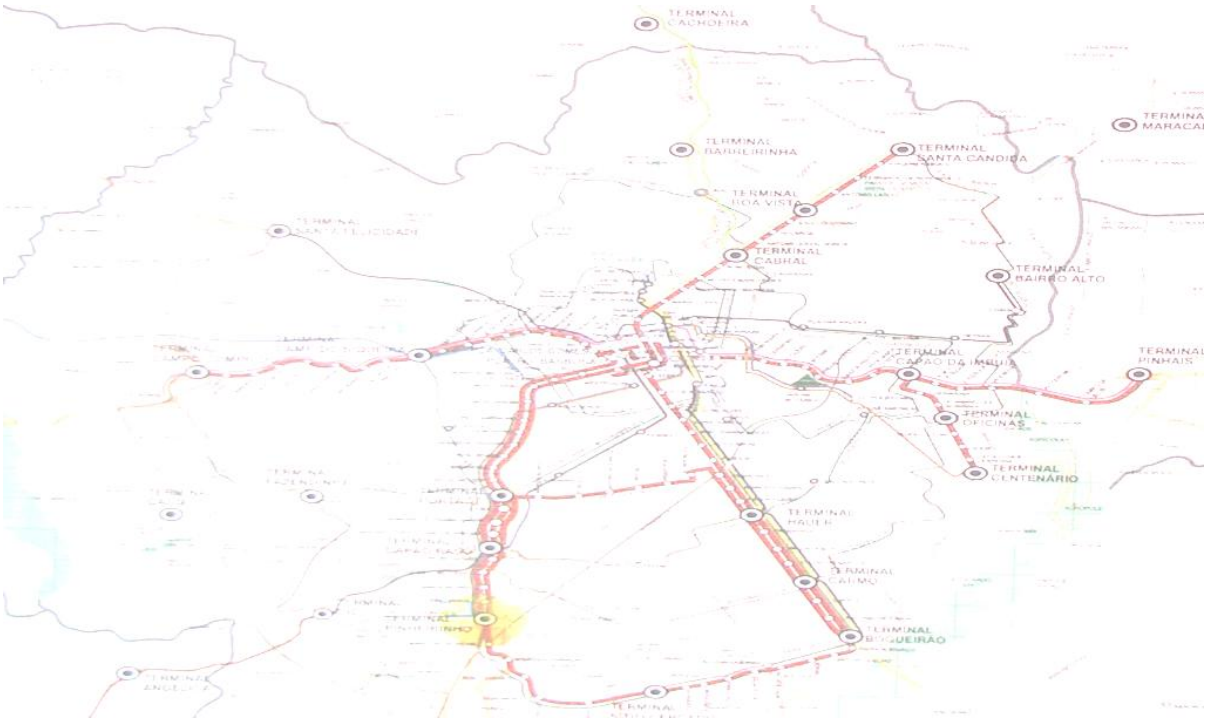
LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

# LIMPOPO DEPARTMENT OF ROADS AND TRANSPORT

## INTEGRATED PUBLIC TRANSPORT NETWORKS IN THE LIMPOPO PROVINCE

## DRAFT REPORT

## 14 DECEMBER 2010

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# INTEGRATED PUBLIC TRANSPORT NETWORKS IN THE LIMPOPO PROVINCE

## EXECUTIVE SUMMARY

*The National Department of Transport produced a Public Transport Strategy in 2007, which requires all provinces to respond and adopt it for implementation. This document is the response of the Department of Roads and Transport, Limpopo Province towards the achievement of this directive.*

*This work is part of the Public Transport Action Plan, Phase 2 and 3. Phase 1 was implemented from 2007 up to 2010, and looked at the Accelerated Recovery & Catalytic projects. Phase 2 is planned to take place from 2010 to 2014, and will concentrate on the promotion and delivery of basic networks, including public transport infrastructure. On the other hand, Phase 3 is planned to run from 2014 to 2020 and will deal with the advancement and sustenance of networks to provide accessibility and mobility.*

*According to the National Department of Transport Public Transport Strategy 2007, the envisaged transport system should be such that it provides high quality networks that are fully integrated, a single integrated commuter service, a mobility solution that is attractive to both current PT users as well as current car users that should be able to result in a modal shift of at least 20% from car work trips to PT by 2020.*

*The main objectives of this report are the development of Integrated Public Transport Networks (IPTNs) for the five districts in Limpopo Province, namely, Mopani, Sekhukhune, Waterberg, Capricorn and Vhembe. This should ensure reduced travelling times, provide proper network coverage and improved service frequencies to all areas. It shall be a system that will result in extended hours of operation, with high quality vehicles and facilities, and the achievement of multi-modal integration**, p**rovision of access for special need users as well as improved needs for non-motorised transport networks.*

*The scope of this project entails the following aspects towards an integrated public transport network in the Province:*

- *Data collection from existing sources, as well as additional surveys to supplement the existing data, to estimate current and projected transport demand.*
- *Identification of key corridors and major routes, including proposed feeder and distribution routes*

- *The identification, location and classification of key infrastructure and the infrastructure upgrading needs along corridors and major intersections*
- *The design of **high-level** public transport services plans, including network designs, vehicle allocation. Detailed designs for the Sekhukhune District will be undertaken after detailed investigation that will be conducted in January 2011. These will in turn be used to enhance the high-level designs in other districts.*
- *Documents were also compiled for revenue collection and operational cost projections, which include cost scheduling, fare policy, empowerment and contract models*
- *A review of vehicle specifications is also included*
- *A review and framework for EIA guidelines and needs is provided*
- *The report culminates with a concise presentation of bankable business plans, showing capital expenditure, operational costs, passenger revenue and subsidy requirements*

*The following conclusions and recommendations are drawn and presented for the implementation of the integrated public transport networks in the Limpopo Province:*

- *The passenger data obtained from existing sources were not adequate to enable detailed services designs. The finalisation of the detailed services designs in the Sekhukhune District, as well as high-level designs in the other districts requires that additional surveys to be conducted, especially directional flows in order to refine the services designs and details if infrastructure needs.*

- *Key corridors and major routes, including proposed feeder and distribution routes were identified, which will enabled the design of PT services*

- *The identification of key infrastructure, location and classification, coupled with the infrastructure upgrading needs along corridors and at major intersections have been achieved. It is recommended that these locations be firmed up and reserved as soon as possible in order to ensure that land is available for future developments*

- *The design of **high-level** public transport services plans, including network designs and vehicle allocation was achieved for all districts. These should be implemented and improvements made as part of a continuous improvement strategy.*

- *Detailed designs for the Sekhukhune District should be undertaken after detailed investigations that will be conducted in January 2011. These will in turn be used to enhance the high-level designs in other districts.*

- *Documents were also compiled for revenue collection and operational cost projections, which include cost scheduling, fare policy, empowerment and contract models. An aspect that requires urgent attention is the work-shopping of all stakeholders prior to the implementation of these plans.*

- *Environmental impact assessments will be required for all infrastructure upgrading, and it will be essential to ensure that all identified PT infrastructure sites comply prior to the acquisition of land for development.*

- *Concise business plans are provided per district municipality. It is recommended that an integrated programme, linking districts, local municipalities and the Province be implemented towards the achievement of an integrated public transport network in the whole Province.*

## 5. INTRODUCTION

### 5.1 Background

The National Department of Transport produced a Public Transport Strategy in 2007, which requires all provinces to respond and adopt it for implementation towards the realization of integrated public transport systems in the whole country. This document is the response of the Department of Roads and Transport, Limpopo Province towards the achievement of the directive from the national department, which was undertaken from September 2009 to December 2010.

This work is part of the Public Transport Action Plan, Phase 2 and 3. Phase 1 was implemented from 2007 up to 2010, and looked at the Accelerated Recovery & Catalytic projects. Phase 2 is planned to take place from 2010 to 2014, and will concentrate on the promotion and delivery of basic networks, including public transport infrastructure. On the other hand, Phase 3 is planned to run from 2014 to 2020 and will deal with the advancement and sustenance of networks to provide accessibility and mobility.

### 5.2 Problem Statement

At present, the different public transport modes, namely, Bus, Taxi, Rail, Non-motorised transport are not integrated to such an extent that they provide a seamless transport system which is *sustainable, equitable and uncongested.* According to the National Department of Transport Public Transport Strategy 2007, the envisaged transport system should be such that it displays the following characteristics:

- *High quality networks* that are fully integrated.
- Single integrated rapid *commuter service*.

- *Mobility solution that is attractive* to both current PT users as well as current car users.
- *Modal shift of 20%* from car work trips to PT by 2020.
- *Improved quality of PT* to a level of service that is car competitive.
- *Radical transformation* of the PT service delivery system

The current PT system is characterised by various shortcomings related to poor quality service in terms of service offered, punctuality, reliability and frequency.

Although some areas in the Province do have regular public transport systems, the major part of the Province still require a well designed service with good coverage in order to ensure that all areas benefit. Key to the achievement of an integrated public transport plan is the establishment of integrated public transport service designs, which combine all the transport modes.

The present classification of public transport infrastructure is disjointed by definition, and is not conducive to the intended integration of the modes into a single integrated public transport system as it is still based on separately designed and designated facilities and infrastructure.

The various levels of government in the Province do not presently have integrated plans as regards the enhancement of public transport. The promotion and delivery of basic networks, as well as the advancement and sustenance of networks to provide accessibility and mobility, requires that well-thought priorities are determined both at corridor intersections and along corridors. These programmes would be implemented in an integrated manner throughout the province to achieve meaningful results for the benefit of the public.

One of the challenges of the public transport system in the Province is that it would require strong and well-organised institutional arrangement at all levels of government to be effective.

## 5.3 Objectives

The main objectives of this report are as follows:

- Development of Integrated Public Transport Networks (IPTNs) for the *five districts* in Limpopo Province, namely, Mopani, Sekhukhune, Waterberg, Capricorn and Vhembe
- Reducing travelling times for all and by all public transport modes
- Provide proper network coverage, including all remote areas –resulting in walking distances to nearest PT facility of less than 1km by 2020
- Improvement of service frequencies to all areas in the whole network
- Provision of a system that will result in extended hours of operation

- Providing high quality vehicles and facilities
- Achievement of multi-modal integration
- Provision of access for special need users
- Network image improvement
- Improve needs for non-motorised transport networks

## 5.4 Approach

The approach methodology the project takes into account the following issues:

- Cognisance of the public transport characteristics in the Province***:*** road condition, trip purpose, trip frequency, origin-destination patterns.

- The promotion of non-motorised transport (NMT) within the Province should be encouraged through the strategy to be developed.
- The PT system changes from a largely market driven one to one characterised by strong central planning and management.
- The public transport authority or authorities will have to be strengthened to be able to implement the plans.

Detailed investigations were conducted in the Sekhukhune District which was taken as the "pilot district" as far as the services designs and the corresponding public transport infrastructure are concerned. The results obtained from the pilot district were then used as a model to plan and design the rest of the districts.

## 5.5 Scope of the Project

The scope of this project entails the following aspects towards an integrated public transport network in the Province:

- Data collection from existing sources, as well as additional surveys to supplement the existing data, in order to estimate current and projected transport demand.
- Identification of key corridors and major routes, including proposed feeder and distribution routes
- The identification of key infrastructure locations, and classification thereof, coupled with the infrastructure upgrading needs along corridors and at these major intersections
- The design of ***high-level*** public transport services plans, including network designs, vehicle allocation. Detailed designs for the Sekhukhune District will be undertaken after detailed investigation that will be conducted in January 2011. These will in turn be used to enhance the high-level designs in other districts.

- Documents were also compiled for revenue collection and operational cost projections, which include cost scheduling, fare policy, empowerment and contract models
- A review of vehicle specifications is also included
- A review and framework for EIA guidelines and needs is provided
- The report culminates with a concise presentation of bankable business plans, showing capital expenditure, operational costs, passenger revenue and subsidy requirements

## 6. DATA COLLECTION AND DEMAND MODELLING

### 6.1 General

The Limpopo Department of Roads and Transport along with Nyeleti/VELA VKE undertook a process consultation with the five district and local municipalities in the province, including key stakeholders such as the Limpopo Bus Operators and the Provincial Taxi Council. Introductory meetings were conducted with the afore-mentioned stakeholders with the purpose of introducing the project, key role players, agree on the processes for interaction and also to request for the available information.

Introduction meetings were conducted as follows:

| Description | Dates |
|---|---|
| Limpopo Bus Operators | 15 September 2009 |
| Mopani District Municipality | 22 September 2009 |
| Waterberg District Municipality | 30 September 2009 |
| Sekhukhune District Municipality | 9 October 2009 |
| Provincial Taxi Council | 15 October 2009 |
| Vhembe District Municipality | 16 October 2009 |
| Capricorn District Municipality | 28 October 2009 |

### 6.2 Data collection process

Respective District Municipalities were individually contacted so that they can provide status quo information. The following documents were received from the District Municipalities:

- RATPLAN
- CPTR
- OLS
- PTP
- ITP

The status quo inventory compiled enabled us to generate demand analysis.

### 6.3 Survey of missing data

The survey for missing data involved the collection of the following data:

- Traffic counts in major intersections which were subsequently converted into passenger numbers
- Historic data and statistics to establish the % growth for the next 20 years
- A questionnaire was distributed to bus operators to assess their expectations regarding main depots, sleeping depots, routes and facilities.
- Physical site inspection (driven and assessed) on selected major corridors to determine requirements for facilities and upgrading needs

### 6.4 Current public transport demand on each of the major corridor segments

To identify and propose key corridors and major routes, it was required to determine the present demand i.e. where people were travelling from and to (O-D patterns) and which modes of transport they were using to do so.

Roads Agency Limpopo (RAL) 12-hour data count (2008 & 2009) were utilised to observe the morning and afternoon public transport movement trends. This included demand (movement) on both gravel and paved roads in Limpopo Province. These counts were taken on most of the major routes in Limpopo at over 588 spots. This information was then condensed into a spreadsheet showing public transport vehicles (taxis and buses) for the peak period only.

The occupancy rates and peak periods were obtained for each District from their individual CPTR reports. The CPTR data indicated the peak period for the Limpopo province to be between 6am – 9am. From this it was possible to aggregate the information for each District and plotted these onto the GIS to depict the current passenger demand graphically.

### 6.5 Projected boarding and alighting at key locations.

The key locations were identified along the priority corridors. The projected boarding and alighting was estimated by site investigations and the variances in the current passenger numbers per corridor. The results were also verified with information obtained from the bus transport companies, mainly from Great North Transport.

## 7. INTEGRATED NETWORK STRUCTURE

### 7.1 General

Public Transport corridors clearly depict the issue of accessibility by relating transport infrastructure and transport demand with other socio-economic aspects. Poor access to transport constrains economic and social development and contributes to poverty.

Improving people's access to essential services requires better mobility through transport infrastructure and services as well as the location, price, and quality of facilities. This can be achieved by having an integrated network structure which caters for all modes of transport.

### 7.2 Proposed key corridors and major routes

Once the public transport passenger demand was depicted, it was then necessary to identify a Strategic Public Transport Network for each District. This was divided into four classes of public transport network roads, identified as:

***Table 3.2.1 Classification of public transport road network***

| Class | Road Type | Passenger Numbers (Peak period) |
|---|---|---|
| Primary | National routes and other major identified public transport routes | |
| Secondary | Feeders to the Primary Network | >1000 passengers in peak period |
| Tertiary | Links towns and villages; acts as a link to the secondary network | <1000 passengers in peak period |
| CUL de SACS | Public transport roads ending within a town or mine. | |

The identified Primary and Secondary routes are summarised in the tables which follow:

**GREATER SEKHUKHUNE DISTRICT MUNICIPALITY**

**PUBLIC TRANSPORT NETWORK**

**PRIMARY NETWORK**

| ROAD NUMBER | ROUTE NUMBER | FROM | TO | LENGTH (km) | | Public transport passengers (a.m. peak) |
|---|---|---|---|---|---|---|
| | | | | Paved | Gravel | |
| N11 | N11 | S. Border | N. Border | 74 | | |
| R37 | R37 | S. Border | N. Border | 130 | | |
| P207/1 | R573 | D856 | N11 | 34.9 | | 1450-11600 |
| P95/1 | R25 | Border | D2535 | 29.4 | | 3550-13100 |
| P51/3 | R33 | Border | Groblersdal | 51.2 | | 1400-25850 |
| P62/2 | R579 | Border | D4295 | 51.3 | | 700-9250 |
| D4295 | R579 | P62/2 | D2219 | 14.8 | | 6150-13800 |
| D2219 | R579 | D4295 | Jane Furse | 11.2 | | 15150-16500 |
| D4045 | R579 | D2219 | D4250 | 43.6 | | 1800-8700 |
| P169/1-3 | R555 | Border | Ohrighstad | 141 | | 2000-17400 |
| P171/1 | R577 | Border | Roossenekal | 12.8 | | 950-1900 |
| P116/1 | R36 | S. Border | N. Border | 66.7 | | 200-6750 |
| P170/1 | R533 | Border | P116/1 | 4.2 | | 1550 |
| P170/1 | R532 | Border | P116/1 | 11.6 | | 2000 |
| D1695 | | D2776 | Marble Hall | 152.9 | | 5550-9100 |
| D1547 | | P51/3 | P62/2 | 38.4 | | 7500-23900 |
| D2219 | | D4295 | P169/1 | 45.1 | | 1100-20600 |
| D4268 | | Jane Furse | D4045 | 10.7 | | 4100-12000 |
| D4260 | | D4370 | D4100 | | 40.9 | 350-1900 |
| | | | TOTALS | 923.8 | 40.9 | 964.7 |

**GREATER SEKHUKHUNE DISTRICT MUNICIPALITY**

**PUBLIC TRANSPORT NETWORK**

**SECONDARY NETWORK**

| ROAD NUMBER | ROUTE NUMBER | FROM | TO | LENGTH (km) | | Public transport passengers (a.m. peak) |
|---|---|---|---|---|---|---|
| | | | | Paved | Gravel | |
| D27 | | Marble Hall | D2534 | 5 | | 3100 |
| D212 | | Border | P169/1 | 26.5 | | 3900-5850 |
| D737 | | R37 | Steelpoort | 16.6 | | 5900 |
| D856 | | P95/1 | P207/1 | 16 | | 8050-13800 |
| D1261 | | P169/2 | D212 | 11.5 | | 7700 |
| D1296 | | R37 | Steelpoort | 13.5 | | 1550-8900 |
| D1392 | | D1296 | D2219 | 0.5 | 29.5 | 450-1600 |
| D1458 | | D1819 | D1547 | 21.4 | | 2050-6900 |
| D1819 | | P51/3 | D1458 | 1.2 | | 700-6300 |
| D2405 | | P116/1 | D2537 | | 39.5 | 250-2400 |
| D2534 | | P51/1 | D4356 | 29.9 | | 450-3100 |
| D2535 | | P95/1 | P51/3 | 24.1 | | 2800-7750 |
| D2537 | | P169/3 | D4134 | 31.6 | | 900-3400 |
| D2664 | | D2900 | N.Border | 11.3 | | 1600-2800 |
| D2900 | | P207/1 | D2664 | 9.3 | | 1500-2100 |
| D2923 | | D856 | Border | 14.5 | | 2350-3900 |
| D4100 | | D1458 | D4250 | 55.2 | | 400-7300 |
| D4134 | | R37 | D2537 | 16.3 | 11.8 | 450-1750 |
| D4150 | | R37 | End | 10.1 | 18.3 | 400-4000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| D4166 | | R37 | End | | 13.6 | 8850 |
| D4169 | | R37 | D4170 | | 10.1 | 1300-2550 |
| D4170 | | R37 | D4185 | | 25.4 | 800-1900 |
| D4180 | | R37 | D4220 | 2.3 | 31.8 | 800-2900 |
| D4185 | | D4180 | R37 | 5.2 | 3.7 | 1650-2550 |
| D4190 | | DSS19 | D4201 | 52.8 | | 2650-9750 |
| D4200 | | Jane Furse | D4252 | 15.5 | 8.1 | 700-4850 |
| D4212 | | D4220 | D4213 | 6.2 | | 250-500 |
| D4220 | | D4190 | D4185 | | 22.3 | 850 |
| D4250 | | D4100 | D4199 | 25.5 | | 2100-2800 |
| D4252 | | D4045 | D4200 | | 11.6 | 200-1100 |
| D4258 | | D4045 | D4268 | 2.6 | 4.2 | 1200-2950 |
| D4264 | | D4260 | D4045 | 10.1 | 2.2 | 350-850 |
| D4285 | | D4341 | D4260 | 19.5 | 6.8 | 400-1300 |
| D4300 | | D4325 | D4100 | | 3.3 | 400 |
| D4325 | | D4300 | D1547 | 4 | 15.9 | 200-3250 |
| D4341 | | D4100 | D4285 | | 4.2 | 1650-1800 |
| D4344 | | D4370 | D4260 | | 9.2 | 100-350 |
| D4350 | | D4370 | D4100 | | 13 | 200-1050 |
| D4356 | | D2534 | D4100 | 4.2 | | 1400-1700 |
| D4370 | | D4350 | P62/2 | 2.8 | 26.4 | 650-18900 |
| | | | TOTALS | 465.2 | 310.9 | 776.1 |

**VHEMBE DISTRICT MUNICIPALITY**

**PUBLIC TRANSPORT NETWORK**

**PRIMARY NETWORK**

| ROAD NUMBER | ROUTE NUMBER | FROM | TO | LENGTH (km) | | Public transport passengers (a.m. peak) |
|---|---|---|---|---|---|---|
| | | | | Paved | Gravel | |
| N1 | N1 | S. Border | N. Border | 153 | | |
| R523 | R523 | W. Border | N1 | 67 | | |
| P98/1 | R524 | N1 | D3653 | 130.3 | | 1500-69800 |
| P98/2 | R522 | N1 | D3715 | 31.7 | | 700-13500 |
| D3715 | | P98/2 | D959 | 25.6 | | 900-5500 |
| D2554 | | N1 | D959 | | 3.4 | 2000 |
| P99/1 | R578 | N1 | S. Border | 60.4 | | 3700-33000 |
| P278/1 | R523 | N1 | P277/1 | 62.9 | | 6000-25300 |
| D3681 | | P278/1 | P277/1 | 9.3 | | 9600 |
| D9 | | D3636 | P98/1 | 26.9 | | 6300-19200 |
| D3708 | | P277/1 | P98/1 | 22 | | 2800-5300 |
| P277/1 | | P98/1 | D3695 | 28.3 | | 11200-55500 |
| D959 | | D3715 | D3918 | 11 | | 3450-9500 |
| D3695 | | P277/1 | D3689 | 5.2 | | 8600 |
| D3688 | | P277/1 | End | | 14.5 | 16500 |
| | | | | | | |
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| | | | |
|---|---|---|---|
| TOTALS | 633.6 | 17.9 | 651.5 |

