LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
ROADS & TRANSPORT

Travel Demand Management Study

Business Plan: Road Safety Study

Mopani District Municipality

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1 INTRODUCTION

The Department of Roads and Transport: Limpopo Province has undertaken an overall Travel Demand Management (TDM) Study covering Mopani and Capricorn District Municipalities. This business plan focuses on the Mopani District Municipality. As described in the District Municipality's TDM report, five pilot programmes were listed in which feasible pilot projects could be identified for short-term implementation. The TDM programmes identified for further investigation included the following:

- Maintain a Road Network Management System (RNMS)
- Undertake a Public Transport Demand Study
- Undertake NMT Planning Study
- Undertake a Traffic Signals Study
- ***Undertake a Road Safety Study***

This document covers the business plan for the implementation of a Road Safety STUDY in Mopani District Municipality and is also applicable to the various local municipalities (Greater Giyani, Greater Letaba, Ba-Phalaborwa, Greater Tzaneen and Maruleng). The purpose of this business plan is to provide a plan to implement a road safety project in the whole of Mopani and on a more detailed level in the local municipalities. This business plan fits into the larger TDM Policy of the District Municipality as well as all the other relevant frameworks and policies.

1.1 Background

Road traffic crashes are a major public health problem and a leading cause of death and injury around the world. Each year nearly 1.2 million people die and millions more are injured or disabled as a result of road crashes, mostly in low-income and middle-income countries. While it creates enormous social costs for individuals, families and communities, road traffic injuries place a heavy burden on health services and economies. As motorization increases, road traffic crashes are a fast-growing problem, particularly in developing countries. If present trends continue unchecked, road traffic injuries will increase dramatically in most parts of the world over the next two decades, with the greatest impact falling on the most vulnerable citizens, which are mostly pedestrians. There is an urgent need for appropriate and targeted action.

Africa is the region with the worst death rate from road crashes, with a fatality rate of 28 deaths per 100 000 population. Most of those affected by road traffic crashes are people who will never be able to afford a car - pedestrians, cyclists and users of public transportation. In a region where 50% of the population is below the age of 16, road crashes also place a heavy burden on the continent's younger members - road crashes are the second leading cause of death for the 5 to 44 age group in African countries (Global Transport Knowledge Partnerships, 2010).Compared to other road users the vulnerable user group is particularly exposed to injury as they are not protected by a vehicle shell. In low and

middle income areas the behaviour and mix of traffic and speeds creates even more dangerous conflicts amongst the different road users. Vehicle factors - such as braking, driving and maintenance as well as defects in road design and lack of traffic separation can also lead to an unsafe road environment for the users.

1.2 Definition of road safety

Road safety refers to the physical condition of the road and its environment and how its is used, so that there is no harm to the drivers of vehicles or passengers, cyclists and pedestrians moving near by it. In other words we can say that road traffic safety means to reduce the potential for crashes on roads.

1.3 Why road safety is important

A road safety study is important as it involves the minimization of injury or death to vehicle occupants and pedestrians. The benefits of a road safety study also include;

- Safer infrastructure for pedestrians and cyclists
- Safer road markings and signs for drivers
- Safer vehicles on the road
- Better law enforcement strategies

The focus of this road safety study for the Mopani District Municipality and the local municipalities is to increase the safety of pedestrians on the road, improve the road infrastructure for driver safety and to increase traffic law enforcement.

1.4 The South African context

Roads in South Africa provide a mixture of first and third world traffic conditions. This creates variations in the population's awareness of road safety hazards and its capacity to cope with the different traffic conditions. The presence of wild animals also creates safety hazards on rural roads. In addition, much of the local social life of the population occurs on and around the road network in the rural areas.

There are approximately 6 million licensed drivers and 7.5 million registered vehicles in South Africa, 4,154,593 of which are motorcars, 241,000 mini-buses, and 27,221 buses. In 2004, motorised vehicles made up 89.3% of the total vehicle population and towed vehicles 10.7%. The average age of automobiles is 10 years, minibuses 13 years and buses and trucks are generally between 11-12 years. The number of registered vehicles is increasing by about 6% annually. (Global Transport Knowledge Partnerships, 2010)

The main means of passenger transport by road is bus or minibus taxis. In urban and sub-urban areas there is a high concentration of minibus taxis. Driver’s experience, overloading, and lack of vehicle roadworthiness are major road safety concerns.

