transport

Department:
Transport
REPUBLIC OF SOUTH AFRICA

National Transport Master Plan

NATMAP 2050

You pay for good transport whether you've got it or not

KWAZULU-NATAL

PHASE 2: ANALYSIS

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GLOSSARY OF TERMS

AADT	Average Annual Daily Traffic
AADTT	Annual average Daily Truck Traffic
ACSA	Airports Company South Africa
ADT	Average Daily Traffic
AGOA	African Growth and Opportunity
AGISA	Accelerated & Shared Growth Initiative for SA
AIDS	Acquire Immunodeficiency Syndrome
AMPS	Annual All Media Products Survey
ARTS	Refuse Transfer Station at Athlone
ASGISA	Accelerated and Shared Growth Initiative
ATNS	Air Traffic and Navigation Services Company
AVR	Abnormal Vehicle Register System
AVTUR	Aviation/Turbine Fuel
BBBEE	Broad Based Black Economic Empowerment
BEE	Black Economic Empowerment
BMR	Bureau of Market Research
BMS	Bridge Management System
BRT	Complete Lansdowne Corridor
BSP	Background and Strategy Paper
CARNS	Community Access Needs Roads Study
CBD	Central Business District
CBPWP	Community - Based Public Works Programme
CD	Chief Director
CFO	Chief Financial Officer
CIBD	Construction Industry Development Board
CMIP	Consolidated Municipal Infrastructure Programme
COCT	City of Cape Town
COTO	Committee of Transport Officials
CPPK	Cost per passenger kilometre
CPK	Central Processing Facility
CPs	Minor roads
CPTR	Current Public Transport Record
CSIR	Council of Scientific and Industrial Research
CTC	Centralised Train Control
CTIA	Cape Town International Airport
DBSA	Development Bank of South Africa
DBT	Dry Bulk Terminal
DDG	Deputy Director General
DEAT	Department of Environmental Affairs and Tourism
DG	Director General
DLTS	Driving License Testing System
DJP	Durban to Johannesburg Pipeline
DNA	District Management Area
DOT	Department of Transport
DPLG	Department of Provisional and Local Government
DPWRT	Department of Public Works, Roads and Transport
DRs	Divisional roads
DWAF	Department of Water Affairs and Forestry
ECDC	Eastern Cape Development Co-orporation
EEI	Economic Employment & Investment Cluster
ELMET	East London Metropolitan Area

EPWP	Expended Public Works Programme
ESRI	Environmental Systems Research Institute
EU	European Union
FDI	Foreign Direct Investment
FES	Financial and Economic Support
FET	Further Education and Training
FFC	Finance & Fiscal Commission
FIFA	International Federation of Association of Football
FOHOD	Forum of Heads of Department
FTP	File Transfer Protocol
FTPD	Freight Transport Policy Development
FSPG	Free State Provincial Government
gJ	Gigajoules
GDP	Gross Domestic Product
GDPTRW	Gauteng Department of Public Transport, Roads and Works
GEMS	Government Employee Medical Scheme
GIS	Geographic Information System
GM	General Manager
GTL	Gas-to-liquid
GVA	Gross Value Add
HCDS	Human Capital Development Strategy
HDI	Human Development Index
HGVs	Heavy Goods Vehicles
HIV	Human Immunodeficiency Virus
HOD	Head of Department
HR	Human Resources
HVs	Heavy Vehicles
HWM	High Water Mark
IA	Implementing Authority
IASC	International Air Services Council
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
ICT	Information and Commercialization Technologies
IDIP	Infrastructure Delivery Improvement Programme
IDP	Integrated Development Plan
IDP	Integrated Development Planning
IDT	Independent Development Trust
IDZ	Industrial Development Zone
IEA	Infrastructure Enhancement Allocation
ILRP	Integrated Law Reform Project
IMF	International Monetary Fund
IMT	Intermediate Means of Transport
IN	Inland Network
IP&C	Infrastructure Planning and Coordination
ISRDP	Integrated and Sustainable Rural Development Programme
ISRDS	Integrated Sustainable Rural Development Strategy
IS	Information Systems
IT	Information Technology
ITMS	Inter Technology Manage System
ITP	Integrated Transport Plan
ITS	Intelligent Transport Systems
JIA	Johannesburg International Airport
Km	Kilometres
KMIA	Kruger Mpumalanga International Airport

KPI	Key Performance Indicators
KZN	KwaZulu-Natal
LDO	Local Development Objectives
LDV	Light Delivery Vehicle (Bakkie)
LED	Local Economic Development
LEDs	Local Economic Development Strategies
LRTB	Local Road Transportation Board
LTL	Less-than-truck load
LTP	Land Transport Promotion
LTPS	Land Transport Permit System
MEC	Member of Executive Council
MEC	Member of the Executive Committee
MEDS	Microeconomic Development Strategy
MELD	Mdantsane East London Development
MGJ	Million Gigajoules
MINCOM	Ministerial Committee of Provincial Transport Ministers
MINMEC	Ministers and Members of the Executive Council
MIS	Management Information System
MML	Minimum Living Level
MPCC	Multi-Purpose Community Centres
MPT	Multi-purpose Terminal
MRs	Main roads
MSA	Moving South Africa
MTA	Metropolitan Transport Area
MTAs	Metropolitan Transport Areas
MTEF	Medium Term Expenditure Framework
MTT	Marine Tanker Terminal
NAAMSA	National Association of Automobile Manufacturers of South Africa
NAMPO	National Maize Product Organization
Natcor	Natal Corridor
NATIS	National Traffic Information System
NATMAP	National Transport Master Plan
NATMAP	National Roads Masterplan
NATMAP	National Land Us / Transport Master Plan
NDA	National Development Agency
NDoT	National Department of Transport
NEPAD	New Partnership for Africa's Development
NHTS	National Household Travel Survey
NLTSF	National Land Transport Strategic Frameworks
NLTTA	National Land Transport Transition Act
NMT	Non-motorized Transport
NMPP	New Multi-Products Pipeline
NPA	National Ports Authority
NRTDS	National Rural Transport and Development Strategy
NSDP	National Spatial Development Perspective
NSG	National Standards and Guidelines
NTTT	National Taxi Task Team
O-D	Original Destination
OEMs	Original Equipment Manufacturers
OLAS	Operating License Administration System
OLB	Operating Licence Board
OLS	Operating License Strategy
Orex	Operations and Spoornet
ORTIA	Oliver Tambo International Airport

PA	Planning Authority
PE	Port Elizabeth
PEMET	Port Elizabeth Metropolitan Area
PFMA	Public Finance Management Act
PFMA	Provisional Finance Management Act
PGDS	Provincial Growth and Development Strategy
PGWC	Provincial Government Western Cape
PIG	Provincial Infrastructure Grant
PIMSS	Planning and Implementation Management Support System
PLTF	Provincial Land Transport Framework
PMS	Pavement Management System
PMU	Project Management Unit
PPP	Public Private Partnership
PPECB	Perishable Products Export Control Board
PROVTECH	Provincial form with Technical / Official representatives from all local municipalities in the Province
PSDF	Provincial Spatial Development Framework
PTOE	Public Transport Operating Entity
PTP	Public Transport Plan
PTPD	Passenger Transport Policy Development
PTPD	Passenger Transport Policy Development (Monitoring & Evaluation)
RAU	Rand Afrikaans University
RBCT	Richards Bay Coal Terminal
RDA	Rural Development Agency
RIDS	Regional Industrial Development Strategy
RIM	Road Infrastructure Management
RNIS	Road Network Information System
RO	Rail Operations
RSA	Republic of South Africa
RTA	Rural Transport Authority
RTI	Rural Transport Infrastructure
RTO	Ratio Train Order
RTS	Rural Transport Services
SBM	Single Buoy Mooring
SA	South African
SAARF	South African Advertising Research Foundation
SACAA	South African Civil Aviation Authority
SADC	South African Development Community
SAMSA	South African maritime Safety Authority
SANRAL	South African National Roads Agency
SARCC	South African Rail Commuter Corporation
SATAWU	South African Transport and Allied Workers
SC	Steering Committee
SCM	Supply Chain Management
SCS	Social Capital Strategy
SDF	Spatial Union Development Framework
SDIP	Sustainable Development Implementation Plan
SDIs	Spatial Development Initiatives
SFF	Strategic Fuel Fund
SHSS	Sustainable Human Settlements Strategy
SIP	Strategic Infrastructure Plan
SMF	Supervising and Monitoring Firm
SMME	Small Medium Micro Enterprise
SOW	Scope of Work

SP	Safety Promotions
SSATP	Sub-Sahara African Transport Programme
SSS	Scarce Skills Strategy
StatsSA	Statistics South Africa
TA	Transport Authority
TETA	Transport Education Training Authority
TFR	Transnet Freight Rail
TIA	Traffic Impact Assessment
ToR	Terms of Reference
TPR	Transport Planning Requirement
TRs	Trunk roads
UDF	Urban Development Framework
UK	United Kingdom
UMET	Umtata Metropolitan Area
UNISA's	University of South Africa
USA	United States of America
V/C	Volume Capacity
VLCC	Very Large Crude Carriers
WC	Western Cape
WCDTPW	Western Cape Department of Transport and Public Works

LIST OF MAPS

EXECUTIVE SUMMARY

BACKGROUND

The main purpose of the Transport Master Plan (NATMAP 2050) is to motivate a prioritized program of interventions to upgrade the transport system in South Africa. Its goal is to develop a dynamic; long term; and sustainable land use/multi-modal transportation systems framework, for the development of networks, infrastructure facilities; interchange termini facilities and service delivery.

Two of the four main Phases of the Project have been concluded, i.e. the Inventory and Analysis phase, Phases 1 and 2.

PURPOSE OF THE REPORT

This report addresses Phase 2 of the NATMAP project dealing with the Analysis of the Status Quo data of the Western Cape Province, and it is the third report produced in the project. The previous reports were the Inception and Inventory reports. This is the draft final version of the Phase 2 Analysis report for Kwa-Zulu Natal (KZN) Province. The report incorporates comments received at the Phase Round Table Conference as well as comments from stakeholders.

OBJECTIVES OF THE PROJECT

The Terms of Reference (TOR) states that the goal of the National Transport Master Plan 2005-2050 is to develop dynamic; long term; and sustainable land use/multi modal transportation systems framework for the development of networks, infrastructure facilities, interchange and termini facilities and service delivery strategies for the RSA.

The specific objectives of the Phase 2 Analysis are as follows:

- *To develop a 2005 base year passenger and freight transport model at national level*
- *To develop a GIS and Databank populated with available status quo data at national level;*
- *To assess the demographic and economic projections made for different scenarios up to 2050 for the Western Cape province*
- *To assess the implications of the provincial and metropolitan spatial development frameworks on transport*
- *To assess the economic role of transport in the province*
- *To analyse the status quo passenger and freight transport demand patterns, operations and policies*
- *To analyse the demand and supply of the road, rail and pipeline networks, the airports and harbours, and review existing planned projects.*
- *To analyse the Financial, Institutional and Legal situation, problems and issues relating to the provision and management of infrastructure of national significance.*

METHODOLOGY

Project phases from TOR

The Project consists of four phases. The Phase 1 Inventory delivers the information about the existing supply and capacity of transport, the main demand side drivers and problems and deficiencies. The Phase 2 Forecasts deliver information about future demand and enables a vision to be developed about the transport supply-side, including the future capacity required and the standards necessary to provide cost-effective and globally competitive transport passenger and freight services. Phase 3 is basically about planning to schedule and prioritise infrastructure investment in sympathy with growing demand. Finally, Phase 4 deals with the necessary policy, institutional changes and support required for effective implementation and details a programme of action.

Revised scope Phase 2

It was agreed by the PMTT that the project schedule and scope of Phase 2 would be adjusted in view of delays in obtaining certain status quo data and calibration of the base year models. These involved freight Origin-Destination (O-D) data, especially by road, and Transnet data relating to their freight model, demand and capacity of rail, ports and pipelines.

It was therefore agreed that Phase 2 will also serve to fill in any remaining gaps in the Inventory data, and to complete only the development of the Base Year models. Model projections will only be done as part of Phase 3.

LIST OF PROBLEMS AND ISSUES DEFINED IN PHASE 1

From the status quo data collected during Phase 1, various problems and issues were identified. These were discussed with the Provincial and National Technical Committees, as well as with provincial stakeholders. This enabled the problems and issues to be confirmed and updated. In the Phase 2 Analysis, the location, size and severity of problems were determined.

PROJECT MANAGEMENT AND CONSULTATION

The NATMAP project is managed through Technical and Steering Committees at provincial and national level. The Project Team, consisting of three Consortia, are managed and guided at operational level by the DoT Project Management Technical Team (PMTT). The DOT also appointed a Consolidated Working Group consisting of representatives from Universities and technical institutions, advising the DoT and integrating the provincial master plans in one national master plan.

The Consortia co-ordinate their work at national level to ensure that work done is at the same standard, level of detail, and scope. The work is coordinated by six Working Groups on the following topics:

- *GIS, Databank and Modelling (GDM), also responsible for demographic and economic projections, as well as land-use*
- *Operations, consisting of two sub-working groups:*

  - *Passenger Transport*
  - *Freight Transport*
- *Infrastructure, consisting of four sub-working groups:*
  - *Roads*
  - *Railways*
  - *Airports*
  - *Ports And Pipelines*

- *Financial, Institutional, Legal and Management (FILM)*
- *Energy and Environment*

At the end of each Phase, a Round Table Conference of national and provincial stakeholders is held where the Project Team informs stakeholders of findings and where the stakeholders provide their inputs and views.

STRUCTURE OF THIS REPORT
The structure of this report contains the following sections:

Chapter 2: Economic Analysis
Chapter 3: Demographic Analysis
Chapter 4: Land-use analysis
Chapter 5: Passenger Operations Analysis
Chapter 6: Freight Operations Analysis
Chapter 7: Infrastructure Analysis
For each category of infrastructure, the following is discussed:
- *Summary of network*
- *Capacity and constraints*
- *Condition and constraints*
- *Missing links*
- *Implications of Existing Plans on Phase 3 Forward Plans*
- *Identification of Alternative Strategies to be Investigated in Phase 3*

The following infrastructure categories are considered:
- *Road Network*
- *Railways*
- *Airports*
- *Ports And Pipelines*

Chapter 8: Financial Analysis
Chapter 9: Institutional and Legal Analysis
Chapter 10: Conclusions and Way Forward

MAIN CONCLUSIONS
The main conclusions are summarised below:

Land Use Analysis

The KZN Provincial Economic Growth and Development Strategy (PGDS) and the Provincial Spatial Economic Development Strategy (PSEDS), as the spatial representation of the PGDS, were briefly discussed, as well as the eThekwini Metropolitan Spatial Development Framework (MSDF).

The PSEDS set-out to amend the apartheid space-economy of the Province by establishing a hierarchy of selected development nodes and corridors. This entails that future settlement and economic development opportunities should be channelled into activity corridors and nodes that are adjacent to, or link the main growth centres in order for them to become regional gateways to the global economy.

The Province is characterised by an extensive mosaic blanket of scattered rural settlements and villages. Vast numbers of these settlements and villages occur within the Zululand, Umkhanyakude, Umzinyathi and Ugu District Municipalities. These municipalities have been earmarked as Rural Development Nodes by the Government's ISRDS programme.

The nodes and corridors selected include existing well established nodes and corridors, as well as nodes and corridors which do not exist in the contemporary, or are very weak. Currently, only the primary and secondary nodes of the Province have been identified for priority interventions. These nodes all display some sort of potential as set out by the NSDP, and include the following:

- *Metropolitan Node – eThekwini.*
- *Primary Node (PN) – Richards Bay.*
- *Secondary Nodes (SN) – Pietermaritzburg/Msunduz, Newcastle, Port Shepstone, Estcourt and Ladysmith.*

National Corridors: The N3 corridor, the N3/N11, the N2 North, and the N2 South.

Provincial Corridors: The R33 link and the R34 corridor

Provincial Development Corridors: The eThekwini / uMhlatuze Corridor (N2 North), the eThekwini / Msunduzi / uMngeni Corridor (N3 The uMhlatuze / Ulundi / Vryheid), (P 700) Corridor (R34), the Lebombo SDI Corridor (N2, R22), the Port Shepstone / St Faiths / Ixopo Corridor (N2, R612, and R617), the Battlefields Route Corridor (Umzinyathi) (R33, N11).

Demographic Analysis

There are large numbers of people travel to work on a daily basis because of the concentration of job opportunities in the eThekwini Metropolitan Municipality. Thus, the need for effective public transport facilities in the contemporary and even more so in the future is clearly evident. High levels of unemployed people are found in villages scattered throughout the Province. Thus, the provision of access (public

transport) to community facilities and job opportunities in centrally located nodes should become a priority.

Economic Analysis

It is concluded that various factors are constraining economic development in the province. These are high poverty and unemployment levels, aggravated by the current financial and economic decline, dispersed and inaccessible settlements far from economic centres, and the unbalanced concentration of economic opportunities in a few major centres. However, the KZN has many economic opportunities, such as a supportive policy environment to develop the economy, high tourist potential, international trade infrastructure and opportunities and abundant natural resources.

Passenger Operations

KwaZulu-Natal province is not seriously affected by the problems of institutional fragmentation as some other provinces in the RSA. There is, therefore, less likelihood of functional bias affecting decisions about sustainable future transport systems and technology. Nevertheless, in the development of a "blue-print" for future infrastructure development, there is a need for NATMAP to advocate decision-making on the basis of "value for money".

Numerous problems and issues are evident from the analysis of the existing passenger transport system in the KZN province. Some of these include:

- *Rising car ownership and use on inter-regional roads, give rise to congestion during peak holiday times, unacceptable levels of air pollution, and wasteful use of valuable urban land.*
- *Aged and, in some cases unsafe, rolling stock*
- *Existing public transport is not sustainable under present operating and management practices.*
- *Low profitability for many private operators, resulting in a failure to adequately maintain and recapitalise fleets.*
- *Limited modal integration of public transport services*
- *Modes are not used where most appropriate.*
- *Most households in KwaZulu-Natal have limited access to public transport, or cannot afford it.*
- *Long-distance rail suffers from very old rolling stock, low demand and hence low profitability.*
- *Long-distance stations and termini are in poor condition and generally not integrated with other supporting land-uses.*
- *Long-distance rail suffers from very old rolling stock, low demand and hence low profitability.*
- *Traffic safety is a major problem, due to old rolling stock, some poor roads, poor driving skills, etc*
- *Inadequate policing and law enforcement, particularly relating to unsafe driving and un-road-worthy vehicles and poor observance of traffic laws.*
- *Operating License Boards lacks capacity resulting in delays*

Freight Operations

Freight transport in the KZN and in South Africa is generally inefficient, and suffers from many problems. Some of these are:

- *Uncompetitive and un-commercial operations.*
- *Failure of funding mechanism leads to obsolescent and inefficiency.*
- *Rates and tariffs do not relate to commercial practice.*
- *Excessive costs and low efficiencies inhibit industrial output.*
- *Institutional structure and monopoly control inhibits private sector investments in industry.*
- *Unavoidable result is total dependence of private sector road transport.*
- *Medium term prospects for fossil fuels makes road transport highly vulnerable.*

The Gauteng-Durban freight corridor is the corridor with the highest freight volumes, while most (80%) of freight exports go through the Durban harbour. Richards Bay serves as the coal export harbour of the country. As such, freight solutions and investments should be given a priority on these corridors and harbours.

It is recognised that due to the organisational structures and institutional framework of the major proportions of freight transport in South Africa, future development of a demand oriented logistics system will require significant policy changes. In particular the monopoly position of the major service provider of rail, port and pipeline services is having a negative impact on the operational efficiency, provision of adequate equipment and facilities, and extent of services to meet present and future demand.

The latent demand for rail service on corridors as well as urban and rural areas is being met by rapid expansion of road freight transport, causing severe un-recovered externalities in the form of road deterioration, congestion, accidents, pollution and excessive freight transport costs.

Cost comparisons indicate that there is urgent need for independent research to fully quantify the additional costs being incurred by lack of competition and to define the options for institutional, organisational and operational reforms to meet the freight transport needs of the country.

Rail infrastructure

According to Transnet forecasts the following capacity constraints will developed for the network within the KZN:

- *Currently there are no capacity constraints*
- *The capacity of the **main line** between Durban and Gauteng will be fully utilised by 2020 and will be exceeded by 2030.*
- *These steep grades limit the capacity of heavy freight trains of the Kwazulu-Natal section between Vooruitsig and Gauteng.*

- *The capacity of the Richards Bay - Ermelo **coal line** is limited by the single Overvaal Tunnel (in Mpumalanga). The demand will exceed the capacity of most sections of the line in Kwazulu-Natal by 2030.*
- *The capacity of the Durban – Swaziland line will be adequate until 2010. The section between Durban and Stanger will reach capacity by 2030.*
- *The branch lines are currently totally under utilised with virtually no demand for capacity. There are very little services currently available that conform to the requirements of potential customers (single truck loads) or that could compete with the road services.*

The condition of the coal line is good while the core lines are generally fair and the branch lines poor to very poor.

Transnet Rail (Freight Rail and Rail Engineering) is making good progress in terms of:

- *Turnaround in rolling stock efficiency and utilisation (major progresses in backlog maintenance and operational initiatives have produced efficiency gains and greater asset utilisation).*
- *Large-scale capital investment is happening (long lead times on loco purchases).*

South Africa must scale up its freight rail network capacity in order to stay ahead of demand and provide a stimulus to economic growth.

<u>Road Infrastructure</u>
The majority of KZN roads (46.9%) operate at LOS B. In total 81.2 percent of the network operates at LOS C or better. Approximately 18.4 percent of the network (1,792 km) needs to be upgraded in order to bring the service level of the whole network to LOS C or better.

Visual condition surveys showed that 52 percent of the blacktop roads are in a poor or very poor condition. A few sections on the N2 south beyond Kokstad and N2 North, the R42 near Volksrust, and the R22 near Swaziland are in a poor or very poor condition, while sections on the N2 south near Kokstad, R33 near Dundee and Vryheid, R42 south of Volksrust, are in a fair condition.
Two of the main constraints which prevent roads from remaining in a good to fair condition over their design life are a lack of funds for maintenance and overloading of heavy vehicles.

There are various constraints regarding overload control, such as lack of trained staff, lack of weighbridges to achieve geographic coverage, lack of the overloading enforcement system, and inadequate legal support.

Airport Infrastructure

Durban International Airport: The current airport capacity is 4.5 MAP. No further expansions will be done to increase the capacity as the airport will be replaced by 2010. The airport is at capacity and is operating at a level of service below the recommended level of service of C. The existing airport is able to handle projected growth up to 2010 at substandard service levels.

The proposed new International Airport at La Mercy will have an ultimate capacity of 42 MAP. When opening in 2010, it will have a capacity of 7.5 MAP.

Pietermaritzburg Airport: The capacity of the terminal will be reached by 2033 assuming domestic growth rates of 10%. The terminal might therefore have to be expanded from 2028 to 2033 to handle the expected demand.

- *Margate Airport: No capacity constraints*
- *Richards Bay Airport: No capacity constraints.*

Port and pipe line Infrastructure

The chief constraints to the Port of Durban, once the Entrance Channel widening and deepening is completed in 2009, are as follows:

- *Lack of space for further major expansion*
- *Road accesses are congested, both via the City to the Point area, and increasing so to the Bayhead area.*
- *A rapidly expanding motor vehicle import/export programme is stretching current port facilities to its limit.*

The only berths which are constricted by virtue of their condition are as follows:
Maydon Wharf Berths 1 to 4, Berth 12, Island View Berth 5

Port of Richards Bay: There are no capacity or condition restraints on the berths.

Financial Analysis

As a country, South Africa is currently experiencing unprecedented capital formation across the entire spectrum of transportation modes and in both infrastructure and operations. The bulk of the expenditure is spend is by the public sector – both government and government agencies.

Except for the air mode, transportation investments have trailed economic growth and, in fact, come in the wake of general 'divestment' when considered against requisite spend just to maintain installed infrastructure and operational capacity. It is fair to conclude that current flurry of investments are a very necessary attempt to restore lost capacity.

Generally, provincial funding is critically (95%) depended on national transfers. Clearly, a multi-modal view of transportation funding, which factors in the enabling role of transportation in the economy as well as transportation's fair share in the creation of the country's GDP has to be taken into account for NATMAP to succeed.

KwaZulu Natal Province currently relies more on provincial allocations in the form of equitable shares, conditional grants and other infrastructure transfers from Treasury. However, other sources mainly in the form of tax receipts (motor vehicle registration and licensing fees, sale of personalised and specific number plates) as well as non tax receipts (traffic fines, sale of capital assets like vehicles) also contribute to the provincial funds. The province, however, incurred deficits amounting to R2.4 million in the 2006/07 period mainly as a result of unforeseen road damage from storms in December 2006 and January 2007.

The apparent acceleration of provincial capital expenditure, projected to grow at 15.6% average for all provinces over the MTEF, is encouraging, but needs to be 'unpacked' to determine the share for transportation and its significance.

Institutional and Legal Analysis

The need has been identified to analyse the roles and responsibilities of the various role-players with a view to the rationalisation of transport systems, through institutional and legal amendments, including:

- *Clarify and contextualise the transport roles and responsibilities of the three spheres of government, in order to achieve integrated transport management*
- *Comprehensive review/rationalization of legislation / institutional parameters to be undertaken, such as maritime issues.*
- *There is a need for more focused capacitation internally to Government.*
- *Institutions need to be more responsive to external innovations and requirements (international, environmental, land use, etc.)*

The second phase focuses on the following problem areas that have already been identified:

- *Linkage between policy, legislation and implementation*
- *General performance in relation to allocated mandate, capacity and/or relationship to the Department of Transport;*
- *Gaps and Overlaps*
- *Failure of cooperative governance*
- *Institutional silos*
- *Problems in procurement*
- *Separation of planning, implementation and maintenance functions*
- *Linkage to government*

At present the Department administers payment of the subsidies and monitoring of the contracts. Substantial sums of money are involved. In terms of the NLTTA the eThekwini Transport Authority must take over this function for its transport area, i.e. be allocated the money for subsidies in its area that are currently administered by the provincial Department.

KwaZulu-Natal is unique at the moment in having the country's only transport authority (TA).

The problems experienced by the ETA will probably also apply to other transport authorities when they are established, and are being addressed by the replacing legislation to the NLTTA. These are mainly a lack of own funding sources and the confusion created by the local government legislation that has post-dated the NLTTA.

A problem with the ETA is the fact that there are too few councillors on the Governing Body (only three), and they reportedly have too many other duties to be able to devote sufficient time to TA transport matters.

Another "unique" structure is the KZN Transport Appeals Tribunal, although some other provinces have also established provincial Appeal Tribunals. The Appeals Tribunal is dealt with below.

As regards roads, the KwaZulu-Natal Provincial Roads Act focuses on provincial roads and leaves municipal roads issues to be dealt with by municipal by-laws. However, it has been found in some other provinces that there is a need to regulate some aspects of municipal roads, e.g. on standards, by provincial legislation.

The KwaZulu-Natal Road Traffic Act 7 of 1997 needs to be amended or replaced to respond to the amendments to the National Road Traffic Act and to the AARTO and RTMC Acts. In the case of public transport, the NLTTA has given rise to the situation where there are different and diverse laws in the provinces replacing Chapter 3, which makes for a lack of uniformity and consistency, and is confusing for people who must implement the legislation. This aspect is under discussion with the revision of the NLTTA.

A serious problem appears to be the fact that regulations for the KwaZulu-Natal Public Transport Act have not been promulgated yet. This makes it impossible to implement many of the provisions of the Act.

1. INTRODUCTION

1.1 BACKGROUND

The main purpose of the Transport Master Plan (NATMAP 2050) is to motivate a prioritized program of interventions to upgrade the transport system in South Africa. Its goal is to develop a dynamic; long term; and sustainable land use/multi-modal transportation systems framework, for the development of networks, infrastructure facilities, interchange termini facilities and service delivery.

The Department of Transport (DoT) appointed SSI Consortium to develop provincial master plans for Kwa-Zulu Natal (KZN) and Western Cape provinces, which are coordinated with the master plans of the other provinces. The Africon and Ingerop Consortia were appointed to develop master plans for the other provinces. The DoT's academic advisers, coordinated by the Dr H Groenewald, were appointed to integrate all the provincial master plans into a single national transport master plan.

Two of the four main Phases of the Project have been concluded, i.e. the Inventory and Analysis phase, Phases 1 and 2.

1.2 PURPOSE OF REPORT

This report addresses Phase 2 of the NATMAP project dealing with the Analysis of the Status Quo data of the KZN Province, and it is the third report produced in the project. The previous reports were the Inception and Inventory reports. This is the draft final version of the Phase 2 Analysis report for Western Cape Province. The report incorporates comments received at the Phase Round Table Conference as well as comments from stakeholders.

Apart form the provincial reports, there are also two reports produced at national level on the following aspects:

- Financial, Institutional, Legislation and Management
- Development of Base Year Passenger and Freight Transport Models

1.3 OBJECTIVES OF THE PROJECT

The Terms of Reference (TOR) states goal of the National Transport Master Plan 2005-2050 is to develop dynamic; long term; and sustainable land use/multi modal transportation systems framework for the development of networks, infrastructure facilities, interchange and termini facilities and service delivery strategies for the RSA. The framework and strategies need to:

- be demand responsive to national/provincial/district and /or any socio-economic growth strategy, and/or any sectoral integrated spatial development plan; and

- have a coordinated implementation schedule and/or action agenda for the whole country; and/or specific national and provincial spatial development corridors and regions until 2050.

In other words the objective is to prepare a physical development plan, sometimes referred to as a Master Plan, as the framework by which RSA's future state-of-the-art multi-modal transportation systems planning, implementation, maintenance, operations, investments, and monitoring decisions are to be made.

The objectives of the Project are to identify, examine, assess, and propose;

- various land use/spatial development models to sustain investment in state-of-the-art multi-modal urban/rural transportation systems;
- cost effective models for an integrated public/private sector corridor/regional economic development;
- vision, goals and objectives for each of the national development corridor and/or economic regions;
- integrated growth and development strategies for each development corridor and/or region of national importance;
- potential economic development projects and compile a comprehensive economic status map of national importance;
- integrated multi-modal infrastructure facilities development Plan;
- cost effective policies promulgation, and/or changes to enhance coordination of transportation services;
- cost effective institutional arrangements model for efficient and effective investment, planning, implementation, operations, maintenance, and monitoring;
- action agenda for the various key stakeholders based on the preferred development strategy and integrated development plan.

The specific objectives of the Phase 2 Analysis are as follows:

- To develop a 2005 base year passenger and freight transport model at national level;
- To develop a GIS and Databank populated with available status quo data at national level;
- To assess the demographic and economic projections made for different scenarios up to 2050 for the KZN province;
- To assess the implications of the provincial and metropolitan spatial development frameworks on transport;
- To assess the economic role of transport in the province;
- To analyse the status quo passenger and freight transport demand patterns, operations and policies;
- To analyse the demand and supply of the road, rail and pipeline networks, the airports and harbours, and review existing planned projects;

- To analyse the Financial, Institutional and Legal situation, problems and issues relating to the provision and management of infrastructure of national significance.

1.4 METHODOLOGY

1.4.1 Project Phases from TOR

The broad approach is depicted in the figure below in terms of the four phases according to the TOR. The Phase 1 Inventory delivers the information about the existing supply and capacity of transport, the main demand side drivers and problems and deficiencies. The Phase 2 Forecasts deliver information about future demand and enables a vision to be developed about the transport supply-side, including the future capacity required and the standards necessary to provide cost-effective and globally competitive transport passenger and freight services. Phase 3 is basically about planning to schedule and prioritise infrastructure investment in sympathy with growing demand. Finally, Phase 4 deals with the necessary policy, institutional changes and support required for effective implementation and details a programme of action.

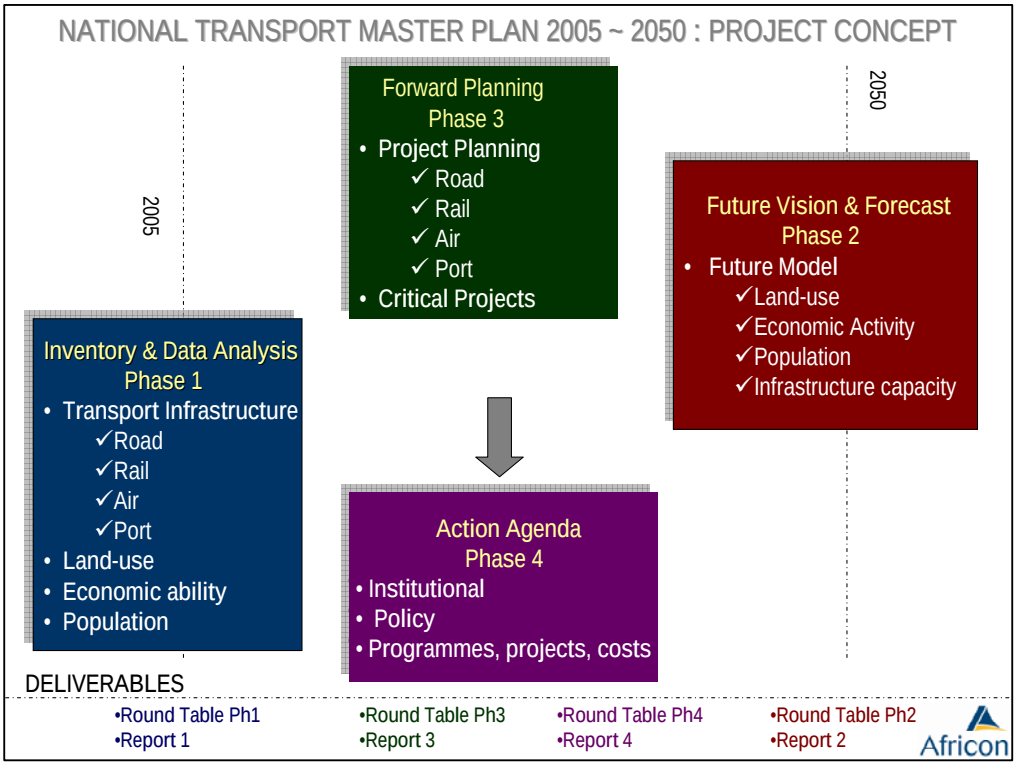


Figure 1: Four project phases from TOR

1.4.2 Revised Scope of Phase 2

It was agreed by the PMTT that the project schedule and scope of Phase 2 would be adjusted in view of delays in obtaining certain status quo data and in the calibration of the base year models. These involved freight Origin-Destination (O-D) data,

especially by road, and Transnet data relating to their freight model, demand and capacity of rail, ports and pipelines.

