CHAPTER 6: ROAD INVESTMENT: PRACTICES AND MAXIMISED ECONOMIC RETURNS

6.1 INTRODUCTION

The aim of this chapter is to refine road investment practices in South Africa, to ensure maximised economic returns. The purpose of this thesis, namely to explore ways of maximising the economic returns of road infrastructure investment, is twofold in that it requires the development of assessment techniques and a change in investment practices in order to ensure maximised economic returns. Chapter 5 addressed the question of maximising economic returns, and this chapter will look at investment practices and the impact of political decision making. It is therefore necessary to assess current road investment practices and their impact on maximised economic returns. These will be followed by an analysis of the relationship between policy making and investment decisions. This information will then be used to propose changes to road infrastructure investment practices in South Africa.

6.2 ROAD INVESTMENT PRACTICES AND MAXIMISED ECONOMIC RETURNS

Maximised economic returns can only be obtained if road investment practices are optimised. To this end, decision makers must ensure the investment of relevant road projects, which is achieved by assessing the expected economic effects of such projects through proper modelling techniques and most importantly making the correct implementation decisions. According to Eberts (1999:1-5) the following four factors are important in examining the relationship between transportation and economic development:

(1) the relevant type of transport investment
(2) the data necessary to analyse the economic effect of the investment
(3) appropriate methodology to analyse the economic effect
(4) the proper dissemination of results and education of professionals regarding the economic effects of transportation investment

Each of these four factors will now cursorily be discussed.

(1) Types of transport investment encompass two forms, namely capital expansion and capital enhancement. The details were discussed in chapter 1 (sec 1.2.1). As stated previously, the aim of this study relates to capital expansion. The relevant type of road investment is of utmost importance (see ch 3), and researchers should not neglect the more fundamental issues of understanding the different effects of road infrastructure on economic development. It is meaningful to explore the different attributes of road infrastructure and their relationship with economic development, in order to help local decision makers make the right decisions. Economic development generally takes place in the longer run after capital improvements – hence the need for adequate information to guide decision making. Bear in mind that economic returns can only be maximised if road projects that offer the highest economic potential are implemented in practice.

(2) This ties in accurate and comprehensive data (see ch 4). Most analyses of the relationship between transport investment and economic development do not take into account the intensity of use of the transport system. Economic studies, particularly those using production and cost functions frameworks, typically treat all transport networks as if traffic flows are the same. This is too simplified and may lead to biases in the estimates of the development

contributions of transport infrastructure, while also ignoring the very activity – the shipment of goods – that generates the economic gains. Studies also tend to ignore important data that link the location of businesses and households to the location of the transport system providing them with services. This stems from the problem that most of them use data that are aggregated by some level of government jurisdiction. According to Eberts (1999:3), useful data include transport system characteristics, employment, firm-level characteristics, transportation financing information, commodity flows and accompanying characteristics of the regions in the economic analysis. In addition, the data should be both cross-sectional and related to time series in order to improve the reliability of estimates. The generation of data can be improved if decision makers understand the importance of this information. Over- or underestimates of the economic potential of road projects may result in poor decision making and subsequent poor economic returns.

(3) There is a clear need for appropriate methodology to analyse the effect of transport investment on economic development (also see sec 4.8). Initially these effects were assessed by cost-benefit analysis. In recent years, analysts have turned to production and cost functions as a means of including a wider range of benefits related to transport investment. This implies larger data requirements to accurately analyse the said relationships. Another factor that impacts on data and modelling techniques relates to the fact that transport has spatial implications – in other words, transport facilities are located in a specific place, provide services to businesses in that specific geographic area and move people and goods between certain points. Any modelling methodology should integrate these effects. In this regard, Eberts (1999:4) cautions that the appropriate methodology has to take into account not only the spatial relations, because the goods and people are

transported between two points, but also the way in which these transport movements fit into a network. The transport system needs to be analysed, because this will provide information on the ease of vehicle and goods movements between the different urban locations competing against one another.

More comprehensive analytical models are required to model these relationships, and should include components of economic development, such as changes in employment, the opening or closing of businesses and impacts on personal income, as well as the transport system performance. Chapter 4 focused on the issues of modelling transport investment and economic development.

(4) The importance of educating transport professionals and decision makers on the economic effects of transport investment should not be underestimated. Transport investment decisions are becoming increasingly difficult and vital. Roads do not only meet the mobility and accessibility needs of commuters, but are also part of the economic infrastructure of cities – hence the need to assess the economic role of road investment. The evaluation of road investment prioritisation has moved away from ranking projects solely in terms of expected net present values (NPV) or internal rates of return (IRR). Cognisance should also be taken of the project's impact on the GDP and employment creation, and so on. Factors such as whether the transport system will serve as a stimulant of growth or as a cost of growth, the effects on the environment, and numerous other factors (ie GDP increases, employment creation, business growth, etc) must be considered. The increasing complexity in the decision making process calls for greater dissemination of information. From this it is evident that expanded educational efforts are required to ensure that transport professionals and

decision makers are adequately trained in order to ensure maximised economic returns associated with road investment decisions.

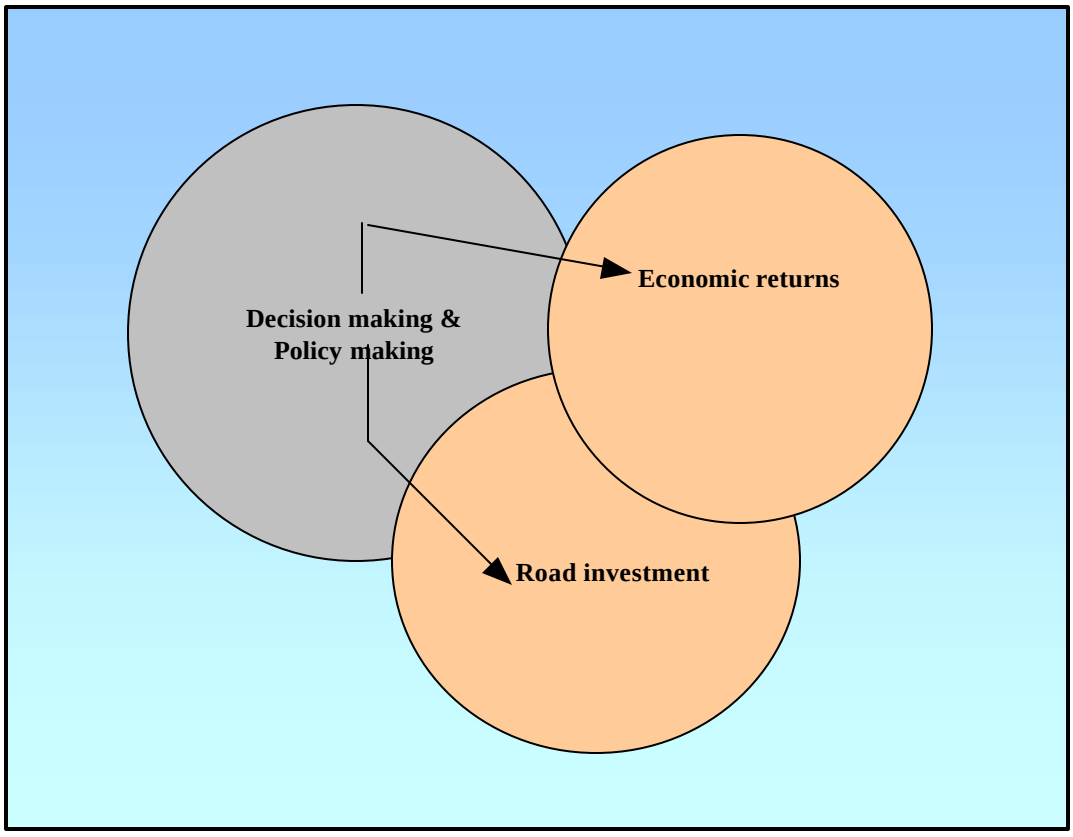
Although the above discussion emphasised the relationship between road investment practices and maximised economic returns, the role of decision makers was clearly highlighted. The next section will address the role of policy making on maximised economic returns.

6.3 MAXIMISED ECONOMIC RETURNS: POLICY MAKING VERSUS INVESTMENT DECISIONS

Most road investment decisions are made at political level. Gramlich (1994:1182) underlines this issue by stating that most state and local officials report that their main hurdle in building new infrastructure capital is gaining the voters' approval – or more specifically the elected politicians. Puentes (2004:2) emphasises and contends that Congress need to move beyond the arguments of money and fundamentally reform the county's dysfunctional transportation system. It is argued that although most Americans live and work in metropolitan areas, these areas make decisions that dispose of only 10 cents of every transportation dollar they generate even though local governments in metropolitan areas own and maintain the vast majority of the transport (including road) infrastructure. According to Puentes (2004:1), the upshot of this policy and these decision making problems is that major highway projects do not create new jobs or spur on economic development as anticipated. From this it is obvious that decision making and policy making play a crucial role in influencing and strengthening the impact of road investment on economic development. In order to maximise the economic returns associated with road infrastructure investment it is necessary to group the interplay between decision making, economic returns and road investment. The

figure below depicts the interplay between policy making and road investment in achieving maximised economic returns.

Figure 6.1: The role of policy making in achieving economic growth



From figure 6.1 it is clear that the interplay between the above three factors is important. The road investment factor refers to the road proposal being considered for investment and may be viewed in terms of the nature of investment, and its scale and location. These factors were discussed in detail in chapter 3. In terms of the three case studies, this relates to decisions in terms of road K8 versus road K16 versus road PWV9. The factor of economic returns has to do with the expected economic returns associated with the road project. Chapter 5 developed a formula on road investment, and the economic potential of each project was analysed in full. In section 5.4 it is stated that road K8 has the highest probability (86%) for high economic returns compared with road K16 (61,25%) and road PWV9 (33,75%). These economic returns are only theoretical if these road projects are

not approved and invested in terms of their economic potential. Thus the third factor, namely policy and decision making, is thus of utmost importance in practice.

According to Banister and Berechman (2000:333), policy making refers to noneconomic factors that influence economic growth. Most importantly, this includes decision making by the political organ and the politicians. Figure 6.1 shows that policy making and the decisions involved, which affect both economic returns and road investment, are the predominant factor in realising economic development benefits from road infrastructure investment. Sections 6.2.1 and 3.4.1 highlighted the scarcity problem of new road investment. This scarcity problem can partly be ascribed to insufficient funding for the construction of road infrastructure. The scarcity problem thus emphasises the opportunity cost related to road investment. An opportunity cost can be defined as the potential benefit that is lost or sacrificed when the selection of one course of action makes it necessary to give up a competing course of action (Garrison & Noreen 1994:48). Cole (1998:108) concurs and defines opportunity cost as a resource cost used to reflect the value of resources used in providing a particular service. This means that limited funding for the construction of one road project (say, road PWV9) implies that the construction of another road (say, road K8) is lost. Should poor investment decisions be made, one can assume that it will be at a high opportunity cost and low returns to the country. This discussion again highlights the prominence given to road PWV9 and the MCDC. Section 1.4.1 highlighted the strategic importance of the SDI programme for government (the political organ). It was also stated that road PWV9 forms part of this policy statement, while roads K8 and K16 have no importance from a policy perspective. From this it is obvious that road PWV9 will be the project with the highest priority, and probability for favourable decision making. This is unsatisfactory because it was shown that this

project has the lowest potential for economic returns. Incorrect decision making may thus have long-term opportunity cost implications.

The Department of Provincial and Local Government (DPLG) proposes that the results of LED projects be measured on a number of levels to make accurate measurement possible – hence the need to distinguish between the inputs, outputs, outcomes and impacts of a project (DPLG 2000:8). This also applies to road projects, the aim of which is to maximise economic returns (this is similar to LED projects.) These terms are explained below:

- **Inputs.** Inputs are the resources and capacity mobilised to ensure the road project. Inputs thus involve the cost of the project as well as other activities related to the road investment process.

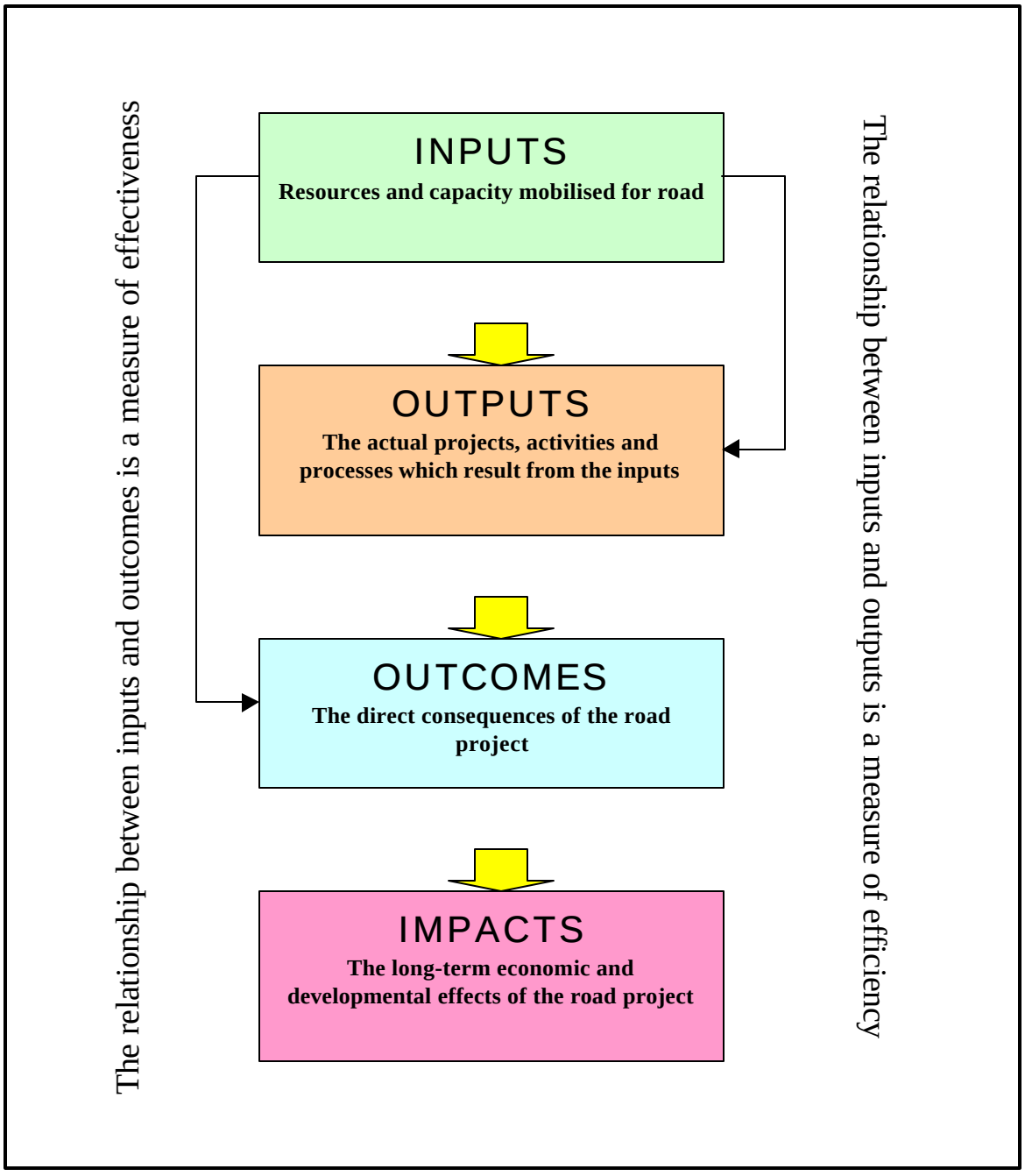
- **Outputs.** The output is the specific project that directly results from the inputs, which is the actual road being constructed.

