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Gauteng Freeway Improvement Project
Social Impact Assessment

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1. Introduction

The South African National Road Agency Limited (SANRAL) is registered as an independent statutory company and has the responsibility for developing and maintaining the national road network in South Africa. A large part of this national road system under the control of the SANRAL forms part of the Gauteng freeway system. It is this freeway system which not only connects the province of Gauteng to the other provinces in the country but also forms an integral part of the region's transport network. The Gauteng freeway system connects Gauteng to the various ports around the country, is used on a commercial basis by thousands of businesses throughout South Africa and serves as access routes to hundreds of thousands of workers in and around the Gauteng region.

For some time now Gauteng has been considered the focal point of economic and social development within South Africa. This situation is confirmed in the Gauteng Transport Network Integration Process report (2006:2) where it is claimed,

> "…that the focus of economic and social development will continue to be the greater Johannesburg, JIA/ [Johannesburg International Airport now O R Tambo] Ekurhuleni and Pretoria areas, and along the N1 corridor (and to a lesser extent the R21 corridor) and between them."

Despite these developments the existing road network that the Gauteng freeway system is based on, and in particular the national (N) routes with the exception of two relatively short sections of the N17 and N4, have not been upgraded for the past 25 years (Gauteng Transport Network Integration Process, 2006). Traffic congestion on these roads, however, continues to increase. The Gauteng Transport Network Integration Process report shows that between 1991 and 2004 traffic volumes on many of the N routes increased dramatically. According to this report the annual vehicle growth rate ranged between 3,9% at Gilloolys and 6,6% along the N1 Olifants amounting to respective growth rates of between 63% and 129% over the 13 year period. A further indicator of the current demands being placed on the Gauteng road system is evident in the growth rate of vehicle ownership. In 2005 registered vehicle ownership in Gauteng reached 2,55 million reflecting a growth rate of 7% in that year.

Consequently, the current state of the freeway system in Gauteng is such that it is having a detrimental social effect on the lives of road users and the citizens of Gauteng. Road users are forced to spend extended hours commuting to and from work or travelling to and from various business engagements. The effects on the quality of life, safety, productivity, cost of travel, emotional well being, and economic development are all negative.

The current state of the Gauteng freeway system is such that the SANRAL is compelled to urgently consider various alternatives that will lead to an improvement in the conditions on the Gauteng freeway network under their control. One of the alternatives that the NRA is considering is the possible tolling of part or all of the N routes in and around Gauteng. The issue of tolling roads is not new but, since its inception, has always been controversial. Consequently the aim of this report is to consider the impacts, both positive and negative that a 'do nothing' approach and the tolling of the N routes in Gauteng is likely to have on road users and the citizens of Gauteng. The urgency and time constraints of this project are such that it is not possible to undertake an in-depth social impact assessment but to consider the concern at a macro level pointing towards any need that might arise to undertake more specific studies in identified areas at the appropriate point in time. By way of background, attention is now turned towards the concept of tolling roads following which a brief demographic description of the Gauteng area will be given.

2. Background

In order to better understand the advantages and disadvantages of introducing a toll system on the Gauteng freeway system it is important to consider the general concept of tolling roads in respect of international experiences and then to discuss this concept in more specific terms, plotted against the demographic makeup of Gauteng.

2.1. The tolling of roads

The World Bank (2007) points out that a review of the extent of tolling globally indicates that most countries do not have toll roads. In countries where toll roads do exist they are unlikely to account for more than 5% of existing road networks. It is also indicated by the World Bank that the average cost per passenger car on these

toll roads amounts to between $0,03 and $0,08 per kilometre with goods vehicles, based on vehicle size, paying higher fees than private passenger vehicles. International experience is that most countries tend to toll specific roads either as a means of securing a stable source of funds to pay for the project and to maintain it, or as a means of controlling traffic flow. In some cases both of these reasons may apply.

No matter what the reasons for tolling roads may be, the issue remains a controversial one worldwide. However, the level of controversy is relative and depends on a number of factors. Firstly, where the road being tolled provides for a less expensive and more convenient alternative to other travel options the controversy surrounding the payment of toll fees is at its lowest and the major focus is on the level of the fee being charged. Examples of this are the tolling of San Francisco Bridge in the USA providing easy access across the San Francisco Bay to thousands of motorists. In South Africa similar examples are along the N2 between Plettenberg Bay and Stormsriver as well as on the N1 at the Huguenot Toll which respectively bridges the Grootrivier and Bloukrans passes and provides tunnelled access through the Du Toitskloof Pass. In all these cases the tolled alternatives are less expensive, less inconvenient and safer than other existing options.

Controversy increases when sections of road are improved and connected by new sections to form a toll road system while the alternative route, which comprises of sections of the old road are neglected. Objections to paying toll fees are usually raised by local residents who are now forced to pay toll fee on a regular basis and often on sections of road that they once used without incurring these costs. It was this type of issue that fuelled the debate surrounding the Midlands Toll Route on the N3 near Mooi River in KwaZulu-Natal as well as the N1 to the north of Pretoria.

Finally, the issue of tolling existing roads, where no viable alternative exists, becomes even more controversial. This controversy increases even further when the major reason for tolling is to control traffic flow in a congested area as is the case in Central London. The decision to increase the western extension of the London pay zone has met major opposition with organisations such as the National Alliance against Toll, mobilizing public opinion against the concept. The option of tolling the

Gauteng freeway system as a means of controlling traffic congestion will no doubt prove to be highly controversial as well.

Attention is now turned towards the geographical structure and the demographics of Gauteng with specific focus being placed on modes of transport in the province.

2.2. Geographical and demographic description of Gauteng

This discussion is based on data collected by Statistics South Africa during the 2001 Census and adjusted to incorporate the new municipal demarcation boundaries which came into effect on 09 December 2006. It must be noted that although Stats SA is the only source of demographic data recognized by the Government it is somewhat outdated and, as Andrew Boraine points out (Davie, 2004) the 2001 Census contains a 16% undercount. Apart from this there has been extensive population growth since the 2001 Census as will be indicated below.

2.2.1. Geographic description

Gauteng accommodates 3 of the 6 metropolitan or category A municipalities in the country and 3 district municipalities. Under these district municipalities are 9 local municipalities. The 3 metropolitan municipalities are City of Johannesburg (JHB), City of Tshwane (TSH), and Ekurhuleni Metropolitan Municipality (EKU). The district municipalities are Sedibeng (DC42), West Rand (DC46) and Metsweding (DC48). All of which are illustrated by means of the map in figure 2.1 below.

Figure 2.1 Map of Gauteng

Source: Demarcation Board http://www.demarcationboard.org.za

The local municipalities are distributed under the district municipalities as follows;

Sedibeng District Municipality (DC42)

Emfuleni Local Municipality (GT421)

Midvaal Local Municipality (GT422)

Lesedi Local Municipality (GT423)

Metsweding District Municipality (DC46)

Nokeng tsa Taemane Local Municipality (GT461)

Kungwini Local Municipality (GT462)

West Rand District Municipality (DC48)

Mogale City Local Municipality (GT481)

Randfontein Local Municipality (GT482)

Westonaria Local Municipality (GT483)
Merafong City Local Municipality (GT484)

Gauteng, geographically the smallest province in South Africa, covers only 1,4% of the entire land area of South Africa and, at the time of the 2001 Census, had a population of 8.8 million resulting in a population density of 519,53/km² (Demarcation Board, 2007). Notwithstanding its size the Province contributes 38% of the gross domestic product (GDP), and 60% of the fiscal revenue of the entire country making Gauteng the economic hub of South Africa.

2.2.2. Demographic description

Gauteng is also demographically the fastest growing province in the country having shown a population growth rate of 20% between the 1996 and 2001 Censuses (Stats SA, 2002) and the population is estimated to have reached 9,6 million in 2006 (Mid-year population estimates, South Africa 2006) indicating a population growth rate of 9.1% between 2001 and 2006. The State of the Cities report (2004) predicts that the population of Gauteng will reach 14.5 million by the year 2015. A caveat is, however, that the increasing prevalence of HIV/AIDS may have an effect on the population growth rate, slowing it somewhat. Nevertheless, the population of Gauteng is fast approaching that of KwaZulu-Natal which, after boundary readjustments stood at 9.9 million in 2006, and by the 2011 Census it is likely that Gauteng will accommodate the greatest share of the South African population.

- *Distribution of population*

In table 2.1 a distribution of the population based on Census 2001 taking into account the new demarcations (09 December 2006) is given. The Census 2001 data is used as the Mid-year population estimates given by Stats SA (2006) are only at a provincial level and no municipal data is provided in respect of this estimate. Notwithstanding this a good estimation on the distribution of the population of Gauteng in terms of the municipalities is provided on a percentage basis. As table 2.1 illustrates the City of Johannesburg makes up the greatest percentage of the Gauteng population at 35,1% followed by Ekurhuleni, 27% and the City of Tshwane at 21,6%. Metsweding District Municipality accounts for only 1,8% of the Gauteng population.