**VHEMBE DISTRICT MUNICIPALITY**

**PUBLIC TRANSPORT NETWORK**

**SECONDARY NETWORK**

| ROAD NUMBER | ROUTE NUMBER | FROM | TO | LENGTH (km) | | Public transport passengers (a.m. peak) |
|---|---|---|---|---|---|---|
| | | | | Paved | Gravel | |
| D2692 | | P94/2 | D1483 | 87.9 | | |
| P94/2 | R572 | D2692 | Border | 7.2 | | 1200-1350 |
| P98/2 | R522 | D3715 | D1468 | 40.5 | | 600-1500 |
| D1468 | | P98/2 | D1589 | 8.9 | | 650-1300 |
| D1589 | | D1468 | Border | 1.9 | | 1300 |
| D4 | | N1 | D3644 | 100.8 | 22.1 | 400-10500 |
| D3750 | | D4 | P98/1 | 8.4 | 5.5 | 5600-9100 |
| D3830 | | D4 | D3727 | | 22.1 | 1100-2800 |
| D3727 | | D3830 | D879 | | 19.2 | 500-1750 |
| D2677 | | D3730 | D3727 | | 5.4 | 700 |
| D3741 | | N1 | P278/1 | | 15.3 | 1300-1700 |
| D3671 | | P278/1 | D3672 | 2.8 | 12 | 1000-6100 |
| D449 | | N1 | P278/1 | 38.3 | | 2600-5700 |
| D3669 | | D449 | P278/1 | | 12.7 | 1600-2000 |
| D3677 | | D3669 | D3692 | | 9.5 | 1900 |
| D3695 | | P278/1 | D3689 | 12.8 | 32 | 400-2200 |
| D3689 | | D3695 | D3675 | 26.7 | 6.8 | 2000-4250 |
| D3697 | | D3689 | D3690 | | 18.3 | 200-3400 |
| D3690 | | D3697 | D3700 | | 5.6 | 200-400 |
| D3700 | | D3690 | D3689 | | 13.3 | 900 |
| P277/1 | | D3685 | P135/1 | 25.1 | 42.7 | 750-4600 |
| P135/1 | | Border | N1 | 126.9 | | 400-1400 |
| D1174 | | P135/1 | N1 | 36 | | 900-1500 |
| D1483 | | D2692 | N1 | 1.8 | | 950 |
| D3730 | | D2677 | D3830 | | 18.6 | 1400 |
| D3735 | | P278/1 | D3730 | | 3.6 | 1100 |
| D3692 | | D3677 | P278/1 | 1.3 | | 15050 |
| D3725 | | D4 | D3754 | | 13.5 | 1700 |
| D3754 | | P99/1 | D3748 | | 10.7 | 3800-4850 |
| D3748 | | D3754 | D4 | | 9.3 | 2550-3550 |
| D3749 | | D3738 | D4 | | 3.6 | 1900 |
| D3738 | | D3749 | D3748 | | 4.6 | 2250 |
| D1253 | | D4 | P98/1 | 8.1 | | 5000-7450 |
| D1806 | | D1253 | D2474 | 4.7 | | 800 |
| D2474 | | P98/1 | D1806 | 4.5 | | 1050-1750 |
| D5002 | | P278/1 | P98/1 | | 7.9 | 1900-1950 |
| D3712 | | P277/1 | D3695 | | 14 | 3300 |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| | | | |
|---|---|---|---|
| TOTALS | 544.6 | 328.3 | 872.9 |

**CAPRICORN DISTRICT MUNICIPALITY**

**PUBLIC TRANSPORT NETWORK**

**PRIMARY NETWORK**

| ROAD NUMBER | ROUTE NUMBER | FROM | TO | LENGTH (km) | | Public transport passengers (a.m. peak) |
|---|---|---|---|---|---|---|
| | | | | Paved | Gravel | |
| D3600 | | D885 | P134/3 | 24.2 | | 3250-5900 |
| P134/3 | | S.Border | P18/1 | 15.0 | | 1800-5650 |
| D3628 | | D3606 | P134/3 | 4.1 | | 3700 |
| D3612 | | P134/3 | R37 | 23.2 | | 6750-24800 |
| D4045 | | S.Border | R37 | 35.2 | | 4050-24150 |
| R37 | R37 | E.Border | R71 | 67 | | |
| R521 | R521 | N1 | N.Border | 81 | | |
| N1 | N1 | S.W.Border | N.E.Border | 95 | | |
| R81 | R81 | R71 | N.E.Border | 61 | | |
| D3390 | | | N11 | 63.7 | | 1850-15950 |
| R71 | R71 | E.Border | R71 | 45 | | |
| R36 | R36 | N.E.Border | N.E.Border | 22 | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | TOTALS | 536.4 | 0 | |

**CAPRICORN DISTRICT MUNICIPALITY**
**MOPANI DISTRICT MUNICIPALITY**
**PUBLIC TRANSPORT NETWORK**
**PUBLIC TRANSPORT NETWORK**

**SECONDARY NETWORK**
**PRIMARY NETWORK**

| ROAD NUMBER | ROUTE NUMBER | FROM | | TO | | LENGTH (km) | LENGTH (km) | | Public transport passengers (a.m. peak) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Paved | Gravel | |
| D885 | ROUTE NUMBER | W.Border | | D2659 | | | | 15.8 | 1200-1250 |
| D3660 | | D885 | | D2534 | Paved | 7.9 | Gravel | | 300-1000 |
| D3557 | R40 | S.Border | D4114 | R526 | D2534 | 54 | | 3.9 | 600-750 |
| D4100 | R526 | R40 | D4045 | R36 | D4090 | 88 | | 18.1 | 700-1300 |
| D4066 | R36 | R526 | D4090 | R81 | D4070 | 35 | | 6.8 | 1500-2450 |
| D4090 | R36 | R81 | D4100 | W.Border | D4093 | 15 | | 5.1 | 950 |
| D4096 | R81 | R36 | D4100 | W.Border | D4095 | 14 | | 7.8 | 850 |
| D4093 | R81 | R36 | D4090 | D9 | D4094 | 122 | | 5.3 | 2100-2200 |
| D4086 | D9 | R81 | D4093 | N.Border | D5010 | 21.3 | | 10.2 | 4800-33400 |
| D5010 | R71 | R36 | D4086 | W.Border | D4090 | 40 | | 9.4 | 2100 |
| P181/1 | | D1656 | | D8 | | 43.7 | | 1400-6000 | 550-800 |
| D8 | | P17/3 | | R526 | | 18.1 | | 2150-8450 | |
| D1267 | | R526 | | D9 | | 77.6 | | 2600-6950 | |
| P99/1 | | R81 | | N.Border | | 31.5 | | 4400-6250 | |
| D1656 | | P181/1 | | R40 | | 25.3 | | 1600-2150 | |
| D726 | | R40 | | D86 | | 36.8 | | 3200-4200 | |
| D86 | | D726 | | | | 7.2 | | 10150-14550 | |
| D3782 | | D726 | | P112/1 | | 5.9 | | 1700-15200 | |
| P112/1 | | E.Border | | R526 | | 59.6 | | 4750-22250 | |
| | | | | | | | | | |
| | | | | TOTALS | | 695 | 0 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| D4090 | | D5010 | D4070 | | 2.9 | 1350 |
| D4070 | | D4066 | D4069 | | 15.3 | 1800-2150 |
| D4069 | | R37 | D4070 | | 5.1 | 1600 |
| D4068 | | R37 | D4070 | | 5.8 | 1300 |
| D4043 | | R37 | D4066 | | 7.8 | 1500 |
| D3608 | | D3612 | D3618 | | 5.9 | 1550 |
| D3618 | | D3613 | D3617 | | 12.3 | 850-2000 |
| D3613 | | D3614 | D3618 | | 4.3 | 1300 |
| P18/1 | | N11 | P18/2 | 39.1 | | 1550-2550 |
| P18/2 | | P18/1 | N1 | 39.1 | | 2300-3100 |
| D1257 | | P18/2 | D1663 | | 14.0 | 100-1050 |
| D2551 | | N1 | | 1.0 | | 350 |
| D2551 | | | | | 5.8 | 1500 |
| D2551 | | | N1 | 3.0 | | 950 |
| D4040 | | R37 | D4014 | 23.2 | | 650-2850 |
| D979 | | D4040 | D1481 | | 17.0 | 600-1100 |
| D1481 | | D977 | D3338 | 3.7 | | 600 |
| D2454 | | R71 | | 5.8 | | 6400 |
| D4020 | | R37 | D4032 | | 11.7 | 4950 |
| D4032 | | D4020 | D4030 | | 10.6 | 1200 |
| D4030 | | D4032 | D1809 | | 10.4 | 1100-2500 |
| D1809 | | D4030 | R37 | | 21.2 | 150-1050 |
| D4028 | | R37 | D4027 | | 5.1 | 2250 |
| D4016 | | R37 | D617 | | 16.2 | 300-1300 |
| D617 | | R37 | E.Border | 23.1 | | 700-25850 |
| D3989 | | R37 | D3339 | | 8.5 | 1150 |
| D3339 | | R81 | D3989 | | 6.5 | 1150 |
| D844 | | R81 | D617 | 16.0 | | 1350-3400 |
| D4004 | | D617 | | 3.0 | | 1900-2050 |
| D4004 | | | D1539 | | 3.5 | 1350-1700 |
| D1539 | | D4004 | D4024 | | 6.6 | 350 |
| D3997 | | D844 | | 4.8 | | 1500-1900 |
| D3997 | | | D4019 | | 5.5 | 800-1800 |
| D4019 | | R81 | D3997 | | 5.2 | 1150-1750 |
| P54/1 | | R81 | R36 | 19.5 | | 450-2600 |
| D1356 | | N1 | D3141 | 8.8 | | 5250-7800 |
| D544 | | D2629 | D862 | 27.9 | | 1450-7650 |
| D862 | | D544 | D3371 | 1.5 | | 2000 |
| D19 | | D544 | D3390 | 54.8 | | 1300-6000 |
| D3437 | | D3390 | D19 | | 7.3 | 3950 |
| D3422 | | R521 | D19 | | 19.8 | 100-2800 |
| D3332 | | D3390 | | 5.5 | | 2050-7200 |
| D3423 | | D3332 | R521 | | 10.6 | 1000-3200 |
| D3473 | | D3332 | D3423 | | 7.3 | 600 |
| D3371 | | D3370 | D3370 | | 2.1 | 250 |
| D3370 | | D3371 | D3333 | | 19.6 | 1000-2200 |

| | | | | | | |
|---|---|---|---|---|---|---|
| D3379 | | D3370 | D19 | | 5.5 | 700 |
| D3355 | | D3370 | D3364 | | 7.5 | 450 |
| D3364 | | D3355 | D19 | | 10.0 | 1300-1350 |
| D3377 | | D3385 | D19 | | 10.9 | 1050-1650 |
| D3385 | | D3377 | D3386 | | 4.0 | 10450 |
| D3386 | | D3385 | D3377 | | 4.5 | 6250 |
| D3398 | | D3390 | D3426 | | 4.8 | 1350 |
| D3426 | | D3398 | D3390 | | 6.4 | 400-3300 |
| D1200 | | D2037 | W.Border | 93.5 | | 150-12350 |
| D3277 | | D1200 | D3270 | | 7.8 | 200-500 |
| D3270 | | D3277 | D3275 | | 12.0 | 2000-2050 |
| D3275 | | D3270 | D1200 | | 2.5 | 700 |
| D3326 | | D1200 | D3278 | | 12.8 | 500-1200 |
| D3278 | | D3326 | D1468 | | 4.6 | 1200 |
| D1468 | | D1200 | | | 22.6 | 850-2200 |
| D1589 | | N.Border | | 30.7 | | 700-1350 |
| P94/2 | | R523 | N.Border | 43.6 | | 1000-1500 |
| | | | | | | |
| | | | TOTALS | 455.5 | 472.2 | 927.7 |

**MOPANI DISTRICT MUNICIPALITY**

**PUBLIC TRANSPORT NETWORK**

**SECONDARY NETWORK**

| ROAD NUMBER | ROUTE NUMBER | FROM | TO | LENGTH (km) | | Public transport passengers (a.m. peak) |
|---|---|---|---|---|---|---|
| | | | | Paved | Gravel | |
| P146/1 | | R40 | P116/1 | 29.4 | | 3050-4950 |
| P116/1 | | R40 | S.Border | 38.6 | | 3900-7900 |
| P181/1 | | P116/1 | D1656 | 9.9 | | 5650-5950 |
| D21 | | P181/1 | P181/1 | 50.3 | | 650-8050 |
| P17/3 | | P181/1 | D523 | 33.3 | | 750-56150 |
| D5011 | | D8 | D673 | 12.7 | | 6750-22700 |
| D673 | | R71/D1350 | D1279 | 19.2 | | 1300-34350 |
| D1279 | | D673 | D523 | 12.9 | | 300-400 |
| D1279 | | D523 | D548 | 6.2 | | 250 |
| D2283 | | P17/3 | D589 | 3.4 | | 2750 |
| D589 | | P17/3 | D1279 | 12.6 | | 3250-4950 |
| D523 | | P17/3 | D1279 | 11.2 | | 1100 |
| D548 | | P17/3 | R71 | 35.6 | | 2350-7100 |
| D978 | | R71 | D1350 | 16.7 | | 6250-13450 |
| D1350 | | D673 | | 25.1 | | 850-12050 |
| D1350 | | | D3180 | | 13.0 | 1800-2350 |
| D447 | | D978 | D3180 | 15.1 | | 5700-10000 |
| D3180 | | D447 | | 51.0 | | 350-11850 |

| | | | | | | |
|---|---|---|---|---|---|---|
| D3180 | | | 3983 | | 7.2 | 350-1000 |
| D1034 | | R36 | R81 | 18.4 | | 1600-2500 |
| D11 | | R81 | D3150 | 17.8 | | 950-1950 |
| D3230 | | D3150 | D3232 | | 4.0 | 100 |
| D3232 | | D3230 | D3150 | 15.4 | | 250-1900 |
| D3210 | | D11 | D3150 | | 3.8 | 1600-1950 |
| D3150 | | D11 | N.Border | 14.0 | | 700-1950 |
| D3164 | | D11 | D3820 | | 16.9 | 850-1450 |
| D3820 | | D3164 | P99/1 | | 22.8 | 1450-1900 |
| P43/3 | | R526 | | 38.0 | | 850-2500 |
| P43/3 | | | D3260 | | 36.8 | 200-550 |
| D1191 | | P112/1 | D3260 | | 32.9 | 50-150 |
| D1655 | | D1191 | P43/3 | | 21.7 | 100 |
| D2512 | | P43/3 | D3848 | | 15.0 | 300-500 |
| D3848 | | D2512 | D3187 | | 7.7 | 600 |
| D3187 | | D3842 | D3980 | | 28.1 | 250-750 |
| | | | | | | |
| D3842 | | D1267 | D3187 | | 10.4 | 200-450 |
| D3853 | | D3187 | D3840 | | 7.5 | 300-450 |
| D3840 | | R81 | | 53.0 | | 100-2700 |
| D3260 | | P112/1 | D3981 | | 26.0 | 1100-1700 |
| D3981 | | D3260 | D3980 | | 9.9 | 200-300 |
| D3980 | | D3981 | D3840 | 24.5 | | 0-100 |
| D996 | | D3840 | | 2.6 | | 750 |
| D3815 | | R81 | D3641 | 3.5 | | 43450 |
| D3615 | | D3815 | D3810 | 12.7 | | 2050-11450 |
| D3812 | | D3815 | D3811 | 15.5 | | 600-11450 |
| | | | TOTALS | 598.6 | 263.7 | 862.3 |

**WATERBERG DISTRICT MUNICIPALITY**

**PUBLIC TRANSPORT NETWORK**

**PRIMARY NETWORK**

| ROAD NUMBER | ROUTE NUMBER | FROM | TO | LENGTH (km) | | Public transport passengers (a.m. peak) |
|---|---|---|---|---|---|---|
| | | | | Paved | Gravel | |
| N1 | N1 | S.Border | N.Border | **106** | | |
| N11 | N11 | S.Border | W.Border | **343** | | |
| R510 | R510 | S.Border | R 572 | **240** | | |
| R572 | R572 | R 510 | N11 | **48** | | |
| P1/3 | R101 | S.Border | P85/1 | 45.6 | | 4050-13550 |
| P1/4 | R101 | P85/1 | P84/1 | 24.5 | | 5200-7500 |
| P84/1 | R33 | P1/4 | P198/1 | 62 | | 2350-4150 |
| P198/1 | R33 | P84/1 | R 510 | 85.3 | | 1350-1900 |

| | | | | | | |
|---|---|---|---|---|---|---|
| P19/1 | R518 | N11 | P19/2 | 45.6 | | 500-2000 |
| P19/2 | R518 | P19/1 | R 510 | 101.7 | | 350-5800 |
| D972 | | P84/1 | P19/1 | 70.4 | | 850-3550 |
| D579 | | D972 | P19/1 | 13.4 | | 300-400 |
| | | | | | | |
| | | | | | | |
| | | | TOTALS | 736.5 | 0 | 736.5 |

**WATERBERG DISTRICT MUNICIPALITY**

**PUBLIC TRANSPORT NETWORK**

**SECONDARY NETWORK**

| ROAD NUMBER | ROUTE NUMBER | FROM | TO | LENGTH (km) | | Public transport passengers (a.m. peak) |
|---|---|---|---|---|---|---|
| | | | | Paved | Gravel | |
| D869 | | R510 | W.Border | | 14.0 | 3300 |
| D1235 | | P110/1 | R510 | 30.7 | | 1000-2250 |
| P110/1 | | S.Border | R510 | 65.4 | | 1600-3000 |
| P20/2 | | P110/1 | P1/3 | 82.0 | | 850-6300 |
| P85/1 | | BelaBela | P85/2 | 29.9 | | 300-7800 |
| P85/2 | | P85/1 | P55/1 | 32.9 | | 450-2000 |
| P55/1 | R33 | D1087 | N11 | 85.9 | | 450-7100 |
| P184/1 | | P85/2 | P55/1 | 15.8 | | 700-1100 |
| D943 | | P55/1 | P134/2 | 30.6 | | 850-1500 |
| P134/1 | | D639 | P134/2 | 9.6 | | 1300 |
| P134/2 | | P134/1 | N11 | 45.6 | | 1200-2900 |
| P134/3 | | N11 | E.Border | 29.0 | | 2200-2900 |
| D885 | | E.Border | N.Border | 29.6 | | 200-300 |
| D192 | | P1/5 | D345 | 35.1 | | 350-500 |
| D345 | | D192 | P19/1 | 11.4 | | 200-250 |
| D190 | | D639 | D710 | 22.5 | 6.0 | 350-600 |
| D710 | | D190 | D192 | | 29.5 | 100-350 |
| D192 | | D710 | P19/1 | | 11.6 | 100 |
| D1485 | | R510 | D928 | 14.7 | | 500-4100 |
| D928 | | D1485 | R510 | 29.1 | | 150-200 |
| P84/1 | | P198/1 | R510 | 54.0 | | 350-1600 |
| D4380 | | D192 | D3500 | 34.6 | | 1100-3000 |
| D3500 | | D4380 | P19/1 | 21.4 | | 3100-5200 |
| D3110 | | P19/2 | R572 | 22.8 | | 600-1600 |
| D1554 | | P19/2 | N11 | 36.2 | | 400 |
| D1179 | | N11 | D1556 | 34.3 | | 110-550 |
| D1556 | | D1179 | D887 | 3.2 | | 300-400 |
| D887 | | N11 | D1556 | 99.8 | | 200-600 |
| | | | | | | |
| | | | TOTALS | 906.1 | 61.1 | 967.2 |

## 7.3 Proposed feeder and distribution routes

In the more rural districts of Limpopo, some people are isolated from the major nodes and have to travel great distances to access these. The rural districts had a greater majority of the people who did not live within a 5km radius of a public transport route as compared to the more urban areas. Some of the roads with a major passenger demand were rural unpaved roads.

## 7.4 Network maps

Network maps were created linking the public transport data using GIS. Maps were created for each District in the Province. The first maps depicted the Public Transport Demand on each road and street link in Limpopo. The second maps depicted the IRPTN network with the four (4) classes of the public transport network. These maps are included as Annexure 1 in the report.

# 8. PUBLIC TRANSPORT INFRASTRUCTURE COMPONENTS

## 8.1 General

The National Transport Master Plan divides the public transport facilities into transfer facilities, bus termini, taxi ranks and public transport halts and lay-byes. This classification is not conducive to the intended integration of the modes into a single integrated public transport system as it is still based on separately designed infrastructure. Integrated transport infrastructure should cater for the combination of all the modes at any particular location, depending on the demand.

The main infrastructure components considered in this report generally consist of depots, intermodal facilities, and stops. Depots are classified into two groups, namely, main depots and sub-depots. The intermodal facilities have been classified according to their potential variable sizes. These facilities are each described in the following sections.

## 8.2 Types of Infrastructure

### 4.2.1 Depots

Depots consist of main and sub-depots, and are generally located at major service centres in the Province. These will serve all modes of transport, namely, buses, taxis as well as non-motorised public transport. Main depots would normally include facilities for the operation and maintenance of the fleet, such as service stations, fuel storage, etc. The criteria for locating depots are shown in Table 4.4a in Section 4.4.

Minor depots or “sleep-over facilities” are located at destinations away from the main depots. The minor depots will function as an overnight storage for

the public transport and will cater for all modes. This increases the efficiency of the public transport towards the major service stations. The minor depots consist of storage for the public transport, accommodation, security, etc.

4.2.2 Intermodal public transport facilities

Intermodal public transport facilities have been classified into five categories, namely:

- Primary intermodal public transport facility
- Secondary intermodal public transport facility
- Tertiary intermodal public transport facility
- Main stopping facility
- Basic/Minor stopping facility

The main characteristic and distinguishing features of the intermodal facilities will be their sizes, composition of the modes as well as the services that will be required as the basic support, in order to ensure that the facility functions at its best. The main determining factor for the above classification is the passenger volumes on the corridors converging at that location. Thus it is critical to first look at the existing passenger volumes in each district, in order to determine the key infrastructure locations.

## 8.3 Passenger Numbers and Growth

Existing passenger numbers were obtained from the Roads Agency Limpopo (RAL) traffic counts conducted in 2008 & 2009. For the purposes of classifying and locating public transport facilities, the morning and afternoon passenger volumes were considered. The morning peak period was chosen as it represents the higher traffic loading. The future AM peak period passenger numbers were calculated based on a facility life span of twenty (20) years and an average population growth rate of 3.0% per annum as per the mid-year population estimates, as published in the "Statistical release, P0302, 2009" by Statistics South Africa.

Critical areas such as mines were also identified for their anticipated accelerated growth in the near future, mainly to take care of the anticipated growths owing to mining activities and other growth factors. The future AM peak period passenger numbers for these areas were also adjusted with a growth rate of between 3% to 10% range per annum.

The locations identified for accelerated growth are Polokwane, Phalaborwa, Lephalale, Musina, Steelpoort and Burgersfort. The projected accelerated passenger growths are shown in Table 4.3.1 below.

