Table of Contents

List of Figures

List of Tables

Annexure

1 Introduction

Context

1.1 This technical note seeks to investigate whether there is a Strategic Business Case (SBC) for continuing to develop the concept of providing a rail commuter service between Polokwane and Mokopane as well as a rail service between Polokwane and Jane Furse.

1.2 The SBC will be the culmination of 6 workstreams, including identifying a need, consideration of the most appropriate intervention and the generation and assessment of suitable options. The outcome will be a recommendation as to whether the envisaged schemes should be taken forward into detailed feasibility.

1.3 This report sets out the approach to option development and the results of the initial assessment to identify the preferred corridor to be taken forward in the Strategic Business Case.

Background

1.4 The study is divided into 3 steps and a brief overview of each step and the key findings are outlined below. The overall study process can be seen in Figure 1.1

Step 1 - Review of existing public transport services

1.5 The first step assessed the status quo and examined the existing infrastructural and operational capability of the rail service between Polokwane and Mokopane as well as the various platforms of public transport between Polokwane and Jane Furse along the 2 alignments identified in Phase 1 of the Limpopo Rail Plan. A baseline route and passenger carrying capability within the current Shosholoza Meyl service (a primarily long-distance service) as well as the Mini-bus/Kombi Taxi services between Polokwane and Mokopane. Equally, the various platforms currently providing public transport services between Polokwane and Jane along the 2 identified alignments were similarly evaluated and the corresponding baseline determined.

1.6 Using these 2 baselines, a demand-capability gap analysis was undertaken that considered the capability of the current services to satisfy passenger demand along the identified alignments. It assessed whether further intervention was necessary, such as the construction of new lines.

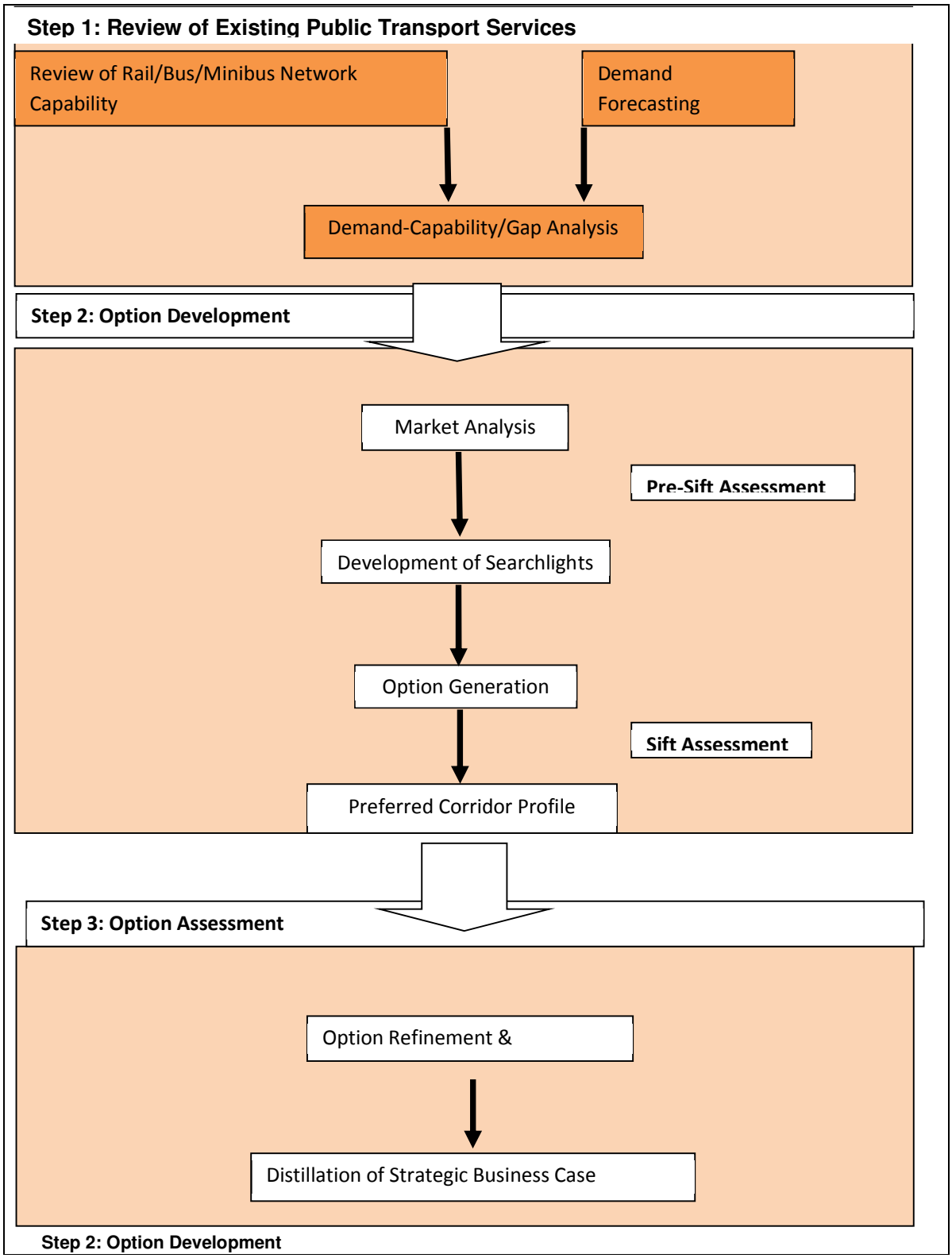


Figure 1.1: DEVELOPING THE STRATEGIC BUSINESS CASE

1.7 Once the supply side need for an intervention had been identified, it was necessary to examine options of new lines. The gap analysis from the previous work (Phase 1 of the Limpopo Rail Plan) was used as a starting point, but most importantly, a market analysis exercise was also undertaken. Any new line will need to both address supply side constraints (capacity) and provide opportunities to make a 'step change' in access to, and attractiveness of, rail travel – both, in terms of modal shit and trip generation (or modal mix matrices) – in order to underpin sustainable economic growth and wider policy objectives such as sustainability and transformation of current largely Minibus/Kombi-based service provision.

1.8 Options were developed and assessed in order to select a preferred corridor for the Polokwane – Jane Furse service. A multi-criteria approach to assessment has been developed based on the broad objectives and the principles of feasibility, sustainability and market potential and was used to make an initial high-level sift to select the preferred corridor.

1.9 The costs and forecasts used in this assessment are a high-level assessment used to identify relative performance between options in order to select a preferred corridor to take forward. They are not intended to represent absolute numbers – same being the preserve of the detailed feasibility.

1.10 This report sets out the approach to assessment and the findings of this study.

Step 3 – Option assessment – Strategic Business Case

1.11 The preferred corridor and core route identified through the sift assessment will then be taken forward for further consideration within the Strategic Business Case.