Table 2.1 Municipal distribution of population Census 2001

Municipality/Province		Total Population 2001	%
Sedibeng District Municipality	DC42	796756	8,7
Metsweding District Municipality	DC46	162270	1,8
West Rand District Municipality	DC48	533675	5,8
Ekurhuleni Metropolitan Municipality	EKU	2478632	27,0
City of Johannesburg Metropolitan Municipality	JHB	3225309	35,1
City of Tshwane Metropolitan Municipality	TSH	1982234	21,6
Gauteng Province		9178876	100,0

Source: Stats SA (Census, 2001)

A more detailed analysis of the Census 2001 (Stats SA) data reveals that there are 2,6 million households in Gauteng placing the household density in the province at 155,86/km².

- *Language*

21,1% of the population of Gauteng speak IsiZulu while 13,6% speak Afrikaans, 12,5% Sesotho and 12% are English speaking. The distribution of language is illustrated in Table 2.2.

Table 2.2 Language distribution in Gauteng 2001

Language	Total	%
Afrikaans	1249933	13,6
English	1101822	12,0
IsiNdebele	210318	2,3
IsiXhosa	642736	7,0
IsiZulu	1937217	21,1
Sepedi	1024663	11,2
Sesotho	1152813	12,6
Setswana	910215	9,9
SiSwati	129418	1,4
Tshivenda	159917	1,7
Xitsonga	570106	6,2
Other	89717	1,0

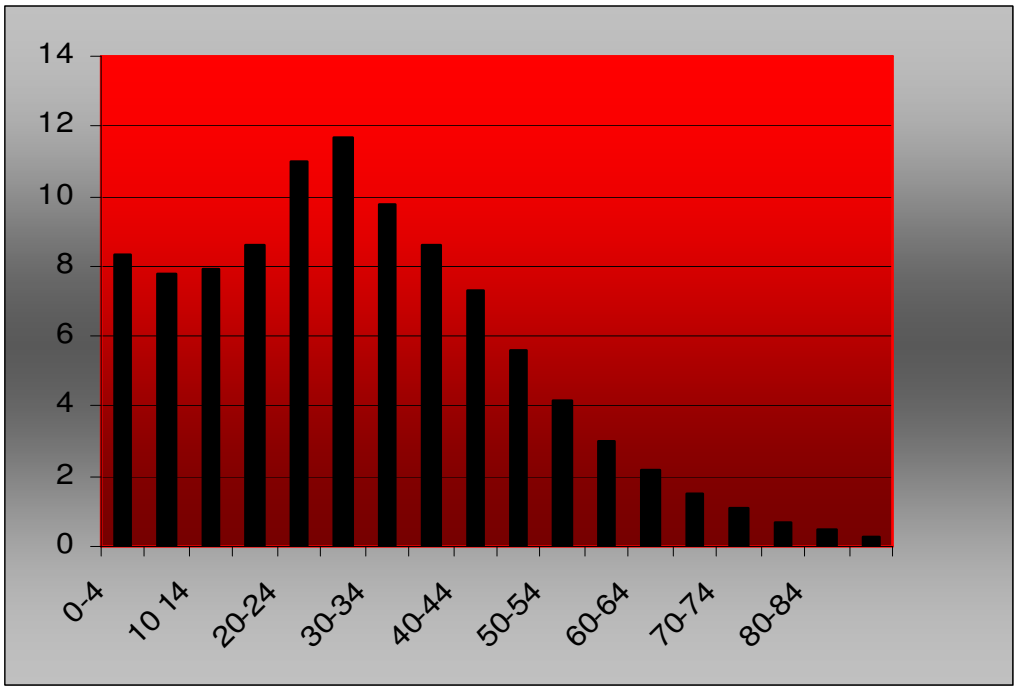
Source: Stats SA (Census, 2001)

- *Race*

On the basis of race 73,8% of the population are black African, 19,9% are white, 3,8% are coloured and 2,5% are Indian/Asian. The average household size is 3,3 and 22,1% of all households are made up of single persons. 24% of the population

are under the age of 15, 19,7% are between 15 and 24, 37,4% are between 25 and 44, 14,9% are between 45 and 64, while 4,0% are 65 years of age or older. Figure 2.2 provides a graphic indication of the distribution of age in the province in increments of 5 years and on a percentage basis.

Figure 2.2 Distribution of age in Gauteng 2001 in percentages



- *Economically active population*

According to the Labour Force Survey released by Statistics South Africa in March 2007, 25,5% of the Gauteng population, between the ages of 15 and 65 years were economically active. The Labour Force Survey placed the official unemployment level in Gauteng at 23,2%, slightly higher than in 2005 when it was officially recorded at 22,8% but lower than in 2001 when it was at 30,4% It is important to understand that for some time there has been controversy surrounding unemployment figures in the country and that the official definition of unemployed used by Stats SA (2007:xxiv) **excludes** persons who indicated that they were unemployed but who had not taken active steps to find work in the four week period leading up to the interview. In effect this definition excludes discouraged work-seekers from being counted as unemployed. Stats SA (2007:xx) places the percentage of discouraged workers in South Africa at 10,7% in 2006 slightly down on the 11,2% of 2005 and only slightly

higher than the 10,6% in 2001. Table 2.4 reflects the breakdown of the economically active population of Gauteng as captured during Census 2001.

Table 2.3 Economically active population in Gauteng 2001

	Total	%
Employed	2938148	44,2
Unemployed	1739262	26,2
Scholar or student	862608	13,0
Homemaker or housewife	242276	3,6
Pensioner or retired person	218700	3,3
Unable to work due to illness or disability	95187	1,4
Seasonal worker not working presently	35281	0,5
Does not choose to work	154810	2,3
Not applicable	356078	5,4

Source: Stats SA (Census, 2001)

- *Mode of travel*

Of specific interest in terms of this report are the statistics concerning mode of travel. In this respect the available data taking into account the 09 December 2006 boundaries (Stats SA, Census, 2001), indicates that although on an overall basis the highest percentage of people (18,8%) travel on foot in the province, and 11,2% travel by minibus/taxi, a relatively high percentage, 10,1%, travel by car as the driver. Only 6,7% travel by car as a passenger. A breakdown of this data is presented below in table 2.5.

Table 2.4 Mode of travel Gauteng 2001

	African/Black		Coloured		Indian/Asian		White		Total	%
	Male	Female	Male	Female	Male	Female	Male	Female		
On foot	817230	715272	34002	33088	11717	9458	53102	49316	1723185	18,8
By bicycle	19387	6486	817	543	449	331	16065	7931	52009	0,6
By motorcycle	6457	3335	349	246	509	346	10182	6323	27747	0,3
By car as a driver	151191	51732	21122	11087	37980	15808	364782	272854	926556	10,1
By car as a passenger	119963	90246	13306	17129	21377	25286	150967	172773	611047	6,7
By minibus / taxi	531720	435555	16669	21247	4097	4099	9129	9106	1031622	11,2
By bus	126577	121422	5659	7820	2467	2824	18667	22312	307748	3,4
By train	168147	89075	2635	1893	352	219	2735	1763	266819	2,9
Other	10893	6822	618	488	1031	496	6696	5391	32435	0,4
Not applicable	1533639	1882398	67605	82056	28512	50495	209984	345015	4199704	45,8
								Total	**9178872**	**100,0**

Source: Stats SA (Census, 2001)

Closer analysis of this data shows that the vast majority, 68,8%, of these drivers are white compared to all other racial groups which together amount to 31,2%. The white racial group also makes up the largest group of passengers in cars at 53% compared to all other racial groups at 47%. This data is illustrated by means of table 2.6.

Table 2.5 Mode of travel racial breakdown 2001

	Black/African, Coloured, Asian/Indian		White		Total
	Total	%	Total	%	
By car as a driver	288920	31,2	637636	68,8	926556
By car as a passenger	287307	47,0	323740	53,0	611047

Source: Stats SA (Census, 2001)

More specifically, Census 2001 shows that the majority of people who use a car as the driver in Gauteng are white males at 39,4% followed by white females at 29,4%.

On a regional basis it is clear that the majority of people who consider their mode of travel to be a car as the driver reside in the 3 metropolitan municipalities of Johannesburg (338 644), Ekurhuleni (250 633) and Tshwane (233 667) with Tshwane having the highest percentage of the population using a car as the driver as their mode of travel but only marginally higher than that of Johannesburg and Ekurhuleni. These statistics are illustrated below in table 2.7.

Table 2.6 Mode of travel district municipalities 2001

	Sedibeng DC42		Metsweding DC46		West Rand D48		Ekurhuleni EKU		Johannesburg JHB		Tshwane TSH	
	Count	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
On foot	186955	23,5	45023	27,8	121916	22,8	424657	17,1	558735	17,3	385897	19,5
Bicycle	7435	0,9	1154	0,7	2803	0,5	16574	0,7	10427	0,3	13618	0,7
Motorcycle	2052	0,3	495	0,3	1208	0,2	8054	0,3	9358	0,3	6579	0,3
Car – driver	51801	6,5	11637	7,2	40173	7,5	**250633**	10,1	**338644**	10,5	**233667**	**11,8**
Car – passenger	35936	4,5	10565	6,5	32051	6,0	172680	7,0	222683	6,9	137128	6,9
Minibus / taxi	80390	10,1	10789	6,7	56834	10,7	319194	12,9	411646	12,8	152773	7,7
Bus	29256	3,7	8469	5,2	15693	2,9	38905	1,6	79267	2,5	136162	6,9
Train	12798	1,6	295	0,2	8848	1,7	75597	3,1	87094	2,7	82187	4,2
Other	2101	0,3	432	0,3	1476	0,3	9114	0,4	11905	0,4	7405	0,4
Not applicable	388031	48,7	73410	45,2	252674	47,4	1163222	46,9	1495549	46,4	826818	41,7
Totals	**796755**	**100,0**	**162269**	**100,0**	**533676**	**100,0**	**2478630**	**100,0**	**3225308**	**100,0**	**1982234**	**100,0**

Source: Stats SA (Census, 2001)

If the white racial group is considered within the district municipal context then it is found that the highest numbers of people using a car as a driver are white people living in the City of Johannesburg. Also at 40,6% the highest percentage of white residents in Johannesburg, at the time of the 2001 Census, used a car as a driver as their mode of travel compared to 37,4% in Ekurhuleni and 36,6% in Tshwane. As table 2.8 illustrates, throughout the region, very few white people use public transport (minibus/taxis, buses and trains) as their preferred mode of travel.