- **Outcomes.** Outcomes refer to the direct consequences or results of an output. The outcome is thus the change in conditions once the road has been constructed. This is the direct result of the project and may include the diversion of traffic to the new road.

- **Impacts.** Impacts reflect the wider economic implications of the project as discussed in section 3.2.3. These impacts may relate to a growth in business sales or income or job creation as a result of the road project; and occur over a longer period than the actual implementation time.

The relationship between the inputs, outputs, outcomes and impacts of road projects is a key indicator of the accuracy of policy and the correctness of political decision making on road investment. Figure 6.2 illustrates this relationship.

Figure 6.2: Relationship between inputs, outputs, outcomes and impacts of road projects



Source: Adapted from DPLG (2000:9)

The relationship between inputs and outputs should be considered in respect of how efficiently the road project was established. This involves the relationship between the cost of the project and the actual road constructed.

In order to assess the effectiveness of the road project, it is necessary to consider the relationship between inputs and outcomes. Measuring the network performance improvements in relation to the cost of the project may achieve this. Road authorities may use the relationship between the inputs and outcomes to assess whether the resources to be used will result in the appropriate outcomes. This entails measuring the accuracy of decision making. The impacts associated with the road project are the final measure of good or bad political decision making. The three case studies will be used to demonstrate the impact of decision making.

6.3.1 Efficiency assessments for roads K8, K16 and PWV9

The inputs of the case studies relate to the cost of the projects. It was shown that road K8 (R30 million for 10 km road) has the lowest cost compared to road K16 (R64,25 million for 7 km road) and PWV9 (R350 million for 23 km road). The efficiency of these projects is a measure of the costs incurred in establishing the project, compared with other similar projects. A measure of efficiency is obtained by dividing the cost of the project by the length of the road in order to measure the cost per kilometre. The respective figures are as follows:

- Road K8 – R3 000 000,00/km
- Road K16 – R9 178 571,43/km
- Road PWV9 – R15 217 391,30/km

From this it is clear that road K8 is the most efficient investment in terms of cost per kilometre.

6.3.2 The effectiveness of the investments in roads K8, K16 and PWV9

In terms of road cost in relation to the project outcomes, the expected network performance can be used as a measure. In section 3.5, the network performance of the case studies was discussed in detail. According to section 3.5.1 (table 3.8), all three roads will ensure improvements in the average speed on the respective road networks. The construction of road K8 will result in a 2,1 km/h improvement on the average speed, while that of K16 will be 4,6 km/h, and road PWV9 6,8 km/h. Table 3.9 in section 3.5.2 shows that the construction of roads K8 and K16 will result in travel time reduction on the road network, while that of road PWV9 will increase. Another significant factor that may impact on opportunity cost is that of the number of jobs created per rand invested in the road project. For the purposes of this study, the jobs created between 2005 and 2010 will be compared with the road construction costs.

Table 6.1: Road cost and jobs created (2005-2010)

Road	Cost (rand million)	Jobs created
K8	30	9 944
K16	64,25	11 574
PWV9	350	16 906

Table 6.1 shows that for road K8, every R3 017 spent on its construction, one job is created. The figure for road K16 is R5 551 per job created, while the cost of road PWV9 is R20 703 per job created. In terms of the effectiveness of the road investment related to job creation as an outcome – road K8 is the preferred road. From the aforementioned one may conclude that roads K8 and K16 will be effective investments, while the effectiveness of road PWV9 is questionable.

6.3.3 The impacts of roads K8, K16 and PWV9

The impacts of the respective road projects were analysed in detail in chapter 5 (tables 5.9 – 5.20). This information showed that road K8 had the highest probability of proper economic development impacts, while road PWV9 had the poorest (road K8 has a probability of 86% for high economic impacts, road K16 61,25%, and road PWV9 33,75%). An empirical investigation of the economic impacts related to the investment of roads K8, K16 and PWV9 was conducted for the purposes of this thesis. This assessment was based on scenarios of socioeconomic growth trends for the study areas of the respective roads for the year 2005 to the year 2020 (in 5-year periods). The purpose of this assessment is to indicate that each road investment decision has an impact on economic development. These decisions need to be managed to ensure maximum returns associated with these investment decisions. Table 6.2 provides detail of the respective assessment years.

Table 6.2: Socioeconomic growth for roads K8, K16 and PWV9

TABLE …….						2001 Base Year: Socio Economic data												
								EA Population		Workers by type of work								
		DESCRIPTION	Functional Area Code	Sub region Code(s)	ZoneSize	Tot Population	%Econ Active	Domestic Servants	Economic Active Population	Office	Retail	Industrl	Spesifiek	Outside +Other	Total Formal Jobs	Domestic	Informal	Unemployed
					177,961	3,382,260	44.9%	26,982	1,518,036	204,448	183,827	186,898	66,999	159,047	801,219	61,195	108,284	418,809
DATA AGGREGATED BY SUB REGION		Temba	1	10	12,508	139,101	39.5%	0	54,953	854	4,065	12,754	1,719	2,533	21,925	0	7,098	18,662
		Stinkwater	1	11	0	74,948	34.4%	0	25,816	0	1,457	177	708	652	2,994	0	2,816	9,177
		Winterveld	3	12	20	119,457	38.6%	0	46,095	0	2,381	323	1,215	1,651	5,570	0	4,986	17,613
		Soshanguwe	2	13	119	332,113	41.3%	0	137,015	0	4,117	760	2,693	2,942	10,512	0	8,371	45,791
		Mabopane	3	14	1,414	112,943	45.0%	0	50,785	413	4,933	1,151	1,894	3,666	12,057	0	5,930	16,979
		Ga-rankuwa	4	15	8,738	71,298	41.3%	0	29,480	226	3,678	7,389	2,972	1,629	15,894	0	3,613	10,029
		Klip-Kruisfontein	4	16	0	119,546	43.3%	0	51,784	0	1,075	210	841	1,169	3,295	0	3,103	17,801
		Hakdoringboom	15	17	0	895	41.5%	65	371	0	20	6	23	149	198	89	30	48
		Rooiwal	15	18	403	10,487	53.6%	764	5,621	0	235	106	102	1,491	1,934	1,054	421	839
		Wildebeeshoek	15	20	4,110	1,524	55.4%	150	845	0	47	5	19	349	420	224	37	93
		Boekenhoutskloof	15	21	8,409	3,284	56.1%	268	1,841	0	80	13	47	536	676	536	86	220
		Atteridgeville	5	25	1,496	210,124	44.0%	85	92,470	37	4,860	857	2,791	3,545	12,090	133	5,758	33,114
		Eersterust	6	26	584	20,046	45.5%	85	9,124	0	1,813	197	300	260	2,570	184	634	1,650
		Mamelodi-Wes	6	27	2,352	216,626	45.7%	0	99,013	76	3,806	669	2,219	1,039	7,809	0	6,105	31,449
		Mamelodi-Oos	6	28	0	75,483	46.9%	0	35,407	0	804	154	618	819	2,395	0	2,201	12,167
		Nellmapius	6	29	723	25,786	47.9%	98	12,346	0	537	132	205	513	1,387	128	763	3,193
		Roslyn	8	30	13,174	67	44.8%	0	30	0	426	25,254	54	2,700	28,434	0	806	1,499
		Akasia-CBD	8	31	173	18,089	51.5%	373	9,322	592	1,507	280	265	1,315	3,959	702	199	691
		Theresa Park	8	32	1,354	12,437	48.8%	393	6,066	0	691	5,202	224	1,497	7,614	768	274	696
		Pretoria noord	8	33	3,218	19,490	47.6%	419	9,282	2,450	4,403	2,334	620	1,366	11,173	850	451	1,106
		Doompoord	8	34	1,287	10,151	56.9%	218	5,778	138	771	1,033	115	587	2,644	390	155	353
		Magalieskruin	8	35	3,438	34,793	50.1%	1,008	17,446	1,198	3,953	738	756	3,926	10,571	3,108	506	1,382
		Daspoort	9	36	3,562	33,628	46.1%	1,045	15,503	554	2,763	8,904	910	2,931	16,062	1,829	812	1,958
