

# **SATC 2007**

## **Limpopo PAVE Strategy: A new approach to provincial traffic resource management in South Africa**

\*T A Matsila and H Ribbens

\*Limpopo Department of Roads and Transport, Private Bag X9491, 0700 Polokwane  
CSIR Built Environment, P O Box 395, 0001 Pretoria

### **ABSTRACT**

The Limpopo Department Roads and Transport embarked upon a new approach to manage road traffic management in the province. The PAVE strategy (Professionalism, Awareness, Visibility, Education) was conceptualised with the objective to enhance the current traffic management strategies, especially which regard to the traffic law enforcement function in line with the key outcomes, performance targets, KRAs and KPIs as contained in the Department of Roads and Transport Management Plan 2005/6 – 2009/10, as well as the Service Standards for core functions as prescribed by the Department of Roads and Transport. The brief of this study was to identify the resources that are required to transform the PAVE strategy into a fully operational strategy.

A holistic approach was followed to gain as much information as possible on the issues and processes that could impact on the transformation of the PAVE principles into an operational strategy and work plan for traffic law enforcement, traffic management and administration (road safety, vehicle testing and licensing, driver testing and licensing). The main focus areas were:

- An audit on the status quo of the resources (human and equipment) of the various traffic management facilities in Limpopo Province, such as provincial and municipal traffic stations, vehicle registration and testing stations, and learner driver testing centres and road safety offices.
- Other factors that would impact on the implementation of the PAVE strategy. This included the expansion of the paved road network in the Province, the increase in vehicular traffic, trends in population growth, population by district, the number of schools and learners in the province, and so on.

The results of the study were used to develop selected resource indicators for the PAVE Strategy. These indicators are based on traffic function-related data compared with provincial demographic data in terms of kilometres of roads, expansion of the road network, registered vehicles and population. By considering these indicators, the effective implementation of the PAVE strategy and the setting of appropriate service levels for traffic management services will be enhanced.

## 1 INTRODUCTION

The objective of the PAVE strategy, introduced by the MEC for Transport for the Limpopo Province, was to expand the current traffic management strategies that were being deployed in the Province, especially which regard to the traffic law enforcement function. Applying the acronym “PAVE” to the traffic law enforcement function means:

- **P:** Professionalism
- **A:** Awareness
- **V:** Visibility
- **E:** Education

## 2 OBJECTIVES OF THE PAPER

The purpose of the paper is to describe a methodology developed by the Limpopo Province to enhance the current traffic management strategies, especially which regard to the traffic management function in line with:

- The key outcomes, performance targets, KRA's and KPI's as contained in the Limpopo Department of Roads and Transport Management Plan 2005/6 – 2009/10.
- The Service Standards for core functions as prescribed by the Limpopo Department of Roads and Transport.

The brief of this study was to identify the resources that are required to transform the PAVE strategy into fully operational traffic law enforcement and traffic management strategy.

## 3 STUDY METHODOLOGY

In order to achieve the objectives of the study, a holistic approach was followed to gain as much as possible information on the issues and processes that could impact on the transformation of the PAVE principles into an operational strategy and work plan for traffic law enforcement; and traffic management and administration (road safety, vehicle testing and licensing, driver testing and licensing).

Some of the main focus areas that were analysed included:

- An audit on the status quo of the resources of the various traffic management facilities in the Limpopo Province, such as provincial and municipal traffic stations, vehicle registration and testing stations, learner driver testing centres, road safety offices.
- Other factors, some of them not within the road environment, which would impact on the implementation of the PAVE strategy. This included the expansion of the paved road network in the Province over the next fifteen years; the increase in vehicular traffic; trends in population growth, population by district; the number of schools and learners in the province; relevant issues in the ITP's of the district municipalities, and so on.

## 4 STATUS QUO ANALYSIS

### 4.1 Factors impacting on the PAVE strategy

#### 4.1.1 Introduction

The quest to improve professionalism among officials responsible for traffic law enforcement and road traffic management required that a broader perspective had to be attained of the factors which impact on their operations. The factors that needed to be considered included aspects such as: the length of the existing road network in the province; the expansion of the paved road network in the province over the next 15 years; the increase in the annual vehicular traffic; trends in population growth and population by district; the number of schools and learners in the province, and so on. The approach followed to collect data regarding a number of relevant factors and the analysis of each of these factors will be discussed hereunder.

#### 4.1.2 Road network

An understanding of the total length of the road network in the Province and especially its extension over the next decade or so provides good insight into the number of traffic officials that should be deployed and planned for in future years to patrol the road network in the Province. The expansion of the paved road network not only leads to increased traffic volumes on the previously unpaved road network but also an increase in traffic offences, especially moving violations such as speeding, unsafe overtaking, etc.