Report Structure

1.12 The remainder of this report document is structured as follows:

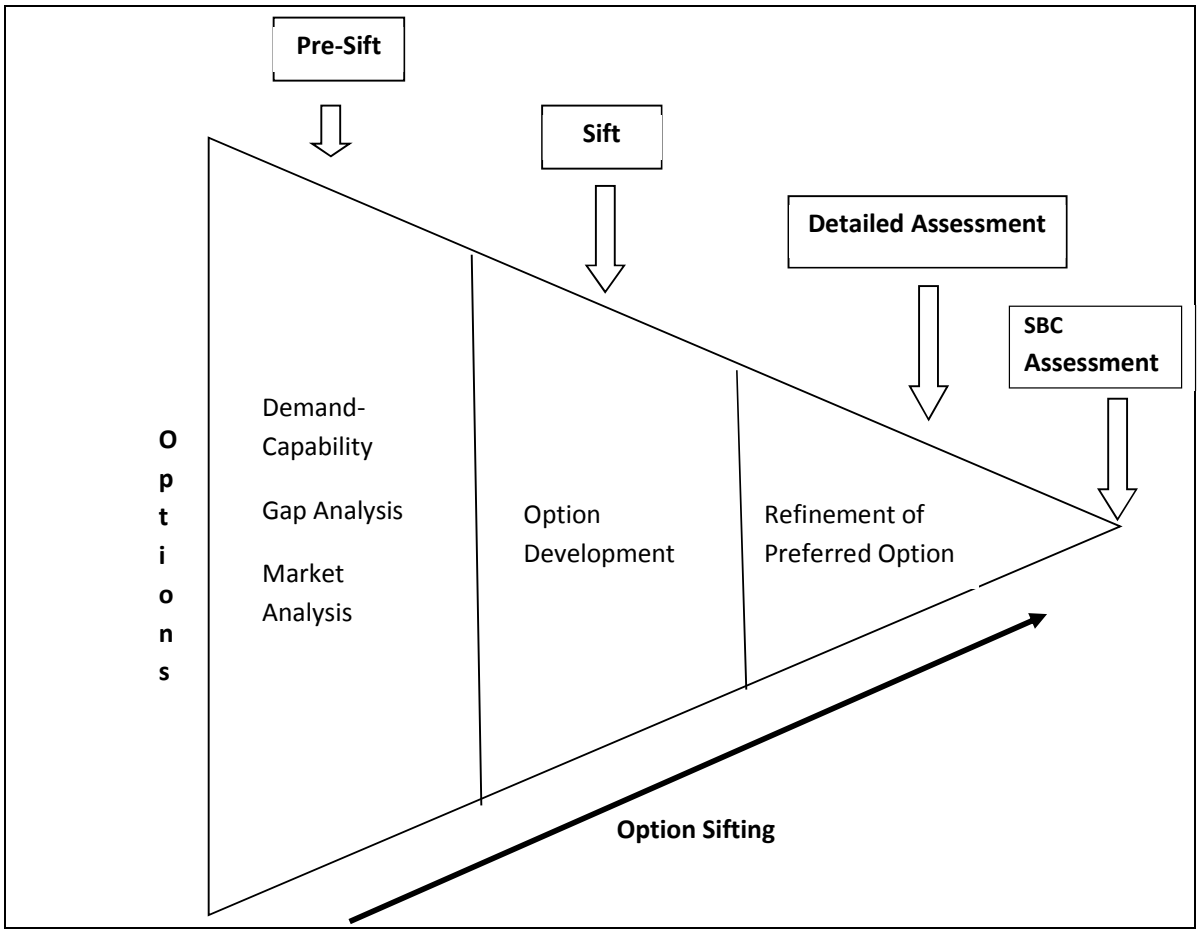
- Section 2 – Approach to assessment;
- Section 3 – Identifying target Markets;
- Section 4 – Pre-sift Assessment;
- Section 5 – Option Generation;
- Section 6 – Sift Assessment; and
- Section 7 – Conclusions.

2 Approach to Assessment

2.1 It is crucial that the development of a business case ensures decision makers are provided with the confidence that a particular project is the best way to proceed and hence that a range of alternative options has been considered. Therefore, to ensure this and the existence of an auditable and transparent trail that leads to the preferred scheme option, it is important that an assessment process is in place. The foundation of the scheme selection and development must be robust.

2.2 The assessment process consisting of a pre-shift, sift and assessment is depicted in Figure 2.1 below:

Figure 2.1 ASSESSMENT CRITERIA APPROACH



3 Identifying Target Markets

3.1 To identify the most likely target markets for both the commuter service between Polokwane and Mokopane and the new line between Polokwane and Jane Furse and quantify strengths of each, a market analysis exercise was undertaken. This included an analysis of current Shosholoza Meyl and Bus/Mini-bus (Taxi) markets and a population and travel style analysis.

Defining targets within scope

3.2 The issues that are particularly important include the fact that Limpopo is a poor province and a large percentage of households have limited access to public transport or cannot afford it. As for most infrastructure, long-distance transfer areas, rail stations and termini are in poor condition and often not integrated with other supporting land-uses, such as shopping and employment centres.

Key Targets and KPIs

3.3 Table 3.1 below is a pro-forma depiction of KPI targets to be assessed and the system developed and benchmarked against during detail feasibility assessment.

Table 3.1 Performance of Passenger Transport System along the corridors

NO	KPI	TARGET	CORRIDOR RESULTS	
			% Not within Target	Number not within Target
1	Travel time to work	Less than 1 hour	To be determined during detailed Feasibility Studies	To be determined during detailed Feasibility Studies
2	Travel time for work trips by public transport	Less than 1 hour		
3	Travel time for educational trips	Not specified (suggest less than 31 mins)		
4	Urban walking times to public transport	15 min (about 1 km)		
5	Rural walking times to public transport	30 minutes		
6	Percentage of households spending more than 10% of income on public transport	A maximum of 10% is suggested		

* Based on perceived walking times from homes to services

3.4 The summary Table 3.1 serves to illustrate the various demand estimates derived for the nodes for both the Polokwane-Mokopane commuter service as well as the regional passenger rail linking Polokwane to Jane Furse – via Zebediela. Such summaries were derived from detail station by station computations along the two alignments under assessment, and these matrices are included hereunder as an Annexure.

Year	Morning Peak		Evening Peak	
	Jane Furse to Polokwane via Ga-Rakgoatha(Near Zebediela) Morning Peak	Polokwane To Jane Furse via Ga-Rakgoatha(Near Zebediela)	Jane Furse to Polokwane via Ga-Rakgoatha(Near Zebediela) Morning Peak	Polokwane To Jane Furse via Ga-Rakgoatha(Near Zebediela)
2012	29442	3736	3732	29371
2013	31019	3936	3932	30944
2014	32597	4137	4132	32518
2015	54678	6939	6932	54546
2016	57202	7259	7252	57063
2017	59725	7579	7571	59581
2018	62249	7900	7891	62098
2019	64772	8220	8211	64616
2020	67296	8540	8531	67133
2025	69820	8860	8851	69651
2030	72343	9181	9171	72168
2035	74867	9501	9491	74686
2040	77390	9821	9811	77203
2045	79914	10141	10131	79721
2050	82438	10462	10451	82238

Table 3.2: Demand Estimates Polokwane-Jane Furse (via Zebediela): AM and PM Peak

The stations with the highest patronage for Polokwane –Jane Furse corridor are Polokwane, Jane Furse, Kebowakgomo, Ga- Rakgoatha(near Zebediela) and Difapyae.

Catchments

3.6 This analysis is based on potential ticket sales data that factors in the commonly and widely observed tendency for a new rail service offering that significantly reduces journey times to draw patronage from a large catchment. Hence, the radii considered are 25 and 50 kms, respectively.

3.7 The proposed alignments linking Pololwane to Mokopane and Polokwane to the Moloto Corridor traverse the following District and Local Municipalities:

- Capricorn District Municipality, including
  - Polokwane Local Municipality, and
  - Lepelle Nkumpi Local Municipality;
- Waterberg District Municipality,including
  - Mogalakwena Local Municipality
- Greater Sekhukhune District Municipality, including
  - Fetakgomo Local Municipality,
  - Greater Tubatse Local Municipality, and
  - Makhuduthamaga Local Municipality.

3.8. Demographic and land-use considerations

Population in Polokwane Local Municipality (PLM) has grown by over 10% since 2001, with a 16% increase experienced from 1996 to 2001. Much of this growth is due to an influx of migrants from more rural municipalities into Polokwane, whilst overall growth for the Province has been more sedate – at 5%, between 2001 and 2007. The area of the Polokwane Local Municipality is about 3,775 square kilometres with an average population density of 136 people per square kilometre - as illustrated in Figure 3.8.1, which also illustrates densification patterns in the area.