It was therefore agreed that Phase 2 will also serve to fill in any remaining gaps in the Inventory data, and to complete only the development of the Base Year models. Model projections will only be done as part of Phase 3.

1.5 PROBLEMS AND ISSUES DEFINED IN PHASE 1

From the status quo data collected during Phase 1, various problems and issues were identified. These were discussed with the provincial and national Technical Committees, as well as with provincial stakeholders. This enabled the problems and issues to be confirmed and updated. In the Phase 2 Analysis, the location, size and severity of problems were determined.

The following problems and issues were identified:

GIS, Databank and Modeling

- Lack of coordination between different GIS and planning systems
  - Limited municipal infrastructure data is available in GIS format. Where captured, the GIS's are small internal systems
  - Available planning data generally not captured into GIS (committed projects, needs and potential developments)

Land Use

- The topography of the Province presents barriers to movements and land-use.
- There is a need for higher density development in urban areas, in an attempt to reduce pressure on roads, and to create the necessary conditions for sustainable public transport.
- The rapid expansion of large housing developments for all income groups is increasing traffic congestion in urban areas.
- Due to the scattered nature of settlements, the provision of primary services such as water reticulation, electricity and road access becomes very costly and non-sustainable. This also results in small, individual non-viable agricultural plots. Higher density residential plots near larger agricultural lands would make for more effective infrastructure provision.

Socio-economic

- The percentage of the population in KwaZulu-Natal that is economically active is lower than the national average.
- The transport infrastructure especially in rural areas is inadequate to support higher levels of economic activity.

Freight Operations

- Heavy agriculture (timber and sugar cane) result in high loadings on roads.

- Road transport is taking over a major portion of livestock and grain transportation due to the ease and convenience of transporting cattle by road.
- A large increase in exports is expected as a result of the approval, in November 2005, of the Richards Bay Coal Terminal (RBCT) expansion project.
- Tariff increase on branch lines is forcing timber haulage onto roads, while current legislation excludes smaller enterprises from operating on these lines.

Passenger Operations

- With rising car ownership and use, pressure on the road network can be expected to mount considerably in the coming decades. The poor quality of public transport services influences this rise in car ownership.
- A very high 63% of scholars and workers walk to school or to their place of employment and cognisance of this is required in the provision of transport infrastructure.

- *Most households in KwaZulu-Natal have no access to public transport, or cannot afford it. Some 43 per cent of households using public transport spend more than 10 percent of their household income on public transport.*

Road Infrastructure

- The shift away from all rail freight onto road transport is resulting in the deterioration of the road pavements.
- The growth in both private and freight road transport is resulting in traffic congestion within major urban areas.
- The provincial and municipal road networks have massive backlogs in terms of maintenance and rehabilitation needs. 52% of the Provincial blacktop roads are in a poor or very poor condition and are in urgent need of rehabilitation. Data on municipal roads maintenance and rehabilitation backlogs is not available.
- Limited co-ordinated planning takes place between the 3 spheres of government.

Rail Infrastructure

- There has been an increasing switch from rail to road over the past ten years with concurrent over utilisation of the main road corridors and under utilisation of the rail system.
- The branch lines in KwaZulu-Natal are in need of extensive overhaul and operational upgrade.
- Main line operations through KwaZulu-Natal are subject to operational inefficiencies.
- The coal-link main line from the interior to Richards Bay requires a considerable amount of upgrading and replacement of rolling stock to keep pace with increasing demand.

Port Infrastructure

Port of Durban:

- The road access to the port is congested and needs urgent capacity expansion.
- The existing rail system and container terminal are barely adequate for present port volumes and needs extensive upgrading to meet the proposed throughput and increased use of rail.
- The current planning process does not provide adequate future capacity for break-bulk and general cargo.
- The limited co-ordiantion of transport planning between the different modes of transport (shipping, rail and road) results in inadequate planning to address the severe transport bottlenecks both within the port and the infrastructure links to the port.

Port of Richards Bay

- The movement of road freight between Gauteng and Richards Bay is not efficient due to the lack of a direct road route.
- The rail market share has been eroded due to costs, operating policies, speed of delivery, service and safety.
- The operational efficiency of the main Coal link rail line is limiting the potential for coal exports.
- The R34 route from Richards Bay to Gauteng is in need of a major upgrade, especially between Melmoth and Richards Bay.

Airports

- *KwaZulu-Natal has several airports and airstrips that are not national or international airports. They present opportunities for passenger and freight transport that have not been exploited.*

Financial

- Funding allocated to the KZN DoT is increasing, but is insufficient to address the massive backlogs that have built up from years of under funding for road maintenance and rehabilitation and it is estimated that a further R 1.6 billion is required per year just for Provincial roads.
- The fluctuations in transport funding, partly the result of the impact of the FIFA 2010 World Cup, are of concern within the municipal sphere since it is difficult to plan ahead when the budgets keep increasing and decreasing on an almost annual basis.
- Presently limited funding is being expended on rural village streets and roads and as a result, this infrastructure is receiving little attention.
- The lack of funds for road traffic management is out of step with the importance of this public function.
- Minimal funding is being provided for the branch line infrastructure in the province.

Legal

- The KwaZulu-Natal Provincial Roads Act focuses on provincial roads and leaves municipal roads issues to be dealt with by municipal by-laws. It has been found in some other provinces that there is a need to regulate some aspects of municipal roads, e.g. on standards, by provincial legislation.

Institutional

- There is a shortage of people who are skilled and experienced in transport planning.
- The eThekwini Transport Authority (ETA) experiences a lack of own funding sources and the confusion created by the local government legislation that has post-dated the NLTTA. There is also a lack of capacity among councillors on the Governing Body.

Energy and Environment

- The call for more power generation for Eskom's grid is increasing the local consumption of Steam Coal.
- Gravel roads need to be continually regraded and regravelled, especially where traffic volumes are high or gradients are steep. Gravel roads are up to 10 times cheaper than surfaced roads. However, scarce and non-renewable gravel resources need to be protected, and the negative environmental impact of quarries should be reduced.
- There is very limited planning, regulation and enforcement surrounding the movement of hazardous materials through the province.
- Urban sprawl and scattered rural communities take up arable land and impacts on environmentally sensitive areas.

1.6 PROJECT MANAGEMENT AND CONSULTATION

The NATMAP project is managed through Technical and Steering Committees at provincial and national level. These are listed below:

- A dedicated Provincial DoT Project Manager for KZN province facilitate work at provincial level, as follows:
  - Coordinate project in province
  - Assist with data collection
  - Assist with logistical arrangements and Provincial meetings
- A Technical and Finance Committee at national and KZN Provincial level consisting of government officials to:
  - Advise and give recommendations on technical issues
  - Assist in identifying and obtaining data
  - Evaluate deliverables
- A Steering Committee at National and Provincial level consisting of heads of departments to:
  - Provide strategic guidance on the project
  - Make policy decisions

- Receive and review milestone deliverables

The Project Team, consisting of three Consortia, are managed and guided at operational level by the DoT Project Management Technical Team (PMTT), consisting of:

- The DoT Project Manager
- The Project Manager of each of the three Consortia
- DOT Project Coordinators, one allocated to each Consortium
- Project Manager of the DOT Consolidated Working Group consisting of representatives from Universities and technical institutions, advising the DoT and integrating the provincial master plans in one national master plan.

Each of the three Consortia is responsible for between two and five provinces. The Consortia co-ordinate their work at national level to ensure that the work is done at the same standard, level of detail and scope. The work is coordinated by six Working Groups on the following topics:

- GIS, Databank and Modelling (GDM), also responsible for demographic and economic projections, as well as land-use

- Operations, consisting of two sub-working groups:
  - Passenger Transport
  - Freight Transport

- Infrastructure, consisting of four sub-working groups:
  - Roads
  - Railways
  - Airports
  - Ports And Pipelines

- Financial, Institutional, Legal and Management (FILM)

- Energy and Environment

Representatives of the WITS and DoT also serve on the Working Groups.

The SSI Consortium coordinates its work by means of meetings, telephone discussions, email, and participating in National Working Groups with the other Consortia.

At the end of each Phase, a Round Table Conference of national and provincial stakeholders is held where the Project Team informs stakeholders of findings and where the stakeholders provide their inputs and views. The Phase 2 Round Table was held on 7 and 8 May 2008.

Following the Round Table Conference, the NATMAP Team (DOT, Consolidated Working Group, and three Consortia had special meetings with the following national agencies, i.e.:

- SARCC
- ACSA
- TRANSNET

A meeting with SANRAL will also be scheduled. At national level, a workshop was held in September 2009 with the DOT, the Consolidated Working Group and other Consortia on the Phase 2 results. A provincial workshop was also conducted by the SSI Team with the Province and the eThekwini Transport Authority during December of 2007 to discuss problems and issues, planned projects and possible future strategies.

1.7 STRUCTURE OF THIS REPORT

The structure of this report follows that agreed by members of the Project Management Task Team in consultation with the DoT's Project Implementation Manager. Aside from the preliminaries, the report contains the following sections:

Chapter 2: Economic Analysis
Chapter 3: Demographic Analysis
Chapter 4: Land-use analysis
Chapter 5: Passenger Operations Analysis
Chapter 6: Freight Operations Analysis
Chapter 7: Infrastructure Analysis

For each category of infrastructure, the following is discussed:

- Summary of network
- Capacity and constraints
- Condition and constraints
- Missing links
- Implications of Existing Plans on Phase 3 Forward Plans
- Identification of Alternative Strategies to be Investigated in Phase 3

The following infrastructure categories are considered:

- Road Network
- Railways
- Airports
- Ports And Pipelines

Chapter 8: Financial Analysis
Chapter 9: Institutional and Legal Analysis
Chapter 10: Conclusions and Way Forward

2. ECONOMIC ANALYSIS

2.1 INTRODUCTION

This section describes the current macro-economic situation in KwaZulu-Natal (KZN). It focuses on three broad areas namely, summary of National Economic Scenario Projections, KZN Economic Analysis, and implications for transport.

2.1.1 Background

Future demographic and economic scenarios for South Africa were developed by Global Insight Southern Africa (PTY) Ltd and the Bureau of Market Research at the University of South Africa (UNISA), as part of the NATMAP project.

Three macro economic and demographic scenarios were formulated, namely a baseline, high road and low road. Population and sector-based economic projections were made by the province and local municipalities. These projections provide a picture of the expected future demand in each province.

In 2005, an input-output model was developed by Statistics South Africa on the basis of a variety of results obtained pertaining to the Gross Domestic Product (GDP), the labour market, economic activities, compensation of employees, household surveys as well as income and expenditure surveys. This was then complemented by two econometric models, which were developed by Global Insight and BMR. The purpose of the latter was to predict the possible economic scenarios for South Africa between 2005 and 2050. Two models were used to this effect. The input-output models sought to determine the economic impacts of future risks to the economy while the Monte Carlo probabilistic model was used to generate future economic growth paths.

This section hence gives a brief summary of the methodologies and findings, with specific focus on KwaZulu-Natal Province. For a detailed description of the economic scenario projections, readers are referred to the report issued by Global Insight and BMR (2008).

2.2 SUMMARY OF PROBLEMS AND ISSUES FOR ANALYSIS

- Only one third (3,2 million) of the population is economically active which is lower than the average for South Africa, namely 37%.
- According to Census 2001, nearly half (1,5 million) of the economically active population was unemployed. The eThekwini Metropolitan Municipality registered the lowest unemployment rate (43%), whereas the highest was found in the Umkhanyakude District Municipality (63%). The largest number of unemployed people (591 000) was however registered in the eThekwini Metropolitan area.
- Economic opportunities in KZN is unbalanced with most occurring within the eThekwini Metropolitan Municipality (e.g. 58% of all formal workers are employed in eThekwini). Economic concentration generally increases to the coast with eThekwini, Pietermaritzburg and Richards Bay constituting the

major job opportunity centres. In many instances the accessibility from rural areas to the centres of employment are poor, hampering poverty alleviation programmes.

- A large part of the Province is gripped by persistent poverty, high levels of unemployment and a high HIV/AIDS infection rate. Consequently, the districts of Umkhanyakude, Zululand and Umzinyathi are earmarked as Rural Development Nodes by the Government's ISRDS programme.
- The dispersed settlement pattern of the Province hinders the effective and sustainable provision of transport, public transport in the rural areas, and hence economic development.
- With the peak oil trend and the high enery demands of transport, the impact of fuel shortage on transport and the economy will be severe.
- The recent global financial and economic crisis is also impacting on South Africa, although to a less severe extend. This is causing trade with other countries to decline, and subsequently less demand for infrastructure. This gives the country and province a breathing space to provide much needed infrastructure ahead of the next upward cycle, in two to three years time. However, on the negative side, there are huge job losses in the mining, manufacturing industries, and to lesser extent in the construction industry.

2.3 ALTERNATIVE SCENARIOS

For the purpose of this report, a number of potential economic impacts were analysed, namely:

- The future economic impact of global and regional economic prospects;
- The future economic impacts of changes in oil prices;
- The future economic impacts of HIV/AIDS; and
- The future economic impacts of skills availability.

Through the use of input-output models, the likely future impacts of each of the above mentioned factors on the future of the South African economy were determined. The latter were then used to generate economic scenarios. It must be noted that there are other variables which would probably have some economic impact but whose impacts could not be easily quantifiable were not included in the model for the purpose of this report. There variables include:

- Environmental aspects such as global warming;
- Technological development and change;
- Development of new energy sources; and
- The availability of sufficient coal reserves for the production of synthetic fuels.

Although these variables were not directly included in the input-output model, they were taken into account when describing the various economic scenario outcomes.

The three economic scenarios that were generated for the purpose of this report are:

- Baseline (Business-as-usual) Scenario ('Middle Variant');
- Relatively Optimistic Scenario ('High Variant'); and
- Relatively Pessimistic Scenario ('Low Variant').

Table 1 gives a summary of the three economic scenarios above.

Table 1: Summary of the Three Economic Scenarios

ASPECT	RELATIVELY PESSIMISTIC	POSSIBLE REASONS	BASELINE	POSSIBLE REASONS	RELATIVELY OPTIMISTIC	POSSIBLE REASONS
GDP Growth	Continuous decline	Declining aggregate demand	Stable at 5 – 6 %	Free market policies remain	Increase to 5 – 9 %	Structural constraints addressed
Exports of goods and services	Continuous decline	Inability to penetrate international markets	Some decline from 7 – 5.7 %	Competitive stagnates	Increase to above 8 % per annum	Competitive ability enhances
Change in compensation per employee	Continuous decline due to inflation etc	Smaller margin between wage increase and CPI	Stable at around 8 % per annum	Business as usual	Increase to about 12 % per annum (high growth low CPI)	Bigger margin between wage increased and CPI
Employment growth	Continuous decline	Declining job creation, more capital intensive	Growth to about 2.1 % per annum	More job creation, more labour intensive	Growth to about 3.3 % per annum	Rapidly increasing production elasticity of employment
Growth in total domestic demand	Continuous decline	Declining growth in disposable income and ensuing negative transmission	Gradual decline from 6.5 – 5 %	Slight decline in household consumption expenditure	Increase to about 8 % per annum	High growth in disposable income and ensuing positive transmission effects
Private consumption expenditure	Continuous decline	Declining growth in household disposable income effects	Decline from 6 to 5% per annum and then stable	Business as usual	Increase to nearly 8% per annum	Increased growth in household disposable income
Public Consumption expenditure	Continuous decline	Stagnation in tax revenue growth	Decline from 5.5 to 4.1% per annum	Business as usual, tax and revenue	Increase to 6.5% per annum	Incresaing tax revenue growth

			and then stable	growth		
Total Capital formation	Continuous decline	Low business confidence, low investment capital	Decline from about 11 to about 4.6 % per annum	Business as usual, business confidence	Decline from 11 to about 8.4% per annum	Increased business confidence

The key drivers that will determine which scenario will be realised are expected to fall within any one of the following:

- Future policies and programs;
- Investment (specifically the levels of foregn direct investment in South Africa);
- Competitiveness (including productivity and technology);
- Infrastructural development;
- Consumption;
- Macro-economic stability;
- Fiscal policy;
- Confidence (including crime and safety issues);
- Service delivery; and
- Environmental sensitivity.

2.4 ECONOMIC ANALYSIS

2.4.1 Global Economy

World economic growth prospects are relatively favourable. This is based on latest detailed forecasts against which average annual GDP growth rate is projected at about 3.1% for the period 2005 to 2050. This is roughly in line with the average global growth for the past 30 years. The key underlying economic assumption of these long term forecasts is that the productivity gains from new technological advances will moderate the impact of the secular, long term slowdown in factor accumulation.

2.4.2 Domestic Economy

A stable investment-friendly environment is assumed to exist over the forecast period. This is so against the current government growth initiatives such as those outlined in the Accelerated and Shared Growth Initiative for South Africa (ASGI-SA). Such initiatives are expected to continuously shape the economic policy environment over the medium term period.

Assuming a sound fiscal and monetary policy mix, inflation is not expected to increase significantly above the planned target of 3 to 6% throughout the medium term to the midpoint target of the long term. It is projected that private sector will be the main driver of economic growth ahead of the public sector. This trend is expected to continue into the long term period. The projected continued growth in domestic demand is expected to drive real GDP growth to above 6% in the medium term, and

thereafter settle at a long term growth path of between 5.5 and 6%. This will be supported by annual employment and productivity growth of around 2.5%, as well as fixed capital growth of above 4% per annum.

Fairly strong global demand and above-trend commodity prices will help boost exports, but rising imports stemming from investment demand means that the current account is projected to remain in deficit, at above 5% over the medium term. Over the longer term, continued weakening terms of trade will help improve the deficit. The current account deficit is expected to be primarily funded by portifolio inflows, where a steady growth in earnings on the back of the expected strong investment growth will ensure foreign investor interest and an increase in foreign direct investment (FDI).

2.4.3 KwaZulu-Natal Province Economy

Strengths of the KZN economy

This section outlines some of the key factors which contribute towards making the KZN an investment destination and exporting platform:

A supportive Policy Environment

The provincial government in KZN has come up with a strategy to promote investment. The strategy focuses on providing the potential investors with the following:

- Pre- and post-establishment support, such as feasibility studies, liaison with government departments, marketing, technical and financial analyses, and assistance with legal formalities and regional regulations;
- Provision of infrastructure and utilities;
- Lease or sale of land and property;
- Loans for acquisition of plant and equipment;
- Working capital loans; and
- Introductions to key contacts, such as auditing companies, legal practitioners, material suppliers and shipping groups.

Good Tourist Infrastructure

KZN offers immense tourism opportunities. For instance the province's participation in the Lubombo Spatial Development Initiative has created unique opportunities for investment in tourism in the St Lucia region. The area has some of the most picturesque and unspoiled natural attractions in Africa.

International Trade Opportunities

The Ports of Durban and Richards Bay provide a crucial gateway for imports and exports, not only for the province, but also for the country and the SADC region, making KZN a crucial hub for industrial development.

Abundant Natural Resources

KZN has a wealthy of mineral resources including platinum which is highly demanded on the world markets. The province's Richards Bay is the centre for South Africa's alluminium industry and also the country's largest exporter of steam coal. Overall the KZN has a sound macro-economic foundation.

Macro-Economic Projections

The projected future GVA and GDP for the KZN province as a whole for the periods 2005 and 2050 for the different scenarios is provided in **Table 2**.

Table 2: Gross Value Added (GVA) and Gross Domestic Product (GDP) (Constant 2000 Prices): Scenario Comparisons

GVA by Economic Sector												
Sector1	**Sector 2**	**Sector 3**	**Sector 4**	**Sector 5**	**Sector 6**	**Sector 7**	**Sector 8**	**Sector 9**	**Sector 10**	**Total GVA**	**Taxes less Subsidies**	**GDP**
2005												
1525762.97	193959.035	25536414.9	2926387.36	3152710.95	19366049.9	17749558.3	21982290.9	12413742.5	5112461.4	109959338	10365520.1	**9948247.2**
2934284.1	282987.35	26937631	3148416.8	3358697	20542470	18338155	22871329	13348431	5384717.3	**117147118**	11050727	**128197845**
1408207.4	38975.68	2258391.3	451874.1	385016.6	2040907.1	2070422.5	2876302.7	3072861.5	861781.91	**15464741**	1394107.3	**16858848**
537071.16	47645.57	349370.11	51971.066	49196.924	265805.48	157470.36	269657.5	515014.27	81359.073	**2324561.5**	240050.66	**2564612.2**
325244.75	36531.362	1991718.5	170714.36	143013.62	686512.47	567197.9	835145.91	1251251.6	211068.2	**6218398.6**	635892.25	**6854290.9**
242933.88	137106.43	128785.8	21870.503	13953.229	64283.229	62798.303	74579.234	227953.96	34418.673	**1008683.2**	86942.111	**1095625.4**
426277.56	166537.21	150999.2	20805.159	45046.941	250087.61	161944.97	217504.58	952088.26	106294.09	**2497585.6**	257434.56	**2755020.1**
461447.18	21051.338	71826.116	21363.678	23523.891	157709.46	103723.65	72388.662	423377.2	134042.93	**1490454.1**	138000.87	**1628455**
891247.34	1008285.5	4751378.4	158040.87	255120.85	943552.05	1234272.9	1112010.1	1332958.5	257876.19	**11944743**	1210390.2	**13155133**
760161.66	967.79777	1444322	85089.395	100536.79	589971	283005.44	419883.41	443718.97	170137.35	**4297794.7**	521797.65	**4819592.3**
1525762.97	193959.035	25536414.9	2926387.36	3152710.95	19366049.9	17749558.3	21982290.9	12413742.5	5112461.4	109959338	10365520.1	120324858
2484610.3	265989.27	26748787	3140694.1	3349307.8	20433110	18291883	22811069	13232180	5366685.4	**116124316**	10954878	**127079193**
1796282.2	52528.981	2004757.9	383859.89	346977.98	1867079.5	1685604.9	2594773	2815719.2	798682.47	**14346266**	1256565.5	**15602832**
519713.78	39132.082	770412.49	121069.71	93169.829	523999.13	565804.51	552388.6	804210.75	144745.84	**4134646.7**	440121.32	**4574768**
273258.48	21239.9	95619.803	29356.064	28344.195	128080.61	68836.857	123003.84	458760.03	55258.662	**1281758.4**	149504.77	**1431263.2**
294695.77	159596.75	2004332.3	156499.58	127018.33	626045.93	556580.58	821262.88	1047105.6	198655.38	**5991793.1**	578388.55	**6570181.6**
437561.41	167197.94	187959.28	30249.708	47047.015	242603.03	181877.09	221972.87	892345.6	73993.186	**2482807.1**	255205.83	**2738013**
519068.31	24277.03	74612.236	24390.004	25603.507	180974.51	105883.51	89664.959	519600.34	169065.22	**1733139.6**	163381.07	**1896520.7**
893493.07	1786782.5	6257952.7	166723.86	356854.53	1290761.3	1831644.7	1451201	1444029.4	297629.81	**15777073**	1481931.8	**17259005**
840126.88	41468.574	1822575.	121256.79	111426.62	651015.	330573.53	517182.69	559649.98	198065.29	**5193341.4**	621834.42	**5815175.8**
1525762.97	193959.035	25536414.9	2926387.36	3152710.95	19366049.9	17749558.3	21982290.9	12413742.5	5112461.4	109959338	10365520.1	120324858
2484610.3	265989.27	26748787	3140694.1	3349307.8	20433110	18291883	22811069	13232180	5366685.4	**116124316**	10954878	**127079193**
1796282.2	52528.981	2004757.9	383859.89	346977.98	1867079.5	1685604.9	2594773	2815719.2	798682.47	**14346266**	1256565.5	**15602832**
519713.78	39132.082	770412.49	121069.71	93169.829	523999.13	565804.51	552388.6	804210.75	144745.84	**4134646.7**	440121.32	**4574768**
273258.48	21239.9	95619.803	29356.064	28344.195	128080.61	68836.857	123003.84	458760.03	55258.662	**1281758.4**	149504.77	**1431263.2**
294695.77	159596.75	2004332.3	156499.58	127018.33	626045.93	556580.58	821262.88	1047105.6	198655.38	**5991793.1**	578388.55	**6570181.6**
437561.41	167197.94	187959.28	30249.708	47047.015	242603.03	181877.09	221972.87	892345.6	73993.186	**2482807.1**	255205.83	**2738013**
529344.09	25150.002	76852.952	25286.639	26583.016	186857.08	111125.52	92437.274	540656.48	175661.29	**1789954.4**	168491.03	**1958445.4**
893493.07	1786782.5	6257952.7	166723.86	356854.53	1290761.3	1831644.7	1451201	1444029.4	297629.81	**15777073**	1481931.8	**17259005**
840126.88	41468.574	1822575.	121256.79	111426.62	651015.	330573.53	517182.69	559649.98	198065.29	**5193341.4**	621834.42	**5815175.8**

	High Scenario		Medium Scenario		Low Scenario

GVA by Economic Sector												
Sector1	**Sector 2**	**Sector 3**	**Sector 4**	**Sector 5**	**Sector 6**	**Sector 7**	**Sector 8**	**Sector 9**	**Sector 10**	**Total GVA**	**Taxes less Subsidies**	**GDP**
2050												
11159143	7786.46576	1170197.63	200392.388	146187.529	468651.833	298307.545	278714.566	1598741.86	238099.129	5174711.6	644691.531	5819403.14
3062085	498969.64	16441122	2842191.6	5383324.8	15358165	9085486.4	16476737	14537461	3832921.2	**95615520**	10045481	**105661001**
3191698	90149.25	6337731.2	1334463.4	1916556.1	7660151.1	6301483.2	9996303	9428436	2545293.9	**46756096**	4484341.8	**51240438**
2579518.1	88370.821	2150558.6	410872.69	816013.58	1655789.4	886945.1	2776950.7	7006961.6	587770.76	**19571931**	2607222.6	**22179154**
1245751	377763.87	25752882	2050315.6	3079681.5	7778902.8	7355764.1	13123755	14230332	2365575.5	**78694490**	8084146.2	**86778636**
3078908	515853.54	1534376	221915.35	395061.76	842648.35	798425.59	1050517.6	2801586.5	357555.09	**9763690.7**	1207699	**10971390**
4069562	829015.77	1294061.6	232018.57	755787.96	2419805.9	1685314.1	3457748.4	12835087	1701128.1	**28288876**	3240434	**31529310**
55646565	6733348.8	24948818	737087.77	3278044.7	6822076.5	9600980.3	7386515.8	7422136.8	1846256.2	**72844827**	6534301.2	**79379128**
1.37E+09	3746288.5	35933251	2119951.9	4267891.4	11380235	8837302.5	12250080	13272158	2965058.3	**102673446**	12417281	**115090727**
	17840536	169791748	14543669	30676312	77311782	75297070	108822180	122062833	25105043	**689124033**	72853729	**761977762**
10455009.5	1491036.02	301215806	34574244.4	72681012.9	230791883	230457382	323468531	323468531	155926488	56957394.9	1418018788	134236819
6587586.1	390241.62	12561316	2452822.5	4503358.4	12686014	7187983.3	12247200	10339211	2832282.7	**71788016**	7393164	**79181180**
12400518	371690.36	21229773	4335160.3	7435220.7	20331981	20684542	37997923	34854681	8898037.4	**168539525**	15938318	**184477843**
3554179.7	204043.68	7538825.8	1370706.2	2003673.8	5782010.8	7011498.7	8297557	10284166	1612598.1	**47659260**	5515499.8	**53174760**
1889233.5	101711	912771.82	314604.17	562898.39	1272161.3	757965.67	2002260.6	5818564.7	615630.94	**14247802**	1858209.7	**16106012**
2011168.9	827343.35	25997526	1867283.5	2944012.9	7398275.1	7314361.1	12698343	13202329	2213198.7	**76473841**	7619856.3	**84093698**
3021322.4	821799.35	1834440	313032.76	901010.99	2360090.3	1989088.2	3531295.9	11006584	824350.3	**26603014**	3132210.4	**29735224**
3583447.5	132041.98	623056.91	259005.4	471433.79	1725382.2	1068655.1	1292518.3	6670161.1	1883537.8	**17709240**	1980391.6	**19689632**
6169880.3	14593681	77032373	1978237	8365243.1	15779145	23941659	21630711	18446080	3315862.4	**191252873**	19297457	**210550330**
5728383.	386717.62	20332729	1454730.1	2672426.	8212854.	4575554.6	8058882.6	7239489.6	2206624.6	**60868393**	8277136.2	**69145529**
1486588.03	212825.654	43325160.1	4972889.31	10525455.8	33226993	33240018.1	46807575.2	22506301.3	8183557.87	204487364	19339651.1	223827015
936682.71	55106.919	1803153.2	352794.83	652163.44	1826986.5	1037844.2	1771367.5	1492866.7	406938.38	**10335904**	1065141.5	**11401046**
1763218	52908.702	3050366.1	623535.6	1076747.3	2926153.2	2984646.1	5496148.9	5028811.2	1278457.4	**24280993**	2296251.6	**26577244**
505365.49	28787.083	1081466	197151.68	290166.3	832319.52	1011015.6	1200182.8	1485420.9	231695.82	**6863571.3**	794624.33	**7658195.6**
268628.34	14301.551	131084.85	45250.207	81517.33	183059.46	109277.25	289151.91	840228.21	88452.982	**2050952.1**	267714.38	**2318666.5**
285966.22	116674.24	3740530.9	268575.48	426343.5	1064923.8	1054702.5	1836687.7	1905894.3	317989.26	**11018288**	1097801.4	**12116089**
429599.01	115507.99	263645.13	45024.188	130481.83	339885.19	286725.18	510294.92	1588095.7	118441.48	**3827700.6**	451261.11	**4278961.7**
509527.05	18700.561	89393.662	37253.314	68271.69	248534.51	154058.65	187036.84	963519.33	270624.04	**2546919.7**	285317.28	**2832236.9**
877289.52	2082587.4	11074521	284534.16	1211430.5	2272160.5	3450519.5	3130438.8	2664047.2	476418.42	**27523947**	2780206.6	**30304154**
814513.52	55366.022	2917932.	209237.01	387013	1182566.	660166.6	1165881.2	1046029.9	317044.7	**8755750.8**	1192496.4	

High Scenario | Medium Scenario | Low Scenario

GDP growth for the middle scenario between 2005 and 2050 is projected to be at about 5.15%. Between 2005 and 2025, GDP is projected to rise at an annual average of 4.5% before peaking to about 5.67% between 2025 and 2050, and at constant 2000 prices. This is also expected to result in a total GDP of about R4.39 billion in 2050 (constant 2000 prices).

For the high scenario, there is an expected average growth in GDP of about 4.61% for the period 2005-2050. Between 2005 and 2025, GDP is expected to increase at an average annual rate of about 5.93%, before slightly dropping to an average of 3.57% per annum thereafter. This is expected to result in a GDP of about R4.03 billion in 2050 (constant 2000 prices).

For the low scenario, there is expected a much lower growth in GDP of about -0.08%, during the period 2005-2050. This growth is also projected to progress at an annual average of about -0.36% between 2005 and 2025, before slightly increasing to an average of 0.15% there after. This is expected to result in a GDP of just over R0.63 billion in 2050 (constant 2000 prices).

There is an exponential increase in the difference between the growths in GDP across the different scenarios over the 45 year period. For instance, GDP growths in the middle and high scenarios are projected to double that of the low scenario between 2005 and 2025. The difference is projected to exponentially increase to over 6 times thereafter. This will have huge implications for transport.

The GDPs for different scenarios during the periods 2005, 2025 and 2050 are provided in **Figure 2**.