The road network in the Limpopo Province is administered by the Roads Agency Limpopo (RAL), the South African National Roads Agency Limited (SANRAL) and district and local municipalities. According to the Roads Agency Limpopo (RAL), the envisaged ultimate proposed ownership of the current road network will be concluded as shown in Table 1.

**Table 1: Envisaged ownership of road network by road authority type**

Road Authority	Total km of road	%
District/local municipalities	12 836 km	55,59
Roads Agency Limpopo	7 054 km	30,55
SANRAL	3 198 km	13,86

More than half of the current road network will in the future be devolved to the district/local municipal level. The impact of this redistribution of the road network among road authorities has significant implications for the devolvement of traffic law enforcement and traffic management functions to the district/local municipal level.

Furthermore, the expansion of the paved provincial road network by district is also of significance to the provincial traffic stations in each district to understand the increase in road kilometres to be patrolled in years to come. The provincial tarring programme whereby the paved provincial road network is expanded also

provides an important cue to the future deployment of traffic enforcement resources.

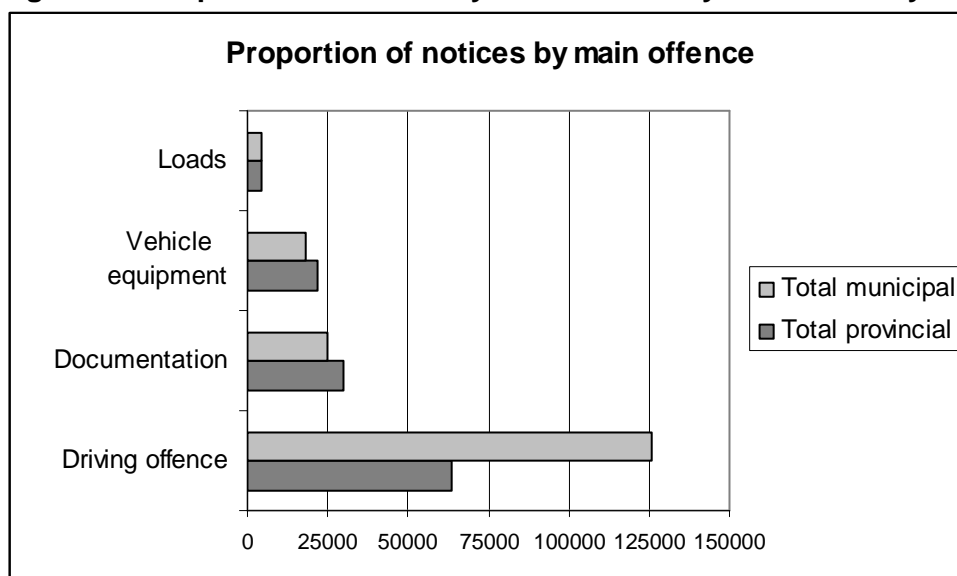
#### 4.1.3 Vehicle population

Another important factor to consider in determining traffic law enforcement resources is the growth in the vehicle population in the province. For example, the annual percentage increase in the number of vehicles in Limpopo Province over the last three years at the end of April each year, showed a 5% and 6% growth per annum respectively. By April 2006, an 8 per cent annual growth in the vehicle population of Limpopo was recorded, the highest of any provinces during this period. The RSA average was a 7 per cent annual growth in the vehicle population.

#### 4.1.4 Traffic offences

An analysis was conducted of the notices issued for different types of offences, for each district in the Limpopo province, combining municipal and provincial information. The current information, however, is not complete, and an analysis was done of the focus of enforcement as shown in Figure 1. The study showed that municipalities, on average had a larger focus on driving offences than provincial stations, although the main focus of provincial stations was also on driving offences.

**Figure 1: Proportion of notices by main offence by road authority**



#### 4.1.5 Flash points, road crashes and casualties

A thorough analysis of the hazardous road sections (flash points) linked to the number and type of road crashes and casualties is another important aspect to be considered in road traffic operations planning, e.g. the type of traffic offences or road user type to be focused on. It was also a specific directive by the MEC for Roads and Transport that the PAVE Strategy should be deployed at flash points throughout the province.