*Table 4.3.1: Passenger Volumes for Accelerated Growth at Major Intersections*

| District Municipality | Location | Present Passenger Volume (2009) | Assumed % Growth Rate | Projected Passenger Volume (2029) |
|---|---|---|---|---|
| Mopani | Phalaborwa | 49 252 | 4 | 107 917 |
| Capricorn | Polokwane | 94 986 | 5 | 304 633 |
| Waterberg | Lephalale<br>Thabazimbi<br>Marken<br>Mokopane<br>Vaalwater<br>Modimolle | 11 628<br>10361<br>2777<br>20016<br>8687<br>18427 | 10<br>3<br>7<br>5<br>7<br>5 | 78 227<br>22 702<br>10 746<br>53 108<br>33 616<br>48 892 |
| Sekhukhune | Steelpoort<br>Burgersfort | 30 162<br>22 735 | 4.5<br>7 | 72 742<br>87 977 |
| Vhembe | Musina | 4 388 | 5 | 11 643 |

The current AM peak period passenger numbers and the projected future growth AM peak period passenger numbers for each district are shown in Tables 4.3.2 to 4.3.6 below.

*Table 4.3.2: Sekhukhune District Public Transport Passenger numbers*

| Location | Present Passenger Volume (2009) | Assumed % Growth Rate | Projected Passenger Volume (2029) |
|---|---|---|---|
| Groblersdal* | 29 346 | 3 | 53 002 |
| Marble Hall | 12 405 | 3 | 22 405 |
| Jane Furse | 50 675 | 3 | 91 525 |
| Atok* | 3 080 | 4 | 6 749 |
| Moteti | 21 121 | 3 | 38 147 |
| Dennilton | 27 159 | 3 | 49 052 |
| Motetema | 23 872 | 3 | 43 115 |
| Monsterlus Town | 23 867 | 3 | 43 106 |
| Phokwane | 30 487 | 3 | 55 063 |
| Glen Cowie | 17 068 | 3 | 30 827 |
| Ga-Masemola | 17 184 | 3 | 31 036 |
| Ga-Nkwana | 5 782 | 3 | 10 443 |
| Ga-Phaahla | 8 981 | 3 | 16 221 |
| Ga-Masha (P169/D2219) | 15 285 | 3 | 27 606 |
| Steelpoort* | 30 162 | 4.5 | 72 742 |
| Tshehlwaneng | 18 627 | 3 | 33 642 |
| Mashegoana | 10 269 | 3 | 18 547 |
| Roosenekal | 5 974 | 3 | 10 790 |
| Vleeschboom | 32 903 | 3 | 59 426 |
| Praktiseer | 6 944 | 3 | 12 542 |
| Burgersfort* | 22 735 | 7 | 87 977 |
| Orighstad | 7 751 | 3 | 13 999 |

*Table 4.3.3: Capricorn District Public Transport Passenger numbers*

| Location | Present Passenger Volume (2009) | Assumed % Growth Rate | Projected Passenger Volume (2029) |
|---|---|---|---|
| Polokwane* | 94 986 | 5 | 304 633 |
| Seshego | 21 651 | 3 | 39 104 |
| Mabokelele | 13 226 | 3 | 23 888 |
| Ga-Rampuru | 5 987 | 3 | 10 813 |
| Tibane | 8 420 | 3 | 15 207 |
| Lebowakgomo | 74 567 | 3 | 134 676 |
| Mogodi (R37/R518) | 16 901 | 3 | 30 525 |
| Mankweng | 26 539 | 3 | 47 932 |
| Senwabarwana | 19 924 | 3 | 35 985 |
| Botlokwa | 9 311 | 3 | 16 817 |
| Zebediela | 14 841 | 3 | 26 804 |
| Mathibela | 15 702 | 3 | 28 360 |
| Mogwadi | 7 216 | 3 | 13 033 |

*Table 4.3.4: Mopani District Public Transport Passenger numbers*

| Location | Present Passenger Volume (2009) | Assumed % Growth Rate | Projected Passenger Volume (2029) |
|---|---|---|---|
| Tzaneen | 78 603 | 3 | 141 966 |
| Giyani | 82 322 | 3 | 148 683 |
| Modjadjiskloof | 10 434 | 3 | 18 845 |
| Nkowankowa | 56 138 | 3 | 101 391 |
| Lenyenye | 21 774 | 3 | 39 326 |
| Letsitele | 10 665 | 3 | 19 262 |
| Tarentaal | 15 221 | 3 | 27 491 |
| Leydsdorp (P17/3) | 15 687 | 3 | 28 332 |
| Bordeaux | 11 115 | 3 | 20 075 |
| The Oaks | 12 473 | 3 | 22 528 |
| Ga-Kgapane | 19 360 | 3 | 34 966 |
| Dzumeri | 11 037 | 3 | 19 934 |
| Jamela | 6 642 | 3 | 11 996 |
| Klaserie | 6 899 | 3 | 12 460 |
| Hoedspruit* | 9 727 | 3 | 17 568 |
| Namakgale | 21 055 | 3 | 38 028 |
| Phalaborwa* | 49 252 | 4 | 107 917 |

*Table 4.3.5: Waterberg District Public Transport Passenger numbers*

| Location | Present Passenger Volume (2009) | Assumed % Growth Rate | Projected Passenger Volume (2029) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Thabazimbi* | 10 361 | 4 | 22 702 |
| Lephalale* | 11 628 | 10 | 78 227 |
| Vaalwater | 8 687 | 7 | 33 616 |
| Pienaarsrivier | 10 330 | 3 | 18 657 |
| Bela-Bela | 31 384 | 3 | 56 683 |
| Modimolle | 18 427 | 5 | 48 892 |
| Mookgophong | 5 524 | 3 | 9 977 |
| Mokopane | 20 016 | 5 | 53 108 |
| Tom Burke | 12 530 | 3 | 22 631 |
| Marken | 2 777 | 7 | 10 746 |

*Table 4.3.6: Vhembe District Public Transport Passenger numbers*

| Location | Present Passenger Volume (2009) | Assumed % Growth Rate | Projected Passenger Volume (2029) |
|---|---|---|---|
| Louis Trichardt | 73 188 | 3 | 132 186 |
| Elim | 34 233 | 3 | 61 829 |
| Bungeni | 15 232 | 3 | 27 511 |
| Vuwani | 10 816 | 3 | 19 535 |
| Tshakhuma | 23 555 | 3 | 42 543 |
| Lwamondo | 32 043 | 3 | 57 873 |
| Sibasa | 43 490 | 3 | 78 548 |
| Vhufuli | 14 849 | 3 | 26 819 |
| Phiphidi | 12 330 | 3 | 22 269 |
| Makonde* | 32 958 | 4 | 72 215 |
| Tshilidzini Hospital | 45 217 | 3 | 81 667 |
| Siloam Hospital | 21 580 | 3 | 38 976 |
| Wyllie's Poort | 7 562 | 3 | 13 658 |
| Kutama (Madombidzha) | 23 127 | 3 | 41 770 |
| Thohoyandou | 81 856 | 3 | 147 841 |
| Musina* | 4 388 | 5 | 11 643 |
| Mutele/Mutale* | 3 988 | 3 | 7 203 |
| Malamulele | 35 141 | 3 | 63 469 |

## 8.4 Classifying, Sizing and Location of Intermodal Facilities

The size of an intermodal facility mainly depends on the number of passengers to be handled during peak hour periods. The estimation and classification of the facilities in this report will be based on the existing facilities that are similar in nature in South Africa, as a method of getting an indication for Limpopo.

The following facilities were visited to observe their main characteristics such as size of land occupied, general layout of facilities, available facilities, types

of modes, retail services provided, informal trading facilities, as well as passenger volumes handled during peak hour periods. Table 4.4.1 shows the summary of analyses in order to classify facilities in Limpopo.

*Table 4.4.1: Some characteristics of existing intermodal PT facilities in Gauteng*

| **Name of Facility** | **Estimated Size and Passengers Volumes** | | | **Facilities Provided (Yes or No)** | | |
|---|---|---|---|---|---|---|
| | ***Estimated Area (ha)*** | ***Approximate Peak-hour volume*** | ***Implied density (passengers/ ha)*** | ***Management offices*** | ***Retail services*** | ***Park & ride*** |
| Johannesburg Park Station | 15 | 151 000 – 180 000 | 7000-10000 | Yes | Yes | Yes |
| Mabopane Station | 25 | 80 000 | 3 200 | Yes | No | Yes |
| Pretoria Station | 20 | | | Yes | No | Yes |

The Park Station in Johannesburg can be considered a model interchange, with a much more compact design. It has modern facilities such as management or administrative offices, retail services such as banks, restaurants, retail shops, medical shops, etc. It has well designed circulation and parking facilities, including park-and-ride with good security services. It even boasts a SAPS station within the precinct.

Pretoria station can be considered secondary to the Park station, with fewer retail facilities and shops. Banking facilities found within the precinct consist of ATMs only. Security seems to be adequate, with an SAPS station within the precinct.

Although the Mabopane station has a huge area with adequate circulation and parking facilities, it still lacks the other services found in the Pretoria and Park station. There are also a huge number of informal trading that lacks proper facilities. The park-and-ride areas are generally too far from the train station. There also seems to be unused space that could be redesign for use by other modes such as bus and non-motorised transport, as well as the provision of retail facilities. Another striking feature of this facility is that it is rather out-of-the-way in its location, while the other two are located on transport corridors, and therefore form better interchanges.

A conclusion that could be drawn from the above analysis is that the location of these facilities should be at intersection of main public transport corridors, within cities or major service centre, and should integrate all public transport modes. Specifically, the following could be deduced:

- The Johannesburg Park station would be an appropriate model to adopt with respect to its office and retail facilities design, which takes advantage of multi-story buildings where space is not in abundance
- The Pretoria station provides insights as far as typical appropriate services such the use of banking facilities like ATMs instead of banking offices
- In terms of land requirements, the Mabopane station could used as a model as it is more rural in nature and thus closer to the nature of most of the towns in Limpopo Province.
- The location should take into account the ultimate land requirements, even

  though the facility may not be developed to its full capacity initially. Land use planning should take priority at all cases. The location of a public transport facility should ideally be determined by the following aspects:

  - Change of trip direction
  - Change of mode
  - Modal trip end
  - Number of passengers converging at that point
  - Proximity to other facilities
  - Land availability
  - Existing facility that can be upgraded

The following criteria, shown in Table 4.4.2 are proposed for the classification, sizing and location of the main intermodal facilities in the Limpopo Province.

*Table 4.4.2: Criteria used for locating and classifying public transport facilities*

| **Classification** | **General Criteria** | **Public transport traffic volume rating** | **Passenger volume range in peak hour** |
|---|---|---|---|
| *Depots* | At major service centres; Journey ends; Operator's choice | | N / A |
| *Primary public transport facility* | Intersection of two primary routes; Major service centre | Very high public transport traffic volume | Larger than 60 000 |
| *Secondary public transport facility* | Intersection of primary and secondary routes | High to intermediate public transport traffic volume | Between 40 000 and 60 000 |
| *Tertiary public transport facility* | Intersection of secondary and tertiary routes | Moderate to low public transport traffic volume | Between 20 000 and 40 000 |
| *Major/Main* | Intersection of two tertiary | Very low public | Less than 20 000 |

| | | | |
|---|---|---|---|
| *public transport stop* | routes; Every 5km along route | transport traffic volume | |
| *Basic/Minor public transport stop* | Intersection of two tertiary routes; Every km in built-up areas | Very low public transport traffic volume | Less than 20 000 |

The proposed locations of the public transport infrastructure in the five districts of Limpopo are shown in the respective maps as Annexure 2. Summaries of the number of intermodal facilities per district are given in the following tables (Table 4.4.3 to Table 4.4.7).

*Table 4.4.3: Sekhukhune District PT intermodal transfer facilities classification*

| Location | Present Passenger Volume (2009) | Projected Passenger Volume (2029) | Classification |
|---|---|---|---|
| Groblersdal* | 29 346 | 53 002 | Secondary |
| Marble Hall | 12 405 | 22 405 | Tertiary |
| Jane Furse | 50 675 | 91 525 | Primary |
| Atok* | 3 080 | 6 749 | Stop |
| Moteti | 21 121 | 38 147 | Tertiary |
| Dennilton | 27 159 | 49 052 | Secondary |
| Motetema | 23 872 | 43 115 | Secondary |
| Monsterlus Town | 23 867 | 43 106 | Secondary |
| Phokwane | 30 487 | 55 063 | Secondary |
| Glen Cowie | 17 068 | 30 827 | Tertiary |
| Ga-Masemola | 17 184 | 31 036 | Tertiary |
| Ga-Nkwana | 5 782 | 10 443 | Tertiary |
| Ga-Phaahla | 8 981 | 16 221 | Tertiary |
| Ga-Masha (P169/D2219) | 15 285 | 27 606 | Tertiary |
| Steelpoort* | 30 162 | 72 742 | Primary |
| Tshehlwaneng | 18 627 | 33 642 | Tertiary |
| Mashegoana | 10 269 | 18 547 | Tertiary |
| Roosenekal | 5 974 | 10 790 | Tertiary |
| Vleeschboom | 32 903 | 59 426 | Secondary |
| Praktiseer | 6 944 | 12 542 | Tertiary |
| Burgersfort* | 22 735 | 87 977 | Primary |
| Orighstad | 7 751 | 13 999 | Tertiary |

*Table 4.4.4: Capricorn District PT intermodal transfer facilities classification*

| Location | Present Passenger Volume (2009) | Projected Passenger Volume (2029) | Classification |
|---|---|---|---|
| Polokwane* | 94 986 | 304 633 | Primary |

| | | | |
|---|---|---|---|
| Seshego | 21 651 | 39 104 | Tertiary |
| Mabokelele | 13 226 | 23 888 | Tertiary |
| Ga-Rampuru | 5 987 | 10 813 | Tertiary |
| Tibane | 8 420 | 15 207 | Tertiary |
| Lebowakgomo | 74 567 | 134 676 | Primary |
| Mogodi (R37/R518) | 16 901 | 30 525 | Tertiary |
| Mankweng | 26 539 | 47 932 | Secondary |
| Senwabarwana | 19 924 | 35 985 | Tertiary |
| Botlokwa | 9 311 | 16 817 | Tertiary |
| Zebediela | 14 841 | 26 804 | Tertiary |
| Mathibela | 15 702 | 28 360 | Tertiary |
| Mogwadi | 7 216 | 13 033 | Tertiary |

*Table 4.4.5: Mopani District PT intermodal transfer facilities classification*

| Location | Present Passenger Volume (2009) | Projected Passenger Volume (2029) | Classification |
|---|---|---|---|
| Tzaneen | 78 603 | 141 966 | Primary |
| Giyani | 82 322 | 148 683 | Primary |
| Modjadjiskloof | 10 434 | 18 845 | Tertiary |
| Nkowankowa | 56 138 | 101 391 | Primary |
| Lenyenye | 21 774 | 39 326 | Tertiary |
| Letsitele | 10 665 | 19 262 | Tertiary |
| Tarentaal | 15 221 | 27 491 | Tertiary |
| Leydsdorp (P17/3) | 15 687 | 28 332 | Tertiary |
| Bordeaux | 11 115 | 20 075 | Tertiary |
| The Oaks | 12 473 | 22 528 | Tertiary |
| Ga-Kgapane | 19 360 | 34 966 | Tertiary |
| Dzumeri | 11 037 | 19 934 | Tertiary |
| Jamela | 6 642 | 11 996 | Tertiary |
| Klaserie | 6 899 | 12 460 | Tertiary |
| Hoedspruit* | 9 727 | 17 568 | Tertiary |
| Namakgale | 21 055 | 38 028 | Tertiary |
| Phalaborwa* | 49 252 | 107 917 | Primary |

*Table 4..4.6: Waterberg District PT intermodal transfer facilities classification*

| Location | Present Passenger Volume (2009) | Projected Passenger Volume (2029) | Classification |
|---|---|---|---|
| Thabazimbi | 10 361 | 22 702 | Tertiary |
| Lephalale* | 11 628 | 78 227 | Primary |
| Vaalwater | 8 687 | 33 616 | Tertiary |
| Pienaarsrivier | 10 330 | 18 657 | Tertiary |
| Bela-Bela | 31 384 | 56 683 | Secondary |

| | | | |
|---|---|---|---|
| Modimolle | 18 427 | 48 892 | Secondary |
| Mookgophong | 5 524 | 9 977 | Tertiary (Note) |
| Mokopane | 20 016 | 53 108 | Secondary |
| Tom Burke | 12 530 | 22 631 | Tertiary |
| Marken | 2 777 | 10 746 | Stop |

*Note*

*Moogkophong shows a very low passenger volume count which is not in line with the other towns of the same characteristics such as Bela-Bela, Modimolle and Mokopane. For the sake of continuity in terms of provision of modal interchange transport infrastructure, it is essential and logical that Mookgophong be given a similar classification as these other three towns, at least a tertiary classification rather than a stop.*

*Table 4.4.7: Vhembe District PT intermodal transfer facilities classification*

| Location | Present Passenger Volume (2009) | Projected Passenger Volume (2029) | Classification |
|---|---|---|---|
| Louis Trichardt | 73 188 | 132 186 | Primary |
| Elim | 34 233 | 61 829 | Primary |
| Bungeni | 15 232 | 27 511 | Tertiary |
| Vuwani | 10 816 | 19 535 | Tertiary |
| Tshakhuma | 23 555 | 42 543 | Secondary |
| Lwamondo | 32 043 | 57 873 | Secondary |
| Sibasa | 43 490 | 78 548 | Primary |
| Vhufuli | 14 849 | 26 819 | Tertiary |
| Phiphidi | 12 330 | 22 269 | Tertiary |
| Makonde* | 32 958 | 59 526 | Secondary |
| Tshilidzini Hospital | 45 217 | 81 667 | Primary |
| Siloam Hospital | 21 580 | 38 976 | Tertiary |
| Wyllie's Poort | 7 562 | 13 658 | Tertiary |
| Kutama (Madombidzha) | 23 127 | 41 770 | Secondary |
| Thohoyandou | 81 856 | 147 841 | Primary |
| Musina* | 4 388 | 11 643 | Tertiary |
| Mutele/Mutale* | 3 988 | 7 203 | Stop |
| Malamulele | 35 141 | 63 469 | Primary |

The summary of the number of intermodal facilities in the districts in the Province is shown in Table 4.4.8 below.

*Table 4.4.8: Summary of Intermodal Facilities in District Municipalities*

| Description | District Municipality | | | | |
|---|---|---|---|---|---|
| | Sekhukhune | Capricorn | Mopani | Waterberg | Vhembe |

| | | | | | |
|---|---|---|---|---|---|
| Depot | 3 | 2 | 3 | 3 | 4 |
| Primary | 3 | 2 | 3 | 2 | 4 |
| Secondary | 6 | 2 | 4 | 3 | 4 |
| Tertiary | 12 | 8 | 13 | 5 | 8 |
| Major Stop | 65 | 37 | 44 | 60 | 43 |
| Minor Stop | 258 | 149 | 175 | 242 | 174 |

## 8.5 Priorities at corridor intersections

In order to function effectively, the intermodal public transport facilities will need to have certain basic infrastructure. Priorities at these intersections are based on the following criteria, which are determined on the basis of the services offered at each of the four types. The actual project level needs will be determined at project implementation stages when accurate project definitions would be done during individual project feasibility study. A general indication of needs at corridor intersections is shown in table 4.5.1 below.

*Table 4.5.1: Priorities and needs at corridor intersections*

| **Type of Facility** | **Needs and services to be provided** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***Offices*** | ***Waiting area/Rest rooms*** | ***Ablution facility*** | ***Pit latrines*** | ***Wash bays*** | ***Shops; Convenience stores*** | ***Informal Business trading*** | ***Shelters for buses, taxis and NMT*** | ***Open informal trading area*** | ***Park-and-Ride facilities*** | ***Bicycle*** |
| *Depots* | Yes | No | Yes | No | Yes | No | No | Yes | No | No | No |
| *Primary Public Transport Facility* | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Secondary Public Transport Facility* | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Tertiary Public Transport Facility* | Yes | Yes | Yes | No | Yes | Yes | Yes | No | Yes | Yes | Yes |
| *Major Stopping Facility* | No | No | No | Yes | No | No | No | No | Yes | No | No |
| *Minor Stopping Facility* | No | No | No | No | No | No | No | No | Yes | No | No |

## 8.6 Priorities along each corridor

Priorities along public transport corridors are defined as those interventions that would result in enhancing travel by public transport along the routes, to an extent that people would leave their private vehicles and travel by public transport. In terms of infrastructure, these would include the provision of the following:

- Additional dedicated lanes on public transport routes, particularly in cities and built-up areas
- Provision of climbing lanes at strategic sections along public transport routes,
- Widening of existing narrow surfaced shoulders,
- Provision of adequate surfaced shoulders at strategic sections,
- Surfacing of collector gravel roads: secondary and tertiary, which are justifiable
- Regravelling of poor gravel roads,
- Provision of adequate drainage structures to ensure all-weather travel and connectivity – even to isolated villages
- Provision of non-motorised transport facilities at strategic locations on the network
- Effective road maintenance programmes, e.g., implementation of road management systems in all districts and the Province.

The approach to the above strategies is discussed in the following paragraphs.

The current AM peak period passenger numbers along the public transport corridors were used to calculate the peak period traffic volume. The assumption was made that the current AM peak period passenger numbers were based on a three (3) hour period. The peak hour traffic was then calculated based on the assumption above. The peak hour traffic was then converted to the Average Annual Daily Traffic (AADT) and compared with the capacity recommendations as published in the "Highway Capacity Manual 2000". Table 4.6.1 below shows the comparison between the AM peak period passenger numbers and the AADT.

*Table 4.6.1: Comparison between morning peak passenger numbers and AADT*

| | **AADT** | | | |
|---|---|---|---|---|
| **Guideline** | **250** | **500** | **700** | **1000** |
| **Passenger No (Peak Period)** | 670 | 1350 | 1900 | 2700 |

Notes: 1.The modal split between the captive transport and the choice transport were obtained from analysis conducted on the actual site observations and records.

2. The sub-modal split between the busses, midi busses, taxi's and non-motorised transport (NMT) were obtained from analysis conducted on the actual site observations and records.

4.6.1 Additional dedicated lanes

One of the most common strategies in major cities is the provision of dedicated public transport ways at highly congested sections of their networks. Sometimes these dedicated ways could be opened up for private transport during off-peak periods. Additional lanes are normally essential in urban areas where there are traffic congestions. According to the "Highway Capacity Manual 2000" the construction of additional lanes are recommended when the AADT is higher than 2550 vehicles per day. The corridors that require additional dedicated lanes were identified using the recommended AADT from the "Highway Capacity Manual 2000", Table 4.6.1 above and site observations.

4.6.2 Climbing Lanes

Major delays occur where public transport vehicles have to follow slow moving trucks in steep mountainous sections of the road network. These conditions do occur at some sections of the roads in the Province, and result in travel delays for public transport. The provision of climbing lanes, especially on long steep routes would ease the flow of traffic on the road network. These widened sections could be marked as dedicated lanes to favour the use by public transport vehicles.

The future climbing lanes were identified by the use of the guidelines in the "Highway Capacity Manual 2000". Where the AADT per lane is higher than 300, construction of a climbing lane would be warranted.