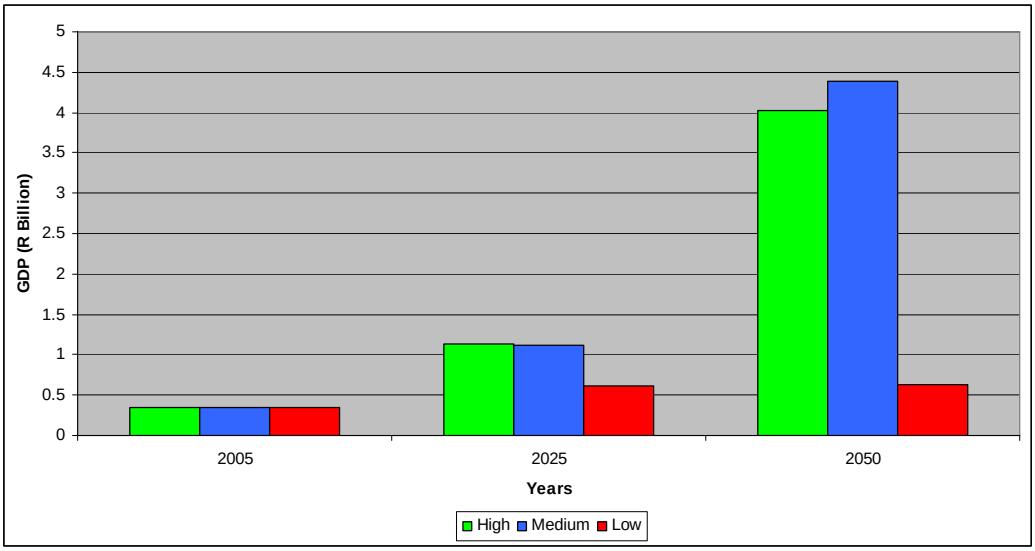


Figure 2: GDP Scenarios for KZN (R Billion, Constant 2000 Prices)

The aggregate GVA and GDP summaries for the three scenarios are summarised in **Table 3**.

Table 3: Total GVA and GDP (2005, 2025, 2050) (Constant 2000 Prices): Scenario Comparisons

SCENARIOS	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Sector 6	Sector 7	Sector 8	Sector 9	Sector 10	TOTAL GVA	Taxes less Subsidies	TOTAL GDP
					2005								
HIGH SCENARIO	8184022.891	2559330.58	39994597.48	4175524.685	4496229.792	25988285.1	23636004	29197850.4	21868780.34	7323771.471	167424397	15942314.88	350791109
MEDIUM SCENARIO	8069085.958	2559086.012	39969249.43	4174996.33	4486729.32	25949552.9	23623931	29185291.1	21794656.76	7309377.319	167121955.7	15906920.97	350150832
LOW SCENARIO	8069085.958	2559086.012	39969249.43	4174996.33	4486729.32	25949552.9	23623931	29185291.1	21794656.76	7309377.319	167121955.7	15906920.97	350150832
					2025								
HIGH SCENARIO	17740358.25	5950326.717	123305025.3	12740490.88	23803721.69	102473532	75817611	101534513	67485820.15	21630937.95	528678614.7	52074164.12	1133235115
MEDIUM SCENARIO	17489925.95	5949882.622	123234136.5	12738820.54	23751482.11	78547233.5	75777149	101486148	67252138.1	21588424.47	527815341	51964701.11	1107595383
LOW SCENARIO	9617270.159	3271690.73	67763350.6	7004756.854	13060342.32	43191147.1	41667948	55804678.8	36980258.4	11870931.36	290232374	28574081.49	609038829
					2050								
HIGH SCENARIO	1453213836	35173000.92	320224422.6	25880792.29	54823562.91	136822966	140405796	199532671	223685178.4	45439024.73	1262450179	132968037.8	4030619468
MEDIUM SCENARIO	55471682.94	19325822.66	469298317.1	48929320.64	102558886.3	306397985	305043099	431261722	274059078.4	81433004.14	2093778919	205311092.7	4392868930
LOW SCENARIO	7887466.781	2753551.788	67480080.84	7037611.365	14852283.77	44111964.4	43996817	62400055.1	39560412.16	11700178.76	301780421.4	29579402.54	633140245

The contributions of different economic sectors to the Gross Value Added (GVA) are provided in **Figure 3**.

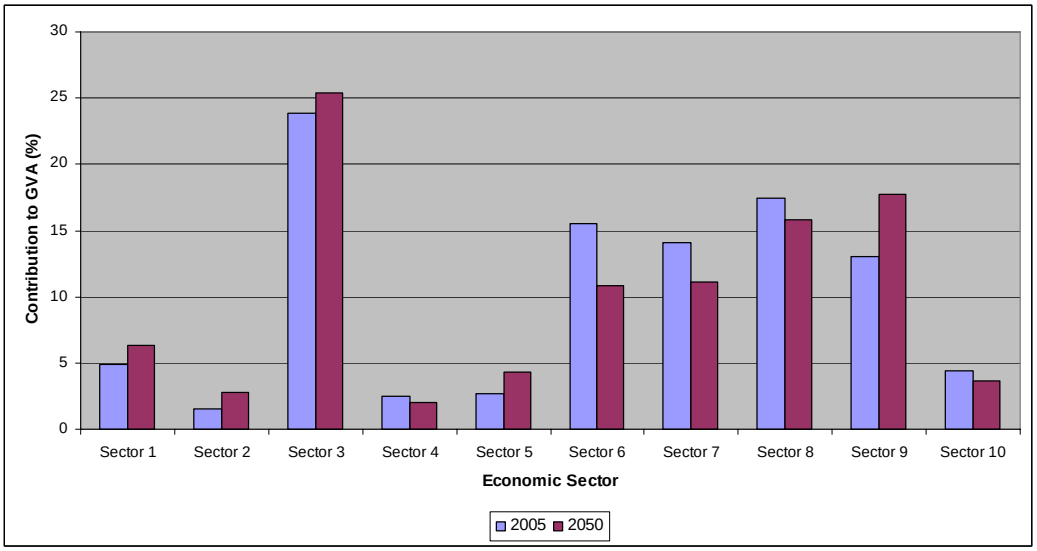


Figure 3: Contribution of Economic Sectors to GVA (High Scenario) for KZN

Key for Figure 3

Sector 1: Agriculture, Forestry and fishing.
Sector 2: Mining and Quarrying
Sector 3: manufacturing
Sector 4: Electricity, Gas and Water
Sector 5: Construction
Sector 6: Wholesale & Retail Trade, Hotels & Restaurants
Sector 7: Transport and Communication
Sector 8: Finance, Real Estate & Business Services
Sector 9: Community, Social & Personal Services
Sector 10: Other Services

The sectors that currently contributes the most to the provinces GGP are Manufacturing, Finance & Business, Trande and Transport & Communications
The sectors showing the highest growth up to 2050 are Community & Social Services, Construction, Agriculture and Mining. Those that show a decline are Trade, Transport and Financial Services.

2.5 IMPLICATIONS FOR TRANSPORT PLANNING

Given the three scenarios and economic projections over the analysis period, for both the country and KwaZulu-Natal (KZN) Province, it is critical to consider the implications thereof for transport planning. It is notable that the widening gap over time in GDP between the different economic growth scenarios will have a major impact on transport. This section identifies and discusses the main implications that can be expected.

- **Higher Economic Growth Necessitates Rapid Infrastructure Development**
  Traditionally, it has been a puzzle as to whether economic growth leads to infrastructure development or the reverse. It has now generally been accepted that the equation is two way. While economic growth results in higher disposable incomes and transformations in consumption, production and reproduction patterns, it is also equally true that investments in infrastructure also stimulates economic growth. China is currently famous for its infrastructure-led development which has seen the economy experiencing the highest growth rates worldwide. Thus for South Africa in general and KZN in particular, it is critical to come up with sustainable transport infrastructure and services plans to address the demands that come with the projected economic growth analysed above. Transport supply should be boosted ahead of demand so that economic growth is not constrained. However, a large over-supply will be a waste of resources, whereas a large under-supply will be a huge impediment to economic development. It is therefore important that economic growth and its impact on transport demand be monitored regularly, and that supply strategies are made flexible to cater for changes in demand.

- **Higher Economic Growth Results in Transformations in the Transport Mix**
  The World Bank (2007) noted that sustained high economic growth is dependent more on a stronger reliance on road transport than rail. This situation is already being experienced in South Africa where the demand for motor vehicle and road-based transport services has continued to grow. Nonetheless the price tag is already being felt in terms of traffic congestion along major roads during peak hours. There is need therefore to revisit the approaches currently applied in urban transport management.

  This is critical given the projected changes in the sectoral distribution of GDP over time. The above projections indicate a proportionate decline in those sectors generating freight transport (agriculture, manufacturing, commerce), relative to those generating passenger transport, which are expected to experience a proportionate increase (Finance and Business services, Community and Social services). The share of passenger transport to freight transport would therefore increase.

  It is hence critical to come up with measures that make public mass transit systems efficient to attract commuters from private to public transportation. This is against the common knowledge that the answer is not always in building more roads but in efficiently managing the existing facilities. KZN should start moving in that direction.

- **Higher Export Levels Demands Better Transport Infrastructure**
  Given the valuable role played by exports in creating favourable balance of trade and higher economic growth streams, it is critical that goods produced in the provincial inland areas be expeditiously moved to airports and harbours to be exported. In KZN, primary industries are projected to continue contributing

less to the Regional Gross Domestic Product (GDPR), as compared to secondary and tertiary. Thus the role played by roads is more critical in expeditiously moving manufactured goods and transporting services for local use as well as exports.

- **Higher Economic Growth Boosts Disposable Incomes and Demand for Transport Infrastructure and Services**
  As explained in foregoing discussions, economic growth leads to increases in average household disposable incomes, which in turn results in major transformations in consumption, production and reproduction patterns. Generally as income increases, the demand for vehicles, travel and transport infrastructure and services also increases. In metros such as Tshwane, Johannesburg, Durban and Cape Town, transportation problems are already being felt in terms of traffic jams during peak hours. South Africa in general and KZN in particular, needs to come up with transport management plans that are based on economic growth trend extrapolations above. The expected increase in demand for tertiary and service sector products at the expense of primary products requires significant investments in the public transport infrastructure and services.

- **Infrastructure Development Gives Rise to Economic Competitive Advantages and Better Standards of Living**
  The concept of economic competitive advantage is based on two concepts namely cost and differentiation advantages (Porter: 2007). Investor decisions to locate in an area are strongly influenced by both direct and generalized costs. A well developed transportation systems reduces both of these costs, making the province more attractive to existing and potential investors. It also provides for differentiation advantages by opening up opportunities for investors to participate in e-commerce where different and large volumes of goods and services are being traded across the globe.

2.6 CONCLUSIONS AND RECOMMENDATIONS FOR PHASE 3

It is concluded that various factors are constraining economic development in the province. These are high poverty and unemployment levels, aggrevated by the current financial and economic decline, dispersed and inaccessible settlements far from economioc centers, and the uncbalanced concentration of economic opportunities in a few major centers. However, the KZN has many economic opportunities, such as a supportive policy environment to develop the economy, high tourist potential, international trade infrastructure and opportunities and abundant natural resources.

During Phase 3 of the project, the economic scenarios will be translated into freight and passenger transport demand for the various future design years. This demand will be loaded on to the existing transport infrastructure to identify the location and size of future bottlenecks. Based on this information, forward plans will be developed

in order to ensure that infrastructure is provided ahead of demand, in the most cost efficient way, which will ensure maximum economic development. Alternative supply strategies will be evaluated in terms of their impact on economic growth, employment and social benefits, amongst others. These economic criteria will form part of the goal achievement matrix that will be developed, in terms of which supply plans and strategies will be evaluated.

3. DEMOGRAPHIC ANALYSIS

3.1 INTRODUCTION

This chapter gives a brief description of the methodology followed by Global Insight Southern Africa and the Bureau of Market Research (BMR) to develop three socio-economic scenarios for the country. It further provides the socio-economic projections per Province and then per District Municipality, for the base year (2005), and design years 2025 and 2050. A more detailed breakdown of the projections is provided in the Annexures and in the database.

3.2 SUMMARY OF PROBLEMS AND ISSUES FOR ANALYSIS

- The Province is characterised by an extensive mosaic of scattered rural settlements and villages. Vast numbers of these settlements and villages occur within the Zululand, Umkhanyakude, Umzinyathi and Ugu District Municipalities. The presence of villages, informal settlements, and formal urban areas increase towards the coastline with the most significant urban conurbation being located within the eThekwini Metropolitan Municipality (33% of the population). The average population density in the eThekwini Metropolitan area is 14,2 persons per hectare. The rest of the province is sparsely populated with less than 2 persons per hectare.
- Only one third (3,2 million) of the population is economically active which is lower than the average for South Africa, namely 37%.
- According to Census 2001, nearly half (1,5 million) of the economically active population was unemployed. The eThekwini Metropolitan Municipality registered the lowest unemployment rate (43%), whereas the highest was found in the Umkhanyakude District Municipality (63%). The largest number of unemployed people (591 000) was however registered in the eThekwini Metropolitan area.
- The education levels in KwaZulu-Natal are slightly lower compared to the national average. A major concern is the relatively high percentage (18%) (1,5 million) of people older than 5 years who received no schooling. In fact, the Umzinyathi and Umkhanyakude Districts reported a “no schooling” percentage of 32% each.
- KZN is the second largest province in terms of GDPR in South Africa. Most of the economic activity in KZN occurs within the eThekwini Metropolitan Municipality (e.g. 58% of all formal workers are employed in eThekwini).

The following issues were noted in phase 1:

- A large part of the Province is gripped by persistent poverty, high levels of unemployment and a high HIV/AIDS infection rate. Consequently, the districts of Umkhanyakude, Zululand and Umzinyathi are earmarked as Rural Development Nodes by the Government’s ISRDS programme.
- Economic concentration generally increases to the coast with eThekwini, Pietermaritzburg and Richards Bay constituting the major job opportunity

centres. In many instances the accessibility from rural areas to the centres of employment are poor, hampering poverty alleviation programmes.

- The dispersed settlement pattern of the Province hinders the effective and sustainable provision of public transport in the rural areas.

3.3 BACKGROUND

Global Insight Southern Africa (PTY) Ltd. and the Bureau of Market Research (BMR) at the University of South Africa (UNISA) were appointed by the Department of Transport to develop future demographic scenarios for South Africa. This was necessary in order to have a consistent set of projections that could serve as input to the transportation demand model.

Firstly projections were developed at a national level, followed by provincial and municipal projections.

The following section gives an overview of the methodology, and assumptions used for the provincial and municipal projections. (For further detail the reader is referred to the report compiled by Global Insight: “Economic Scenario Projections for the National Transport Master Plan for South Africa, 2005-2050, February 2008”).

3.3.1 Methodology

The following modelling techniques were used to develop the population projections:

The local municipal demographic projections were derived in three stages, with each stage using a different technique and model. The first stage entailed the projection of the national population, followed by breaking down the national projections to provincial level. Finally the population figure for each province was divided into the local and metropolitan municipalities that make up the province.

As is the case with the national model, the provincial demographic model makes use of the cohort component model. It uses the results obtained from the national population model as the benchmark for the age-gender structures, specifically for the census years where detailed provincial data is available. The provincial model follows a different approach compared to the national model where a base year is used as a starting point. The nine provinces as they are known today were only created in 1994, and since then the boundaries have changed significantly.

In order to overcome this problem, the 1991, 1996 and 2001 population census data was re-worked to fit the Dec-2005 provincial boundaries. The migration data derived from these three population censuses were entered as the migration assumptions into the model, where after an iterative process of calibration followed. The provincial model was projected forward, starting with the 1991 distribution as the "virtual base year", and iteratively refined by adjusting this distribution to fit all three population census distributions as closely as possible. A function was developed to measure the

goodness of fit, by tracking the age groups over time, e.g. the 0-4 aged in 1991 compared to the 5-9 in 1996 and 10-14 in 2001.

This provided a fairly stable and good fit for the three population census years: 1991, 1996 and 2001. The next step was to calibrate the **Total Fertility Rates (TFR)** per province, by looking at the number of babies born over this period. Even within the same population group, some provinces have recorded higher fertility rates than other provinces, e.g. the Africans in the Eastern Cape have more children compared to those having migrated to the Western Cape. This variable was benchmarked to fit the number of babies born in the period 1991 to 2001. It is worthy to note that the 0-4 age category is often underreported during population censuses, and therefore this figure was adjusted slightly upwards to correspond with the national TFR rates. The **Birth Ratio** which defines the number of male vs. female born was also calibrated to fit the age and gender structures as measured in the population census.

The final step was to break down the provincial models to local municipality level. The 1996 and 2001 Census distributions were used, with interpolated data for the years in between. The changes in the “share-of-provincial-total” between 1996 and 2001 were annualised, and applied from 2002 onwards, making sure the share never reached zero or turned negative, by reducing the change in share over time, reaching its peak in 2020 after which the shares were constant.

In order to compensate for known projects in the pipeline that will affect the local municipalities in the years to come, inputs from the various IDP and LED reports per municipality were used, e.g. ore and coal reserves, as well as bigger projects in the pipeline that have been published in the public domain.

3.3.1.1 Inter Provincial Migration

The key difference between a provincial model and a national model is the difference in migration. In the national context, this refers to international migration, i.e. people moving between different countries. For the provincial models, an extra dimension is added: people moving to and from other provinces. South Africa has witnessed high levels of inter-provincial migration in the past 10-15 years, with particularly high migration towards the provinces of Gauteng and the Western Cape. Refer to the below table.

Table 4: The Importance of the Inter-Provincial Migration

			Average Annual - 2001-2005			
Province	**2001**	**2005**	**Births**	**Deaths**	**Migration**	**Total**
Eastern Cape	6,333,784	6,374,945	162,296	-87,143	-59,231	15,922
Free State	2,829,872	2,857,286	60,485	-41,004	-10,191	9,291
Gauteng	9,056,417	9,699,849	173,806	-120,233	106,702	160,275
KwaZulu-Natal	9,614,052	9,910,700	257,733	-158,208	-18,263	81,261
Limpopo	4,985,736	5,186,876	152,076	-63,898	-37,011	51,167
Mpumalanga	3,487,707	3,616,467	94,688	-54,145	-6,709	33,835
Northern Cape	1,017,806	1,054,636	23,902	-12,627	-1,862	9,413
North West	3,372,563	3,453,925	74,335	-47,487	-4,549	22,299
Western Cape	4,552,715	4,911,076	95,224	-50,124	42,012	87,112
South Africa	**45,250,652**	**47,065,760**	**1,094,546**	**-634,869**	**10,899**	**470,577**

Source: Global Insight provincial demographic model

Various future migration outcomes are possible. On the one extreme there might be a low inter-provincial migration stream, whilst on the other extreme a high inter-provincial migration stream (associated with a high level of urbanisation) may occur as vast numbers of people cross provincial borders in their search for a better future.

3.3.1.2 HIV Prevalence rates

The stage of the HIV/AIDS virus differs from province to province, e.g. KwaZulu-Natal is at a much more advanced stage of the disease and on a higher level than the Western Cape. The Adult HIV prevalence rates from the HIV/AIDS model constructed by the Actuarial Society of Southern Africa (ASSA-2003) were used on a provincial level. The provincial ASSA-2003 data was slightly adjusted to reflect the national HIV Prevalence rate per population group as used in the national demographic models. In turn, the ASSA model uses the prevalence rates from various primary data sets – in particular the HIV/AIDS surveys conducted by the Department of Health.

3.3.1.3 Description of Scenarios

Similar to the national macro-economic environment, three population scenarios that describe the risks and possible outcomes were developed. HIV/AIDS for example, which was identified as an economic risk, impacts on the population. Similarly, higher international immigration was also identified as being a risk.

The biggest difference in the three population scenarios is the concept of centralisation, i.e. urbanisation and metropolisation – people migrating to the cities, and specifically the metropolitan areas. The concept of high, middle and low may be confusing when comparing urban areas to rural areas – the scenarios will therefore be labelled **RED**, **GREEN** and **BLUE**.

The low or "relative pessimistic" economic scenario goes together with the **RED** population scenario, the baseline or middle economic scenario matches the **BLUE** population scenario, and the high or "relative optimistic" scenario goes hand in hand with the **GREEN** population scenario.

The assumptions for the different scenarios are listed below:

Low / RED

Decentralised population growth by assuming lower inter-provincial migration than the migration measured between 1991 and 2001.
High HIV Aids, which results in lower life expectancy.
Lower outflow of people from rural provinces.

Middle / Baseline / BLUE

- Inter-provincial migration rates at the same level as we have measured between 1991 and 2001.
- HIV/AIDS assumptions of greatest likelihood.

High: GREEN

- Centralised population growth by assuming higher inter-provincial migration and resulting urbanisation. For the period 2002-2007, inter-provincial migration streams, of the Community Survey 2007 were assumed, after which the figures decline to levels slightly higher than the Census 2001 inter-provincial migration streams.
- Low HIV/AIDS; Higher anti-retroviral treatment roll-out to patients.
- Higher international in-migration.
- Higher outflow of people from "rural" provinces, those without a metropolitan area.

3.4 POPULATION AND SOCIO-ECONOMIC PROJECTIONS

3.4.1 Provincial Projections per Scenario (all 3 scenarios)

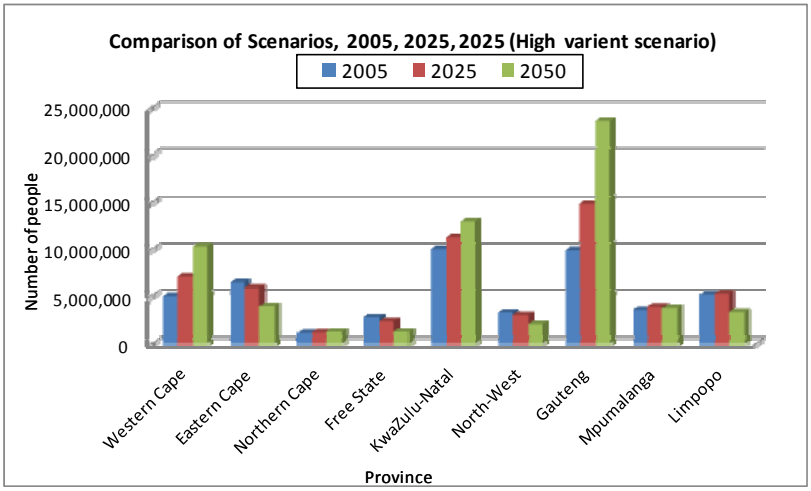
3.4.1.1 Population

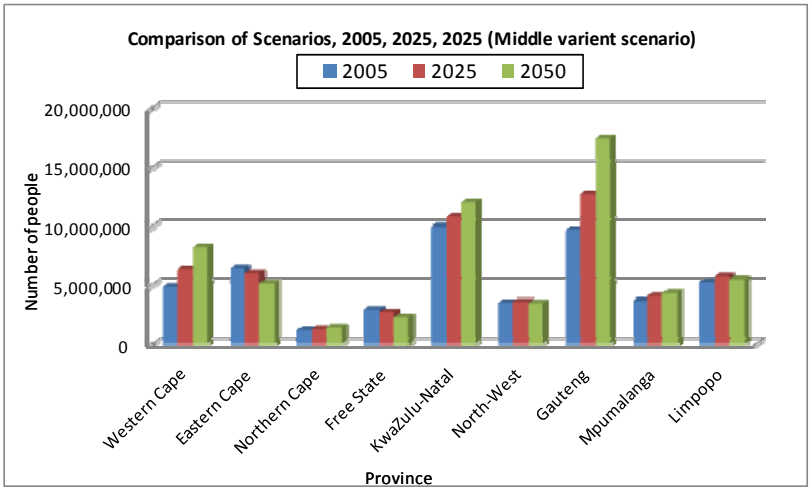
Refer to **Table 5** and **Figure 4.**

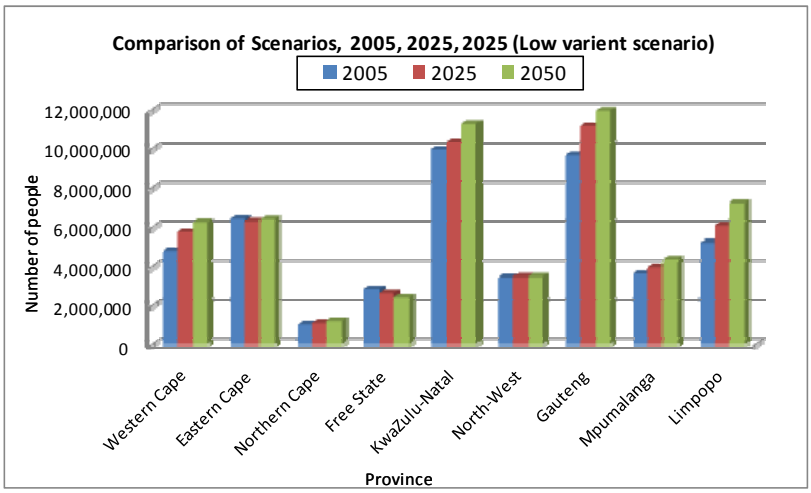
Table 5: Comparison of Scenario per Province: Population, 2005, 2025, 2050

SCENARIO	PROVINCE	2005	%	2025	%	2050	%
HIGH (Green)							
	Western Cape	4,964,265	10%	7,099,898	13%	10,348,223	17%
	Eastern Cape	6,453,120	14%	5,866,387	11%	4,048,021	6%
	Northern Cape	1,049,562	2%	1,122,788	2%	1,203,562	2%
	Free State	2,812,379	6%	2,358,768	4%	1,194,059	2%
	KwaZulu-Natal	10,045,752	21%	11,285,176	21%	12,853,439	21%
	North-West	3,346,041	7%	3,014,126	6%	2,017,358	3%
	Gauteng	9,914,438	21%	14,825,501	27%	23,707,047	38%
	Mpumalanga	3,612,725	8%	3,967,317	7%	3,837,091	6%
	Limpopo	5,163,398	11%	5,232,259	10%	3,367,664	5%
	National Total	47,361,680	100%	54,772,220	100%	62,576,465	100%
MIDDLE (Blue)	MIDDLE	2005	%	2025	%	2050	%
	Western Cape	4,838,347	10%	6,312,859	12%	8,175,696	14%
	Eastern Cape	6,411,178	14%	5,975,232	11%	5,119,691	9%
	Northern Cape	1,056,942	2%	1,150,322	2%	1,269,666	2%
	Free State	2,867,783	6%	2,653,604	5%	2,189,149	4%
	KwaZulu-Natal	9,969,849	21%	10,742,108	20%	12,000,650	20%
	North-West	3,469,549	7%	3,556,093	7%	3,437,058	6%
	Gauteng	9,720,475	21%	12,728,253	24%	17,413,440	29%
	Mpumalanga	3,638,951	8%	4,021,968	8%	4,275,017	7%
	Limpopo	5,225,672	11%	5,718,232	11%	5,450,774	9%
	National Total	47,198,746	100%	52,858,672	100%	59,331,139	100%
LOW (Red)	LOW	2005	%	2025	%	2050	%
	Western Cape	4,816,019	10%	5,779,209	11%	6,270,494	11%
	Eastern Cape	6,434,846	14%	6,313,195	12%	6,403,839	12%
	Northern Cape	1,057,037	2%	1,138,234	2%	1,246,765	2%
	Free State	2,867,866	6%	2,663,228	5%	2,440,142	4%
	KwaZulu-Natal	9,954,613	21%	10,372,966	20%	11,254,962	21%
	North-West	3,467,043	7%	3,497,476	7%	3,487,639	6%
	Gauteng	9,655,346	20%	11,134,283	22%	11,947,546	22%
	Mpumalanga	3,634,412	8%	3,957,159	8%	4,375,328	8%
	Limpopo	5,240,895	11%	6,091,320	12%	7,216,348	13%
	National Total	47,128,076	100%	50,947,071	100%	54,643,063	100%

Source: Global Insight SA, 2008







(Source: Global Insight SA, 2008)

Figure 4: KwaZulu-Natal: Comparison of Scenarios per Province: Population 2005, 2025, 2050

indicates the population projection per Scenario (High, Middle, Low) for the 9 provinces in South Africa. The relative share of KwaZulu-Natal's population is expected to remain at approximately 21% of the national total, irrespective of the scenario.

Table 6 and **Figure 5** indicates the results of the High (Green), Middle (Blue) and Low (Red) Scenarios for KwaZulu-Natal Province by Income Group.

Table 6: Comparison of Scenarios: Population by Income Group, 2005, 2025, 2050

	2005				2025				2050			
	POPULATION BY INCOME GROUP				POPULATION BY INCOME GROUP				POPULATION BY INCOME GROUP			
SCENARIO	HIGH	MEDIUM	LOW	TOTAL	HIGH	MEDIUM	LOW	TOTAL	HIGH	MEDIUM	LOW	TOTAL
HIGH (Green)												
KWAZULU NATAL	1,416,726	1,799,216	6,828,418	10,044,361	1,782,252	2,145,832	7,357,051	11,285,136	1,981,265	2,521,544	8,350,810	12,853,620
MIDDLE (Blue)												
KWAZULU NATAL	1,405,601	1,785,618	6,778,630	9,969,849	1,616,921	1,979,220	7,145,928	10,742,069	1,727,793	2,135,069	8,137,748	12,000,610
LOW (Red)												
KWAZULU NATAL	1,403,923	1,783,109	6,767,987	9,955,019	1,439,129	1,832,195	7,101,617	10,372,942	1,457,063	1,882,671	7,915,168	11,254,902
PERCENTAGES												
HIGH (Green)												
KWAZULU NATAL	14%	18%	68%	100%	16%	19%	65%	100%	15%	20%	65%	100%
MIDDLE (Blue)												
KWAZULU NATAL	14%	18%	68%	100%	15%	18%	67%	100%	14%	18%	68%	100%
LOW (Red)												
KWAZULU NATAL	14%	18%	68%	100%	14%	18%	68%	100%	13%	17%	70%	100%
GROWTH PER ANNUM	2005 - 2025				2025 - 2050							
HIGH (Green)												
KWAZULU NATAL	1.2%	0.9%	0.4%	0.6%	0.4%	0.6%	0.5%	0.5%	0.7%	0.8%	0.4%	0.5%
MIDDLE (Blue)												
KWAZULU NATAL	0.7%	0.5%	0.3%	0.4%	0.3%	0.3%	0.5%	0.4%	0.5%	0.4%	0.4%	0.4%
LOW (Red)												
KWAZULU NATAL	0.1%	0.1%	0.2%	0.2%	0.0%	0.1%	0.4%	0.3%	0.1%	0.1%	0.3%	0.3%

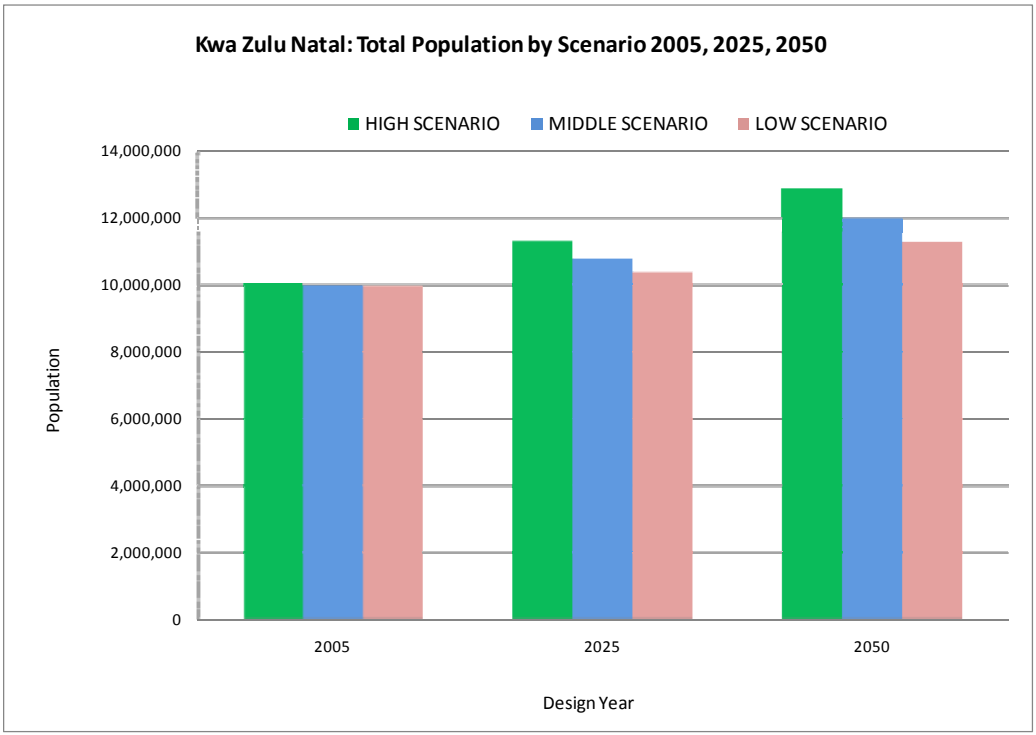
Source: Global Insight SA, 2008

Note:

Monthly Income per household: High: more than R6,000 per month

Medium: between R3,000 and R6,000 per month

Low: less than R3,000 per month, taken at constant 2000 prices



(Source: Global Insight SA, 2008)

Figure 5: KwaZulu-Natal Population: Comparison of Scenarios: 2005, 2025, 2050

According to the High Scenario the population is expected to increase by 2,8 million people in the next 45 years, from 10 million in 2005 to 12,8 million in 2050 (0,55% growth p.a.). The population in the Middle and Low Scenarios will increase by 2,0 million (0,4% growth p.a.) and 1,3 million (0,3% growth p.a.) respectively. The Middle Scenario is considered the most likely scenario to actualise in future, because it is based on the inter-provincial migration rates measured between 1991 and 2001, as well as HIV/AIDS assumptions of greatest likelihood. As a result, the Middle Scenario will serve as input to the transportation model.