		Moot	9	37	4,556	75,527	50.1%	2,945	37,844	4,410	11,384	3,749	2,249	5,807	27,599	6,082	1,327	3,381
		Silverton	9	38	3,714	34,553	50.6%	960	17,492	10,015	8,729	25,821	1,510	11,763	57,838	2,501	2,039	4,238
		Pretoria- Wes	12	39	3,479	45,311	34.1%	605	15,470	2,210	15,439	12,953	5,111	8,872	44,585	1,341	1,766	3,574
		Pretoria CBD	10	40	939	20,629	54.7%	22	11,275	82,262	29,122	3,649	3,616	24,868	143,517	845	4,860	7,843
		Sunnyside	10	41	762	47,603	51.9%	215	24,708	19,370	8,934	722	2,755	4,583	36,366	1,381	1,634	3,204
		Brooklyn	11	42	2,473	31,929	43.3%	1,834	13,830	18,903	11,437	1,321	4,403	7,552	43,616	3,631	1,481	2,886
		Waterkloof	11	43	1,805	20,693	54.8%	1,470	11,348	2,086	1,131	166	316	863	4,568	2,913	282	636
		Wapadrand	13	44	2,205	40,799	50.9%	1,311	20,768	10,207	4,187	420	1,549	4,433	20,796	3,287	872	1,807
		Garstfontein	13	45	2,872	71,772	53.8%	1,643	38,628	12,723	9,556	1,223	1,394	7,230	32,126	4,854	1,532	2,776
		Rietvleidam	13	46	3,684	30	66.7%	3	20	0	2	1	3	30	36	6	1	3
		Voorekkerhoogte	12	47	2,599	26,611	17.2%	405	4,566	9	1,659	280	3,281	3,777	9,006	776	375	728
		Fontains	11	48	2,120	7		0	3	0	14	4	84	284	386	0	11	20
		Centurion CBD	14	51	3,979	38,993	48.5%	1,144	18,914	9,492	5,449	3,312	2,494	8,226	28,973	3,356	969	2,230
		Irene	14	53	7,091	19,926	57.2%	620	11,388	8,334	893	3,647	518	3,016	16,408	2,360	633	919
		Rooihuiskraal	14	54	1,440	17,950	53.4%	599	9,583	790	811	3,297	237	812	5,947	1,086	237	880
		Wierdapark	14	55	5,044	49,601	52.1%	2,583	25,863	1,112	2,219	6,144	938	2,649	13,062	6,212	598	2,162
		Laudium	12	56	1,215	27,741	43.2%	1,033	11,995	128	1,023	819	681	457	3,108	1,661	522	1,888
		Rantesig	15	57	87	7,278	57.3%	683	4,170	0	89	37	87	1,319	1,532	966	249	595
		Olivenhoutbosch	7	58	867	18,713	42.0%	250	7,852	32	218	113	139	539	1,041	924	442	2,717
		Midrand CBD	16	61	15,740	714	58.1%	3	415	3,442	2,982	22,807	205	3,656	33,092	6	1,345	3,125
		Midrand Centrl West	16	62	12,280	29,104	57.0%	422	16,580	10,197	2,040	5,879	1,317	1,351	20,784	811	1,126	3,737
		Midrand Centrl East	16	63	4,142	7,826	53.8%	370	4,214	143	130	129	104	694	1,200	789	130	419
		Olifantsfontein	16	64	2,347	6,143	50.9%	71	3,128	1,261	2,360	8,905	784	1,713	15,023	116	1,011	2,969
		Ivory Park	17	65	6,773	255,110	46.0%	179	117,324	0	2,790	4,104	1,839	663	9,396	570	4,902	29,681
		Tembisa	17	66	2,338	451,866	50.1%	2	226,250	0	2,451	3,143	2,484	1,072	9,150	3	10,465	64,276
		Midrand suid	16	67	2,131	3,262	49.4%	91	1,613	0	153	1,744	138	433	2,468	174	107	436
		Midrand Rural West	16	68	2,546	14,518	58.5%	73	8,496	120	294	174	210	642	1,442	334	441	998
		Diepsloot	17	69	77	30,000	40.0%	0	12,000	0	257	77	308	113	755	0	577	3,105
		Roodeplaat	19	70	716	18,472	47.8%	1,091	8,824	260	528	721	483	3,881	5,873	1,471	894	2,048
		Pienaarspoort	18	71	0	870	53.7%	63	467	0	29	7	24	526	586	91	46	79
		Silver Lakes	18	72	4,293	7,474	54.2%	413	4,052	0	303	394	308	1,766	2,771	1,051	189	276
		Smutskoppie	18	73	20	493	55.0%	63	271	0	61	17	70	371	519	126	19	26
		Hartebeespoortdam	21	75	5,940	17,069	47.8%	765	8,155	404	1,060	569	329	2,820	5,182	1,373	432	839
		Garankuwa-West	21	80	405	43,485	38.7%	80	16,848	0	1,404	600	828	516	3,348	103	1,888	5,461
		Hebron	21	81	200	85,393	39.4%	0	33,631	0	2,323	637	1,823	1,286	6,069	0	3,689	12,500
		Ganotle	20	82	0	47,261	34.3%	0	16,195	0	1,282	188	761	844	3,075	0	1,813	6,136
		Makapanstad	20	83	0	105,215	35.6%	0	37,459	0	2,662	477	2,309	2,347	7,795	0	4,225	13,701
		TOTAL STUDY AREA			177,961	3,382,260	44.9%	26,982	1,518,036	204,448	183,827	186,898	66,999	159,047	801,219	61,195	108,284	418,809
DATA AGGREGATED BY FUNCTIONAL AREA	PDI areas in Tshwane	Temba/Stinkwater	1	10-11	12,508	214,049	37.7%	0	80,769	854	5,522	12,931	2,427	3,185	24,919	0	9,914	27,839
		Shoshanguve	2	13	119	332,113	41.3%	0	137,015	0	4,117	760	2,693	2,942	10,512	0	8,371	45,791
		Mabopane/Winterveld	3	12,14	1,434	232,400	41.7%	0	96,880	413	7,314	1,474	3,109	5,317	17,627	0	10,916	34,592
		Ga-rankuwa/Klip-kruifontein	4	15-16	8,738	190,844	42.6%	0	81,264	226	4,753	7,599	3,813	2,798	19,189	0	6,716	27,830
		Atteridgeville	5	25	1,496	210,124	44.0%	85	92,470	37	4,860	857	2,791	3,545	12,090	133	5,758	33,114
		Mamelodi/Eersterus	6	26-29	3,658	337,941	46.1%	183	155,890	76	6,960	1,152	3,342	2,631	14,161	312	9,703	48,459
		Olivenhoutbosch	7	58	867	18,713	42.0%	250	7,852	32	218	113	139	539	1,041	924	442	2,717
		Sub-total 1a: PDI areas in Tshwane			28,820	1,536,184	42.5%	518	652,140	1,638	33,744	24,886	18,314	20,957	99,539	1,369	51,820	220,342
	Non PDI & rural	Rosslyn/Akasia/Montana	8	30-35	22,644	95,027	50.4%	2,411	47,924	4,378	11,751	34,841	2,034	11,391	64,395	5,818	2,391	5,727
		Moot	9	36-38	11,833	143,708	49.3%	4,950	70,839	14,979	22,876	38,474	4,669	20,501	101,499	10,412	4,178	9,577
		CBD/Sunnyside/Arcadia	10	40-41	1,702	68,234	52.7%	237	35,983	101,632	38,056	4,371	6,371	29,453	179,883	2,226	6,494	11,047
		Old-East	11	42,43,48	6,398	52,629	47.8%	3,304	25,181	20,989	12,582	1,491	4,803	8,705	48,570	6,544	1,774	3,542
		Pta-West/Laudium/ Voortrekkerhoogte	12	39,47,56	7,292	99,663	32.1%	2,043	32,031	2,347	18,121	14,052	9,073	13,106	56,699	3,778	2,663	6,190
		Wapadrand/Moreletapark	13	44-46	8,761	112,601	52.8%	2,957	59,416	22,930	13,745	1,644	2,946	11,693	52,958	8,147	2,405	4,586
		Centurion	14	51,53-55	17,554	126,470	52.0%	4,946	65,748	19,728	9,372	16,400	4,187	14,703	64,390	13,014	2,437	6,191
		Tshwane Rural	15	17-21,57	13,009	23,468	54.7%	1,930	12,848	0	471	167	278	3,844	4,760	2,869	823	1,795
		Sub total 1b: Non PDI / Rural in Tshwane			89,193	721,800	48.5%	22,778	349,970	186,983	126,974	111,440	34,361	113,396	573,154	52,808	23,165	48,655
	Sub total 1: Total in Tshwane				118,013	2,257,984	44.4%	23,296	1,002,110	188,621	160,718	136,326	52,675	134,353	672,693	54,177	74,985	268,997
	Secondary area	Midrand	16	61-64,67-68	39,186	61,568	55.9%	1,030	34,446	15,163	7,959	39,638	2,758	8,491	74,009	2,230	4,160	11,684
		Tembisa/Ivorypark/Diepsloot	17	65-66,69	9,188	736,976	48.2%	181	355,574	0	5,498	7,324	4,631	1,848	19,301	573	15,944	97,062
		South East (Silverlakes/Smutskoppie)	18	71-73	4,313	8,837	54.2%	539	4,790	0	393	418	402	2,663	3,876	1,268	254	381
		North-east (Tweefontein)	19	70	716	18,472	47.8%	1,091	8,824	260	528	721	483	3,881	5,873	1,471	894	2,048
		North (Makapanstad/Gamoltle)	20	82-83	0	152,476	35.2%	0	53,654	0	3,944	665	3,070	3,191	10,870	0	6,038	19,837
		West (Hartebeespoort/Ga-rankuwa)	21	75,80-81	6,545	145,947	40.2%	845	58,638	404	4,787	1,806	2,980	4,620	14,597	1,476	6,009	18,800
	Sub total 2: Total in secondary area				59,948	1,124,276	45.9%	3,686	515,926	15,827	23,109	50,572	14,324	24,694	128,526	7,018	33,299	149,812
	TOTAAL: PRIMARY PLUS SECONDARY AREA				177,961	3,382,260	44.9%	26,982	1,518,036	204,448	183,827	186,898	66,999	159,047	801,219	61,195	108,284	418,809
DATA AGGRE-GATED PER CORRIDOR		K8 CORRIDOR		30-35	22,644	95,027	50.4%	2,411	47,924	4,378	11,751	34,841	2,034	11,391	64,395	5,818	2,391	5,727
		K16 CORRIDOR		26,36-38	12,417	163,754	48.8%	5,035	79,963	14,979	24,689	38,671	4,969	20,761	104,069	10,596	4,812	11,227
		PWV9 CORRIDOR		30-32,36,39, 47,55-58	31,553	239,476	42.1%	7,370	100,837	4,637	26,034	59,986	11,690	26,056	128,403	15,179	6,043	16,508
GROWTH RATES		K8 CORRIDOR				-27.5%		-58.9%	-27.3%	-53.7%	-5.1%	1.0%	35.8%	56.3%	-1.1%	-68.6%	-20.8%	-36.1%
		K16 CORRIDOR				-20.8%		-40.7%	-20.8%	-18.5%	-12.1%	0.9%	-47.3%	-29.1%	-15.7%	-49.6%	-25.3%	-35.9%
		PWV9 CORRIDOR				-14.7%		-48.3%	-17.2%	-30.9%	-14.3%	4.7%	-57.6%	-16.2%	-16.1%	-57.3%	-8.3%	-26.3%
		K8 CORRIDOR		30-35	22,644	130,996	50.3%	5,861	65,936	9,459	12,382	34,506	1,498	7,287	65,132	18,516	3,018	8,963
		K16 CORRIDOR		26,36-38	12,417	206,736	48.9%	8,493	100,993	18,379	28,081	38,342	9,434	29,274	123,510	21,042	6,438	17,516
		PWV9 CORRIDOR		30-32,36,39,47	31,553	280,644	43.4%	14,264	121,833	6,712	30,386	57,311	27,541	31,092	153,042	35,550	6,587	22,407