In addition, it was necessary to analyse fatalities and crashes for the province by different parameters to understand the focus of the envisaged traffic law enforcement programme. A number of parameters was analysed in Limpopo Province collectively in order to gain a balanced view of the incidence and changes in crash and fatality trends to implement the PAVE strategy. The main trends for each parameter are also given:

- ***Cumulative million vehicle kilometers traveled per vehicle type:***  
Motor cars showed a decrease in kilometers travelled, buses a slight increase and minibuses a slight decrease. LDV's/bakkies and trucks showed a noticeable increase.
- ***Number of fatalities per 10 000 registered vehicles:***  
Minibuses showed a marked increase of 40 fatalities per 10 000 registered vehicles and buses a marked decrease of about 31 fatalities per 10 000 registered vehicles. All other vehicle categories showed a slight decrease.
- ***Number of fatalities per 100 million vehicle kilometers traveled:***  
Similarly to the above parameter, minibuses showed a significant increase in fatalities (18,81 per 100 million kilometres travelled). Motor cars showed a very slight increase (0,41 per 100 million kilometres travelled). All other vehicle categories showed decreases.
- ***Estimated number of vehicles per type involved in fatal crashes:***  
Motor cars and LDV's were the most involved in fatal crashes. Although minibuses and buses are less involved than motor cars and LDV's in the actual numbers of crashes, the number of fatalities per incident is normally much higher.
- ***Estimated number of fatalities per vehicle type:***  
Minibuses and minibus taxis (most probably more of the latter) showed a major increase in fatalities, whereas LDV's showed a marked decrease in its involvement in road fatalities.

#### 4.1.6 Demographics

Demographics such as population distribution in the province, population growth, population by age group, language and gender are all aspects to be considered in the planning and implementation of a traffic law enforcement strategy and the provision of services. This is not only true for traffic law enforcement but also for the provision of other traffic management services such as road safety education and communication, driver license testing, and vehicle testing and registration. The population figures in a province by age group are also useful in planning adult educational programmes.

The population of the Limpopo Province proved to be a very young population. According to the 2005 mid-year population estimate, more than 50 per cent were still younger than 20 years of age and more than 60 per cent still younger than 25 years. This has specific implications for the PAVE strategy in the years to come in the sense that the average age at which drivers in South Africa obtain their driver's licences are 25 years of age.

Table 2 shows recent trends in population growth for the Limpopo Province based on the last two population census and the 2005 mid-year estimate. These

figures show a 7 per cent increase in population between 1985 and 2001 and again about 7 per cent between 2001 and the 2005 mid-year estimate.

**Table 2: Limpopo Province: Recent trends in population growth: 1995 – 2005**

Year	Population figure	% increase (1995 as base year)
1995 Population Census	4 929 368	-
2001 Population Census	5 273 642	6,98 %
2005 Mid-year estimate	5 635 000	6,85 %

