* These bypass studies gather statistical information about a series of bypasses rather than focus on specific communities. The studies make generalizations using regression modeling or other statistical techniques.
- *Contextual Factors.* In these studies, changes in the local economy are placed in the context of non-transportation factors and local economic shifts underway prior to the bypass.

2.1 Economic impact

The focus of this section is on four key economic impacts usually reported in US studies of highway bypasses – highway generated trade, land use and land value, industry structure and employment. It is through an assessment of these particular impacts that the effects of a highway bypass are isolated from that of other economic factors. Generally, the key findings from these studies are that highway bypasses have more long-term positive economic impacts on total growth than negative impacts. The size of town and its economic structure are reported as two key factors affecting the magnitude of economic impacts.

2.1.1 Highway generated trade

Studies that focus on highway generated trade deal with impacts of a town bypass on the retail sector and on businesses serving the needs of passing motorists. Changes in retail sales are the main variable of interest. There are three major findings from these studies:

- Retail sales are not significantly affected by a town bypass.

- What negative impacts occur are usually relatively small and tend to affect small communities more than medium and larger sized ones.
- Other factors besides a bypass may be equally as important in terms of understanding the magnitude and nature of impacts on a bypassed community.

A landmark US study (NCHRP, 1996) in the mid 1990s reviewed the literature associated with 83 highway bypasses. The study reported that of the 80 plus highway bypass studies reviewed, a community's overall business activity (gross annual sales) grows more rapidly where bypasses have been constructed. Sales declined in the community overall in only 7 of the 71 bypassed communities for which these statistics were collected. The study team expected that sales of highway generated businesses (petrol stations and eateries) along the old route would be most adversely affected by a bypass. However, declining sales for such businesses were only observed in 18 out of 61 cases (30 percent). In all the studies reviewed as part of the NCHRP (1996) project there was no mention of adverse impacts on the accommodation sector in bypassed communities, even in the smaller towns.

NCHRP (1996) also reported that detailed studies of highway bypasses in Texas indicated that over one-third of highway oriented businesses along the old routes closed following bypass construction. However, just as many new businesses opened during the same study periods – many along the new bypass routes.

Otto and Andersen (1995) examined the economic impact of rural highway bypasses in Iowa and Minnesota over a 6 year period based on performance of the retail sectors in the affected communities and from the perceptions of individual businesses in the communities (a total of 21 communities). Each bypassed community was then matched against three control communities that were comparable on certain criteria to the bypassed communities. Their general findings were as follows:

- Overall levels of retail sales in a bypassed community are not significantly affected by the presence of a bypass. However, there was a tendency for sales in the highway related sector of these communities to experience minor re-distributional effects – a gain in sales in the non highway related sector and some decline in the highway related sector.
- Business survey respondents believed by a two-to-one margin that business had not been adversely affected by the bypass (the level of positive response was reported to have increased with the number of years since the bypass opening – a reflection of the degree of adaptation and business adjustment to the bypass). Service industries and highway oriented businesses were more positive

than general businesses and reported business activities improved or unchanged since the bypass opening.

- In addition to the opening of the bypass, business survey respondents also listed regional shopping malls and general declines in rural trading as factors affecting their level of business activity.

Many of the findings reported above about the positive impacts of highway bypasses are mirrored in a summary of highway bypass studies reported by Leong and Weisbrod (2002) that focussed on case studies in Wisconsin, Iowa, Kansas, Texas and North Carolina. Most of the communities included in the study had been bypassed in the 1960s and 1970s, with data collected for the study in 1992 – a considerable amount of time after the opening of respective highway bypasses. They concluded that the wide range of highway bypass studies carried out around the country provide a generally consistent story - highway bypasses are seldom either devastating or the savior of a community business district. “The locational shift in traffic can cause some existing businesses to turn over or relocate, but net economic impacts on the broader community are usually relatively small (positive or negative). Communities and business districts that have a strong identity as a destination for visitors or for local shoppers are the ones that are most likely to be strengthened due to the reduction in traffic delays through their centers. However, there is also a broad perception that adequate signage to the bypassed business center is an important need (and concern) for ensuring its continued success”.

Yeh et.al (1998) studied the economic impacts of highway bypasses on 17 Wisconsin communities using the survey-control method in which each of the 17 bypass towns was compared to a set of similar control towns classed as either small (less than 2,500 population), medium (2000-5000 population) or large (more than 5000 population). The 17 bypassed communities ranged in size from 304 to 28,089 persons, and most had been bypassed for up to 10 years by the time the study was undertaken. The key findings, based on focus interview surveys, analysis of traffic, population and employment data, and analysis of census data, indicated:

- Insufficient evidence was found that bypasses adversely impact the overall economies of most communities. However, it was found that smaller communities have a greater potential to be impacted economically by a bypass.
- Over the long term, average traffic levels on “old routes” in medium and larger communities are close to pre-bypass levels, indicating continued economic activity in those communities, and the opportunity for all kinds of retail trade to flourish, including traffic-dependent businesses.
- “Retail flight” in Wisconsin bypass communities is not apparent; very few retail businesses that

are newly developed or that relocated from the town centre were found near bypass facilities.