TABLE …….					2005 Trend Land use: Socio-economic data													
							EA Population		Workers by type of work									
		DESCRIPTION	Functional Area Code	Sub region Code(s)	ZoneSize	Tot Population	%Econ Active	Domestic Servants	Economic Active Population	Office	Retail	Industrl	Spesifiek	Outside +Other	Total Formal Jobs	Domestic	Informal	Unemployed
					177,961	4,389,693	44.6%	48,060	1,959,714	273,802	239,336	252,166	73,324	209,175	1,047,803	131,455	147,632	494,362
DATA AGGREGATED BY SUB REGION		Temba	1	10	12,508	203,329	39.2%	0	79,660	1,067	5,294	12,508	878	903	20,652	0	13,109	28,087
		Stinkwater	1	11	0	116,361	34.3%	0	39,867	0	1,854	0	0	13	1,867	0	5,891	13,162
		Winterveld	3	12	20	165,116	38.6%	0	63,677	0	2,571	20	1	147	2,739	0	9,883	23,108
		Soshanguwe	2	13	119	501,727	41.5%	0	208,257	0	6,012	119	0	994	7,125	0	9,163	63,682
		Mabopane	3	14	1,414	197,973	44.1%	0	87,216	426	6,633	1,414	3,623	649	12,745	0	12,931	28,669
		Ga-rankuwa	4	15	8,738	120,263	42.4%	0	50,950	261	3,206	8,738	202	142	12,549	0	6,385	15,244
		Klip-Kruisfontein	4	16	0	163,035	43.5%	0	70,861	0	1,517	0	0	256	1,773	0	2,718	19,809
		Hakdoringboom	15	17	0	0		0	0	0	0	0	0	0	0	0	0	0
		Rooiwal	15	18	403	16,660	53.6%	28	8,932	0	638	403	12	4,450	5,503	36	1,222	2,835
		Wildebeeshoek	15	20	4,110	1,222	55.5%	115	678	1	12	4	7	44	68	287	0	57
		Boekenhoutskloof	15	21	8,409	3,866	50.8%	333	1,963	4	36	12	20	129	201	832	0	166
		Atteridgeville	5	25	1,496	235,238	44.5%	0	104,699	167	9,612	361	0	3,617	13,757	0	4,018	30,445
		Eersterust	6	26	584	21,479	45.5%	428	9,782	0	1,742	123	0	616	2,481	923	516	2,175
		Mamelodi-Wes	6	27	2,352	265,536	45.9%	0	121,749	173	5,315	319	320	1,366	7,493	0	5,042	38,149
		Mamelodi-Oos	6	28	0	69,389	47.9%	0	33,209	0	702	0	0	286	988	0	1,225	10,407
		Nellmapius	6	29	723	37,570	44.5%	5	16,721	0	1,778	404	0	546	2,728	11	733	5,025
		Roslyn	8	30	13,174	331	45.0%	0	149	0	373	25,251	0	1,163	26,787	0	712	1,332
		Akasia-CBD	8	31	173	21,742	51.6%	847	11,221	1,358	1,653	0	0	74	3,085	1,801	201	1,139
		Theresa Park	8	32	1,354	15,670	48.7%	844	7,634	0	411	4,650	0	546	5,607	1,799	222	919
		Pretoria noord	8	33	3,218	23,299	47.8%	805	11,130	3,840	5,085	2,424	473	3,547	15,369	1,830	780	1,724
		Doompoord	8	34	1,287	10,452	56.8%	508	5,941	221	840	1,263	0	683	3,007	1,075	263	698
		Magalieskruin	8	35	3,438	59,502	50.2%	2,857	29,861	4,040	4,020	918	1,025	1,274	11,277	12,011	840	3,151
		Daspoort	9	36	3,562	40,212	46.2%	2,374	18,590	483	3,112	7,684	1,897	4,123	17,299	4,975	1,069	2,720
		Moot	9	37	4,556	94,202	50.0%	4,068	47,141	4,868	12,663	3,057	2,899	7,580	31,067	8,973	2,317	5,720
		Silverton	9	38	3,714	50,843	50.1%	1,623	25,480	13,028	10,564	27,478	4,638	16,955	72,663	6,171	2,536	6,901
		Pretoria- Wes	12	39	3,479	54,997	36.4%	1,204	20,008	2,957	19,903	12,238	13,162	19,762	68,022	3,011	2,493	4,547
		Pretoria CBD	10	40	939	29,944	52.0%	0	15,567	98,550	38,422	3,039	5,375	68,853	214,239	1,484	8,435	10,129
		Sunnyside	10	41	762	67,720	51.6%	143	34,912	20,069	11,649	88	995	12,197	44,998	3,390	2,495	4,728
		Brooklyn	11	42	2,473	38,023	43.7%	2,424	16,633	21,998	18,605	621	2,223	8,873	52,322	5,861	2,176	4,320
		Waterkloof	11	43	1,805	27,485	54.3%	2,743	14,922	3,174	1,717	84	0	908	5,883	7,412	554	1,547
		Wapadrand	13	44	2,205	52,719	51.1%	2,237	26,955	11,777	5,111	267	3,915	2,908	23,978	5,577	1,290	3,135
		Garstfontein	13	45	2,872	86,673	53.6%	3,073	46,482	17,699	11,196	585	1,234	9,463	40,177	8,657	2,276	4,481
		Rietvleidam	13	46	3,684	30	66.7%	3	20	0	2	1	3	30	36	6	1	3
		Voorekkerhoogte	12	47	2,599	29,756	20.6%	958	6,138	9	1,287	0	11,464	1,671	14,431	2,242	857	1,459
		Fontains	11	48	2,120	0		0	0	0	0	0	330	118	448	0	11	19
		Centurion CBD	14	51	3,979	44,350	49.5%	2,019	21,964	12,061	7,319	7,780	7,529	5,593	40,282	5,952	1,176	3,691
		Irene	14	53	7,091	32,331	53.3%	620	17,248	10,946	2,764	10,805	920	3,413	28,848	2,999	1,133	1,671
		Rooihuiskraal	14	54	1,440	22,483	53.2%	1,578	11,960	263	866	4,431	0	667	6,226	3,408	239	2,357
		Wierdapark	14	55	5,044	57,095	50.9%	4,896	30,681	1,111	1,925	6,315	0	2,116	11,467	13,669	466	4,908
		Laudium	12	56	1,215	37,988	43.6%	1,550	16,568	632	1,315	699	976	779	4,401	2,793	252	3,041
		Rantesig	15	57	87	3,927	53.7%	556	2,108	0	56	87	42	573	758	979	99	343
		Olivenhoutbosch	7	58	867	18,922	43.6%	1,035	8,735	162	351	387	0	285	1,185	4,281	216	1,999
		Midrand CBD	16	61	15,740	152	58.6%	18	89	11,260	9,345	60,971	348	4,568	86,492	31	1,761	1,870
		Midrand Centrl West	16	62	12,280	58,525	57.2%	2,098	33,488	28,342	1,205	10,070	1,812	1,769	43,198	4,053	862	4,917
		Midrand Centrl East	16	63	4,142	23,708	49.0%	710	11,618	500	291	536	85	463	1,881	1,750	167	1,151
		Olifantsfontein	16	64	2,347	5,523	51.0%	348	2,819	500	2,134	4,654	463	1,428	9,179	565	205	818
		Ivory Park	17	65	6,773	255,748	45.6%	896	116,581	0	6,283	18,221	0	986	25,490	2,844	2,574	5,420
		Tembisa	17	66	2,338	435,053	49.9%	8	217,007	0	2,317	4,003	2,320	894	9,534	16	9,945	61,136
		Midrand suid	16	67	2,131	11,838	48.1%	456	5,698	0	186	6,582	0	261	7,029	877	141	1,019
		Midrand Rural West	16	68	2,546	58,073	56.9%	373	33,597	600	624	616	39	56	1,935	1,678	1,662	3,340
		Diepsloot	17	69	77	30,000	40.0%	0	12,000	0	257	77	308	113	755	0	377	3,105
		Roodeplaat	19	70	716	17,728	47.4%	1,048	8,401	260	510	716	462	3,743	5,691	1,397	876	2,023
		Pienaarspoort	18	71	0	536	45.0%	0	241	0	8	0	0	48	56	0	1	15
		Silver Lakes	18	72	4,293	11,814	56.6%	413	6,681	974	496	448	527	1,766	4,211	1,464	283	445
		Smutskoppie	18	73	20	705	55.0%	63	388	0	67	20	80	371	538	154	21	29
		Hartebeespoortdam	21	75	5,940	20,438	47.7%	1,675	9,747	20	315	70	141	2,819	3,365	4,078	186	1,058
		Garankuwa-West	21	80	405	64,905	38.7%	80	25,125	0	1,444	405	144	197	2,190	103	3,720	8,262
		Hebron	21	81	200	115,022	39.3%	0	45,225	0	1,906	200	382	793	3,281	0	6,655	14,938
		Gamotle	20	82	0	76,903	34.4%	0	26,445	0	1,233	0	29	183	1,445	0	3,692	8,237
		Makapanstad	20	83	0	163,545	35.6%	0	58,283	0	2,584	0	2,021	395	5,000	0	8,359	18,877
		TOTAL STUDY AREA			177,961	4,389,693	44.6%	48,060	1,959,714	273,802	239,336	252,166	73,324	209,175	1,047,803	131,455	147,632	494,362
DATA AGGREGATED BY FUNCTIONAL AREA	PDI areas in Tshwane	Temba/Stinkwater	1	10-11	12,508	319,690	37.4%	0	119,527	1,067	7,148	12,508	878	918	22,519	0	19,000	41,249
		Shoshanguve	2	13	119	501,727	41.5%	0	208,257	0	6,012	119	0	994	7,125	0	9,163	63,682
		Mabopane/Winterveld	3	12,14	1,434	363,089	41.6%	0	150,893	426	9,204	1,434	3,624	796	15,484	0	22,814	51,777
		Ga-rankuwa/Klip-kruifontein	4	15-16	8,738	283,298	43.0%	0	121,811	261	4,723	8,738	202	398	14,322	0	9,103	35,053
		Atteridgeville	5	25	1,496	235,238	44.5%	0	104,699	167	9,612	361	0	3,617	13,757	0	4,018	30,445
		Mamelodi/Eersterus	6	26-29	3,658	393,974	46.1%	433	181,461	173	9,537	846	320	2,814	13,689	934	7,516	55,756
		Olivenhoutbosch	7	58	867	18,922	46.2%	1,035	8,735	162	351	387	0	285	1,185	4,281	216	1,999
		Sub-total 1a: PDI areas in Tshwane			28,820	2,115,938	42.3%	1,468	895,383	2,255	46,587	24,393	5,024	9,822	88,081	5,215	71,830	279,961
	Non PDI & rural	Rosslyn/Akasia/Montana	8	30-35	22,644	130,996	50.3%	5,861	65,936	9,459	12,382	34,506	1,498	7,287	65,132	18,516	3,018	8,963
		Moot	9	36-38	11,833	185,257	49.2%	8,065	91,211	18,379	26,339	38,219	9,434	28,658	121,029	20,119	5,922	15,341
		CBD/Sunnyside/Arcadia	10	40-41	1,702	97,664	51.7%	143	50,479	118,619	50,071	3,127	6,370	81,050	259,237	4,874	10,930	14,857
		Old-East	11	42,43,48	6,398	65,508	48.2%	5,167	31,555	25,172	20,322	705	2,553	9,901	58,653	13,273	2,741	5,886
		Pta-West/Laudium/ Voortrekkerhoogte	12	39,47,56	7,292	122,741	34.8%	3,712	42,715	3,598	22,505	12,937	25,602	22,212	86,854	8,046	3,602	9,047
		Wapadrand/Moreletapark	13	44-46	8,761	139,428	52.7%	5,313	73,457	29,476	16,309	853	5,152	12,401	64,191	14,240	3,567	7,619
		Centurion	14	51,53-55	17,554	156,269	52.4%	9,113	81,859	24,383	12,874	29,331	8,449	11,789	86,826	26,028	3,014	12,627
		Tshwane Rural	15	17-21,57	13,009	25,675	53.3%	1,032	13,681	5	742	506	81	5,196	6,530	2,134	1,321	3,401
		Sub total 1b: Non PDI / Rural in Tshwane			89,193	923,538	48.8%	38,406	450,893	229,091	161,544	120,184	59,139	178,494	748,452	107,230	34,115	77,741
	Sub total 1: Total in Tshwane				118,013	3,039,476	44.3%	39,874	1,346,276	231,346	208,131	144,577	64,163	188,316	836,533	112,445	105,945	357,702
	Secondary area	Midrand	16	61-64,67-68	39,186	157,820	55.3%	4,003	87,310	41,202	13,785	83,429	2,747	8,551	149,714	8,954	4,798	13,115
		Tembisa/Ivorypark/Diepsloot	17	65-66,69	9,188	720,801	47.9%	904	345,588	0	8,857	22,301	2,628	1,993	35,779	2,860	13,096	69,661
		South East (Silverlakes/Smutskoppie)	18	71-73	4,313	13,055	56.0%	476	7,310	974	571	468	607	2,185	4,805	1,618	305	489
		North-east (Tweefontein)	19	70	716	17,728	47.4%	1,048	8,401	260	510	716	462	3,743	5,691	1,397	876	2,023
		North (Makapanstad/Gamoltle)	20	82-83	0	240,448	35.2%	0	84,730	0	3,817	0	2,050	578	6,445	0	12,051	27,114
		West (Hartebeespoort/Ga-rankuwa)	21	75,80-81	6,545	200,365	40.0%	1,755	80,099	20	3,665	675	667	3,809	8,836	4,181	10,561	24,258
	Sub total 2: Total in secondary area				59,948	1,350,217	45.4%	8,186	613,438	42,456	31,205	107,589	9,161	20,859	211,270	19,010	41,687	136,660
	TOTAAL: PRIMARY PLUS SECONDARY AREA				177,961	4,389,693	44.6%	48,060	1,959,714	273,802	239,336	252,166	73,324	209,175	1,047,803	131,455	147,632	494,362
DATA AGGRE-GATED PER CORRIDOR		K8 CORRIDOR		30-35	22,644	130,996	50.3%	5,861	65,936	9,459	12,382	34,506	1,498	7,287	65,132	18,516	3,018	8,963
		K16 CORRIDOR		26,36-38	12,417	206,736	48.9%	8,493	100,993	18,379	28,081	38,342	9,434	29,274	123,510	21,042	6,438	17,516
		PWV9 CORRIDOR		30-32,36,39, 47,55-58	31,553	280,644	43.4%	14,264	121,833	6,712	30,386	57,311	27,541	31,092	153,042	35,550	6,587	22,407
GROWTH RATES		K8 CORRIDOR				0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		K16 CORRIDOR				0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		PWV9 CORRIDOR				0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		K8 CORRIDOR		30-35	22,644	130,996	50.3%	5,861	65,936	9,459	12,382	34,506	1,498	7,287	65,132	18,516	3,018	8,963
		K16 CORRIDOR		26,36-38	12,417	206,736	48.9%	8,493	100,993	18,379	28,081	38,342	9,434	29,274	123,510	21,042	6,438	17,516
		PWV9 CORRIDOR		30-32,36,39,47	31,553	280,644	43.4%	14,264	121,833	6,712	30,386	57,311	27,541	31,092	153,042	35,550	6,587	22,407