It is expected that the share of low income people to total people will stay high in future – between 65% - 70% of total population. These people are totally dependent on public transport as a means of moving from home to work or shop etc.

3.4.1.2 Employment Status (by Place of Residence)

Table 7 and **Figure 6** reflect the employment status of the population for the three scenarios in KwaZulu-Natal.

“Economically Active People” refers to all people between the ages of 15-65 years who provide their labour for production of goods and services, and includes people in the formal- and informal sectors, as well as the unemployed.

Table 7: Comparison of Scenarios: Employment Status, 2005, 2025, 2050

	2005			2025			2050		
	ECONOMICALLY ACTIVE			ECONOMICALLY ACTIVE			ECONOMICALLY ACTIVE		
SCENARIO	EMPLOYED	UNEM-PLOYED	TOTAL	EMPLOYED	UNEM-PLOYED	TOTAL	EMPLOYED	UNEM-PLOYED	TOTAL
HIGH (Green)									
KWAZULU NATAL	1,817,876	1,450,172	3,268,048	2,883,564	811,128	3,694,692	3,665,052	383,927	4,048,979
MIDDLE (Blue)									
KWAZULU NATAL	1,817,883	1,450,166	3,268,048	2,663,760	930,797	3,594,557	3,490,443	379,697	3,870,140
LOW (Red)									
KWAZULU NATAL	1,817,813	1,450,235	3,268,048	2,275,173	1,297,101	3,572,274	2,834,938	917,244	3,752,182
PERCENTAGES	EMPLOYED	UNEM-PLOYED	TOTAL	EMPLOYED	UNEM-PLOYED	TOTAL	EMPLOYED	UNEM-PLOYED	TOTAL
HIGH (Green)									
KWAZULU NATAL	56%	44%	100%	78%	22%	100%	91%	9%	100%
MIDDLE (Blue)									
KWAZULU NATAL	56%	44%	100%	74%	26%	100%	90%	10%	100%
LOW (Red)									
KWAZULU NATAL	56%	44%	100%	64%	36%	100%	76%	24%	100%

Source: Global Insight SA, 2008

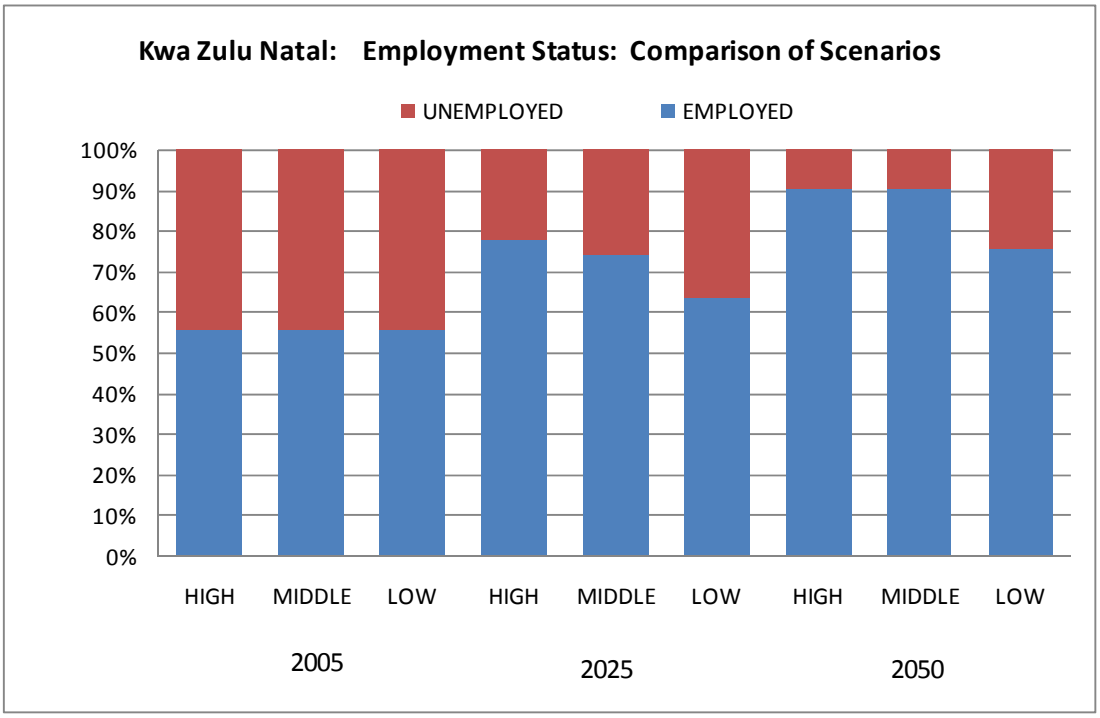


Figure 6: KwaZulu-Natal: Employment Status by Place of Residence: Comparison of Scenarios, 2005, 2025, 2050

The total economically active population (High Scenario) could increase to 4,0 million by 2050 (32% of the population), compared with 3,9 million in the Middle Scenario (32% of the population) and 3,8 million in the Low Scenario (33% of the population). Notably, unemployment could be halved by 2025 in the High and Middle Scenarios, whereas in the Low Scenario unemployment is expected to decrease from 44% in 2005 to 36% by 2025 and 24% by 2050 (**Figure 6**).

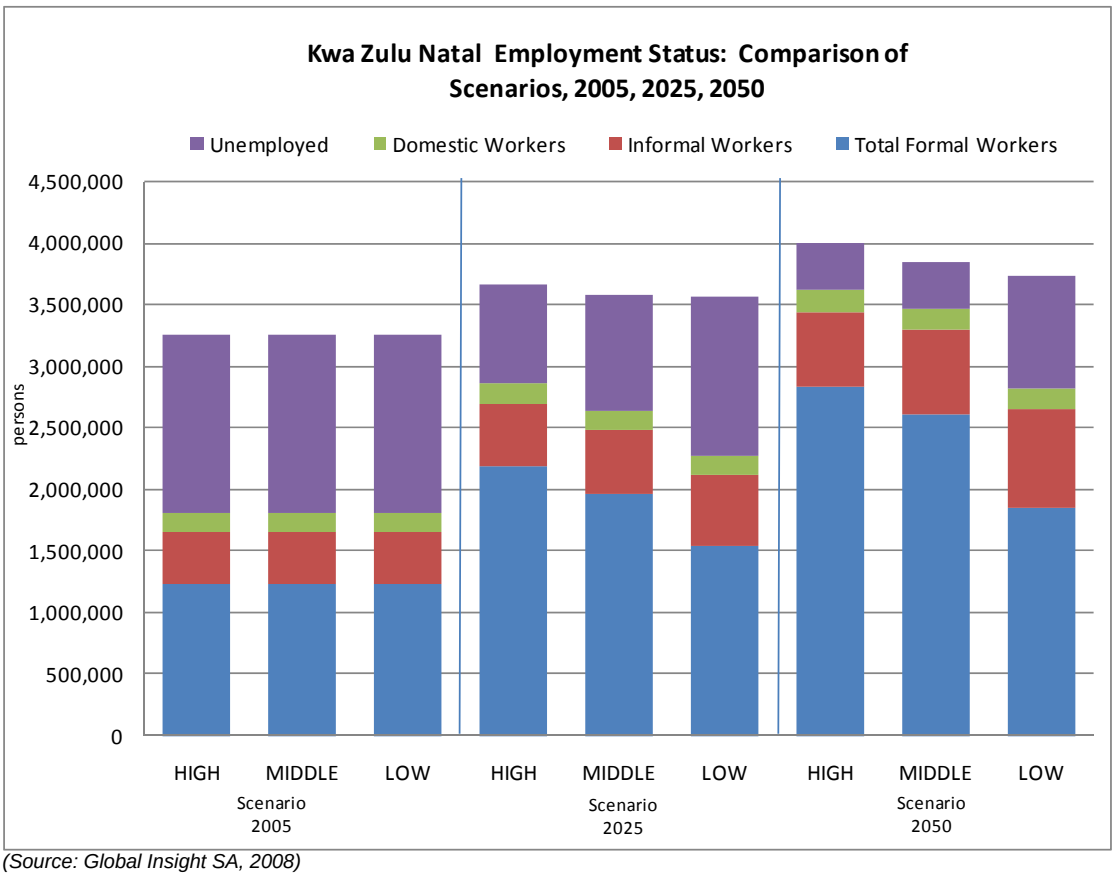
3.4.1.3 Employment (by Place of Work)

Table 8 and **Figure 7** show a comparison between the three scenarios regarding the employment by workplace.

Table 8: Comparison of Scenarios: Employment, 2005, 2025, 2050

	2005					2025					2050				
LOCAL/DISTRICT MUNICIPALITY	Total Formal	Informal	Domestic	Unemployed	TOTAL JOBS	Total Formal	Informal	Domestic	Unemployed	TOTAL JOBS	Total Formal	Informal	Domestic	Unemployed	TOTAL JOBS
HIGH (Green)															
KWAZULU NATAL	1,228,802	431,973	148,018	1,450,172	3,258,965	2,187,336	501,600	165,205	811,128	3,665,269	2,825,678	604,622	181,039	383,927	3,995,266
MIDDLE (Blue)															
KWAZULU NATAL	1,228,802	431,973	148,018	1,450,166	3,258,958	1,955,804	527,089	158,641	930,797	3,572,331	2,612,292	675,955	170,250	379,697	3,838,194
LOW (Red)															
KWAZULU NATAL	1,228,802	431,973	148,018	1,450,235	3,259,028	1,541,331	570,447	154,843	1,297,101	3,563,721	1,844,464	807,540	165,530	917,244	3,734,777
PERCENTAGES															
HIGH (Green)															
KWAZULU NATAL	38%	13%	5%	44%	100%	60%	14%	5%	22%	100%	71%	15%	5%	10%	100%
MIDDLE (Blue)															
KWAZULU NATAL	38%	13%	5%	44%	100%	55%	15%	4%	26%	100%	68%	18%	4%	10%	100%
LOW (Red)															
KWAZULU NATAL	38%	13%	5%	44%	100%	43%	16%	4%	36%	100%	49%	22%	4%	25%	100%
GROWTH PER ANNUM	2005 - 2025					2025 - 2050					2005 - 2050				
HIGH (Green)															
KWAZULU NATAL	2.9%	0.8%	0.6%	-2.9%	0.6%	1.0%	0.8%	0.4%	-2.9%	0.3%	1.9%	0.8%	0.4%	-2.9%	0.5%
MIDDLE (Blue)															
KWAZULU NATAL	2.4%	1.0%	0.3%	-2.2%	0.5%	1.2%	1.0%	0.3%	-3.5%	0.3%	1.7%	1.0%	0.3%	-2.9%	0.4%
LOW (Red)															
KWAZULU NATAL	1.1%	1.4%	0.2%	-0.6%	0.4%	0.7%	1.4%	0.3%	-1.4%	0.2%	0.9%	1.4%	0.2%	-1.0%	0.3%

Source: Global Insight SA, 2008



(Source: Global Insight SA, 2008)

Figure 7: KwaZulu-Natal: Employment by Place of Work: Comparison of Scenarios 2005, 2025, 2050

The four main employment categories are formal employed, informal employed, domestic workers and the unemployed. The largest growth in formal workers (2005-2050) is expected to take place in the High Scenario (1,6 million), compared to 1,4 million in the Middle Scenario, and 616, 000 in the Low Scenario. In terms of formal worker growth rates the High Scenario is expected to grow at 1,9% p.a., the Middle Scenario at 1,7% p.a., and the Low Scenario at 0,9% per annum.

The share of formal workers to total workers is expected to increase dramatically in the High Scenario, from 38% to 71% in 45 year's time, compared to 68% in the Middle Scenario, and 49% in the Low Scenario. (Refer to **Figure 7**).

The Middle Scenario is considered as the most realistic scenario, and thus the results will serve as input to the transportation model. Consequently, the next section of the report will deal with the description of the Middle Scenario by District Municipality. The detailed tables, which display results by Local Municipality, are attached in **Annexure A**.

3.4.2 Projections by District Municipality (Middle Scenario)

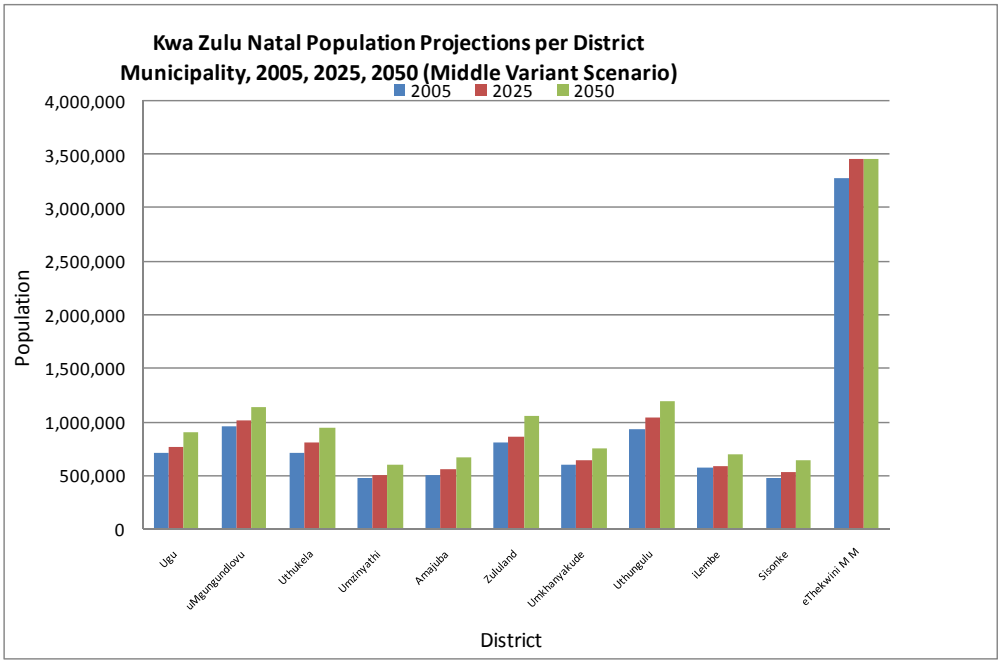
3.4.2.1 Population

The population projections (2005-2050) by District Municipality are displayed in **Table 9** and **Figure 8**. The projections were developed in 5-year intervals, from 2005 to 2050. (Refer to detailed tables in Natmap Database). For practical purposes only 2005, 2025, and 2050 design years are discussed in the report.

Table 9: Population by Income Group in KwaZulu-Natal District Municipalities, 2005, 2025, 2050

	2005					2025					2050				
	POPULATION BY INCOME GROUP					POPULATION BY INCOME GROUP					POPULATION BY INCOME GROUP				
DISTRICT MUNICIPALITY	HIGH	MEDIUM	LOW	TOTAL	%	HIGH	MEDIUM	LOW	TOTAL	%	HIGH	MEDIUM	LOW	TOTAL	%
Ugu	77,006	137,313	496,554	710,873	7%	92,325	153,005	516,475	761,805	7%	102,063	183,290	613,911	899,264	7%
uMgungundlovu	178,973	214,628	555,334	948,935	10%	207,895	231,504	566,819	1,006,219	9%	229,612	266,589	633,219	1,129,420	9%
Uthukela	48,817	109,804	544,729	703,351	7%	65,373	116,982	620,496	802,851	7%	76,443	132,947	735,196	944,586	8%
Umzinyathi	24,360	59,035	393,440	476,834	5%	28,033	58,534	409,246	495,813	5%	34,097	57,605	503,410	595,112	5%
Amajuba	65,198	88,052	339,082	492,332	5%	83,879	102,441	365,622	551,942	5%	98,986	128,352	436,690	664,027	6%
Zululand	43,017	102,082	652,633	797,732	8%	51,773	99,514	712,406	863,693	8%	65,400	102,085	880,364	1,047,849	9%
Umkhanyakude	23,066	68,656	500,343	592,065	6%	27,631	70,517	545,352	643,501	6%	32,547	71,491	639,512	743,550	6%
Uthungulu	134,054	184,671	615,466	934,192	9%	184,744	202,612	652,471	1,039,827	10%	200,789	234,427	755,653	1,190,869	10%
iLembe	47,830	113,197	400,497	561,523	6%	54,232	143,037	388,431	585,700	5%	60,128	176,615	452,786	689,530	6%
Sisonke	17,877	53,401	404,888	476,165	5%	20,905	54,967	454,655	530,527	5%	25,840	60,215	547,878	633,933	5%
eThekwini M M	745,403	654,780	1,875,663	3,275,847	33%	800,131	746,106	1,913,955	3,460,192	32%	801,890	721,453	1,939,129	3,462,472	29%
KZN TOTAL	**1,405,601**	**1,785,618**	**6,778,630**	**9,969,849**	**100%**	**1,616,921**	**1,979,220**	**7,145,928**	**10,742,069**	**100%**	**1,727,793**	**2,135,069**	**8,137,748**	**12,000,610**	**100%**
%	**14%**	**18%**	**68%**	**100%**		**15%**	**18%**	**67%**	**100%**		**14%**	**18%**	**68%**	**100%**	

Source: Global Insight SA, 2008



(Source: Global Insight SA, 2008)

Figure 8: KwaZulu-Natal: Population Projections per District Municipality, 2005, 2025, 2050

The total population in KwaZulu-Natal is expected to increase from 9,97 million in 2005 to 10,7 million (0,4% growth p.a.) in 2025 and 12,0 million in 2050 (0,4% growth p.a.).

According to the State of the Cities report (2006), KwaZulu-Natal registered an urbanisation rate of 45%, in other words 55% of KwaZulu-Natal's population is regarded as rural (refer to **Map 3.4 A**). It is expected that this pattern will remain for the foreseeable future, contributing to service delivery and public transport problems.

Map 3.4 A also illustrates the existing and expected population projections from 2005 to 2050. It is evident from **Map 3.4 A** that the largest increment in population between 2005 and 2050, is expected in the Uthungulu District Municipality (256,000) and followed by Zululand District Municipality (250,000) and Uthukela District Municipality (241,000). The main growth areas in the Uthungulu District Municipality is the Richardsbay/Empangeni area; Abaqulusi and Ulundi in the Zululand District Municipality; and Emnambithi/Ladysmith Local Municipality in the Uthukela District Municipality. All four of the above Local Municipalities were mentioned by the KwaZulu-Natal Provincial Spatial Economic Development Strategy (PSEDS) as local municipalities with very high numbers of people living in poverty.

The population in eThekwini Metropolitan area is expected to increase from 3,28 million in 2005 to 3,46 million by 2050. It is expected that eThekwini's share of the total population will decrease from 33% in 2005 to 29% by 2050. Assuming that 10% of the incremental population will settle in the existing urban area as a result of densification and redevelopment, and by further assuming that the remainder of the incremental population will settle at a gross density of 20 dwelling units per hectare, approximately 2,400 hectare of additional land will be needed to accommodate the potential population growth of eThekwini up to 2050. To date, ample provision has been made for future development around the Dube Trade Port in the north, and Illovo in the south refer to **Map 4.3 B** later in the report.

3.4.2.2 Employment Status (by Place of Residence)

Table 10 and **Figure 6** shows the employment status of the population by District Municipality.

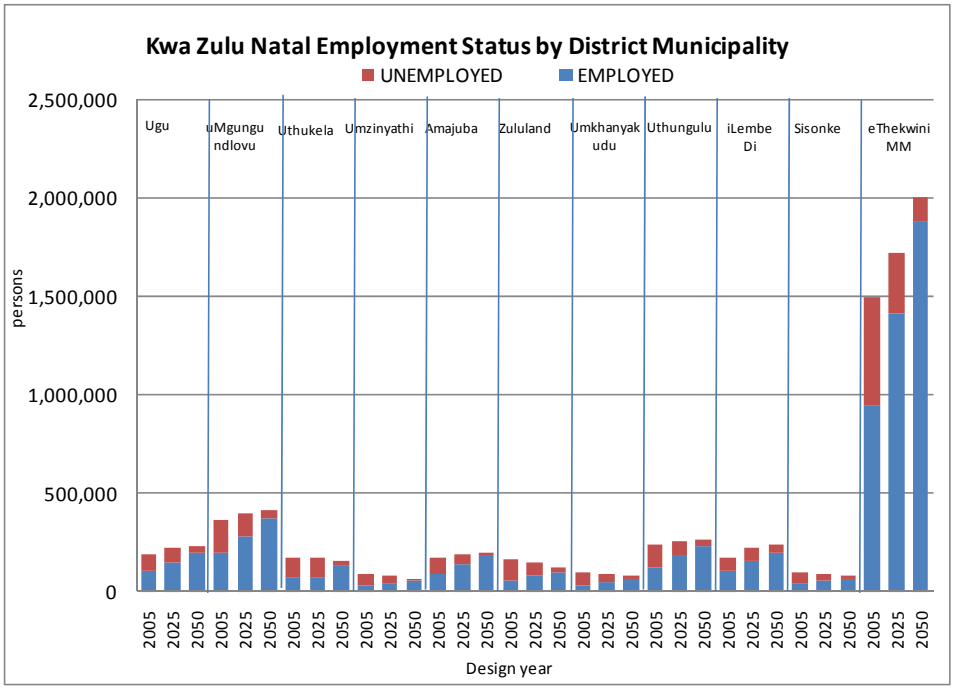
Currently, 33% of the population in KwaZulu-Natal can be regarded as economically active, and this is expected to decrease slightly to 32% in 2050.

"Economically Active People" refers to all people between the ages of 15-65 years who provide their labour for production of goods and services, and includes people in the formal- and informal sectors, as well as the unemployed.

Table 10: Employment Status of the Economically Active Population of KZN by District, 2005, 2025, 2050

	2005				2025				2050			
	ECONOMICALLY ACTIVE				ECONOMICALLY ACTIVE				ECONOMICALLY ACTIVE			
DISTRICT MUNICIPALITY	EMPLOYED	UNEM-PLOYED	TOTAL	%	EMPLOYED	UNEM-PLOYED	TOTAL	%	EMPLOYED	UNEM-PLOYED	TOTAL	%
Ugu	104,424	89,768	194,192	6%	151,843	72,320	224,163	6%	197,730	32,617	230,348	6%
(%)	54%	46%	100%		68%	32%	100%		86%	14%	100%	
Ecomomic Ativity Rate (%)			27%				29%				26%	
uMgungundlovu	199,046	167,293	366,339	11%	285,652	109,323	394,975	11%	371,936	46,177	418,113	11%
(%)	54%	46%	100%		72%	28%	100%		89%	11%	100%	
Ecomomic Ativity Rate (%)			39%				39%				37%	
Uthukela	77,490	96,187	173,678	5%	106,876	61,109	167,986	5%	135,699	23,327	159,026	4%
(%)	45%	55%	100%		64%	36%	100%		85%	15%	100%	
Ecomomic Ativity Rate (%)			25%				21%				17%	
Umzinyathi	29,310	59,229	88,539	3%	43,714	41,484	85,198	2%	54,424	14,737	69,161	2%
(%)	33%	67%	100%		51%	49%	100%		79%	21%	100%	
Ecomomic Ativity Rate (%)			19%				17%				12%	
Amajuba	94,946	76,831	171,777	5%	137,611	52,143	189,754	5%	179,194	23,457	202,651	5%
(%)	55%	45%	100%		73%	27%	100%		88%	12%	100%	
Ecomomic Ativity Rate (%)			35%				34%				31%	
Zululand	58,537	107,356	165,893	5%	81,723	65,983	147,707	4%	101,060	23,082	124,142	3%
(%)	35%	65%	100%		55%	45%	100%		81%	19%	100%	
Ecomomic Ativity Rate (%)			21%				17%				12%	
Umkhanyakude	36,793	62,848	99,641	3%	52,936	42,095	95,031	3%	66,032	14,917	80,950	2%
(%)	37%	63%	100%		56%	44%	100%		82%	18%	100%	
Ecomomic Ativity Rate (%)	73,586		17%				15%				11%	
Uthungulu	123,406	117,028	240,434	7%	178,775	79,690	258,465	7%	233,168	34,245	267,413	7%
(%)	51%	49%	100%		69%	31%	100%		87%	13%	100%	
Ecomomic Ativity Rate (%)			26%				25%				22%	
iLembe Di	105,128	65,321	170,449	5%	155,040	66,227	221,268	6%	203,442	34,129	237,571	6%
(%)	62%	38%	100%		70%	30%	100%		86%	14%	100%	
Ecomomic Ativity Rate (%)			30%				38%				34%	
Sisonke	44,157	55,769	99,926	3%	56,013	33,120	89,132	2%	68,753	12,433	81,186	2%
(%)	44%	56%	100%		63%	37%	100%		85%	15%	100%	
Ecomomic Ativity Rate (%)			21%				17%				13%	
eThekwini M M	944,646	552,534	1,497,180	46%	1,413,577	307,303	1,720,880	48%	1,879,005	120,575	1,999,580	52%
(%)	63%	37%	100%		82%	18%	100%		94%	6%	100%	
Ecomomic Ativity Rate (%)			46%				50%				58%	
KWA ZULU NATAL	**1,817,883**	**1,450,166**	**3,268,048**	**100%**	**2,663,760**	**930,797**	**3,594,557**	**100%**	**3,490,443**	**379,697**	**3,870,140**	**100%**
(%)	**56%**	**44%**	**100%**		**74%**	**26%**	**100%**		**90%**	**10%**	**100%**	
Ecomomic Ativity Rate (%)			**33%**				**33%**				**32%**	

Source: Global Insight SA, 2008



(Source: Global Insight SA, 2008)

Figure 9: KwaZulu-Natal Employment Status of the Economically Active Population of KwaZulu-Natal by District, 2005, 2025, 2050

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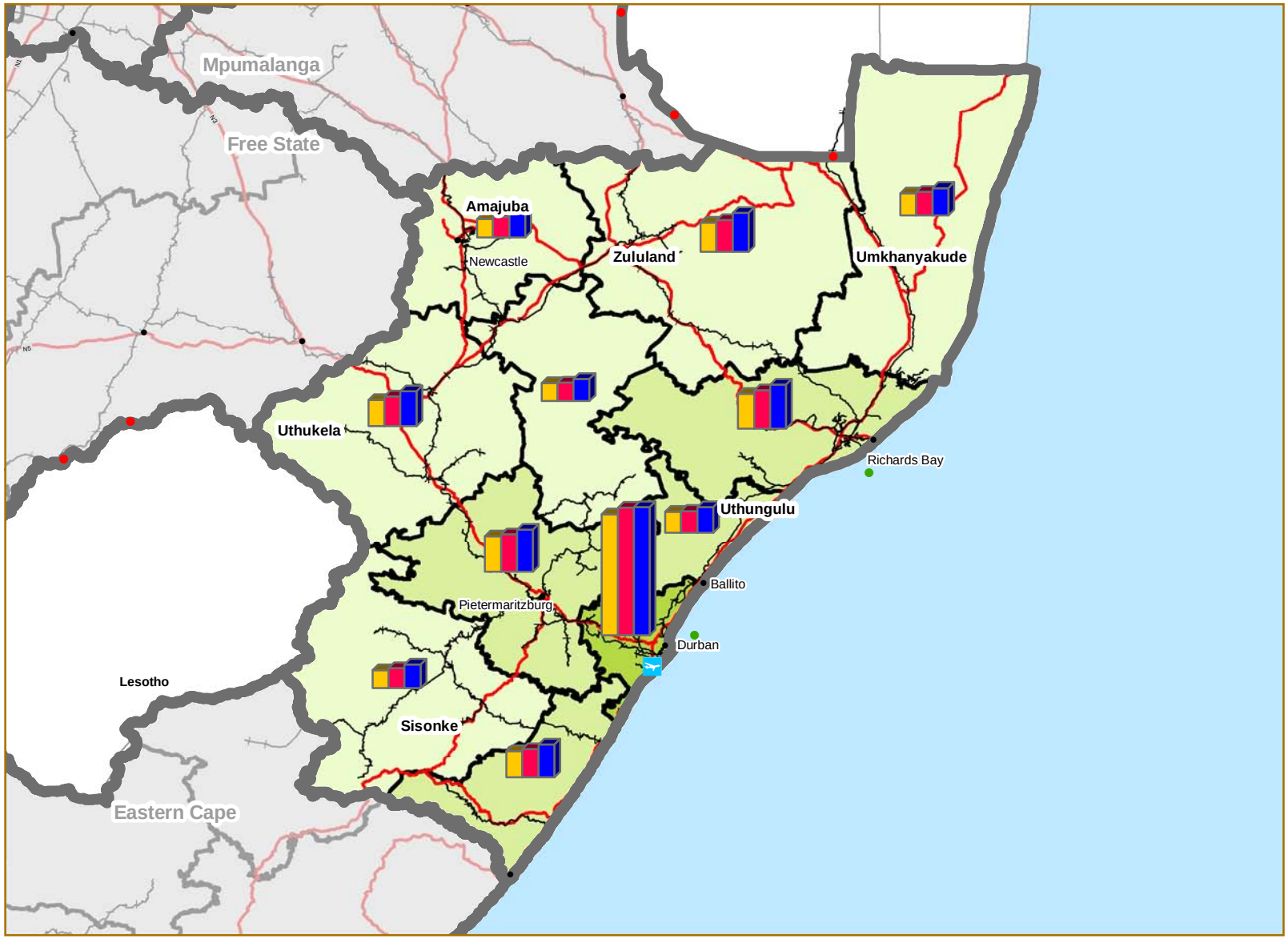
Kwazulu Natal Province: POPULATION PROJECTIONS BY DISTRICT MUNICIPALITY (2005-2050)



SDF

POPULATION (2005-2050)

860,000

2005
2025
2050

Population Density (Persons per HA)

- >0.12
- 0.12 - 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 5.5

BASEMAP LEGEND:

- SANRAL Road Network
- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

0-15% 25% 50% 75% 80% 90% 100%

February '09

MAP 3.4A Population Projections by District Municipality (2005-2050)

NATIONAL TRANSPORT MASTERPLAN 2050

The goal of halving poverty and unemployment by 2014 will require extraordinary interventions, seeing that according to the Global Insight projection unemployment will only be halved after 20 years, and thereafter declining to 10 % in 2050,

The highest unemployment rate is currently found in Umzinyathi District Municipality, whereas the largest number of unemployed people resides in eThekwini Metropolitan Municipality, followed by Umgungundlovo District Municipality (**Figure 9**). It is expected that the pattern will remain the same for the foreseeable future

3.4.2.3 Employment (By Place of Work)

Table 11, Table 12, Table 13 display the existing and expected number of formal workers by sector for 2005, 2025 and 2050.