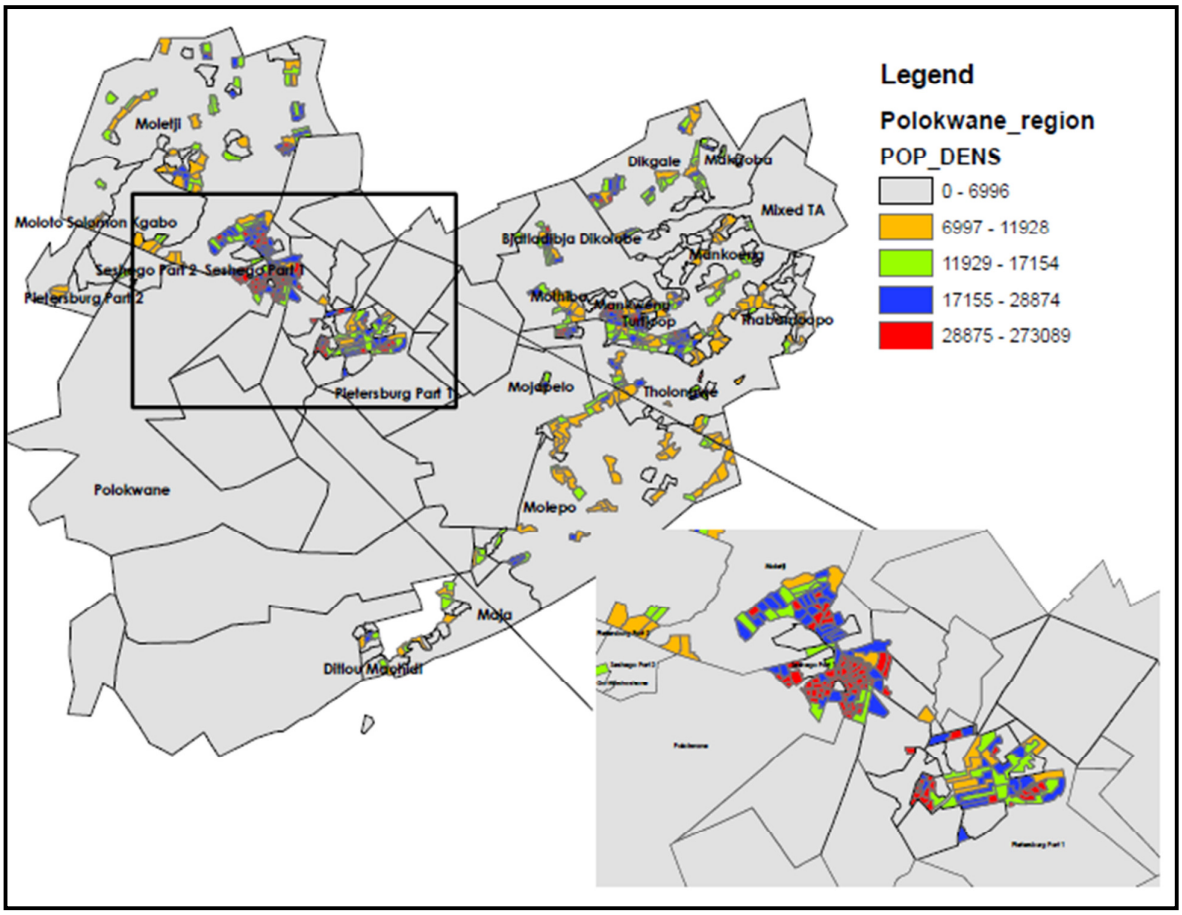


Figure 3.8.1 Polokwane Population Density by Census Enumeration area (2001)

Polokwane serves as the economic hub of Limpopo. The Polokwane CBD is therefore of regional importance, serving as a regional trading and shopping hub to the greater Polokwane area. Even though Polokwane is the provincial capital, Lebowakgomo is home to the Provincial Government and Provincial Government departments. Figure 3.8.2 illustrates mining activity and reserves in Limpopo alongside the two corridors. The Mogalakwena Area and the Mogalakwena tinfields. A number of minerals occur in the Mogalakwena area, the most important of which are clay, dimension stone, limestone, Fluorspar, tin and platinum.

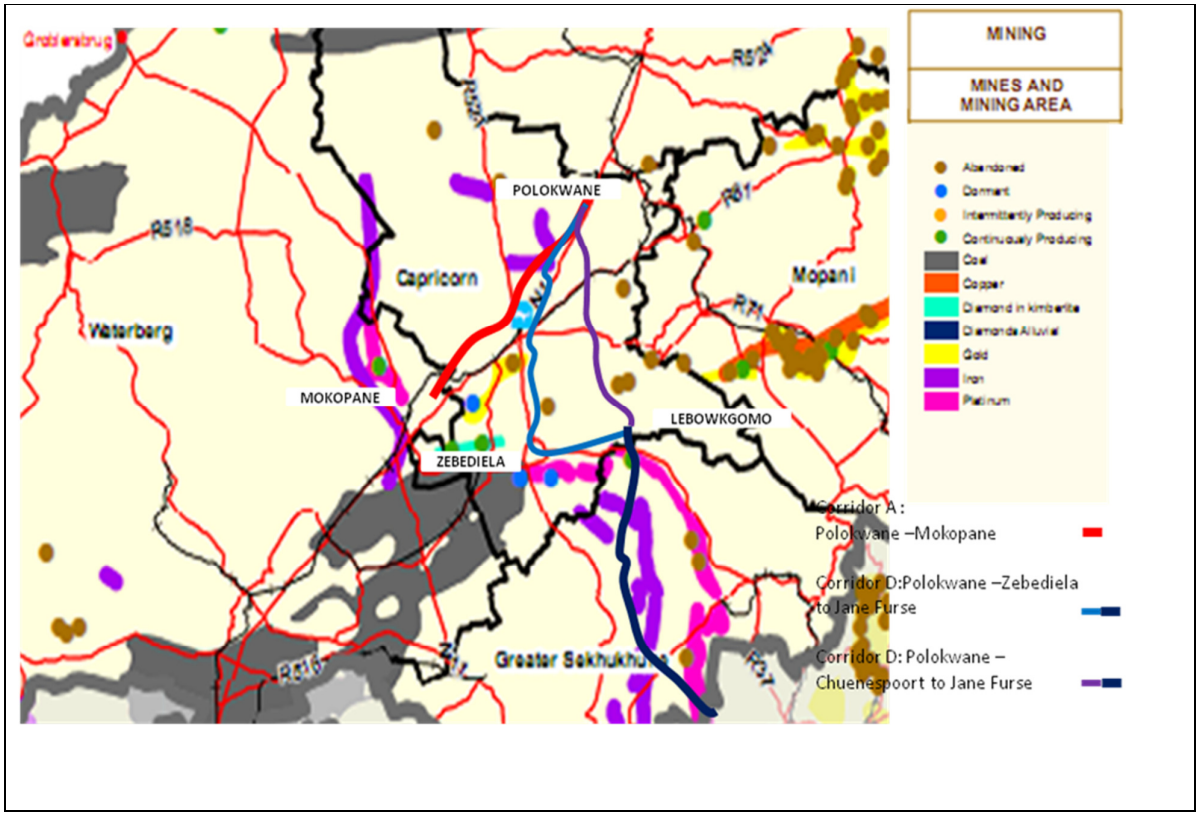


Figure 3.8.2 Mining potential and activities along the two corridors

Estimates for the second node, Mokopane, vary in different sources, but, based on the BMR adjustments to SSA census of 2001, the total population of Mogalakwena Municipality is about 298 440 persons, in about 68 010 households, and an average household of 4,4 persons. However, many households are home to more than ten persons, and also, it should be borne in mind that the population size of the Municipality could be more than the number of people indicated as many people live on farms throughout the area. The area population changes with the seasons, since many residents migrate to work elsewhere. The annual population growth rate is estimated at 1,4%, which represents the average provincial population growth rate. The total population after projections by 1,4% annual growth rate is 324467 which gives an increase in population by 4480. The total population increased by 1.4 % since 2006.

Areas around Mokopane contain large concentration of platinum reserves. The Reef runs from Thabazimbi southwards towards Rustenburg and eastwards towards Madibeng (formerly Brits). Large mining companies operate within the municipal area, such as Anglo Platinum and Goldfields.

For the last node, Jane Furse, the most recent survey of 2007 gave the population in Makhuduthamaga at about 300'206 in 56 642 households (Statistics South Africa, Community Survey 2007). The average households' size has been calculated at 5.3 persons per household. The Burgersfort mining belt is situated in the Tubatse municipality area. Chrome, Vanadium and Platinum is found and mined extensively along this mining belt and is exported by rail and sea (via Richards Bay harbour) to overseas destinations. The Burgersfort mining belt is situated in the Tubatse municipality area. Chrome, Vanadium and Platinum is found and mined extensively along this mining belt and is exported by rail and sea (via Richards Bay harbour) to overseas destinations.

