

EXECUTIVE SUMMARY

A. OVERVIEW AND PROJECT APPRECIATION

Presently the link between Polokwane and Mokopane stations is made by a rail line of 65 km electrified with 25 kV AC. By road, the distance is about 58 km. The current average travelling time is 1 ¹/₄ hours whereas it's approximately ³/₄ hour by road.

The Moloto Corridor project was accepted by Cabinet to link Moloto in Mpumalanga to Tshwane with a standard gauge rail line. The corridor could be extended in future via Jane Furse to Burgersfort. Two options are required to be studied. The first option could be a 36km new rail line could be provided from Polokwane to Zebediela with a possible extension to the Lebowakgomo area. This option would use 19km of the existing mainline between Polokwane and Mokopane. An alternative route to the Lebowakgomo area would be from the Polokwane – Mankweng option.

This report presents the market analysis for the corridors.

B. CORRIDOR PROFILE - CORRIDOR A POLOKWANE –MOKOPANE AND CORRIDOR D-POLOKWANE MOLOTO CORRIDOR

The proposed alignments linking Polokwane 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.

Although rich in terms of availability of mineral resources, power supply, forest cover etc, Limpopo is a rural province. The Provincial government and Municipalities have accorded priority to various sectors of the economy with emphasis on increasing production and productivity, judicious exploitation of state's natural resources and human development with emphasis on provision of basic amenities as enumerated in the Infrastructure Development Plans(IDP). The district and local municipalities within which the corridors lie with its human resource potential, proactive policies and commitment to ensure encouraging climate to the investors is poised to graduate into the league of prosperous municipalities.

C. STRATEGY FOR SPATIAL DEVELOPMENT ALONG CORRIDORS- CORRIDOR A POLOKWANE –MOKOPANE AND CORRIDOR D-POLOKWANE MOLOTO CORRIDOR

The planning context for Corridor A and Corridor D highlights some of the key issues that need to be addressed in formulating a strategy for development as part of the **Corridor Modernization programme of PRASA**. The spatial concept has to take into consideration policy directives and parameters contextually as they occur on the site of proposed development. It emerges from the study of global rail corridors, that following parameters are important for any spatial concept (refer **Figure 1**).

1. Efficient linkage with airport, port / dryport .
2. Location with respect to cosmopolitan city to support the functioning of settlements.
3. Availability of world class physical infrastructure like roads, power, water supply, sewerage, drainage etc.
4. Natural support base of land, water and environmental aspects to ensure ecological balance and environmental sustainability.

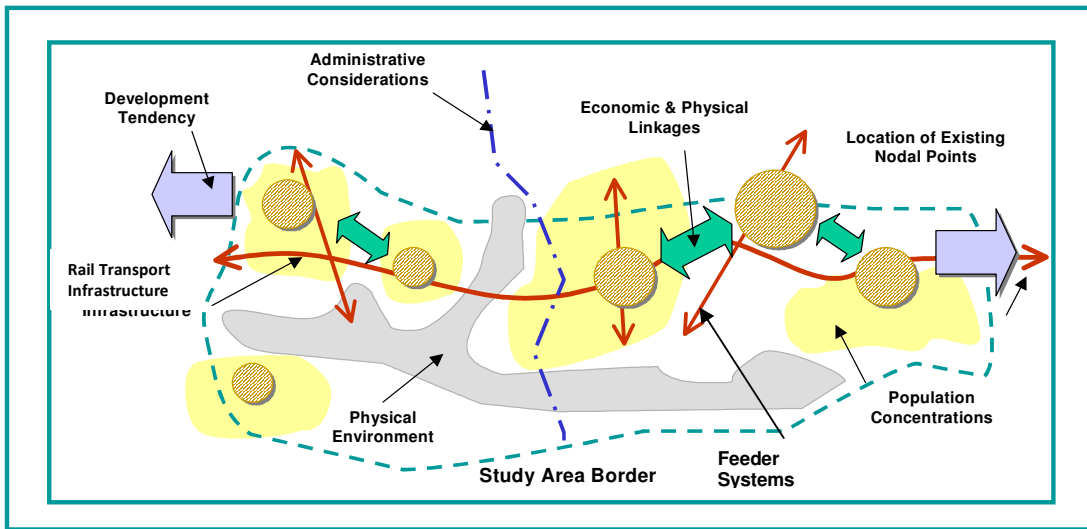


Figure 1: Schematic Representation of considerations for development of corridors(A and D)

The spatial configuration and distribution of functions and infra structure will require detailed study of the area, which should be undertaken on basis of detailed data on land, infrastructure, water, power etc and carrying capacity of the ecosystem to sustain population and development.