- Communities consider their bypasses to be beneficial overall, while understanding that a bypass brings a number of changes for a community and individual businesses that need to be addressed proactively to ensure the most benefits and least adverse impacts.

In sum, the authors concluded that “bypasses rarely have created adverse economic impacts on communities. The most likely communities to see any adverse impacts are the smallest communities (under 1,000 population). Medium and larger communities were unlikely to see any negative change in their overall economic condition due to the bypass”. For small communities the authors recommend the need to develop and market themselves as destinations to minimise adverse economic impacts from a bypass – a point discussed in Section 2.3.

Rogers and Marshment (2001) assessed the impact of bypasses on small Oklahoma towns located along U.S. Highway 70. The authors developed regression models to analyze the impact of bypasses, and to compare results with non-bypassed cities. They concluded that bypasses did not have a statistically significant impact on the retail sales tax base in the towns with bypasses. They suggest that non-transportation factors, such as the introduction of large discount retailers in rural markets, decline in agricultural demand, restructuring in the oil and gas industry and environmental regulations may be more important than highway service in small town economies. They caution that even if aggregate impacts are small, bypasses may have differential impacts on different constituents.

Similar conclusions were reported by Babcock and Davalos (2004) after investigating 9 bypassed communities over a 12 year period in Kansas. The principal conclusions of the study are as follows:

- Statistical results were consistent with the conclusion that the bypasses did not have a statistically significant effect on total employment in the bypass towns.
- A majority of the owners and the managers of the highway-related business firms interviewed felt that the bypass had a major effect on retail sales of their firm in the 1999 to 2001 period. However, they felt it did not have any effect on their employment during the same time period.
- There was substantial variation in the opinions and perceptions of the respondents concerning the impact of the bypass on retail sales and employment of the four industry groups in the sample; the accommodation sector perceived only minimal adverse impacts on sales, but the petrol stations and eateries perceived a higher level of negative impact on sales.

The overall conclusion from the study was that highway bypasses have resulted in important economic development benefits for towns with bypasses as they have promoted basic industries that serve the needs of customers outside the town and promoted retail trade and customer service businesses (non-basic businesses) in the town.

A more recent study that specifically focused on highway generated trade is that by Sivaramakrishnan and Kockelman (2002) which analysed the impact of bypasses on 23 small and medium sized communities in Texas with a population of 2,500 to 50,000. In a survey-control area methodology similar to that of Yeh et.al (1998), nineteen “control” towns were used as a comparison measure, and nine years of data were collected for each of the 42 towns in the study. Per capita sales from four industry sectors were used: retail sales sector; petrol service station sales; sales at eating and drinking establishments; and service receipts. The results of the study found:

- A bypass negatively affects all four sectors examined, with the overall impacts of the bypass being most negative for petrol stations and the least for service industries such as hotels and motels.
- Communities of larger population size lost less traffic to a bypass and thus per capita retail sales were not as negatively impacted. They were seen as providing a buffer to negative impacts.
- Communities located closer to a larger centre lost more traffic to the bypass as the larger centre became an alternative destination for highway and non-highway related needs.
- The magnitude of traffic volumes on the bypass increased with time since the opening of the bypass but this tends to taper off with as some stopping traffic returns to the bypassed community.

The overall negative results reported in the study by Sivaramakrishnan and Kockelman (2002) appear to occur because only data from retail and service sector businesses were considered; no account was taken of total growth in their study communities.

An Australian study that has reported severe impacts on highway generated trade is that by Rowe and Phibbs (2005) on the impacts of a highway bypass on the town of Karuah (population of 1070 in 2001) located on the Pacific Highway north of Newcastle. The bypass opening in 2004 diverted 98 percent of through traffic onto the bypass with resulting adverse economic impacts. One year after the bypass had opened, 6 of the 38 businesses in Karuah had closed with decreased revenues for the remaining businesses across the food, petrol station, general retail and accommodation sectors.

These adverse findings are unique in the Australian context given that the smaller communities examined as part of the Hume Highway project in the mid 1990s (Parolin and Garner, 1994) generally fared much better than Karuah, even after one year. Rowe and Phibbs (2005) suggest that there were unique circumstances at Karuah that made it particularly vulnerable to bypass impacts:

- Low population.
- Remoteness from other larger centres and no outside economic linkages.
- A high level of dependency on passing trade and highway generated trade.
- Low urban design quality.
- Existing community issues – unemployment and low paid workforce.

It is interesting to note that “Remoteness from a larger centre” is viewed as contributing to the vulnerability of Karuah whereas distance from larger centre in the international studies is viewed as contributing to positive impacts due to less retail leakage and alternative destinations for stopping traffic. The role of distance to a larger centre in contributing to highway bypass impacts remains inconclusive and warrants further investigation in future highway bypass studies.

Retail sales were also examined by Thompson *et.al* (2001) for 21 bypassed communities in Kentucky that were matched with similar communities that had not been bypassed. Total employment growth rates were also examined. Data from the five years previous to the bypass and up to five years after completion of the bypass were analysed. The more relevant findings of the study were as follows:

- The construction of a bypass has either no effect or a modest negative effect on the community.
- The opening of a bypass route reduces aggregate retail sales, but does not have a significant effect on retail employment, total employment or population levels.
- The bypass is more likely to encourage total employment growth if the bypass has partial access control, and is located close to the downtown sector.
- The presence of a bypass influences business mix in the downtown area; and
- Many government officials, media representatives and business people agreed that the bypass promoted growth and improved quality of life.