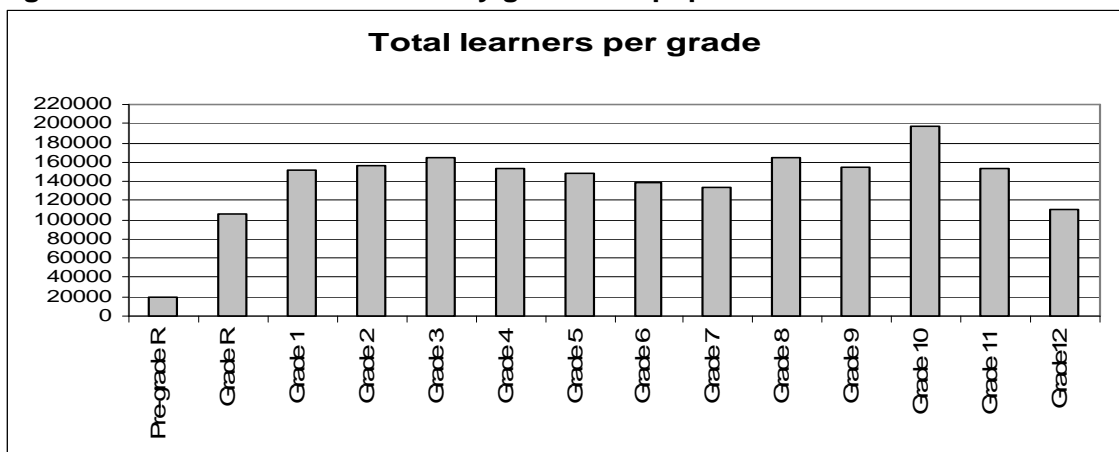
Source: Statistics South Africa

#### 4.1.7 Educational centres

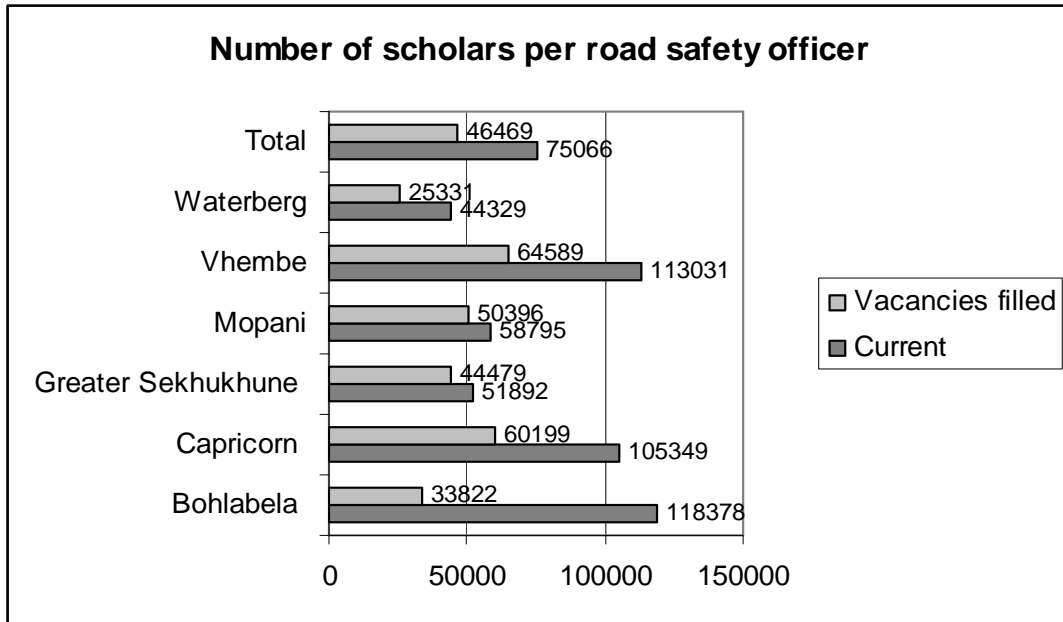
It is important in the planning for traffic law enforcement resources to consider the number of schools and learners in the province and in each district. This information is important to do planning for road safety education at schools. This will also assist in determining the number of road safety officers that needs to be deployed in each district to visit schools to ensure that each learner is afforded the opportunity to be exposed to road safety education and awareness. The school and learner numbers should also be analysed by grade and school circuit which allows for a more focused approach.

The distribution of learners per grade and total learners by district per road safety officer for the Limpopo Province is shown in Figures 2 and 3 respectively. These statistics are useful in planning for the deployment of traffic law enforcement resources to conduct road safety education at schools and the future demand for driver license services.

**Figure 2: Distribution of learners by grade: Limpopo Province: 2005**

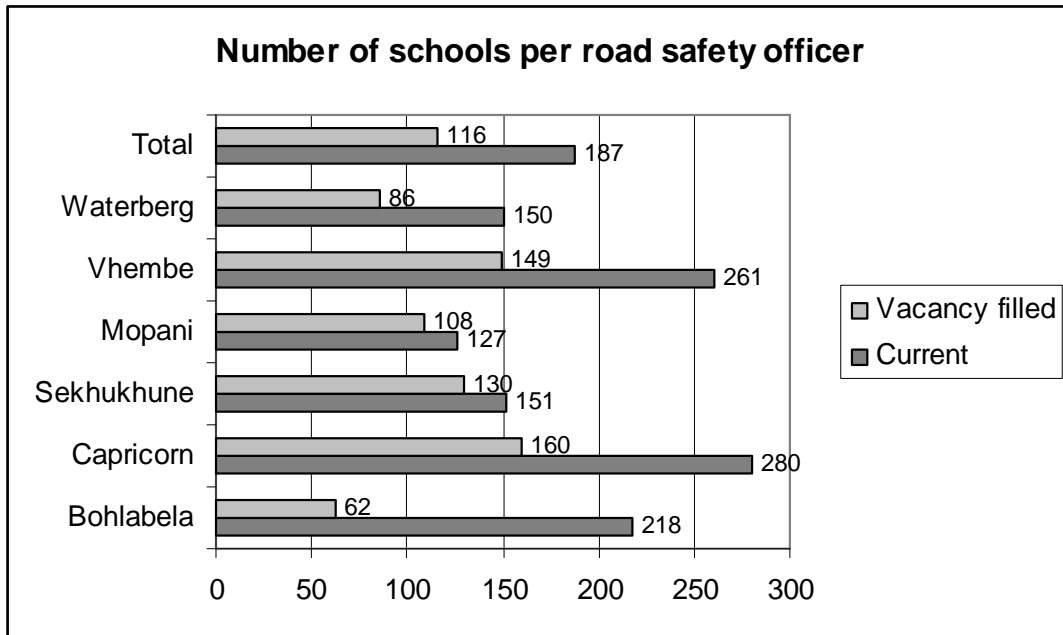


**Figure 3: Number of scholars per road safety officer by district: Limpopo Province: 2005**



An analysis of the number of schools per road safety officer as shown in Figure 4, also gives a good indication of the adequacy of the law enforcement resources deployed at educational institutions.