D. IDENTIFICATION OF STATION LOCATION

Existing constraints and issues within the study area were then identified, including those which would have a low, medium or high bearing on the location of stations and alignments. Issues that were considered include:

- identified future growth areas;
- existing and future road networks;
- property boundaries and property access;

- the locations of dwellings and infrastructure;
- the locations of community facilities such as schools, places of worship and hospitals;
- number of transfers at a station;
- availability of space to construct bus/taxi ranks and waiting areas;
- number of elderly or physically challenged individuals in the area;
- frequency of service;
- Balance between rail service and taxi/bus service;
- Topography/access and egress issues;
- Significant generators and attractors.

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. For determining the location of stations for Corridor A Polokwane Mokopane and Corridor D Polokwane Moloto Corridor, primary catchment area of 25km and secondary catchment area of 50 km was considered. For Corridor A Polokwane Mokopane, the number of settlements within radius of 25 km and 50 km are 39 and 101 respectively. For Corridor D Polokwane Moloto Corridor, the number of settlements within radius of 25 km and 50 km are 152 and 148 respectively.

Table 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

Nodal Development criteria has been applied for conceptual development of stations along Corridor A and D and shall be followed in the Detailed Feasibility stage. The nodal development areas accommodates identified economic infrastructure and services connecting each economic activity segment along the corridor. Apart from serving as the main connection points of the corridor, these nodal points must serve as the concentration and re-distribution points where public transport transfers should take place(interchanges between road feeder services and line haul rail services). The preferred nodal points should therefore support effective accessibility criteria in terms of public transport.

The table underneath indicates all stations that will form part of Corridor A: Polokwane-Mokopane Corridor and Corridor D: Polokwane –Moloto Corridor. Some of this stations are existing stations(e.g. Polokwane and Mokopane) within the study area. A total of 10 stations have been identified along Corridor A: Polokwane –Mokopane Corridor, with 2 stations viz; Polokwane and Mokopane as existing stations. For Corridor D, the number of stations identified for the options via Chuenespoort and Zebediela are 11 and 14 respectively. Commuter stations 7 and 8 also form part of the network for the option via Zebediela for Corridor D, The identified candidate station positions include

Table 2: Stations along Corridor A and D

Corridor A: Polokwane -Mokopane		
SI No	Station	Distance between Stations
1	Mokopane	0
2	Commuter Station 1	6.75
3	Commuter Station 2	2.88
4	Commuter Station 3	10
5	Commuter Station 4	5.08
6	Commuter Station 5	12.19
7	Commuter Station 6	14.37
8	Commuter Station 7	9.6
9	Commuter Station 8	1.65
10	Polokwane	2.27
Corridor D: Polokwane -Jane Furse		
Option A: Polokwane to Jane Furse via Ga- Rakgoatha(Zebediela)		
1	Jane Furse	5.42
2	Difapayae	8.18
3	Ga-Marishane	3.31
4	Makadikwe	7.8
5	Mashabela	14.22
6	Ga-Masemola	14.65
7	Marulaneng	11.61
8	Lebowakgomo South	5.85
9	Lebowakgomo	3.3
10	Mmakotse	9.16
11	Ga-Rakgoatha (Zebediela)	53.63
12	Commuter Station 7	1.65
13	Commuter Station 8	2.27
14	Polokwane	
Option B: Polokwane to Jane Furse via Ga-Chuene / Chuenespoort		
SI No	Station	Distance between Stations
1	Jane Furse	0
2	Difapayae	5.42
3	Ga-Marishane	8.18
4	Makadikwe	3.31
5	Mashabela	7.8
6	Ga-Masemola	14.22
7	Marulaneng	14.65

8	Lebowakgomo South	11.61
9	Lebowakgomo	5.85
10	Ga- Chuene	13.16
11	Polokwane	36.06

E. TRAFFIC SURVEYS AND 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.

E.1: MOKOPANE – POLOKWANE

E.1.1: 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.

E.1.2: 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.

E.1.3: 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'.

E.2: POLOKWANE - ZEBEDIELA

E.2.1 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.

E.2.2: 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.

E: 2.3: 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.

E: 2.4: 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'.

E.3: ZEBEDIELA – LEBOWAKGOMO

E:3.1: 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%.

E3.2: 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.

E:3.3: 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.

E.4: POLOKWANE - LEBOWAKGOMO (VIA CHUENESPOORT)

E:4.1: 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.