Comer and Finchum (2001) examined economic impacts on 14 bypassed Oklahoma towns, ranging in population from 732 to 13,187. Using a survey-control area methodology the bypassed towns were compared to 14 control towns. The 14 bypassed towns and the 14 control towns were divided into three

population categories: small towns (fewer than 2,500 people), medium towns (between 2,500 and 7,500 people) and large towns (over 7,500 people). Based on an analysis of sales tax data (highway generated trade), the impacts varied according to the nature of the business in question and to population size of the town. In the study, three different types of businesses were identified that showed distinct levels of impact: traffic dependant businesses (such as restaurants and petrol stations); traffic related businesses (such as downtown shops and professional services); and non-traffic related businesses (such as factories and mines). The key findings of the study were as follows:

- Frequency counts of the three different types of businesses indicated that small towns, both on the survey and control groups, have been in decline for some time and few show signs of revitalization.
- Small towns have the highest business vacancy rates (averaging 33 percent) and that the economic bases of these towns are in steep decline and primarily serving a locale clientele. Medium and larger towns had vacancy rates ranging between 8 and 24 percent.
- Analysis of annual changes in sales tax collection data up to four years before the bypass opening and up to five years after the opening indicated that small towns experienced declines after four years. Medium towns showed robust sales tax growth rates before and immediately after the bypass opening, though average increases were then at half their former level. Large towns showed consistent and positive changes from year to year indicating that they more easily accommodate the changes caused by bypasses.

The study concluded that town size is a critical indicator of post bypass economic change. The smaller the town, typically one with a population under 2,500, the more negative the economic impacts, especially for the highway related sectors. However, it was noted that despite small towns being in a state of decline in the post bypass environment, they continue to survive - mainly from a local clientele. The study also concluded from the data collected that the future bypass of a small town already in a state of decline will worsen the economic situation of that town but that it will continue to survive. The study also demonstrated that the existing business vacancy rate of control towns could act as predictors of the economic impacts a bypass may bring in the future - the higher the vacancy rate, the stronger the negative effects of a bypass on a town.

The studies reviewed agree that the strength of the town's economy before the highway bypass is of vital importance to the impacts the town will experience. The stronger the economic base of the

community (and the lower the business vacancy rate), the better it will fare after a bypass is constructed. Handy *et al.* (2000) and Chase and Gustafson (2004) both report that communities or towns that are, and historically have been, a regional trading centre notice less negative impacts than those that are not. Chase and Gustafson (2004), in their attempt to assess the likely impacts of a highway bypass on a Canadian town, conclude that the "...opening of a highway bypass will have short-term economic effects on the town that is newly bypassed. These effects range in magnitude depending on many factors such as the size of the town, the structure of the economy and the characteristics of its economic "flagships", as well as the response from municipal government and economic development agencies".

There are many other factors that contribute to a town's economic health in addition to highway routing. Leong and Weisbrod (1999), and Clapp *et al.* (2003) all stress that factors such as the condition of the national and/or regional economy, the number of chain retail stores in the town, and the size of the local population may have more of an impact on the economy of a town when factored together, or even individually, than the introduction of a highway bypass.

Handy *et al.* (2000) similarly concluded that these regional structural factors have a notable effect on the magnitude and nature of impacts of bypasses on communities. The overall decline of rural populations and growth of metropolitan areas, increases in the scale of stores and shopping centres in the retail industry (what has been called the "Wal-Mart effect"), and consolidation of distribution channels for petrol services were all cited as trends that explain some of the impacts commonly attributed to the construction of bypass routes (Handy *et al.* 2000).

In sum, the key conclusion for the majority of US studies reviewed in Section 2.1.1 that have mainly used a survey-control area method of data collection is that a highway bypass is generally positive in the longer-term on highway generated trade and other retail sales, and on the overall economy of the town. The negative impacts, if any, tend to be of a short-term duration and affect smaller communities more than medium or larger sized towns. The size of a town has been shown to be a key variable affecting outcomes in relation to highway generated trade. When size of a town is combined with another key variable – dependence on highway related trade – smaller communities tend to have a higher propensity to experience adverse economic impacts of a highway bypass, even though other factors as reported in the Karuah study may affect the vulnerability of a community.

2.1.2 Land use and land values

A focus on bypass related land use and land value impacts is another aspect that has been examined in the literature, mainly with the US studies. Land use changes are mainly focused on the changing main street, the downtown retail activities, the location of new highway related activities along the bypass route (US studies only) and their corresponding land value changes. The major finding of these studies is that a highway bypass does trigger new business location or re-location along the new route in many cases, at the expense of main street locations (the old route), but that even the traditional downtown or main street location experiences new land use activity in the longer-term.

Because a highway bypass influences land access, particularly in areas through which the new bypass runs, land use and land value might be expected to show substantial change following bypass construction. The NCHRP (1996) study reported that within virtually all communities studied (68 cases), the amount of land in commercial or industrial use had increased both along existing routes and new bypasses.