Table 2.7 Mode of travel white group across district municipalities 2001

	Sedibeng DC42		Metsweding DC46		West Rand D48		Ekurhuleni EKU		Johannesburg JHB		Tshwane TSH	
	Count	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
Car – driver	36734	28,2	8907	26,9	29018	29,1	180277	37,4	209109	**40,6**	173591	36,6
Car – passenger	21099	16,2	6160	18,6	17576	17,6	96363	20,0	95629	18,6	86912	18,3
Minibus / taxi	1428	1,1	347	1,1	1256	1,3	5013	1,0	5475	1,1	4716	1,0
Bus	2778	2,1	931	2,8	2498	2,5	7319	1,5	10249	2,0	17205	3,6
Train	218	0,2	70	0,2	476	0,5	1710	0,4	1247	0,2	777	0,2

Source: Stats SA (Census, 2001)

Finally, it must be noted that this analysis is based on data collected during the 2001 Census and, considering the demographic changes that the country has undergone

since then, there is likely to be a shift towards a higher percentage of black/Africans using a car as a driver as their mode of travel. A shift of this nature is unavoidable if one takes the figures released by the National Association of Automobile Manufacturers of SA indicating that the increasing growth in new car sales reached a level of 18,8% in the first half of 2006 into account. Also van der Merwe (in Benjamin, 2006) points out that "…research had found that Gauteng residents, in particular the growing black middle class, aspired to own cars and to move away from using public transport."

This increase in new car sales is quite a different scenario than in 1996, when Stats SA revealed that

> "[t]he total number of new vehicles registered during September 1996 (9 977) in the provinces of North-West, Gauteng and Mpumalanga shows a substantial decrease of 39,0% compared with September 1995 (16 350). It also shows a marked decrease of 29,2% compared with August 1996 (14 098)."

It is clear that the situation on the Gauteng road network needs urgent and immediate attention to prevent it leading to serious and irreversible negative social and economic consequences not only for Gauteng but for the country as a whole, as well as the Southern African region. In the following section attention will be turned towards the preferred modes of travel in Gauteng.

3. Attitudes towards choice of transport in Gauteng

The choice of the private motor vehicle as the preferred mode of transport is common amongst industrialized countries. The FIA Foundation (undated:8) included the UK, Canada, France, Germany, Italy, Japan, Spain and the USA, amongst a group of industrialised countries in a study in which it was found that;

> "The automobile dominates passenger travel. …
>
> Car ownership is rising in every country.
>
> Transport is a major part of household expenditure – on average about 14% of all expenditure. About 85% of this expenditure is for the purchase and use of cars.

For journeys up to 40 km long, travel by car takes no more time than half the time door to door as travel by bus or rail, except along a few corridors suitable for heavy rail or express bus.

A car allows access to wider choice and better opportunities for employment, homes, and key services.

Congestion is a growing problem in some areas. But overall, average door to door travel time is not increased.

Road safety is improving. Fatalities per vehicle kilometre have fallen by a factor of three since 1980, and by a factor of five in some countries since 1970. Emission of toxic pollutants from cars has fallen dramatically. A new car today is around 30 times cleaner than a new car in the early 1980's.

Cars are now responsible for less than 15% of greenhouse emissions worldwide, and some 15-20% of greenhouse emissions from developed countries. Government and car manufacturers are taking serious steps to improve fuel efficiency through technology.

Car drivers pay up to four times more in road user taxes than the amount reinvested in transport."

And (FIA, undated:9-10) "There is no evidence that the level of motorisation has reached a limit anywhere, even [in the] USA ...

Using a car enables people to travel further in the same time. As car ownership has increased, the average distance travelled per year has also increased.

The journeys people make by car are different to those by public transport. Car trips are from anywhere to anywhere, and are often across town or around the edge of towns. Public transport trips are along corridors where many people travel, often radial into the centre of towns.

The majority of journeys are for personal rather than professional reasons. …"

Given these findings it becomes clear that the car continues to become the preferred mode of transport within industrialised countries, despite the fact that congestion continues to increase as a result of more people taking to the roads. Consequently, it is most unlikely that, at least in the short term, public opinion will be inclined to shift towards using public transport on a more regular basis. This view is supported by

the findings of the social impact study into the Central London Congestion Charging Scheme (2004:196) where it was found

> "…that most respondents did not expect congestion charging to make any difference to the way they organised the selected tour. Around 67 percent of drivers in the charging zone and inner London expected to make no changes to their tour. This compares to nearly 90 percent of non-drivers in the charging zone and inner London and slightly less for those in outer London and beyond the M25."

New York City has similar misgivings when it comes to shifting commuters towards using public transport as is pointed out in a report on congestion in New York (Partnership for New York City, 2006:8).

> "The most immediate source of relief—expanded bus services—is caught in a "Catch 22" situation, since people will only move from cars to buses when the buses are speedy and reliable. That scenario is impossible with heavily congested conditions."

In South Africa the question of shifting public opinion towards making greater use of public transport becomes even more difficult and for two reasons in particular any attempt to do so at this point in time is most unlikely to succeed. Firstly, although the findings of the FIA or the New York studies cannot be applied to the South African situation in their entirety, some of these finding could apply to some degree. In essence the South African public, given the choice, continues to choose the private car as the most convenient form of transport (see van der Merwe in Benjamin, 2006). Notwithstanding increasing traffic congestion the motorcar is regarded as the quickest, safest and often the only means of transport from one point to another. Although the safety factor on the South African roads may differ greatly to those in the industrialised countries mentioned above, improved safety features of the modern car do apply to South African cars. What is also applicable are the improved pollution emissions of contemporary motor vehicles.

Secondly, the alternative transport options in South Africa are perceived to be most problematic, the most viable alternatives being minibus/taxies, buses and trains. These modes of transport having been neglected for years are perceived by the

public to be unreliable, unsafe and even unavailable at times, or a combination of these applies. Trains are restricted in terms of the rail network while minibus/taxies and buses, although somewhat more flexible, are subjected to traffic congestion to the same degree as are private motorcars as they share the same right-of-way as other vehicles. At present the High Occupancy Vehicle (HOV) alternative does not receive a high degree of public support. In a press release covering a survey undertaken by Synovate (2006) in respect of the recent (23rd – 27th October, 2006) HOV trials on certain N freeways in Gauteng it is indicated that amongst the 400 motorists surveyed only 30% believed the HOV option could be a solution to Gauteng's traffic congestion. Synovate also found that 68% of respondents do not regard the tolling of high density roads as a viable solution either but that 52% supported the Gautrain as one solution.

From this it can be assumed that although the public would like to see a solution to the traffic congestion, currently the public transport option is not viable and the attitude towards public transport remains negative. Consequently, the key to the success of any initiative is to shift public opinion towards using public transport which, considering prevailing conditions is likely to be a difficult task needing an extensive and long-term strategy. This view finds support in Synovate's survey (2006:5) as they found that, even if public transport was improved and existing roads were tolled, 72% of respondents would continue to use the tolled alternative. This means that only 28% of respondents would make the shift towards an improved public transport system. When respondents were asked if they would consider a park-and-ride system, 67% indicated that they would not select this option for the following reasons "… *lack of flexibility* (50%), *inconvenience* (49%), and the fact that one has to *rely on other people* (48%)" (Synovate, 2006:1). It is most likely that in general the same reasons and to a similar degree, will be given by Gauteng motorists currently using the N freeway system in response to abandoning their cars in favour of any form of public or shared transport alternative.

From the above discussion it is clear that the trend towards private car use as opposed to using public transport is a world wide phenomenon. It is also clear that, apart from this worldwide trend, which South African motorists are likely to follow at least to some degree, the public transport system in South Africa is in dire need of

improvement (see for instance Gauteng Transport Network Integration Process: Proposal for a Gauteng Freeway Improvement Scheme, June, 2006; Sunday Times, 1st October 2006; Business Day, 23rd October, 2006). The public regards the taxi services to be unregulated and unsafe, the bus service as being sub-standard and miss-targeted and the commuter rail services as dangerous and unreliable. Consequently, it will take a concerted effort from a range of authorities over an extended period of time to switch the attitude of Gauteng motorists away from the perceived convenience of the private car towards public transport. Focus will now be turned towards the social impacts, both positive and negative, of the prevailing situation on the Gauteng freeway system and the option of charging a toll fee on this road system.