3.9 Public Transport Survey Analysis

High-level surveys conducted along the alignment for both Corridors A & D sought to capture public transport counts, origin and destinations as well as boarding and alighting locations. No stated preference was conducted for this initial assessment – being the preserve of the detailed feasibility.

MOKOPANE – POLOKWANE

3.9.1 At Mokopane, the public transport vehicle park (midi-busses and Kombis) composition was as follows:

- 28-Seater: 36%;
- 22-Seater: 29%;
- 16-Seater: 24%, and
- 13-Seater: 11%;

with no busses servicing the route between Polokwane and Mokopane along the R101.

3.9.2 The trip fare at the time of survey was R25.00 per direction. Travel time varies between 30' and 45', and the service is unscheduled – being a factor of full occupancy prior to departure. Only 3 pick-up and drop-off points along the route between origin and destination were observed, but the general principle of 'indicate when wishing to alight' applies.

3.9.3 Mokopane to Polokwane Weekday Morning Peak occurs at 06h00am and peak vehicle occupancy is 1'896 passengers, with peak frequency as high as 5-7' intervals, and the average between 06h00 and 07h00 being 15', rising to 35 by mid-morning, and deteriorating to 'departure when full occupancy' standard by midday. Evening Peak occurs at 18h00 and peak vehicle occupancy is 1'645 passengers, with the average frequency being between 10' and 15'.

POLOKWANE - ZEBEDIELA

3.9.4 On the Polokwane to Zebediela portion of the Polokwane – Jane Furse alignment, the public transport vehicle park (midi-busses and Kombis) composition was as follows:

- 28-Seater: 45%;
- 22-Seater: 30%;
- 16-Seater: 15%, and
- 13-Seater: 10%;

with no busses servicing the R519 route.

3.9.5 However, the Polokwane – Zebediela route is characterised by a huge peak on Mondays and Fridays, when passengers commute to Polokwane on Monday morning to return on Friday evening. Consequently, only 3 Taxis operate daily on the R519 route. Similarly to the Polokwane – Mokopane route, no intermediate stops between origin and destination on the R519 route.

3.9.6 The trip fare at the time of survey was between R25.00 and R30.00 per direction. Travel time varies between 30' and 45', and the service is also unscheduled – being a factor of the standard full occupancy prior to departure. Travel time is between 45' to 1 hour.

3.9.7 Zebediela to Polokwane Monday Morning Peak occurs at 06h00am and peak vehicle occupancy is 3'235 passengers, with peak frequency as high as 5-7' intervals, and the average between 06h00 and 07h00 being 15', deteriorating to the 'departure when full occupancy' standard by midday. Friday Evening Peak from Polokwane to Zebediela occurs at 18h00 and peak vehicle occupancy is 3'789 passengers, with the average frequency being between 10' and 15'.

ZEBEDIELA - LEBOWAKGOMO

3.9.8 On the Zebediela to Lebowakgomo portion of the Polokwane – Jane Furse alignment, the public transport vehicle park (midi-busses and Kombis) composition was as follows:

- 28-Seater: 37%;
- 22-Seater: 24%;
- 16-Seater: 24%, and
- 13-Seater: 15%.

3.9.9 The trip fare at the time of survey between Zebediela and Lebowakgomo was R14.00 per direction. Travel time varies between 30' and 45', and the service is also unscheduled – being a factor of the standard full occupancy prior to departure. Travel time is between 45' to 1 hour.

3.9.10 Zebediela to Lebowakgomo Weekday Morning Peak occurs at 06h00am and peak vehicle occupancy is 2'978 passengers, with peak frequency as high as 5-7' intervals, and the average between 06h00 and 07h00 being 15', deteriorating to the 'departure when full occupancy' standard by midday.

POLOKWANE - LEBOWAKGOMO (VIA CHUENESPOORT)

3.9.11 The Polokwane to Lebowakgomo via Chuenespoort link is serviced by busses operated by both Great North and Kopano. Bus capacity is 65 seated and 19 standing. Composite fare is R17.00, and there are 4 scheduled stops. Morning Peak is between 06h00 and 08h00.

LEBOWAKGOMO – JANE FURSE

3.9.12 The Lebowakgomo – Jane Furse link is common to both alignments options leading to Polokwane from Lebowakgomo (i.e., either through Zebediela or Chuenespoort).

3.9.13 At Lebowakgomo, the public transport vehicle park (midi-busses and Kombis) composition was as follows:

- 28-Seater: 37%;
- 22-Seater: 30%;
- 16-Seater: 21%, and
- 13-Seater: 12%;

with no busses servicing the route between Lebowakgomo and Jane Furse.

3.9.14 The Lebowakgomo – Jane Furse route is the most complex link on the Polokwane – Jane Furse alignment in terms of segmentation and fare structure. Figure 3.9 below is a schematic depicting the route fare structure.

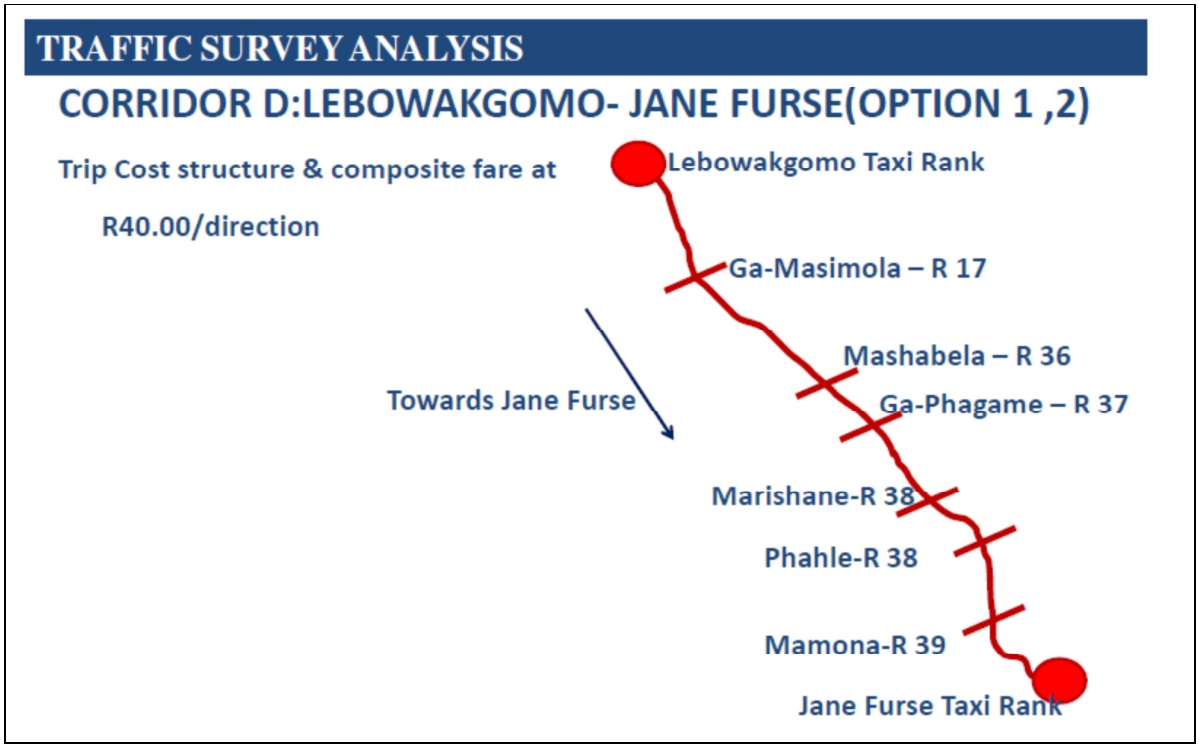


Figure 3.9 Lebowakgomo – Jane Furse Route & Fare Structure

3.15 The trip fare at the time of survey was R40.00 per direction. Weekday Morning Peak occurs at 06h00am and peak vehicle occupancy is 2'456 passengers, with peak frequency as high as 5-7' intervals, and the average between 06h00 and 07h00 being 15', rising to 35 by mid-morning, and deteriorating to the 'departure when full occupancy' standard by midday.