Land value increases along the new bypass were observed in all instances reviewed (68 cases). Along the older existing routes, increases were observed in 47 of 50 cases, and the three cases with declines were small. Pooled-data studies showed results consistent with these findings – that communities experience land value increases following construction of a bypass.

An 'after' study of the effects of a highway bypass on the small Australian towns of Berrima and Mittagong – which was based on several surveys of retail and tourism businesses – reported very positive effects on land and property values for the medium and long-term in Berrima (BTCE, 1994). However, business survey respondents in Mittagong perceived no estimated effects on land and property values in the short- or long-term, despite perceived increases in highway generated trade and employment in the longer-term.

The review of bypass studies by Handy et.al (2000) also concluded that the overall impact of a bypass on land values appears to be positive. However, the impact on any given property will be dependent on several factors including type (commercial or residential), presence of water and sewerage, traffic volumes and proximity to the bypass. While those residential properties not adjacent to the bypass have been found to increase more than those which are adjacent, accessibility benefits generally outweigh negative impacts such as noise and air pollution and hence a general upward trend is experienced.

While the above findings indicate favourable outcomes for bypassed communities in terms of land

use change along the traditional main street or downtown location they are limited in terms of understanding the extent and nature of the changing retail landscape. For example, none of the studies discussed above assessed the underlying changes on the main street such as changes in ownership, or openings and closings of the main street business community. This information should be assessed in future highway bypass studies.

2.1.3 Industry structure

A focus on industry structure has been found to be very limited in the overseas and Australian literature. Minimal information on industry structure is a function of the studies themselves that are more geared to immediate and traditional economic impacts as opposed to industrial structure.

When a bypass is constructed around a community, a short-term restructuring of some industry may occur particularly for towns dependent on highway trade (ARUP, 2005). Research indicates that bypassed communities generally have a lower proportion of retail outlets and a higher proportion of new businesses (Chase and Gustavson, 2004). In these circumstances, a clear economic strategy is necessary to help the community find and maintain an alternative economic focus to highway generated trade (KCERC, 2004).

Improved road conditions can improve accessibility which can also lead to:

- improved tourism and services in the region as travellers find the town a more appealing place to stop and stay (ARUP, 2005; RTA, 2004);
- increased opportunities for interaction with larger nearby centres (ARUP, 2005; RTA, 2004); and
- economic development (ARUP, 2005; RTA, 2004).

2.1.4 Employment

Due to fears of lost highway trade as a result of a bypass, there are often associated fears that jobs will be lost. However, in a similar result to studies on highway generated trade, employment impacts have generally been reported as being minimal. In particular, employment impacts are generally not as severe as initially forecast due to the establishment of niche markets, highway service centres and growth in accommodation (ARUP, 2005).

The single most direct impact on employment in a bypassed town, in the Australian case, is the

establishment of a highway service centre. These can offset employment losses in highway dependent businesses in the town (KCERC, 2004; ARUP, 2005). However, service centres can also have some negative impacts as travellers tend to stop at these more convenient locations rather than detour into a town (Parolin and Garner, 1996; ARUP, 2005).

While studies suggest mixed impacts on employment from small increases (Sivaramakrishnan and Kockelman, 2002) to no significant impact (Chase and Gustavson, 2004; Thompson et.al, 2001), most agree that highway investment contributes to growth in non manufacturing business (Handy et al, 2000). Employment opportunities can also arise outside of the bypassed community, through an opening up of the labour market. As a result of improved accessibility, local residents can commute to work in other regional centres and residents of surrounding regions can commute to the bypassed town for employment (Handy et al, 2000). Rowe and Phibbs (2005) document how the opening of the Karuah bypass has facilitated access to the larger regional centre (Newcastle) for employment.

2.1.5 Economic impact summary

As with much of the literature prior to the mid 1990s, the research since confirms that there is potential for short-term negative impacts to be experienced in some smaller communities, but bypassed communities can generally recover from being bypassed, and in many cases can prosper, due to improved environmental amenity (Sivaramakrishnan and Kockelman, 2002). Most importantly, the impact on the community will depend on its reliance on passing trade, but there are also a number of other factors which have been shown to influence the decision by through motorists to enter the town.

Other factors which are considered to influence the impact on highway generated trade include (after Western Research Institute, 2006):

- **The vacancy rate for business premises prior to the opening of a bypass.** Vacancy provides an indication of the overall strength of the town's economy, hence, the higher the pre-bypass vacancy rate, the more severe the impact (Chase and Gustavson, 2004).
- **The size of the bypassed community.** Towns under 2,500 residents can be expected to suffer more negative impacts than larger towns (Chase and Gustavson, 2004). A larger town is likely to experience minimal effects as more traffic will continue to pass through the town (Sivaramakrishnan and Kockelman, 2002), the larger population base is likely to be able to continue to support businesses suffering from lost trade and the town may attract shoppers

from surrounding areas (Chase and Gustavson, 2004).

- **Proximity of the bypassed town to larger cities and towns on the Highway.** Economies of adjacent communities may grow at the expense of the bypassed community through two effects: 1) travellers may choose to stop at a centre on the highway instead of the bypassed town and 2) local residents have easier access to metropolitan centres and may become more prone to out-shopping. (Sivaramakrishnan and Kockelman, 2002; Handy et al, 2000).
- **The distance to the town from the bypass.** The greater the distance to the town, the less likely traffic will be to stop in the town (Sivaramakrishnan and Kockelman, 2002; Handy et al, 2000).