4.6.3 Widening of existing narrow surfaced shoulders

The majority of the roads in the Provincial network do not have adequately constructed shoulders. The situation may be worsened by worn-out edges and shoulders that are in dire need for re-gravelling. Adequate surfaced shoulders have a huge potential to increase the capacity of a road, and thus result in rapid public transport in the system. These will need to be wide enough to enable slow moving vehicles such as trucks, to drive on them and allow public transport to pass. A total shoulder width of 2.5m would be adequate. Adequate signage will have to be placed to regulate the traffic. The

widening of surfaced shoulders was determined by field observations and analysis of the field data.

4.6.4 Provision of adequate surfaced shoulders

The majority of the surfaced roads in the Province have no surfaced shoulders, even though they may have wide enough gravel shoulders. As stated in 4.5.3 above, the capacity of these roads could be enhanced by surfacing the shoulders. A total shoulder width of 2.5m would be adequate. The need for surfaced shoulders was determined by field observations and analysis of the field data.

4.6.5 Surfacing of Gravel Roads

Poor gravel roads have a huge negative contribution towards delays on public transport and movement of passengers. Travel times could be reduced tremendously when gravel roads are surfaced. The gravel roads were identified by using the recommendation from the "Highway Capacity Manual 2000". The manual recommends that a gravel road must be upgraded to a surfaced road when the AADT is higher than 500 vehicles per day. The recommended surfacing of roads was also based on the access to the following public or community facilities:

- Clinics and Hospitals
- Shopping centres
- Schools
- New and future developments

4.6.6 Regravelling of roads

Those gravel roads that cannot be justified for surfacing both economically and socially, should at least be regravelled in order to improve their riding quality. This would result in the reduction of travel times on the network. The gravel roads to be regravelled were identified by using again the recommendation from the "Highway Capacity Manual 2000". For the purposes of this investigations the following criteria were used to determine which gravel roads should be regravelled:

- Passenger volume exceeding 300 passengers peak hour period
- Roads in a poor state and inaccessible

4.6.7 Provision of adequate drainage structures

The provision of adequate drainage structures will open up access for remote communities. This strategy could be one simultaneously with the regravelling

of the road in the network. The following criteria were used to determine the drainage structures along the corridors.

- Rainfall in the corridor area
- The terrain (Flat, Rolling or Mountainous)
- New drainage structures along the new proposed surfaced road

The results for the upgrading of the road network in order to enhance PT are shown in the table below, Table 4.6.2.

4.6.8 Non-motorised transport facilities

Non-motorised transport facilities comprise the following aspects that should be integrated into the whole public transport infrastructure implementation strategies in the Provincial network.

- Walkways
- Cycle-ways
- Bicycle storage facilities
- Animal-drawn vehicle-ways

The approach to the priorities along public transport routes is summarised in Table 4.6.2 below.

*Table 4.6.2: Approach to determine priorities and strategies along PT routes*

| **Road category** | **Strategic actions** | | | | | | |
|---|---|---|---|---|---|---|---|
| | ***Dedicated lanes*** | ***Climbing lanes*** | ***Surfacing of gravel shoulders*** | ***Surfacing gravel roads*** | ***Re-gravel poor gravel roads*** | ***NMT*** | |
| | | | | | | ***Walk/ Cycle-ways*** | ***Animal drawn Vehicle ways*** |
| *Primary* | Yes | Yes | Yes | n/a | n/a | Yes | Yes |
| *Secondary* | Yes | Yes | Yes | n/a | n/a | Yes | Yes |
| *Tertiary* | n/a | Yes | Yes | Yes | Yes | Yes | Yes |
| *Minor/ Gravel roads* | n/a | n/a | n/a | Yes or No | Yes | n/a | n/a |

The actual needs along the public transport routes could be summarised as shown in Table 4.6.3 below.

*Table 4.6.3: Summary of upgrading needs along public transport routes*

| **District** | **Type of upgrading needs proposed** |
|---|---|

| | Dedicated or climbing lanes (km) | Widening existing shoulders & Surfacing of gravel shoulders (km) | Surfacing of collector gravel roads (km) | Re-gravel poor gravel roads (km) | Clearing of gravel shoulders (km) |
|---|---|---|---|---|---|
| Capricorn | 146 | 466 | 1564 | 1350 | 518 |
| Mopani | 176 | 347 | 879 | 950 | 454 |
| Sekhukhune | 644 | 388 | 835 | 1000 | 941 |
| Vhembe | 84 | 48 | 2408 | 1800 | 384 |
| Waterberg | 116 | 474 | 1259 | 2350 | 660 |

### 4.6.9 Road maintenance management systems

One of the most challenging aspects in the management of road networks is to keep the roads in good condition at all times. Failure to achieve an acceptable level of maintenance would result in poor riding quality which would impact negatively on travel times. It is therefore essential that the road authorities should practise proven methods to maintain their networks.

## 8.7 Potential impacts at major junctions on each corridor

### 4.7.1 Impacts

A study of the major junctions was conducted at selected junctions in each district. The junctions selected were divided and classified as urban and rural junctions. The traffic regimes were observed by determining the composition of traffic converging at a particular junction. The observations classified the traffic into the following:

- Public transport modes, which comprises:
  - Bus
  - Midi-buses
  - Kombis
  - Non-motorised
- Private transport, comprising all other vehicles.

Analyses of the data yielded the following information with regard to the distribution of traffic at these selected intersections.

*Table 4.7.1: Modal split at Major Intersections per District*

| District | Bus % | Midi Taxi % | Kombi Taxi % | Other % | Non Motorised % |
|---|---|---|---|---|---|
| | | | | | |
| Capricorn | 1.66 | 1.44 | 23.85 | 72.73 | 0.32 |
| Sekhukhune | 0.91 | 0.82 | 16.97 | 81.31 | 0.00 |
| Vhembe | 3.40 | 0.32 | 22.21 | 74.05 | 0.03 |
| Mopani | 1.88 | 0.75 | 17.09 | 80.12 | 0.16 |
| Waterberg | 2.55 | 1.14 | 12.75 | 83.50 | 0.07 |
| **Average** | **1.96** | **0.83** | **20.03** | **77.05** | **0.13** |

From the above analysis, the following can be concluded:

- Buses constitute 1.0% to 3.4% of the total traffic
- Midi buses constitute some 0.32% to 1.44% of the total traffic
- Kombi taxes are dominating the PT, ranging from 12.75% to 23.85% of total traffic
- Non-motorised transport is till very small, comprising some 0.0% to .32% of total traffic
- On average, the dominant public transport mode is the kombi taxis with 20.03 %, followed by busses with 1.96% and midi buses with 0.83%. The non-motorised is coming last with 0.13%.
- The traffic modal split is still dominated by other modes (private transport) which comprises of private and heavy vehicles (70.05%).

### 4.7.2 Potential Strategies to streamline PT

The planning and design of public transport facilities, as well as their ultimate location should be done in such a way that will result in the smooth running of the public transport element of the total road traffic. The following aspects will require special attention, to minimise conflicts between public and private transport.

- Adequate acceleration and deceleration lanes
- Provision of pedestrian facilities, such as walkways
- Provision of bicycle ways, if it is combined with pedestrian walkways
- Additional lanes where required, in addition to climbing lanes

- Park-and-ride facilities at modal interchanges
- Efficient intermodal facility design, integrating all modes and having good access and circulation

## 8.8 Framework for depots, termini, stations and stops

Planning for intermodal public transport facilities needs to take into account a number of factors, the most important of which are those listed below. Some of these factors should be considered immediately as they pertain to issues of land use management, and should not be left to the time a facility is due for implementation. Failure to do this might jeopardise the effectiveness of the transportation system, for example, the lack of land to develop such a facility.

*Table 4.8.1: Framework for PT facilities*

| Factor | Depots | Intermodal Facilities | Stop |
|---|---|---|---|
| **Location** | Passenger volumes<br><br>Major service centres<br><br>Trip ends | Passenger volumes<br>Intersection major corridors<br><br>Interchanges | Every 1km<br><br>Minimise walking<br><br>distances<br><br>Direction of travel |
| **Land** | To be identified, rezoned and reserved urgently<br><br>10 ha to 20 ha | Identify, rezone and reserve urgently<br><br>15ha to 30 ha | Within the road reserve |
| **Size** | Dependent on class of facility, modal split requirements, required services, distribution in the network | Dependent on the class of facility, passenger volumes, distribution of facilities of facilities, in the network, modal split requirements, required services | Passenger volumes,<br><br>Modal split requirements |
| **Design** | Traffic impacts<br><br>Geotechnical constriction<br><br>Environmental impacts | Traffic impacts<br><br>Geotechnical constriction<br><br>Environmental impacts | |
| **Stakeholder Participation** | Public Transport Operators<br>General public<br><br>Local municipalities<br><br>District municipalities<br>Provincial departments<br>National government departments<br><br>Parastatals | Public Transport Operators<br>General public<br><br>Local municipalities<br><br>District municipalities<br>Provincial departments<br>National government departments<br><br>Parastatals | PT operators<br><br>General public<br><br>Local municipalities |

| | | | |
|---|---|---|---|
| **Environmental Impacts** | High<br><br>Consider immediately after location as part of approval of facility | High<br><br>Consider immediately after location as part of approval of facility | Low<br><br>Part of road improvements |

# 6 INTEGRATED PUBLIC TRANSPORT NETWORK: HIGH LEVEL SERVICE DESIGNS

## 5.6 Introduction

The Limpopo Department of Roads and Transport appointed Nyeleti and Vela VKE Joint Venture in July 2009 to do a study on integrated public transport network. This report details the approach, constraints and methodology applied for the part of the project dealing with the service design as per the scope i.e.

- Network design and vehicle allocation
- Determination of frequencies and operating details

This report details the development of high level new service designs for the current subsidised services in the Limpopo Province. The new Integrated Public Transport Network (IPTN) designs for each area are attached.

## 5.7 Background

There are current subsidised services in all districts of the province. The following areas were considered as part of the redesign of services based on Induced Passenger Demand methodology:

- Sekhukhune District
  - Groblersdal
  - Greater Tubatse
  - Makhuduthamaga
  - Marble Hall
- Waterberg District
  - Mokopane
  - Lephalale
- Vhembe
  - Thohoyandou
  - Makhado
- Capricorn
  - Lepelle Nkumpi
  - Molemole
  - Polokwane (Mankweng and Dikgale)
- Mopani
  - Tzaneen

The approach for the design was to include the quality issues in the public transport strategy and the action plan. The transport quality issues include the following:-

- To reduce travel time;
- To reduce travel distance;
- Improve access to public transport;
  - Service frequency and hours of operation; and
  - Service quality that is car competitive

## 5.8 Methodology

The accepted standard method for the development of service designs entails the following:-

- Collection of passenger survey data on all public transport services;
- Determine origins and destinations;
- Determine directional flows of public transport vehicles;
- Measure public transport routes and operating kilometres;
- Develop timetables;
- Determine fleet requirements;

The standard method was not followed as set out above due to the restrictions of the scope. As a result thereof the following constraints were experienced:-

- Some of the rural areas do not appear on the maps;
- The RAL counts did not give directional flow of the passengers;
- The counts did not specify the mode of transport used;
- Vehicle counts did not correlate with some of the contracted services;
- There were no route measurement information; and
- Overall, the information was insufficient to follow the methodology outlined above.

The restrictive scope and the constraints required the adoption of an **alternate methodology** known as the induced public transport demand approach which included the following:-

- Analysing available information and data;
- Analysis of district maps, current routes, origins and destinations from the current subsidised services;
- Identify the line haul routes;
- Identify complementary routes;
- Identify Integrated Public Transport Networks (IPTN);
- Identify the villages to be serviced;

- Apply transport quality issues;
- Analysis of passenger demand;
- Assign trips to complementary and line haul routes;
- Identify en-route stops and transfer points;
- Application of modal efficiencies;
- Development of peak and off-peak frequencies; and
- Draft timetables.

From the analysis of the current subsidised services, a service based on trunk routes and complementary services was designed. Once the current passenger demand is determined, the fleet requirements will be considered. This will be based on modal efficiencies for the trunk routes as well as the complementary services.

The next step is the identification of certain stopping points, junctions, transfer points and stops along the highlighted IPTN on the area maps. The transfer points were identified to serve as starting points for the line haul service. For each transfer point and stop, villages were identified that will be served by the complementary service. The approach in the service design was with the aim of increasing mobility by assigning trips to the identified transfer point at a high frequency during the peak hours. In some instances, the starting time as per the current service was altered by assigning trips at more convenient times with an understanding that passengers currently use an earlier service because of longer travel times and lack of suitable alternative departure times.

## 5.9 Services Designs

### 5.9.1 Sekhukhune District Municipality

The service designs in Sekhukhune district will include inter district service which has been identified in phases differentiated by the IPTN routes.

Phase 1 of the service design inter connect 3 municipalities namely Makhuduthamaga, Elias Motsoaledi and Marble Hall.

Phase 2 inter connect Marble Hall, Makhuduthamaga and Elias Motsoaledi

Phase 3 inter connect Marble Hall, Makhuduthamaga and Elias Motsoaledi

Phase 4 inter connect Fetakgomo, Tubatse and Makhuduthamaga

Phase 5 inter connect Fetakgomo, Makhuduthamaga and Tubatse

**PHASE 1:**

**STARTING POINT JANE FURSE (MAKHUDUTHAMAGA, ELIAS MOTSOALEDI, MARBLE HALL)**

**TRANSFER POINT 1 (JUNCTION D2219 and D4295)**

The following villages will be provided with complementary services to this transfer point:-

Vleeschboom

Phokwane

Glen Cowie

Phatametsane

The following villages will be provided with complementary services at **STOP 1.1** Maserumo:-

| | |
|---|---|
| Nebo | Kopjeng |
| Thoto | Mathlatseng |
| Patantswane | Ga Rantho |

The following villages will be provided with complementary services at **STOP 1.2** Vierfontein A:-

| | |
|---|---|
| Vierfontein | Lemakong |
| Ngwaritsi | Morulaneng |
| Eenzaam | |

**TRANSFER POINT 2 (JUNCTION D4295 and D1547)**

The following villages will be provided with complementary services to this transfer point D4295 and D1547:-

| | | | |
|---|---|---|---|
| Magukubjane | Thabaleboto | Zaaiplaats | Mare |
| Makgopeng | Dindela | Elandslaagte | Ga Phetla |
| Talane | Vaalkopfontein | Monsterlus | Masodi |
| Hlogotlou | Mathula Stands | Keerom | |

The following villages will be provided with complementary services at **STOP 2.1** Sephaku Crossing:-

| | |
|---|---|
| Mabintwane A | Manyaga/ |
| Maraleng | Sephaku |
| Ga Matloponya | Jerusalem |
| Ga Pamadi | Kwadlaulane |

The following villages will be provided with complementary services at **STOP 2.2** D4330 and D1547:-

| | | | |
|---|---|---|---|
| Bafaladi | Lukau | Irutseneng | Nkadimeng |
| Matsepe | Mabitsi | Seriteng | |
| Ngwanalemong | Vaalbank | Legolaneng | |
| Puleng | Ga Hlopa | Madiilo | |

The following villages will be provided with complementary services at **STOP 2.3** Tafelkop:-

| | |
|---|---|
| Welgelegen | Rite |
| Dikgalaopeng | Tafelkop |

The following villages will be provided with complementary services at **STOP 2.4** Motetema:-

Matshelapata

Motetema

**TRANSFER POINT 3 (JUNCTION D856 AND P95/1)**

**(DENNILTON SERVICE TO GROBLERSDAL)**

The following villages will be provided with complementary services to this transfer point D856 and P95/1:-

| | |
|---|---|
| Dennilton | Thabakhubedu |
| Mpheleng | Ntwane |
| Magakadimeng | Marapong |
| Mthenti | Elandsdoring |
| Kalofane | Matlala |

The following villages will be provided with complementary services at **STOP 3.1** Uitspanning A:-

Uitspanning

**TRANSFER POINT 4 (JUNCTION D2919 and D2664)**

**(RATHOKE SERVICE TO MARBLE HALL)**

The following villages will be provided with complementary services to **STOP 4.1** D2919 and D2664:-

| | | |
|---|---|---|
| Leeuwkuil | Driefontein | Rathoke |
| Spitspunt | Uitvlucgt | Zamenkonst |
| Doornlaagte | Keerom | |

The following village will be provided with complementary service to **STOP 4.2** Matlala

Matlala

**TRANSFER POINT 5 (MARBLE HALL)**

The following villages will be provided with complementary services to this transfer point:-

Marble Hall

Leeuwfontein

The following villages will be provided with complementary services at **STOP 5.1** Moganyaka:-

Moganyaka

Manapsane

The following villages will be provided with complementary services at **STOP 5.2** Mamphogo:-

Mamphogo

Tsimanyane

Makharankana

The following villages will be provided with complementary services at **STOP 5.3** D4325 and D4300:-

Welgelegen

Dikgalaopeng

The following villages will be provided with complementary services at **STOP 5.4** D4300 and D4373:-

Puleng

Madiilo

The following villages will be provided with complementary services at **STOP 5.5** D998, D4328 and D4371:-

| | | | |
|---|---|---|---|
| Ga Mmela | Goru | Seriteng | Motwaneng |
| Ga Matlala | Makhutso | Mabitsi | |
| Ragaphela | Selabeng | Vaalbank | |

The following villages will be provided with complementary services at **STOP 5.6** D4334 and D4285:-

Mabintwane

Doornspruit

**PHASE 2: STARTING POINT MARBLE HALL (MARBLE HALL, MAKHUDUTHAMAGA, ELIAS MOTSOALEDI)**

**TRANSFER POINT 6 (JUNCTION D4100 AND D4300)**

The following villages will be provided with complementary services to this transfer point D4100 and D4300:

| | |
|---|---|
| Marble Hall | Madiilo |
| Leeuwfontein | Puleng |
| Moganyaka | Dikgalaopeng |
| Manapsane | Welgelegen |

The following villages will be provided with complementary services at **STOP 6.1** D4100 and D4370:-

Ga Makharankana

Kromdraai

Tsimanyane

Ga Mmela

The following villages will be provided with complementary services at **STOP 6.2** Mogaladi:-

Mohlotsi

Masanteng

Serageng

De Makhutso

The following villages will be provided with complementary services at **STOP 6.3** D4344 and D4260:-

| | |
|---|---|
| Moomane | Kome |
| Sephoto | Semahlakole |
| Ga Manyanyane | Good Hope |

The following villages will be provided with complementary services at **STOP 6.4** D4262 and D4264:-

Sehuswane

Masehlaneng

Mathapisa

The following villages will be provided with complementary services at **STOP 6.5** Ga Marishane:-

Ga Marishane

**PHASE 3: STARTING POINT MARBLE HALL (MARBLE HALL, MAKHUDUTHAMAGA, ELIAS MOTSOALEDI)**

**TRANSFER POINT 7 (JUNCTION D4100 AND D4370)**

The following villages will be provided with complementary services to this transfer point D4100 and D4370:

| | | |
|---|---|---|
| Marble Hall | Madiilo | Mohlotsi |
| Leeuwfontein | Puleng | Masanteng |
| Moganyaka | Ga Makharankana | Serageng |

| | | |
|---|---|---|
| Kromdraai | Manapsane | De Makhutso |
| Tsimanyane | Ga Mmela | |

The following villages will be provided with complementary services at **STOP 7.1** D4356 and D4100:-

Phetwane

Elandskraal

V/d Merwe Kraal

The following villages will be provided with complementary services at **STOP 7.2** D4360 and D4100:-

Mogolotsane

Masanteng

The following villages will be provided with complementary services at **STOP 7.3** Tswatago:-

Serageng

Tswatago

The following villages will be provided with complementary services at **STOP 7.4** D4260 and D4100:-

| | | |
|---|---|---|
| Thabanapitsi | Moswanyaneng | Mahlolweneng |
| Mmakgwabe | Matubane | |
| Malope | Maraganeng | |

**TRANSFER POINT 8 (JUNCTION D4045 and D4250)**

The following villages will be provided with complementary services to this transfer point D4045 and D4250:-

Mabokotswane

Tswaing

Vlakplaats

The following villages will be provided with complementary services at **STOP 8.1** D4255 and D4045:-

Manane

Maroge

The following villages will be provided with complementary services at **STOP 8.2** D4249 and D4045:-

Mahubetswane

Mahlakole

Momokgatsane

Moeding

Mapoteng

Ga Mokalapa

Thabampshe

The following villages will be provided with complementary services at **STOP 8.3** D4256 and D4045:-

Magate

Nooitgedacht

Kwete

The following villages will be provided with complementary services at **STOP 8.4** D4252 and D4045:-

Proberen

Mogodumo

Ga Machacha

The following villages will be provided with complementary services at **STOP 8.5** Ga Phahla:-

Ga Rantobeng Ga Phahla

Mmatsekele Magukubu

Dihlabeng

**PHASE 4: STARTING POINT APEL (FETAKGOMO, TUBATSE, MAKHUDUTHAMAGA)**

**TRANSFER POINT 9 (JUNCTION D4250 AND D4190)**

The following villages will be provided with complementary services to this transfer point D4250 and D4190:-

Apel

The following villages will be provided with complementary services at **STOP 9.1** D4191 and D4190:-

Maesela

Sesesehu

The following villages will be provided with complementary services at **STOP 9.2** D4124 and D4190:-

Ga Maesela

Modimolle

Pelangwe

The following villages will be provided with complementary services at **STOP 9.3** D4197 and D4190:-

Mphaaneng

Malogeng

The following villages will be provided with complementary services at **STOP 9.4** D4197 and D4180:-

| | |
|---|---|
| Petsa | Ga Manotwane |
| Masilabele | Ga Selepe |
| Marupotleng | Umkoanestad |
| Malomanye | |

The following villages will be provided with complementary services at **STOP 9.5** D4195 and D4180:-

Sefateng

Monametsi

**TRANSFER POINT 10 (JUNCTION D4180 AND R37)**

The following villages will be provided with complementary services to this transfer point D4180 and R37:-

Mmabulela

Atok

Shubushubung

Jaglust

The following villages will be provided with complementary services at **STOP 10.1** D4126 and R37:-

Jobskop

Matianyane

Ga Wannankaya

Modupyane

The following villages will be provided with complementary services at **STOP 10.2** D5013 and R37:-

Ga Pasha

Senthane

Lekgwareng

Wismar

The following villages will be provided with complementary services at **STOP 10.3** D4130 and R37:-

Lesetse

**TRANSFER POINT 11 (JUNCTION D4134 AND R37)**

The following villages will be provided with complementary services to this transfer point D4134 and R37:-

| | |
|---|---|
| De Paarl | Moshira |
| Senyatho | Thagatse |
| Molekele A and B | Malokela |

The following villages will be provided with complementary services at **STOP 11.1** D4134 and R37:-

| | |
|---|---|
| Twickenham A and B | Magakala |

Mongatane Village Mashabale

The following villages will be provided with complementary services at **STOP 11.2** Mecklenberg Hospital:-

Mecklenberg

The following villages will be provided with complementary services at **STOP 11.3** Ga Kgwete:-