4. Assessment of social impacts

In this section the impact assessment technique utilised during this study will be described, the probable social impacts of increasing traffic congestion will be considered followed by a discussion concerning the likely social impacts that could result from imposing a toll fee on the existing Gauteng freeway system. It must however be noted that, although the study draws extensively on both local and international experience in respect of research and discussion with organisations such as the Automobile Association of South Africa, no extensive public engagement process was undertake at this stage. This is due to the urgency of the situation and resultant time restraints.

4.1. Impact assessment technique

The Social Impact Assessment (SIA) aims to ascertain the nature, extent, duration, probability, significance and status of identified impacts that may result from either leaving the traffic situation on the Gauteng freeway system as is, the 'do nothing' option, or to introduce a toll fee on the freeway system as one way of managing traffic on the system. Introducing a toll fee will also consist of a series of stages that can be categorised into the following chronological sequence of events, the pre-construction, construction and operational phases of the project. This assessment will take each of these phases into account.

On this basis, the following characteristics of each of the potential significant impacts are identified and tabulated in accordance with a recognised format previously applied to the Gauteng Rapid Rail Link (see Uys, Bews and Hatting, 2002) and are:

The ***nature*****:** Which includes a description of what causes the effect, what will be affected and how it will be affected.

The ***extent*****:** A prediction of the magnitude of the impact (or change), which may result from the implementation of the project.

The **size:** of an impact is described in terms of three possibilities. In the first place the impact could be **local** (**L**), where the impact is restricted to the communities adjacent to or using the Gauteng freeway system. Secondly, the impact could affect a bigger area, which would include the **immediate surroundings** (**I**) of the freeway system including adjacent road networks, such as the neighbourhood through which the freeway runs. Thirdly, the impact could be **regional** (**R**) affecting the local (Lo) or district (D) or the province (Pr) or at the nation (N) level.

The ***duration:*** The lifetime or anticipated length of time during which the impact will be felt. This is indicated in terms of whether the lifetime of the impact will be

∗ Short term (ST) (<5 years);

∗ Medium term (MT) (5-20 years);

∗ Long term (LT) (>20 years): where the impact will cease after the operational life of the activity, either because of natural processes, or through human intervention; or

∗ Permanent (P): where mitigation either by natural process or through human intervention will not occur in such a way, or in such a time span, that the impact can be considered temporary.

The ***probability****:* The likelihood of the impact actually occurring indicated as

∗ Improbable (I), where the possibility of the impact occurring is very low;

∗ Probable (P), where there is a distinct possibility of the impact occurring;

∗ Highly probable (HP), where it is most likely that the impact will occur;

or

∗ Definite (D), where the impact will occur regardless of any preventative measures taken.

The ***status***: An appraisal of the type of effect the activity would have on the affected environment, which is described as either positive (Pos), negative (Neg) or neutral (Neu).

The ***significance*** of the impacts: Whether an impact alters an important aspect of the environment. This is determined and rated as:

∗ No impact (NI): The social environment and peoples' daily lives are not affected.

∗ Low (L), where it will have very little influence on the decision. This level of impact is of little significance and likely to have no effect. Social, cultural and economic activities are unlikely to change. There is no apparent benefit.

∗ Medium (M), where it should have an influence on the decision, unless fairly easily mitigated. At this level the impact is both real and extensive. Although social, cultural, and economic activities are changed, mitigation remains feasible. With some modification to the project, its effects on the community can be limited. The social, cultural and economic activities of the community can continue in a modified form.

∗ High (H), where it would influence the decision, regardless of any possible mitigation. Benefits are of the highest order within the confines of all anticipated impacts.

∗ Severe (S), at this level mitigation is extremely difficult or not possible. Social, cultural and economic activities are most likely to change to the extent that the community is seriously disrupted, or that these activities are terminated.

Based on this format the various social impacts will now be identified and assessed on two levels. The firstly of these levels refers to the **'do nothing' option**, while the second, concerns the **upgrading and tolling option**.

4.2. Impacts in respect of prevailing traffic congestion.

Increasing traffic congestion on the Gauteng freeway system has, particularly over the last five years, had a negative social impact in respect of a series of issues. These issues are divided into the following broader categories, economic, personal, family, and work related impacts. None of these categories are exclusive as each, to a lesser or greater degree, overlaps with the others. An attempt is, however, made here to deal with the specific issues under the category with which they most fit. The range of impacts is listed in table 4.1 below and each impact is discussed in more detail, in accordance with the impact assessment technique discribed under 4.1 above.

Table 4.1 Social impacts of traffic congestion

Impact category	Social Impact
Socio-economic	Travel time
	Predictability of time schedules
	Frequency of deliveries/service calls
	Vehicle running costs
	Accident rate
	Job losses
Personal	Journey experience
	Health & safety
	Leisure time & exercise
	Sleep patterns
	Social activities
	Choice of residential location
Family	Domestic chores
	Family time
	Collecting children from school
	Supervision of children
Work	Reliability
	Productivity
	Interpersonal relations
	Education

4.2.1. Socio-economic impacts

The socio-economic range of impacts includes those impacts that affect individuals and groups in a manner that have some broader economic consequences. The

economic significance of these impacts could be felt at either the local, regional and/or national level/s. It must be noted that the emphasis here remains at the social level. Consequently, the focus in respect of this report is on perceptions which cannot be quantified in financial terms. The purpose of this section therefore is to highlight the socio-economic impacts from a social perspective which would be addressed in greater depth in the economic impact assessment.

- *Travel time*

Increased traffic congestion has resulted in users of the Gauteng roads network spending longer time in the traffic. The Gauteng Transport Network Proposal (2006:3) points out that "… morning and afternoon traffic peak periods have extended to almost 3 hours respectively… ", and all indications are that this situation will deteriorate over time. These extensions have an economic consequence not only in respect of commuters, which in itself has an economic consequence, but also in respect of goods and passenger vehicles, the cost of which is passed on to the public. Longer travel time may also have economic consequences as far as consumers are concerned, as limited, available research does show that "…it is widely understood that high traffic congestion will impact the nett number of shopping trips and retail sales" (Partnership for New York City, 2006:33).

Accordingly, it can be argued that severe traffic congestion has negative economic consequences for both commuters and consumers. Socially, spending more time in the traffic leads to frustrations and issues of safety which, having individual, family and work related consequences, will be addressed under the appropriate category below.

The extent of this impact, considering that Gauteng is the economic hub of South Africa, is such that it is likely to have a significant and negative impact not only on a local (L) and regional (R) but also at the national (N) level. The duration, if the road system is left to deteriorate, is long-term (LT) and the probability is definite (D). The affect is negative (Neg) and the significance severe (S).

- *Predictability of time schedules*

Increased traffic congestion makes it difficult for business people to estimate travel time between appointments thus making it difficult for them to plan their day as overall a greater amount of time must be allocated to travel. Due to the unpredictable nature of current traffic patterns, however, it is difficult to allocate the correct amount of time for travel which often results in an over or under allocation of time which leads to frustration. People arriving late or even early for appointments results in increased costs being incurred as people engage in their day-to-day business.

In the report prepared by the Partnership for New York City (2006:3-4) it is indicated that

> "[t]he costs of congestion are not only borne by motorists and commercial vehicles stuck in traffic, but also affect the cost of doing business and the cost of living in the entire region… ".

The report continues to point out that

> "[t]he costs of congestion are distributed across many sectors of the economy, but the effects are most clearly felt in sectors such as manufacturing, wholesale trade, and construction – which pass them on to other businesses and consumers."

Although this impact is likely to have a local (L) impact it will at times reach beyond this to affect the regional (R) and national (N) levels. The duration is long-term (LT) and the probability definite (D). The effect is negative (Neg) and the significance severe (S).

- *Frequency of deliveries/service calls*

Virtually all goods and services in Gauteng, and often beyond, rely on the Gauteng freeway system. Any disruption brought about due to an inadequate system will result in a reduction in the number of deliveries and quality and frequency of service calls that are executed within a working day. This again has negative economic consequences which are eventually passed on to consumers. It is further pointed out by the Partnership for New York City (2006:4) that "[k]ey sectors of the regional economy, especially financial and professional services, suffer losses in productivity due to congestion… ".

The impact is expected to be local (L) but will have both regional (R) and national (N) consequences. The duration is long-term (LT) and the probability definite (D), while the effect is negative (Neg) and the significance severe (S).

- *Vehicle running costs*

Traffic congestion has a negative effect in respect of both fuel and maintenance costs. Left to continue the way it is the situation will deteriorate to a point that the South African economy will eventually be choked. On a socio-economic level these costs are borne by drivers of private motor vehicles and are passed on by the commercial and passenger transport industry to commuters and consumers. It is people in the lower income groups who are most negatively affected by increasing transport costs.

In respect of this the impact is likely to be local (L) but will have regional (R) and national (N) consequences. The duration is long-term (LT) and the probability definite (D), while the effect is negative (Neg) and the significance high (H).

- *Accident rate*

High congestion is likely to result in an increase in accidents having both social and economic consequences. The unit costs of accidents can be calculated through a formula devised and recently modified by the CSIR Transportek (de Beer & van Niekerk 2004/6:1) which takes into account, amongst other things, the direct cost, loss of output and qualitative aspects such as pain, grief, suffering and loss of amenities of life as well as the financial burden placed on families. It is these costs that have individual and social consequences that will rise as traffic congestion increases on the Gauteng freeway system.