Traffic safety is regarded as a serious problem by the national government. The cost of crashes in 2005 was estimated at R38 billion (USD 6 billion). In the period December 2005 to December 2006 the number of registered vehicles increased by 573 715 (7.20%). During this period, the number of driving licences issued increased by 4.05%, the number of fatal crashes for 2006 increased by 6.12% and the number of road traffic related fatalities increased by 8.9%. Of the fatalities, the number of driver fatalities increased by 15.49%, passenger fatalities increased by 18.20% and pedestrian fatalities increased by 2.26%. (Department of Transport, 2006)

The primary contributory factors in fatal crashes, or that impact on the seriousness of injuries, include excessive speed, drinking and driving and the non-wearing of seatbelts. Pedestrians account for almost 50% of road crash fatalities.

Until recently, road safety in the Mopani District Municipality and the local municipalities has not received the attention it deserves. This focus is however changing given the shift at a global and national level towards the target of a 50% reduction in fatalities by 2014, as set by the Millennium Development Goals (MDG) for the Transport Sector. (Department of Transport, 2006)

1.5 Study structure

The report will address the following areas regarding the study;

- Analysis of study area
- Required data
- Road infrastructure analysis
- Analysis of safety issues
- Proposed safety improvements

2 STUDY AREA

The study should cover the whole area of Mopani District including the local municipalities. It should also address all the relevant roads that have to be investigated and their classifications.

Potential roads to be investigated*;*

- Sapekoe Drive (R36)
- Giyani to Siyandani
- Giyani to Shishosana
- Giyani to Mapayeni
- Rubbervale and Gravelotte
- Dzumeri to Mzilela

- Giyani to Mavalani/Nwadzekudzeku
- Giyani to Muswani
- Dzumeri to Nwamarhanga

3 DATA REQUIRED

Good data are needed to correctly identify problems, risk factors and priority areas, and to formulate strategy, set targets and monitor performance. Quality data is also needed to raise awareness about road traffic injuries to convince policymakers of the need for action and to allocate resources. A good road crash data system should capture nearly all crashes and provide adequate detail on vehicle, road user, environment, and accurate location.

In order to conduct an overall situational assessment of the system, different data sources need to be integrated to show the magnitude of the problem to convince policy makers of the need for action. The main objective of a situational assessment is to identify people and agencies involved in the collection and processing of data, data sources and systems already in place, the needs of the end-users and political factors that will help or hinder the improvement of road safety data systems.

The type of data needed will be:

- Collision data
- Vehicle accident data
- Pedestrian fatality data
- Number of fatal crashes
- Road infrastructure data
- Traffic offences
- Traffic data
- Speed limits

The data could be obtained from:

- Police and law enforcement agencies
- Transport departments
- Health departments
- Road Traffic Management Corporation (RTMC)
- South African Police Service (SAPS)
- Accident Data Centre (ADC)
- Routine Maintenance Team (Element)

4 ROAD INFRASTRUCTURE ANALYSIS

The road environment and infrastructure are very important for road safety. Infrastructure gives the framework for the physical movement within a society. Roads tend to be used by large numbers of motorcyclists, non-motorized vehicles and pedestrians. Many countries' road design standards originate from what was used decades ago in the developed world with standards intended for a different mix of traffic and different types of vehicles. Safety features for the vulnerable road users like pedestrian crossing facilities, motorcycle lanes, signs, and markings might not even be there. The increase in motorization and vehicles capable of higher speeds and more people living in towns has put vulnerable road users in more danger.

The road needs to be checked in terms of:

- Road markings
- Road signs
- Vertical alignment
- Horizontal alignment
- Road side treatments
- Junctions layout
- Road surface treatment
- Traffic calming infrastructure
- Lighting

5 ANALYSIS OF SAFETY ISSUES

After all the necessary data has been captured and obtained from the relevant departments, the data needs to be analyzed. This analysis should highlight the areas of most concern in terms of safety. The analysis should include but not be limited to the following:

- Routes with inadequate road markings and signs
- Routes with inadequate vertical and horizontal alignments
- Routes with the most fatal collisions
- Routes with the most pedestrian accidents
- Routes with inadequate street lighting
- Routes with the highest speeds
- Routes with highest traffic offences
- Date/time of highest number of traffic offences

The causes of incidents need to be investigated so that appropriate measures are taken to prevent them from taking place in the future. Routes with poor infrastructure need to be brought to the attention of the relevant transport departments.