**Figure 4: Number of schools per road safety officer: 2005**



## 4.2 Review of current Traffic Management Resources

### 4.2.1 Introduction

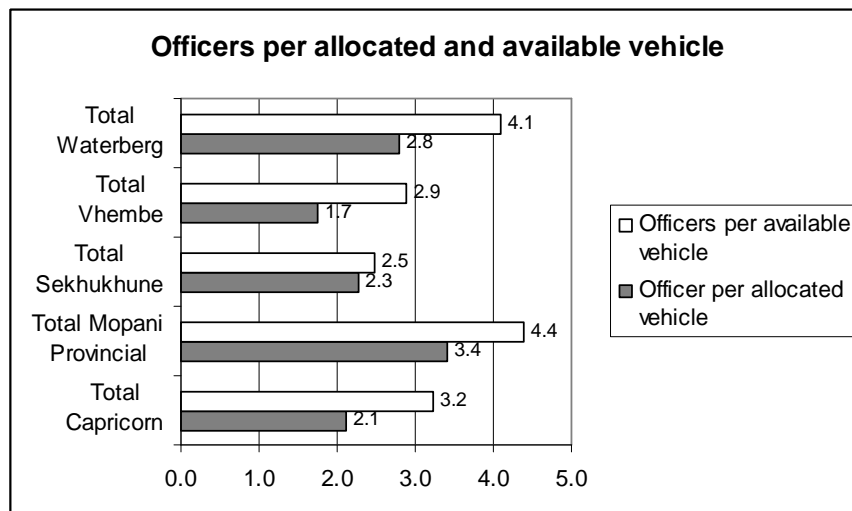
A review of current traffic management resources requires a thorough analysis of all the different services rendered and especially services offered to the public. This includes the regional distribution of traffic law enforcement services that

plays an important role in rendering an efficient and effective service to the public such as traffic law enforcement; vehicle testing, licensing and registration; driver testing and licensing and road safety support services. The aspects that need to be considered in resource allocation are briefly discussed in the next few paragraphs.

#### 4.2.2 Traffic stations, traffic law enforcement and equipment

The distribution of provincial traffic law enforcement officials by traffic station in a province should be based on the factors as already discussed. Other aspects that should be audited include the ratio of traffic officers to selected indicators such as vehicle availability, equipment, storage space, notices issued and patrolling. Vehicle availability refers to the average number of vehicles available per 1 000 km of road network. An example of such an analysis in the Limpopo province is given in Figure 5.