Although these costs can be calculated in monetary terms on an economic basis, on a social basis it can also be indicated that this impact is local (L), regional (R) and national (N). If the road system is left in its existing state the duration is long-term (LT) and the probability definite (D), while the effect is negative (Neg) and the significance severe (S).

- *Job losses*

The cost of high levels of traffic congestion has a direct impact on the number of jobs created or lost in a region. This is highlighted by the Partnership for New York City (2006:4) when they mention that "[c]ombined business costs, lost revenues and lost productivity mean that there are 37,000 to 52,000 fewer jobs created in the Metro Region [of New York City] every year" due to traffic congestion. Although the number of job losses related to traffic congestion in Gauteng would be substantially lower than that in New York, the point is made that traffic congestion will have a negative impact on jobs in the region.

This impact is likely to have a significant and negative impact largely on a local (L) level but at times could extend to the regional (R) and even national (N) levels. The duration is long-term (LT). The probability is definite (D), the effect negative (Neg) and the significance is high (H).

4.2.2. Personal impacts

Personal impacts refer to those impacts having an effect on the individual. At this point this is done in general terms in order to provide a universal view of the range of impacts and consequences that could flow from worsening congestion on the Gauteng freeway system. It must, however, be kept in mind that in a multi-levelled, multi-cultured society such as South Africa a diverse range of impacts will emerge. For instance, the impact of traffic congestion is experienced differently by different segments of the population, dependent on factors such as life cycle stages (age, marital and family status), income groups and car ownership, all of which will have a direct bearing on how impacts may emerge.

- *Journey experience*

Congested traffic patterns have a negative effect on the journey experience of most drivers and can result in high levels of frustration, aggravation and discomfort, which could manifest in incidents of road rage. The Automobile Association of South Africa, on its web site (2007, www.aa.co.za), points out that incidents of road rage are on the increase internationally and that "… stress, when combined with the frustration of repeated experiences of bad driving and traffic congestion is then often expressed as road rage." The current situation on the Gauteng freeway system is such that

drivers are spending extended periods, often in uncomfortable conditions resulting in high levels of stress and fatigue. This has changed the life patterns of drivers and commuters as they are forced to extend the time of their journeys to and from work and has had an adverse effect in respect of the overall quality of life.

The extent of this impact is such that it is likely to have a significant and negative impact largely on a local (L) level but at times could extend to the regional (R) and even national (N) levels as motorists travelling to or passing through the region are effected. The duration, if the road system is left to deteriorate, is long-term (LT) for motorists and commuters needing to use the freeway system on a daily basis. The probability is definite (D), the effect negative (Neg) and the significance high (H) for those using the system on a daily basis.

- *Health and Safety*

There is data available to support the claim that traffic congestion has a negative impact on the environment and public health (Partnership for New York City, 2006:5). An extended commuting period, under stressful and often uncomfortable conditions, will have a negative impact on the health and safety of drivers and commuters. Travellers will experience high levels of frustration and stress that will have a direct effect on their physical and mental health. It has been well documented (see for instance Kemi, 2006; Brewer, 2007) that traffic congestion has been linked to increased respiratory diseases. Noise and the stress of being out of control while late for work, for appointments or to collect the children from school or crèche could also create or extend negative health hazards.

Hennessy and Wiesenthal (2004:348) in studying stress and stress related behaviours, including aggression found that a

> " …greater variety of direct and indirect behaviours were reported in high congestion. Reports of aggressive behaviours showed the greatest increase from low to high congestion."

The issue of safety on congested freeways is also a major consideration as congestions results in an increased exposure to incidents of road rage, incidents of 'smash and grab' at on and off ramps and accidents. Despite the fact that it may be illegal, pedestrians are also at increased risk as they attempt to cross crowded

freeways. In 2000 in South Africa road traffic accidents were the 4th highest cause of death amongst both men and women between the ages of 15-44, accounting for 7,3% of deaths amongst men and 3,2% of deaths amongst women (Bradshaw *et al*., 2003:11-12).

This impact is likely to have a significant and negative impact largely on a local (L) level but at times could extend to the regional (R) and even national (N) level as motorists travelling to or passing through the region are affected. The duration, if the road system is left to deteriorate, is long-term (LT) for motorists and commuters needing to use the freeway system on a daily basis. The probability is definite (D), the effect negative (Neg) and, for those using the system on a daily basis, the significance is severe (S).

- *Leisure time & exercise*

Extended journey time adversely affects the time that individuals have available for leisure and exercise. A study undertaken in Latin America and the Caribbean (Jacoby, Bull, & Neiman 2003:226), where some of the most densely populated areas in the developing world exist, has found that poor public transport and traffic congestion is a contributing factor towards physical inactivity as this results in less time being allocated to work and leisure activities. Thus, the study finds, the inactive portion of the population in 24 of the countries in the Americas has reached 50% with several approaching 60%. Inactivity, Jacoby *et al*., point out, increase the risk behind noncommunicable diseases (NCD) which, according to the World Health Organisation reached epidemic proportions in 2000 with 86% of all deaths in Europe, 76% in the Americas and 75% in the Western Pacific region being contributed to NCD (Jacoby *et al*., 2003:226). In recent years, South Africa has also experienced an increase in NCD particularly amongst the black population as a sedentary lifestyle spreads amongst the population and traffic congestion is likely to exacerbate the situation.

It is likely that this impact will have a significant and negative effect largely at the local (L) level. The duration under prevailing conditions is long-term (LT) for motorists and commuters needing to use the freeway system on a daily basis. The

probability is definite (D), the effect negative (Neg) and, for those using the system on a regular basis, the significance is high (H).

- *Sleep patterns*

The lifestyle disruption brought about by having to confront daily traffic congestion is most likely to affect sleep patterns of those now forced to spend more time commuting to and from work. In a study that was undertaken in the Philippines (Sundo, & Fujii. 2003) it was found that a compressed week resulted in "[c]ommuters reduce[ing] household activities by about one hour, sleeping time by about twenty minutes, and pre-work preparation time by about thirty minutes." The reduction in available time and the resultant lifestyle adjustment in respect of the compressed work week is likely to be comparable to increased commuting times and adjustments made by commuters. The major difference will be in respect of the amount of time lost to traffic congestion and the impact that this has on the amount of time allocated to other daily activity patterns.

The Gauteng Transport Network Integration Process Proposal (2006:3) claims that

> "… morning and afternoon traffic peak periods have extended to almost 3 hours respectively, resulting in increased travel times between home and work, and decreased private time for family, education and leisure."

A 3 hour increase each side of the working day will undoubtedly have a significant impact on sleep patterns, particularly relating to the need to rise early in order to reach work on time and amongst lower-income earners who may rely on a range of transport systems to reach work. Shorter periods of sleep are likely to have a negative effect on productivity and behaviour patterns and could increase the risk of accidents both work related and on the road as well as increase the risk of road rage.

It is likely that this impact will have a significant and negative effect largely at the local (L) level. The duration under prevailing conditions is long-term (LT) for motorists and commuters needing to use the freeway system on a daily basis. The probability is definite (D), the effect negative (Neg) and, for those using the system on a regular basis, the significance is high (H).

- *Social activities*

Spending longer time in the traffic will result in commuters having less time available for social activities as they adjust their life styles to cope. In this regard see for example the discussion concerning changes in lifestyles that occur when a population has reduced leisure time (Jacoby, *et al*., 2003; Sundo & Fujii. 2003).

It is likely that this impact will have a significant and negative effect largely at the local (L) level. The duration under prevailing conditions is long-term (LT) for motorists and commuters needing to use the freeway system on a daily basis. The probability is definite (D), the effect negative (Neg) and, for those using the system on a regular basis, the significance is medium (M).

- *Choice of residential location*

Commuters are forced to make residential choices due to their dependency on motor vehicles and the increasing traffic congestion. Choices are made that are most convenient in respect of access to schools, work and to a somewhat lesser degree other amenities such as shops. At one time the availability of relatively cheap private motoring resulted in an urban spread but current levels of congestion experienced over the last few years has resulted in the development of high density nodes adding to this congestion. Traffic congestion has an impact on the growth and deterioration of urban areas as is indicated by the proceedings of a conference held in Washington D.C. (Traffic Congestion: Issues and Options. June 26-27, 2003).

It is likely that this impact will have a significant and negative effect largely at the local (L) and regional (R) levels. The duration under prevailing conditions is long-term (LT). The probability is definite (D), the effect negative (Neg) and the significance medium (M).

4.2.3. Family impacts

Family impacts relate to the range of impacts that have direct bearing on family life. Although some of the issues such as those in respect of time available and quality of life have individual consequences and have accordingly been dealt with above, they are addressed here with specific emphasis on the impact that they have on the family and as such provide for an additional level of analysis.

- *Domestic chores*

The study undertaken by Sundo, & Fujii (2003) on the effect of a compressed working week introduced over a two-month experimental period in the Philippines found that, due to time constraints brought about by the compressed working week, commuters reduced their household activities by approximately one hour. It is likely that any time loss, including that taken up by extended periods of travel, will have a similar effect. The actual extent of this effect will, however, depend on the amount of time lost and factors such as the distribution of time amongst a range of commitments which will often be culturally dependent. There is however, no doubt

that being forced to spend extended periods commuting to and from work is inversely proportional to the amount of time available to undertake domestic chores.

It is likely that this impact will have a significant and negative effect largely at the local (L) and regional (R) levels. The duration under prevailing conditions is long-term (LT). The probability is definite (D), the effect negative (Neg) and the significance medium (M).