Shakung

The Shelter

Ga Kgwete

The following villages will be provided with complementary services at **STOP 11.4** D4185 and R37:-

| | | |
|---|---|---|
| Morapaneng | Maetsi | Magabeneng |
| Surbiton A | Seuwe | |
| Diphale village | Ntswaneng | |

The following villages will be provided with complementary services at **STOP 11.5** D995 and R37:-

Clapham A

The following villages will be provided with complementary services at **STOP 11.6** Ga Selala:-

Ga Mashishi

Ga Selala

Matadi

**TRANSFER POINT 12 (JUNCTION D4172 AND R37**)

The following villages will be provided with complementary services to this transfer point D4172 and R37:-

Ga Podile

Motlolo

The following villages will be provided with complementary services at **STOP 12.1** Mooihoek A:-

Mooihoek

The following villages will be provided with complementary services at **STOP 12.2** Ga Mahlopi:-

Ga Mahlopi

The following villages will be provided with complementary services at **STOP 12.3** D4169 and R37:-

Mahlokwane

Groothoek A

Ga Mathipa

Ga Ragopola

The following villages will be provided with complementary services at **STOP 12.4** Ga Morethe:-

Ga Morethe

The following villages will be provided with complementary services at **STOP 12.5** Sebope:-

Sebope

The following villages will be provided with complementary services at **STOP 12.6** Mashibiring:-

Mashibiring

Driekop village

The following villages will be provided with complementary services at **STOP 12.7** Driekop:-

| | | |
|---|---|---|
| Digabane | Ga Maroga | Matimatsatsi |
| Ditjineng | Sekiti | Molongwane |
| Ga Moeng | Setshitshi | Difatsaneng |
| Ga Maepa | Mpuru | |

The following villages will be provided with complementary services at **STOP 12.8** D4166 and R37 (Riba cross):-

| | |
|---|---|
| Growe | Ga Madiseng |
| Ga Modupi | Makgamathe |
| Lekorokorwaneng | |
| Ga Riba | |

**TRANSFER POINT 13 (JUNCTION D4134 AND D2537)**

**(D2537 AND D4150 TO BURGERSFORT)**

The following villages will be provided with complementary services to this transfer point 13 D4134 and D2537:

| | |
|---|---|
| Mmamogolo | Kgoponeng |
| Penge | Streatham A |
| Segorong | |

The following villages will be provided with complementary services at **STOP 13.1** Ga Malepe:

Ga Malepe

The following villages will be provided with complementary services at **STOP 13.2** Morgezon:-

Morgenzon

Ga Motshana

The following villages will be provided with complementary services at **STOP 13.3** D4140 and D2537:-

| | |
|---|---|
| Makubu | Sekopung |
| Mabotsha | Ga Makofane |
| Maphoko | |

The following villages will be provided with complementary services at **STOP 13.4** Mokgobola:-

Mokgobola

The following villages will be provided with complementary services at **STOP 13.5** Mabotsha:-

Mabotsha

**TRANSFER POINT 14 (TAUNG VILLAGE**)

The following villages will be provided with complementary services to this transfer point Taung village:

Taung village

Ga Maditsi

The following villages will be provided with complementary services at **STOP 14.1** Makwataseng:-

Makwataseng

The following villages will be provided with complementary services at **STOP 14.2** D4165 and D4150:-

Bogwasa

The following villages will be provided with complementary services at **STOP 14.3** Ga Motodi:-

Ga Motodi

The following villages will be provided with complementary services at **STOP 14.4** Praktiseer:-

Praktiseer

The following villages will be provided with complementary services at **STOP 14.5** Bothashoek village:-

Bothashoek village

The following villages will be provided with complementary services at **STOP 14.6**:- Ramaube

Ramaube

The following villages will be provided with complementary services at **STOP 14.7** Ga Manoke:-

Ga Manoke

**TRANSFER POINT 15 (JUNCTION D4151 AND D2405)**

The following villages will be provided with complementary services to this transfer point D4151 and D2405:

Motsepulana

Mahlasi

The following villages will be provided with complementary services at **STOP 15.1** Alverton:-

Alverton

Motlailane

Naboomkoppies

The following villages will be provided with complementary services at **STOP 15.2** D2537 and D4425:-

Appiesdoringdraai

**PROPOSED PHASE 4.1 STARTING POINT JANE FURSE TO BURGERSFORT**

**TRANSFER POINT 16 (JUNCTION D2219 AND D4190)**

The following villages will be provided with complementary services at **STOP 16.1** D2219 and D4190:-

Tshehlwaneng

Ratau

Makgeru

The following villages will be provided with complementary services at **STOP 16.2** Ngwaabe:-

Ngwaabe

The following villages will be provided with complementary services at **STOP 16.3** D4239 and D2219:-

Ga Maepa Makuwa

Maphopha

The following villages will be provided with complementary services at **STOP 16.4** D4240 and D2219:-

Ga Masha

Mmaphoko

The following villages will be provided with complementary services at **STOP 16.5** D2219 and D169/1:-

Madibeng

Kutullo

The following villages will be provided with complementary services at **STOP 16.6** D2484 and D1392:-

Ga Mampuru Mabodile

Mapate Mamphahlane

Tukakgomo

**PHASE 5**

**STARTING POINT APEL (FETAKGOMO, MAKHUDUTHAMAGA, TUBATSE)**

**TRANSFER POINT 17 (JUNCTION D4250 AND D4190)**

The following villages will be provided with complementary services at **STOP 17.1** D4250 and D4190:-

Ga Matlala

Mogofele

Maesela

The following villages will be provided with complementary services at **STOP 17.2** Ga Mankopane:-

Ga Mankopane

The following villages will be provided with complementary services at **STOP 17.3** D4206 and D4190:-

Mohlaletsi

Hoeraroep A

Ga Makopa

The following villages will be provided with complementary services at **STOP 17.4** Dinotsi:-

Dinotsi

The following villages will be provided with complementary services at **STOP 17.5** D4209 and D4190:-

Tswereng

Ga Seroka

Ga Maroga

The following villages will be provided with complementary services at **STOP 17.6** D4212 and D4190:-

| | |
|---|---|
| Manoge | Ga Radingwana |
| Petseng | Phageng |
| Nalaneng | |

The following villages will be provided with complementary services at **STOP 17.7** D4228 and D4190:-

| | |
|---|---|
| Ga Maila | Madibaneng |
| Mathibeng | Tshatane |
| Marolo | Malegale |

The following villages will be provided with complementary services at **STOP 17.8** D4224 and D4190:-

Manganeng

Mankgota

The following villages will be provided with complementary services at **STOP 17.9** D4227 and D4190:-

| | |
|---|---|
| Seopela | Leokeng |
| Legare | Dihlabaneng |
| Mashegoana | |

The following villages will be provided with complementary services at **STOP 17.10** D4234 and D4190:-

| | | |
|---|---|---|
| Tswale | Soupiana B | Dingwane |
| Sekele | Kotsiri | Ga Makatane |
| Tswale | Maloma | |
| Mashegoana | Tshesane | |

5.9.2 Waterberg District Municipality

**LEPHALALE**

**PHASE 1**

**TRANSFER POINT 1 (Junction D3110 and R572)**

The following villages will be provided with complementary services to this transfer point:-

| | |
|---|---|
| Robroy 1&2 | Strydomsdrift |
| Kauletsi | Ga Seleka |
| Rietfontein | |
| Kokstad | |
| Madibaneng | |

The following villages will be provided with complementary services to this stop point 1.1:- D174 and R572

Bossche Diesd

Ga Seleka

**TRANSFER POINT 2 (Junction D3126 and D3110)**

The following villages will be provided with complementary services to this transfer point:-

| | | | |
|---|---|---|---|
| Registrasie | Klipspruit | Melkbosch | Van Leeuwen |
| Honey | Tshelamfake | Hugo De Groot | |
| Immelman | Witpoort | Thornlands | |

The following villages will be provided with complementary services to this stop point 2.1:- D1754 and D3110

Enterprise

Kitty

Melinda

Rooipoort

The following villages will be provided with complementary services to this stop point 2.2:- D3109 and D3110

| | |
|---|---|
| Olifantsdrift | Abbottspoort |
| Wagenervley | Neckar |
| Disappointment | |

**TRANSFER POINT 3 (MARKEN)**

The following villages will be provided with complementary services to this transfer point :- Marken

Vianen

Ga Rapadi

Mongatane

The following villages will be provided with complementary services to this stop point 3.1:- D1347 and P19/2

Ga Maeteletsa

Bangalong

The following villages will be provided with complementary services to this stop point 3.2:- D1748 and P19/2

Ga Monyeki

Setateng

**TRANSFER POINT 4 (Junction D2001)**

The following village will be provided with complementary services to this transfer point :-

Marapong

**TRANSFER POINT 5 (D1675)**

The following area will be provided with complementary services to this transfer point:-

Onverwacht

**TRANSFER POINT 6 (LEPHALALE)**

The villages identified in transfer point 1 and 2 will be provided with a service from Lephalale

To Medupi station, Matimba station and Exxarro mine with stops at junction D2001 and junction D1675.

**SERVICE TO ADDRESS SHIFT WORKERS NEEDS**

The service design to the power stations and the mine will be provided on shift basis since they operate 24 hours per day. Some services will be outside of normal operating hours to ensure that shift workers are catered for.

**MOKOPANE**

**Transfer Point 1 (D3500 and P19/1)**

The following villages will be provided with complimentary service to this transfer point:-

| | |
|---|---|
| Ga Mapela | Ga Masenya |
| Ga Matlou | Ga Mmalepekete |
| Viane | Ga Kgubudi |
| Sandsloot | Ga Letwaba |
| Nkidikitlana | Ga Mokaba |

**Transfer Point 2**

The following villages will be provided with complimentary service to this transfer point:- R35 and P19/1

| | |
|---|---|
| Mahwelereng | Lekalakala |
| Tshamahansi | Ga Molekana |
| Ga Madiba | Sekuruwe |
| Sekgakgapeng | Moshate |

### 5.9.3 CAPRICORN DISTRICT

**BOTLOKWA**

**Transfer Point 1 (N1-Matoks)**

The following villages will be provided with complementary service to this transfer point:-

| | |
|---|---|
| Makgato | Mphakane |
| Mangata | Eisleben |
| Sekakene | Ramokgopa |
| Ga Phasha | Ramatshowe |
| Sekonye | Matseke |

**DIKGALE**

**Transfer Point 1 (Sebayeng)**

The following villages will be provided with complementary service to this transfer point:- Sebayeng with D1536 and D4004 as stops to Mankweng and junction D3339 and R81 and Kotishing as stops to Polokwane.

| | |
|---|---|
| Marobala | Kgwareng |
| Maselaphaleng | Mantheding |
| Maphoto | Moshate |
| Dikgale | Madiga |
| Mehlakong | Masekwatse |
| Ga Mokgopo | Moduwane |
| Mantheding | Solomondale |

**MANKWENG**

**Transfer Point 1 (Boyne)**

The following villages will be provided with complementary service to this transfer point:- Boyne

| | |
|---|---|
| Ga Molepo | Mountainview |
| Makubung | Makgeng |
| Mamatsha | Dihlophaneng |

Ga Mogano Ga Ramphere

**Transfer Point 2 (Mentz)**

The following villages will be provided with complementary service to this transfer point:- Mentz

Matshelapata Ga Papo

Viking Houtbosdorp

Thabakgone Kgokong

Komaneng Leswane

Thune Ga Mamphaka

Ga Kama

**Transfer Point 3 (Nobody)**

The following villages will be provided with complementary services to this transfer point:- Nobody

Ga Thoka

Ga Mothapo

Ga Magowa

Ga Sebati

Laaste Hoop

**LEBOWAKGOMO SERVICE**

**Transfer Point 1**

The following villages will be provided with complementary services to this transfer point:- P134/3 and D3600

| | |
|---|---|
| Gedroogte | Manaileng |
| Khureng | Bolahlakgomo |
| Magatle | Molapo |
| Moletlane | Ga Madisha |
| Mogoto | Motantanyane |
| Makweng | Madika |
| Ga Madisha | |

**Transfer Point 2**

The following villages will be provided with complementary services to this transfer point:- P134/3 and D3612 with stops at junction D3608 and junction D3617 and D3618

Mogoto

Groethoek

Ga Rakgwatha

Mmakotse

Ga Ledwaba

**Transfer Point 3**

The following villages will be provided with complementary services to this transfer point:- D4045 and D3612

| | |
|---|---|
| Lenting | Lekhuswaneng |
| Tooseng | Ga Madisha |
| Marulaneng | Byldrift |
| Thamagane | Dithabaneng |

| | |
|---|---|
| Morotse | Maraleng |
| Malekapane | Makurung |

**Transfer Point 4**

The following villages will be provided with complementary services to this transfer point: Junction D4066 and D3612

| | |
|---|---|
| Seleteng | Mogodi |
| Hwelesaneng | Phalakwane |
| Patoga | Dithabaneng |
| Lekurung | Ramorake |
| Lesetsi | Masite |
| Shotolane | |

### 4.5.4 MOPANI DISTRICT

**TZANEEN**

**Transfer Point 1**

The following villages will be provided complementary services at this transfer point:- Junction D3881 with D3763 and junction D3870 and P17/3 as the stops.

| | |
|---|---|
| Sangoma | Matawa |
| Lefara | Hoveni |
| Rita | Bonn |
| Mafarana | Mulati |

| | |
|---|---|
| Gabaza | Cukumetani |
| Shiluvane | Mangweni |
| Mogapeng | Maralena |
| Nsolani | |

**Transfer Point 2**

The following villages will be provided complementary services at this transfer point:- D3763

Petanenge

Mohlaba Head kraal

Mohlaba cross

Moime

**Transfer Point 3**

The following villages will be provided complementary services at this transfer point:- D3870

Mogoboya

Craighead

Long valley

New Co-op

Khujwana

**Transfer Point 4 (To Tzaneen and Nkowankowa)**

The following villages will be provided complementary services at this transfer point:- D1292 and D3247

| | | |
|---|---|---|
| Mawa | Jopi | Mandlakazi |

| | | |
|---|---|---|
| Ga wale | Mavele | Fofoza |
| Ga Mokgwathi | Radoo | |
| Xihoko | Babanana | |
| Runnymede | Nwajaheni | |

**Transfer Point 5**

The following villages will be provided complementary services along D3180

| | |
|---|---|
| Matswe | Medingen |
| Mamphakgathe | Kgapane |
| Boshage | Motsinoni |
| Sekgothi | Sefolwe |
| Thako | |

**Transfer Point 6**

The following villages will be provided complementary services along D1350

| | |
|---|---|
| Thapane | Morapalala |
| Moruji | Mathomeng |
| Madumane | |
| Pjapjamela | |

**GIYANI**

The following villages will be provided complementary services along R81

| | | |
|---|---|---|
| Maphalle | Jamela | Basani |
| Ditshoshing | Msengi | Dzingidzingi |
| Shawela | Mamokgadi | Nwamankena |
| Maupa | Sefofotse | Shimange |
| Sedibene | Bellevue | Nooitgedacht |
| Nakampe | Dingamazi | |

The following villages will be provided complementary services along D1267

| | | |
|---|---|---|
| Mushiyani | Matsotsosela | Ratjeke |
| Xitlakati | Kheyi | Lekwareng |
| Khaxani | Guwela | Dumeri |
| Zava | Maphata | Mageva |
| Mphagani | Mayephu | Sikhuyani |

The following villages will be provided complementary services along P99/1

Maswanganyi

Bode

The following villages will be provided complementary services along D9

| | | |
|---|---|---|
| Tomu | Siyandani | Elim |
| Nwadzekudzeku | Sifasonke | Hatshama |
| Phaphazela | Nkuri | Mapuve |
| Mavalani | Shivulani | |
| Nghalalumi | Mulamula | |

The following villages will be provided complementary services along D3840

Nkomo
Phalaubeni
Xawela
Savulani
Xikhumba

The following villages will be provided complementary services along D3812

Vuhehli
Mapayeni
Homu

The following villages will be provided complementary services along D3541

Muyexe
Thomo
Mhlaba
Khakhala
Gawula

**PHALABORWA**

The following villages will be provided complementary services along P112/1

Mashishimale
Namakgale

The following villages will be provided complementary services from D4424 to P112/1

Lulekani

**HOEDSPRUIT**

Complementary service will be provided from

Acornhoek

Phalaborwa

The Oaks

### 5.9.4 VHEMBE DISTRICT

**THOHOYANDOU SERVICE**

The following villages will be provided complementary services at this transfer point:- junction D3689 & D3695

| | |
|---|---|
| Folovhodwe | Tshandama |
| Matavhela | Tshilavulu |
| Dzimauli | Tshilamba |
| Matangari | Thengwe |
| Tshithuthuni | Mutale |
| Bondzabdala | |

The following villages will be provided complementary services at this transfer point:- junction P277/1 and D3695

| | |
|---|---|
| Makuya | Tswera |
| Domboni | Tshitavha |
| Lamvi | Vhurivhuri |
| Mahungwi | Mavunde |

The following villages will be provided complementary services at this transfer point:-Junction D3712 &P277/1

| | |
|---|---|
| Matangari A+B | Tshixwadza |
| Pile | Luvhimbi |
| Thenzheni | Makonde |
| Thongwe | |
| Muhotoni | |

The following villages will be provided complementary services at this transfer point:- junction D3688 & D3708

Tshiwani

Tshipako

Vhutalu

Damani

The following villages will be provided complementary service at this transfer point:- junction D3708 & P277/1

| | |
|---|---|
| Tshaulu | Mukula |
| Munangwe | Tshivhilwi |
| Dzivhadolo | Tshikombe |
| Tshifudi | Tshidzini |
| Tshithotholwe | |

The following villages will be provided complimentary services to this transfer point:- Junction D3750 & D4

Vuwani

Vyeboom

Tshino

Tshitongolwani

Malonga

**MAKHADO SERVICE**

The following villages will be provided complementary service at this transfer point:- Elim

| | | |
|---|---|---|
| Nwamatatane | Matsila | Sidoni |
| Vyeboom | Masia | Blinkwater |
| Madobi | Bungeni | Basani |
| Ha Masia | Njakanjaka | Nkuzani |
| Tshikwarani | Wayeni | Rivala |
| Vhangani | Ha Mashamba | Mukondeni |
| Majosi | Mufeba | Mahlatlani |
| Magoro | Kwakane | Tshiphusheni |
| Rotterdam | Muwaweni | |
| Masakona | Nwaxinyamane | |

The following villages will be provided complementary services at this transfer point:- Junction D5003

| | |
|---|---|
| Midoroni | Muralani |
| Moebani | Tshikota |
| Mara | |
| Maebane | |

The following villages will be provided complementary services at this transfer point:- Junction D3715 and D959

| | | |
|---|---|---|
| Muungadi | Magau | Ramahantsha |
| Manavhela | Rathidili | Gogabole |
| Muduluni | Tshikwani | HaRavele |
| Madadonga | Modombidza | |
| Madabani | Tshiozwi | |

The following villages will be provided complementary services at this transfer point:-Junction D3741

Manvuka

Manyii

Matsa

The following villages will be provided complementary services at this transfer point :-Junction D3671 and P278/1 is identified as the starting point with junction D3692 and P278/1 and junction D3735 and P278/1 as stops to Makhado.

| | |
|---|---|
| Telema | Tshituni |
| Mukusha | Matidza |
| Musekwa | Dzanani |
| Maangani | Mokonkoza |

The following villages will be provided complementary services at this transfer point:- Junction D3692 and P278/1 and D3735 and P278/1 are identified as stops for the following origins and complementary to the villages:-

| | |
|---|---|
| Ha-mapila, | Matsa |
| Mutititi | Makhado village |

The following villages will be provided complementary services at this transfer point:- Junction D3669 and D449

| | |
|---|---|
| Mungomani | Maelula |
| Mavhunga | Vuvha |
| Maluma | Vhulaudzi |
| Khunda | Shanze |
| Mpzema | Dopeni |
| Tshitavha | Tshivhilidulu |

## 5.10 Terminal and depot sizes

The sizes of the public transport facilities in particular locations will depend on the specific requirements at that site, and will differ from one location to another. The most important factors that will influence the size would among others, comprise the following:

- Traffic impacts: public transport passenger volumes,
- Modal requirements: train, bus, taxi and NMT
- Demand for parking and storage
- Commercial requirements: offices, shops, banks,
- Environmental requirements/constraints
- Security requirements: SAPS, SARPS, etc.
- Land availability

Depot sizes will most invariably depend on the fleet sizes for the various operators. The main components of the sites will consist of covered shelters, workshops, open storage areas, wash-bays, offices, etc.

# 7. REVENUE COLLECTION

## 6.11 Introduction

The fare policy must be distinguished from the fare regime. The policy would be addressing the policy imperatives as contained in the White Paper on National Transport Policy (1996) as well as the macro priorities of government and how they manifest in the Limpopo province.

The broad goal of transport is the smooth and efficient interaction that allows society and the economy to assume their preferred form. To play this role, the policies in the transport sector are outward looking, shaped by the needs of society in general, of the users or customers of transport, and of the economy that transport has to support. Transport can also play a leading role by acting

as a catalyst for development or in correcting spatial distortions. It follows from these that the priorities in providing and using the transport system should be consistent with those that have been set for the country as a whole.

These priorities are summed up in the Reconstruction and Development Programme, namely meeting basic needs, growing the economy, developing human resources, and democratising the state and society. However, the current priorities such as poverty alleviation, employment creation, economic growth, etc., are relevant and transport policies must strive to contribute toward national priorities.

The Public Transport Strategy and Action Plan provide strategic direction in achieving the transport policy goals. The approach adopted firstly focuses on a network approach based on an Integrated Public Transport Network which ensures wider coverage. This would improve access to public transport within one to two kilometre walk for users; it would be a move away from commuter based services to public transport services (inclusive of workers, learners, elderly, children and people with disabilities). This means that the focus will no longer mean services only in the peaks to meet worker demand, but to meet the needs of users and potential users.

In developing the fare policy considerations of:

- Affordability;
- The level of cost coverage from fare revenue;
- Sources of funding;
- Quantum of assistance to keep fares affordable;
- Targeting of financial support; and
- Leveraging the policy to increase public transport usage from new markets

All the above must contribute to improving ridership/ patronage of public transport.

## 6.12 White Paper on National Transport Policy

The transport policy places emphasis on affordability; safety; integration and meeting customer needs. Thus the vision for land passenger transport is

*"The promotion of a safe, reliable, effective, efficient, co-ordinated, integrated, and environmentally friendly land passenger transport system in South African urban and rural areas, and the southern African region, managed in an accountable manner to ensure that people experience improving levels of mobility and accessibility".*

For a fare policy to give effect to the policy objectives of the White Paper it will need to be integrated with all transport operations within the service area, yet be affordable and promote public transport usage.

## 6.13 Public Transport Strategy

The strategy stipulates that the fare revenue from an operator perspective should be based on kilometres operated and the quality of the services as opposed to the number of passengers on the service.

Furthermore, it promotes integrated fare structures that would be implemented through an electronic fare collection system.

The approach in the strategy assumes that the fare revenue would cover the operating costs and any assistance from the authorities would be in capital investments. This may be true in the other countries with extremely high densities along corridors, but the medium to low densities and the fact that many of the cities implementing IRPTNs are not providing a full package solution will mean that the necessary volumes to ensure self sustainability of the operations will not be realised.