Despite much concern in communities prior to the opening of bypasses, the overall impacts are primarily small and insignificant to the wellbeing of the community (Chase and Gustavson, 2004). In particular, the impact of reduced through traffic on sales is generally less than anticipated (Handy et al, 2000; Parolin and Garner, 2006a). Although the quantity of customers may decrease, the quality generally increases with those choosing to stop in the town more likely to make major purchases (Handy et.al, 2000).

2.2 Social impacts

Recognition and reporting of social impacts internationally and in Australia is more prevalent and prominent in highway bypass studies since the Parolin and Garner (1994) review. Social impacts generally entail assessment of quality of life (safety, access, visual amenity) and environmental amenity (reduced air and noise pollution) on bypass communities, and on population changes that a bypass may influence. The literature on social impacts has generally documented positive impacts on quality of life and amenity resulting from highway bypasses. Residents benefit from significant reductions in traffic flows through their main streets and, in particular, their town centers. The residents of bypassed towns often feel that “the removal of traffic has returned the street...back to the community” (Parolin and Garner, 1996a). Parking on the main street has become much easier, more pleasant and safer for the town’s residents.

The study by Otto and Andersen (1995) was the only bypass study to model business perceptions of a positive or negative impact on the community and on business activity as a function of variables measuring the characteristics of the business and their community. What is most notable about their findings is that a number of quality of life variables (characteristics of the community) were very influential on perceptions of

positive or negative impact. In other words, even among the business operators – those most impacted by the decline in through traffic volume – there was a perception that the bypass was very important to the quality of life in their communities.

Similar findings were reported for the town of Karuah which experienced very strong positive social outcomes as a result of being bypassed. Karuah was previously a town divided by heavy highway traffic. Residents believe that the bypass has improved their quality of life, with a reduction in traffic through the town centre resulting in improvements in pedestrian and school student safety, school amenity, town appearance, and noise and air quality (Rowe and Phibbs, 2005). One year after the completion of the bypass of Karuah a community survey showed that 78.4% of the residents thought that the long term impact of the bypass would actually be positive (Rowe and Phibbs, 2005). This is despite the severe economic impact (discussed in Section 2.1.1).

2.3 Community response and mitigating adverse impact

Since the mid 1990s both overseas and Australian studies have devoted considerably more attention to the issue of how communities and transport planning authorities should mitigate against any adverse impacts of a highway bypass. Indeed, there is a noticeable focus on the role of transport planning authorities for monitoring of impacts in the pre- and post bypass periods. Findings from some of the key studies are summarised below.

2.3.1 International studies

Several of the US bypass studies (Leong and Weisbrod, 1999; Handy *et al.* 2001) that were examined noted that although the evidence suggests a highway bypass will not have significant overall negative long-term economic impacts on the community, they stress the importance of:

- Active leadership and planning.
- A strong and proactive political and business town council.
- Increased signage on the new route indicating the variety of shops and services in the bypassed town.
- Actions of local government that facilitate economic adjustments, such as the provision of utilities and other city services to new business locations at interchanges, helps improve longer-term economic performance.

The California study (System Metrics Group, 2006) that reviewed the US literature on bypass studies suggested that California Department of Transportation (Caltrans) planners and engineers, local business leaders, and local governments should consider several issues in planning and designing bypasses with the approach of “*What can Caltrans do?*” and “*What can local communities do?*” as seen in Box A.

Box A: Caltrans Recommendations

“What can Caltrans do?”

- In the field research, local communities offered several suggestions on how Caltrans can provide signs that may mitigate negative economic impacts.
- A bypass could be designated as a bypass route, while the original route retains the State Route designation. This may conflict with the State’s policy to avoid parallel routes.
- The large lag between initial planning and engineering and construction, which may discourage businesses and residents from believing that a bypass will eventually be built, should be used by Districts to try to keep the public actively involved, remind residents and businesses about planned bypasses, and help the community plan for the transition.
- Caltrans can work with local governments and chambers of commerce to encourage businesses to plan early for bypasses. Businesses may choose to market to local residents, change their line of business, or relocate.
- Caltrans should continue to recognize the need to conduct early analyses of impacts on indigenous communities, facilities, and economies. Districts need to consult in the earliest planning stages and on an on-going basis with the Native American communities as critical stakeholders for transportation planning”.

“What can local communities do?”

- Take advantage of reduced general and truck traffic along Main Street by engaging in redevelopment activities, such as main street programs, the provision of benches, planting and improved sidewalks, economic development incentives and grants, providing parking facilities, etc.
- Local governments and chambers of commerce can work with local businesses to develop business plans that take into account the change in traffic due to bypasses.
- The community should have a vision of how a bypass will be integrated into the local environment (e.g., transportation flow, redevelopment, visual impact, economics, etc.).
- Communities can provide roads, utilities, and other infrastructure at interchanges along the bypass to attract businesses and encourage the relocation of traffic-dependant businesses, such as gas stations and fast food restaurants.
- If a bypass remains outside of the local jurisdiction, a town can annex territory to make sure that any economic development remains inside the local tax base. Alternatively, the local community can zone the area or withhold utilities and infrastructure, so developments that compete with downtown do not occur”.