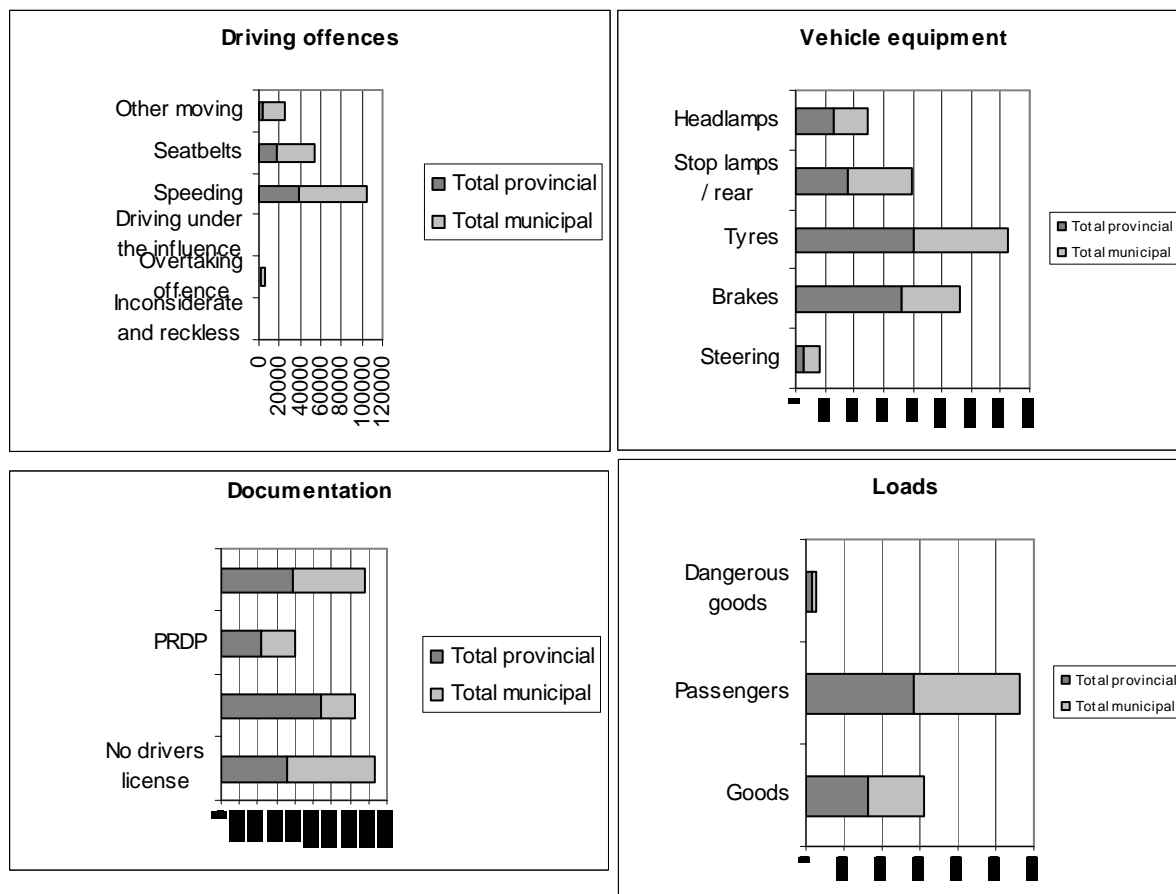
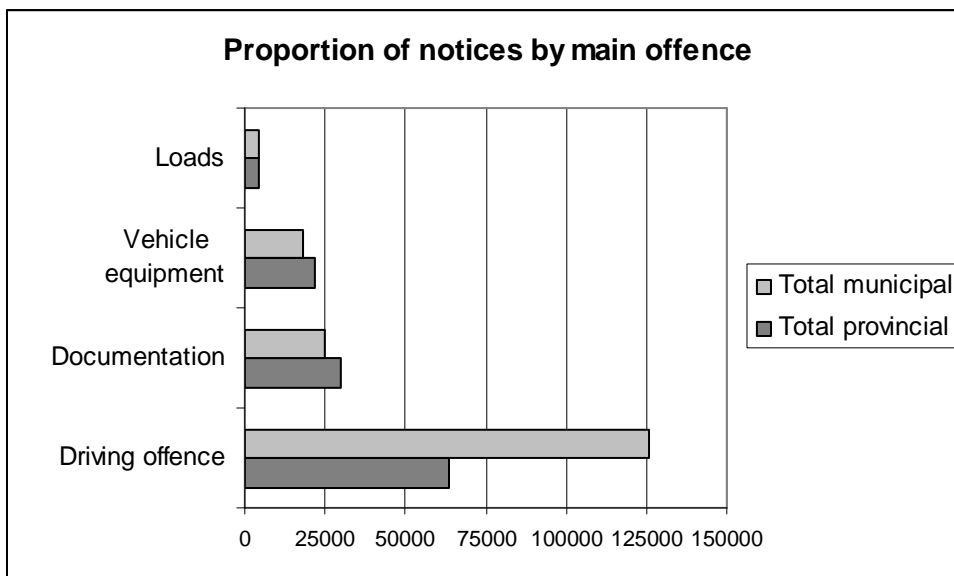
**Figure 5: Officers per allocated and available patrol vehicle: 2005**



The availability of adequate and calibrated law enforcement equipment by traffic station such as speed and alcohol evidentiary equipment is also an important element of effective law enforcement. Furthermore, secure storage space for original documentation and equipment is essential. The recording system at each traffic station should be able to track the number of notices issued as well as exact information on the number of kilometres patrolled by patrol car and officials. Examples of the formats in which these notices were analysed in Limpopo Province are shown in Table 6. These different analyses give a good indication where traffic law enforcement efforts should be focussed.



**Table 6: Notices in Limpopo Province by main offence type: 2005**



**4.2.3 Service standards for traffic law enforcement in provinces**

Provinces must specify service standards for all core functions in line with the Bato Pele principles. These service standards in relation to service levels

required, also give guidance of the number of traffic officials to be deployed as given below for the Limpopo Province:

- Vehicle and driving license centres and provincial registering authorities are operating daily from 08:00 to 15:00.
- A testing officer shall test a maximum of 8 driver's license applicants per day.
- The administration process after an applicant driver has been tested shall not exceed 75 minutes.
- A maximum of 5 learner driver's sessions are conducted per station per day.
- Road Traffic Safety Strategy is reviewed annually and communicated to all officials for implementation.
- Respond to 75 per cent of accident scenes within 45 minutes of reporting.
- Queuing time for renewal of licences, and other counter services shall not exceed three quarters of an hour.
- The control room shall respond to all calls reporting accidents within five minutes.
- Law enforcement operations are conducted daily.
- Point duty by provincial traffic stations is done on a daily basis.
- Traffic control room operate 24 hours.