Limpopo Province is predominantly rural and issues of distances, the current peak nature of services and other challenges such as the operating environment will impact on the operating costs.

## 6.14 Rural Transport Strategy

The Department of Transport Rural Transport Strategy has identified two strategic thrusts viz.:

- *Promote coordinated rural nodal and linkage development; and;*
- *Develop demand responsive balanced and sustainable rural transport services.*

In order to give effect to the strategic thrusts would require rural transport services to be designed to meet the socio-economic needs of rural communities. These communities must be in a position to access mainstream as well as second economy opportunities and social activities.

This would require that services be designed to be affordable, reliable and demand responsive.

## 6.15 Subsidised Public Transport Services that Serve Semi-Rural or Rural Economies

The case for subsidised public transport services to areas that are not geographically integrated with metropolitan employment centres is based on the rationale for transformation and the recognition of the role that these subsidies are currently performing is to sustain these communities in the locations where they currently are.

Unlike the contracts that are geographically integral to metropolitan economies, the services in Limpopo lack the rationale that the transport investment involved is underpinned by the economic benefits associated with developing urban agglomerations. In order for a broad-based rationale to be [re]-instituted, either the people must be encouraged to come nearer to the jobs or a case must be made for taking jobs to the people.

Either way, the transport subsidy should be viewed as at best a medium term arrangement while strategic decisions are allowed to develop concerning a longer term economic future for these areas. Longer term economic development strategies may take many years to be fully developed, it should be anticipated that contracts falling into this category may need to be in place for at least a decade, or longer. This means that contract time periods can be optimized to allow for more effective amortization of capital within the contract terms.

## 6.16 Transport Policy Goals

Definitive policy goals to address affordability, travel times and distances for public transport were set in the National White Paper and include:

- Not more than 10% of disposable income should be spent on transport.
- Travel times should not be more than one hour in each direction
- Travel distance should not be more than 40 km in each direction

To meet the policy goals, addressing the challenges of unemployment, poverty, spatial distortions and access and mobility are critical. Thus transport interventions alone will not assist in meeting these targets.

The lack of progress in the transformation of the public transport subsidy system has delayed integration and has not factored in growth in demand. This means that the subsidy allocations over the years have not grown in real terms. The integration of services by other transport operators has not been included for various reasons.

The role of a fare policy and fare regime is not only to address affordability, but should strive to address the policy goals. This is not easy considering that the key aspects to subsidies in the South African context was based on bringing in labour to serve the apartheid government needs from dormitory townships and the homelands. These were characterised by long travel distances and travel times. The purpose of subsidies needs to move away from being support for workers but should assist the unemployed, the elderly, learners and others. Thus the aim should be for the subsidy to play a socio-economic role providing improvements ion access and mobility.

## 6.17 Distinction between Fare Policy and Fare Regime

It is important to highlight the distinction which must be drawn between a fare policy and a fare regime. The expectation that the fare policy will address the fare levels/structure is a misconception. The fare structure will be determined based on the fare policy direction. The purpose of this document therefore is to address the fare policy.

### 6.17.1 Fare Policy

The policy objectives from a national level as well as transport specific policy objectives need to be covered by the fare policy and give effect to government policy objectives. The demographics of the Limpopo Province are an extremely important input in the determination of the policy.

Thus the fare policy will address, *inter alia*:

- The purpose, goals and objectives of the fare;
- Integration of the fares with other modes eg. bus and taxi;
- Cost recovery levels;
- Determining affordability levels;
- Rationale behind subsidies;
- The quantum of the subsidy per km;
- Concession fares for specific target groups;
- Categories of passengers that will benefit from subsidisation;
- Fare incentives to address externalities such as traffic congestion, pollution etc.; and;
- Duplication of services

One of the contentious policy decisions that the province would need to address is the issue of affordability versus operational cost recovery.

6.17.2 Fare Regime

The fare regime is the actual method of implementing a fare system. It may be described as the implementation/procedure manual in setting and adjusting fares. It will include but not be limited to:

- Fare levels or pricing structures
- Implement targeting
- Determining the implementation of different fares products;
- Develop the formulae for setting fares and dealing with fare escalation;
- Development of a fare planning model and application thereof
- Method of fare collection (manual or electronic) i.e., the operational aspects of the EFC system and fare distribution ; and;
- Development of software; deployment of hardware and the required maintenance and upgrading.

## 6.18 Population Characteristics

6.18.1 SA population

Statistics SA in their statistical release P0302: Mid-year population estimates 2009, estimated South Africa's population to be 49, 32 million. Table 1 below provides an indication of the population based on age.

*Table 1. SA population based on age*

| AGE PROFILE | PERCENTAGE |
|---|---|
| 0 – 15 years (children-including school going age) | 31,4 |
| 16 – 59 years (economically active age including students) | 61,1 |
| 60 + (some economically active – retired/pensioners) | 7,5 |

Approximately 14, 1 million South Africans are not economically active for reasons such as being students, home-maker, too old/young, illness/disability or discouraged. The Quarterly Labour Force Survey put unemployment rate at 24, 3% for the October to December 2009 quarter.

6.18.2 Limpopo population

Limpopo's percentage of the total population is 10, 6% which translates to 5, 22 million. It is important to note that for the period 2006-2011, the Mid-year estimates indicate that Limpopo may experience a net outmigration of about 200 000 mainly to Gauteng.

Limpopo has an approximate population of 3, 14 million people of working age.

*Table 2: Labour force characteristics for Limpopo (Source: Quarterly Labour Force Survey, Quarter 4, 2009)*

| | |
|---|---|
| Population working age (16-64) | **3 140 000** |
| Labour force | 1 245 000 |
| Employed | 910 000 |
| Unemployed | 335 000 |
| Not economically active | 1 895 000 |
| Discourage work-seekers | 219 000 |
| Other | 1 676 000 |

Although the national unemployment rate for the 4th quarter of 2009 is 24.3%, the rate for Limpopo is 26.9%.

According to the PROVIDE Project Background Paper 2009: 1(9) indicated that the African population make up 97.07% of the total population of Limpopo. This therefore also means public transport users in Limpopo would come from this population group. The household income as at 2007 for the African population group was R 1718 and for agricultural sector worker R630 per month.

Access to education is a further challenge for the province, with 259 scholar transport routes of which 79 routes do not have transport service providers. Approximately 19 000 learners would benefit from scholars transport services at a cost of R100m being provided for this service in the 2010/2011 financial year (Press Statement of MEC for Education in Limpopo dated 15 February 2010). Being a predominantly rural province access to education proves to be critical for the medium to long term socio-economic upliftment of the province.

Being a predominantly rural province access to health care services is a challenge and people experience long distances to access health care services. 2008 statistics estimate that approximately 400 000 residents of Limpopo were HIV positive (Source: Nathea Nicolay, Metropolitan 2008).

## 6.19 Fare Policy

The provision of public transport the world over cannot be sustained by the fare revenue alone. The provision of financial assistance in the form of a subsidy has as its objectives to make public transport affordable. However, a secondary objective should be striving for the provision of efficiency and effectiveness in the provision of services. Thus the networks approach (IPTN) and achieving of modal efficiencies.

### 6.19.1 Goals and Objectives

The provision of public transport comes at a cost. However the benefits of an efficient and effective public transport system outweigh the cost of the provision. The provision of an efficient service with an affordable and acceptable fare attracts users and improves the accessibility and mobility for citizens.

Fares are integral to the system as neither government nor the public transport operators can fully carry the cost of the provision of the service. The role of fares is to cover the operating costs, but in many instances passenger fares alone are not sufficient to fully cover operating cost for various reasons such as affordability, low passenger volumes, limited operating hours and high travel distances, etc. The objective of the fare policy are:

- Make sure fares are affordable
- Promote access to socio-economic activities
- Promote modal integration eg. bus and taxi;
- Cost recovery;
- Determining whether there is a need for a subsidy
- Quantum or level of subsidy;
- Concession fares for specific target groups;
- Fare incentives to address externalities such as traffic congestion, pollution etc.

### 6.19.2 Subsidisation of Public Transport

Considering the rural nature, high unemployment and poverty levels in the Limpopo Province there is a need for continuation and extension of the provision of subsidised public transport. The purpose of a subsidy is make the service affordable for the passengers. The future service designs must:

- Promote integration based on modal efficiencies;
- Be based on the network approach of an Integrated Public Transport Network consisting of high frequency trunk corridors and feeder services; and;
- Meet customer needs.

The National Land Transport Act, 2009 requires that subsidised services are either procured through tenders or via negotiated contracts. The latter can be negotiated once only.

### 6.19.3 Quantum of Subsidy

In order to keep fares affordable the function of the subsidy is to cover a portion of the operating costs of the public transport operator. The balance of such cost recovery is from the fare charged. The quantum of cost recovery between the subsidy and the fare is based on a level of demand. Thus as demand drops the burden of cost recovery moves to the remaining users.

From the National Passenger Road Plan of 2006, the subsidy on average for Limpopo covered 44% percent and the fare covered 56%. Considering the network approach, the introduction of modal efficiencies and meeting demand in the most effective manner, the operating costs may be reduced. However, there is no guarantee as many cost elements are outside of the control of the public transport operator and government. This will include fuel and lubricant costs which are based on the oil price as well as labour that is subject to bargaining council agreements.

Thus the quantum of 50/50 is proposed between fare revenue and subsidy in terms of covering the operating costs. Thus fare levels and the fare structure should strive to reach the 50/50 ratio. It is important to consider this aspect on the basis of the approach to service provision based on smaller midi and minibus taxi vehicles providing shorter distance services and buses providing longer distance services. Larger vehicles over longer distances are more economical which it can maximise revenue, while the converse holds true for smaller vehicles.

### 6.19.4 Concessionary Fares

One of the striking characteristics of public transport services in Limpopo is that they operate only in the morning and afternoon peak, thus addressing the need of workers. The need for off peak services is important to address access to social activities such as education, health services as well as shopping trips, etc. Thus to stimulate off peak travel consideration of concessionary fares for particular groups is important.

Concessionary fare will mean lower fares in the off peak for specific groups such as pensioners and the elderly, learners where learner transport is not provided, students, children and women. This will significantly enhance access to social services.

The fare regime will provide for concessionary fares for identified groups and provide such discounted fares.

6.19.5 Fare Collection

Electronic fare collection systems will be the method of ticketing and this would be linked to GPS and a control centre for the purpose of monitoring. The cost of the implementation of such a system will be shared between the Limpopo Province and the operator.

The Operator will cover the costs of the ticketing machines, the maintenance thereof, ticket sales and the on-board ticketing machines. The Limpopo province will be responsible ensuring compliance to the EFC standards and requirements, the GPS link, establishing and maintaining control centre and monitoring that the operators fare collection equipment is fully operational at all times.

## 6.20 Conclusion

*It is clear from data analysed for this study that the demand for public transport services exceeds supply. In consequence, the provision of adequate service levels to meet the demand will inevitably increase the total subsidy quantum in real terms.*

*There are two approaches which may be taken in terms of fare policy to address this dilemma. These are:*

- *Accept the fact that services need to be substantially increased and arrange a concomitant increase in the annual subsidy budget; or*
- *Focus the existing subsidy budget on the user groups who are most in need of assistance (i.e. indigent, unemployed, aged, learners, remote communities and others).*

*Either of these choices will require strong leadership, political support and the financial backing of central government to implement.*

# 8. OPERATIONAL COST PROJECTION

## 7.4 Introduction

In the development of the proposed service areas and the contract packages for new subsidised services the approach is to promote modal integration based on contract packages that reflect the functional transport areas. Thus the current contracts will be expanded to include the current taxi and small bus operators who provide a significant levels of services, without financial assistance from government in Limpopo and to assign trips to the identified primary Integrated Public Transport Network supported by feeder services. The role of the dominant road based public transport modes will be based on modal efficiencies.

The basis of the cost model is the National Passenger Road Plan of 2006 developed by the National Department of Transport. It will assist the Limpopo Province and the District Municipalities costing the services when negotiating of calling for tenders. The figures in the cost model will however need to be updated annually to keep it realistic and current.

This document will:

- Provide an overview of the current state of subsidised services contracts in Limpopo (viz. Interim, Tender/Negotiated commuter bus service contracts;
- Use commuter bus capital and operating costs to develop a cost model for use as a broad basis for estimating/appraising tender costs;
- Introduce financial viability model to determine taxi capital and operating costs;

- Estimate the total funding and consequently the subsidy requirements for all future contract services in Limpopo.

## 7.5 Status Quo of Bus Services and Contacts in Limpopo

Currently there are approximately 664 commuter buses operating in the public transport subsidy system in Limpopo.

Various types of bus services are currently provided with various rules applied. The services can be subdivided as follows:

- Services provided under Interim Contracts
- Services provided under tendered and negotiated contracts
- Services provided as scholar services

The information contained in this document in respect of the subsidy contracts contain figures from the 2005/2006 financial year and will be updated as soon as the latest figures are made available.

### 7.5.1 Status Quo of Interim Contracts (IC)

In November 2009 all ICs were converted from ticket sales to kilometres based contracts. However, they remain interim contracts that are being extended on a month to month basis. The following aspects are important in this regard:

- 17 IC's expired in 2001 and from 2003 they have been extended on a monthly basis.
- In 2005/2006 – 58% of subsidy budget allocated to IC's.
- Services are based on multi journey tickets which are mostly bought by passengers travelling on a regular basis (mostly workers).

- Services are not monitored and are prone to fraudulent activities.
- Old fleet are no longer compliant with the current age specifications.
- Routes do not address current demand in certain areas, partly as result of restrictions on the extension of the ticket subsidy system due to budgetary constraints.
- Monthly extension and uncertainty of future contracts restricts investment in fleet.
- IC's are dominated by large established bus operators.

A summary of the current status of the Interim Contracts are provided in Table 1. The following information is provided:

- District Municipality
- Name of Operator
- Number of buses
- Kilometres operated per annum
- Passenger revenue per annum
- Subsidy per annum

**TABLE 1: Status of Interim Contract**

| District municipality | Contract No. | No. buses | Operator |
|---|---|---|---|
| Capricorn | IC 16/97 | 46 | Bahwaduba |
| Capricorn | IC 16/97 | | Madodi BS |
| Lepelle Nkumbi | | 24 | GNT |
| Lepelle Nkumpi | IC 8/97 | | Kopano BS |
| Mopane | IC 11/97 | 37 | GNT |

| | | | |
|---|---|---|---|
| Tzaneen | | | |
| Mopane | | 58 | GNT |
| Mopane | | 22 | GNT |
| Mopane | | 13 | GNT |
| Mopane | | 31 | GNT |
| Mopane: Tzaneen | IC 15/97 | 11 | Risaba |
| Vhembe | IC 7/97 | 36 | GNT |
| Vhembe | | 8 | GNT |
| Vhembe | IC 14/97 | 36 | G Phadziri |
| Vhembe | IC 13/97 | 21 | Mabirimisa |
| Sekhukhune<br><br>Marble Hall | MP<br><br>IC 21/97 | 21 | GNT |
| Sekhukhune<br><br>Groblersdal | MP<br><br>IC 20/97 | 25 | GNT |
| Sekhukhune | MP | 7 | PUTCO |
| Waterberg<br><br>Kaalfontein to Modimolle | IC 18/97 | 1 | PUTCO |
| Vhembe | ICNP 01/97 | | Enos Bus S |
| Vhembe | ICNP 03/97 | | Mabidi B.S |
| Vhembe | ICNP 04/97 | | Magwaba B |
| Vhembe | ICNP 06/97 | | Mukondeleli Bus service |
| Vhembe | ICNP 07/97 | | Mulaudzi Transport |
| Vhembe | ICNP 08/97 | | Netshituni Bus service |
| Vhembe | ICNP 09/97 | | R Phadziri bus service |
| Vhembe | ICNP 10/97 | | Swangi transport |

Source: Department of Transport: National Road Passenger Plan: 2006

### 7.5.2 Status quo of Tendered and Negotiated Contracts

| District municipality | Contract type | No. bus | Operator |
|---|---|---|---|

The following aspects are important in this regard:

- Negotiated Contracts expired (extended on a monthly basis).
- Approximately 42% of the subsidy budget is allocated to negotiated contracts.
- Service areas are largely the same as IC.
- Services are not integrated with municipal plans.
- Lack of standardised monitoring process.

A summary of the current status of the Tendered and Negotiated Contracts are provided in Table 2 below.

The following information is provided:

- District Municipality.
- Name of Operator.
- Number of buses.
- Kilometres operated per annum.
- Passenger revenue per annum.
- Subsidy per annum.

**Table 2: Status of Tendered and Negotiated Contracts**

| | | | |
|---|---|---|---|
| Capricorn | Negotiated | 146 | GNT |
| Lepele Nkumbi | Negotiated | 11 | GNT |
| Mopane | Negotiated | 37 | GNT |
| Waterberg | Negotiated | 22 | GNT |
| Waterberg | Tendered | 30 | Lowveld BS |
| **TOTAL** | | **246** | |

Source: Department of Transport: National Road Passenger Plan: 2006

### 7.5.3 Municipal Bus Services

There are no municipal operated bus services in Limpopo.

### 7.5.4 Learner Services

The provision of learner transport services is funded by and managed by Limpopo Provincial Department of Education on a separate basis and does therefore not form part of the planning of the broader public transport system in Limpopo. The sustainability of these services is questionable because they are generally, poorly managed and not subject to any form of monitoring.

Access to education is a challenge for the province, with 259 scholar transport routes of which 79 routes do not have transport service providers. Approximately 19 000 learners benefit from scholars transport services at a cost of R100m being provided for this service in the 2010/2011 financial year (Press Statement of MEC for Education in Limpopo dated 15 February 2010).

## 7.6 Funding Requirements for Subsidised Services: Cost Model

### 7.6.1 Development of a financial model

The cost of operating a commuter bus service as well as taxi type service will be outlined to be able to broadly estimate the level of subsidies required under different funding scenarios. With more detailed work and consultation, this cost model could become a sound basis to assist future tendering authorities in interrogating tenders.

The total funding requirement for any particular service will depend on various aspects such as:

- Operational area conditions and specific requirements.
- Passenger mix, passenger numbers and passenger revenue.
- Personnel requirements.
- Infrastructure requirements.
- Technical requirements.
- Systems requirements
- Financial arrangements and aspects such as exchange rates, interest rates.

These inputs can be used to generate the total cost of providing a basic service in terms of a tendered or negotiated contract. The current and projected revenue streams can be used to quantify profitability.

The revenue streams of a bus service can be divided into three main areas: cash ticket sales, multi-journey tickets (weekly, monthly) and subsidies received from the relevant transport authority for the rendering of the services.

The major cost drivers in a bus service are diesel, labour and maintenance. The fluctuation of interest rates is relevant in as far as the purchasing, leasing

and refurbishment of buses and equipment are concerned. Items such as bus chassis and other spare parts are imported and these costs are subject to currency fluctuations, especially the Rand/Euro exchange rate.

Since the taxi industry cost structure is not known because of the informal nature ` of the operations, an attempt will be made to develop a cost model.

### 7.6.2 General Parameters for Costing a Service

There are no formal bus and taxi industry norms due to operators not disclosing detailed information of cost structures because of the need to maintain a competitive edge in a tendering process. This area of secrecy gives rise to a probability of cost overstatement in negotiating contract rates because Government cannot test the true cost against any reliable historical data base.

In a tender situation full or true costs are not necessarily given because of the need to maintain the competitive edge in order to win. Many tenderers will calculate the value (and cost) of the non-contracted services that will be available in the contracting area and so discount the true rate of providing the contracted services in order to ensure a winning tender.

An analysis of the main cost contributors will show that most of these will stay exactly the same for a negotiated contract, as well as for a tendered contract. In most cases a shadow tender price or benchmark price can be calculated with acceptable accuracy as most of these cost items are known or regulated by government. In the analysis below the items which are responsible for approximately 85% of total costs are outlined.

### 7.6.3 Fuel

Government regulates the fuel price per litre, although some operators may get a small discount should they buy in bulk. The cost of fuel can be obtained from fuel suppliers and fuel efficiency figures from bus and mini/midi-bus manufacturers. The cost of fuel is calculated based on kilometres operated. Revenue kilometres are provided in the contract documentation, together with a timetable. Dead kilometres can be calculated through a scheduling exercise. The cost of fuel will be exactly the same for a tendered and negotiated contract.

### 7.6.4 Tyres and tubes

Most brands of tyres cost the same on a per kilometre basis. An expensive tyre's lifespan will however be longer than that of a cheaper tyre. The cost of tyres can easily be calculated as tyre lifetime and the cost of tyres are available from tyre suppliers. The prices for tyres and tubes will also be the same for a negotiated contract and a tendered contract, based on the brand used.

### 7.6.5 Spare parts

The cost of spare parts for different types and makes of buses differ to some extent depending on whether local or imported spares are used. For both types of contracts these figures will be the same if the same type/make of vehicle is used on both. The comparisons must be drawn on a basket of fast moving spares. The cost of a basket of spare parts is available from all leading vehicle manufacturers.

### 7.6.6 Cost of buses and mini/midi buses

The differences of the cost of new buses manufactured by the leading bus manufacturers are minimal. It must however be noted that should an operator be able to tender with a bus fleet just complying with the contract specifications, it will be less expensive than one where an operator tenders with a brand new fleet.

The problem is that most compliant buses are on contract already and cannot be released. The second hand market for compliant buses is stagnant, as very few of these vehicles come into the market.

In some instances, the cash flow for new buses with a maintenance contract and a buyback agreement from a financial institution is lower than an option where buses are rebuilt. This is due to the following reasons:

- The fuel efficiency for new buses is generally much better than those of refurbished vehicles
- The maintenance cost for new buses is generally much lower than those of refurbished vehicles. The operator will have a very small maintenance contingent as the vehicle manufacturer will maintain the vehicles.
- The instalments on the new vehicles are lower than that of a rebuilt bus as the operator will only finance the vehicle partially. Vehicle manufacturers can give buyback agreements of up to 45 percent.

The above outstrips the additional cost of higher insurance. The cost of owning a vehicle fleet can easily be calculated as bus prices are available from vehicle manufacturers and interest rates from the financial institutions. In both types of contracts operators should be required to operate with similar vehicles, therefore creating no difference in the cost of the contracts.

Taxi vehicle cost differs based on seating bands as categorised in the taxi recapitalisation and from manufacturer to manufacturer. In order to maintain relative uniformity in costs, contract specifications could specify on seating capacity. The cost of finance for taxi vehicles tends to be higher due to the perceived risk of the taxi owners.

### 7.6.7 Insurance cost

The cost of insurance is based on the purchase price of the vehicle. Most operators pay the same for insurance. It must however be noted that some of the larger operators make use of self-insurance which may be cheaper. It is however more the exception than the rule. The cost of insurance can be obtained from insurers and is accurate.

### 7.6.8 License fees

Provincial government regulates the license fees of vehicles. It will therefore be the same for any operator in any specific province, any specific vehicle or sort of contract. This information is available from any local authority.