Source: System Metrics Group (2006)

The study by Yeh et.al (1998) for Wisconsin Department of Transportation (WisDOT) noted that the 17 communities that they studied all acknowledged the benefits of the bypasses, and nearly all of the communities indicated that the “bypass created issues and challenges that were not necessarily positive or negative, but that need to be addressed proactively by the community”. They made specific recommendations for WisDOT (see Box B) as a key decision-maker in regard to future bypass construction. Recommendations were also made for the community as can be seen in Box B.

Box B: WisDOT Recommendations

Recommendations for WisDOT

- Respond to the Budget Mandate For Study of Bypasses and Their Impacts. To budget specifically for studies on the effects of planning, constructing and operating highway bypasses on the economies of future bypass communities using a standardised methodology and data inventory. Follow-up studies to develop a better understanding of the economies of future bypass communities
- Acknowledge Local Interest in Planning. WisDOT needs to continue to gather local input and share information on bypass projects. As communities become more involved with land use issues, the need for ongoing local participation in bypass planning is magnified. WisDOT should continue to respond to communities’ desires for additional information and analysis on potential impacts of bypasses, and assist in land use and development planning efforts.
- Take Appropriate Follow-up Actions. WisDOT to continue to respond to communities after a bypass has been opened. Some places have concerns about signs, traffic signals, intersection lighting, and other needs after the bypass has been built.

Recommendations for Communities

- Understand that Bypasses are Beneficial. Most communities view their bypasses as beneficial overall. Bypasses have provided traffic congestion relief and more predictable traffic patterns in communities. There is little evidence to suggest that bypasses cause negative impacts to community economic growth trends.
- Small Communities Have Greater Potential for Negative Impacts, and Need to Develop and Market Themselves as “Destinations”. Small communities (less than 2,000 population) have the greatest potential to see adverse economic impacts from a bypass; are less likely to have regional retail or service markets; should carefully plan to address potential negative impacts of a bypass; special efforts must be taken to attract commerce to the community if it is desired to make it a destination for traffic.
- Communities Must Respond Proactively. All communities, whether large or small, must respond in a proactive manner to the changes brought about by a bypass. Many of the existing bypass communities have taken proactive measures to respond to bypasses. These include working with WisDOT on issues relating directly to the bypass. Other efforts include the active marketing of the community, or of different sectors of the community, such as a downtown retail district.

Source: Yeh et.al (1998)

Clapp *et al.* (2003) used 20 years of data in a study on the effects on retail sales in bypassed Iowa towns. In the study, three towns that were to be bypassed were compared with six towns that were bypassed in the 1980s and that were of comparable structure, size and distance from metropolitan centres. All the towns examined had a rural, farm-based economy. Based on the experience of the communities that were bypassed, the following factors were identified as helping the bypassed towns adjust to the changes and remain economically vibrant:

- Presence of an active economic development agency in the community.
- Ability of the town to attract new businesses to the area.

The study by Handy *et al.* (2001) on planning for impacts of highway relief routes on small and medium sized cities in Texas, also mirrors many of the recommendations made in the above studies. Their research suggests that the most successful planning efforts involve a partnership between the state Department of Transport (DoT) and the local community – a collaborative planning effort - which takes a considerable amount of time. According to the authors, the key elements of a collaborative planning effort are:

- Adequate communication. The DoT must provide up-to-date information to the community about the status of the project and provide opportunities for residents of the community to express their ideas and share their concerns.
- DoT to contribute to the collaborative process by conducting community impact assessments as part of the project development process. These assessments are not as standardized as Environmental Impact Assessments (EIAs) and there are some guides that can be used to evaluate the potential social and economic impacts of highway project on a community. These guides share similarities to the *Guide to Good Practice* prepared by Parolin and Garner (1996b) for the Australian case.
- The community contributes to the collaborative process by providing a clear vision of its future. A visioning process addresses four questions: where are we now; where are we going; where do we want to be; and how do we get there. In the Australian case, the Karuah Community and Economic Re-Development Plan (2004) would be an example of a 'visioning' exercise.

2.3.2 Australian studies

The Australian bypass studies literature since the mid 1990s has proposed mitigation measures that are,

for the most part, a continuation of initiatives or alleviating strategies proposed by Parolin and Garner (1996b). These initiatives focus on the potential role of Highway Service Centres, improved signage, promotion of tourism/recreation, initiatives to stimulate the retail/commercial sectors of bypass towns, main street improvements, business adjustment initiatives, and the role of advertising and information.

The notion of cooperative planning between the local business community and the local government authority serves as a valuable aim for bypassed communities or those to be bypassed in the future. Many of the Environmental Impact Statements (EIS) prepared by consultants since the mid 1990s have relied on the Parolin and Garner (1996b) document as the basis for proposing mitigation measures for the town to be bypassed. For example, the EIS of the Moorland to Herons Creek bypass ARUP (2005), the EIS for Bulahdelah (Parsons Brinckerhoff, 2004), the EIS for the Karuah to Bulahdelah upgrade (ERM, 1999) and the EIS for Tarcutta (Parsons Brinckerhoff, 2010) deal with most of the above mitigation measures.