6 PROPOSED SAFETY IMPROVEMENTS

6.1 Legislation and enforcement of traffic regulations

Consistent traffic law enforcement is essential for road safety. The main objective of traffic policing is for the safe and efficient flow of traffic, achieved through means of persuasion, prevention, and punishment. Safe behaviour in traffic does not come naturally for most people, but with the right laws in place, behaviour can be changed by traffic law enforcement. Targeted and appropriate legislation that is consistently enforced and well understood by the public is a critical component of successful enforcement.

Enforcement of speed limits

Setting road speed limits is closely associated with road function and road design. A single, stationary police vehicle that is visible to drivers will also reduce the average speed. Cameras are highly effective, provided that an accurate and readily accessible vehicle and driver data base is available.

Enforcement of restrictions on drinking and driving

Drinking and driving is an issue in many countries and often one of the main causes of road crashes. Random breath testing is carried out in several countries and has subsequently lead to reductions in the number of alcohol related road crashes by up to 20%. The visibility and randomness of the enforcement affect and change people's behaviour.

Enforcement of seatbelt use

Seatbelts have saved many lives, however experience shows that mandatory legislation and enforcement are necessary to make people use seatbelts. The cost-benefit ratio of mandatory seat-belt use has been estimated at between 1:3 and 1:8. It is relatively easy to detect if drivers and passengers are using seatbelts properly. It increases the wearing rate if the seatbelt checks are repeated randomly and over time. (Global Transport Knowledge Partnerships, 2010)

Enforcement of helmet wearing

Most motorcyclists killed in traffic die from head injuries. Introducing and enforcing helmet laws has been shown to be highly effective in reducing the overall number of road crash fatalities and injuries.

6.2 Pedestrian and cyclist safety measures

Collisions between pedestrians and vehicles occur in a number of situations, including:

- walking in to the path of a vehicle, especially while trying to cross the road
- walking along the roadside, or on the road
- playing or working on the road
- on driveways or footpaths
- while boarding or leaving public transport vehicles.

The severity of pedestrian crashes is strongly dependent on the speed of traffic. Research shows that the chances of a pedestrian surviving an impact with a motorised vehicle reduces dramatically above 30 km/h, and even at lower speeds than this, serious harm can be caused, especially to elderly or child pedestrians (International Road Assessment Program, 2010).

The risk of pedestrian injuries is increased by a number factors that relate to the road environment, including:

- high speed of traffic
- inadequate crossing facilities
- lack of pedestrian crossing opportunities (gaps in passing traffic)
- number of lanes to cross
- complexity and unpredictability of traffic movements at intersection
- inadequate separation from traffic
- inadequate crossing sight distance.

Behaviour of pedestrians is often not straightforward travel from one place to another. The main reasons for walking can be divided into three categories: journeys to work or school etc., exercise or leisure. When people are walking, they usually choose the shortest route and do not want to spend any extra time on the trip. They obey the rules when they think it is sensible and necessary. Taking the shortest route can mean that they do not use underpasses or pedestrian crossings. They may not obey traffic lights, if waiting for the green light seems to take too long. Pedestrians on familiar routes tend to pay less attention to traffic than when walking in unknown surroundings. Children may play and can also suddenly rush into the street.

Some of the pedestrian improvements include:

Pedestrian crossings

It is a clearly defined crossing point where pedestrians are ‘expected'. Disruption to traffic flow is comparatively low. Pedestrian crashes are reduced if installed at appropriate locations, and if pedestrian priority is enforced.

Rural footways

A footway next to the road, or a wide flat road shoulder, can prevent pedestrian crashes. The safety benefits will be greatest if the footway is separated from the road (for example, by a drain, a grass verge or a barrier).

Urban footways

In urban areas inadequate footway space, street traders, parked cars or poor footway surfaces can force pedestrians onto the road. In some areas the existing footway may be widened to improve access. Physical barriers to prevent parking on the footway can be useful.

Pedestrian barriers (fences)

Pedestrian bridges/underpasses

Establish pick-up and drop-off areas

6.3 Traffic calming measures

Traffic calming treatments cause drivers to change their driving pattern. Usually they have to reduce their speed but sometimes drivers are exposed to something undesirable (e.g. rumbling, or delays) which encourages them to choose a different route.