TABLE …….

		DESCRIPTION	Functional Area Code	Sub region Code(s)	Zone Size	Tot Population	%Econ Active	Domestic Servants	Economic Active Population	Office	Retail	Industrl	Spesifiek	Outside +Other	Total Formal Jobs	Domestic	Informal	Unemployed
								EA Population		**Workers by type of work**								
					177,961	5,140,013	44.8%	50,252	2,303,702	335,451	287,078	289,431	82,425	238,372	1,232,757	147,017	184,079	574,122
DATA AGGREGATED BY SUB REGION		Temba	1	10	12,508	228,593	38.9%	0	88,974	1,184	6,220	12,638	991	1,014	22,047	0	14,506	31,451
		Stinkwater	1	11	0	133,890	34.2%	0	45,741	0	2,337	0	0	15	2,352	0	6,727	15,208
		Winterveld	3	12	20	203,480	39.1%	0	79,514	0	3,410	20	2	164	3,596	0	11,108	27,922
		Soshanguwe	2	13	119	546,479	41.7%	0	227,620	0	7,333	145	0	1,141	8,619	0	9,868	67,963
		Mabopane	3	14	1,414	231,850	43.9%	0	101,868	473	7,700	1,933	4,094	729	14,929	0	14,827	33,861
		Ga-rankuwa	4	15	8,738	150,463	42.6%	0	64,064	291	3,970	10,683	228	160	15,332	0	8,463	20,625
		Klip-Kruisfontein	4	16	0	220,099	43.5%	0	95,663	0	2,174	0	0	294	2,468	0	3,589	25,989
		Hakdoringboom	15	17	0	0		0	0	0	0	0	0	0	0	0	0	0
		Rooiwal	15	18	403	19,976	53.6%	28	10,706	0	745	403	12	4,989	6,149	36	1,471	3,446
		Wildebeeshoek	15	20	4,110	1,422	55.5%	133	789	2	14	5	8	47	76	332	0	67
		Boekenhoutskloof	15	21	8,409	4,403	50.8%	376	2,236	5	39	14	23	136	217	940	0	189
		Atteridgeville	5	25	1,496	252,967	44.7%	0	113,157	220	11,766	790	0	4,141	16,917	0	4,580	32,643
		Eersterust	6	26	584	22,861	45.5%	428	10,411	0	1,821	119	0	706	2,646	923	560	2,275
		Mamelodi-Wes	6	27	2,352	271,276	45.8%	0	124,330	291	6,145	430	320	1,555	8,741	0	5,227	38,652
		Mamelodi-Oos	6	28	0	75,001	47.8%	0	35,883	0	935	0	0	328	1,263	0	1,337	11,086
		Nellmapius	6	29	723	57,831	44.6%	5	25,765	0	2,406	388	0	626	3,420	11	1,136	7,636
		Roslyn	8	30	13,174	885	45.0%	0	398	0	402	25,008	0	1,331	26,741	0	1,023	1,641
		Akasia-CBD	8	31	173	25,394	51.5%	981	13,068	2,240	2,203	0	0	86	4,529	2,073	305	1,614
		Theresa Park	8	32	1,354	19,694	48.8%	1,020	9,615	0	638	5,215	0	625	6,478	2,171	326	1,432
		Pretoria noord	8	33	3,218	23,919	47.8%	808	11,429	4,949	5,827	2,478	524	4,061	17,839	1,908	1,070	2,008
		Doompoord	8	34	1,287	11,579	56.5%	508	6,543	310	937	1,667	0	786	3,700	1,744	332	881
		Magalieskruin	8	35	3,438	73,358	50.3%	3,521	36,872	6,327	5,557	1,310	1,135	1,460	15,789	15,759	1,182	5,068
		Daspoort	9	36	3,562	52,327	47.0%	2,438	24,586	483	3,903	7,863	2,100	4,722	19,071	4,960	1,533	4,495
		Moot	9	37	4,556	103,495	50.3%	4,123	52,027	5,365	14,271	2,938	3,207	8,682	34,463	9,507	2,833	6,998
		Silverton	9	38	3,714	58,317	50.0%	1,766	29,170	14,580	12,433	27,450	5,129	19,408	79,000	7,671	3,644	8,490
		Pretoria- Wes	12	39	3,479	61,652	37.0%	1,204	22,800	3,258	21,768	12,137	14,558	22,624	74,345	3,248	3,630	6,103
		Pretoria CBD	10	40	939	31,587	52.1%	0	16,459	100,678	42,401	3,018	5,945	78,821	230,863	1,541	11,609	12,697
		Sunnyside	10	41	762	69,772	51.6%	143	35,999	20,589	13,165	88	1,102	13,964	48,908	3,417	3,186	5,354
		Brooklyn	11	42	2,473	39,389	44.0%	2,424	17,316	28,371	22,856	313	2,459	10,166	64,165	6,046	3,326	5,459
		Waterkloof	11	43	1,805	29,680	53.9%	2,743	15,990	3,780	2,463	43	0	1,040	7,326	8,462	691	1,861
		Wapadrand	13	44	2,205	60,639	50.9%	2,283	30,888	13,736	6,308	229	4,481	3,203	27,957	6,289	1,780	3,956
		Garstfontein	13	45	2,872	105,182	53.7%	3,102	56,498	20,470	13,388	653	2,024	10,069	46,604	9,819	3,174	5,480
		Rietvleidam	13	46	3,684	30	66.7%	3	20	0	2	1	3	30	36	6	2	3
		Voorekkerhoogte	12	47	2,599	30,589	21.4%	958	6,555	9	1,523	0	12,679	1,914	16,125	2,396	1,099	1,767
		Fontains	11	48	2,120	0		0	0	0	0	0	365	136	501	0	19	25
		Centurion CBD	14	51	3,979	52,269	50.0%	2,114	26,143	15,372	8,925	9,445	8,327	6,404	48,473	6,666	2,014	5,331
		Irene	14	53	7,091	49,155	50.9%	620	25,036	15,183	4,245	17,911	1,608	3,786	42,733	3,849	2,271	2,799
		Rooihuiskraal	14	54	1,440	24,012	53.3%	1,678	12,790	1,381	943	5,718	0	737	8,779	3,696	434	2,742
		Wierdapark	14	55	5,044	64,102	53.8%	5,222	34,484	1,956	2,518	8,226	0	2,428	15,128	16,334	772	6,022
		Laudium	12	56	1,215	39,524	43.7%	1,607	17,283	634	1,510	704	1,079	894	4,821	2,919	321	3,187
		Rantesig	15	57	87	4,054	53.9%	556	2,184	0	60	103	42	595	800	1,157	106	356
		Olivenhoutbosch	7	58	867	26,289	44.6%	1,035	11,733	281	692	610	0	327	1,910	4,347	305	2,770
		Midrand CBD	16	61	15,740	156	58.3%	18	91	15,689	13,096	67,723	348	5,162	102,018	31	2,162	2,243
		Midrand Centrl West	16	62	12,280	83,884	57.2%	2,098	47,980	51,216	1,577	12,216	1,812	3,158	69,979	4,506	1,401	5,908
		Midrand Centrl East	16	63	4,142	51,095	46.9%	710	23,944	1,971	829	1,460	262	594	5,116	2,079	1,895	2,748
		Olifantsfontein	16	64	2,347	5,617	51.0%	348	2,867	500	2,146	7,568	463	1,487	12,164	565	340	943
		Ivory Park	17	65	6,773	322,427	45.9%	896	147,992	0	7,459	18,615	0	1,008	27,082	1,555	4,674	6,230
		Tembisa	17	66	2,338	435,059	49.9%	8	217,010	0	2,319	4,481	2,320	920	10,040	16	9,956	61,147
		Midrand suid	16	67	2,131	25,535	48.1%	456	12,285	0	334	12,857	0	609	13,800	612	704	1,315
		Midrand Rural West	16	68	2,546	121,365	57.7%	373	70,085	1,519	1,447	1,497	39	157	4,659	1,098	4,011	5,107
		Diepsloot	17	69	77	30,000	40.0%	0	12,000	0	257	77	308	113	755	0	577	3,105
		Roodeplaat	19	70	716	17,728	47.4%	1,048	8,401	260	510	716	462	3,743	5,691	1,397	876	2,023
		Pienaarspoort	18	71	0	32,432	45.0%	0	14,586	0	727	0	0	55	782	0	37	3,969
		Silver Lakes	18	72	4,293	16,672	57.5%	413	9,586	1,856	909	822	820	2,022	6,429	1,984	496	702
		Smutskoppie	18	73	20	822	55.0%	63	452	0	71	21	86	371	549	170	30	34
		Hartebeespoortdam	21	75	5,940	23,715	47.7%	1,914	11,306	22	344	77	152	2,877	3,472	4,674	186	1,178
		Garankuwa-West	21	80	405	75,488	38.7%	80	29,195	0	1,751	405	161	211	2,528	103	4,310	9,708
		Hebron	21	81	200	143,426	38.7%	0	55,571	0	2,496	200	432	891	4,019	0	8,114	18,512
		Gamotle	20	82	0	89,431	34.5%	0	30,819	0	1,563	0	32	206	1,801	0	4,335	9,809
		Makapanstad	20	83	0	187,677	35.7%	0	66,921	0	3,290	0	2,283	444	6,017	0	9,589	21,889
		TOTAL STUDY AREA			177,961	5,140,013	44.8%	50,252	2,303,702	335,451	287,078	289,431	82,425	238,372	1,232,757	147,017	184,079	574,122
DATA AGGREGATED BY FUNCTIONAL AREA	PDI areas in Tshwane	Temba/Stinkwater	1	10-11	12,508	362,483	37.2%	0	134,715	1,184	8,557	12,638	991	1,029	24,399	0	21,233	46,659
		Shoshanguve	2	13	119	546,479	41.7%	0	227,620	0	7,333	145	0	1,141	8,619	0	9,868	67,963
		Mabopane/Winterveld	3	12,14	1,434	435,330	41.7%	0	181,382	473	11,110	1,953	4,096	893	18,525	0	25,935	61,783
		Ga-rankuwa/Klip-kruifontein	4	15-16	8,738	370,562	43.1%	0	159,727	291	6,144	10,683	228	454	17,800	0	12,052	46,614
		Atteridgeville	5	25	1,496	252,967	44.7%	0	113,157	220	11,766	790	0	4,141	16,917	0	4,580	32,643
		Mamelodi/Eersterus	6	26-29	3,658	426,969	46.0%	433	196,393	291	11,307	937	320	3,215	16,070	934	8,260	59,649
		Olivenhoutbosch	7	58	867	26,289	44.6%	1,035	11,733	281	692	610	0	327	1,910	4,347	305	2,770
		Sub-total 1a: PDI areas in Tshwane			28,820	2,421,079	42.3%	1,468	1,024,727	2,740	56,909	27,756	5,635	11,200	104,240	5,281	82,233	318,081
	Non PDI & rural	Rosslyn/Akasia/Montana	8	30-35	22,644	154,829	50.3%	6,838	77,925	13,826	15,564	35,678	1,659	8,349	75,076	23,655	4,238	12,644
		Moot	9	36-38	11,833	214,139	49.4%	8,327	105,783	20,428	30,607	38,251	10,436	32,812	132,534	22,138	8,010	19,983
		CBD/Sunnyside/Arcadia	10	40-41	1,702	101,359	51.8%	143	52,458	121,267	55,566	3,106	7,047	92,785	279,771	4,958	14,795	18,051
		Old-East	11	42,43,48	6,398	69,069	48.2%	5,167	33,306	32,151	25,319	356	2,824	11,342	71,992	14,508	4,036	7,345
		Pta-West/Laudium/ Voortrekkerhoogte	12	39,47,56	7,292	131,765	35.4%	3,769	46,636	3,901	24,801	12,841	28,316	25,432	95,291	8,563	5,050	11,057
		Wapadrand/Moreletapark	13	44-46	8,761	165,851	52.7%	5,388	87,406	34,206	19,698	883	6,508	13,302	74,597	16,114	4,956	9,439
		Centurion	14	51,53-55	17,554	189,538	51.9%	9,634	98,453	33,892	16,631	41,300	9,935	13,355	115,113	30,545	5,491	16,894
		Tshwane Rural	15	17-21,57	13,009	29,855	53.3%	1,093	15,915	7	858	525	85	5,767	7,242	2,465	1,577	4,058
		Sub total 1b: Non PDI / Rural in Tshwane			89,193	1,056,405	49.0%	40,359	517,884	259,678	189,044	132,940	66,810	203,144	851,616	122,946	48,153	99,471
	Sub total 1: Total in Tshwane				118,013	3,477,484	44.4%	41,827	1,542,611	262,418	245,953	160,696	72,445	214,344	955,856	128,227	130,386	417,552
	Secondary area	Midrand	16	61-64,67-68	39,186	287,652	54.7%	4,003	157,252	70,895	19,429	103,321	2,924	11,167	207,736	8,891	10,513	18,264
		Tembisa/Ivorypark/Diepsloot	17	65-66,69	9,188	787,486	47.9%	904	377,002	0	10,035	23,173	2,628	2,041	37,877	1,571	15,207	70,482
		South East (Silverlakes/Smutskoppie)	18	71-73	4,313	49,926	49.3%	476	24,624	1,856	1,707	843	906	2,448	7,760	2,154	563	4,705
		North-east (Tweefontein)	19	70	716	17,728	47.4%	1,048	8,401	260	510	716	462	3,743	5,691	1,397	876	2,023
		North (Makapanstad/Gamoltle)	20	82-83	0	277,108	35.3%	0	97,740	0	4,853	0	2,315	650	7,818	0	13,924	31,698
		West (Hartebeespoort/Ga-rankuwa)	21	75,80-81	6,545	242,629	39.6%	1,994	96,072	22	4,591	682	745	3,979	10,019	4,777	12,610	29,398
	Sub total 2: Total in secondary area				59,948	1,662,529	45.8%	8,425	761,091	73,033	41,125	128,735	9,980	24,028	276,901	18,790	53,693	156,570
	TOTAAL: PRIMARY PLUS SECONDARY AREA				177,961	5,140,013	44.8%	50,252	2,303,702	335,451	287,078	289,431	82,425	238,372	1,232,757	147,017	184,079	574,122
DATA AGGREGATED PER CORRIDOR		K8 CORRIDOR		30-35	22,644	154,829	50.3%	6,838	77,925	13,826	15,564	35,678	1,659	8,349	75,076	23,655	4,238	12,644
		K16 CORRIDOR		26,36-38	12,417	237,000	49.0%	8,755	116,194	20,428	32,428	38,370	10,436	33,518	135,180	23,061	8,570	22,258
		PWV9 CORRIDOR		30-32,36,39, 47,55-58	31,553	324,510	44.0%	15,021	142,706	8,861	35,217	59,866	30,458	35,546	169,948	39,605	9,420	29,387
GROWTH RATES		K8 CORRIDOR				18.2%		16.7%	18.2%	46.2%	25.7%	3.4%	10.7%	14.6%	15.3%	27.8%	40.4%	41.1%
		K16 CORRIDOR				14.6%		3.1%	15.1%	11.1%	15.5%	0.1%	10.6%	14.5%	9.4%	9.6%	33.1%	27.1%
		PWV9 CORRIDOR				15.6%		5.3%	17.1%	32.0%	15.9%	4.5%	10.6%	14.3%	11.0%	11.4%	43.0%	31.2%
		K8 CORRIDOR		30-35	22,644	130,996	50.3%	5,861	65,936	9,459	12,382	34,506	1,498	7,287	65,132	18,516	3,018	8,963
		K16 CORRIDOR		26,36-38	12,417	206,736	48.9%	8,493	100,993	18,379	28,081	38,342	9,434	29,274	123,510	21,042	6,438	17,516
		PWV9 CORRIDOR		30-32,36,39,47,	31,553	280,644	43.4%	14,264	121,833	6,712	30,386	57,311	27,541	31,092	153,042	35,550	6,587	22,407