#### 4.2.3 Service standards for road safety education and communication in provinces

The following service standards for road safety education and communication apply in the Limpopo Province:

- The Road Safety Division conducts in-house research on one pedestrian hazardous location per district per annum.
- Implement education and law enforcement measures/interventions at identified pedestrian hazardous locations per district once per annum.
- Mass media campaigns to promote road safety during peak traffic periods every year.
- Direct road safety education lectures are conducted on a weekly basis.
- Accident information is captured within 72 hours after receipt of accident forms.
- Conduct driver education seminars with professional drivers (taxi, busses and companies) on a quarterly basis.

## 5 **A MODEL FOR THE ASSESSMENT OF PATROLLING NEEDS ON PAVED ROADS IN LIMPOPO**

One of the requirements of the PAVE strategy is that there will be a visibility (presence) of traffic law enforcement officers on the road network. A model as shown in Table 7 was developed to comply with this requirement. The model had to take a number of factors into account such as the road network expansion (5 and 10 years), intervals at which a patrol car will pass a fixed point (at least every 4 hours), percentage of time involved in patrol related enforcement and administration (50 or 33 per cent), and so on.

In order to assess patrolling needs, some assumptions had to be made as given below.

**Assumptions:**

- An officer has a theoretical availability of 2000 hours per year (weekends and public holidays subtracted from 365 days).
- Officers cannot be on duty for 2000 hours per year, but have to take leave, sick leave and go on training.
- It is assumed that an officer is, on average, available for physical duty of 1800 hours per year.
- Furthermore, when on duty, the officer is involved in other duties. The most basic, if the officers is on full-time patrol, is administrative, estimated at 1 hour per shift. Also while on patrol the officer are involved in active enforcement (e.g. issuing a notice), after which his/her patrolling duty is resumed. It is assumed that each officer will be involved in 50 per cent of mobile patrol and 50 per cent of his/her time will be taken up by administrative and active enforcement duties. In Table 7 a calculation is also made for 33 per cent (20 minutes of each hour) involvement in administrative and enforcement duties.
- The interval, at which a patrolling unit is “visible” to the public, is determined by the average speed at which the unit moves, while on active patrol. This interval is a service level, to be decided strategically at political level. The calculation for Table 7 was based on a 4 hour interval and an average patrolling speed of 80km/hour.
- Each patrol unit consists of 2 officers.
- Supervisors of patrol units are involved in patrolling duties, on average 80 per cent of their time.

<b>Table 7: Estimate of number of dedicated patrolling officers to employ, to sustain average visibility on all paved roads in Limpopo.</b>							
<b>Assumptions</b>		<b>Estimate of officer to employ to maintain visibility</b>					
Interval at which patrol car will pass a fixed point (hours)	% time involved in patrol related enforcement and admin	Capricorn	Mopani	Sekhukhune	Vhembe	Waterberg	Total
4	50	46	42	19	54	105	267
4	30	35	31	14	41	79	200
<b>5 years network expansion plan: 2010</b>							
4	50	64	61	29	71	118	344
4	30	48	46	22	53	89	258
<b>10 years network expansion plan: 2020</b>							
4	50	88	67	42	86	140	423
4	30	66	50	32	64	105	317

*Note – the calculation excludes manpower needed to react to calls for service, accidents, obstructions), overloading, escorting of abnormal vehicles, driver and vehicle examiner duties, radio, court, and special duties. The calculation also excludes special traffic enforcement activities like road blocks and stationary speed enforcement. The calculation is purely for the maintenance of visible patrolling presence, while taking into account patrol related enforcement.*

## **6 RECOMMENDATIONS TO ENHANCE TRAFFIC RESOURCE MANAGEMENT IN PROVINCES**

Based on the study, a number of recommendations were made to enhance traffic resource management with regard to traffic law enforcement, vehicle testing stations, licensing and registration, driver testing centers and licensing and road safety officers.

### **6.1 Traffic law enforcement**

#### **6.1.1 Traffic law enforcement: General**

There are a number of factors which impact on the demand for traffic officers. These are, inter, alia:

- The possibility of traffic law enforcement implemented as a 24 hour service.
- Greater involvement in the attendance of traffic accidents.
- Greater complexity of the road environment.
- The level of lawlessness in the country.