- *Family time*

Again long periods spent commuting to and from work will have a negative impact on the amount of time spent together as a family. Consequently, the amount of time available for the transfer of norms and values through the family is limited. Insufficient socialisation of children is a factor linked to increased crime. Amongst some communities at least one and often both parents are forced to leave home before the children wake up and only return home once the children have gone to sleep. This situation means that in those families children are left with limited contact with their parents and need to prepare for and get to school themselves. This situation is far from ideal and is being compounded by increasing traffic congestion.

It is likely that this impact will have a significant and negative effect largely at the local (L) and regional (R) levels. The duration under existing conditions is long-term (LT). The probability is definite (D), the effect negative (Neg) and the significance medium (M).

- *Collecting children from school*

Unpredictable traffic patterns can create stress for parents having to collect children from school adding to the pressures of dealing with traffic congestion. Often, children are left unattended while waiting for parents to pick them up from school or are forced to find their own way home or wait under what could be risky conditions.

It is likely that this impact will have a significant and negative effect largely at the local (L) and regional (R) levels. The duration under current conditions is long-term (LT). The probability is definite (D), the effect negative (Neg) and the significance medium (M).

- *Supervision of children*

Extended time spent commuting also means that some parents will have less time available to assist children with their home work. There may also be occasions where younger children are left unattended for long periods which may not be ideal. Often, the problems that the education system experiences with undisciplined children can be related to a lack of parental involvement. Again these types of situations increase the stress brought about by being out of control and having guilt feelings brought about by the role conflict of employee/parent, which is then exacerbated due to traffic congestion.

It is likely that this impact will have a significant and negative effect largely at the local (L) and regional (R) levels. The duration under prevailing conditions is long-term (LT). The probability is definite (D), the effect negative (Neg) and the significance medium (M).

4.2.4. Work impacts

Work impacts are that cluster of impacts that affects a person within the work setting in respect of productivity and career progression and which can have an effect on colleagues within the work setting. Broader organisational effects are dealt with under 4.2.1 Socio-economic impacts above. These work impacts remain at the social level and consequently no attempt will be made to attach an economic value to any of them, which would be in the realm of an economic impact assessment.

- *Reliability*

An increase in traffic congestion and reduction in the ability to predict travel time and estimate time of arrival have a direct and negative impact on perceived and actual reliability of employees (Partnership for New Your City, 2006:19). Traffic congestion can result in tardiness which may be compounded in situations of role conflict as the time shared between work and family responsibilities is reduced and role conflict intensifies. The inability to accurately estimate travel time also has a negative impact on generating work schedules, arranging meetings and keeping appointments. There are even increasing incidences where people have missed flights due to traffic congestion.

It is likely that this impact will have a significant and negative effect largely at the local (L) regional (R) and even national (N) levels. The duration under current conditions is long-term (LT). The probability is definite (D), the effect negative (Neg) and the significance medium (H).

- *Productivity*

As indicated by the Partnership for New York City (2006:5) "[m]ost importantly, traffic delays translate into loss of worker productivity… ". This is particularly so for professionals, sales people, service providers and commercial vehicles, needing to use the road systems on a daily basis to conduct their business. Not only do they face time delays commuting to and from work but they encounter disruptions as they move between appointments and delivery points. As the Partnership continues to point out, (2006:40) "[a]nother important assumption, related to work-related travel such as business meetings, is that congestion-caused delays reduce labor productivity, which drive up production costs."

It is likely that this impact will have a significant and negative effect largely at the local (L) and regional (R) levels. The duration under prevailing conditions is long-term (LT). The probability is definite (D), the effect negative (Neg) and the significance medium (M).

- *Interpersonal relationships*

Frustrations of facing early morning traffic congestion or returning late for an appointment will at times spill over into the work situation in much the same way as occurs with road rage. These tensions build up when commuters feel helpless in the traffic and may be inappropriately expressed in the work or even family situation. In this respect see the work of Hennessy and Wiesenthal (2004) who have linked traffic induced stress states to aggressive behaviour.

It is likely that this impact will have a significant and negative effect largely at the local (L) and regional (R) levels although at times it may stretch to a national (N) level. The duration under current conditions is long-term (LT). The probability is definite (D), the effect negative (Neg) and the significance medium (M).

- *Education*

As people are faced with extended travel time the time that they are able to allocate to personal development is reduced. Considering the current skills shortage that the country faces it is important for employers to encourage employees to develop their skills through self-study. Prevailing conditions on the Gauteng freeway system, however, are counter productive in this regard as employees find it difficult to remain motivated and committed after spending long hours commuting to and from work.

It is likely that this impact will have a significant and negative effect largely at the local (L) and regional (R) levels. The duration under present conditions is long-term (LT). There is a distinct probability (P) that it will occur, the effect is negative (Neg) and the significance low (L).

4.3. Synthesis of social impacts

The various social impacts, resulting from traffic congestion on the Gauteng freeway system as discussed above, are presented in tabular format in table 4.2 below. This is done in accordance with the social impact assessment technique as applied throughout this study.

Table 4.2 Synthesis of the impacts of congestion

Nature	Extent	Duration	Probability	Status	Significance	Comments
Socio-economic						Socio-economic impacts are evaluated at the social not economic level
Travel time	L R N	LT	D	Neg	S	
Predictability of time schedules	L R N	LT	D	Neg	S	
Frequency of deliveries/service calls	L R N	LT	D	Neg	S	
Vehicle running costs	L R N	LT	D	Neg	H	
Accident rates	L R N	LT	D	Neg	S	
Job losses	L R N	LT	D	Neg	H	
Personal						Personal impacts are evaluated at the social not individual level
Journey experience	L R N	LT	D	Neg	H	
Health & safety	L R N	LT	D	Neg	S	
Leisure time & exercise	L R	LT	D	Neg	H	
Sleep patterns	L R	LT	D	Neg	H	
Social activities	L R	LT	D	Neg	M	
Choice of residential location	L R	LT	D	Neg	M	
Family						
Domestic chores	L R	LT	D	Neg	M	
Family time	L R	LT	D	Neg	M	
Collecting children from school	L R	LT	D	Neg	M	
Supervision of children	L R	LT	D	Neg	M	
Work						
Reliability	L R N	LT	D	Neg	H	
Productivity	L R	LT	D	Neg	M	
Interpersonal relations	L R	LT	D	Neg	L	
Education	L R	LT	D	Neg	L	

Key to codes:
Extent
Local – L; Immediate surrounds – I; Regional – R; National – N.
Duration
Short-term (<5 years) – ST; Medium-term (5-20 years) – MT; Long-term (>20 years) – LT
Probability
Improbable – I; Probable – P; Highly probable – HP; Definite – D
Status
Positive – Pos; Neutral – Neu; Negative - Neg
Significance
No impact – NI; Low impact – L; Medium impact – M; High impact – H; Severe impact – S

From the above discussion it is clear that there are compelling reasons for the relevant authorities to deal with the prevailing situation on the Gauteng freeway system as a matter of urgency as there are clearly **no positive social impacts** in

respect of the 'do nothing' alternative. More in depth research is required to fully capture the macro-economic effect of excessive congestion. It is, however, clear that the 'do nothing' option of leaving the situation to deteriorate has serious social and economic implications making it totally inappropriate. The most appropriate option is a concerted effort from all relevant authorities concerned with transport and municipal services. One aspect of this could be to consider tolling sectors of or the entire Gauteng freeway system. This decision would, however, have certain social consequences attached which will be considered below.

4.4. Impacts in respect of imposing a toll fee

A scan of both international and local literature, as well as media, uncovers virtually as many arguments for the tolling of congested roads as there are against it. On both sides of the divide there are arguments put forward by academics, transport specialists and the public. What is clear is that the issue of charging toll fees is a complex one that needs the attention of a range of subject experts taking it way beyond the scope of this study. Nevertheless, this study focuses on one aspect of this issue which is the social impact that charging toll fees is likely to have on the Gauteng freeway system. International experience indicates that a range of social impacts, that vary in intensity and that are dependent on individual situations are likely to emerge. For instance the study of the Central London Congestion Charging Scheme (Impacts monitoring – Second Annual Report, April 2004) shows that expectations of the social impact of charging a congestion fee in Central London depended on whether respondents were drivers or non-drivers, and whether they lived inside or outside of the charging zone. It is not surprising that such different views surface. What is, however, important to keep in mind is that the London study focused on an intra-city congestion problem, whereas the Gauteng situation involves a more complicated intra-city freeway network congestion problem that cannot simply be solved through tolling in isolation. What is also important is to ensure that all interested and affected parties are given fair and equal opportunity to air their views and that these views are noted.

In this section some of the positive and negative social impacts that are likely to emerge out of imposing a toll fee on the existing Gauteng freeway system will be considered. These impacts, **based on the assumption that an integrated**

transport plan is successfully implemented, are presented in tabular form in table 4.3 below and are then discussed individually after which a synthesis, in respect of all the assessed impacts, is provided.

Table 4.3 Social impacts of tolling the Gauteng freeway system

Impact category	Social Impact
Socio-economic	Cost of travel
	The macro-economy
	Vehicle running costs
	Accident rate
	Job creation
	Cost of services
Personal	Viability of alternate routes
	Viability of alternate choices of transport
	Journey experience
	Security
	Safety

4.4.1. Socio-economic impacts

Again it must be noted that when addressing this range of impacts the emphasis remains at the social level and again, no monetary values are attached.