2010_OptimLU: SOCIO-ECONOMIC DATA

TABLE …….					2015_OptimLU: SOCIO-ECONOMIC DATA													
						EA Population			Workers by type of work									
		DESCRIPTION	Functional Area Code	Sub region Code(s)	Zone Size	Tot Population	%Econ Active	Domestic Servants	Economic Active Population	Office	Retail	Industrl	Spesifiek	Outside +Other	Total Formal Jobs	Domestic	Informal	Unemployed
					177,961	5,880,760	44.9%	52,561	2,642,859	398,000	333,728	326,294	91,295	268,426	1,417,743	162,344	220,450	653,709
DATA AGGREGATED BY SUB REGION		Temba	1	10	12,508	253,846	38.7%	0	98,284	1,301	7,141	12,768	1,104	1,123	23,437	0	15,897	34,810
		Stinkwater	1	11	0	151,414	34.1%	0	51,614	0	2,817	0	0	16	2,833	0	7,560	17,253
		Winterveld	3	12	20	241,824	39.4%	0	95,344	0	4,243	20	2	181	4,446	0	12,331	32,733
		Soshanguwe	2	13	119	591,221	41.8%	0	246,978	0	8,646	170	0	1,280	10,096	0	10,566	72,240
		Mabopane	3	14	1,414	265,713	43.8%	0	116,515	520	8,764	2,451	4,561	807	17,103	0	16,721	39,050
		Ga-rankuwa	4	15	8,738	180,659	42.7%	0	77,177	319	4,734	12,627	254	176	18,110	0	10,539	26,002
		Klip-Kruisfontein	4	16	0	277,159	43.5%	0	120,463	0	2,828	0	0	330	3,158	0	4,457	32,165
		Hakdoringboom	15	17	0	0		0	0	0	0	0	0	0	0	0	0	0
		Rooiwal	15	18	403	23,286	53.6%	28	12,476	0	850	403	12	5,526	6,791	36	1,718	4,052
		Wildebeeshoek	15	20	4,110	1,622	55.5%	150	900	2	14	5	8	49	78	375	0	75
		Boekenhoutskloof	15	21	8,409	4,938	50.8%	418	2,507	5	41	14	23	142	225	1,045	0	210
		Atteridgeville	5	25	1,496	270,674	44.9%	0	121,606	270	13,915	1,219	0	4,660	20,064	0	5,137	34,837
		Eersterust	6	26	584	24,238	45.5%	428	11,038	0	1,898	112	0	794	2,804	923	601	2,371
		Mamelodi-Wes	6	27	2,352	276,996	45.8%	0	126,901	408	6,970	541	320	1,740	9,979	0	5,405	39,149
		Mamelodi-Oos	6	28	0	80,611	47.8%	0	38,556	0	1,167	0	0	368	1,535	0	1,448	11,763
		Nellmapius	6	29	723	78,084	44.6%	5	34,814	0	3,032	372	0	704	4,108	11	1,539	10,244
		Roslyn	8	30	13,174	1,432	45.0%	0	644	0	427	24,764	0	1,498	26,689	0	1,331	1,948
		Akasia-CBD	8	31	173	29,037	51.3%	1,112	14,910	3,121	2,751	0	0	95	5,967	2,344	406	2,083
		Theresa Park	8	32	1,354	23,717	48.9%	1,195	11,595	0	861	5,779	0	704	7,344	2,540	428	1,943
		Pretoria noord	8	33	3,218	24,535	47.8%	811	11,725	6,056	6,568	2,530	574	4,572	20,300	1,985	1,356	2,290
		Doompoord	8	34	1,287	12,699	56.2%	508	7,141	397	1,029	2,069	0	883	4,378	2,411	394	1,061
		Magalieskruin	8	35	3,438	87,195	50.3%	4,180	43,874	8,613	7,087	1,694	1,242	1,643	20,279	19,500	1,516	6,978
		Daspoort	9	36	3,562	64,428	47.5%	2,499	30,577	483	4,690	8,037	2,299	5,315	20,824	4,941	1,991	6,263
		Moot	9	37	4,556	112,770	50.5%	4,178	56,904	5,858	15,871	2,813	3,512	9,772	37,826	10,028	3,330	8,262
		Silverton	9	38	3,714	65,770	49.9%	1,907	32,850	16,122	14,294	27,415	5,620	21,849	85,300	9,163	4,742	10,071
		Pretoria- Wes	12	39	3,479	68,291	37.5%	1,204	25,586	3,550	23,622	12,027	15,951	25,474	80,624	3,481	4,754	7,650
		Pretoria CBD	10	40	939	33,167	52.2%	0	17,324	102,766	46,339	2,976	6,512	88,746	247,339	1,596	14,741	15,225
		Sunnyside	10	41	762	71,801	51.6%	143	37,074	21,091	14,668	87	1,206	15,717	52,769	3,441	3,863	5,972
		Brooklyn	11	42	2,473	40,732	44.2%	2,424	17,987	34,725	27,093	0	2,694	11,438	75,950	6,220	4,460	6,581
		Waterkloof	11	43	1,805	31,869	53.5%	2,743	17,054	4,381	3,205	0	0	1,171	8,757	9,508	820	2,167
		Wapadrand	13	44	2,205	68,327	50.8%	2,329	34,740	15,584	7,448	180	5,040	3,353	31,605	7,034	2,258	4,750
		Garsfontein	13	45	2,872	116,603	53.7%	3,131	62,610	22,063	15,030	645	2,525	11,235	51,498	10,602	3,956	6,327
		Rietvleidam	13	46	3,684	36	66.7%	3	20	0	2	1	3	30	36	6	2	4
		Voorekkerhoogte	12	47	2,599	31,418	22.2%	958	6,970	9	1,756	0	13,893	2,153	17,811	2,550	1,338	2,073
		Fontains	11	48	2,120	0		0	0	0	0	0	400	153	553	0	26	31
		Centurion CBD	14	51	3,979	60,180	50.4%	2,205	30,318	18,676	10,524	11,106	9,122	7,209	56,637	7,373	2,843	6,964
		Irene	14	53	7,091	58,554	50.0%	768	29,264	20,954	4,906	25,736	2,078	4,150	57,824	4,354	3,384	3,828
		Rooihuiskraal	14	54	1,440	25,534	53.3%	1,774	13,613	2,497	1,017	7,003	0	861	11,378	3,982	622	3,130
		Wierdapark	14	55	5,044	71,093	53.8%	5,543	38,278	2,799	3,104	10,130	0	2,733	18,766	18,986	1,067	7,128
		Laudium	12	56	1,215	41,048	43.8%	1,663	17,991	635	1,700	709	1,182	1,006	5,232	3,044	388	3,327
		Rantesig	15	57	87	4,182	54.0%	556	2,260	0	62	118	42	615	837	1,334	113	369
		Olivenhoutbosch	7	58	867	33,651	43.8%	1,035	14,730	400	1,031	832	0	369	2,632	4,411	391	3,539
		Midrand CBD	16	61	15,740	157	58.6%	18	92	20,492	16,848	74,196	348	6,250	118,134	31	2,604	2,656
		Midrand Centrl West	16	62	12,280	109,227	57.2%	2,098	62,464	74,079	1,941	14,359	1,812	4,537	96,728	4,953	1,933	6,887
		Midrand Centrl East	16	63	4,142	81,309	46.2%	710	37,541	3,410	1,450	2,408	539	718	8,525	2,672	3,774	4,495
		Olifantsfontein	16	64	2,347	5,710	51.0%	348	2,914	500	2,157	9,460	463	1,725	14,305	565	464	1,044
		Ivory Park	17	65	6,773	389,104	46.1%	896	179,402	0	8,630	19,007	0	1,029	28,666	265	6,770	7,035
		Tembisa	17	66	2,338	435,064	49.9%	8	217,013	0	2,319	4,958	2,320	946	10,543	16	9,966	61,157
		Midrand suid	16	67	2,131	39,221	48.1%	456	18,867	0	480	19,129	0	955	20,564	344	1,265	1,609
		Midrand Rural West	16	68	2,546	184,654	57.7%	373	106,570	2,434	2,266	2,376	39	255	7,370	514	6,358	6,872
		Diepsloot	17	69	77	30,000	40.0%	0	12,000	0	257	77	308	113	755	0	577	3,105
		Roodeplaat	19	70	716	17,728	47.4%	1,048	8,401	260	510	716	462	3,743	5,691	1,397	876	2,023
		Pienaarspoort	18	71	0	64,329	45.0%	0	28,931	0	1,446	0	0	61	1,507	0	72	7,922
		Silver Lakes	18	72	4,293	24,044	58.2%	413	13,993	3,135	1,796	948	1,324	2,221	9,424	2,769	813	1,077
		Smutskoppie	18	73	20	1,224	55.0%	63	673	61	87	619	105	371	1,243	222	93	96
		Hartebeespoortdam	21	75	5,940	26,991	47.7%	2,152	12,864	24	373	83	162	2,934	3,576	5,269	186	1,297
		Garankuwa-West	21	80	405	86,065	38.6%	80	33,263	0	2,057	405	176	224	2,862	103	4,900	11,153
		Hebron	21	81	200	171,824	38.4%	0	65,912	0	3,082	200	480	985	4,747	0	9,569	22,085
		Gamotle	20	82	0	101,952	34.5%	0	35,188	0	1,891	0	35	228	2,154	0	4,974	11,379
		Makapanstad	20	83	0	211,809	35.7%	0	75,559	0	3,993	0	2,543	491	7,027	0	10,817	24,899
		TOTAL STUDY AREA			177,961	5,880,760	44.9%	52,561	2,642,859	398,000	333,728	326,294	91,295	268,426	1,417,743	162,344	220,450	653,709
DATA AGGREGATED BY FUNCTIONAL AREA	PDI areas in Tshwane	Temba/Stinkwater	1	10-11	12,508	405,260	37.0%	0	149,898	1,301	9,958	12,768	1,104	1,139	26,270	0	23,457	52,063
		Shoshanguve	2	13	119	591,221	41.8%	0	246,978	0	8,646	170	0	1,280	10,096	0	10,566	72,240
		Mabopane/Winterveld	3	12,14	1,434	507,537	41.7%	0	211,859	520	13,007	2,471	4,563	988	21,549	0	29,052	71,783
		Ga-rankuwa/Klip-kruifontein	4	15-16	8,738	457,818	43.2%	0	197,640	319	7,562	12,627	254	506	21,268	0	14,996	58,167
		Atteridgeville	5	25	1,496	270,674	44.9%	0	121,606	270	13,915	1,219	0	4,660	20,064	0	5,137	34,837
		Mamelodi/Eersterus	6	26-29	3,658	459,929	45.9%	433	211,309	408	13,067	1,025	320	3,606	18,426	934	8,993	63,527
		Olivenhoutbosch	7	58	867	33,651	43.8%	1,035	14,730	400	1,031	832	0	369	2,632	4,411	391	3,539
		Sub-total 1a: PDI areas in Tshwane			28,820	2,726,090	42.3%	1,468	1,154,020	3,218	67,186	31,112	6,241	12,548	120,305	5,345	92,592	356,156
	Non PDI & rural	Rosslyn/Akasia/Montana	8	30-35	22,644	178,615	50.3%	7,806	89,889	18,187	18,723	36,836	1,816	9,395	84,957	28,780	5,431	16,303
		Moot	9	36-38	11,833	242,968	49.5%	8,584	120,331	22,463	34,855	38,265	11,431	36,936	143,950	24,132	10,063	24,596
		CBD/Sunnyside/Arcadia	10	40-41	1,702	104,968	51.8%	143	54,398	123,857	61,007	3,063	7,718	104,463	300,108	5,037	18,604	21,197
		Old-East	11	42,43,48	6,398	72,601	48.3%	5,167	35,041	39,106	30,298	0	3,094	12,762	85,260	15,728	5,306	8,779
		Pta-West/Laudium/ Voortrekkerhoogte	12	39,47,56	7,292	140,757	35.9%	3,825	50,547	4,194	27,078	12,736	31,026	28,633	103,667	9,075	6,480	13,050
		Wapadrand/Moreletapark	13	44-46	8,761	184,960	52.6%	5,463	97,370	37,647	22,480	826	7,568	14,618	83,139	17,642	6,216	11,081
		Centurion	14	51,53-55	17,554	215,361	51.8%	10,290	111,473	44,926	19,551	53,975	11,200	14,953	144,605	34,695	7,916	21,050
		Tshwane Rural	15	17-21,57	13,009	34,028	53.3%	1,152	18,143	7	967	540	85	6,332	7,931	2,790	1,831	4,706
		Sub total 1b: Non PDI / Rural in Tshwane			89,193	1,174,258	49.2%	42,430	577,192	290,387	214,959	146,241	73,938	228,092	953,617	137,879	61,847	120,762
	Sub total 1: Total in Tshwane				118,013	3,900,348	44.4%	43,898	1,731,212	293,605	282,145	177,353	80,179	240,640	1,073,922	143,224	154,439	476,918
	Secondary area	Midrand	16	61-64,67-68	39,186	420,278	54.4%	4,003	228,448	100,915	25,142	121,928	3,201	14,440	265,626	9,079	16,398	23,563
		Tembisa/Ivorypark/Diepsloot	17	65-66,69	9,188	854,168	47.8%	904	408,415	0	11,206	24,042	2,628	2,088	39,964	281	17,313	71,297
		South East (Silverlakes/Smutskoppie)	18	71-73	4,313	89,597	48.7%	476	43,597	3,196	3,329	1,567	1,429	2,653	12,174	2,991	978	9,095
		North-east (Tweefontein)	19	70	716	17,728	47.4%	1,048	8,401	260	510	716	462	3,743	5,691	1,397	876	2,023
		North (Makapanstad/Gamoltle)	20	82-83	0	313,761	35.3%	0	110,747	0	5,884	0	2,578	719	9,181	0	15,791	36,278
		West (Hartebeespoort/Ga-rankuwa)	21	75,80-81	6,545	284,880	39.3%	2,232	112,039	24	5,512	688	818	4,143	11,185	5,372	14,655	34,535
	Sub total 2: Total in secondary area				59,948	1,980,412	46.0%	8,663	911,647	104,395	51,583	148,941	11,116	27,786	343,821	19,120	66,011	176,791
	TOTAAL: PRIMARY PLUS SECONDARY AREA				177,961	5,880,760	44.9%	52,561	2,642,859	398,000	333,728	326,294	91,295	268,426	1,417,743	162,344	220,450	653,709
DATA AGGRE-GATED PER CORRIDOR		K8 CORRIDOR		30-35	22,644	178,615	50.3%	7,806	89,889	18,187	18,723	36,836	1,816	9,395	84,957	28,780	5,431	16,303
		K16 CORRIDOR		26,36-38	12,417	267,206	49.2%	9,012	131,369	22,463	36,753	38,377	11,431	37,730	146,754	25,055	10,664	26,967
		PWV9 CORRIDOR		30-32,36,39, 47,55-58	31,553	368,297	44.4%	15,765	163,541	10,997	40,004	62,396	33,367	39,962	186,726	43,631	12,207	36,323
GROWTH RATES		K8 CORRIDOR				36.4%		33.2%	36.3%	92.3%	51.2%	6.8%	21.2%	28.9%	30.4%	55.4%	80.0%	81.9%
		K16 CORRIDOR				29.2%		6.1%	30.1%	22.2%	30.9%	0.1%	21.2%	28.9%	18.8%	19.1%	65.6%	54.0%
		PWV9 CORRIDOR				31.2%		10.5%	34.2%	63.8%	31.7%	8.9%	21.2%	28.5%	22.0%	22.7%	85.3%	62.1%
		K8 CORRIDOR		30-35	22,644	130,996	50.3%	5,861	65,936	9,459	12,382	34,506	1,498	7,287	65,132	18,516	3,018	8,963
		K16 CORRIDOR		26,36-38	12,417	206,736	48.9%	8,493	100,993	18,379	28,081	38,342	9,434	29,274	123,510	21,042	6,438	17,516
		PWV9 CORRIDOR		30-32,36,39,47,	31,553	280,644	43.4%	14,264	121,833	6,712	30,386	57,311	27,541	31,092	153,042	35,550	6,587	22,407

TABLE …….