However, there are also some new ideas that have emerged in the Australian literature since 1994. One of the most novel ideas is an outcome of the EIS for Karuah (ERM, 1999) where it was estimated that the negative effects of the bypass on the town would be extreme; estimated closure of 12 businesses and potential loss of 131 jobs or 58 percent of total employment in Karuah. The likely effect of the bypass on Karuah was identified as a key and problematic issue by the then Department of Urban Affairs and Planning (DUAP). DUAPs development approval consent stipulated that the Roads and Traffic Authority (RTA) make a financial contribution of \$200,000 to fund a community economic and redevelopment plan, and a requirement that the effect of the bypass be monitored at 12 month and 5 year intervals – the first known example in Australia of where an approval authority has made the highway bypass proponent (RTA) responsible for monitoring the likely negative impacts of the bypass proposal on the community in question.

The Karuah Community and Economic Redevelopment Plan was completed in July 2004, two months prior to the opening of the bypass on September 22, 2004 (KCERC, 2004). The objective of the *Plan* was to establish a 'Vision for Karuah' that will 'enhance the opportunities for Karuah to be an active, prosperous and healthy community beyond the Bypass'. Key strategies and actions (see Box C) were developed to help mitigate the impacts of the bypass and contribute to social and economic stability. In a similar vein to some of the overseas literature discussed above, the Plan provided a framework to strengthen neighbourhood and community networks and to coordinate the planning and timely

provision of community and social services to Karuah residents while contributing to the town's economic stability and future growth. Strategies included in the Plan are shown in Box C.

Box C: Strategies included in the Plan

- Project coordinator position to implement identified projects in the *Plan* according to priority ranking.
- Marketing Karuah through appropriate signage, advertising, annual festivals
- Developing a Karuah Community hub by increasing social infrastructure for the community (e.g. Expansion of the Karuah Community Hall)
- Establishing a Rural Transaction Centre to be incorporated with a Visitors Information Centre
- Main street improvements: priority issues include consideration of landscaping, improved parking, safe pedestrian access, public seating, footpaths, street art, and traffic calming
- Riverfront/foreshore upgrade and improvements: enhance the tourism potential of Karuah
- Promoting indigenous projects through funding and partnerships
- Aquaculture industry and Co-op seafood and market produce: opportunity for expansion and development of land based aquaculture industry and co-op
- Develop holiday destination and value holiday packages: opportunities to promote Karuah as a holiday destination and increase the number of tourist staying in Karuah. Requires a co-ordinated marketing and promotion campaign and requires a co-ordinated approach from related business.
- Ferry link trips: opportunity for scenic ferry link to Karuah from other centres in Port Stephens to attract day-trippers.
- Local food promotion: opportunity exists to promote local produce, especially locally grown oysters. Requires the establishment of a business/community network with a coordinated approach.
- Business assistance program: program to enhance skills of local businesses and to coordinate/ integrate business opportunities in Karuah and prevent economic leakage in revenue generated in Karuah and increase production of local goods and services.
- Future subdivision: Opportunity for increase in residential population in Karuah, up to 4000.

Source: KCERC (2004)

Most of the above strategies are direct mitigation measures that attempt to transition the economy away from highway generated trade to an economy focused on tourism activities.

A study of Karuah one year after the bypass was opened found that there were substantial negative economic impacts on the town – closure of 6 businesses and loss of 48 jobs. It is estimated that only 2 percent of travelers on the Pacific Highway leave the highway and visit Karuah and that most of these stopovers occur for only a short period, if at all (Rowe and Phibbs, 2005). At the time of the one year

report, the short term impact in Karuah was a serious concern, though not as severe as had been predicted in the EIS (ERM, 1999) or the economic redevelopment plan (KCERC, 2004). One telling comment in the one year report is that only 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” (Rowe and Phibbs, 2005). In essence, the town was not very successful in mitigating the negative impacts of the bypass as many of the planned strategies had not been implemented at the time of the one year report. A Project coordinator had been appointed one year after the bypass opening to oversee implementation of the mitigation measures.

The value of coordinated action by the local community before the opening of the bypass, or immediately following a bypass opening, should not be underestimated in terms of the potential impacts of mitigation measures. In contrast to Karuah, the town of Berrima has been very successful in transitioning its economy to tourism related activities, primarily through implementation of a *Vision* for the town and through cooperative planning exercises (Parolin and Garner, 1996b).

Besides the town of Berrima, there are two other documented examples of successful attempts to mitigate the impacts of a bypass. The town of Deloraine (population 2000) in Tasmania was bypassed in 1991 with the closure of 12 businesses (Kenyon and Black, 2001). One of the key reasons why Deloraine was successful was the early employment of a Community Development Officer to initiate and coordinate a wide range of community endeavours, and the leadership role of local government (Kenyon and Black, 2001). This is in contrast to events at Karuah and it highlights the important role that a Community Development Officer and active Local Council can play in facilitating change in a bypassed community.