- Cost of travel

The introduction of a toll fee will have a negative effect on the cost of travelling on the freeway system. This increased cost will have the greatest impact on commuters in the lower-income brackets, particularly those who use the system on a daily basis and who may have to rely on minibus/taxis as a means of transport. Considering the demographics of Gauteng this is also the largest sector of the community. The concern of social equity with the poorer drivers paying the same fees as more affluent drivers will also arise.

It is likely that this impact will have a significant and negative effect largely at the local (L) and regional (R) levels. The duration is long-term (LT). The probability is definite (D), the effect is negative (Neg) and the significance is high (H).

- The macro-economy

The effect that the toll option would have on the macro-economy of the area is two-fold. The first is associated with the development and maintenance of the toll infrastructure with regard to job creation and household income generated at both the construction and operational phases of the project. The second is more ambiguous and concerns the overall success of the project in establishing an efficient and effective freeway system over the long-term.

A report undertaken on behalf of the Gauteng Department of Transport and Public Works (GAUTRANS) claims that the toll infrastructure has the potential to increase business sales in Gauteng by approximately R46.7m per annum, create 485 sustainable jobs in the province, raise household income by R9.4m annually and increase the provincial GGP by R8.9m per annum (Urban-Econ: Development Economists, 2001:11).

Although in South Africa, without viable alternative corridors or a viable alternative public transport system, the situation is somewhat different, the London experience resulted in congestion fees freeing up the central city. As the Partnership for New York City (2006:55-56) explains,

> "[b]efore implementing congestion pricing, London suffered the worst traffic in the United Kingdom and among the worst in Europe. Drivers in Central London routinely spent 50 percent of their commuting time sitting in traffic. Economic estimates showed that London lost between $178 million and $357 million a year due to time lost in congestion. … Since instituting a congestion charge in the central business district, London has seen freer flow in traffic, increased reliability of trip times and increased utilization of rapid transit. Equally important, fears that pricing could hurt business in the zone have not been realized."

However, in order to achieve this, London significantly improved its bus service, expanding it by 300 additional busses, providing an integrated ticketing system, information boards and bus lanes, all to make it easier for the commuter and thus increasing bus usage by 37% and reducing the number of vehicle trips into the central zone by 15% (Partnership for New York City, 2006:56-57). Considering these

achievements, without a concerted effort by all transport authorities in Gauteng it is unlikely that a congestion charge alone would have the desired effect.

In the event that the toll fee option was successful, it is likely that this impact will have a significant and positive effect at the local (L), regional (R) and national (N) levels. The duration is long-term (LT). The likelihood is probable (P), the effect is positive (Pos) and the significance is high (H).

- Vehicle running costs

The effect that the introduction of a toll fee will have on the running costs of vehicles will be directly dependent on the success the system has in unclogging the freeway system. As a stand-alone strategy, the introduction of the toll system is unlikely to have much impact, but undertaken as part of integrated plan that targets the entire system by including both the upgrading of alternate routes and alternate transport systems, the probability of success is likely to increase. Where some benefit may occur in reducing vehicle costs is in respect of the rehabilitation and upgrading of the freeway system. The calculations of actual savings that may be brought about through this lies outside the realm of this report and falls into that of the traffic engineers and economists. However, on a social basis the potential for an upgraded freeway system to significantly reduce vehicle running costs is noted.

It is likely that this impact will have a significant and positive effect at the local (L), regional (R) and national (N) levels. The duration is long-term (LT). The likelihood is probable (P), the effect is positive (Pos) and the significance is medium (M).

- Accident rate

The introduction of an upgraded freeway system could have a positive effect in respect of accident rates on a number of fronts. Firstly, if traffic volumes and stop-start driving is reduced then it is likely that the number of rear end and multiple vehicle collisions will be reduced. The introduction of a toll system provides an opportunity to introduce technology and mechanisms such as cctv and fencing to restrict access to pedestrians on the freeway. The upgrading of the freeway provides the opportunity to give attention to the building of pedestrian crossings and to construct traffic separation barriers along the middle island in sections of the freeway

that currently lack such facilities. Again, apart from noting these opportunities the feasibility of this remains in the realm of the traffic engineers.

It is likely that this impact will have a significant and positive effect at the local (L), regional (R) and national (N) levels. The duration is long-term (LT). The likelihood is highly probable (HP), the effect is positive (Pos) and the significance severe (S).

- Job creation

Job creation can be seen on two levels, namely jobs directly generated through the tolling project during the construction and operational phases, and jobs indirectly created through the success of the project unclogging the transport infrastructure. In the economic impact assessment undertaken for GAUTRANS, Urban-Econ (2001:14) claim that the "[c]apital investment in the 7 provincial routes has the potential to create more than 49 000 job opportunities during the construction phase." They define job opportunities as one person being employed for one year. Urban-Econ (2001:14-15) continues to claim that, during the operational phase, the tolling infrastructure option will result in the creation of 485 new sustainable jobs, while the operation and maintenance of the roads will generate a further 345 new sustainable jobs.

On an indirect level it is difficult to accurately predict the number of jobs created through road projects. However, there is no doubt that an improved infrastructure relates to a better economy (see for instance the Partnership for New York City, 2006; Transport for London, http://www.cclondon.com/whatis.html) and consequently more jobs. In the Gauteng Transport Network Integration Process Proposal (2006:28) it is claimed that in the region of "24,000 jobs are created in the economy for every R1 billion spent on road projects" and on the basis of R8.5 billion being spent on the toll scheme 204,000 can be created. Apart from this the opportunity exists for significant skills creation, BBBEE and SMME stimulation.

It is likely that this impact will have a significant and positive effect at the local (L), regional (R) and national (N) levels. The duration is short term (ST) in respect of the construction phase and long-term (LT) in respect of the operational phase. The likelihood is definite (D), the effect is positive (Pos) and the significance severe (S).

- Cost of services

Freeway systems and toll concessions can at times result in monopolies (Spry & Crowley, 2004). These roadways have a high number of captive customers and vendors, such as fuel and food suppliers, have little or no competition compared to what would occur in a free market situation. In a study undertaken in New Jersey by Spry and Crowly (2004:396) they discovered that

> "[s]everal features are common to all of the contracts we examined. First, toll road authorities grant exclusive gas and food operating rights at a service area to *one* firm; all other firms are prohibited from serving motorists. In other words, one contract grants exclusive rights to sell gasoline and another grants the exclusive rights to operate food courts."

Although the question concerning fuel is less of an issue in South Africa, as fuel prices are fixed on a national basis, the situation regarding food may need some attention.

It is likely that this impact could have a significant negative effect at the local (L), regional (R) and national (N) levels. If managed carefully the duration is short-term (ST). The likelihood is probable (P), the effect is negative (Neg) and the significance low (L).

4.4.2. Personal impacts

Under this section impacts that affect the individual will be considered. Due to the fact that it is difficult to separate the categories of impacts in a clinical manner and that consequently a degree of overlap occurs between the categories there is likely to be some degree of repetition but the assessment is done at the personal level.

- Viability of alternate routes

One of the major impacts of introducing a toll fee on the Gauteng freeway system is that currently the availability of alternative routes is extremely limited. Without the option of alternative routes it is unlikely that a toll fee will have the desired affect of significantly reducing the number of vehicle trips on the freeway system. Indications are, at least in the short-term, that car ownership will continue to increase, and this

will lead to further congestion on the freeway as well as on alternative routes. Any attempt to encourage motorists to use alternative routes will, if successful, compound the problem on these routes and motorists are likely to choose to pay the premium for the use of a highway system. One option is to continue to introduce traffic information technology, similar to what is currently in use on the N1 system and to inform motorists of viable alternatives. This, however, has its limitations if few viable alternatives exist and the number of vehicles continues to increase. In the survey undertaken by Synovate (2006:4) it was found that amongst motorists surveyed, 79% regarded one cause of the traffic congestion as being due to poor road infrastructure and planning. It is unlikely that these motorists would consider alternative routes as an option to the prevailing traffic problems.

It is likely that this impact will have a significant and negative effect largely at the local (L), regional (R) and national (N) levels. The duration under prevailing conditions is long-term (LT). The probability is definite (D), the effect negative (Neg) and the significance severe (S).

- Viability of alternate choices of transport

Alternative transport sources are also currently limited. Taxi services are seen as unsafe, bus services as unreliable and rail services as dangerous and impractical. The recent spate of industrial action in the transport industry and demonstrations against the taxi recapitalisation process helps to enforce the public's negative perception of public transport. As is pointed out in the Gauteng Transport Network Integration Process Proposal (2006:4), the public transport system "… is generally regarded as a default service for the poor and does not enjoy support across [all] income levels as in other countries." In the London experience the public transport system enjoys greater and broader support and by improving the bus system usage increased by 37%. Notwithstanding this, 85% drivers in London did not change their mode of transport (Partnership for New York City, 2006:57). In the Synovate (2006:5) survey motorists were asked if the public service was to be improved, would toll roads encourage them to use this service to commute to work and 72% said they still would not move from using a car. In reality it is most likely that the percentage of people who would actually make the change would be even lower than those who say that they would.