4 Pre-Sift Assessment Results

4.1 Introduction

The purpose of the pre-shift is to identify the target destinations and route corridors that will be taken forward for option development. As this assignment follows upon Phase 1 of the Limpopo Rail Plan, the Team merely satisfied itself that the given alignments w.r.t Corridor D (via Zebediela or alternatively through Chuenespoort) is consistent with the overarching project objectives that provide the hurdle that the new line must pass. With respect to Corridor A, the Team is satisfied that the benefits accruing to an approach that maintains the existing alignment far outweigh those of seeking out a completely new alignment – even as the Team anticipates the construction of a standard gauge line thereon and parallel to the existing single track narrow gauge infrastructure.

4.2 Project Objectives

The objectives are to achieve modal integration, increase in rail mode share, full system accessibility, uncompromised safety/security, enhanced customer experience, transit oriented development / densification, public transport financial & business sustainability and green corridor principles.

4.3 Demand-Capability Gap Analysis

The Demand-Capability Analysis considered the capability of the in scope narrow gauge line between Polokwane and Mokopane to satisfy passenger demand both currently and at a future date. It assessed whether further intervention is necessary, such as the construction of a standard gauge-based new line – both with respect to the current long-distance Shosholoza Meyl services and the expected improvement thereof as well as the integration of services along Corridor D – which would have to run parallel to the Polokwane – Mokopane rail commuter alignment (and superimposed on the existing Shosholoza Meyl alignment) up to about the Km 267.8 branch-off. The technical details of this analysis are contained in both the Infrastructure and Operations Analysis Technical Notes appended hereto.

With respect to Corridor D, the rail-based public transport service is new and will be dimensioned on the standard gauge – the technical details of which are also contained in both the Infrastructure and Operations Analysis Technical Notes appended hereto.

4.4 Searchlights

The concept of 'searchlights' has been developed to help focus the area of study and allow options to be generated. The searchlights look from Polokwane to target destinations along the Polokwane – Mokopane as well as Polokwane – Jane Furse alignments to determine targets destinations to be added to generate an option. These searchlights are not fixed in either bearing or breath beyond the 'common sense' practical limitations of physical geography and railway operability.

4.1 Identified Searchlights

Three broad searchlights have been identified. Due to geography, some targets feature in more than one searchlight. Identified 'searchlights' are depicted below on Figures 4.1 to 4.3, and summarised on Table 4.1.

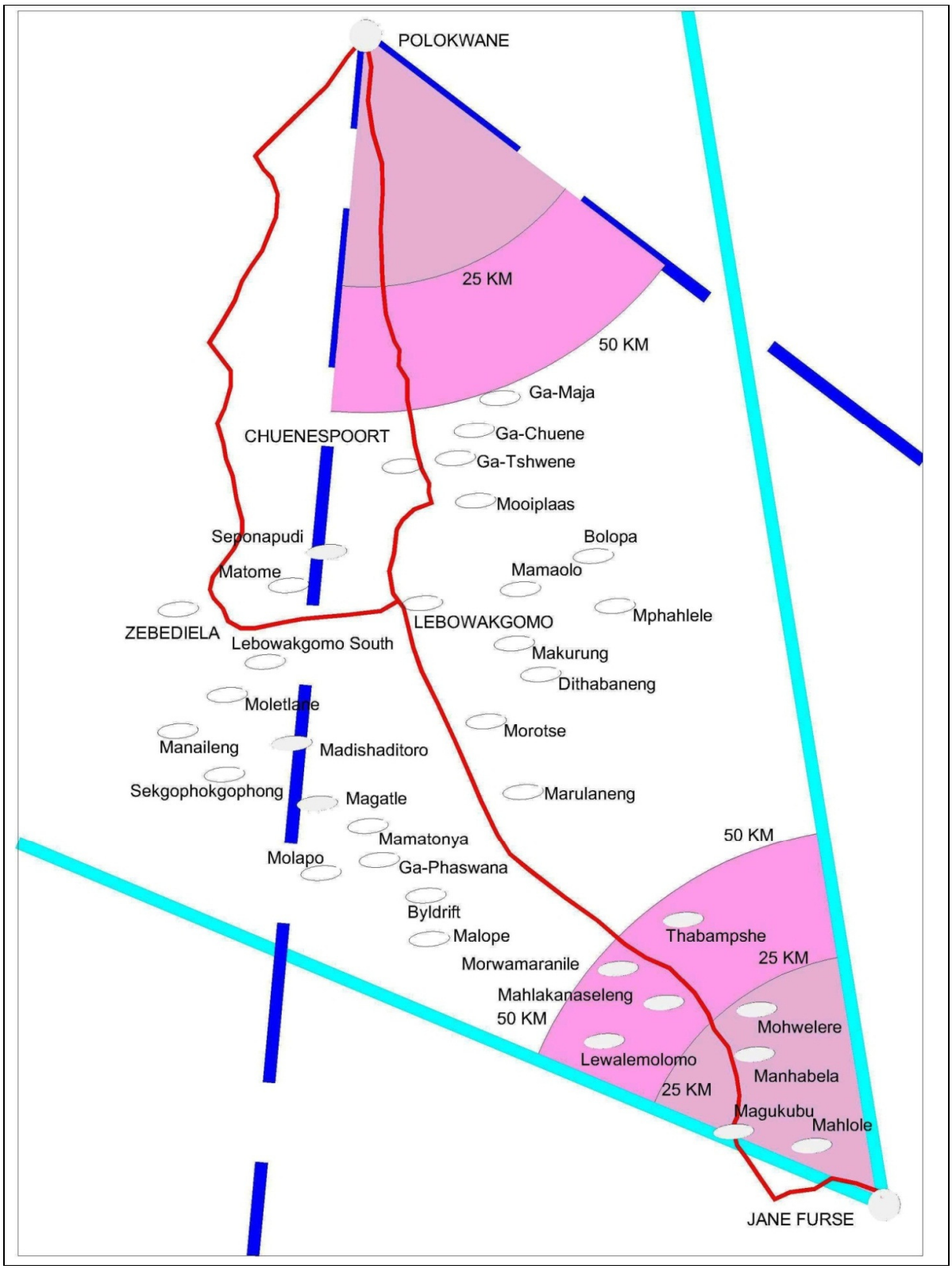


Figure 4.1 Polokwane – Jane Furse (via Chuenespoort)