		DESCRIPTION	Functional Area Code	Sub region Code(s)	Zone Size	Tot Population	%Econ Active	Domestic Servants	Economic Active Population	Office	Retail	Industrl	Spesifiek	Outside +Other	Total Formal Jobs	Domestic	Informal	Unemployed
								2020_OptimLU: SOCIO-ECONOMIC DATA										
								EA Population		Workers by type of work								
					177,961	6,690,680	44.9%	56,857	3,002,563	427,908	377,528	350,104	99,131	284,939	1,539,610	138,562	412,030	804,074
DATA AGGREGATED BY SUB REGION		Temba	1	10	12,508	278,868	38.5%	0	107,483	1,404	7,914	12,882	1,210	1,220	24,630	0	18,362	40,619
		Stinkwater	1	11	0	165,448	34.0%	0	56,271	0	3,217	0	0	17	3,234	0	8,502	19,436
		Winterveld	3	12	20	281,812	38.7%	0	109,028	0	5,164	20	2	855	6,041	0	16,654	36,396
		Soshanguwe	2	13	119	482,429	41.2%	0	198,915	42	12,064	168	0	1,586	13,860	0	9,732	57,915
		Mabopane	3	14	1,414	263,039	43.5%	0	114,537	573	9,415	2,907	4,994	1,018	18,907	0	18,066	40,157
		Ga-rankuwa	4	15	8,738	200,850	42.8%	0	85,895	375	5,759	14,335	278	662	21,409	0	10,710	27,140
		Klip-Kruisfontein	4	16	0	356,855	43.3%	0	154,466	327	6,354	0	0	5,162	11,843	0	6,192	40,238
		Hakdoringboom	15	17	0	219,882	40.5%	0	88,988	416	3,736	3,961	0	4,158	12,271	0	19,444	27,035
		Rooiwal	15	18	403	23,805	53.6%	28	12,754	0	936	403	12	5,999	7,350	36	1,790	4,203
		Wildebeeshoek	15	20	4,110	1,844	55.5%	170	1,023	2	14	5	8	51	80	426	426	85
		Boekenhoutskloof	15	21	8,409	5,504	50.8%	466	2,795	5	42	14	24	149	234	1,165	1,165	234
		Atteridgeville	5	25	1,496	296,075	45.2%	0	133,894	1,331	16,109	1,209	0	13,464	32,113	0	8,801	39,380
		Eersterust	6	26	584	25,867	45.5%	428	11,779	0	1,993	112	0	0	2,105	923	1,548	2,453
		Mamelodi-Wes	6	27	2,352	285,008	45.8%	0	130,637	433	8,265	538	320	1,661	11,217	0	5,668	39,634
		Mamelodi-Oos	6	28	0	78,361	47.8%	0	37,454	0	1,555	0	0	700	2,255	0	1,441	11,261
		Nellmapius	6	29	723	91,568	45.3%	5	41,484	0	3,731	369	0	4,292	8,392	11	2,179	12,370
		Roslyn	8	30	13,174	1,858	45.0%	0	836	4	652	24,563	0	107	25,326	0	1,874	3,541
		Akasia-CBD	8	31	173	45,457	51.1%	1,785	23,232	5,787	4,280	0	0	458	10,525	3,746	4,605	4,579
		Theresa Park	8	32	1,354	37,072	48.7%	2,099	18,039	0	1,890	10,482	0	411	12,783	2,251	3,223	4,163
		Pretoria noord	8	33	3,218	26,105	47.8%	820	12,482	6,360	7,406	2,511	619	3,371	20,267	343	2,150	3,512
		Doompoord	8	34	1,287	39,732	56.5%	442	22,434	12,229	3,665	4,132	0	8,018	28,044	2,401	4,547	7,138
		Magalieskruin	8	35	3,438	96,172	50.2%	4,471	48,321	8,739	9,596	1,685	1,340	14,179	35,539	19,163	22,204	10,895
		Daspoort	9	36	3,562	104,162	48.2%	2,499	50,204	816	7,006	10,368	2,480	7,432	28,102	1,881	11,082	13,510
		Moot	9	37	4,556	151,126	53.4%	5,293	80,736	5,973	18,961	2,791	3,789	10,259	41,773	9,929	14,376	15,687
		Silverton	9	38	3,714	86,347	48.7%	1,674	42,031	16,062	15,242	27,204	6,063	18,025	82,596	4,678	11,161	16,254
		Pretoria- Wes	12	39	3,479	83,491	39.4%	1,313	32,894	3,526	23,737	7,884	17,207	21,944	74,298	2,367	8,549	12,881
		Pretoria CBD	10	40	939	44,635	53.1%	0	23,697	100,814	40,116	1,696	7,026	52,716	202,368	1,617	18,754	24,859
		Sunnyside	10	41	762	72,500	51.6%	143	37,415	21,154	13,672	45	1,301	9,991	46,163	3,370	7,950	8,053
		Brooklyn	11	42	2,473	63,218	45.4%	2,761	28,725	31,586	29,280	565	2,907	11,653	75,991	7,077	13,240	13,290
		Waterkloof	11	43	1,805	32,421	53.5%	2,743	17,348	4,489	4,086	77	0	1,745	10,397	7,054	8,183	2,814
		Wapadrand	13	44	2,205	71,869	50.9%	2,330	36,606	15,574	8,300	373	5,517	1,618	31,382	7,307	8,373	6,498
		Garsfontein	13	45	2,872	126,928	53.4%	3,130	67,805	24,056	17,117	996	2,972	7,488	52,629	11,183	10,658	9,406
		Rietvleidam	13	46	3,684	36	66.7%	3	24	0	2	1	3	30	36	6	2	6
		Voorekkerhoogte	12	47	2,599	32,295	22.9%	958	7,410	9	2,290	0	14,986	2,282	19,567	1,375	3,235	3,372
		Fontains	11	48	2,120	0		0	0	0	0	0	431	162	593	0	42	65
		Centurion CBD	14	51	3,979	62,670	50.5%	2,205	31,641	18,676	11,157	11,038	9,839	8,798	59,508	6,399	10,632	10,352
		Irene	14	53	7,091	63,687	50.6%	768	32,202	26,775	6,298	33,079	2,369	4,408	72,929	4,668	4,360	9,458
		Rooihuiskraal	14	54	1,440	25,911	53.3%	1,774	13,814	8,487	1,486	9,546	0	4,342	23,861	4,688	6,356	5,791
		Wierdapark	14	55	5,044	77,408	53.8%	5,836	41,661	3,232	3,993	10,056	0	6,871	24,152	8,425	10,288	9,339
		Laudium	12	56	1,215	47,822	44.5%	2,186	21,293	635	1,890	1,417	1,276	864	6,082	2,394	2,959	4,576
		Rantesig	15	57	87	3,686	53.1%	556	1,957	0	61	118	42	457	678	756	562	290
		Olivenhoutbosch	7	58	867	103,436	43.3%	1,035	44,831	459	2,622	828	0	11,100	15,009	1,820	7,975	12,329
		Midrand CBD	16	61	15,740	157	58.6%	18	92	20,882	16,860	75,571	347	6,451	120,111	31	2,697	3,398
		Midrand Centrl West	16	62	12,280	109,229	57.2%	2,095	62,465	74,077	1,941	14,359	1,812	4,538	96,727	4,952	1,933	6,886
		Midrand Centrl East	16	63	4,142	88,226	46.1%	710	40,652	3,506	1,690	2,609	827	718	9,350	3,316	4,124	5,018
		Olifantsfontein	16	64	2,347	5,710	51.0%	348	2,914	500	2,157	9,460	463	1,725	14,305	565	464	1,424
		Ivory Park	17	65	6,773	389,104	46.1%	895	179,402	0	8,629	19,007	0	1,030	28,666	265	6,769	7,034
		Tembisa	17	66	2,338	435,064	49.9%	7	217,013	0	2,319	4,958	2,320	946	10,543	16	9,966	61,156
		Midrand suid	16	67	2,131	39,221	48.1%	456	18,867	0	480	19,127	0	954	20,561	344	1,264	1,608
		Midrand Rural West	16	68	2,546	184,654	57.7%	373	106,570	2,434	2,266	2,376	39	255	7,370	514	6,358	6,872
		Diepsloot	17	69	77	30,000	40.0%	0	12,000	0	257	77	308	113	755	0	577	3,105
		Roodeplaat	19	70	716	36,242	52.2%	1,048	18,934	832	1,317	716	462	4,223	7,550	1,397	3,547	5,341
		Pienaarspoort	18	71	0	74,448	49.5%	0	36,847	518	2,980	0	0	6,469	9,967	1	5,918	11,093
		Silver Lakes	18	72	4,293	28,427	58.1%	413	16,522	4,600	2,252	1,034	1,666	2,337	11,889	3,285	1,003	2,029
		Smutskoppie	18	73	20	2,216	55.0%	63	1,219	182	127	1,737	153	371	2,570	349	183	344
		Hartebeespoortdam	21	75	5,940	30,447	47.7%	2,430	14,508	27	407	90	175	3,000	3,699	5,965	6,031	1,436
		Garankuwa-West	21	80	405	115,064	38.6%	80	44,462	0	2,370	405	191	236	3,202	103	5,501	12,526
		Hebron	21	81	200	192,045	38.2%	0	73,305	0	3,581	200	528	1,069	5,378	0	9,863	22,645
		Gamotle	20	82	0	127,001	34.7%	0	44,018	0	2,204	0	39	247	2,490	0	5,555	12,710
		Makapanstad	20	83	0	246,173	35.6%	0	87,724	0	4,618	0	2,786	534	7,938	0	12,257	28,235
		TOTAL STUDY AREA			177,961	6,690,680	44.9%	56,857	3,002,563	427,908	377,528	350,104	99,131	284,939	1,539,610	138,562	412,030	804,074
DATA AGGREGATED BY FUNCTIONAL AREA	PDI areas in Tshwane	Temba/Stinkwater	1	10-11	12,508	444,316	36.9%	0	163,754	1,404	11,131	12,882	1,210	1,237	27,864	0	26,864	60,055
		Shoshanguve	2	13	119	482,429	41.2%	0	198,915	42	12,064	168	0	1,586	13,860	0	9,732	57,915
		Mabopane/Winterveld	3	12,14	1,434	544,851	41.0%	0	223,565	573	14,579	2,927	4,996	1,873	24,948	0	34,720	76,553
		Ga-rankuwa/Klip-kruifontein	4	15-16	8,738	557,705	43.1%	0	240,361	702	12,113	14,335	278	5,824	33,252	0	16,902	67,378
		Atteridgeville	5	25	1,496	296,075	45.2%	0	133,894	1,331	16,109	1,209	0	13,464	32,113	0	8,801	39,380
		Mamelodi/Eersterus	6	26-29	3,658	480,804	46.0%	433	221,354	433	15,544	1,019	320	6,653	23,969	934	10,836	65,718
		Olivenhoutbosch	7	58	867	103,436	43.3%	1,035	44,831	459	2,622	828	0	11,100	15,009	1,820	7,975	12,329
		Sub-total 1a: PDI areas in Tshwane			28,820	2,909,616	42.2%	1,468	1,226,674	4,944	84,162	33,368	6,804	41,737	171,015	2,754	115,830	379,328
	Non PDI & rural	Rosslyn/Akasia/Montana	8	30-35	22,644	246,396	50.9%	9,617	125,344	33,119	27,489	43,373	1,959	26,544	132,484	27,904	38,603	33,828
		Moot	9	36-38	11,833	341,635	50.6%	9,466	172,971	22,851	41,209	40,363	12,332	35,716	152,471	16,488	36,619	45,451
		CBD/Sunnyside/Arcadia	10	40-41	1,702	117,135	52.2%	143	61,114	121,968	53,788	1,741	8,327	62,707	248,531	4,987	26,704	32,912
		Old-East	11	42,43,48	6,398	95,639	48.2%	5,504	46,073	36,075	33,366	642	3,338	13,560	86,981	14,131	21,465	16,169
		Pta-West/Laudium/ Voortrekkerhoogte	12	39,47,56	7,292	163,608	37.7%	4,457	61,603	4,170	27,917	9,301	33,469	25,090	99,947	6,136	14,743	20,829
		Wapadrand/Moreletapark	13	44-46	8,761	198,827	52.5%	5,463	104,435	39,630	25,419	1,370	8,492	9,136	84,047	18,496	19,033	15,910
		Centurion	14	51,53-55	17,554	229,676	52.0%	10,583	119,318	57,170	22,934	63,719	12,208	24,419	180,450	24,180	31,636	34,940
		Tshwane Rural	15	17-21,57	13,009	254,721	42.2%	1,220	107,517	423	4,789	4,501	86	10,814	20,613	2,383	23,387	31,847
		Sub total 1b: Non PDI / Rural in Tshwane			89,193	1,647,637	48.5%	46,453	798,375	315,406	236,911	165,010	80,211	207,986	1,005,524	114,705	212,190	231,886
	Sub total 1: Total in Tshwane				118,013	4,557,253	44.4%	47,921	2,025,049	320,350	321,073	198,378	87,015	249,723	1,176,539	117,459	328,020	611,214
	Secondary area	Midrand	16	61-64,67-68	39,186	427,197	54.2%	4,000	231,560	101,399	25,394	123,502	3,488	14,641	268,424	9,722	16,840	25,206
		Tembisa/Ivorypark/Diepsloot	17	65-66,69	9,188	854,168	47.8%	902	408,415	0	11,205	24,042	2,628	2,089	39,964	281	17,312	71,295
		South East (Silverlakes/Smutskoppie)	18	71-73	4,313	105,091	51.9%	476	54,588	5,300	5,359	2,771	1,819	9,177	24,426	3,635	7,104	13,466
		North-east (Tweefontein)	19	70	716	36,242	52.2%	1,048	18,934	832	1,317	716	462	4,223	7,550	1,397	3,547	5,341
		North (Makapanstad/Gamoltle)	20	82-83	0	373,173	35.3%	0	131,742	0	6,822	0	2,825	781	10,428	0	17,812	40,945
		West (Hartebeespoort/Ga-rankuwa)	21	75,80-81	6,545	337,556	39.2%	2,510	132,275	27	6,358	695	894	4,305	12,279	6,068	21,395	36,607
	Sub total 2: Total in secondary area				59,948	2,133,427	45.8%	8,936	977,514	107,558	56,455	151,726	12,116	35,216	363,071	21,103	84,010	192,860
	TOTAAL: PRIMARY PLUS SECONDARY AREA				177,961	6,690,680	44.9%	56,857	3,002,563	427,908	377,528	350,104	99,131	284,939	1,539,610	138,562	412,030	804,074
DATA AGGREGATED PER CORRIDOR		K8 CORRIDOR		30-35	22,644	246,396	50.9%	9,617	125,344	33,119	27,489	43,373	1,959	26,544	132,484	27,904	38,603	33,828
		K16 CORRIDOR		26,36-38	12,417	367,502	50.3%	9,894	184,750	22,851	43,202	40,475	12,332	35,716	154,576	17,411	38,167	47,904
		PWV9 CORRIDOR		30-32,36,39, 47,55-58	31,553	536,687	45.2%	18,267	242,363	14,468	48,421	65,716	35,991	51,926	216,522	25,015	54,352	68,580
GROWTH RATES		K8 CORRIDOR				88.1%		64.1%	90.1%	250.1%	122.0%	25.7%	30.8%	264.3%	103.4%	50.7%	1179.1%	277.4%
		K16 CORRIDOR				77.8%		16.5%	82.9%	24.3%	53.8%	5.6%	30.7%	22.0%	25.2%	-17.3%	492.8%	173.5%
		PWV9 CORRIDOR				91.2%		28.1%	98.9%	115.6%	59.4%	14.7%	30.7%	67.0%	41.5%	-29.6%	725.1%	206.1%
		K8 CORRIDOR		30-35	22,644	130,996	50.3%	5,861	65,936	9,459	12,382	34,506	1,498	7,287	65,132	18,516	3,018	8,963
		K16 CORRIDOR		26,36-38	12,417	206,736	48.9%	8,493	100,993	18,379	28,081	38,342	9,434	29,274	123,510	21,042	6,438	17,516
		PWV9 CORRIDOR		30-32,36,39,47,	31,553	280,644	43.4%	14,264	121,833	6,712	30,386	57,311	27,541	31,092	153,042	35,550	6,587	22,407

The main results are summarised in table 6.3 below.