Table 11: Employment by Economic Sector in KZN, 2005

	2005										
District Municipality	Agriculture, Hunting, Forestry, Fishing	Mining , Quarrying	Manufacturing	Electricity, gas, water	Construction	Wholesale, Retail,Catering, Accomodation	Transport, Storage, Communication	Finance, Insurance, Real estate, Business	Community, Social, Personal services	Other service activities	Total Formal
Ugu	12,276	614	8,071	629	2,872	9,967	2,055	5,650	13,964	1,513	**57,611**
%	21.3%	1.1%	14.0%	1.1%	5.0%	17.3%	3.6%	9.8%	24.2%	2.6%	**100.0%**
%											**5%**
uMgungundlovu	20,066	312	22,859	1,784	4,856	16,260	5,552	17,058	37,021	3,926	**129,695**
%	15.5%	0.2%	17.6%	1.4%	3.7%	12.5%	4.3%	13.2%	28.5%	3.0%	**100.0%**
%											**11%**
Uthukela	4,517	75	10,825	589	1,729	5,850	2,918	4,107	13,444	1,131	**45,187**
%	10.0%	0.2%	24.0%	1.3%	3.8%	12.9%	6.5%	9.1%	29.8%	2.5%	**100.0%**
%											**4%**
Umzinyathi	5,114	128	1,162	75	379	970	436	709	7,395	328	**16,696**
%	30.6%	0.8%	7.0%	0.5%	2.3%	5.8%	2.6%	4.2%	44.3%	2.0%	**100.0%**
%											**1%**
Amajuba	3489	1117	18326	592	1516	5780	2624	5453	14053	1022	**53,971**
%	6.5%	2.1%	34.0%	1.1%	2.8%	10.7%	4.9%	10.1%	26.0%	1.9%	**100.0%**
%											**4%**
Zululand	8,537	1,427	1,694	321	801	2,222	1,061	1,854	15,807	545	**34,270**
%	24.9%	4.2%	4.9%	0.9%	2.3%	6.5%	3.1%	5.4%	46.1%	1.6%	**100.0%**
%											**3%**
Umkhanyakude	6,224	323	1,003	142	404	945	478	904	10,614	1,491	**22,529**
%	27.6%	1.4%	4.5%	0.6%	1.8%	4.2%	2.1%	4.0%	47.1%	6.6%	**100.0%**
%											**2%**
Uthungulu	11,362	4,845	18,214	694	5,064	9,793	6,627	8,820	18,388	1,811	**85,619**
%	13.3%	5.7%	21.3%	0.8%	5.9%	11.4%	7.7%	10.3%	21.5%	2.1%	**100.0%**
%											**7%**
iLembe	18,020	94	11,781	199	1,920	4,574	1,880	3,748	8,442	765	**51,423**
%	35.0%	0.2%	22.9%	0.4%	3.7%	8.9%	3.7%	7.3%	16.4%	1.5%	**100.0%**
%											**4%**
Sisonke	9,672	59	1,443	100	360	1,492	387	579	8,015	342	**22,450**
%	43.1%	0.3%	6.4%	0.4%	1.6%	6.6%	1.7%	2.6%	35.7%	1.5%	**100.0%**
%											**2%**
eThekwini MM	12,210	299	196,292	6,001	42,209	124,688	51,195	118,580	134,743	23,134	**709,351**
%	1.7%	0.0%	27.7%	0.8%	6.0%	17.6%	7.2%	16.7%	19.0%	3.3%	**100.0%**
%											**58%**
KZN TOTAL	**111,488**	**9,294**	**291,669**	**11,127**	**62,110**	**182,543**	**75,215**	**167,464**	**281,885**	**36,007**	**1,228,802**
%	**9.1%**	**0.8%**	**23.7%**	**0.9%**	**5.1%**	**14.9%**	**6.1%**	**13.6%**	**22.9%**	**2.9%**	**100.0%**
%											**100%**

Table 12: Employment by Economic Sector in KZN, 2025

	2025										
District Municipality	Agriculture, Hunting, Forestry, Fishing	Mining , Quarrying	Manufacturing	Electricity, gas, water	Construction	Wholesale, Retail,Catering, Accomodation	Transport, Storage, Communication	Finance, Insurance, Real estate, Business	Community, Social, Personal services	Other service activities	Total Formal
Ugu	13,925	596	11,538	977	7,783	15,219	3,376	10,449	22,228	2,282	**88,371**
%	15.8%	0.7%	13.1%	1.1%	8.8%	17.2%	3.8%	11.8%	25.2%	2.6%	**100.0%**
%											**5%**
uMgungundlovu	23,068	350	32,334	2,783	12,669	23,629	8,736	31,021	59,154	6,036	**199,781**
%	11.5%	0.2%	16.2%	1.4%	6.3%	11.8%	4.4%	15.5%	29.6%	3.0%	**100.0%**
%											**10%**
Uthukela	5,276	86	13,994	912	4,493	8,540	4,561	7,329	21,746	1,738	**68,676**
%	7.7%	0.1%	20.4%	1.3%	6.5%	12.4%	6.6%	10.7%	31.7%	2.5%	**100.0%**
%											**4%**
Umzinyathi	6,123	128	1,550	110	957	1,350	651	1,266	12,832	508	**25,474**
%	24.0%	0.5%	6.1%	0.4%	3.8%	5.3%	2.6%	5.0%	50.4%	2.0%	**100.0%**
%											**1%**
Amajuba	3889	1216	29042	941	4139	8875	4332	10350	21924	1530	**86,239**
%	4.5%	1.4%	33.7%	1.1%	4.8%	10.3%	5.0%	12.0%	25.4%	1.8%	**100.0%**
%											**4%**
Zululand	9,564	1,416	2,224	442	1,926	2,967	1,516	3,106	26,455	856	**50,471**
%	18.9%	2.8%	4.4%	0.9%	3.8%	5.9%	3.0%	6.2%	52.4%	1.7%	**100.0%**
%											**3%**
Umkhanyakude	6,868	242	1,153	202	877	1,154	614	1,350	16,695	2,251	**31,405**
%	21.9%	0.8%	3.7%	0.6%	2.8%	3.7%	2.0%	4.3%	53.2%	7.2%	**100.0%**
%											**2%**
Uthungulu	13,025	6,270	29,369	1,126	14,197	15,522	11,273	16,882	30,367	2,781	**140,811**
%	9.2%	4.5%	20.9%	0.8%	10.1%	11.0%	8.0%	12.0%	21.6%	2.0%	**100.0%**
%											**7%**
iLembe	19,832	134	17,634	323	5,466	7,256	3,210	7,325	13,889	1,165	**76,234**
%	26.0%	0.2%	23.1%	0.4%	7.2%	9.5%	4.2%	9.6%	18.2%	1.5%	**100.0%**
%											**4%**
Sisonke	10,951	59	2,025	145	1,119	2,052	596	964	13,398	534	**31,843**
%	34.4%	0.2%	6.4%	0.5%	3.5%	6.4%	1.9%	3.0%	42.1%	1.7%	**100.0%**
%											**2%**
eThekwini MM	13,297	318	289,569	9,411	113,509	187,590	82,768	219,231	206,667	34,139	**1,156,499**
%	1.1%	0.0%	25.0%	0.8%	9.8%	16.2%	7.2%	19.0%	17.9%	3.0%	**100.0%**
%											**59%**
KZN TOTAL	**125,816**	**10,815**	**430,433**	**17,372**	**167,134**	**274,154**	**121,633**	**309,273**	**445,356**	**53,819**	**1,955,804**
%	**6.4%**	**0.6%**	**22.0%**	**0.9%**	**8.5%**	**14.0%**	**6.2%**	**15.8%**	**22.8%**	**2.8%**	**100.0%**
%											**100%**

Table 13: Employment by Economic Sector in KZN, 2050

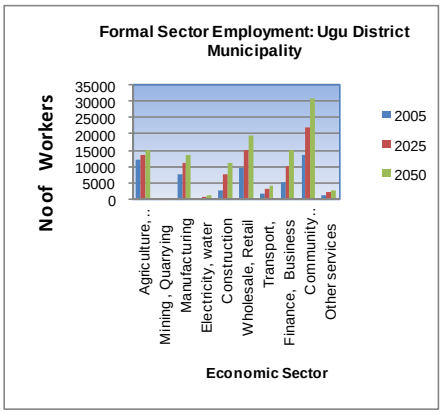
	2050										
District Municipality	Agriculture, Hunting, Forestry, Fishing	Mining , Quarrying	Manufacturing	Electricity, gas, water	Construction	Wholesale, Retail,Catering, Accomodation	Transport, Storage, Communication	Finance, Insurance, Real estate, Business	Community, Social, Personal services	Other service activities	Total Formal
Ugu	15,184	575	13,729	1,270	11,222	19,741	4,530	15,370	31,216	2,904	**115,742**
%	19.6%	0.3%	3.0%	0.8%	5.0%	3.7%	2.1%	2.5%	6.3%	2.6%	**100.0%**
%											**4%**
uMgungundlovu	25,013	359	39,369	3,614	18,308	30,640	11,700	46,059	81,606	7,654	**264,322**
%	12.5%	0.1%	3.1%	1.0%	3.7%	2.3%	3.1%	3.3%	7.5%	3.0%	**100.0%**
%											**10%**
Uthukela	5,574	84	15,962	1,147	6,372	10,878	5,966	10,620	29,914	2,162	**88,679**
%	9.5%	0.1%	3.2%	1.2%	3.8%	2.9%	5.8%	2.8%	6.4%	2.5%	**100.0%**
%											**3%**
Umzinyathi	6,703	115	1,843	140	1,367	1,725	855	1,854	17,701	637	**32,939**
%	20.7%	0.7%	0.8%	0.4%	2.3%	1.6%	2.1%	1.1%	10.5%	2.0%	**100.0%**
%											**1%**
Amajuba	4141	1171	36265	1226	6002	11592	5785	15368	30496	1949	**113,996**
%	5.7%	1.8%	1.3%	1.1%	2.8%	2.1%	4.0%	3.0%	6.4%	1.9%	**100.0%**
%											**4%**
Zululand	9,982	1,224	2,627	551	2,675	3,700	1,940	4,427	35,229	1,037	**63,391**
%	15.7%	1.9%	4.1%	0.9%	4.2%	5.8%	3.1%	7.0%	55.6%	1.6%	**100.0%**
%											**2%**
Umkhanyakude	6,682	192	1,260	232	1,130	1,327	729	1,747	20,215	2,454	**35,969**
%	18.6%	0.5%	3.5%	0.6%	3.1%	3.7%	2.0%	4.9%	56.2%	6.8%	**100.0%**
%											**1%**
Uthungulu	14,192	7,162	36,665	1,464	20,525	20,195	14,985	25,074	42,657	3,524	**186,442**
%	7.6%	3.8%	19.7%	0.8%	11.0%	10.8%	8.0%	13.4%	22.9%	1.9%	**100.0%**
%											**7%**
iLembe	22,279	153	21,772	428	8,096	9,610	4,400	11,072	20,570	1,521	**99,902**
%	22.3%	0.2%	21.8%	0.4%	8.1%	9.6%	4.4%	11.1%	20.6%	1.5%	**100.0%**
%											**4%**
Sisonke	11,443	53	2,359	179	1,570	2,602	772	1,374	18,024	652	**39,028**
%	29.3%	0.1%	6.0%	0.5%	4.0%	6.7%	2.0%	3.5%	46.2%	1.7%	**100.0%**
%											**1%**
eThekwini MM	14,639	350	361,420	12,347	165,722	245,375	111,644	327,918	288,737	43,731	**1,571,882**
%	0.9%	0.0%	23.0%	0.8%	10.5%	15.6%	7.1%	20.9%	18.4%	2.8%	**100.0%**
%											**60%**
KZN TOTAL	**135,833**	**11,439**	**533,271**	**22,597**	**242,988**	**357,384**	**163,307**	**460,883**	**616,365**	**68,226**	**2,612,292**
%	**5.2%**	**0.4%**	**20.4%**	**0.9%**	**9.3%**	**13.7%**	**6.3%**	**17.6%**	**23.6%**	**2.6%**	**100.0%**
%											**100%**

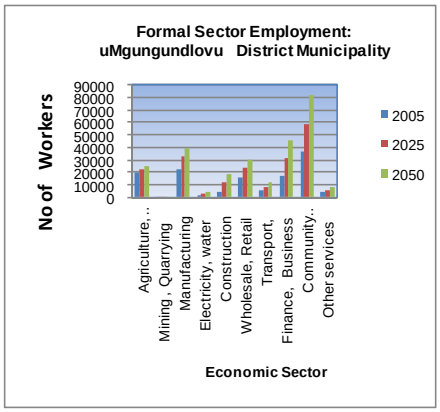
Source: Global Insight SA, 2008

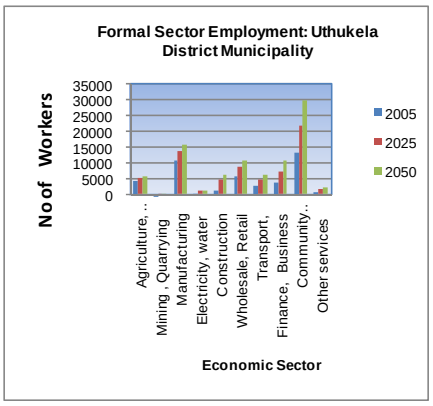
Manufacturing stands out as the sector which employed most workers in 2005 (291,700), and is expected to increase to 533,300 in 2050. It is however disappointing that its share of total employment is expected to decrease from 24% in 2005 to 20% by 2050. Community, social and personal services is expected to become the dominant sector by 2050, with the expected number of workers in the order of 616,000.

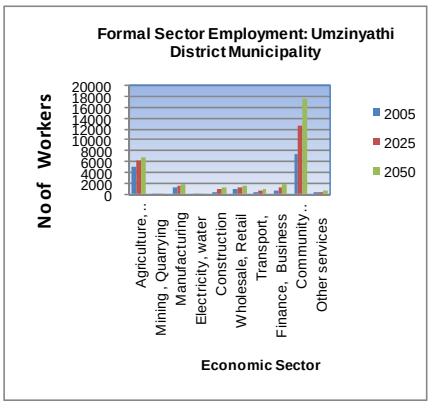
Of concern is the agricultural sector whose share is expected to decline from 9% in 2005 to 5% by 2050. The protection of high potential agricultural land together with adequate provision of resources and training to new farmers will be of utmost importance to increase agricultural production. The role of the agricultural sector is particularly important in the following districts: Ugu, Umzinyathi, Zululand, Umkhanyakude, Ilembi and Sisonke. The most diversified economy is found in the Etekwini Metropolitan Municipality and is expected to remain as such.

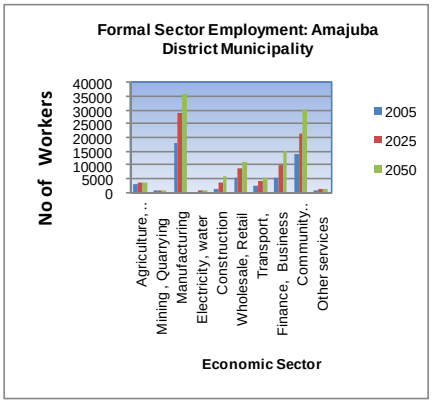
The below figure, shows the expected growth by economic sector for the different district municipalities and eTekwini Metropolitan Municipality.

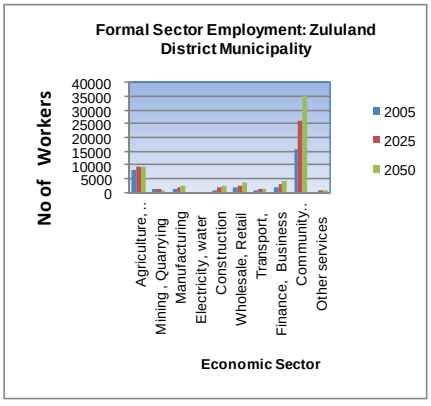












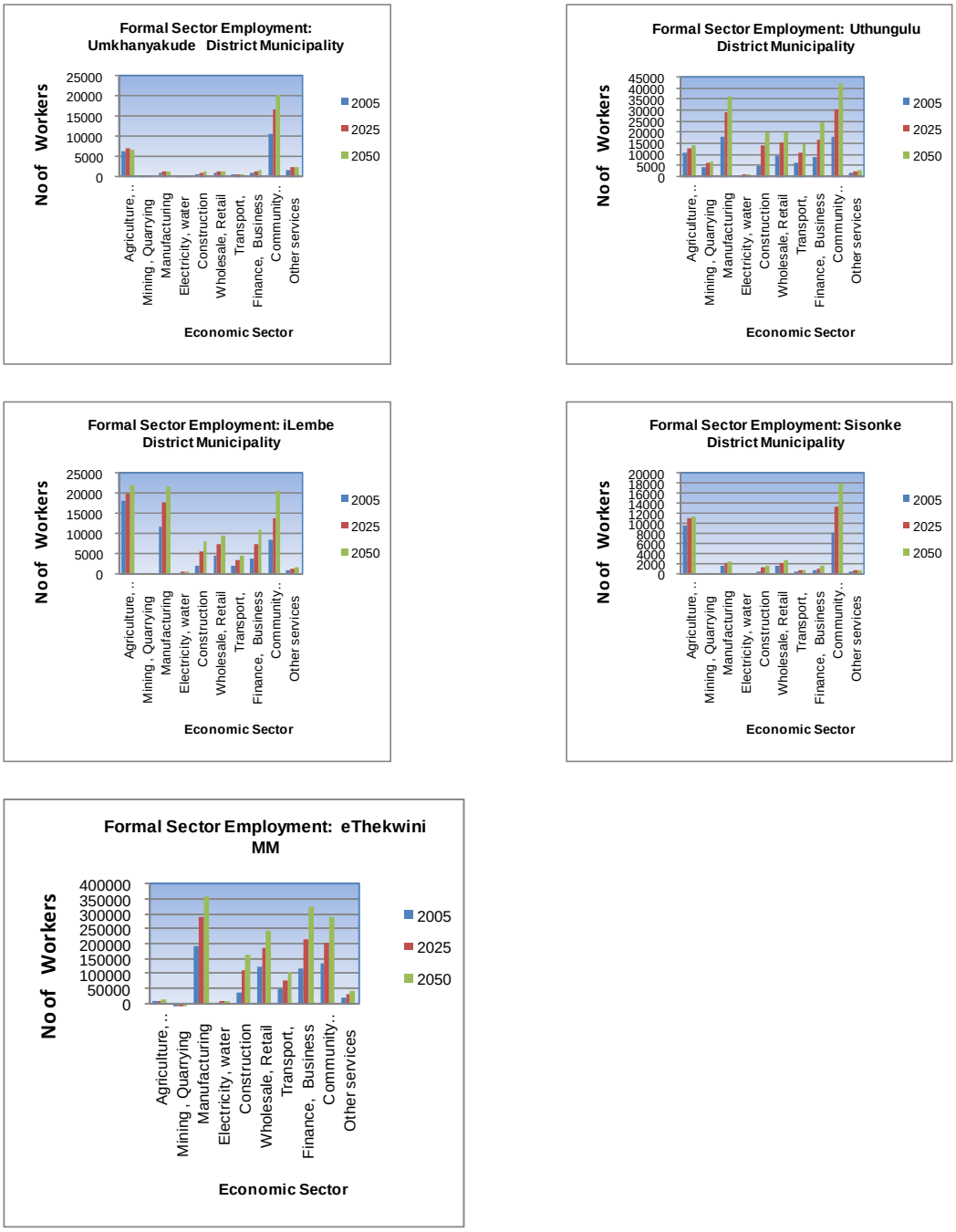


Figure 10: Expected Growth by Economic Sector for the different District Municipalities and eThekwini Metropolitan Municipality

The following sectoral trends are observed from Figure 10:

- **Ugo** (which includes, *inter alia,* the towns of Scottburgh, Harding, Port Shepstone and Margate):
  A relatively strong and balanced growth is foreseen between the following sectors, e.g. agriculture, manufacturing, construction, retail, business and community/personal services.

- **uMgungundlovo** (which includes, *inter alia*, the town of Pietermaritzburg):
  A relatively strong and balanced growth is foreseen between the following sectors, e.g. agriculture, manufacturing, construction, retail, business and community/personal services.

- **Uthukela** (which includes, *inter alia*, the towns of Ladysmith, Colenso, Weenen and Estcourt):
  A relatively strong growth is expected in the manufacturing and community/personal services sectors.

- **Umzinyathi** (which includes, *inter alia*, the towns of Dundee, Glenco, Keates Drift and Greytown):
  A relatively strong growth is expected in the agriculture and community/personal services sectors.

- **Amajuba** (which includes, *inter alia*, the towns of Newcastle, Utrecht and Dannhauser):
  A strong growth is expected in the manufacturing and community/personal services sectors. Retail and business services are also expected to grow in future.

- **Zululand** (which includes, *inter alia*, the towns of Paulpietersburg, Vryheid and Ulundi):
  A relatively strong growth is expected in the agricultural and community/personal services sectors.

- **Umkhonyakude** (which includes, *inter alia*, the towns of Hluhluwe and St Lucia):
  A relatively strong growth is expected in the agricultural and community/personal services sectors.

- **Uthungulu** (which includes, *inter alia*, the towns of Richards Bay, Empangeni, Eshowe and Melmoth):
  A very strong growth is foreseen in the following sectors: manufacturing, construction, retail, transport, business services and community/personal facilities.

- **iLembe** (which includes, *inter alia*, the towns of Stanger and Ballito):
  Agriculture, manufacturing and community/personal services will play a major role in future.

- **Sisonke** (which includes, *inter alia*, the towns of Creighton, Kokstad and Ixopo):
  A relatively strong growth is expected in the agriculture and community/personal services sectors.

- **eThekwini MM**: Very strong growth is expected in the manufacturing, construction, retail, transport, business and community/personal services sectors.

From Figure 11 and **Map 3.4 B**, it is evident that the total number of formal workers in KwaZulu-Natal is expected to increase from 1,2 million in 2005 to 2,6 million by 2050 (1,7% growth p.a.). Currently, 58% of all formal job opportunities in KwaZulu-Natal are located in eThekwini Metropolitan Municipality, and it is expected to increase to 60% by 2050. There is a strong movement of workers from surrounding areas into eThekwini which is expected to increase by 2050.

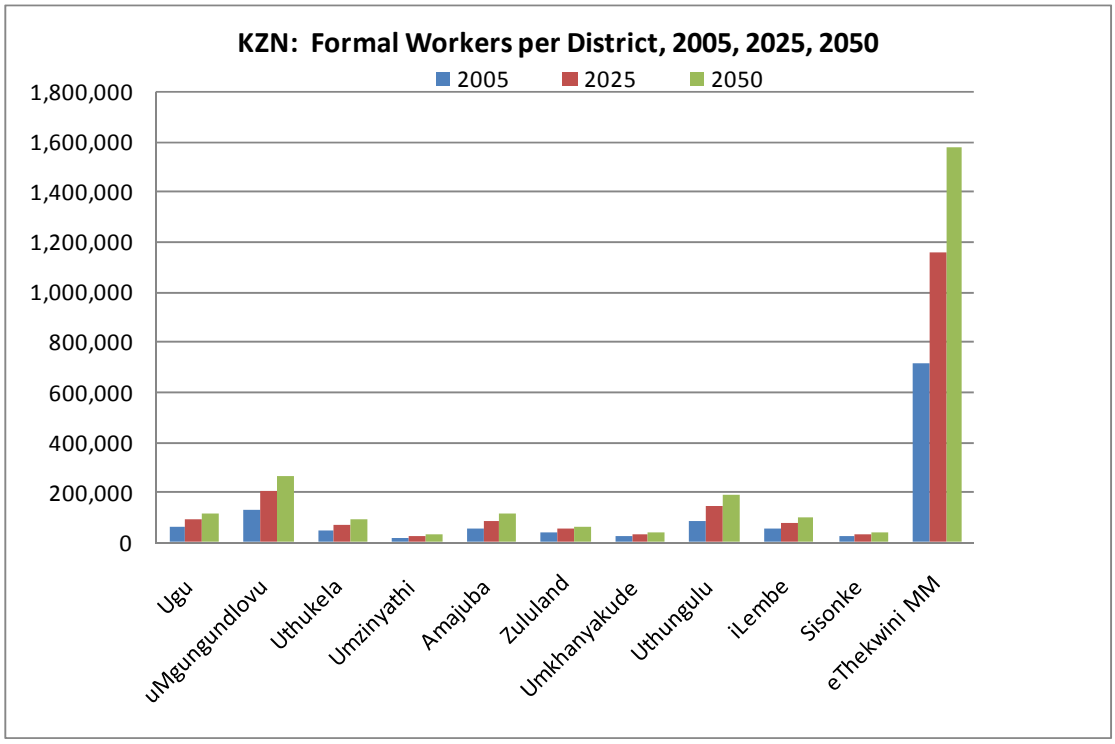
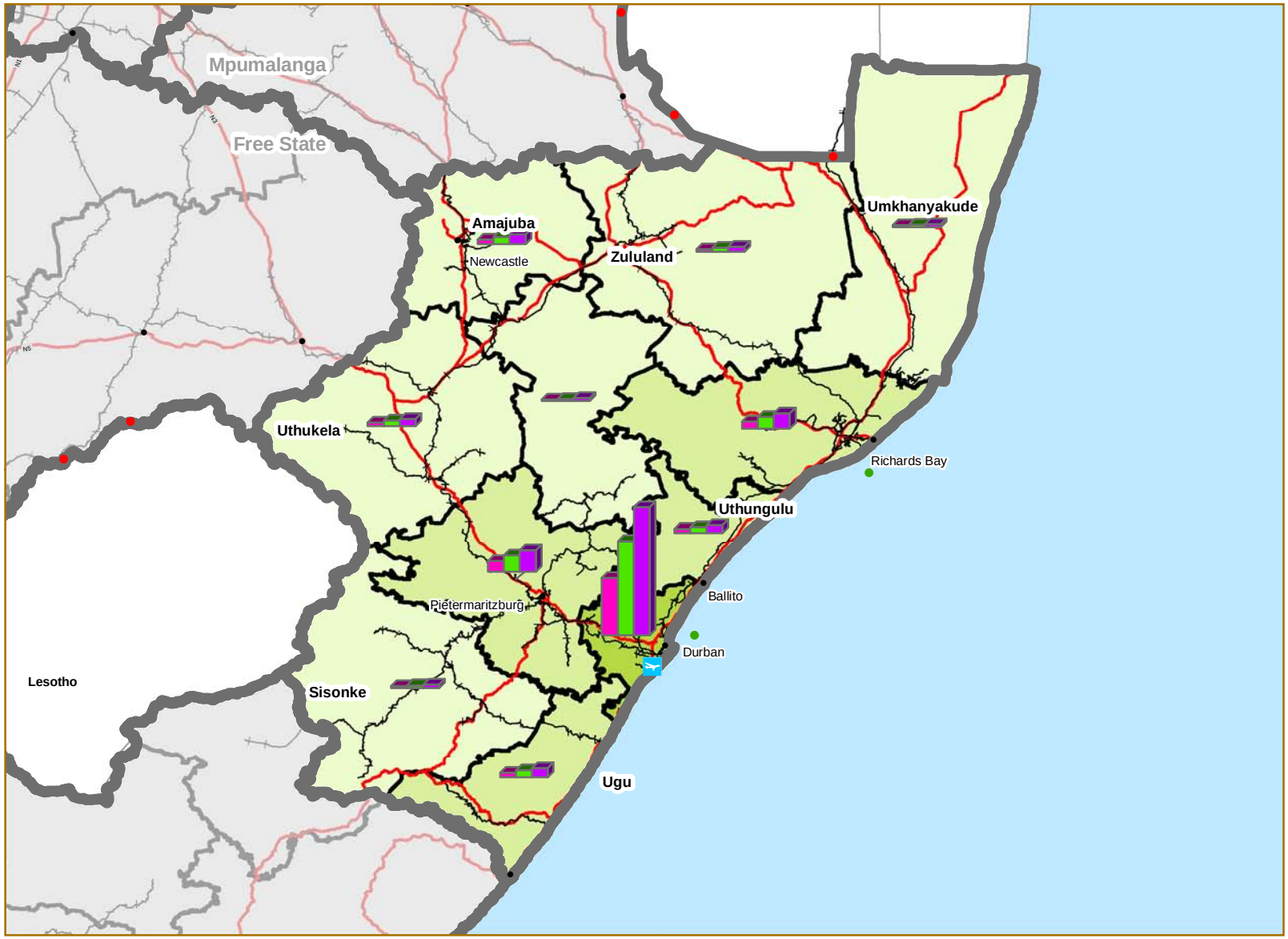


Figure 11: KwaZulu-Natal: Formal Workers per District, 2005, 2025, 2050

Maps 3.4 C-E illustrates the sectoral division of the formally employed workers by District Municipality.

Kwazulu Natal Province: JOB OPPORTUNITY PROJECTIONS PER DISTRICT MUNICIPALITY (2005-2050)



SDF

JOB OPPORTUNITY (2005-2050)

400,000

2005
2025
2050

Population Density (Persons per HA)

>0.12
0.12 - 0.2
0.2 - 0.5
0.5 - 1
1 - 5.5

BASEMAP LEGEND:

SANRAL Road Network
Railway Network
Border Posts
Harbours
Airports
Towns
District Municipal Boundary
Provincial Boundaries

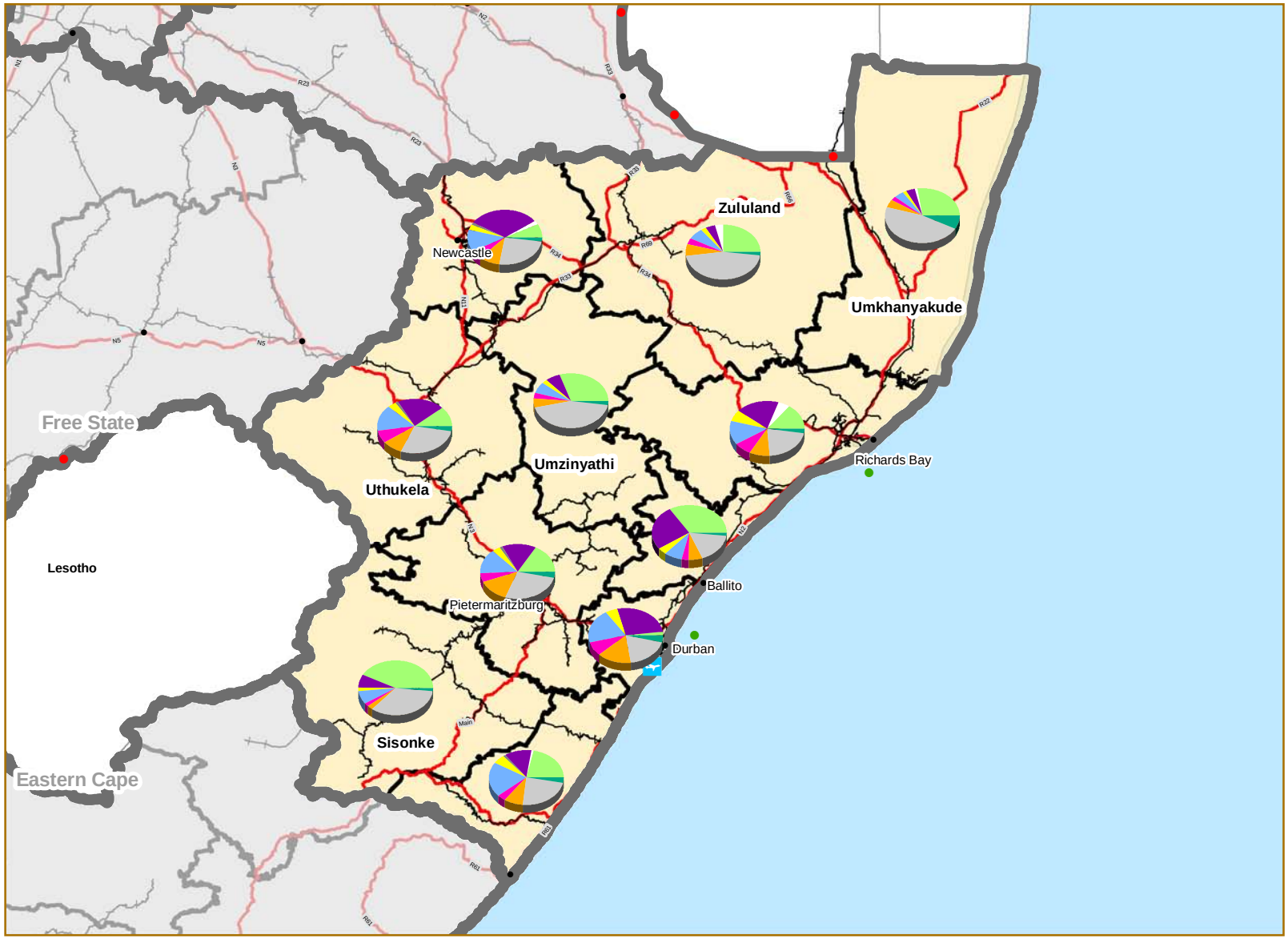
1:3,500,000
0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed
0-15% 25% 50% 75% 80% 90% 100%
February '09

MAP 3.4B Job Opportunity Projections by District Municipality (2005-2050)

NATIONAL TRANSPORT MASTERPLAN 2050

Kwazulu Natal Province: FORMAL WORKERS BY SECTOR (2005)



SDF

FORMAL WORKERS BY SECTOR (2005)

- Agriculture
- Mining
- Manufacturing
- Electricity and Water
- Construction
- Wholesale and Retail
- Transport and Communication
- Finance
- Community and Social
- Other

BASEMAP LEGEND:

- SANRAL Road Network
- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

0-15% 25% 50% 75% 80% 90% 100%

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MAP 3.4C Formal Workers by Sector (2005)

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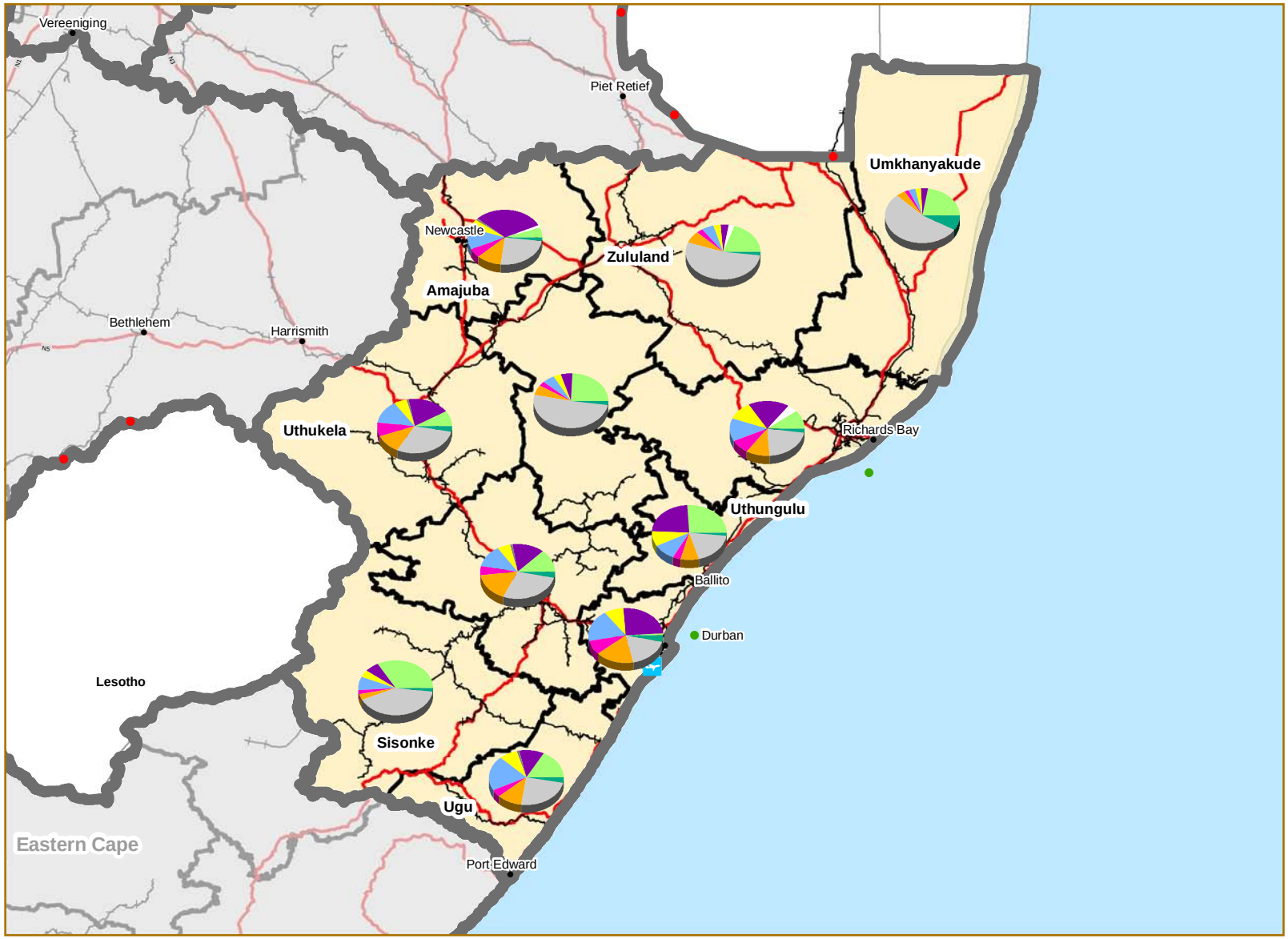
Kwazulu Natal Province: FORMAL WORKERS BY SECTOR (2025)