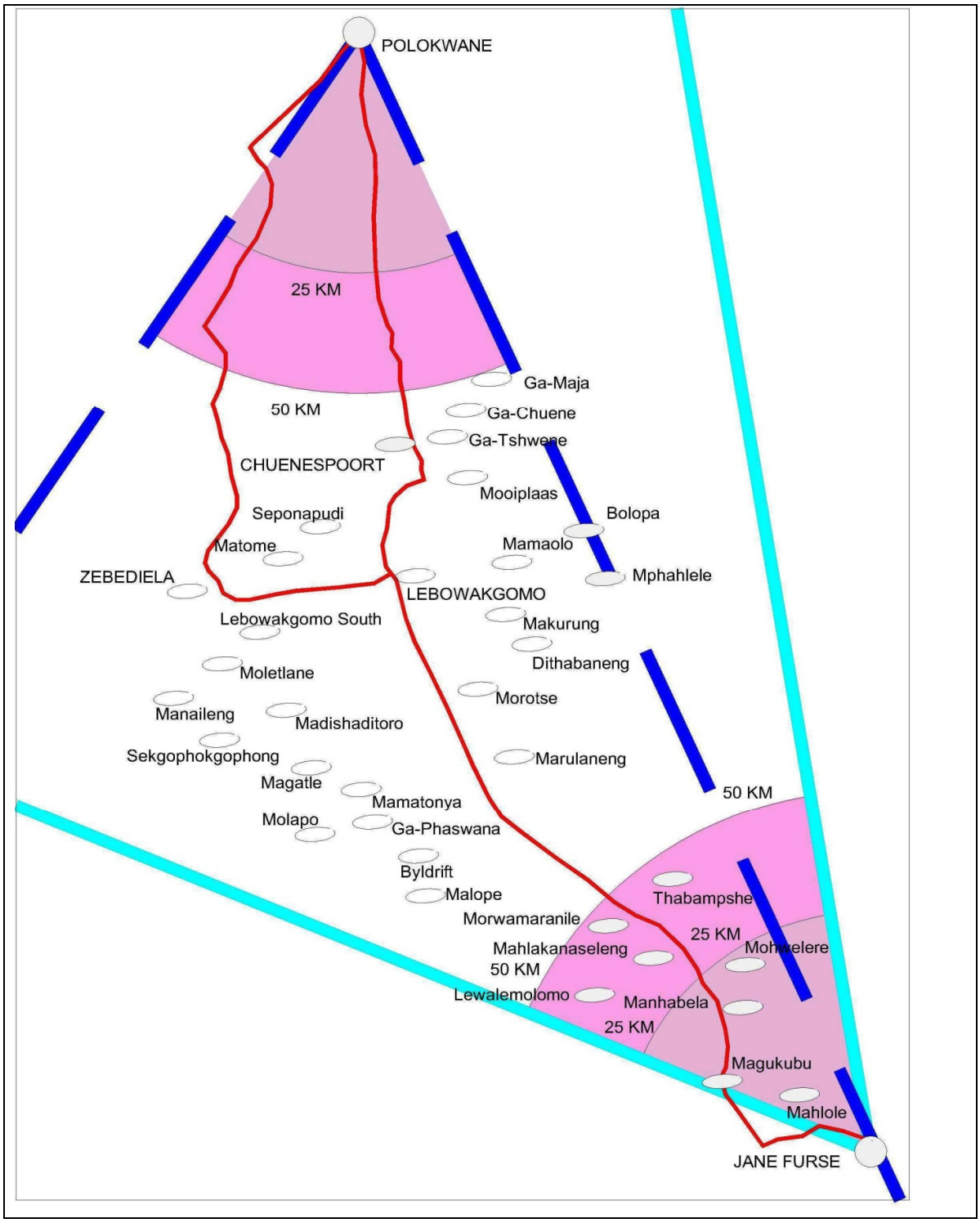


Figure 4.2 Polokwane – Jane Furse (via Zebediela)

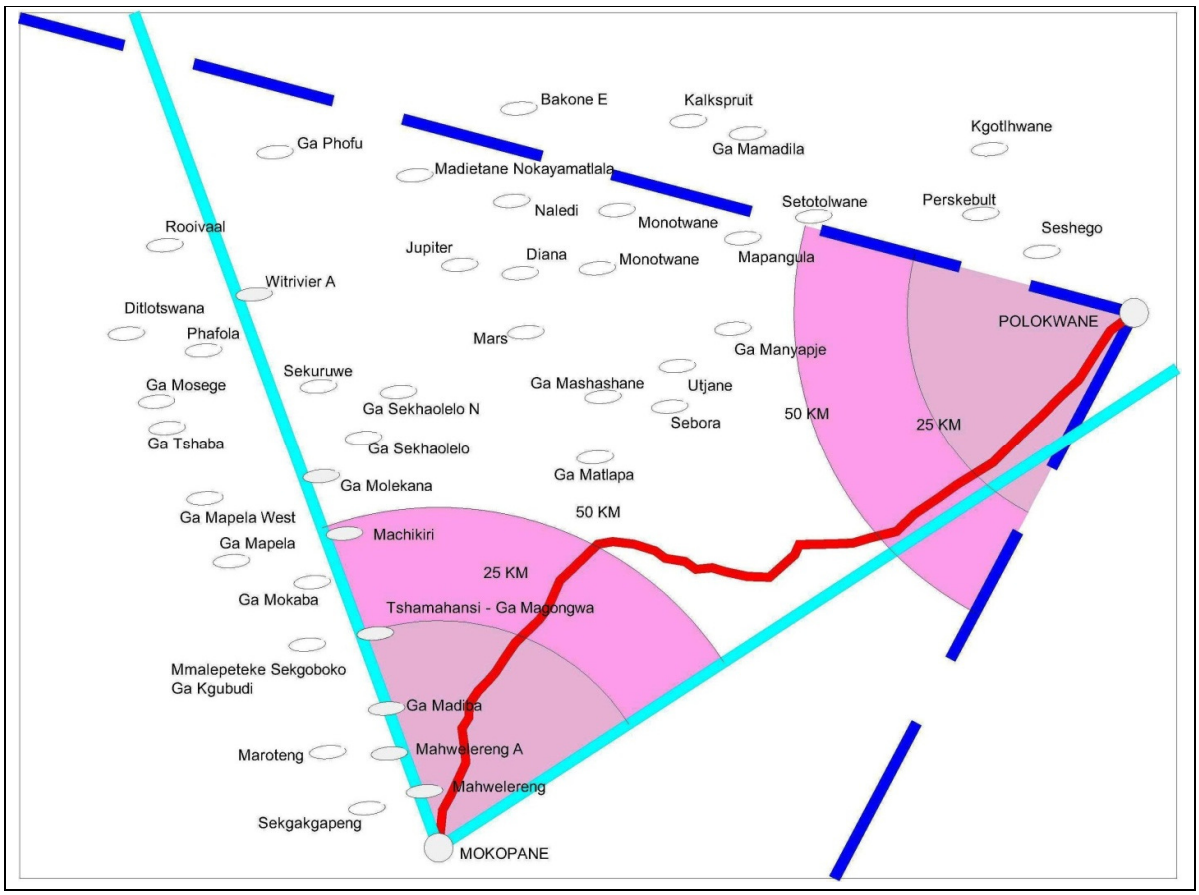


Figure 4.3 Polokwane – Mokopane

Table 4.1 IDENTIFIED SEARCHLIGHTS

Searchlight	Target Settlements
Polokwane – Jane Furse (via Chuenespoort)	25 km - 136 and 50 km - 112
Polokwane – Jane Furse (via Zebediela)	25 km - 152 and 50 km - 148
Polokwane – Mokopane	25 km -39 and 50km - 101

5 Option Generation

Methodology

5.1 A consistent approach to option generation was applied. By looking at each searchlight, agglomeration targets (village, settlement, town) were added to the core line. Special attention was put on to maximizing the use of existing services as distributors to the line, using current Bus, Midi- & Minibus journeys and service patterns. A judgment was then made on how many train journey hours each target could support.

5.2 This incremental approach also enabled an order of magnitude value of each market to be determined in terms of cost and revenue estimates. Current (as practised by the informal Midi- / Minibus services, Bus services and Shosholoza Meyl long-distance services) applicable cost per trip was used as a baseline to estimate revenue.

5.3 Although this is a strategic business case analysis, outline options had to be taken further and indicative alignments developed to arrive at preferred options. This was particularly necessary to take Corridor D forward. It was also necessary to include environmental considerations as additional sift criteria for option development.

5.3.1 It is important to note that the multi-criteria approach to this assessment also included socio-economic developmental objectives, i.e., regional economic development, regional accessibility, population mobility and enterprise development.

5.3.2 In the case of enterprise development, explicit and specific recognition of the need to include current public transport service providers into any future rail-based solution. It is thus that the informal Mini-bus Taxi/Bus industry will form the backbone of the passenger distribution model and, hence, is assumed to be integrated to the rail-based mobility solution of the preferred options recommended for detail feasibility consideration.

5.4 Each option that has been generated has been considered as completely self-contained (with a new line all the way).

5.5 Potential savings in utilizing the classic line for the portion of the route from Polokwane to the South up to the kilometre 267.8 branch off for both A & D corridors were assessed against the principles of feasibility and suitability. However, the economic impacts of utilizing said portion have only been undertaken for the self-contained versions of the options.

Train Service Specifications

5.6 In order to assess the options, train service specifications have been developed for each. These include estimated route distance, journey times, turnaround times and train set requirements. In all cases, the assumptions made are considered moderately conservative.

Assumptions

5.7 A full explanation and rationale of the technical assumptions can be found in the High Level Technical Operations Specification technical note. However, the key assumptions used for defining the outline options used in the sifting process are outlined below.

Route Distance

5.8 As no design has been undertaken within this study, the route distances within the options needed to be estimated. The point to point distance between any 2 stations pairs is based on the straight line distance and in some cases, a factor of up to +7% has been added to the straight line distance, where obvious route geography features that the new line must cross or circumnavigate, could constrain straight line route choice. Similarly, where the destination is served as a diverging main line, a judgement has been made on what impact this will have. In the case of the Polokwane – Mokopane line, for the most, the assumed point to point distances are similar to the classic line route distances. For this reason, no environmental impact assessment was necessary for the new line.