There is a wide range of traffic calming devices available. These include:

- roundabouts
- kerb build-outs
- speed humps
- raised tables
- entry treatments
- speed cushions
- modified intersections

7 PERFORMANCE INDICATORS

Key indicators are needed to monitor the performance of the safety strategies that are implemented. Some of these indicators are (Wegman & al, 2008):

- **A1** Safety targets – the availability and ambition of quantitative national safety targets;
- **A2** Selection of interventions – whether a sound analysis preceded the development of the national safety programme;
- **A3** Economic evaluation – whether a sound economic evaluation preceded the design of the national safety programme;
- **A4** Monitoring – whether the national safety programme is systematically monitored;
- **A5** Stakeholders – who is responsible for the programme's performance.

Indicators	Possible values
A1 Safety targets	a. Ambitious b. Available but not ambitious c. Not available
A2 Selection of interventions	a. Sound analysis and diagnosis of road safety problems preceded the programme's development, and evidence-based interventions were selected b. Some analysis was performed, and evidence-based interventions were selected c. Detailed analysis of road safety problems was performed, however, the selection of interventions was arbitrary d. The diagnosis of road safety problems was poor and the selection of interventions was arbitrary
A3 Economic evaluation	a. Sound economic evaluation preceded the programme's composition b. Some economic evaluation was performed c. Economic evaluation was not performed
A4 Monitoring the programme's performance	a. Systematic monitoring takes place b. A need for monitoring is stated but monitoring reports are not found c. No evidence of monitoring activities

Table 7-1: Definition of basic indicators for the A-group: characteristics of national safety policies (Wegman & al, 2008)

Issues considered	Indicators defined
Personal safety	B1 Fatalities per million inhabitants
Traffic safety rate **Traffic safety risk**	B2 Fatalities per million passenger cars B3 Fatalities per 10 billion passenger-km travelled
Scope of traffic injury	B4 Injury accidents per fatality**

Issues considered	Indicators defined
Scope of the problem of vulnerable road users	B5 Share of pedestrian fatalities out of the total fatalities B6 Share of bicyclist fatalities out of the total fatalities B7 Share of motorcyclist fatalities out of the total fatalities

Table 7-2: Definition of basic indicators for the B-group: Road safety performance indicator, final outcomes (Wegman & al, 2008)

Safety areas considered	Indicators defined
Alcohol-impaired driving **Use of protective systems in cars**	C1 Share of total for fatalities in drink-driving accidents C2 Daytime wearing rates of seatbelts in the front seats (aggregated for driver and front passenger) C3 Daytime wearing rates of seatbelts in the rear seats
Vehicles: **Crashworthiness of the passenger car fleet** **Vehicle fleet composition**	C4 Average EuroNCAP score of passenger car fleet C5 Median age of the passenger car fleet C6 Share of motorcycles in the vehicle fleet C7 Share of heavy goods vehicles (HGV) in the vehicle fleet

Table 7-3: Definition of basic indicators for the C-group: Road safety performance indicator, intermediate outcomes, SPIs. (Wegman & al, 2008)

Characteristic considered	Indicators defined
Motorization level	D1 Number of passenger cars per 1000 inhabitants
Population density	D2 Population per 1 km2 of country's territory

Table 7-4: Definition of basic indicators for D-group: background characteristics. (Wegman & al, 2008)

8 TEAM OF PROFESSIONALS

In order to conduct a successful road safety study, it is proposed to include certain key positions as part of the professional team. These positions include amongst others the following:

- A project leader with similar experience and a technical background in this particular field;
- A civil engineer with experience with road safety audits;
- A survey team who has performed similar surveys in the past;
- A technical team member responsible for processing the survey results;
- A public participation specialist who can assist with public participation meetings and knows the local conditions

9 TIMEFRAME

The road safety study's duration will depend on the size of the study area. Duration of approximately three months should be adequate. The context of the study area can influence the duration of the road safety study, for instance in a large study area it might take more time to travel to far-off destinations. An example of a road safety study's project schedule is indicated in Table 9-1.

Road Safety Study	Month 1				Month 2				Month 3			
	W 1	W 2	W 3	W 4	W 1	W 2	W 3	W 4	W 1	W 2	W 3	W 4
Gathering of data												
Road safety audit and surveys												
Analyse survey results												
Write report												

Table 9-1: Project schedule

10 BUDGET

It is difficult to give an indication of the budget that will be required for a road safety study in Mopani District. Past experience indicated budgets ranging between R300 000 and R500 000 in South Africa.

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