### 7.6.9 Interest

The cost of capital is regulated by the Reserve Bank through its fiscal policies. Most established operators will pay a similar interest rate should they have to buy assets. This information can be calculated accurately and is available from any financial institution.

### 7.6.10 Labour cost

It has been proved in the past that operators have used labour cost to compete effectively for tenders. It has been recorded that some operators have slashed the cost of labour up to 30 percent in order to retain or win new business. The cost of labour in a negotiated contract will be higher than that of a tendered contract because formal wage scales are maintained.

It must however be noted that this practice of cutting wage rates is a bone of contention for all labour unions and has been debated by all stakeholders that form part of the Heads of Agreement. The practice creates instability in the workforce and can lead to strikes as well as pilferage of cash.

Labour cost can be determined accurately by an analysis of the payroll of an operator and the analysis of minimum wages applicable in the transport sector.

In conclusion, it can be assumed that most of the items contributing to total cost will be the same for a negotiated contract and for a tendered contract, with the exception of labour cost. Most of these contributors can also be accurately determined without the assistance of an operator.

In some instances the true cost of an operator was used to determine on a ratio basis the figures that will go into the model. The model was tested various times with the true cost of operators and it gives an accuracy rate of 95%.

The bargaining council minimum wage determination differs between the taxi and bus industry and this would need to be normalised through the Department of Labour.

### 7.6.11 Cost model based on discussion of cost elements

The discussion above is now applied to making estimates of costs in each category as follows; all costs being based on October 2005 – September 2006 data.

### 7.6.12 Fuel

The cost of fuel can be calculated by using an average fuel consumption rate for a type of bus and multiply it with the cost of fuel. Most operators receive a rebate from fuel suppliers. This is also taken into consideration. The main assumptions regarding fuel are shown in the Table 3 below.

**Table 3: Fuel Costs**

| **MAIN ASSUMPTIONS FOR FUEL** | |
|---|---|
| Fuel consumption standard buses (Kms per litre) | 2.60 |
| Fuel consumption Accessible buses (Kms per litre) | 2.60 |
| Fuel consumption Recap vehicles (Kms per litre) | 5.00 |
| Fuel Price | R 8.50 |

### 7.6.13 Tyres

Tyre cost was calculated by using an average lifetime for a set of tyres multiplied by the cost of a tyre. The main assumptions in respect of tyres are as in Table 4:

**Table 4: Tyre Costs**

| **MAIN ASSUMPTIONS FOR TYRES** | |
|---|---|
| **TYRES STANDARD BUSES** | |
| Number of tyres on vehicle | 6 |
| Average lifetime of tyres (km) | 50000 |
| Cost of tyres one tyre | 4000 |
| **TYRES ACCESSIBLE BUSES** | |

| | |
|---|---|
| Number of tyres on vehicle | 6 |
| Average lifetime of tyres | 50000 |
| Cost of tyres one tyre | 4000 |
| **TYRES RECAP VEHICLES** | |
| Number of tyres on vehicle | 6 |
| Average lifetime of tyres | 50000 km |
| Costs of tyres one tyre | 2000 |

### 7.6.14 Spares and units

The cost of spares are based the costs from two leading vehicle manufacturers. This was compared with actual figures of bus operators and a strong correlation was found.

The cost of spares includes the cost of main spares that operators use to maintain buses whether it is routine maintenance or the cost of running repairs.

The cost of units represents the cost of major components over the lifetime of a vehicle and includes the cost of engines, gearboxes and differentials.

The main assumptions for spares and unit are shown in Table 5 below.

| **MAIN ASSUMPTIONS FOR SPARES AND UNITS** | |
|---|---|
| **SPARES** | |
| Cost of spares per km standard buses | R1.30 |
| Cost of spares per km Accessible buses | R1.40 |
| Cost of spares per km Recap vehicles | R1.10 |
| Cost of units per km standard buses | R0.30 |
| Cost of units per km Accessible buses | R0.30 |
| Cost of units per km Recap vehicles | R0.20 |

### 7.6.15 Capital cost of vehicles

The cost of capital is one of the most important cost elements in any bus operators' cost structure. The cost of capital includes the full instalment, which comprises of interest and capital redemption.

An average price of *R1m* including value added tax was used for standard buses in the calculations to continue with re-tendering for tendered contracts. It must however be noted that this will vary from operator to operator, as operators are at different stages of recapitalising their fleet. In the case where an operator's fleet is fully recapitalised, the capital cost will only be represented by the depreciation cost of the vehicle, while in a case where a bus fleet is not recapitalised at all, the cost of a bus will be in the region of R1,0 million inclusive of value added tax. This figure was assumed for the calculation of the cost of tenders where Interim Contracts are retendered.

A more detailed study will have to be conducted to determine the stages of recapitalisation of each individual bus operator.

Information and discussion with bus operators revealed that operators in the tender system are further down the path with recapitalisation than operators within the interim contract system.

With regard to capital cost of articulated vehicles and smaller recap vehicles, the full cost has been taken into account as these types of vehicles do not feature to a large extent in the tender or interim contract system.

The number of instalments for all vehicles is over a sixty month period as financial institutions will not/cannot finance vehicles over a longer period.

The interest rate used for calculation purposes was set at 12,5 percent, which is at present the bank overdraft rate. It must be noted that SMME and PDI operators seldom receive this rate as they are viewed as a higher risk potential, compared to large bus companies.

The instalment is also influenced by whether the vehicle manufacturer is willing to give a buyback after the contract period. In these cases the financial institutions will allow the lender a residual which will be paid by the vehicle manufacturer should the operator not retain his contract.

**Table 6: Capital Costs**

| MAIN ASSUMPTIONS: CAPITAL COSTS | INTERIM | TENDERED/ NEGOTIATED |
|---|---|---|
| **PRICE PER VEHICLE: STANDARD BUS** | R1 300 000 | R1 300 000 |
| Number of instalments | 60 | 60 |
| Interest rate % | 12.50 | 12.50 |
| Residual % | 30 | 30 |
| Residual Value | -R390 000 | -R390 000 |
| **PRICE PER VEHICLE: ACCESSIBLE BUS** | R1 600 000 | R1 600 000 |
| Number instalments | 60 | 60 |
| Interest rate | 12.50 | 12.50 |
| Residual % | 25 | 25 |
| Residual Value | -R400 000 | -R400 000 |
| **PRICE PER VEHICLE: RECAP TAXI VEHICLE** | R350 000 | R350 000 |
| Number of instalments | 60 | 60 |
| Interest rate % | 12.50 | 12.50 |

| | | |
|---|---|---|
| Residual % | 25 | 25 |
| Residual value | -R87 500 | -R87 500 |

Note that the interim contracts do not specify recapitalised taxi and accessible buses. Redesigned services for future tendered or negotiated contracts will include the aforementioned vehicles.

### 7.6.16 Cost of insurance

The cost of insurance includes insurance for vehicles, as well as public liability and passenger liability insurance. The method of insurance varies from operator to operator. Larger operators tend to have more self insurance than smaller operators.

A rate of 4.5 percent of the purchase price of the vehicle is used to determine the insurance cost. This rate is supported by most insurance companies and the South African Bus Operators' Association (SABOA) who has an insurance scheme in place with Glenrand MIB for their members.

The main assumptions for insurance are shown in Table 7 below:

**Table 7: Insurance Costs**

| MAIN ASSUMPTIONS: INSURANCE | INTERIM | TENDERED/ NEGOTIATED |
|---|---|---|
| **INSURANCE AMOUNT: STANDARD BUS** | R1 300 000 | R1 300 000 |
| Insurance % | 4.50 | 4.50 |
| **INSURANCE AMOUNT: ACCESSIBLE** | R1 600 000 | R1 600 000 |

| | | |
|---|---|---|
| **BUS** | | |
| Insurance % | 4.50 | 4.50 |
| **INSURANCE AMOUNT: ARTICULATED BUS** | R2 200 000 | R2 200 000 |
| Insurance % | 4.50 | 4.50 |
| **INSURANCE AMOUNT: RECAP TAXI VEHICLE** | R350 000 | R350 000 |
| Insurance % | 4.50 | 4.50 |

### 7.6.17 Licence fees

The cost of licence fees is determined by a schedule which changes from year to year as decided by the licensing authority. The value of the licence fee is furthermore influenced by the weight of the vehicle. The following average values were used.

**Table 8: Licence Fee Costs**

| **MAIN ASSUMPTIONS LICENCE FEES** | |
|---|---|
| **LICENCE FEE STANDARD BUSES**<br>Licence fee per unit | **R12,000** |
| **LICENCE FEE ACCESSIBLE BUS**<br>Licence fee per unit | **R12,000** |

| | |
|---|---|
| **LICENCE FEE TAXI RECAP VEHICLE** | |
| Licence fee per unit | **R8,000** |

### 7.6.18 Electronic Ticket Equipment

The tender system requires all operators to fit their buses with electronic ticket equipment. The cost of this equipment was obtained from two leading manufacturers in the field.

It was assumed that all tendered contracts will have new equipment as the life of this equipment is approximately five years. In terms of interim contacts, the same approach was followed as very few operators on an interim contract have fitted their vehicles with this equipment.

In most cases operators finance the equipment through a financial institution. The interest rates that apply will be 12,5 percent, which is slightly higher than the current prime overdraft rate. The instalments are calculated over a period of 60 months which is the same as the buses.

The main assumptions regarding electronic equipment are as shown in Table 9:

**Table 9: Electronic Ticket Equipment Costs**

| MAIN ASSUMPTIONS ELECTRONIC TICKETING | |
|---|---|
| ETMS | |
| Average costs of operating equipment | 35000 |
| Number of units | 1 per bus |
| Number of instalments | Based on se |
| Interest rate | 12.50% |
| Insurance percentage | 2.00% |

### 7.3.19 Cost of service support vehicles

The cost for service vehicles includes the capital cost for ancillary vehicles needed to operate the contract. These vehicles are in most cases also financed. The ratio that normally applies is one vehicle for every 10 buses.

Ancillary vehicles are normally financed by a financial institution. The interest rate and period of finance are the same as for buses. The main assumptions are in Table 10:

**Table 10: Cost of Service Vehicles**

| MAIN ASSUMPTIONS SERVICE VEHICLES | |
|---|---|
| SERVICE VEHICLES | |
| Average costs of service vehicles | R250,000 |
| Number of units | per contrac |
| Number of instalments | 60 |
| Interest rate | 12.50% |

### 7.3.20 Cost of labour

The cost of labour is one of the most important cost elements in the cost structure of bus operators. In the past, operators have used this cost element to great effect to win tenders as the tender documents only specify minimum entry salaries for all staff.

The cost of labour also varies significantly from operator to operator and definitely needs more investigation. For purposes of this calculation, the actual cost of an operator, operating 35 buses was taken to determine the manpower cost.

The main assumptions were as shown in Table 11:

## Table 11: Typical Personnel Structure and Cost

| PERSONNEL STUCTURE | | | | |
|---|---|---|---|---|
| **Job category** | **Number** | **Minimum wage** | **Benefits** | **Total** |
| **A Traffic** | | | | |
| Inspector | 4 | R 4,200 | R 840 | R 20,160 |
| Driver conductor, conductor, OMO | 42 | R 4,000 | R 800 | R 201,600 |
| Senior despatcher | 1 | R 4,200 | R 840 | R 5,040 |
| Despatcher, Route despatcher, Sub depot despatcher | 2 | R 4,000 | R 800 | R 9,600 |
| Light vehicle driver, Mobile driver | 2 | R 3,000 | R 600 | R 7,200 |
| Operational Supt | 1 | R 8,000 | R 1,600 | R 9,600 |
| **SUBTOTAL** | **52** | **R 39,000** | | **R 253,200** |
| **B ENGINEERING** | | | | |
| Artisans (negotiated for) | 4 | R 6,000 | R 1,200 | R 28,800 |
| Inspector | 1 | R 5,500 | R 1,100 | R 6,600 |
| Foremen | 2 | R 10,000 | R 2,000 | R 24,000 |
| Assistant artisans | 4 | R 3,750 | R 750 | R 18,000 |
| Operatives (grades a,b,c and d) | 2 | R 4,583 | R 917 | R 10,999 |
| Tyre attendant | 1 | R 3,000 | R 600 | R 3,600 |
| Tyre superindendent | 1 | R 3,800 | R 760 | R 4,560 |
| Senior engineering clerk.engineering clerk | 1 | R 4,000 | R 800 | R 4,800 |
| Stores clerk Stores Assistant | 1 | R 4,000 | R 800 | R 4,800 |
| Stores superintendent | 0 | R 12,000 | R 2,400 | R 0 |
| Driver shunter, Technical driver | 1 | R 3,600 | R 720 | R 4,320 |
| Bus Cleaner, Cleaner, Bus Washer | 3 | R 1,800 | R 360 | R 6,480 |
| Data typist, data input clerk | 2 | R 3,800 | R 760 | R 9,120 |
| **SUBTOTAL** | **23** | **R 13,000** | | **R 126,079** |
| **C ADMINSISTRATION** | | | | |
| Schedules clerk, Ticket clerk, Clerk | 2 | R 3,800 | R 760 | R 9,120 |
| Telephonist, Telephonist/ Receptionist | 2 | R 3,800 | R 760 | R 9,120 |
| Clerks | 2 | R 3,800 | R 760 | R 9,120 |
| Accountant | 1 | R 10,000 | R 2,000 | R 12,000 |
| Clerks | 1 | R 4,800 | R 960 | R 5,760 |
| Promotion supervisor | 1 | R 5,000 | R 1,000 | R 6,000 |
| **SUBTOTAL** | **9** | **R 12,500** | **R 2,500** | **R 51,120** |
| **D MANAGEMENT** | | | | **R 0** |
| Chief executive officer | 1 | R 25,000 | R 5,000 | R 30,000 |
| Operations manager | 1 | R 20,000 | R 4,000 | R 24,000 |
| Financial Manager | 1 | R 20,000 | R 4,000 | R 24,000 |
| Technical manager | 1 | R 15,000 | R 3,000 | R 18,000 |
| **SUBTOTAL** | **4** | **R 80,000** | **R 16,000** | **R 96,000** |
| **GRANDTOTAL** | **88** | **R 80,600** | | **R 526,399** |

*Please note that the costs fluctuate on a quarterly basis.

In conclusion this document has provided some clarity on the current state of the subsidised services contracts in Limpopo. Commuter bus capital and operating costs have been revealed. This will enable the development of a

cost model for use as a broad basis for estimating/appraising tender costs. A financial viability model has been introduced which is used to determine taxi capital and operating costs. The total funding and subsidy requirements have been estimated for all future contract services in Limpopo.

## 8. VEHICLE SPECIFICATIONS

## 8.1 General

## 8.2 Vehicle sizes

*Table 8.1: Types of Vehicles and Physical Sizes*

| Type | Length(m) | | Wheel base(m) | Ground Clearance(mm) | |
|---|---|---|---|---|---|
| | Minimum | Maximum | | Minimum | Maximum |
| Articulated | 18.00 | 22.00 | 6.20 | | |
| Standard | 11.00 | 12,50 | 7.62 | | |
| Midi bus | 7.00 | 9.30 | 2.23 | | |
| Mini bus | 6.00 | | 1.80 | | |

## 8.3 Vehicle seats and standard capacities

*Table 8.2: Vehicle seats and standard capacities*

| Type | Capacity (Number of passengers) | | | |
|---|---|---|---|---|
| | Seated | | Standing | |
| | Minimum | Maximum | Minimum | Maximum |
| Articulated | 80 | 115 | 35 | 60 |
| Standard | 36 | 66 | 10 | 30 |
| Midi bus | 19 | 35 | N/A | N/A |
| Mini bus | 13 | 18 | N/A | N/A |

## 8.4 Acceptance of standing over the distances of travel

| Type | Capacity (Number of passengers) | | | | Comments |
|---|---|---|---|---|---|
| | Seated | | Standing | | |
| | Minimum | **Maximum** | **Minimum** | **Maximum** | |
| Articulated | 80 | 115 | 35 | 60 | Only inner city travel |
| Standard | 36 | 66 | 10 | 30 | Only inner city travel |
| Midi bus | 19 | 35 | N/A | N/A | Not allowed |
| Mini bus | 13 | 18 | N/A | N/A | Not allowed |

## 8.5 Required engine size and emission standards

| Type | Engine size | | Emission ($CO_2$kg/km) | |
|---|---|---|---|---|
| | **Minimum** | **Maximum** | **Minimum** | **Maximum** |
| Articulated | 10 158 | 10 158 | 0.089 | 0.089 |
| Standard | 10 158 | 10 158 | 0.089 | 0.089 |
| Midi bus | 2 500 | 3 500 | 0.050 | 0.050 |
| Mini bus | 2 000 | 2 500 | 0.016 | 0.016 |

## 8.6 Other specifications

| Type of vehicle | Stop requirements | Depot requirements | Delivery time |
|---|---|---|---|
| ***Articulated*** | 65m | Number of vehicles | 3 months |
| ***Standard*** | 45m | Number of vehicles | 3 months |
| ***Midi bus*** | 26m | Number of vehicles | 3 months |
| ***Mini bus*** | 26m | Number of vehicles | 3 months |

References: PUTCO (Mike Foster and Ashwin Maharaj), Euro 2 and 3 emission standards, SANS 20049, National Regulator for Compulsary Specifications Act, City of Tshwane Standard drawings, Comparison of Energy Use & CO2 Emissions From Different Transportation Modes (USA Study).

## 8.7 Alternate fuels`

Biofuels can contribute significantly to the reduction of carbon dioxide emissions. They can be used mixed with diesel and stand alone over time. Biofules consist of a wide range of fuels:

- Ethonol bus engines are also available. The technology is based on diesel combustion. The bioethenol is an alcohol based product made by fermenting of various elements.

- Biofuels which is developed from plant oils and animal fats. The technology is being investigated by various engine manufactuers. It can be used as a diesel but common practice is use of these fuels as additives to reduce emissions

- Synthetic diesels can be mixed with regular diesels to reduce imissions. Synthetic fuels is generated from coal, oil shale, biomas etc.

- Gas is being used by many developing countries around the world. Carbon Dioxide is reduced by almost 100%. Gas can be generated from natural gas resources or waste and sewage treatment. The drawback is that gas is not easily carried onboard vehicles.

Many motor manufactures have built and tested hydrogen engines. For large transport vehicles it is very difficult to transport hydrogen gas in sufficient amounts.

Kgco2/100km's

| | |
|---|---|
| **Volvo 8700 D7 Euro IV City 2** | **112** |
| **Volvo 9700 Euro IV Commuter 2** | **80** |
| **Volvo 9700 Euro IV Commuter 2 with I-shift*** | **71** |
| **Volvo 7500 Euro IV Biartic City 2** | **188** |
| **Volvo 7500 Euro IV Biartic BRT** | **122** |

**Interesting article on North West buses**

Commuter buses featuring Marcopolo's Torino bodies are now a common sight in the northern parts of South Africa. It started a few years ago when Great North Transport (GNT) in the Limpopo Province signed a multi-million rand contract to acquire 340 commuter buses over two years.

Known as The Great North, the Limpopo Province is the gateway to sub-Saharan Africa, bordering three African countries, namely Botswana, Mozambique and Zimbabwe. It is a diverse landscape of bushveld, savanna, semi-desert, and subtropical vegetation.

Northwest Transport Investments (NTI) in the neighbouring Northwest Province has also opted for Torino bodies on ten new Mercedes-Benz OF 1730 chassis. The vehicles were bought to cope with the increasing demand for bus transport in the region. The Northwest Province also forms part of the SA border with Botswana. Its agricultural (maize, beef and sunflower seeds) and mining (gold, platinum and diamonds) production plays a vital role in the boosting of the South African economy.

Both GNT and NTI serve millions of people who live in towns, villages and remote settlements and often travel distances of more than 100km - unprofitable for taxi drivers - to get to work. With 20% of the roads also un-tarred, sturdily built buses that can withstand dust, heat, rainstorms, floods and potholes are required.

"NTI's decision to purchase ten buses fitted with Torino bodies goes to show that these bodies are standing up very well to South Africa's often adverse weather and road conditions," said Sean Rook van Rensburg, Marcopolo sales co-ordinator based in Johannesburg. "But then Torino buses have been running very successfully in different parts of Africa."

The Torino 60-seater standard body of tubular structure with galvanised steel,

anti-noise and anti-corrosion protection is assembled at Marcopolo's plant in Germiston, near Johannesburg, to Marcopolo's international quality and durability standards. The Torino features a sturdy body with air vents on the ceiling, an ergonomic dashboard in fibreglass and a roof of polyester resin reinforced with fibre glass. It's a sturdy body which can be maintained at low cost, with part replacement being very simple, so it offers an excellent cost benefit and good resale value.

Optional are air-conditioning, cushioned seats instead of the standard vinyl seats, tinted glass, stereo system, electronic designation sign and an elevator for handicapped passengers. Low-entry and articulated versions are also available.

Willem van Breda, NTI's chief operating officer, said the purchase decision was made after a thorough inspection of the factory and the Torino's bodywork.

"We used to purchase bodies from local manufacturers and were most impressed with the finish and the quality of workmanship of the Torino. Our buses often take a hammering but so far we have had no problems other than replacing light globes. The follow up from Marcopolo and feedback from our passengers has been very good," he added.

Northwest chose the Torino to be built onto a Mercedes-Benz 1730 front-engined chassis. The OF 1730 is powered by the Euro 3-compliant OM 926 LA 6-cyliner turbodiesel engine which has an output of 220 kW (300 hp) and is the successor to the legendary OF1729 of which, more than 1 000 units have been built in East London. This engine has completed many hours of arduous testing over the years.

# 9 ENVIRONMENTAL IMPACT ANALYSIS

## 9.1 General Roads Construction and Environment

The road construction industry is divided into several categories namely: earthworks including material mining, pavement work, bridge works and other works like signage involved in the road construction. The **environmental impact of roads** includes the local effects of public roads such as on noise, water pollution, habitat destruction/disturbance and local air quality; and the wider effects including climate change from vehicle emissions.

There is a growing awareness that road development has major environmental impacts. Some of the major environmental impacts of road projects include damage to sensitive ecosystems, loss of productive agricultural lands, resettlement of large numbers of people, permanent disruption of local economic activities, demographic change, accelerated urbanization, and introduction of disease.

## 9.2 Generic Roads Impact Analysis

### Air quality

Roads can have both negative and positive effects on air quality.

| Negative impacts | Positive impacts |
|---|---|

### Noise

| Negative impacts | Positive impacts |
|---|---|
| Motor vehicle traffic on roads will generate noise.<br><br>Road noise can be a nuisance if it impinges on population centres, especially for roads at higher operating speeds, near intersections and on uphill sections. Noise health effects can be expected in such locations from road systems used by large numbers of motor vehicles. Noise mitigation strategies exist to reduce sound levels at nearby sensitive receptors. Speed bumps, which are usually deployed in built-up areas, can increase noise pollution, especially if large vehicles use the road and particularly at night. | New roads can divert traffic away from population centres thus relieving the noise pollution. E.g. the new road project for the N1 bypassing Polokwane city promises to reduce traffic noise in Polokwane city centre. |

### Water pollution

| |
|---|
| Urban runoff from roads and other impervious surfaces is a major source of water pollution. Rainwater running off of roads tends to pick up gasoline, motor oil, heavy |

metals, trash and other pollutants. Road runoff is a major source of nickel, copper, zinc, cadmium, lead and polycyclic aromatic hydrocarbons (PAHs), which are created as combustion byproducts of gasoline and other fossil fuels.