E.5: LEBOWAKGOMO – JANE FURSE

E:5.1: The Lebowakgomo – Jane Furse link is common to both alignments options leading to Polokwane from Lebowakgomo (i.e., either through Zebediela or Chuenespoort).

E5.2: 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.

E:5.3: The Lebowakgomo – Jane Furse route is the most complex link on the Polokwane – Jane Furse alignment in terms of segmentation and fare structure. **Figure 2** below is a schematic depicting the route fare structure.

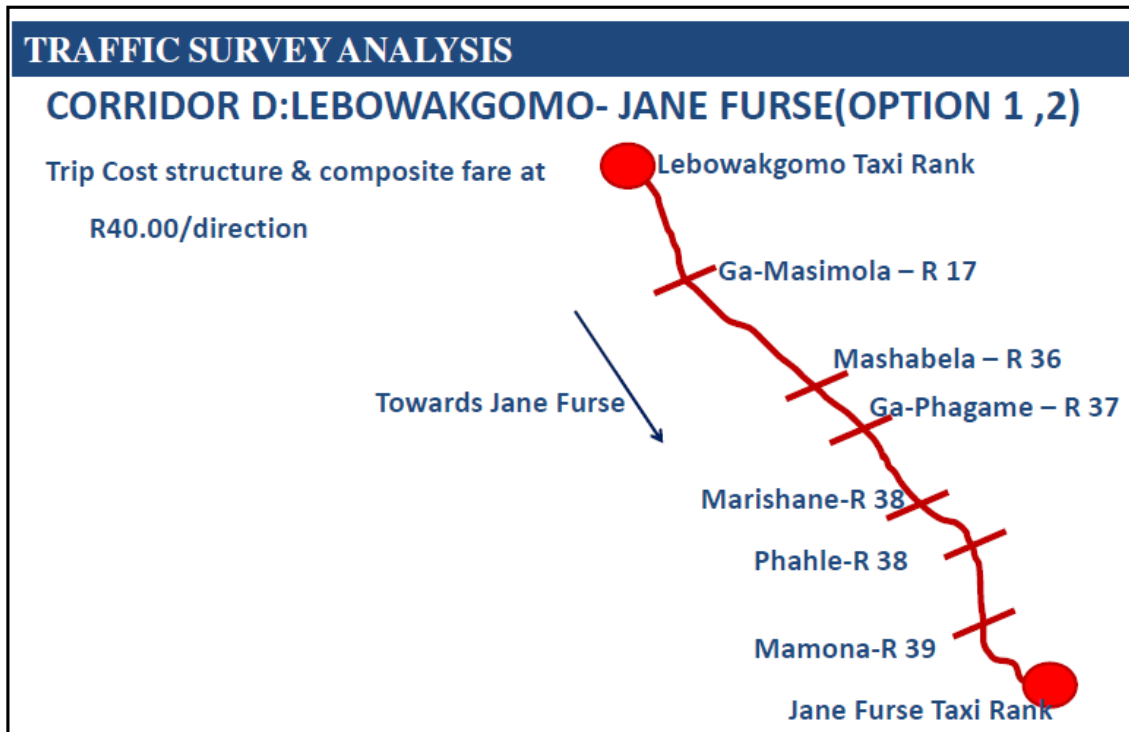


Figure 2: Lebowakgomo – Jane Furse Route & Fare Structure

E:5.4: 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.

F. DEMAND MODELLING AND RIDERSHIP ESTIMATION

Detailed transit assignment model has been developed for the study for accurately forecasting the ridership levels for Polokwane –Mokopane and Polokwane – Moloto Corridor. Important aspects for forecasting were considered which are mentioned below:

- Forecast using the four Step Method(EMME3 Software)

- Interregional traffic volume is based on NATMAP
- Passenger transport: Updated the NATMAP model of percentage shares among transportation modes to reflect existing situation
- Prerequisites: Ensure safety and access to rail stations

The forecasting method is presented in **Figure 3**.