SDF

FORMAL WORKERS BY SECTOR (2025)

- Agriculture
- Mining
- Manufacturing
- Electricity and Water
- Construction
- Wholesale and Retail
- Transport and Communication
- Finance
- Community and Social
- Other

BASEMAP LEGEND:

- SANRAL Road Network
- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

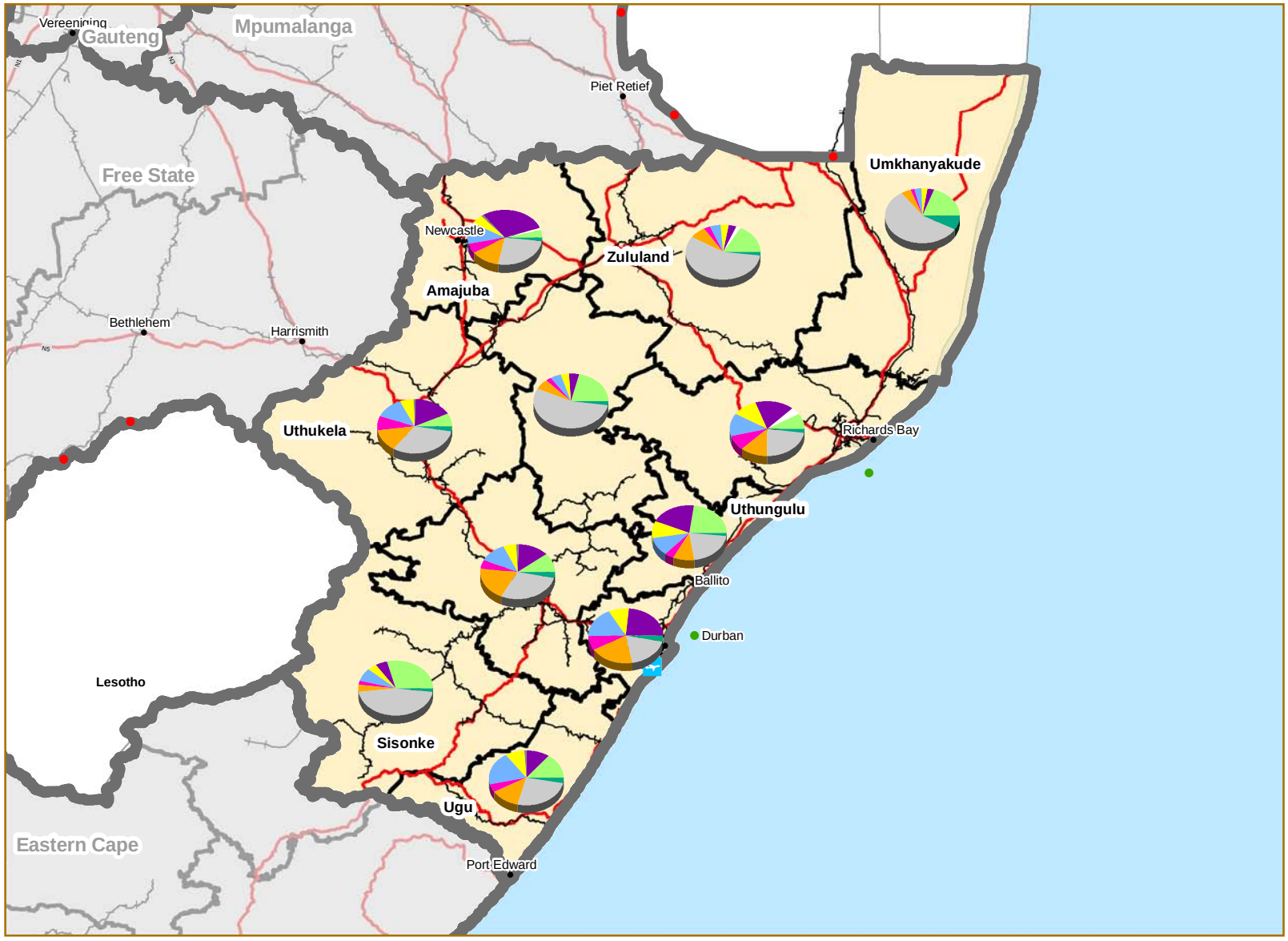
0-15% | 25% | 50% | 75% | 80% | 90% | 100%

February '09

MAP 3.4D Formal Workers by Sector (2025)

NATIONAL TRANSPORT MASTERPLAN 2050

Kwazulu Natal Province: FORMAL WORKERS BY SECTOR (2050)



SDF

FORMAL WORKERS BY SECTOR (2050)

- Agriculture
- Mining
- Manufacturing
- Electricity and Water
- Construction
- Wholesale and Retail
- Transport and Communication
- Finance
- Community and Social
- Other

BASEMAP LEGEND:

- SANRAL Road Network
- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

0-15% 25% 50% 75% 80% 90% 100%

February '09

NATIONAL TRANSPORT MASTERPLAN 2050

MAP 3.4E Formal Workers by Sector (2050)

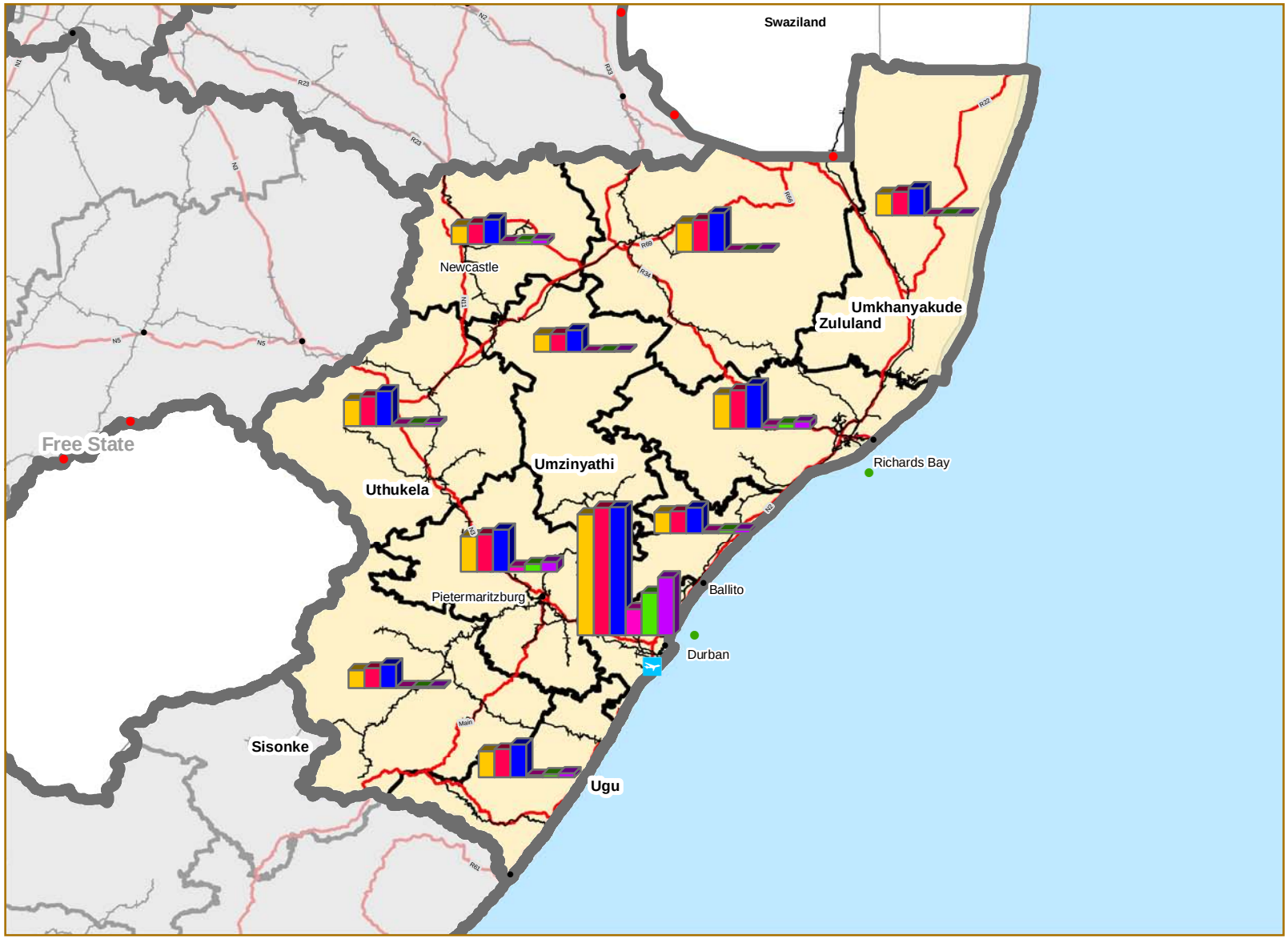
3.5 IMPLICATIONS FOR TRANSPORT PLANNING

Map 3.5 shows the distribution of population and job opportunities by District Municipality. It is very clear that large numbers of people travel to work on a daily basis because of the concentration of job opportunities in the eThekwini Metropolitan Municipality. Thus, the need for effective public transport facilities in the contemporary and even more so in the future is clearly evident. High levels of unemployed people are found in villages scattered throughout the Province. Thus, the provision of access (public transport) to community facilities and job opportunities in centrally located nodes should become a priority.

3.6 CONCLUSIONS AND RECOMMENDATIONS FOR PHASE 3

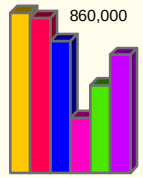
The results of the three socio-economic scenarios developed in Phase 2 will serve as input to the transportation demand model. Phase 3 will thus focus on the impact of these scenarios on sustainability in general (rural and urban) as well as on the integration of land use and transport in future e.g. the need to develop one-stop community centres in rural (poor) areas, to create jobs at such centres (poverty alleviation) and to improve public transport to these areas.

Kwazulu Natal Province: POPULATION VS JOB OPPORTUNITIES PER DISTRICT MUNICIPALITY (2005-2050)



SDF

POPULATION VS JOB OPPORTUNITIES



- Population 2005
- Population 2025
- Population 2050
- Job Opportunities 2005
- Job Opportunities 2025
- Job Opportunities 2050

BASEMAP LEGEND:

- SANRAL Road Network
- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

0-15% 25% 50% 75% 80% 90% 100%

February '09

MAP 3.5 Population vs Job Opportunities (2005-2050)

NATIONAL TRANSPORT MASTERPLAN 2050

4. LAND-USE ANALYSIS

4.1 INTRODUCTION

In support of, and to give effect to the broad national goals delineated by the Accelerated and Shared Growth Initiative for South Africa (ASGISA), the KwaZulu-Natal Provincial Government revised its Provincial Economic Growth and Development Strategy (PGDS). The new strategy (launched a year ago) aims at *"transforming the structure of the economy, and narrowing and eventually eliminating the gap between the first and second economies"* (PSEDS, 2007).

Although the PGDS provides a framework for public and private sector investment, indicating broad development opportunities and priorities, it does not provide a detailed spatial perspective on where development should take place around the Province. Hence, it has become necessary for the Provincial Government to develop a "spatially-based" economic development strategy to give a spatial context to the Provincial Priorities and development programmes identified in the PGDS. Essentially, the Provincial Spatial Economic Development Strategy (PSEDS) can thus be regarded as the spatial representation of the PGDS.

4.1.1 Vision

In essence, the PSEDS strives to *"focus fixed infrastructure investment in areas of economic development potential (whether realised or dormant), and prioritises areas of greatest need based on poverty densities" (PSEDS, 2007).* Whilst all communities are being, and should be, provided with the constitutionally mandate minimum level of services, areas displaying potential for economic growth and development should be provided with the appropriate levels of infrastructure to attract investment interest. This is consistent with the principles laid down by the NSDP (Refer to **Figure 12** , and allows for better management of potential environmental impacts(s).

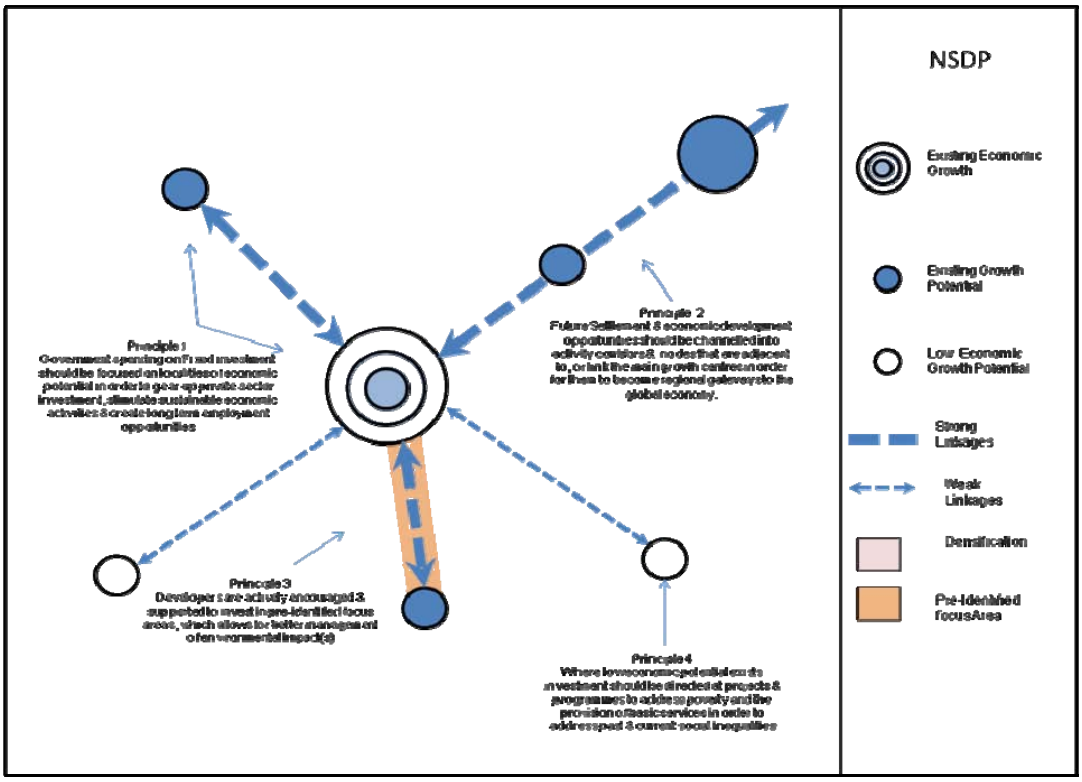


Figure 12: NSCP Principle

Simply put, the PSEDS set-out to amend the apartheid space-economy of the Province by **establishing a hierarchy of selected development nodes and corridors**. This entails that **future settlement and economic development opportunities should be channelled into activity corridors and nodes that are adjacent to, or link the main growth centres** in order for them to become regional gateways to the global economy.

4.1.2 Goals

The overall vision and objective of the PSEDS can be translated into a number of goals. These include *inter alia:*

- The **identification of priority development areas**;
- **Strengthening or development of major movement routes and corridors**;
- The **identification of areas that have to be protected for biodiversity and conservation purposes**;
- The **identification of areas that display economic development potential (whether realised or dormant)**;
- **Focusing and directing government investment and development initiatives** to ensure sustainable and maximum impact;
- **Capitalising on complementarities and facilitating consistent and focused decision making**; and

- **Act as a tool to help government** move beyond mere focusing on integration and coordination procedures, to establishing processes and mechanisms to bring about strategic coordination, interaction and alignment.

4.2 SUMMARY OF PROBLEMS AND ISSUES FOR ANALYSIS

A rigorous analysis of the space economy of the Province was conducted as part of the process in compiling the PSEDS. The following key issues were noted:

4.2.1 Settlement Patterns

The Province is characterised by an extensive mosaic blanket of scattered rural settlements and villages. Vast numbers of these settlements and villages occur within the Zululand, Umkhanyakude, Umzinyathi and Ugu District Municipalities. These municipalities have been earmarked as Rural Development Nodes by the Government's ISRDS programme. The presence of villages, informal settlements, and formal urban areas generally increase towards the coastline, with the most significant urban conurbation being located within the eThekwini Metropolitan Municipality. Characteristically, a string of urban areas are found along the coastline. These are predominantly found in a southerly direction towards East London, with the exception of Richards Bay being located to the north. The interior of the Province does however also feature large and well-established urban areas such as Pietermaritzburg, Ulundi, Newcastle, Vryheid, and Ladysmith. Many of these urban areas are either located along the intersection of major national / provincial routes, within areas featuring significant agricultural or industrial activity, or around major tourist attractions.

The key settlement areas sited for **priority intervention** within the Province include *inter alia:*

- eThekwini, Richards Bay, Msunduzi, Newcastle, Port Shepstone, Ladysmith, Stanger, Pietermaritzburg, Howick, and the Utrecht-Osizweni-Dannhauser Cluster.

Towns specifically being **targeted for investment as part of the Agrarian Revolution** include:

- Jozini, Makhatini, Ulundi, Nongoma, Pongola, Nkandla, Eshowe, Msinga, Estcourt, Bergville, UKhahlamba, Msunduzi, Impendle, Mshwati, and Ugu.

Key issues relating to the existing settlement pattern characterising the Province include *inter alia:*

- Generally, the **dispersed spatial pattern** of the Province hinders the effective and sustainable provision of community services and bulk services infrastructure, especially water and electricity.
- Apartheid planning has resulted in **socially segregated settlements**.

- The **undulating topography and existing transportation network** greatly influences the settlement pattern of the Province.
- The numerous rural settlements and villages located throughout the Province are characterised by high levels of poverty and very low levels of economic opportunity. Consequently, **sustainable service provision is hampered by the inability of households to pay for municipal services**.
- Economic concentration generally increases to the coast, with **very little activity in the central and north-eastern part**s bordering Swaziland and Mozambique.
- **Ribbon development** along the coast is not only encroaching onto valuable agricultural land and areas of pristine natural beauty, but is hampering the provision of bulk municipal infrastructure and services in a sustainable manner.
- The **rapid expansion of large housing developments** is increasing the footprints of urbanised areas.
- The **need for higher density developments** in urban areas via densification and infill development, to curb the negative cost implications associated with sprawl.
- The main economic activity nodes (Pietermaritzburg, Richards Bay, and Greater Durban / eThekwini) within the Province, not only hosts the highest concentrations of people, but also the **highest concentrations of people living under the MML**.
- Four of the Province's district municipalities with their associated settlement areas have been declared **Rural Development Nodes** as part of the Government's ISRDS programme.

4.2.2 Agriculture/Fishing/Forestries

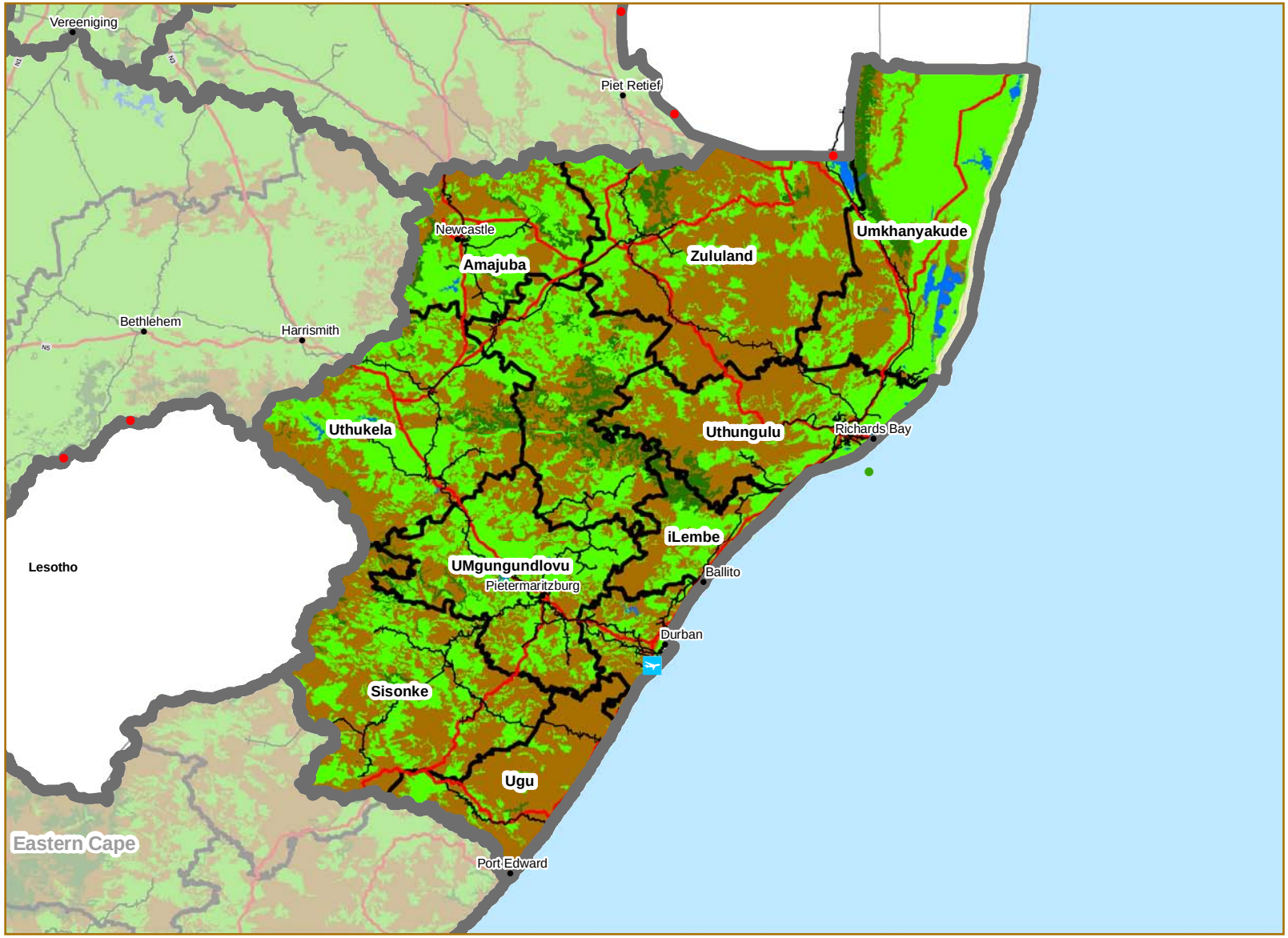
Due to the Province's vast areas of land suitable for commercial farming, the **commercial agriculture sector is the major employer in the majority of the Province's municipalities**, and forms the economic anchor of these municipalities. **Subsistence agriculture is also by far the most important source of provisions for rural households**. In accordance with the Agricultural Revolution and the Land Reform Programme, approximately 1,250,000ha of the Province's white-owned agricultural land is due to be transferred to black owners by 2014.

Some of the most prevalent issues affecting agriculture within the Province include *inter alia*:

- **Loss of productive commercial agricultural land to residential development.**
- **The Loss of land with commercial agricultural potential in poor rural areas** due to the scattered settlement pattern of dwellings. (Refer to **Map 4.2A**). This pattern of settlement ensures that it is only possible to undertake subsistence agriculture on arable land with commercial potential, hence negatively impacting on the ability of agriculture to reduce poverty and create jobs in the poorest areas.
- **Land reform could result in a loss of productive commercial agriculture.** If the massive land transfer delivery target (30% of white –

owned agricultural land) is met, and if the resultant operations on this land are unsustainable, it “will not only virtually destroy the agricultural sector in the province, resulting in massive unemployment and poverty and a lack of food security, but it will also cause the collapse of the local economies of many of the existing rural towns in the province which rely on commercial agriculture for their livelihood” (PSEDS, 2007).

Kwazulu Natal Province: AGRICULTURAL POTENTIAL



LAND USE

AGRICULTURAL POTENTIAL

- ARABLE
- GRAZING
- WILDLIFE
- WATER

BASEMAP LEGEND:

- SANRAL Road Network
- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

0-15% 25% 50% 75% 80% 90% 100%

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MAP 4.2A Agricultural Potential

NATIONAL TRANSPORT MASTERPLAN 2050

The Provision of adequate water supplies will be critical to the long term development of agriculture in the Province. Threats to water supply in the Province include changing weather patterns, uncontrolled spread of alien vegetation, dispersed human settlements, water loss due to ageing infrastructure, etc.

- **Poor land management** results in the loss of soil fertility which reduces opportunity for agriculture, causes the silting of dams, and damages the natural environment in a number of ways.

4.2.3 Mining

Although **mining activity is generally on the decline within the Province** (see **Map 4.2 B**) for all abandoned mining activities), the bulk of the existing activity (predominantly coal mining) is situated in, and around, the **Utrecht-Osizweni-Dannhauser cluster (Amajuba District Municipality), which is placing severe pressure on the local roads**. Due to a general decline in mining activity within the Province, **the role of some settlements / towns should be reassessed**. Some new mining potential (diamonds in Kimberlite) does however exist along the Umkhanyakude District Municipality coast line. The extent of mining activity within this area is however not expected to be significant.

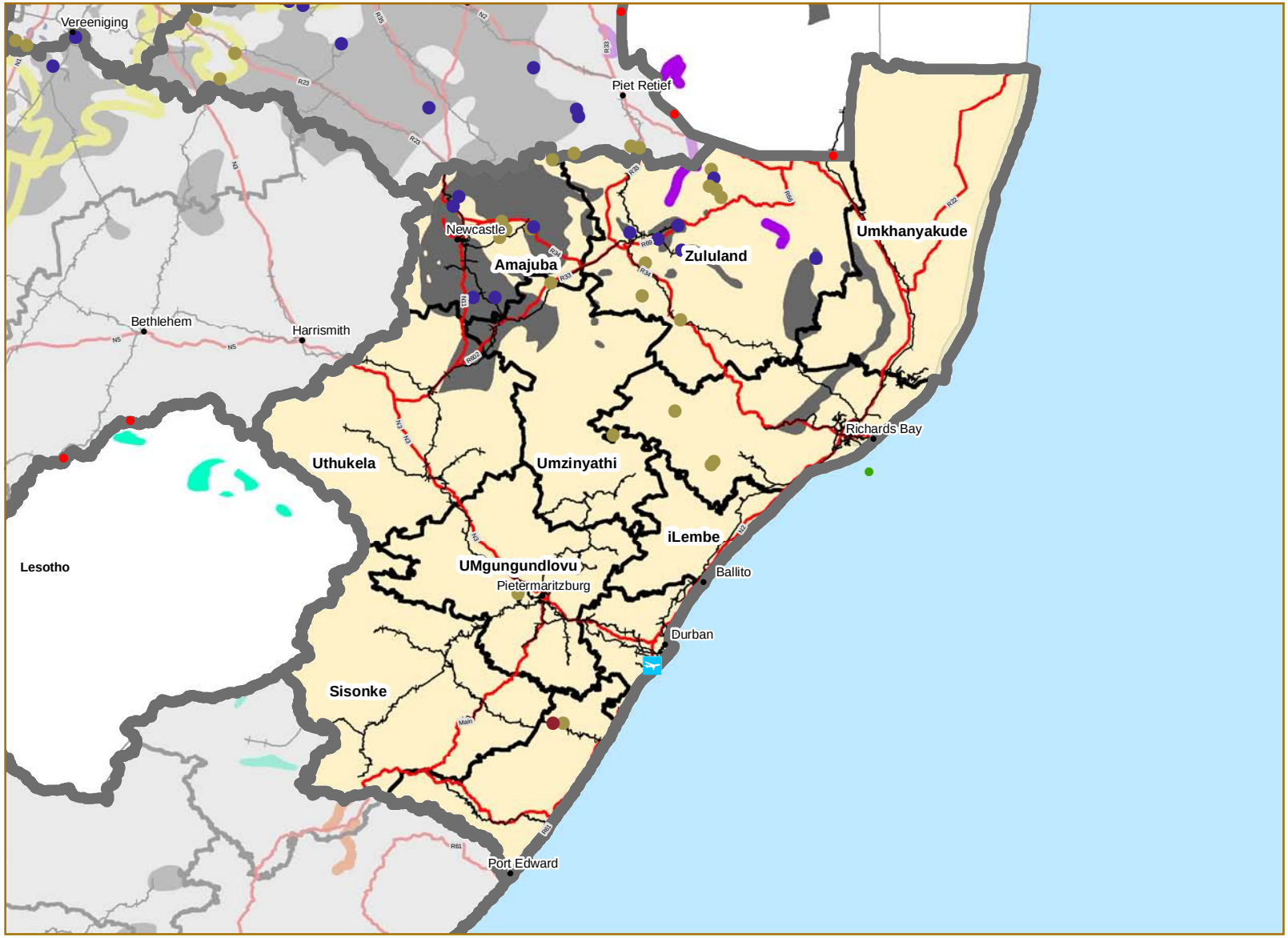
Besides the areas mentioned, there is significant mining activity within the Zululand District Municipality. Zululand Anthracite Colliery is a large mine to the East of Ulundi and a new mine with an anticipated life of at least 30 years is expected to commence operations to the East of nongoma soon.

4.2.4 Industries and Manufacturing

The **potential for industrial development within the Province is primarily located in the nodes of eThekwini and Umhlatuze.** Significantly, the corridors between these two nodes (and extending up to Howick) form the primary zone of industrial development of the Province. Furthermore, the towns of **Newcastle, Ladysmith, and Port Shepstone serve as important secondary nodes** of industrial development potential. Some of the most prevalent issues affecting industry within the Province include *inter alia*:

- **The reliability of services.** Industry is heavily reliant on the provision of reliable and affordable services. It is thus imperative that the logistics network of the Province supports industrial development.
- **Social support services.** The importance of affordable and appropriate housing, education, transport, health and leisure services for industrial development cannot be over-emphasized. Not only does it ensure the health and wellbeing of workers it also determines where management decide to locate their industry.

Kwazulu Natal Province: MINING ACTIVITY AND RESERVES



MINING

MINES AND MINING AREA

- Abandoned
- Dormant
- Intermittently Producing
- Continuously Producing
- Coal
- Copper
- Diamond in kimberlite
- Diamonds Alluvial
- Gold
- Iron
- Platinum

BASEMAP LEGEND:

- SANRAL Road Network
- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

0-15% 25% 50% 75% 80% 90% 100%

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MAP 4.2B Mining Activity and Reserves

NATIONAL TRANSPORT MASTERPLAN 2050

4.2.5 Tourism

The primary tourism potential within the Province is in the beach-tourism, cultural-tourism, and eco-tourism markets. The **areas of national tourism importance within the Province are Southern Zululand, the Dolphin Coast, the Elephant Coast and surrounds, the greater Pietermaritzburg, the Durban region, and the Drakensberg region**. Some of the most prevalent trends and issues affecting tourism within the Province include *inter alia*:

- **Land invasion and illegal activities are affecting the Province's tourism assets.** Such activities include activities related to high levels of poverty such as land invasion and poaching, environmental pollution from industry, visual pollution from billboards, and the destruction of historically or architecturally significant buildings.
- **Safety and security.** The extent of tourism growth in the Province is integrally linked to the levels of risk, and perceived levels of risk to a tourist's safety and security. This *"not only involves an increase or improvement in policing, it also includes improving road safety, the provision of adequate signage,…, and the creation of viable income opportunities for poor communities through tourism"* (PSEDS, 2007).
- **Quality of Roads.** Many tourist attractions are served by only gravel roads. As a result they are avoided by international visitors as well as some domestic visitors who are not used to travelling on such roads.

4.2.6 Land Use and Transportation Integration

The increasingly unplanned and uncontrolled nature of the rural settlement patterns and urban development in the Province is placing severe limitations on the ability of departments to provide affordable services of an acceptable standard. Specific issues include:

- **Public facilities and services are being scattered** across community areas rather than grouped together at accessible points;
- **The public transport system is being under-utilised**, and land use patterns do not support efficiencies;
- **Centrally located urban areas continue to have generally low density development.** The public transportation system cannot operate efficiently in a low density residential and / or business environment; and
- There is a **high degree of segregation between places of work, entertainment and residence**.
- Due to the scattered nature of settlements, the provision of primary services such as water reticulation, electricity and road access becomes very costly and non-sustainable.