Table 6.3: Trend scenario for socioeconomic growth of road K8 (2005 – 2020)

Year	Total population	Economically active population (%)	Total formal jobs
Year 2005	130 996	50,3	65 132
Year 2010	154 829	50,3	75 076
Year 2015	178 615	50,3	84 957
Year 2020	246 396	50,9	132 484
Growth rate (%) 2005-2020	88,1%	1,1%	103,4%

From the above table it is evident that for the economy of the study area associated with road K8, the population growth is expected to be 88,1% and that of formal jobs 103,4% from 2005 to the year 2020 (note that these figures did not consider the impact of HIV/AIDS). Although these figures seem fairly high, they are for a 15-year period. The population growth in the study area is about 5 to 6% per annum, while the average growth rate for the Tshwane metropolitan area is predicted to be 3,37% per annum. Given the aforementioned, one can deduce that these figures are acceptable because certain areas in the city will have a negative growth rate. These figures imply that good economic development is expected to occur, which is augmented by the high growth in the formal job sector.

Table 6.4 provides details of the economic impacts associated with the study area of road K16. From this table it is clear that the population growth rate, between 2005 and 2020, is expected to be 77,8% and that of formal jobs, 25,2%. The economic impacts associated with road K16 are lower in relation to those of road K8.

Table 6.4: Trend scenario for socioeconomic growth of road K16 (year 2005 – 2020)

Year	Total population	Economically active population (%)	Total formal jobs
Year 2005	206 736	48,9	123 510
Year 2010	237 000	49,0	135 180
Year 2015	267 206	49,2	146 754
Year 2020	367 502	50,3	154 576
Growth rate (%) 2005-2020	77,8%	2,9%	25,2%

Table 6.5: Trend scenario for socioeconomic growth of road PWV9 (year 2005 –2020).

Year	Total population	Economically active population (%)	Total formal jobs
Year 2005	280 644	43,4	153 042
Year 2010	324 510	44,0	169 948
Year 2015	368 297	44,4	186 726
Year 2020	536 687	45,2	216 522
Growth rate (%) 2005-20	91,2%	4,0%	41,5%

From table 6.5 it is evident that the population growth rate is expected to be 91,2% and that of formal jobs 41,5% in the study area of road PWV9 for 2005 to 2020.

A comparison of the above figures will provide more information on the growth potential of the respective study areas and the expected economic impacts. In terms of these figures, the expected population growth of the study area of road PWV9 is the highest, while that of road K16 is the lowest. These figures support previous discussions (see ch 5) which indicated that the aforementioned study area is not well developed with its large vacant areas, while the latter is located in a

mature urban area. It was also stated earlier that road K8 is expected to have the highest economic growth rate of the different alternatives. This is true if measured in terms of the expected growth rate of formal jobs in the different study areas. For instance, the expected growth rate of K8 is 103,4% compared with 25,2% and 41,5% of roads K16 and PWV9 respectively. The above tables also indicate that road PWV9 is expected to have the highest growth rate in terms of economically active population (4,0%). This can be ascribed to the fact that the area is not well developed at present and that the high growth in population and future economic activity of the area should improve the lives of the economically active population of the area. The other study areas already have high percentages of economically active population (50,9% for road K8 and 50,3% for road K16 compared with only 45,2% for road PWV9).

This discussion highlighted the importance of effective policy making and decision making to ensure that road investments are made efficiently and effective with the highest economic impacts.

Policy making should thus be refocused to ensure maximised economic returns of road infrastructure investment. The interplay between decision making, economic returns and road investment must thus be optimised to ensure satisfactory decision making for road investment projects and subsequent maximised economic returns.

6.4 REFOCUSING ROAD INFRASTRUCTURE INVESTMENT

In section 6.4 it was argued that policy making on road investment needs to be reformed to ensure maximised economic returns associated with these investment decisions. This problem is not confined to South Africa – but it seems to be a global phenomenon. Puentes (2004:1) concurs and states that sadly, in the USA, the national transportation system is in a bad way and in dire need of fundamental

reform. He goes on to say that billions and billions of dollars of additional federal investments will do precious little to ameliorate transportation problems without significant reform.

Current road investment practices are not focused to ensure maximised economic returns. This was shown throughout this thesis:

- Uncertainty about the important relationship between road infrastructure investment and economic development has led to inappropriate policy decisions (ch 1).
- There is limited understanding of the nature of road infrastructure, often resulting in unsatisfactory investment decisions with poor economic returns (ch 2).
- There is a poor understanding of the relationship between road infrastructure investment and economic development, resulting in limited economic growth (ch 3).
- Ineffective modelling techniques or inadequate economic studies have led to poor investment advice (ch 4).
- There is no formula for road investment and economic development – hence road investment priorities are not based on maximised economic returns associated with these investments (ch 5).
- There is a poor relationship between policy making and investment decisions with resultant poor economic returns (ch 6).

The above problems support the need to refocus road infrastructure investment decisions. Most of these road investment decisions are made at political level, which emphasises the crucial role of policy making in influencing and strengthening the impact of road investment on economic development.

This section proposes certain road infrastructure investment reforms required to ensure maximised economic returns associated with road investment. The road infrastructure investment reforms outlined below are needed to ensure the optimum economic returns associated with road infrastructure investment decisions.

6.4.1 Creating greater efficiency in road infrastructure investment decisions

Section 6.3.1 discussed the issue of efficiency and road investment. It was shown that certain decisions on road investment are not efficient. Reform is thus required to address the problems of over- or underinvestment in road infrastructure. An investment of only 1% in South Africa's infrastructure, particularly in its road infrastructure, could result in a net increase in the GDP of between 2 and 3% (Anon 1995:35).

This efficiency will be achieved if the principal findings of chapters 2 and 3 are implemented. For instance, in chapter 2, it was argued that because this approach is demand led, the unbalanced approach will lead to better investment decisions. South Africa cannot afford the costs associated with the balanced approach towards road investment. Chapter 3 focused on the causality between road infrastructure investment. Any investment decision should focus on the following four themes:

(1) the investment component or so-called "trigger mechanism"
(2) the network performance component
(3) transport economic behaviour which is manifested in location and real effects
(4) the economic development component

Chapter 4 proposed a framework on how to model the impacts associated with road infrastructure investment and economic development.

Improved efficiency in road investment will maximise economic growth and development.

6.4.2 Rethinking road prioritisation

This study highlighted the process of moving away from road prioritisation based purely on direct transport impacts. The indirect economic implications associated with road infrastructure should play a vital role in setting priorities. This calls for rigorous economic studies, which include both direct transport impacts and indirect economic impacts. Proper economic studies provide a sound basis for improved road priorities and hence investment decisions. Road projects with the highest potential economic returns should receive top priority.

6.4.3 Depoliticising road infrastructure investment decisions

Studies in the USA (Gramlich 1994:1182) have found that state and local officials report that their main hurdle in building new infrastructure capital is in gaining voter's approval. Roughly 20% of all new state and local construction must be approved by referenda. This means that infrastructure investment proposals may be prioritised on political grounds, which may not reflect real priorities. This matter was also discussed in section 6.3.

In South Africa, nowadays political preferences are aimed at addressing social and health-related projects, hence limiting allocations to road projects. In this regard, Van der Merwe and Babamia (DOT 1995:1-1) caution that the expectation is that until social demands such as the improvement of living conditions and education

have been satisfied, it is unlikely that there will be increased funds for transport infrastructure. According to Steyn (2004:58), the most critical aspect of state spending that needs to change is the imbalance between capital spending and spending on social security, because of the large portion allocated to social security in the state budget. Mirrilees (DOT 1991:1-1) agrees and concludes that in the face of this competition (ie the social demands), superficially the requirements for road infrastructure appear to be of less importance. This clearly places road prioritisation in a dilemma.

In addition to the competing demands of other infrastructure and services, the political objectives of the spatial development initiatives (SDIs) may promote incorrect road investment decisions. The MCDC project is a case in point. Although the concept of SDIs is sound, it is based on a fundamentally flawed approach. The projects have limited economic justification and are based mainly on a supply-side approach. Chapter 2 highlighted the problems associated with such an approach.

The discussions in section 6.3 enphasised the need for a proper relationship between political decision making, road investment and economic returns. By depoliticising road investment decisions with effective policy making, maximised economic returns can be achieved with road projects.

6.4.4 Institutional reforms

There is a need for closer cooperation between the different road authorities. This calls for certain institutional reforms to ensure this cooperation. A national road investment body consisting of officials from the different road agencies at all tiers of government, and treasury officials may prove invaluable. This will also

promote meaningful policy making and hence higher economic returns associated with road investment.

This section highlighted the reforms required to refocus road investment in this country. If these reforms are in place it is anticipated that the relationship between policy making and road investment decisions will be optimised thus ensuring maximum economic returns.

6.5 SUMMARY

This chapter assessed the relationship between road investment practices and maximised economic returns. The principal findings are summarised below.

(1) The following four factors are important in examining the relationship between transportation and economic development:

- the relevant type of transport investment
- the data necessary to analyse the economic effect of the investment
- appropriate methodology to analyse the economic effect
- proper dissemination of the results and the education of professionals on the economic effects of transportation investment

(2) Road investment projects need to measure inputs, outputs, outcomes and impacts in order to maximise economic returns. These terms are explained below.

- **Inputs.** Inputs are the resources and capacity mobilised to ensure the road project. Inputs thus have to do with the cost of the project as well as other activities related to the road investment process.

- **Outputs.** The output is the specific project that results directly from the inputs, which is the actual road being constructed.

- **Outcomes**. Outcomes refer to the direct consequences or results flowing from an output. The outcome is thus the change in conditions once the road has been constructed. This is the direct result of the project and may include the diversion of traffic to the new road.

- **Impacts.** Impacts reflect the wider economic implications of the project. These impacts may relate to a growth in business sales or income or job creation as a result of the road project, and occur over a longer period than the actual implementation time.

The relationship between inputs, outputs, outcomes and impacts of road projects is a key indicator of the accuracy of policy and the correctness of political decision making on road investment decisions. The relationship between input and outcomes measures efficiency, while the relationship between inputs and outcomes measure effectiveness. Road K8 was the most efficient and effective project in terms of the three case studies.

(3) Current road investment practices are not focused to ensure maximised economic returns. This is based on the following:

- Uncertainty about the important relationship between road infrastructure investment and economic development has led to inappropriate policy decisions.
- Limited understanding of the nature of road infrastructure often results in incorrect investment decisions with poor economic returns.

- A lack of understanding of the relationship between road infrastructure investment and economic development leads to limited economic growth.
- Improper modelling techniques or inadequate economic studies lead to poor investment advice.
- There is no formula for road investment and economic development – hence road investment priorities are not based on maximised economic returns associated with these investments.
- There is a poor relationship between policy making and investment decisions with resultant poor economic returns.

(4) The following road infrastructure investment reforms are required to ensure the optimum economic returns associated with road infrastructure investment decisions:

- creating greater efficiency in road infrastructure investment decisions
- rethinking road prioritisation
- depoliticising road infrastructure investment decisions
- institutional reforms

6.6 CONCLUSION

The purpose of this thesis, namely to explore ways to maximise the economic returns of road infrastructure investment, was twofold because it required the development of assessment techniques, as well as changes investment practices to ensure maximised economic returns. The aim of this chapter was to refine road investment practices in South Africa to ensure maximised economic returns.

It was shown that decision making and policy making play a crucial role in influencing and strengthening the impact of road investment on economic development. Policy making includes decision making by the political organ and the politicians. Hence policy making and the decisions emanating from it, which affect both economic returns and road investment, are the predominant factor in realising economic development benefits from road infrastructure investment. It was shown that the relationship between these factors does not support the maximisation of the economic returns of these road investments, a fact proven by the three case studies. In terms of current policy initiatives, road PWV9 receives the highest priority, but this road investment project is inefficient (based on the relationship of input and outputs) and ineffective (based on the relationship between inputs and outcomes), with poor economic impacts expected in the long run. Road K8 is the most efficient and effective road investment project, but does not have any policy priority. The relationship between policy making and road investment decisions are such that high economic returns cannot be expected. This will lead to either over- or underinvestment in road projects in South Africa.

In order to maximise the economic returns associated with road infrastructure investment it is necessary to optimise the interplay between decision making, economic returns and road investment. The policy reforms proposed in this chapter should help to realise this goal.