The town of Deloraine mitigated lost tourist traffic by undertaking several beautification projects (Kenyon and Black, 2001). Upgrades were performed on the main street, the local parks and the roundabouts at the town’s entrances and exits. A festival was established to generate much needed community spirit and the town now receives 30,000 patrons annually for their signature event, the “Tasmanian Craft Fair”, which generates \$1 Million for the local economy – an event that has given the

community a "... sense of pride and organisational confidence, and has contributed to many new settlers being attracted to the district's strong art, craft and community focus" (Kenyon and Black, 2001).

Local businesses may require assistance with adjustment initiatives for the post bypass environment in order to improve business performance. Assistance provided by the Office of Small Business NSW State and Regional Development to the Mittagong business community has been documented in Parolin and Garner (1996b). The townspeople of Deloraine established the Meander Valley Enterprise Centre which provided "a variety of support for local business development and work training programs" (Kenyon and Black, 2001). The town of Oatlands (population 500), also in Tasmania, and bypassed in 1989, developed a community college which provides 160 short courses to provide businesses and the wider community with new skills or a way to formalise qualifications (Kenyon and Black, 2001).

The town of Oatlands also provides a successful model for securing large amounts of funding to pay for the sometimes expensive mitigation measures. Oatlands established a body called the Midlands Initiatives for Local Employment (MILE), which was a body dedicated to locating and attaining government funding for various projects (Kenyon and Black, 2001). In its first 3 years, MILE was able to secure \$320,000 in outside government funding, which paid for a range of community initiatives to reinvigorate the town.

3. Conclusions

The purpose of this review was to update and review the highway bypass literature since 1994 with a view to understanding the longer-term economic impacts of highway bypass roads and how communities have adapted and changed in response to these impacts. Focus was on literature that, with one exception, has assessed impacts long after completion of a highway bypass road. The aim was to understand those factors that influence the economic impacts of highway bypasses on communities in the longer-term and to provide the proponent and community with more up-to-date indicators that could be considered when planning and designing bypasses. The review examined three key areas of highway bypass impacts – economic impacts, social impacts and community response and mitigation measures.

The key findings of the review are as follows:

- Overall consensus of the studies is that in the longer-term highway bypasses do not have adverse economic impacts (highway generated trade and employment) on towns that are bypassed; what economic impacts do occur tend to be minimal and of a short-term duration. The evidence suggests that in most cases highway bypasses have resulted in economic development benefits for towns which have been bypassed.
- There are three main indicators of post-bypass economic change: population size, economic base and distance from a larger economic centre.
 - The small towns (less than 2,500 population) are generally more at risk of adverse economic impacts (highway generated trade and employment) from a highway bypass than medium and larger towns; however, they continue to survive.
 - Economic base, that is the degree of dependence on highway generated trade; those towns with a higher level of dependence on highway generated trade may experience greater difficulty in managing post-bypass recovery than towns with a low level of dependence on highway generated trade.
 - Distance from a larger centre; in some studies being close to a larger centre was seen as detrimental to post bypass recovery as motorists could use the bypass to quickly access the larger centre for highway related services. In other studies it was remoteness from a larger centre that was a hindrance to economic growth in the post bypass environment.
- That the longer-term traffic levels in medium or larger bypassed towns may approach those of pre-bypass levels, with the studies indicating increased economic activity from local and regional clientele and from stopping traffic.
- Other factors such as state of the national and regional economy, rural population decline, restructuring of industry and services and the number and scale of chain retail stores may have more of an impact on the economy of a town than the introduction of a highway bypass.
- A highway bypass generally brings about positive land use and land value changes for the bypassed community and for businesses on the main street, with new land use activity generated along the bypass route (US studies only).
- The social impacts of a highway bypassed on a bypassed community are generally very positive; there is a perception on the part of residents and businesses in bypassed communities that the bypass is very important to the quality of life in their communities and to the environmental amenity of their communities.

- Increased focus on fostering pre- and post-bypass cooperative planning arrangements between a community to be bypassed and those already bypassed, and Government and road authorities, to develop mitigation measures that minimise adverse economic impacts and strengthen positive impacts. Active leadership and proactive planning on the part of the local community and Government and road authorities are important aspects of managing change in a post-bypass environment.

In conclusion, the strong message for bypassed communities, or those to be bypassed, from the review of literature is that in the longer term there is “life after the bypass”, even for smaller communities, and that other impacts may influence the economic prosperity of a community more so than a highway bypass. For smaller communities that may be more at risk from a highway bypass the importance of pre- and post-bypass proactive planning to mitigate against any potential adverse losses is a necessary step in managing post-bypass change. Irrespective of the population size of a bypassed community or its distance from a larger centre, a highway bypass triggers change in the highway related sector of a town economy so that the retail landscape may be quite different in the longer-term. It is important for businesses and the community to capitalise on these changes.

For Government and road authorities the review highlights the need to better understand the role of population size, the degree of dependence on highway generated trade and distance from a larger centre in influencing economic impacts as part of planning and designing highway bypasses. Increasingly, the expectation will be that Government and road authorities will enter into cooperative planning arrangements with communities to manage post-bypass economic change.

The above factors are to be assessed in three case study towns on the Hume Highway (Yass, Gunning and Goulburn) as part of a research project on the “Economic Evaluation of Town Bypasses” by the University of New South Wales.

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