De-icing chemicals and sand can run off into roadsides, contaminate groundwater and pollute surface waters. Road salts (primarily chlorides of sodium, calcium or magnesium) can be toxic to sensitive plants and animals. Sand can alter stream bed environments, causing stress for the plants and animals that live there.

**Habitat fragmentation**

Roads can act as barriers or filters to animal movement and lead to habitat fragmentation. Many species will not cross the open space created by a road due to the threat of predation and roads also cause increased animal mortality from traffic. This barrier effect can prevent species from migrating and recolonising areas where the species has gone locally extinct as well as restricting access to seasonally available or widely scattered resources.

Habitat fragmentation may also divide large continuous populations into smaller more isolated populations. These smaller populations are more vulnerable to genetic drift, inbreeding depression and an increased risk of population decline and extinction.

South African Legislation for Authorization of Roads Environmental Projects

- National Environmental Management Act, 107 of 1998 (NEMA) and Regulations R 543 and R 544 of 2010
- Minerals and Petroleum Resources Development Act, 28 of 2002 (MPRDA)

Additional permits and licences that shall be required are:

- Water Use Licence (National Water Act, 36 of 1998)
- Clearance from South African Heritage Resources Agency
- Waste disposal permit (Section 20 of Environment Conservation Act, 73 of 1989)

The process of applying to authorities will cover the following:

- DME –mining right application for borrow pits

DEDET – application to provincial authority for “identified activities” in terms of Regulations R 543 and R 544

Since environmental impacts from road development are quite common, such projects usually call for Basic environmental assessment studies, carried out by EA professionals who support the main engineering team.

This assessment is legally required for activities that due to nature and/or extent are:

- Likely to have insignificant impacts
- Associated with low levels of pollution /
- waste / environmental degradation
- Impacts can easily be predicted
- Lower risk activities

In Limpopo Province, The Department of Economic Development, Environment and Tourism is the environmental authority who deems the listed activities triggered as the competent authority in respect of the activities listed by Regulations R 543 and R 544 in the respective schedules below.

If an application for an activity contemplated in section 24C(2) of NEMA in which case the competent authority is the Minister of Environmental Affairs and Tourism or an organ of state with delegated powers in terms of section 42(1) of NEMA, as amended. e.g. The competent authority in respect of the activities listed in the respective schedules is the environmental authority in the province unless in which the activity will affect more than one province or traverse international boundaries;

This will identify issues and potential impacts and mitigation measures, and will be followed by the Environmental Management Plan (EMP) and Operational Environmental Management Plan.

Table 9: The listed activities in terms of sec 25(4) of NEMA

| Item Number i.t.o R. 544 | DESCRIPTION OF THE ACTIVITY |
|---|---|
| 11 & 39 | *The construction and/or expansion of :*<br><br>*i. canals;*<br>*ii. channels;*<br>*iii. bridges;*<br>*iv. dams;*<br>*v. Weirs;*<br>*vi. Bulk storm water outlet structures;*<br>*vii. Marinas;*<br>*viii. Jetties exceeding 50 square metres in size;*<br>*ix. Slipways exceeding 50 metres in size;*<br>*x. Buildings exceeding 50 square metres in size; or*<br>*xi. Infrastructure or structures covering 50 square metres or more*<br>*Where such construction/expansion occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of the watercourse, excluding where such construction/ expansion will occur behind the development setback line.* |
| 13 | *The construction of facilities or infrastructure for the storage, or for the storage and handling , of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres;* |
| **20** | *Any activity requiring a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) or renewal thereof.* |
| 22 | *The construction of a road, outside urban areas,*<br><br>*(i) With a reserve wider than 13.5 meters or,*<br>*(ii) Where no reserve exists where the road is wider than 8 metres, or*<br>*(iii) For which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010* |
| 24 | *The transformation of land bigger than 1000 square metres in size, residential, retail, commercial, industrial or institutional use, where, at the time of coming into effect of this schedule such land was zoned open space, conservation or had an equivalent zoning.* |
| 47 | *The widening of a road by more than 6 metres, or lengthening a road by more than 1 Kilometre-*<br><br>*(i) Where the existing reserve is wider than 13.5 metres; or*<br>*(ii) Where no reserve exists, where the existing road is wider than 8 metres-*<br>*Excluding widening or lengthening occurring inside urban areas.* |

## 9.4. Description of areas where EIA'S may be required

| AREA OR ACTIVITIES WHERE EIA MAY BE REQUIRED | ITEM NO. TRIGGERED | POSSIBLE IMPACTS |
|---|---|---|
| Additional dedicated lanes on public transport routes, particularly in cities and built-up areas | 11,22, 39, 47 | Impacts will depend on the degree of expansion or type of change to the existing facility. |
| Provision of climbing lanes at strategic sections along public transport routes, | 11,22, 39, 47 | Could result in increased pollution and safety hazards. |
| Widening of existing narrow surfaced shoulders, | 11,22, 39, 47 | Physical impacts on ecosystems may occur. The channelisation of streams (creating a hard surface over which the water flows by constructing a concrete channel) destroys the integrity of the ecosystem and has vast effects on the organisms and vegetation (i.e. decreases oxygen, reduces plants and micro-organisms therefore decreasing birdlife which feeds on them.)<br>• infilling of existing vacant lots could further reduce green urban areas and impact on remaining essential habitats (i.e. threatened mole species, birds);<br>Bird breeding may be affected due to the reduction of safe areas for fledglings and increased danger to organisms due to flooding (water also flows faster over hard surfaces.)<br>Large-scale impacts from dams on downstream environments include:<br>• Interruption of the natural flow of rivers leads to drying out of wetlands and the sedimentation of downstream ponds, rivers, and lakes thereby reducing essential ecosystem services.<br>• Increased danger to downstream inhabitants both in terms of drought and flooding if the dam wall breaks.<br>Dams/weirs also present physical barriers to organisms (especially juvenile water birds).<br>Increased water pooling can provide habitat for insects carrying disease and could increase malaria/bilharzia. |
| Provision of adequate surfaced shoulders at strategic sections, | 11,22, 39, 47 | |
| Surfacing of collector gravel roads: secondary and tertiary, which are justifiable | 11,22, 39, 47 | Mining activities (prospecting, mining, and mining closure) may have the following impacts:<br>• degradation of ecosystems by destroying and changing habitat;<br>• water pollution from waste dumps; |
| Regravelling of poor gravel roads, and Mining of Borrow Pits for road | 11,22, 39, 47 | |

| | | |
|---|---|---|
| construction material | | • increased water and energy usage;<br>• noise and air pollution from transport and processing infrastructure;<br>• cultural and socio-economic impacts on surrounding inhabitants (benefits from mining are rarely shared with local communities); and<br>influx of people could result in inflow of HIV/AIDS, other STDs, human transmittable diseases, prostitution, drugs, breakdown of social/cultural norms etc. |
| Provision of adequate drainage structures to ensure all-weather travel and connectivity – even to isolated villages | 11,22, 39, 47 | |
| Provision of non-motorised transport facilities at strategic locations on the network. E.g. Interchange Stations and Depots (storage of petroleum fuels) | 11,22, 39, 47 | Impacts may include:<br>• ecosystem impacts associated with construction and development (e.g. habitat destruction, impacts to animals and plants);<br>• infilling of existing vacant lots could further reduce green urban areas and impact on remaining essential habitats (i.e. threatened mole species, birds);<br>• further fragmentation of ecosystems, destruction of ecosystem integrity and reduction of ecosystem services; and<br>• increased residential development in an area may increas demand for water and electricity supplies, and increase waste production and traffic congestion.<br>Fuel tanks have potential water/air/soil pollution through leakage or damage to storage facilities and the resulting health impacts on nearby inhabitants and ecosystems/organisms. |
| Construction water use and source | | Impacts associated with the extraction of water in large quantities may be:<br>• reduction of groundwater supplies and, if done in excessive quantities, could supersede replenishment levels causing collapse of water supply;<br>• cumulative impacts of many people abstracting water from one groundwater source;<br>• leaching of soils and salt-water intrusion if the aquifer is nearby the coast; and<br>• Long-term impacts could be ecosystem degradation as well as subsidence (when the ground collapses), preventing the aquifer from being recharged and thus a total loss of a renewable resource. |

## 9.5 Allowance for EIA Time Frames

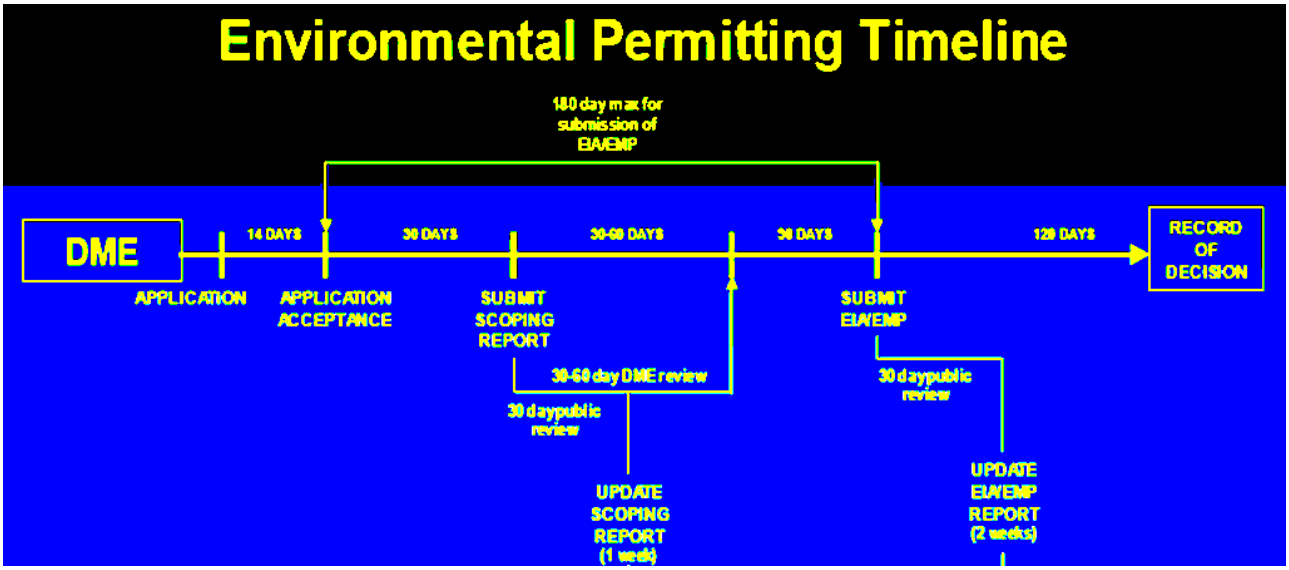
Broadly speaking, the duration of an environmental assessment is usually between six and eighteen months, and expenses range between five and ten percent of project preparation costs. An EA begun late in the project (at the design stage, for instance) may cause delays and exceed the suggested time range.

Below is the schematic diagram of the Basic assessment process that may be

Applicable


The budget and timeline expenditures for less extensive environmental analyses are well below these levels; studies lasting as little as six weeks have been reported.

Questions that should be considered when estimating an EA's duration and budget are: information available in existing databases or is a field study necessary?. The study can be undertaken parallel to technical and economic investigations, not only after planning work has been completed since this might lead to tighter time constraints, and can lead to project delays.




The **Allowable time frames** should be at least **4 months** to accommodate all authorisations and permits required by a specific activity.

### 9.6 Deliverables at the end of the process

The following are the deliverables that should be obtained prior to commencement of construction activities for infrastructure projects:

- DME – granting of mining rights for borrow pits
- DEDET – Environmental authorisation for EIA study
- DWA - Water Use Licence for water use

# 10 BUSINESS PLANS FOR FIVE DISTRICT MUNICIPALITIES

## 10.5 Assumptions

In order to prepare the business plans it was necessary to define a consistent set of assumptions regarding the proposed transformed services which are

proposed. These relate to service frequencies on the various trunk route types, the vehicles to be deployed and the extent of the supplementary services which are included in each set of contract packages. These assumptions allow the monthly operating costs of the fleet to be determined for each District.

Similarly, assumptions need to be made concerning average vehicle occupancy levels, average trip length per passenger and average fare per trip in order to estimate the monthly fare revenue expected.

The difference between the operating costs and projected revenue yields the required subsidy level required for the District.

Capital costs have been calculated from the road improvements and public transport infrastructure requirements determined in Section 4 of the report.

The assumptions made in order to calculating the operational costs are as follows:

- Trip frequencies on primary routes (connecting main activity nodes) are every 30 minutes in peak periods, and every hour in off-peak and over weekends. These assumptions yield a total of **517** vehicle-trips per month.
- On secondary routes the frequencies are reduced to every hour in peak periods and every two hours in the off-peak and over weekends, giving a total of **271** vehicle-trips per month on these routes.
- The supplementary services are assumed to comprise **1.3** times the vehicle-kilometres of the trunk services.
- Operating costs are assumed to be **R20/km** for a standard bus and **R8/km** for a supplementary vehicle (Recap taxi).

Assumptions made in respect of the revenue cost drivers are as follows:

- Average seat occupancy on primary routes is assumed to be **90%** in peak periods, **60%** in off-peak periods and **50%** over weekends. (Although it may appear that these occupancies are high, it should be borne in mind that the same seat may be occupied by more than one person on a trip, and the average occupancy per seat could be as high as 200% in some cases.)
- On secondary routes, the average seat occupancy is assumed to be **80%** in peak periods, **40%** in off-peak and **50%** over weekends.

- Seating capacity of a standard bus is assumed to be **65** passengers. The above occupancies and the monthly number of buses derived above thus translate into **7 598** and **3 659** passengers per bus per month on primary and secondary IPTN routes respectively.
- The average trip length per passenger is assumed to be **10km**, at an average fare of **R10** including use of the supplementary service.

These assumptions were used as a basis to estimate the financial details for each District Municipality reported below. They will also be tested and refined during the next project phase when more detailed information is collected for the proposed pilot project.

## 10.6 Greater Sekhukhune District Municipality

The following statistics provide an overview of the financial requirements for implementing the IPTN in the municipality.

| | | | |
|---|---|---|---|
| **GREATER SEKHUKHUNE DISTRICT MUNICIPALITY** | | | |
| | | | |
| Business plan for IPTN implementation: | | | |
| | | | operating kilometres per mont |
| Primary IPTN length: | 965 | km | 498,905 |
| Secondary IPTN length: | 780 | km | 211,380 |
| **TOTAL IPTN:** | **1,745** | km | |
| Phases: | 5 | | |
| | | | |
| **CAPITAL EXPENDITURE:** | | | |
| Road improvements: | R 4,687,500,000 | | |
| Facilities: | R 5,651,200,000 | | |
| **TOTAL:** | **R 10,338,700,000** | from PTIS | |
| | | | |
| **OPERATING EXPENSES:** | | | |
| Primary trunk routes: | R 9,978,100 | | |
| Secondary trunk routes: | R 4,227,600 | | |
| Supplementary routes: | R 7,386,960 | | 923,370 |
| **TOTAL:** | **R 21,592,660** | | |
| | | | |
| **PASSENGER REVENUE:** | **R 6,547,822** | per month | |
| | | | |
| **SUBSIDY REQUIREMENT:** | **R 15,044,838** | per month | from PTOG |
| | | | |
| **PER PHASE:** | | | |
| CAPEX: | **R 2,067,740,000** | | |
| PTOG (monthly): | **R 3,008,968** | | |

## 10.7 Waterberg District Municipality

| | | | | |
|---|---|---|---|---|
| **WATERBERG DISTRICT MUNICIPALITY** | | | | |
| | | | | |
| Business plan for IPTN implementation: | | | | |
| | | | operating kilometres per month | |
| Primary IPTN length: | 740 | km | 382,580 | |
| Secondary IPTN length: | 910 | km | 246,610 | |
| **TOTAL IPTN:** | **1,650** | km | | |
| Phases: | 4 | | | |
| | | | | |
| **CAPITAL EXPENDITURE:** | | | | |
| Road improvements: | R 4,266,000,000 | | | |
| Facilities: | R 5,546,600,000 | | | |
| **TOTAL:** | **R 9,812,600,000** | from PTIS | | |
| | | | | |
| **OPERATING EXPENSES:** | | | | |
| Primary trunk routes: | R 7,651,600 | | | |
| Secondary trunk routes: | R 4,932,200 | | | |
| Supplementary routes: | R 6,543,576 | | 817,947 | |
| **TOTAL:** | **R 19,127,376** | | | |
| | | | | |
| **PASSENGER REVENUE:** | **R 6,191,350** | per month | | |
| | | | | |
| **SUBSIDY REQUIREMENT:** | **R 12,936,026** | per month | from PTOG | |
| | | | | |
| **PER PHASE:** | | | | |
| CAPEX: | **R 2,453,150,000** | | | |
| PTOG (monthly): | **R 3,234,007** | | | |

## 10.8 Capricorn District Municipality

| | | | |
|---|---|---|---|
| **CAPRICORN DISTRICT MUNICIPALITY** | | | |
| | | | |
| Business plan for IPTN implementation: | | | |
| | | | operating kilometres per month |
| Primary IPTN length: | 540 | km | 279 180 |
| Secondary IPTN length: | 460 | km | 124 660 |
| **TOTAL IPTN:** | **1 000** | km | |
| Phases: | 4 | | |
| | | | |
| **CAPITAL EXPENDITURE:** | | | |
| Road improvements: | R 2 714 000 000 | | |
| Facilities: | R 3 529 700 000 | | |
| **TOTAL:** | **R 6 243 700 000** | from PTIS | |
| | | | |
| **OPERATING EXPENSES:** | | | |
| Primary trunk routes: | R 5 583 600 | | |
| Secondary trunk routes: | R 2 493 200 | | |
| Supplementary routes: | R 4 199 936 | | 524 992 |
| **TOTAL:** | **R 12 276 736** | | |
| | | | |
| **PASSENGER REVENUE:** | **R 3 752 333** | per month | |
| | | | |
| **SUBSIDY REQUIREMENT:** | **R 8 524 403** | per month | from PTOG |
| | | | |
| **PER PHASE:** | | | |
| CAPEX: | **R 1 560 925 000** | | |
| PTOG (monthly): | **R 2 131 101** | | |

## 10.9 Mopani District Municipality

| | | | |
|---|---|---|---|
| **MOPANI DISTRICT MUNICIPALITY** | | | |
| | | | |
| Business plan for IPTN implementation: | | | |
| | | | operating kilometres per month |
| Primary IPTN length: | 700 | km | 361 900 |
| Secondary IPTN length: | 860 | km | 233 060 |
| **TOTAL IPTN:** | **1 560** | km | |
| Phases: | 5 | | |
| | | | |
| **CAPITAL EXPENDITURE:** | | | |
| Road improvements: | R 3 277 500 000 | | |
| Facilities: | R 4 435 700 000 | | |
| **TOTAL:** | **R 7 713 200 000** | from PTIS | |
| | | | |
| **OPERATING EXPENSES:** | | | |
| Primary trunk routes: | R 7 238 000 | | |
| Secondary trunk routes: | R 4 661 200 | | |
| Supplementary routes: | R 6 187 584 | | 773 448 |
| **TOTAL:** | **R 18 086 784** | | |
| | | | |
| **PASSENGER REVENUE:** | **R 5 853 640** | per month | |
| | | | |
| **SUBSIDY REQUIREMENT:** | **R 12 233 144** | per month | from PTOG |
| | | | |
| **PER PHASE:** | | | |
| CAPEX: | **R 1 542 640 000** | | |
| PTOG (monthly): | **R 2 446 629** | | |
| | | | |

## 10.10 Vhembe District Municipality

| | | | |
|---|---|---|---|
| **VHEMBE DISTRICT MUNICIPALITY** | | | |
| | | | |
| Business plan for IPTN implementation: | | | |
| | | | operating kilometres per month |
| Primary IPTN length: | 640 | km | 330 880 |
| Secondary IPTN length: | 880 | km | 238 480 |
| **TOTAL IPTN:** | **1 520** | km | |
| Phases: | 5 | | |
| | | | |
| **CAPITAL EXPENDITURE:** | | | |
| Road improvements: | R 3 201 000 000 | | |
| Facilities: | R 4 334 900 000 | | |
| **TOTAL:** | **R 7 535 900 000** | from PTIS | |
| | | | |
| **OPERATING EXPENSES:** | | | |
| Primary trunk routes: | R 6 617 600 | | |
| Secondary trunk routes: | R 4 769 600 | | |
| Supplementary routes: | R 5 921 344 | | 740 168 |
| **TOTAL:** | **R 17 308 544** | | |
| | | | |
| **PASSENGER REVENUE:** | **R 5 703 547** | per month | |
| | | | |
| **SUBSIDY REQUIREMENT:** | **R 11 604 997** | per month | from PTOG |
| | | | |
| **PER PHASE:** | | | |
| CAPEX: | **R 1 507 180 000** | | |
| PTOG (monthly): | **R 2 320 999** | | |
| | | | |

# 11. CONCLUSIONS AND RECOMMENDATIONS

11.1 The following conclusions and recommendations are drawn and presented for the implementation of the integrated public transport networks in the Limpopo Province:

11.2 The passenger data obtained from existing sources were not adequate to enable detailed services designs. The finalisation of the detailed services designs in the Sekhukhune District, as well as high-level designs in the other districts requires that additional information be surveyed regarding the latest existing passenger volumes, especially directional flows in order to refine the services designs and details if infrastructure needs.

11.3 Key corridors and major routes, including proposed feeder and distribution routes were identified, which will enabled the design of PT services

11.4 The identification of key infrastructure, location and classification, coupled with the infrastructure upgrading needs along corridors and at major intersections has been achieved. It is recommended that these locations be firmed up and reserved as soon as possible in order to ensure that land is available for future developments

11.5 The design of ***high-level*** public transport services plans, including network designs and vehicle allocation was achieved for all districts. These will need to be implemented and improvements made as part of continuous improvement strategy.

11.6 Detailed designs for the Sekhukhune District should be undertaken after detailed investigations that will be conducted in January 2011. These will in turn be used to enhance the high-level designs in other districts.

11.7 Documents were also compiled for revenue collection and operational cost projections, which include cost scheduling, fare policy, empowerment and contract models. An aspect that requires urgent attention is the work-shopping of all stakeholders prior to the implementation of these plans.

11.8 Environmental impact assessments will be required for all infrastructure upgrading as well as the construction of new PT facilities. A framework for use in this regard is provided. It will be essential to ensure that all identified PT infrastructure sites comply with the EIA requirements prior to the acquisitions of land for development.

11.9 Concise business plans are provided per district municipality, showing capital expenditure, operational costs, passenger revenue and subsidy requirements. It is recommended that an integrated programme, linking districts, local municipalities and the Province be implemented towards the achievement of an integrated public transport network in the whole Province.