Journey Times

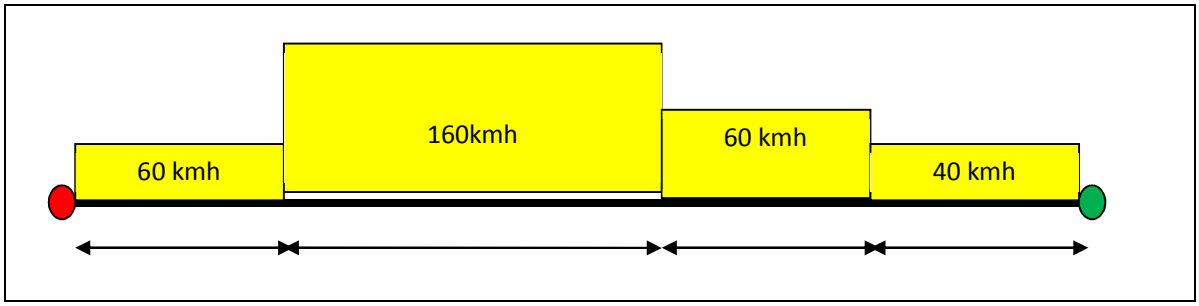
5.9 Journey times have been calculated using the assumed distance plus speed assumptions. The maximum line speed of 160km/h has been assumed.

5.10 Figure 5.1 below shows the line speed profile used to calculate journey times between any 2 stations pairs. Using this profile, journey times between all the station pairs has been calculated using Rail Systems and assuming the vehicles have AGV traction and performance characteristics. A notional 2.5% performance allowance was also added to all calculated times.

Assumed speed profile

- 0-15 kilometres from Polokwane 60 kmh
- 15 - 85 kilometres from Polokwane (Express Service) 160 kmh
- 30 kilometres from destination 60 kmh
- 10 kilometres from destination 40 kmh

Figure 5.1 Assumed Speed Profile



Stations

5.11 All station platforms are assumed to accommodate train lengths varying between 300 - 402 m. However in this assessment, the maximum train length is assumed is 402 m.

Tools for Assessment

5.11 A range of tools were developed to assess the options through the sifting process. These tools enable a quantified assessment of the options in terms affordability and financial feasibility to add to the qualitative assessment. A summary of these tools and their outputs is given below:

Demand and Revenue forecasting framework

5.12 The demand forecasting framework has been designed to consider the impacts on a range of markets that could be affect ted by the new lines:

- Long distance Intercity market served by the new line, in particular, the Polokwane Jane Furse connectivity to the envisaged Moloto Corridor, and hence, the Limpopo – Mpumalanga – Gauteng connectivity was assessed at a qualitative level;
- The impact on commuter and regional markets;
- The improvement in the attractiveness of using rail within and without the Limpopo Province.

5.13 The framework comprises of spreadsheet based models (decision support tools), designed to capture the impact on each of the 2 markets, i.e., the commuter and regional markets. Both models are peak demand models.

5.14 The decision support tools are exactly that; at this stage, the key requirement is that the tools enable relative differences between options to be estimated and assessed with confidence. At the sift stage, these tools are not designed to produce precise absolute forecasts.

Sift Infrastructure Cost Model

5.15 The purpose of the sift cost model is to allow the potential capital cost of the generated options to be efficiently compared against each other, and not to provide accurate estimate of final cost. A more detailed model will be the preserve of the detail feasibility assessment.

5.16 It is important to recognize the options being sifted have been developed at a very high level and only the following information is known:

- Estimate of route mileage of the new lines;
- Number of stations, intermediate stations and termini;
- Number of platforms at each station, and,
- Number of junctions/branch-offs.

5.17 Non construction costs such as design, project management and obtaining consents are allocated as percentages of the total construction cost. Operating, renewal and

maintenance costs are similarly base on widespread international practice gleaned from the Team's international activity. The sift assessment has no separate provision for project risk.

5.18 A more detailed version of this model will be developed at detail feasibility stage.

Operating Cost Model

5.19 Again, the purpose of the Operating Cost Model is to compare a range of options consistently. Using unit costs derived from widespread practice and the Team's international activity, these costs are benchmarked where possible, and the model uses a bottom-up approach to estimating.

5.20 Unit rates for each cost item and train service features that drive operating costs are:

Corridor A: Polokwane –Mokopane (2050)

- Total train kilometres: 39.000 km (per day),
- Number of trains: 30 (each train consists of 3 units and each unit consists of 4 coaches)
- Number of stations: 10

Corridor D: Polokwane –Moloto

- Total train kilometres: 56,600 km(per day)
- Number of train sets: 50(each train consists of 3 units and each unit consists of 15 coaches)
- Number of stations: 16

Model Development

5.21 Due to project timescales, the sift process was undertaken before the business case models were fully finalized. An interim model suite was developed to provide an internally consistent comparison of the options. However, it should be noted that these models were then further developed to provide inputs for the final business case. Therefore, the numbers shown in this document are not replicated within the business case, and should only be used to understand the relative performance of options.

Generated Options

5.22 From the searchlights identified during the pre-sift, two options have been developed.

Polokwane – Mokopane

5.23 This option (Corridor A) takes Polokwane to Mokopane as the core and adds 8 new stations in between, as depicted below on Figure 5.2.

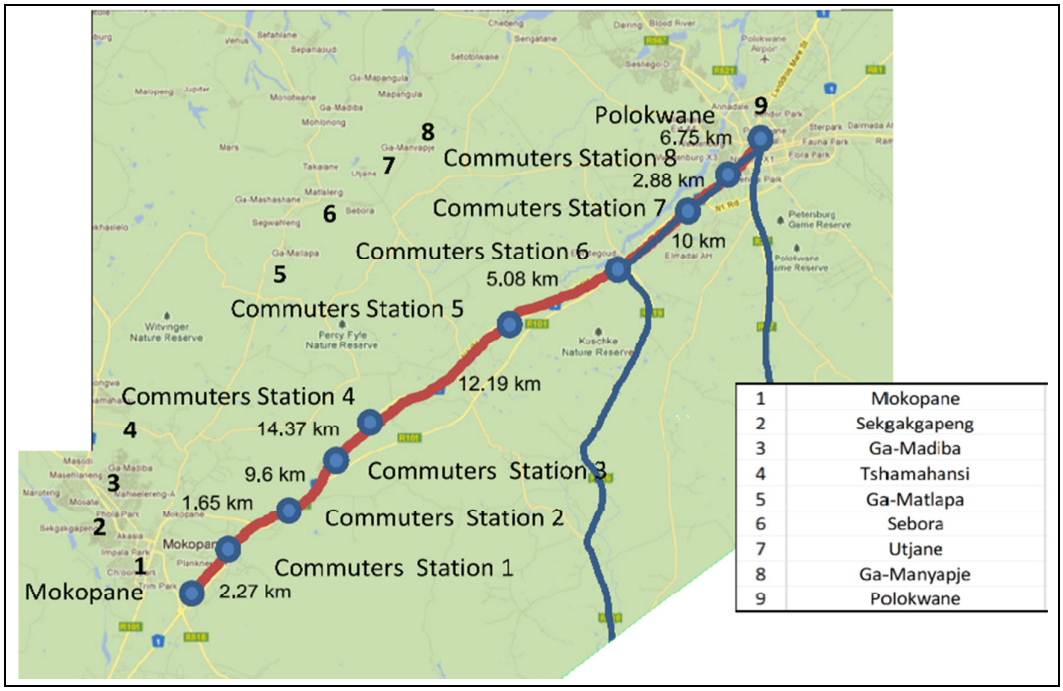


Figure 5.2 Corridor A – Polokwane to Mokopane

5.24 This option (Corridor D) takes Polokwane to Jane Furse (via Zebediela) as the core and adds 15 stations in between as depicted below on Figure 5.3.