4.2.7 Other Categories

- **Services**
  With the exception of two districts, the service sector is the largest contributor to district economies and comprises wholesale/retail trade, transport/storage, communication, financial/insurance, real estate, business services, community/social/personal services, and government services. To ensure the growth of the services sector, the Provincial Government needs to:

  - "Develop a bulk water and electricity strategy for the Province within the framework of the PSEDS", and
  - "Develop a comprehensive rail transport strategy for the Province within the overall framework of the PSEDS" (PSEDS, 2007).

- **Poverty**
  The **highest levels of poverty and need are mainly concentrated within those areas previously forming part of the KwaZulu-Natal homeland areas**. Some of the most deprived areas in the Province are Nkandla, Ulundi, Nqutu, Indaka, Msinga, uMlalazi, Ingwe, Okhahlamba, Nongoma, Ndwedwe, Maphumulo, Umzumbe, Abaqulusi, and Umzimkhulu. The **10 local municipalities with the highest number of people living in poverty** are eThekwini, Msunduzi, Newcastle, uMhlatuze, Jozini, Emnambithi, Hibiscus Coast, Abaqulusi, Ulundi, and KwaDukuza. Consistent with what the NSDP has shown, these municipalities are concentrated around the major economic centres of the Province.

4.2.8 The eThekwini Metropolitan Area

Specific key issues faced by the eThekwini Metropolitan Area include:

- **Critical infrastructure** viewed as important by investors need to be improved;
- According to the PSEDS, **Durban needs to reposition and market itself as a serious business and manufacturing location.** This will necessitate the provision of relevant infrastructure;
- **Un-coordinated development** is having an irreversible effect on the biodiversity found within the metropolitan area;
- Lobbying and advocacy work is required to prioritize the relocation of informal settlers in the South Durban Basin (SDB), because of the strategic importance of the SDB to the city and the Province as a whole;
- Due to limited land being available for housing development, **the provision of affordable housing is a key challenge in the SDB**. In light of this, Social Housing is viewed as a potential approach to address the housing backlog in the SDB;
- The **South Coast Road Economic Corridor** is faced with complex, mixed land uses leading to high pressures being exerted on the road; and

- **Rail transport needs to be integrated into the larger public transport system** of the Metro;
- The **inadequate rail and road access** to the port has become a major bottleneck to the ports operations.

4.3 PROVINCIAL SPATIAL DEVELOPMENT FRAMEWORK

4.3.1 Introduction

Having considered the strengths, weaknesses, opportunities, and threats associated with the Profile of the Province, the KwaZulu-Natal Cabinet resolved in July 2005 to pursue the concept of **"corridor development"** as a means to stimulate economic growth in the Province. To this end, the basic objective of the spatial framework put forward by the PSEDS is to **consolidate the scattered rural population of the Province around a hierarchy of selected services centres (connected by various corridors)** where infrastructure and services spending will be determined using the principles of the NSDP. The spatial framework put forward by the PSEDS consists of the following components:

4.3.2 Hierarchy of Human Settlement

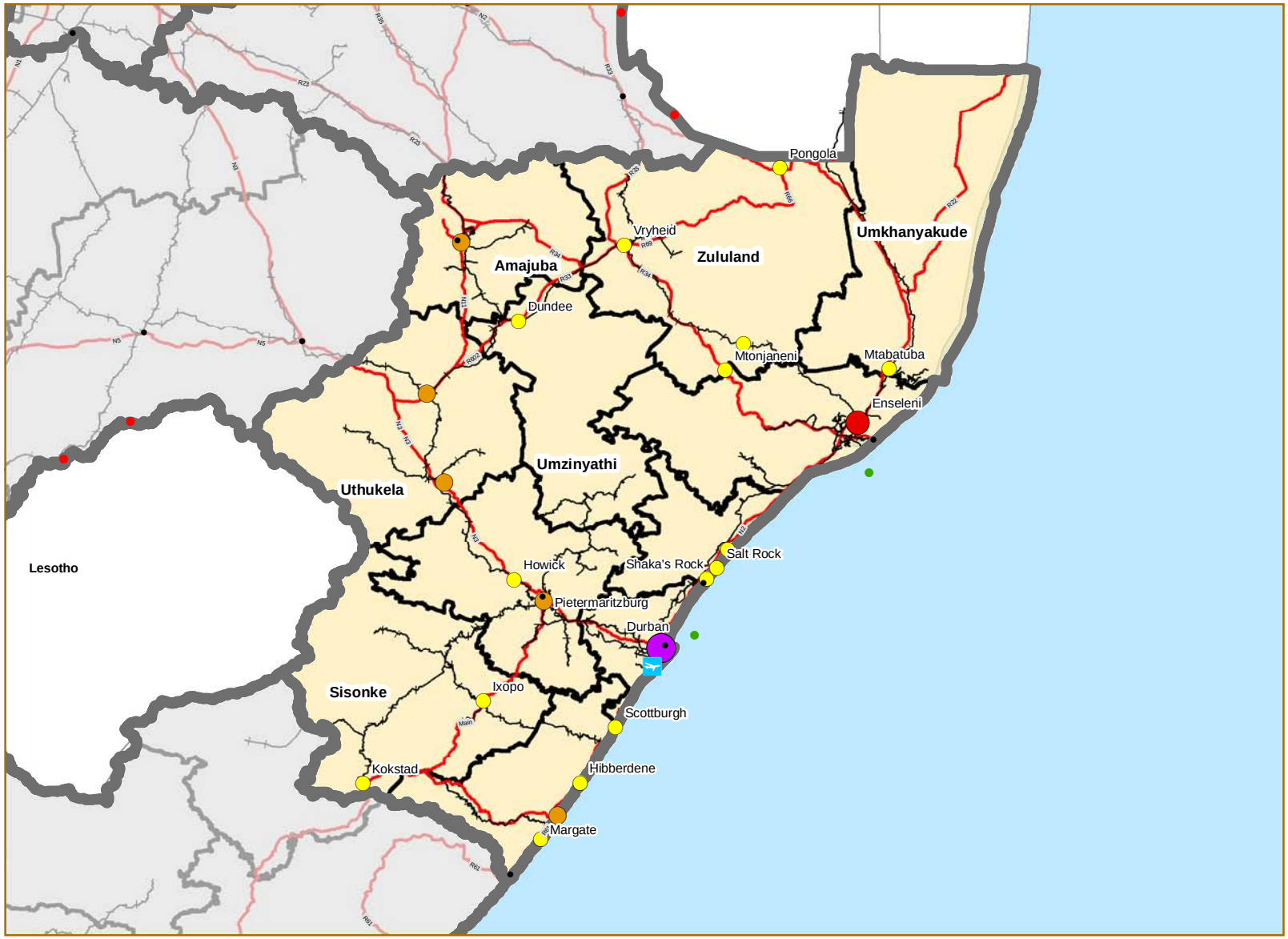
The corridors and nodes identified form the backbone of the spatial framework of the Province, as they serve to:

- **Facilitate the increased growth of existing centres and corridors** of economic development; and
- **To ensure that the potential for economic development** within areas displaying high poverty levels and densities is realised.

For this reason the nodes and corridors selected include existing well established nodes and corridors, as well as nodes and corridors which do not exist in the contemporary, or are very weak. Currently, only **the primary and secondary nodes of the Province have been identified for priority interventions**. These nodes all display some sort of potential as set out by the NSDP, and include the following (Refer to **Map 4.3 A**):

- **Metropolitan Node** – eThekwini**.**
- **Primary Node (PN)** – Richards Bay.
- **Secondary Nodes (SN)** – Pietermaritzburg/Msunduz, Newcastle, Port Shepstone, Estcourt and Ladysmith.

Kwazulu Natal Province: HIERARCHY OF HUMAN SETTLEMENTS



SDF

HIERARCHY OF HUMAN SETTLEMENTS

- Metropolitan
- Primary
- Secondary
- Tertiary

BASEMAP LEGEND:

- SANRAL Road Network
- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

0-15% | 25% | 50% | 75% | 80% | 90% | 100%

February '09

MAP 4.3A Hierarchy of Human Settlements

NATIONAL TRANSPORT MASTERPLAN 2050

4.3.3 Economic Development Nodes

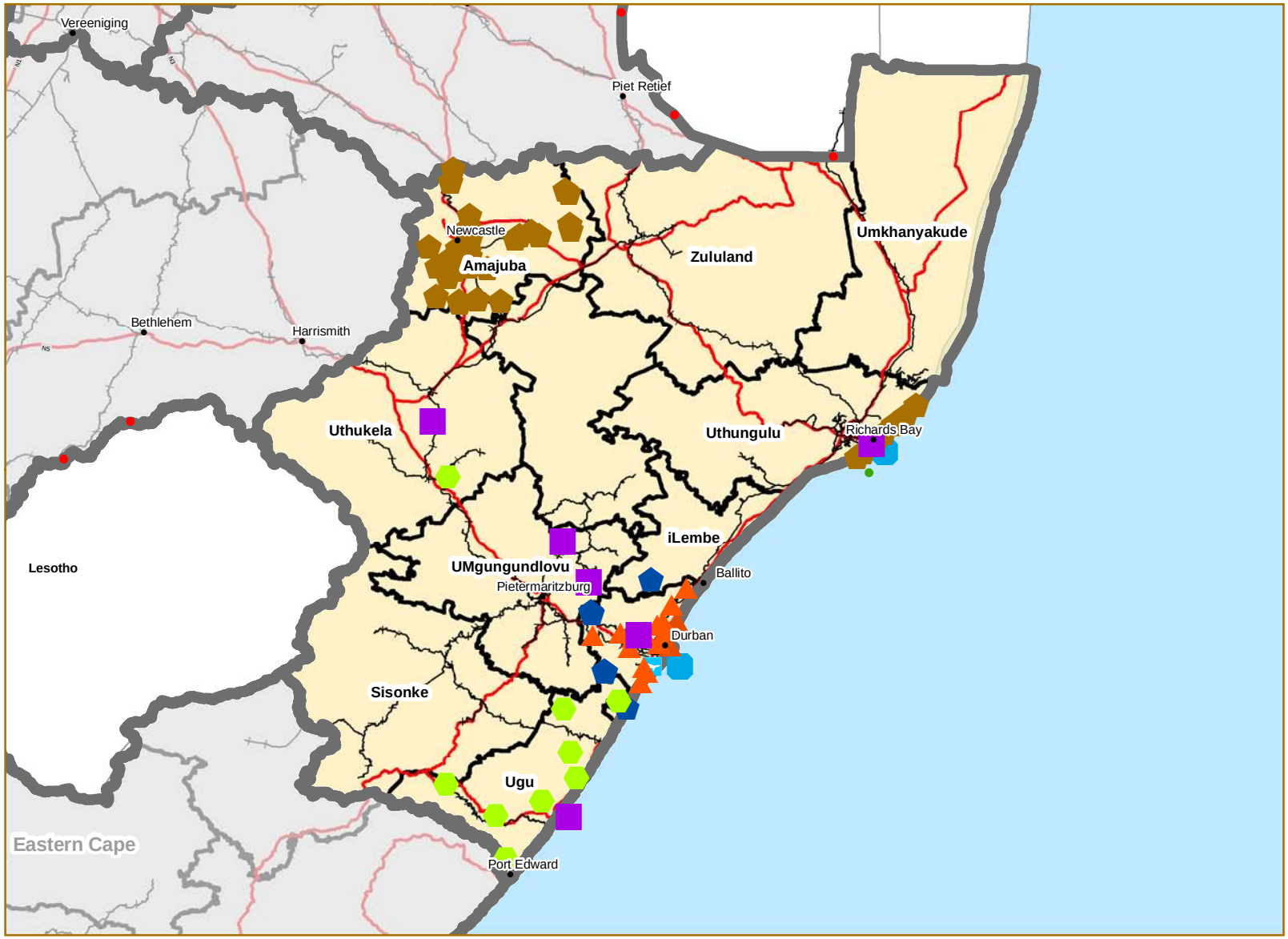
As mentioned, the potential for industrial development within the Province is primarily located in the nodes of eThekwini and uMhlatuze. Furthermore, the corridors between these two nodes (and extending up to Howick) form the primary zone of industrial development of the Province. The PSEDS identifies the following industrial development nodes for the Province:

- **Durban and Richards Bay** harbours as the main anchors of industrial development;
- **Dube Trade Port** to stimulate new opportunities;
- **Newcastle, Ladysmith, Stanger, Pietermaritzburg, Howick and Port Shepstone** as important primary, secondary, and tertiary nodes of industrial development potential
- The **Utrecht-Osizweni-Dannhauser Cluster** as the main anchor of mining activities in the Province, albeit a declining sector.

Apart from heavy industries, one **of the areas in which KwaZulu-Natal is recognised to enjoy a comparative advantage is agriculture**, given its strategic "gateway" position on the eastern seaboard, and favourable climatic conditions. However, the agricultural sector has traditionally been an underperformer, and has never achieved anything like its true potential. For this reason, the Provincial Government has identified the need to exponentially increase the level of agricultural output in the Province via an "Agrarian Revolution". The Agrarian Revolution targets the following areas (refer to **Map 4.3 B**) for the establishment of commercial farming and agro-industries: **Umkhanyakude** (Jozini, Makhatini); **Zululand** (Ulundi, Nongoma & Pongola); **Uthungulu** (Nkandla, Eshowe); **Umzinyathi** (Msinga); **Uthukela** (Estcourt, Bergville and Okhahlamba); **Umngungundlovu** (Msunduzi, Impendle, uMshwati); and **Ugu**.

Note: The identified major economic investment nodes, rural investment nodes, and mixed investment nodes (indicated on **Map 4.3 B**) falling within the jurisdictional boundaries of the eThekwini Metropolitan Municipality will be discussed within the context of the eThekwini Metropolitan area.

Kwazulu Natal Province: ECONOMIC DEVELOPMENT NODES



SDF

ECONOMIC DEVELOPMENT NODES

- Industrial
- Mixed Investment
- Agro Industry
- Mining
- Rural Investment Node
- Major Investment
- Port
- Institutional

BASEMAP LEGEND:

- SANRAL Road Network
- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

0-15% | 25% | 50% | 75% | 80% | 90% | 100%

February '09

MAP 4.3B Economic Development Nodes

NATIONAL TRANSPORT MASTERPLAN 2050

4.3.4 Corridors

The PSEDS does not attempt to identify a functional hierarchy of corridors throughout the Province, but instead focuses its attention on identifying development corridors. It is however **essential that the proposed development corridors are adequately served by appropriate transport infrastructure, as well as electricity, water, housing, health services, education facilities, and safety services**. Hence, for transportation and land use planning purposes, the numerous corridors identified by the PSEDS have been assigned a hierarchical level within the Province. Consequently, the following national and provincial transport corridors, and provincial development corridors constitute the PSEDS's transport network (Refer to **Map 4.3C: Corridors**):

4.3.4.1 National Corridors

- **The N3 corridor** linking Durban to Gauteng via Estcourt and Harrismith in the Free State.
- **The N3/N11** corridor linking Durban to important economic activity nodes within the Province's hinterland such as Pietermaritzburg, Ladysmith, and Newcastle. It also serves to link Durban to the Witbank-Middleburg economic activity area within the Mpumalanga Province, via Volksrust and Ermelo.
- **The N2 (North)** linking Durban to Richards Bay, parts of Mpumalanga, Swaziland, and Mozambique via the R22 and R439.
- **The N2 (South)** linking Durban to Port Shepstone and the Eastern Cape.

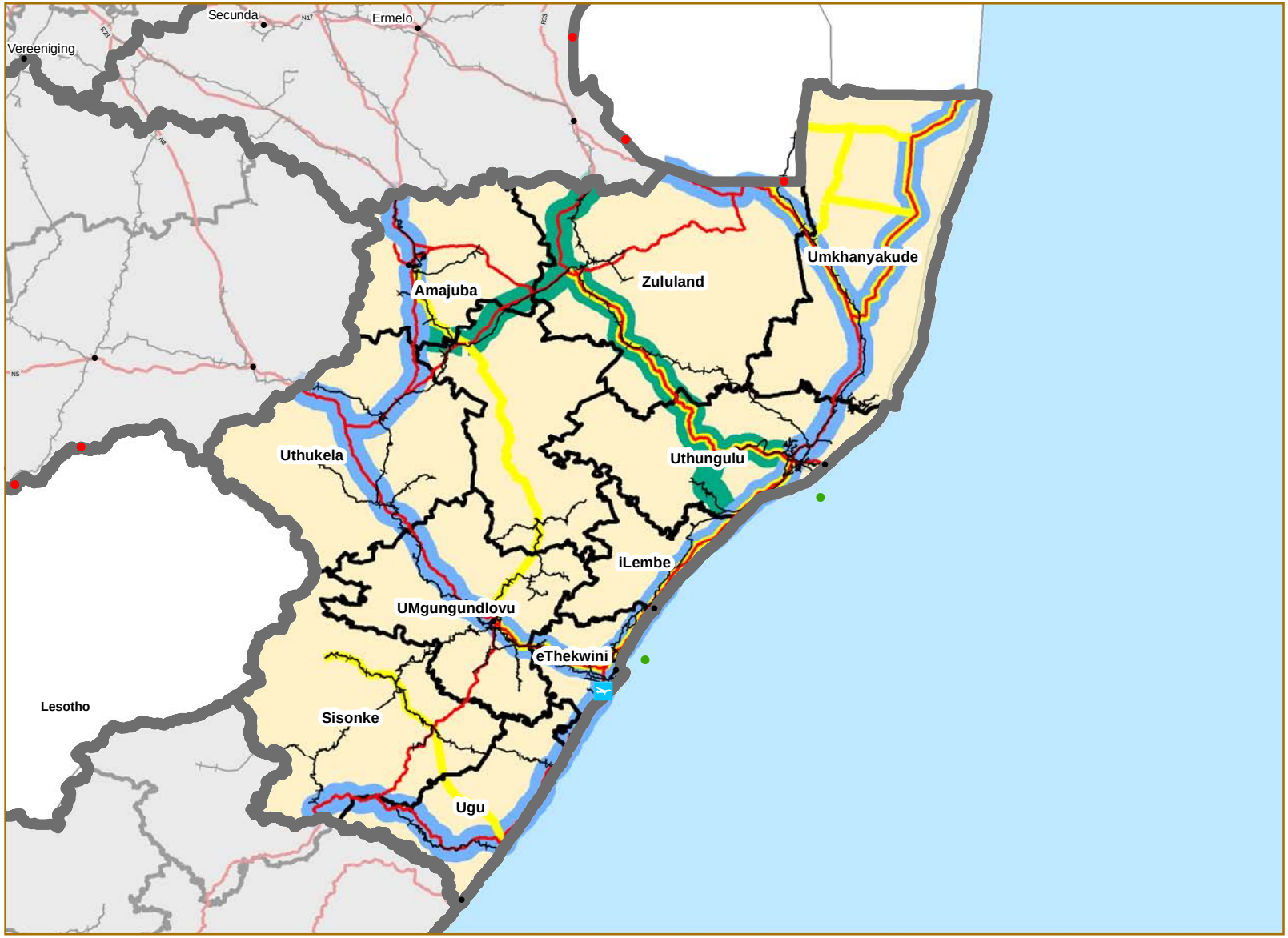
4.3.4.2 Provincial Corridors

- **The R33 link** between Dundee, Vryheid, and Mpumalanga, which joins the R34v corridor at Vryheid.
- **The R34 corridor** from Richards Bay to Vryheid, and beyond to Piet Retief. This corridor includes the railway line between Richards Bay, Vryheid, and over the provincial border to Broodsnyersplaas and Ermelo.

4.3.4.3 Development Corridors (Provincial)

- **The eThekwini / uMhlatuze Corridor (N2 North),** focusing primarily on development opportunities being presented as part of the La Mercy/DTP development, and creating opportunities for linking and strengthening the second and first economy
- **The eThekwini / Msunduzi / uMngeni Corridor (N3),** focusing primarily on establishing inter-municipal planning processes to ensure that the development opportunities presented in this region are optimised.

Kwazulu Natal Province: CORRIDORS



TRANSPORTATION

CORRIDORS

- Development Corridor
- Provincial Corridor
- National Corridor

BASEMAP LEGEND:

- SANRAL Road Network
- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

0-15% | 25% | 50% | 75% | 80% | 90% | 100%

February '09

NATIONAL TRANSPORT MASTERPLAN 2050

MAP 4.3C Corridors

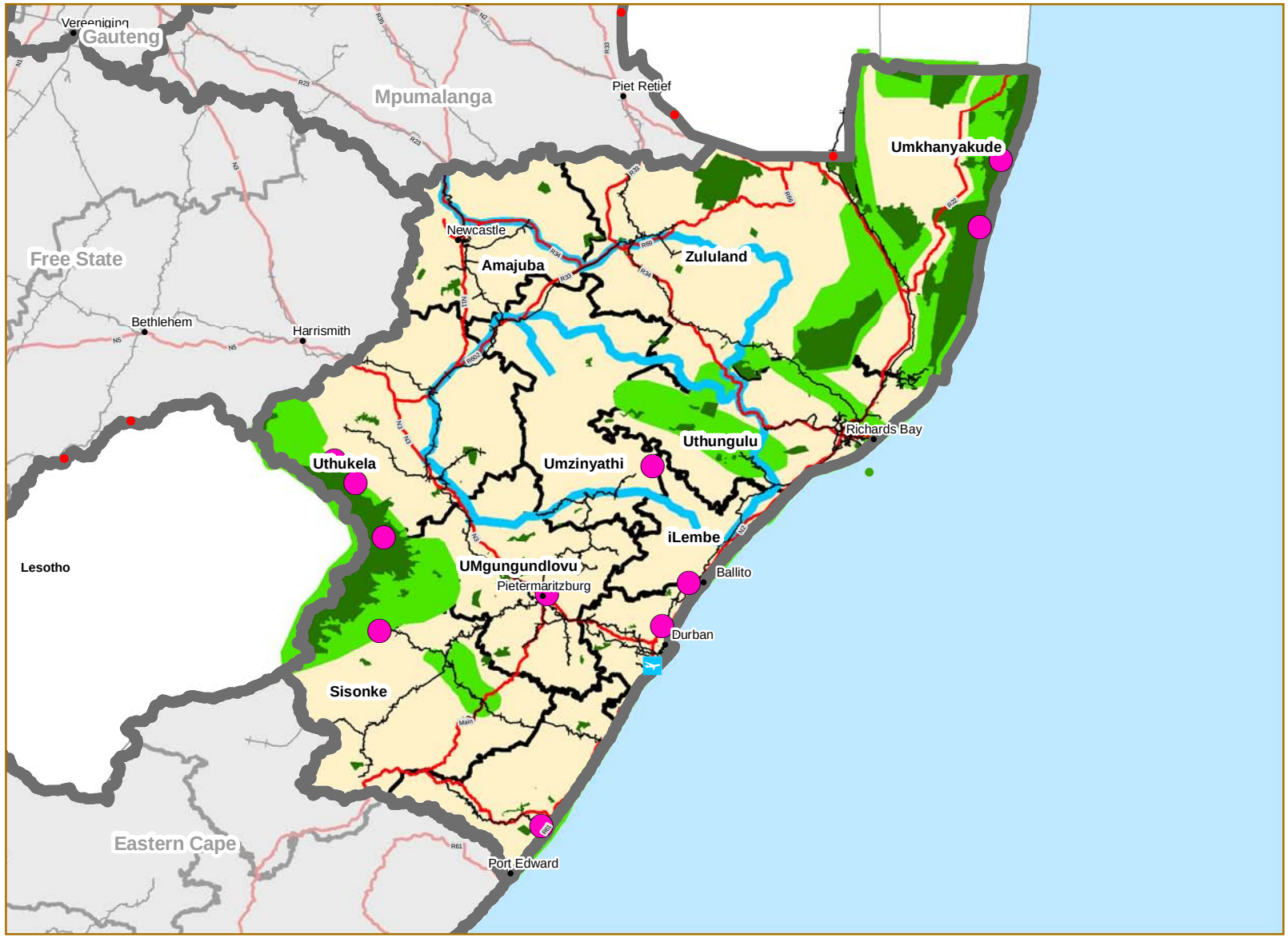
- **The uMhlatuze / Ulundi / Vryheid (P 700) Corridor (R34)** as a new link between the Richards Bay harbor and Gauteng, focusing primarily on the section between Ulundi and the Cengeni Gate of Umfolozi Game Reserve, and the Ulundi Airport.
- **The Lebombo SDI Corridor (N2, R22),** focusing primarily on developments along the southern and eastern sections of the Pongola Poort Dam; tourism facilities along the new SDI Route to Mozambique; large scale agricultural development; and enhancing the development opportunities related to the Greater St. Lucia Wetland Park.
- **The Port Shepstone / St Faiths / Ixopo Corridor (N2, R612, and R617),** focusing primarily on developing a direct link between the Southern Drakensberg (Underberg) and the coastal areas to expand the basket of tourist destinations and spending options.
- **The Battlefields Route Corridor (Umzinyathi) (R33, N11)**, focusing primarily on the route between Dundee and Greytown via Msinga, as a priority for the further development of the Battlefields routes of the Province.

4.3.5 Tourism Development Areas (TDAs) and Routes

Primary sectors of tourism potential are beach, cultural, and eco-tourism. The PSEDS identifies a number of Provincial tourism priorities which forms part of the Province's spatial framework. The targeted areas / Provincial tourism priorities (Refer to **Map 4.3 D**) are:

- The **Greater Durban and Pietermaritzburg area** offering beach and cultural tourism;
- The **Drakensburg region** offering eco-tourism;
- The **Greater St. Lucia and surrounding big five reserves** offering cultural and eco-tourism;

Kwazulu Natal Province: TOURISM DEVELOPMENT AREAS AND ROUTES



SDF

TOURISM AND ROUTES

- Tourism Development
- Tourism Routes
- Conservation Area
- Eco Tourism Development Area

BASEMAP LEGEND:

- SANRAL Road Network
- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

0-15% 25% 50% 75% 80% 90% 100%

February '09

MAP 4.3D Tourism Development Areas and Routes

NATIONAL TRANSPORT MASTERPLAN 2050

- The **South and North Coast** offering beach tourism;
- The **Zulu Heritage and Cultural Trail** offering cultural, and arts and crafts tourism within the Midlands Meander and Albert Falls Amble; and
- The **Battlefields Route** offering cultural tourism

4.3.6 Other categories

- Environmental Biodiversity Conservation PlanThe health and well-being of all individuals within the Province is reliant on a number of environmental services such as clean water supply, storm water management, flood protection, food production, and waste treatment. Furthermore, the Province's economy relies on the wildlife and recreational tourism generated by the Province's natural beauty and rich biodiversity. Hence, the protection of the Province's natural and ecologically sensitive areas is of the utmost importance.

  In order to protect the natural environment, all dams, rivers, sensitive ecological habitats, nature reserve, and beaches have been identified as ecological corridors.

4.3.7 Metropolitan area

The Metropolitan Spatial Development Framework (MSDF) sets out the spatial response to achieving the vision and outcomes of the Long Term Development Framework (LTDF) (2001) for the eThekwini Municipal Area (EMA). Hence, the MSDF consists of, and is constructed in the following manner (Refer to **Map 4.3 E**):

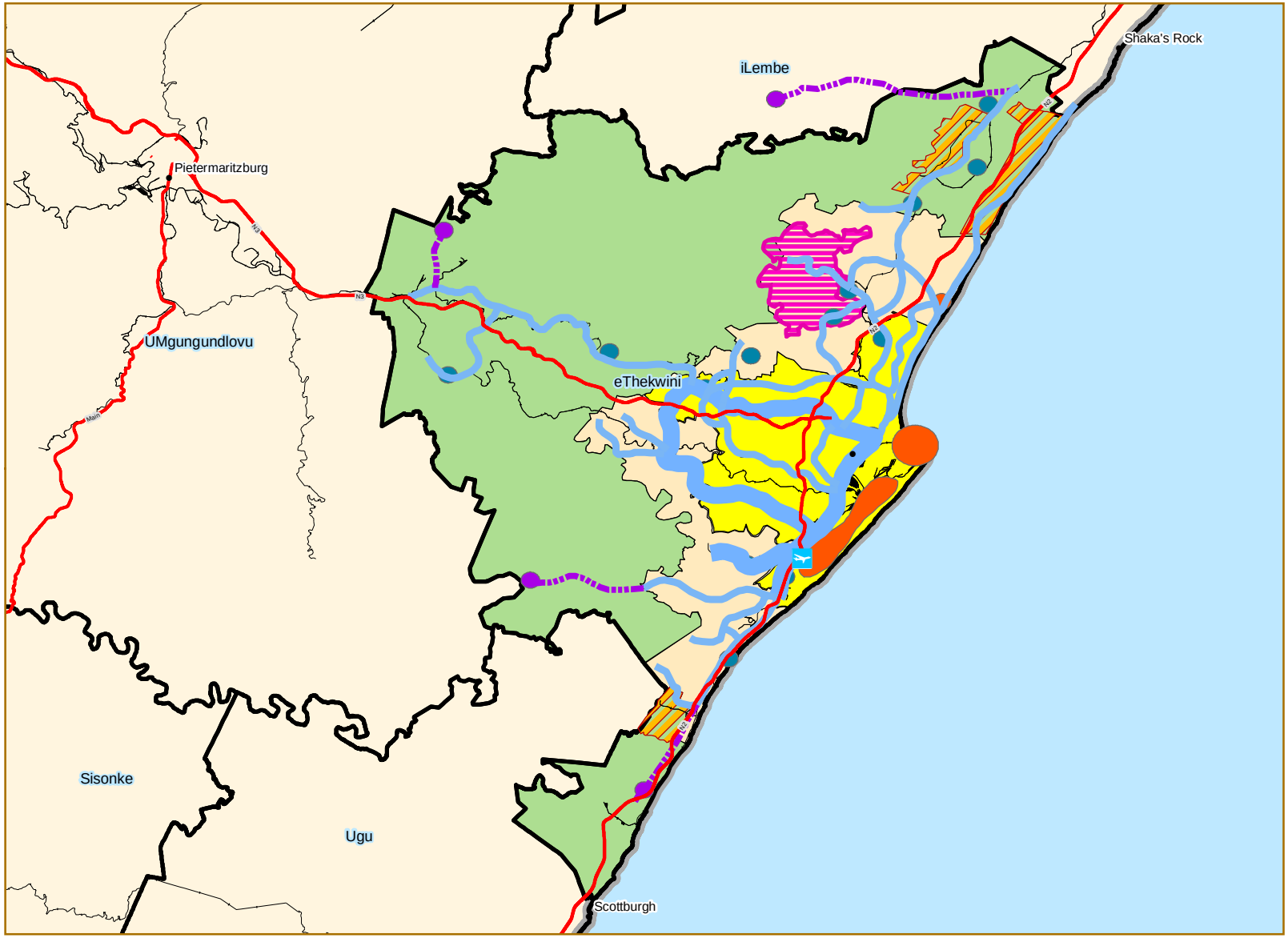
4.3.7.1 Structuring Elements

On the basis of settlement density, infrastructure capacity, and the differing nature of the landscape three broad categories / development areas have been delineated, namely the **urban core**, the **urban periphery**, and the **rural periphery (peri-urban)**.

Urban Edge

To ensure the sustainability of the EMA, an urban edge has been delineated. **Urban-level services should not be provided beyond this line.** The yellow shaded area (urban core area) indicates where excess infrastructural capacity in roads, water and sanitation can support an increase in development intensity within the urban edge. Hence, the MSDF proposes that this is the **area within which consolidation around existing infrastructure should take place.** It is proposed that **developments outside the edge should be low density, and form part of eco-tourism initiatives** so as to secure the natural areas on which the health of the urban areas depend. This said, two residential areas, as well as a dedicated trade zone has none the less been established outside of the current urban edge to accommodate future population and economic growth (Refer to Areas Suitable for Future Developments). It is expected that the current urban edge will be revised during 2008 by the Council to formally include these new areas within the edge.

Kwazulu Natal Province: ETHEKWINI METROPOLITAN MUNICIPALITY



SDF

ETHEKWINI METROPOLITAN MUNICIPALITY

Investment Corridors
- Feeder Routes
- High Priority Public Transport Network
- Rural Feeder Routes

Investment Nodes
- Major Economic Investment Node
- Mixed Investment Reinforcement Nodes
- Rural Investment Node
- Future Residential Development
- Presidential Project

Structuring Elements
- Rural/Peri Urban
- Urban Core
- Urban Periphery

BASEMAP LEGEND:
- SANRAL Road Network
- Railway Network
- Airports
- Towns
- District Municipal Boundary

1:600,000

0 2.5 5 10 15 20 Kilometers

Map and Data Current Status Completed

0-15% | 25% | 50% | 75% | 80% | 90% | 100%

February '09

MAP 4.3E:Ethekwini Metropolitan Area

NATIONAL TRANSPORT MASTERPLAN 2050

4.3.7.2 Development Areas

The EMA is reliant on a number of environmental services such as clean water supply, storm water management, flood protection, food production, recreation, and waste treatment. Hence, the MSDF identifies two categories of environmental assets, namely:

- **Ecologically threatened areas to be secured within the next five years**; and
- **Additional critical areas that form part of the long-term plan.**

Areas falling within either of the two categories predominantly occur within the peri-urban areas of the EMA (**KwaXimba, Mpumalanga, and Umbumbulu**), as well as the central parts of the urban core (**Cato Manor**). The **Port of Durban** also features some ecologically threatened areas.