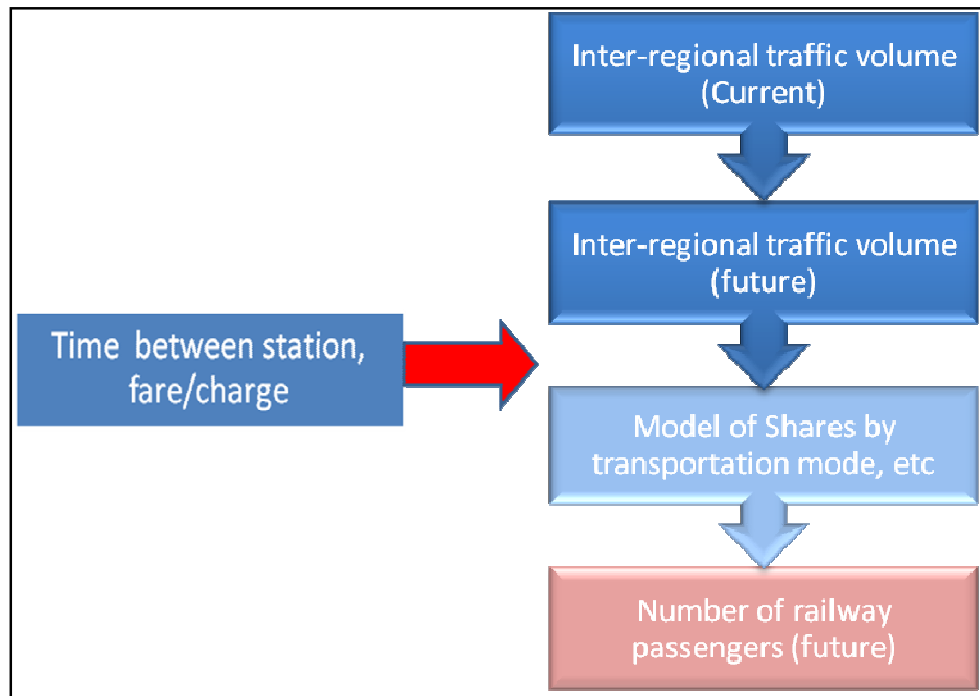


Figure 3: Forecasting Methodology

The demand estimates are for the morning peak hour of 0500- 0700 hrs and evening peak hour of 1600 hrs -1800hrs and represent Peak Passenger Per two Hours per Direction. The model is an AM /PM peak hour model. However , morning/evening peak hour is going to constitute 70 % of the total travel demand on the corridor, with the remainder 30% accounted for shopping and leisure trips .We believe that the frequencies have to absorb the required patronage in the morning and evening peak hours. The demand estimates in the represent the realisable /normal estimates for the corridors. The detail for the year 2050 is has presented in **Table 3** and **4**. 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.

Table 3: Station Boarding and Alighting Passenger Per two Hours Per Direction (2050)
- Mokopane to Polokwane - Morning Peak

Route	Embark	Dis- embark	Total in Section
Mokopane	18463	0	18463
Commuter Station 1	15454	0	33917
Commuter Station 2	6736	0	40654
Commuter Station 3	6633	0	47286
Commuter Station 4	7213	0	54499
Commuter Station 5	541	0	55040
Commuter Station 6	7693	0	62733
Commuter Station 7	0	5126	57607
Commuter Station 8	0	17616	39990
Polokwane	0	39992	0
	62733	62734	

Table 4: Station Boarding and Alighting Passenger Per two Hours Per Direction (2050)
- Jane Furse to Polokwane via Ga- Rakgoatha(Near Zebediela) Morning Peak

Route	Embark	Dis- embark	Total in Section
Jane Furse	6115	0	6115
Difapayae	5284	0	11399
Ga-Marishane	1325	0	12724
Makadikwe	314	0	13038
Mashabela	251	0	13289
Ga-Masemola	2493	0	15782
Marulaneng	1772	0	17554
Lebowakgomo South	11760	3760	25554
Lebowakgomo	44218	14468	55303
Mmakotse	3340	0	58643
Ga-Rakgoatha	5566	0	64210
Drop	0	0	64210
Plaas	0	0	64210
Commuter Station 7	0	8271	55938
Commuter Station 8	0	19158	36781
Polokwane	0	36781	0
Total	82438	82438	

G. FEEDER AND DISTRIBUTION SYSTEMS

The following is recommended with regard to feeder and distribution services in general:

- 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.
- A system of high-quality feeder and distribution services should be developed to transport passengers to and from rail stations, thereby offering them an effective "door-to-door" service.
- Existing public transport services should be amended/restructured where necessary to form part of the feeder services for passengers travelling to Stations.
- Integrated payment and through-ticketing, linked to integrated information on all services, should be an essential link between the dedicated services and the Rail service. More work should be done on the ticketing and payment system taking cognisance of:
 - ✓ International practices.
 - ✓ Current developments in South Africa on smartcards.

H. CONCLUSION AND RECOMMENDATIONS

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. 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.

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