Another option is to encourage car sharing. Results of the Synovate survey, however, showed that 67% of motorists surveyed would not make use of a park and ride facility because it would lack flexibility, is inconvenient and they would need to rely on others. It is likely that public opinion towards car sharing would be similar and for similar reasons; lack of flexibility, inconvenience and having to rely on others. In London, of the 15% of commuters who changed from car usage, only 15-25% chose either carpooling, biking or changed the time of their trip (Partnership for New York City, 2006:57). Many people use cars as they need them during the day in order to conduct their day-to-day business. Consequently, the car sharing option would only have limited effect that is likely to be insignificant considering the magnitude of current and predicted levels of congestion.

It is likely that this impact will have a significant and negative effect largely at the local (L), regional (R) and national (N) levels. The duration under prevailing conditions is long-term (LT). The probability is definite (D), the effect negative (Neg) and the significance severe (S).

- Journey experience

The introduction of a toll fee on the Gauteng freeway system will be accompanied by the upgrading of the system which, in itself, can result in improvements that can transform into a better journey experience. The toll infrastructure, however, would need to be carefully planned making use of electronic tolling technology as inappropriately placed toll plazas, resulting in long queues, are likely to interfere with traffic flow, which in turn would spoil the journey experience.

If the project is successful in reducing traffic congestion on the freeway that too would move a long way towards making trips more pleasurable for road uses. The question remains, however, considering the state of current alternatives to using the freeway, to what degree a toll fee will have a noticeable effect on the density of traffic, particularly during peak hours. Another obstacle is the difficulty of changing public attitudes. At a conference on traffic congestion organised by the University of California Los Angeles, Robert W. Poole, Jr., Director of Transportation Studies and

Founder of The Reason Foundation pointed towards the difficulty in securing 25 percent of public support for pricing (Traffic Congestion: Issues and Options, 2003).

It is likely that this impact will have a significant and positive effect largely at the local (L), regional (R) and national (N) levels. The duration is long-term (LT). The likelihood is probable (P), the effect positive (Pos) and significance high (H).

- Security

The rehabilitation and upgrading of the Gauteng freeway system provides an opportunity to improve the security of the system. The installation of adequate lighting, fencing, electronic monitoring systems, emergency phone points and freeway patrols will all move towards helping to improve security.

It is likely that this impact will have a significant and positive effect largely at the local (L), regional (R) and national (N) levels. The duration is long-term (LT). The likelihood is highly probable (HP), the effect positive (Pos) and the significance severe (S).

- Safety

Kauf (2005), of the International Road Foundation (IRF), claims that there are 3 key factors for road safety, *the driver*, *the vehicle* and *the infrastructure*. The toll option provides the opportunity to upgrade this infrastructure. In this regard the erection of safety barriers, improved warning signs and road markings and the installation of safety features such as rumble-wave surfaces alerting drivers to hazards will help to increase road safety. Using the French experience Kauf (2005) continues to point out that based on 2004 data the French toll motorways were 4 times safer than main roads in France. While there were 2,4 deaths per billion km travelled on toll motorways there were 10,8 deaths per billion km travelled on main roads.

It is likely that this impact will have a significant and positive effect largely at the local (L), regional (R) and national (N) levels. The duration is long-term (LT). The likelihood is highly probable (HP), the effect positive (Pos) and the significance severe (S).

4.5. Synthesis of the social impacts of imposing a toll fee

The various social impacts, resulting from imposing a toll fee on the Gauteng freeway system and based on the assumption that an integrated transport plan will be successfully implemented, are presented in tabular format in table 4.3 below. This is done in accordance with the social impact assessment technique as applied throughout this study. It must also be noted that while comparisons are made with the congestion charge in Central London the London situation is somewhat different to that in Gauteng.

Table 4.4 Synthesis of the impacts of implementing a toll fee

Nature	Extent	Duration	Probability	Status	Significance	Comments
Socio-economic						Socio-economic impacts are evaluated at the social not economic level
Cost of travel	LR	LT	D	Neg	H	
The macro-economy	LRN	LT	P	Pos	H	
Vehicle running costs	LRN	LT	P	Pos	M	
Accident rate	LRN	LT	HP	Pos	S	
Job creation	LRN	LT	D	Pos	S	
Cost of services	LRN	LT	HP	Neg	L	
Personal						Personal impacts are evaluated at the social not individual level
Viability of alternate routes	LRN	LT	D	Neg	S	This impact has serious consequences in respect of the success of the project
Viability of alternate choices of transport	LRN	LT	D	Neg	S	This impact also has serious consequences in respect of the success of the project
Journey experience	LRN	LT	P	Pos	H	
Security	LRN	LT	HP	Pos	S	
Safety	LRN	LT	LP	Pos	S	

Key to codes:
Extent
Local – L; Immediate surrounds – I; Regional – R; National – N.
Duration
Short-term (<5 years) – ST; Medium-term (5-20 years) – MT; Long-term (>20 years) – LT
Probability
Improbable – I; Probable – P; Highly probable – HP; Definite – D
Status
Positive – Pos; Neutral – Neu; Negative - Neg
Significance
No impact – NI; Low impact – L; Medium impact – M; High impact – H; Severe impact – S

Attention will now be turned towards the mitigation measures that need to be implemented when introducing a toll fee on the Gauteng freeway system.

5. Mitigation measures

Considering the range of social impacts discussed under 4.2 Impacts in respect of prevailing traffic conditions, all of which are negative, there is compelling reason for the situation to be addressed as a matter of urgency. The nature of the situation is such that it requires a concerted and integrated effort from a range of institutions which include provincial and municipal transport authorities. Consequently, the focus under mitigation will be placed on the social impacts discussed under 4.4 Impacts in respect of imposing a toll fee. The list of mitigation measures includes the following.

It is important that the toll option is only considered as part of an integrated transport plan and in the event of there being **viable alternatives** which will be addressed below.

Consideration must be given to the issue of social equity. The toll fee pricing structure must take into account the need to soften the impact that charging a toll fee would have on the poorer sector of the community. Of particular importance are low-income drivers, and commuters forced to use the system on a regular basis.

The awarding of concessions to vendors of services such as fuel and food on the toll system must be carefully considered and monitored to ensure that the monopolies that will arise do not translate into overcharging of the public.

The viability of alternate routes is an extremely important issue, firstly in respect of fairness towards the public and secondly with regard to the viability of the project. Charging a fee on an existing road system with few or no alternatives raises questions of fairness that will be challenged by the public. If no practical alternatives exist the viability of the project will also encounter serious difficulty.

The viability of alternate choices of transport closely relates to the previous impact with regard to fairness and the viability of the project. This issue requires urgent and

serious attention by the province and municipalities and in particular the various departments of transport. Existing public transport alternatives are currently not viable and would have to undergo considerable upgrading. Serious consideration needs to be given to the development of an integrated transport system that provides user friendly access to all forms of public transport across the province. Such options as an integrated ticketing system, an upgraded, reliable and safe rail, bus and minibus/taxi service that are integrated and uniform across the metropolitan area of the province need to be introduced.

Safety and security will always be an issue, as will commuter comfort. Attention needs to be given to ensure that if commuters are required to pay toll fees on an existing freeway system they receive direct benefit in accordance with the fee paid.

Prior to the implementation of a toll fee option on the Gauteng freeway it is important to undertake an extensive public participation process over an extended period. The public participation process must provide ample opportunity for the public to enter the debate concerning the prevailing situation and the various solutions. This entails a process of advertising in the press and holding a series of public meeting with interested and affected parties (I&A Ps) to elicit their opinions concerning the matter.

6. Conclusion

Two scenarios where considered in this report. The first concerns the 'do nothing' scenario and is a state where the Gauteng freeway system is left to deteriorate. The second relates to a situation where the freeway system is upgraded and a toll fee is implemented.

With regard to the first scenario a range of negative social impacts emerge at the socio-economic, personal, family and work levels. In this respect it is noted that the current state of the system has an overall negative impact with regard to the time spent by commuters travelling to and from work and perusing their daily business. The safety and health of these commuters is at risk and the economic implications for both commuters caught in traffic on a daily basis and the country as a whole are unacceptable. It is clear that the current situation is untenable and needs drastic attention. Left to continue the way it is the situation will deteriorate to a point that the

South African economy will eventually be choked. It is also clear that the situation is part of a wider problem that encompasses an aging and inappropriate transport infrastructure which for some time now has had a negative effect on both passenger and freight transportation throughout the country.

The success of the second scenario, in which the system is upgraded and toll fees are charged, is largely dependent on a range of factors such as the availability of viable alternate routes and there being a reliable, safe and practical public transport system in place. Notwithstanding this, and notwithstanding the fact that an upgraded system carries with it certain positive social impacts, the major obstacle in this regard will be the ability to change public attitudes away from mainly relying on private car usage on the freeway system towards public transport and other alternatives. If this is achieved certain social benefits could be derived in respect of journey experience, macro-economic benefits and job creation as well as the safety and security of travellers on an upgraded freeway system.

At a conference convened by the UCLA Extension Public Policy Program and the UCLA Institute of Transportation Studies (Traffic Congestion: Issues and Options, 2003:2) it was noted that,

> "[t]he answers [to traffic congestion] range from traditional approaches that add capacity or supply, to newer solutions that rely on technology, to changes in land use and development, to transportation pricing to influence transportation demand. Each has its place and its promise."

This applies in the Gauteng situation as well.

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