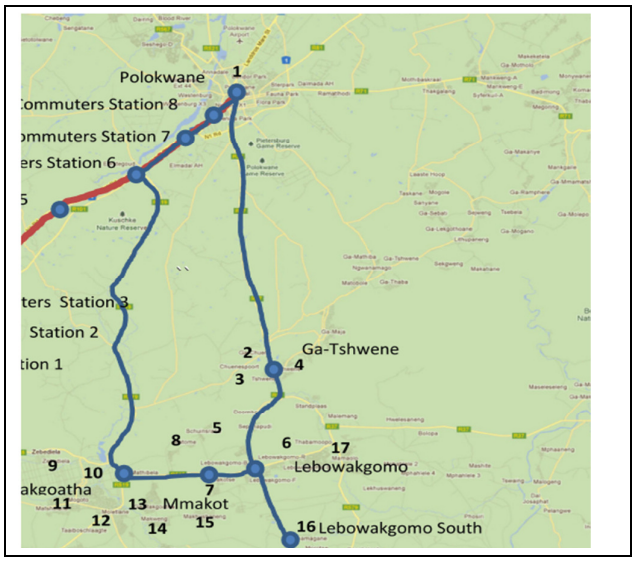


Figure 5.3 Corridor D – Polokwane to Lebowakgomo

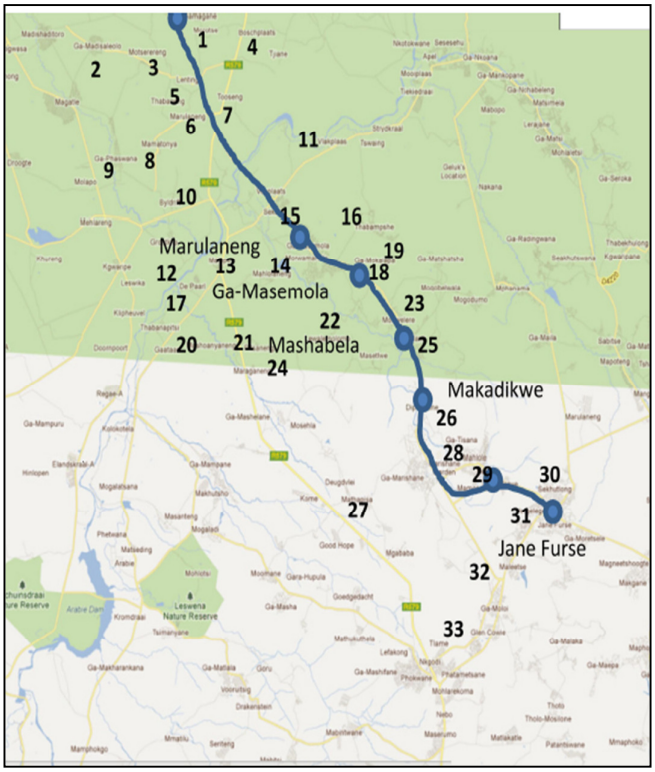


Figure 5.4 Corridor D – Lebowakgomo to Jane Furse

6 Sift Assessment

Approach

6.1 The sifting of the developed options are based upon the principles of feasibility, suitability and acceptability. The process examined each generated option against these principles. Each was assessed against a number of criteria to allow a prioritization of the options and the identification of a preferred corridor to be taken forward for more detailed assessment. No explicit weighting has been given to the principles or the criteria during assessment.

6.2 Associated with this approach, the assessment of each criteria has been either quantified or qualitatively scored – e.g., adverse, beneficial. The intention of this approach is to avoid the addition of scores and the creation of a 'single' number for each option, which would negate the whole ethos of undertaking the multiple criteria assessment.

Sift Results

Polokwane to Mokopane

Feasibility

6.3 In operational terms, a wholly new line would be relatively simple to plan and operate, and should achieve excellent performance and reliability. If the existing classic line were to be adapted to provide commuter services alongside the current long-distance Shosholoza Meyl service, then there would be considerable operational constraints due to the technological performance characteristics of the classic line (including the one track nature of the line) as well as the complex mix of existing passenger and freight train on this route section. Classic line running also requires that new line rolling stock is compatible with the current classic line infrastructure.

Suitability

6.4 The market demand analysis found that in case on Polokwane –Mokopane , the morning peak hour trips towards Polokwane is 62734(2050)

Polokwane to Jane Furse

Feasibility

6.5 Similar considerations as recorded under 6.3 above were factored into the assessment of the Polokwane – Jane Furse line with regard to the track portion from Polokwane to the kilometre 267.8 turn-off, where the route is parallel to the classic line route between Polokwane and Mokopane. The intuitive advantages of utilizing the classic line were far outweighed by the negative operational disadvantages. If the existing classic line were to be adapted to provide commuter services alongside the current long-distance Shosholoza Meyl service, then there would be considerable operational constraints due to the technological performance characteristics of the classic line (including the one track nature of the line) as well as the complex mix of existing passenger and freight train on this route section. Classic line running also requires that new line rolling stock is compatible with the current classic line infrastructure.

6.6 In terms of construction, there are a few issues that strongly favoured the Polokwane Jane Furse via Zebediela ahead of via Chuenespoort. The alignment through Zebediela traverses through flatter terrain; hence there is no requirement of tunnels.

6.7 Equally, environmental considerations weighed decisively in favour of the via Zebediela option. The option via Chuenespoort traverses through area of high environmental sensitivity viz; Bewaarkloof Nature Reserve, Centres of Endemism, vulnerable and endangered eco-systems, heritage areas, whereas there are no such issues via the Zebediela option. Moreover, the option via Zebediela passes through land capable of arable culture and there will be fewer traffic accidents due to terrain conditions

Suitability

6.8 In case of Polokwane –Moloto Corridor, both the options viz. Option 1via Chuenespoort and Option 2 via were modelled. As the demand estimates are higher for the option via Zebediela, it is recommended for as the preferred linkage from demand side (82,438 morning peak hour trips towards Polokwane via Zebediela vis-a-vis 74872 morning peak hour trips towards Polokwane via Chunespoort) for the cardinal year 2050.

7 Conclusions

7.1 This report outlines the approach to option development and the results of the initial assessment to identify the preferred corridor to be taken forward in the Strategic Business Case. In order to accomplish this, a two-phase sift process has been undertaken, assessing different targets and options against the project objectives and the principles of feasibility and suitability.

7.2 As part of the pre-sift assessment, a market analysis ascertained the top target agglomerations – being Polokwane to Mokopane on the one hand and Polokwane Jane Furse, on the other. Broad searchlights were constructed using the top targets and settlements in the regions, and these were taken forward to the next phase of assessment.

7.3 Three broad options were then generated around these targets for the purpose of assessment:

Polokwane – Mokopane;

Polokwane – Jane Furse (via Cheunespoort); and

Polokwane – Jane Furse (via Zebediela).

7.4 A high level analysis was undertaken of the top targets and the three options to understand their relative performance. The target Polokwane – Jane Furse (via Chuenespoort) performed the worst due to higher infrastructure costs and environmental impact, as well as market demand. Though the route length is shorter than the option via Zebediela, yet the number of settlements covered via Zebediela are higher. This results in higher demand estimates of 82438 morning peak hour trips towards Polokwane via Zebediela vis-a-vis 74872 morning peak hour trips towards Polokwane via Cheunespoort (2050).

7.5 Using the project objectives, a multi-criteria assessment was developed - including socio-economic objectives, and each option was assessed in terms of feasibility and suitability. This included the generation and assessment of the costs and benefits of each option.

7.6 The Taxi Mini-bus/Bus industry operating in the sphere of influence of the preferred options is deemed mandatory for inclusion in the rail-based public transport solution presented in the preferred options. However, this study has only considered strategic and qualitative elements of the industry's inclusion advocated herein, and has not worked out the quantitative dimension of the industry's integration into the preferred options proposed hereunder, that being an assessment to be included in the detail feasibility considerations taking the Strategic Business Case forward.

7.7 In terms of feasibility, all options had some construction issues, although the most severe were considered to be in the Polokwane – Jane Furse (via Chuenespoort) variant.

7.8 In terms of suitability and, although the principal objective of this study is to provide for passenger transport, the detail feasibility should include freight movement capacity along the corridors of the preferred options.

Recommendation

7.9 This assessment recommends that the Polokwane – Mokopane rail commuter service (Corridor A) as well as the regional passenger rail service from Polokwane to Jane Furse

(Corridor D) be taken forward for detail feasibility consideration when the appropriate market demand indicators are fulfilled in the medium term.