Specific objectives for law enforcement should be set, in terms of visibility, the number of vehicles to stop, number of offences to check for, etc. After this an assessment can be made in terms of manpower needs.

#### **6.1.2 Training of traffic law enforcement officers**

There are, however, various factors which impact on training:

- Updating in terms of legislation amendments.
- In-service training to ensure that all officers work towards the same goal and objectives.
- A new qualification for the basic training of traffic officers has been registered for more than a year. It is recommended that an assessment is made in terms of Recognition of Prior Learning assessments for officers currently employed.

#### **6.1.3 Vehicle availability**

At the least, there should be at the most 4 officers per available dedicated patrol vehicle, to ensure a patrol vehicle per 2 officer patrolling units for each shift.

The management of vehicles should be assessed and a quality assurance system developed to ensure that vehicles are timeously replaced, serviced, and licensed.

#### **6.1.4 Equipment**

Provincial traffic stations seem to have a dire need of equipment, especially speed equipment, and alcohol screeners. There should also be at least one evidentiary alcohol unit in each region.

#### **6.1.5 Storage space**

It is evident that secure storage space is needed for both valuable equipment

and original documentation. Criteria for safe storage should be documented and each station audited to make and assessment of requirements.

#### 6.1.6 Notices issued

Although it seems possible to extract detail information in regard to notices issued, information in regard to the successful payment rate is not so evident. With the imminent implementation of AARTO, it is necessary for provinces to maintain summarised, strategic level information in regard to notices issued, such as the success rate of payments, value of payments, etc.

It is necessary that provinces maintain a central contravention data base. This does not imply that municipalities should change to other systems, but that there should be sharing of strategic information on a formal basis.

#### 6.1.7 Patrolling

It is recommended that logs be kept of km driven for different activities, in order to keep track of dedicated patrolling activities.

The patrolling function should be defined as a separate function which shall enhance the visibility of traffic enforcement considerably and should be budgeted and staffed for with a visibility level in mind.

### 6.2 **Vehicle testing stations, licensing and registration**

An effective provincial HelpDesk should be established to alleviate some of the pressure on the National HelpDesk and speed up certain processes.

The technical and practical implications of selected NaTIS transactions only available to the national level should be revised. A request, supplying technical problems and implications should be drafted by municipal, provincial and selected private testing stations.

There should be a business plan for each vehicle testing station, in order to address infrastructure problems, standardised equipment, upgrading where necessary, storage and security of original documents, service levels to the public, in service training of examiners, etc.

There should be a central provincial function to ensure that all updates of regulations are distributed to all vehicle testing stations.

The issue of standards and differences between different types of stations should be addressed through the implementation and inspection of a quality assurance system. The province should have its own quality assurance inspectorate.

There should be an monthly analysis of NaTIS transactions pertaining to the vehicle testing function and broken down for each vehicle testing station, giving information in regard to the number of tests, value of transactions, transactions per examiner and NaTIS officer.

### 6.3 **Driver testing centres and licensing**

Various recommendations pertaining to NaTIS overlap with that of vehicle testing centres, e.g. the establishment of a provincial HelpDesk, formal

application by testing centres stating the implications of not having access to certain transactions.

A monthly updated analysis from NaTIS, pertaining to different driver testing and application transactions, per testing station, including the value of the transaction, transactions per examiner and NaTIS officer. Some information would be exclusively for the use of management, while some information should be made public, e.g. passing rates.

An audit of the maximum capacity of each testing station in terms of current testing procedures, followed by a business plan for each station, addressing infrastructure upgrading and expansion and the appointment of trained driver examiners to the maximum capacity of the testing station.

#### **6.4 Road safety officers**

There should be an assessment of different ways in which the number of road safety officers could be augmented/supplemented in provinces:

- Employing more road safety officers.
- Enhancing the education role of the traffic law enforcement officer – taking into consideration that this, if taken seriously, would also imply an increase in traffic law enforcement manpower.
- Enhancing the role of community forums and volunteers. The maintenance of community forums and volunteer groups also imply an increase in the number of road safety officers to sustain these forums and groups.

#### **BIBLIOGRAPHY**

H Ribbens and E C van Niekerk. Limpopo PAVE Strategy: Recommendations for Resource Management. Limpopo Department of Roads and Transport, Report 2006/0003/C, July 2006.

Limpopo Department of Roads and Transport. Management Plan, 2005/6 – 2009/10.

Limpopo Department of Roads and Transport. Service Standards for Core Functions. Undated.

\*\*\*\*\*