4.3.7.3 Movement System (Investment Lines)

The MSDF identifies a number of investment lines and points. These are a spatial indication of where public investment should be directed at, and where private investment should be encouraged. The investment lines include the following:

- **High Priority Public Transport Network (HPPTN):** Investment should firstly be around the HPPTN. This will serve to increase usage of the public transport network, and support higher order facilities along the network.
- **Feeder routes**: The feeder transport routes serve to integrate the municipal areas by promoting easy access for all to opportunities within the urban core.
- **Rural feeder routes:** The rural feeder routes serve as links to rural service centres.

4.3.7.4 Nodes (Investment Points)

As with investment lines, investment points are a spatial indication of where public investment should be directed, and where private investment should be encouraged. Importantly, the investment points / nodes identified by the MSDF vary in their investment responses. The following investment points / nodes have been identified:

- **Major economic investment nodes include**: Beachfront; Point; CBD; SIB; and Umhlanga.
- **Mixed investment nodes (transport, social, and/or economic) include:** Mpumalanga; Umlazi; KwaMashu; Effingham Avoca; and Milky Way.
- **Reinforcement investment nodes include:** King Shaka Airport; Verulam; and Amanzimtoti.
- **Rural investment nodes include:** KwaXimba; Umgababa; Umbumbulu; and Ndwedwe.

4.3.7.5 Areas Suitable for Future Developments

The past decade has witnessed the decentralisation of the traditional CBD to outlying areas such as Gateway in the north and Amanzimtoti in the south. A major new industrial node is also being planned in the Cato Ridge area. Although the establishment of the Dube Trade Port to the north of Gateway presents a similar decentralization risk to Gateway as the CBD faced, **an extensive area surrounding the Trade Port has been earmarked for residential, business, commercial, industrial, and mixed use expansion.**

The Dube Trade Port has been earmarked as a **dedicated trade zone**, with the immediately surrounding land towards the north, west, and south functioning as a **dedicated airport support zone**. Secondary industries directly related to the activities of an airport are envisioned to take place within this support zone. **No new industrial development areas / nodes** (except for the Dube Trade Port area) are envisioned. Instead, intensification of the existing ones is proposed. The **site on which the current Durban International Airport is located** will be vacant once the airport moves to its new location at the Dube Trade Port. Initially indications are that this site should be dug-out and utilized as a dedicated container terminal.

Illovo South has also been earmarked for residential expansion. Importantly, all areas earmarked for future residential expansion are to comprise a mixture of tenure options so as to provide all inhabitants of the EMA with equitable access to affordable housing.

4.3.7.6 Area Based Management (ABM) Areas

In 2003 the eThekwini Municipality embarked on an innovative five year Area Based Management and Development Programme (ABMDP) with the intention to enhance service delivery, address spatial and social inequalities, as well as deepening local democracy in five strategically defined geographical areas of the City. The five operational areas are INK, iTRUMP, Cato Manor, KwaXimba, and SIB/SDB. **The Southern Industrial Basin (SIB) or South Durban Basin (SDB)** is a particularly important area in the context of this study.

The South Durban Basin (SDB) is a national economic powerhouse which consists of an industrial area within the eThekwini Metropole. The SDB contributes largely to Durban being the most significant logistics hub in the country, while nationally significant chemical, petrochemical, motor vehicle, and pulp manufacturers ensure its status as a key manufacturing node. As such, and **with the potential for expansion in a range of industries, the SDB will make a significant contribution to national priorities focused on economic growth, skills development and job creation.** Hence,

providing the SDB with adequate infrastructure (such as transportation) is of national importance.

Apart from the SDB's inherent industrial potential, the area also hosts a number of other crowning jewels which include the **naval base on the Bluff Headlands, the blue flag beach at Ansteys, the un-interrupted sea view at Cutting View Point, the mangroves at Isipingo Beach, and Pipeline Beach in Amanzimtoti.**

4.4 CONCLUSIONS AND RECOMMENDATIONS FOR PHASE 3

The growth experienced by the South African economy since 1999 – the longest period of economic expansion in the country's recorded history – has undoubtedly had its positive effects. As a result the Province currently boasts a number of large infrastructure development projects such as the expansion of the Richards Bay Coal Terminal (RBCT) and associated aluminium-smelting plants, upgrading of the Richards Bay "coal line", the Dube Trade Port, construction of the King Shaka International Airport at La Mercy, converting the current Durban International Airport site into a dedicated dug-out container terminal, expansion of the Sappi Saiccor pulp plant, the eThekwini Municipality's gas-to-electricity project, a new oil refinery between Empangeni and Richards Bay, a mix-use waterfront development at Durban harbour, and the expansion of the International Convention Centre (ICC). Most of the aforementioned developments are not only important to the continued economic growth and well-being of the Province, but also present nationally import initiatives. Apart from all the new development(s), the Province already features nationally and internationally acclaimed nature reserves and tourist destinations such as the game reserves, Drakensberg resorts and coastal beaches.

Yet, economic development also comes at a cost as new capacity continually needs to be created, placing more and more stress on available energy and water resources (especially the demand for more Steam Coal), transportation infrastructure (especially the N3 and Durban harbour), and the natural environment. The Province's resources are already being place under huge pressure due to the scattered nature of rural communities, urban sprawl, the rapid expansion of large housing developments, rising car ownership, and the topography of the Province presenting considerable barriers to cost-effective infrastructure development and land use patterns.

Thus, taking into consideration key indicators for the future such as the present energy crisis, global environmental pollution concerns, and the rising costs of infrastructures provision, it has become vital to create a sustainable settlement structure and transportation network for the Province. Critically, the economic growth and stability of not only the Province, but South Africa as a whole depends on the ability of its ports to function optimally, and the existence of an effective road and rail network to, and from, the ports of Durban and Richards Bay.

Unavoidably, the Province will have to adopt a settlement and transport strategy that allows for continued economic growth (in order to ensure socio-economic well-being), whilst minimising the impact of new infrastructure development(s) on the Province's natural environment, and valuable agricultural land. The Province's natural environment not only serves to attract thousands of tourists each year, but also provides for critical environmental services and valuable agricultural land to drive the "Agrarian Revolution". Internationally, the need to maximise growth and minimise negative impact has been, and is still being addressed, through greater land use and public transportation integration.

Hence, as economic and population growth continues to strain existing infrastructure and resources, necessitating the need for additional infrastructure and land to be developed within the Province, the negative impacts of such new development(s) should be minimized through developing infrastructure that is public transport orientated, and in turn, land use activities that supports public transport via clustered higher density developments.

A decision will undoubtedly have to be taken as to the future of the numerous scattered settlements throughout the rural hinterland of the Province. As is, the transport infrastructure in rural areas is inadequate to support higher levels of economic activity. The role that a number of towns (e.g. Newcastle, Ladysmith, and Glencoe) play within the Province's economy will also have to be reassessed due to the depletion of the majority of the Province's coal fields. Furthermore, the current activities supported by the Richards Bay and Durban harbours should be assessed, and a decision should be taken as to the strategic role that each should play in light of national and provincial growth and development goals.

5. PASSENGER TRANSPORT OPERATIONAL ANALYSIS

5.1 INTRODUCTION

5.1.1 Background to passenger transport

This Chapter analyses the problems and issues identified in the Phase 1 Status Quo Report. The main focus is the comparison of passenger demand and supply and identification of capacity bottlenecks.

In terms of passenger operations, there are two types of capacity utilisation problems. The fist one is service capacity, which deals with the utilisation of the supplied seats of vehicles. The second one deals with right-of-way infrastructure capacity, or line capacity, in rail terms. Service supply problems can be solved in various ways, i.e. increasing frequencies, re-routing of vehicles from over-supplied to under-supplied routes, increasing the vehicle fleet, or more efficient scheduling. Infrastructure capacity problems can be solved by adding capacity in terms of more lanes in the case of roads, or extra lines in the case of rail. The use of transport management techniques can also increase the capacity of the infrastructure as a short term measure.

Policies, institutional, legal and financial issues that impact on operations are addressed in the national report on Financial, Institional, Legal and Management Aspects.

It should be noted that the scope of the work focuses on the demand and operations pertaining to inter-city transport and not on collector / distribution aspects. However, operations dealing with access to and from land-uses of national importance, such as metropolitan inter-city public transport facilities, stations, ports and airports are included.

The Phase 2 report only deals with base year, that is current problems, and not with future projected problems. The demand modelling is documented in a national report, and future projected problems are addressed in Phase 3.

5.1.2 Objectives

The main objective of the Passenger Operations Chapter is to determine the base year (2005) service capacity bottlenecks for the inter-city / inter regional passenger transport modes for rail, air, bus, minibus-taxi and private transport modes.

To define the detailed objectives and scope of the work in more detail, the Passenger Working Group (PWG) held a meeting with **the client, the Department of Transport, i**n the early stages of Phase 2. These are discussed in the section that follows.

With reference to NATMAP's Terms of Reference (ToR), in particular clause 4.3.4, "determine the most sustainable high-quality country-wide, multi-modal, integrated passenger transport system over the planning period 2005 to 2050 in South Africa", the following interpretation was agreed by the client and the PWG:

i) The system should include institutional, legal and financial components covering both infrastructure and operations to ensure that strategies, programmes and projects can be implemented.
ii) The emphasis is to be on long-distance passenger movement, i.e. inter-city in general, and inter-metropolitan in particular.
iii) Local passenger movement is only of concern where it compromises efficient long distance transport, e.g. congested or capacity restricted intra-urban trunk routes affecting access to ports and airports, efficient freight movement and inter-urban passenger movement.
iv) The scope and breadth of the mandate should be restricted to infrastructure and modes of travel regulated by the national Department of Transport. In this regard the passenger strategies, programmes and projects in NATMAP should be harmonized with the plans of independent transport entities such as the CAA, ACSA, SARCC and SANRAL. The Master Plans of these entities should be reflected in the 2050 plans for NATMAP. Only the inconsistencies between these plans should be addressed.
v) Future passenger demand estimates in NATMAP should reflect the master plans of these transport entities and those of national, provincial and municipal development authorities and agencies. In the passenger arena these will include national, provincial and municipal Spatial Development Initiatives.
vi) Passenger strategies and actions developed in NATMAP should be mindful of energy depletion, environmental issues and the millennium development goals.

There are a number of policy issues which affect passenger transport and have a critical bearing on the passenger content of the Master Plan. These are:

(i.) **LONG DISTANCE** passenger transport is largely in the hands of the private sector (except for SAA, Gautrans and Shosholoza Meyl) and it is not appropriate for a government planning initiative to be involved in **TRANSPORT OPERATIONS** involving private sector service providers. Supply of services by private operators is market driven and is demand responsive and variable because it is subject to market fluctuations caused by inter alia, foreign investment variability, energy price, interest rates, and government policies. No review of this policy of deregulated inter-city passenger transport is necessary unless this need is revealed by Phase 2 Analysis

(ii.) There seems to be a gap in respect of **policy review**, however, namely poor performance in passenger **POLICY IMPLEMENTATION** by most provinces and municipalities. The need for policy review and adjustments and likely necessary long term policy changes will be assessed in Phase 2 and is a gap which the Passenger Working Group will address.

(iii.) **MARITIME, AVIATION** and to a lesser extent **INTER-CITY RAIL** are highly specialised services involving amongst other things international safety regulations, bi-lateral agreements and other specific matters of detail. The Passenger Working Group should be guided by existing and evolving Master Plans being prepared by ACSA, SARCC, and SHOSHOLOZA MEYL. It will restrict itself to providing input to long-term demand scenarios for inter-city movement by road, rail and air, the resultant road and rail infrastructure requirements and policy matters related to supply and demand. Coastal passenger movement and its supply and demand is a private sector initiative and is not a national imperative, except as a "nice to have" for the tourist industry.

(iv.) **CAR AND NON-MOTORISED TRANSPORT** trends and forecasts will be included. These modes both compete with and support, public transport. Policy positions need to be taken regarding the supply, regulation and standard of infrastructure for these essential passenger transport modes.

To summarise, the detailed objectives of the passenger operations analysis are to:

- To identify the main problems and issues from the Status Quo information in Phse 1;
- To determine the base year (2005) service capacity bottlenecks by comparing the demand and supply on various inter-regional routes;
- To identify alternative strategies to investgate in Phase 3; and
- To assess the impkication of existing plans on the Phase 3 forward plans.

5.1.3 Methodology

The main methodology involved the estimation of the 2005 passenger and vehicle volumes by mode on the road, rail and air networks from the transport demand model. The volumes were compared with the supplied capacity of the networks for each mode, and volume - capacity ratios were determined. The location and severity of the bottlenecks could thus be determined.

Although the status quo information from Phase 1 also provides demand and supply data and service capacity bottlenecks, the assumptions and formats of the data differ between provinces and survey data also relate to different times of the year. Many gaps also exist in the survey data. Using the modelled demand for the base year instead of the status quo data solves all these problems as a consistent database can be used for the whole country.

The bottlenecks identified from the model were compared and supplemented with the status quo information, as well as the knowledge of the relevant agencies and authorities dealing with the transport infrastructure.

In view of the fact that the model is a strategic inter-regional model, it provides only average daily passenger and vehicle volumes. In order to conduct capacity analyses, peak hour volumes are needed. Appropriate peak hour factors were herefore used to convert the daily volumes to peak hour volumes.

The basis for capacity analyses vary from mode to mode. For road and rail modes, the link volume – capacity ratios are used. For air, the airport termini peak hour arrivals and departures on the land side and air side are used as well as the annual passenger movements for the runway capacity. In terms of road modes, the link capacity analysis requires the car, bus and mini-bus taxi volumes to be combined, although the car mode has the higest impact on the road level of service. For the public transport modes, the inter-city rail, bus and mini-bus taxi termini are assessed in terms of peak hour capacity utilisation.

For information on the passenger demand estimations, model assumptions, model specifications, modelling techniques and parameters should be consulted in the national report on the NATMAP transport model.

Many problems relating to passenger operations and their solutions are not only a matter of demand and supply. The Phase 1 report identified a large range of problems dealing with policy, management and finance. Therefore these problems were also analysed in conjunction with the service capacity problems with a view to identify integrated strategies dealing with all aspects of passenger operations.

Authorities dealing with passenger infrastructure and operations have developed their own modal plans, which have been summarised in the Phase 1 report. These have been assessed and incorporated into possible alternative strategies to be investigated in Phase 3 forward plans.

5.1.4 Structure of this chapter

The structure of this chapter is as follows:

Paragraph 5.2: Summary of problems and issues for analysis from Phase 1
Paragraph 5.3: Service capacity bottlenecks
Paragraph 5.4: Summary of issues and problems of passenger operations analysis
Paragraph 5.5: Identification of alternative strategies to be investigated in Phase 3
Paragraph 6.5: Implication of existing plans on Phase 3 forward plans
Paragraph 6.6: Conclusions Phase 2 and recommendations for Phase 3

5.2 SUMMARY OF ISSUES AND PROBLEMS FOR ANALYSIS FROM PHASE 1

5.2.1 Introduction

A summary is given here of problems and issues that were identified in the Status Quo report. These problems are quantified in the Phase 2 report with regard to their size, location and severity. The main focus of the NATMAP project is on the demand for transport and plans to meet the demand by appropriate supply strategies. Other problems are therefore not analysed to the same extent. Most passenger operational problems are not related to infrastructure, but rather to inefficient management, lack of funding, institutional fragmentation, as well as inadequate and complex legislation.

Passenger transport experiences great difficulty in moving towards the achievement of integration and seamless public transport services because the operating space is divided and hotly contested. This contest is manifested in two ways as follows:

1. Institutional rivalry between national, provincial and municipal government authorities over planning and strategy development and control of operations and plan implementation.
2. Physical competition between modes and institutional disagreements about the role of modes particularly in the context of the contest for state funds for plan implementation.

These institutional problems are addressed in the National report on Financial, Institutional, and Legal aspects.

It must also be appreciated that passenger operational problems are mostly related to urban problems, which are not the focuss of the Project. These are also summarised below, but not further analysed.

Inter-regional passenger transport does not experience many current problems, unlike urban passenger transport. Inter-city air, bus, and mini-bus taxi are provided by private operators and are provided very efficiently, especially where they serve the higher income markets. However, the problems would get more severe in future with increasing demand, and these will be addressed in Phase 3, which considers demand projections and forward planning.

A distinction is made below between urban and inter-regional problems, although most of these problems are present in both urban and inter-regional transport.

5.2.1 Urban problems

- With rising car ownership and use, pressure on the road network can be expected to mount considerably in the coming decades. The poor quality of public transport services influences this rise in car ownership.
- Rising car ownership and use in the metropolitan areas and large urban centres, giving rise to serious congestion and unacceptable levels of air pollution and wasteful use of valuable urban land taken up by roads and car parking.
- Aged and, in some cases unsafe, rolling stock and public transport vehicles, subject to breakdowns and being uncomfortable and unattractive to passengers.
- Serious user dissatisfaction with almost all attributes of train, bus and minibus taxi services often leading to vandalisation of vehicles and an incipient tendency to burn vehicles as a form of protest against non-delivery of adequate services.
- Existing public transport is not sustainable under present operating and management practices. The main problem is low profitability for many private operators, resulting in a failure to adequately maintain and recapitalise fleets. The result will be a reduction in service offered in the medium- to long-term. Public operators are not incentivised to offer improved services or limit operating losses.
- There is a vast difference between rail service and line capacity. Service capacity has declined because of a failure to invest in new rolling stock. Failure to maintain and upgrade line and signal systems will also result in a reduction of line capacity.
- Non-uniformity of public transport service standards, and non-integration between modes;
- A very high scholars and workers walk to school (79%) or to their place of employment (18%) and cognisance of this is required in the provision of transport infrastructure
- A large percentage of households in KwaZulu-Natal have limited access to public transport or cannot afford it. Some 15 % have limited access – both urban and rural. Some 43 per cent of households using public transport spend more than 10 percent of their household income on public transport.
- Delays to road-based public transport services caused by buses and minibus taxis having to operate in congested traffic streams and making public transport even less attractive to commuters.
- Perceptions of a lack of safety from crime on the accesses to public transport services, crime at stations and on trains;
- Absence of common, controlled fare structures and common signage;
- The slow pace of compliance with universal accessibility standards.
- Absence of off-peak services and low frequency of services;
- Poor scheduling and routing leading to unproductivity.
- Overcrowding on trains and mini-bus taxis;
- The reckless driving and bad behaviour of minibus taxi drivers;
- Traffic safety is a major problem relating to car, bus and mini-bus taxi transport.

- Perception of lack of safety during the non-motorised part of public transport journeys;
- Manpower capacity and ineffectual management are the main cause of low productivity in the transport system, apart from the ageing fleets of vehicles and rolling stock.
- Inadequate policing and law enforcement, particularly relating to unsafe driving and un-road-worthy vehicles and poor observance of traffic laws.

5.2.2 Inter-regional problems

Similar problems to those in urban areas are experienced, especially with services targeting the low-income market. Only the main inter-regional problems are highlighted here.

- With rising car ownership and use, pressure on the road network can be expected to mount considerably in the coming decades. The poor quality of public transport services influences this rise in car ownership.
- Rising car ownership and use on inter-regional roads give rise to congestion during peak holiday times and unacceptable levels of air pollution and wasteful use of valuable urban land taken up by roads.
- Aged and, in some cases unsafe, rolling stock and public transport vehicles, subject to breakdowns and being uncomfortable and unattractive to passengers.
- Serious user dissatisfaction with almost all attributes of train, bus and minibus taxi services often leading to vandalisation of vehicles and an incipient tendency to burn vehicles as a form of protest against non-delivery of adequate services.
- Existing public transport is not sustainable under present operating and management practices. The main problem is low profitability for many private operators, resulting in a failure to adequately maintain and recapitalise fleets. The result will be a reduction in service offered in the medium- to long-term. Public operators are not incentivised to offer improved services or limit operating losses.
- The modal integration of public transport services is limited and public transport planning and infrastructure provision does not support the integration of transport modes. Collection and distribution services at termini are indadequate and intergated with the main line modes.
- Modes are not used where most appropriate, for example, mini-bus taxis undertaking long trips, which can be done more efficiently by means of bus and train.
- Most households in KwaZulu-Natal have limited access to public transport, or cannot afford it. The result is that a limited number of the population undertake long-distance holiday trips. Monthly migration trips are limited to low-income households who make use of low quality buses and mini-bus taxi services.

- Long-distance rail suffers from very old rolling stock, low demand and hence low profitability. Many services have been discontinued, and only the core services are remaining.
- Long-distance stations and termini are in poor condition and generally not integrated with other supporting land-uses, such as shopping and employment centers. The exception is the Durban International airport and Durban train station. Durban station is being upgraded, while a new international airport is being developed at La Mercy north of the city.
- Traffic safety is a major problem relating to car, bus and mini-bus taxi transport. This is often the result of poor roads, old and un-roadworthy rolling stock, long driving hours, and lack of effective law enforcement.

5.2.3 Analysis of performance of public transport system in KZN

The White Paper on National Transport Policy in 1996 suggested some strategic targets for improvements to the public transport system in South Africa. These targets were later translated into key performance indicators for public transport in the National Land Transport Strategic Framework published by the DoT in 2000. The NHTS enables these KPI's to be measured to reflect on the performance of public transport in the province of KwaZulu-Natal. **Table 14** highlights the situation in KZN. In summary, the following points in **Table 14** are noteworthy:

Table 14: Passenger Key Performance Indicators (KPIs) in KwaZulu-Natal

No	KPI	Target	KwaZulu-Natal Results	
			% not within target	Number not within target
1	Travel time to work	Less than 1 hour	17 % of all commuters	270 000 commuters
2	Travel time for work trips by public transport	Less than 1 hour	56 % of train commuters; 34 % of bus commuters; 20 % of taxi commuters;	25 000 train commuters; 79 000 bus commuters; 95 000 taxi commuters
3	Travel time for educational trips	Not specified (suggest less than 31 min)	42 % longer than 30 minutes; and 11% longer than 60 minutes	1.4 million longer than 30 minutes; and 354 000 longer than 60 minutes
4	Metropolitan and urban walking times to public transport	15 min (about 1 km)	14 % of urban metropolitan households	167 000 households

5	Rural walking times to public transport	30 minutes	15 % of rural households	132 000 households
6	Percentage of households spending more than 10 % of income on public transport	A maximum of 10 % was suggested	34 % of households	720 000 households

* Based on perceived walking times from homes to services.

The foregoing results reflect on some of the improvements that need to be addressed through policy adjustments and investment through the NATMAP action plan and the other modal master plans.

- Infrastructure – increases in line capacity to reduce overcrowding and increase frequencies. Improvements to facilities at stations, bus stops and taxi facilities. Security infrastructure improvements including closed stations and surveillance cameras.
- Management – particularly policing, and scheduling and routing adjustments.
- Law enforcement – particularly to address concerns about unroadworthy vehicles and reckless driving.

The issues to be addressed by policy changes which will affect the output of the NATMAP passenger action plan are those of car restraint and road user charging. It will not be sustainable or environmentally responsible for infrastructure supply policies to continue to satisfy the rising demand for road space. At the same time car restraint will struggle to be politically acceptable if public transport remains in its present run-down, badly managed and poorly regulated state. Dissatisfaction with public transport services in the KwaZulu Natal and Ethekwini reflects on the improvements that will be necessary to make public transport car competitive. These levels of dissatisfaction signal that transport policies need to shift investment priority significantly from roads to public transport.

5.3 SERVICE AND INFRASTRUCTURE CAPACITY BOTTLENECKS

5.3.1 Introduction

In this Section the base year (2005) capacity bottlenecks are discussed based on the outputs of the passenger model. The national report on the NATMAP model provides the details of the model specifications, assumptions, calibration and validation procedures, and summary outputs. In the provincial chapters, the model outputs are considered in detail for each province.

The two categories of capacity, service capacity and infrastructure capacity are analysed in different ways, as explained below:

The service capacity is given by the number of seats utilised compared to the number of seats supplied. It is expressed as:

% Service Capacity Utilisation = number of seats occupied per time period and per link divided by number of seats supplied per time period and per link.

The capacity utilisation varies per link on the network, and by time of day. To quantify the capacity utilisation, very detailed data is required, which is not available for national purposes. The size of the vehicles fleet and schedules in stock are known per route only, from which a coarse analysis can be made. The model provides the number of daily passengers, or seats occupied, per link, which is compared to vehicle schedules, provided by operators.

An accurate analysis is not required, as capacity problems are easily solved by increasing the vehicle fleet, increasing frequencies, changing routes and schedules. Apart from the rail mode, inter-city passenger services are owned by private operators, i.e. air lines, coach operators and mini-bus taxi operators. In many cases there is an over-supply, and this is solved by phasing out old vehicles, rescheduling, or promoting the use of the services to increase demand. The main problem actually relates to the under-utilisation of rail, and congestion (over-utilisation) of cars.

Analysis of service capacity is therefore done on a very coarse basis.

The infrastructure capacity bottlenecks are the main inputs analysed by the infrastructure working group, provided in Chapter 7. For example, for roads, this is expressed as:

% infrastructure capacity utilisation = number of passenger car units per link per hour divided by capacity in terms of passenger car units per hour. This is further categorised in terms of levels of service, which indicate a cetain level of performance.

It is normally analysed per lane for a specific road link or section. The way in which capacity is measured differs from mode to mode. Further details are given in the infrastructure chapters.

In view of the fact that the main analysis is given in the infrastructure chapters, it is only necessary to review the impact of infrastructure bottlenecks on operations.

5.3.2 Link volumes by mode

Maps 5.3 A to E give the passenger link volumes from the model outputs by mode (rail, bus, mini-bus taxi, air and car). Different scales are used in order to show differences between links for each mode.

Map 5.3 A shows the rail passenger volumes. The only service runs from Durban via Pietermaritzburg to Johannesburg.

Map 5.3 B shows the bus and coach passenger volumes. The highest volumes are shown on the N3 route to Johannesburg. Significant volumes are also shown on the routes to N2 along the South and North Coast, and inland to Kokstad, Volksrust and Vryheid. Most routes are centered on Cape Town.

Map 5.3 C shows the taxi passenger volumes. More routes are operated by taxis compared to bus. Taxis also operate more on shorther routes. The highest volumes are shown on the routes to Johannesburg. Unlike bus, routes are not all centered on Cape Town.

Map 5.3 D shows the air passenger volumes as well as the feeder distribution routes by road. The highest volumes are to Johannesburg

Map 5.3 E shows the car passenger volumes. The highest volumes are on the N3 route to Johannesburg and along the N2 along the coast. Volumes increase the closer the routes get to Cape Town, as a result of the higher densities around Durban.

The highest passenger volumes are on the car mode (130,000), followed by bus (10,000), taxi (119,000), air (8,000), and rail (10,000). The modal split is shown by passengers departing or arriving within the KZN province.

Figure 13 shows the percentage modal split of inter-zonal trips for trips departing from the KZN province and arriving in the KZN province. These include inter-zonal trips within the province. Public transport has a 75 percentage share of total trips. Taxi has the highest share by far of all modes, followed by car and bus. Train and air have small and equal shares.

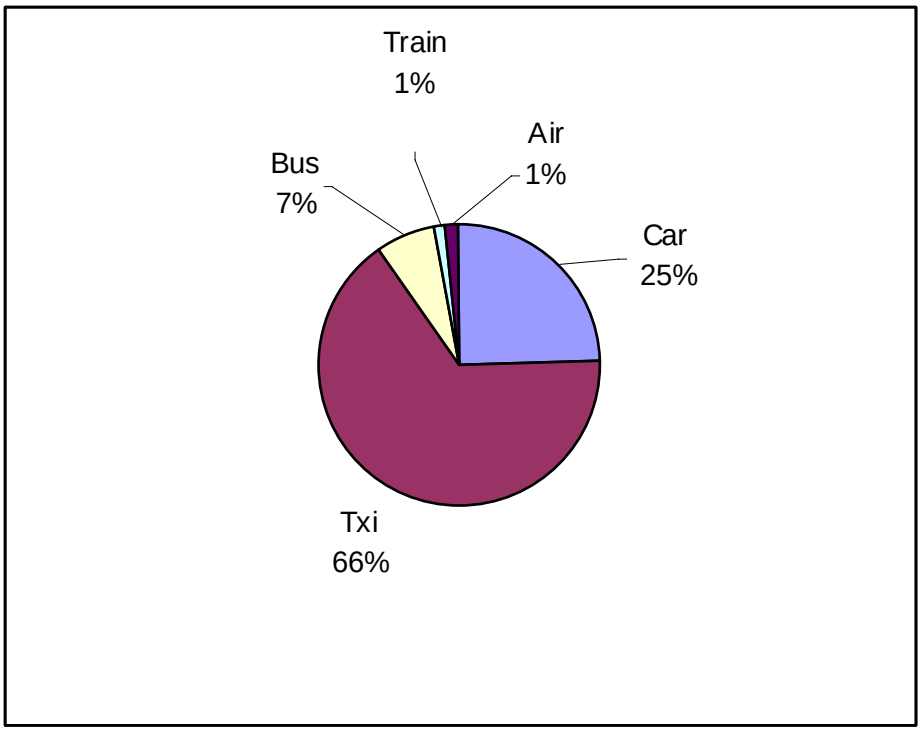
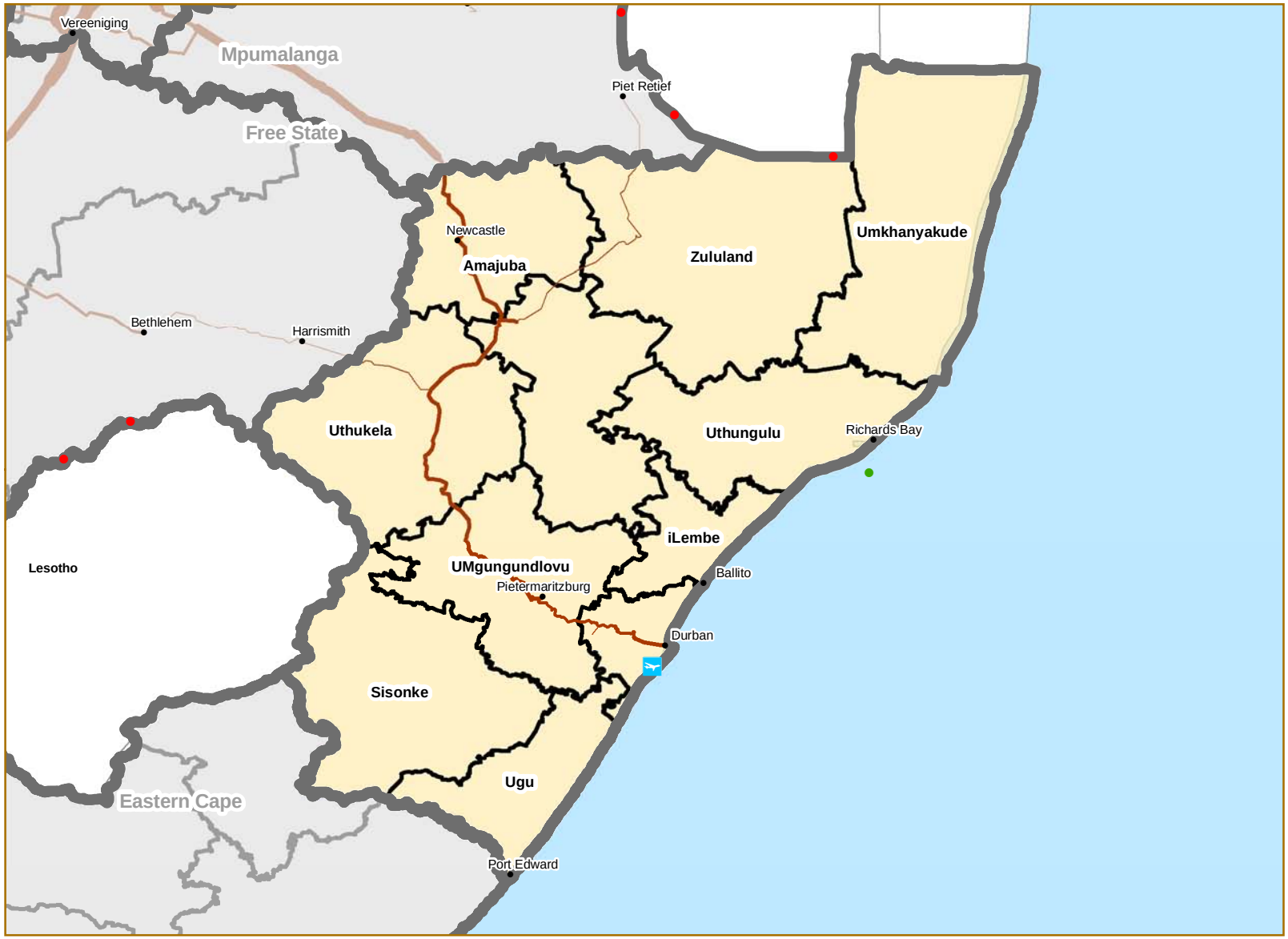


Figure 13: Modal Split of Inter-Zonal Departing And Arriving In The Western Cape Province (Natmap Model)

Kwazulu Natal Province: AVERAGE DAILY PASSENGER LINK VOLUMES BY RAIL



PASSENGER VOLUMES

RAIL

- 10 - 100
- 101 - 250
- 251 - 350
- 351 - 500
- 501 - 10 000

BASEMAP LEGEND:

- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

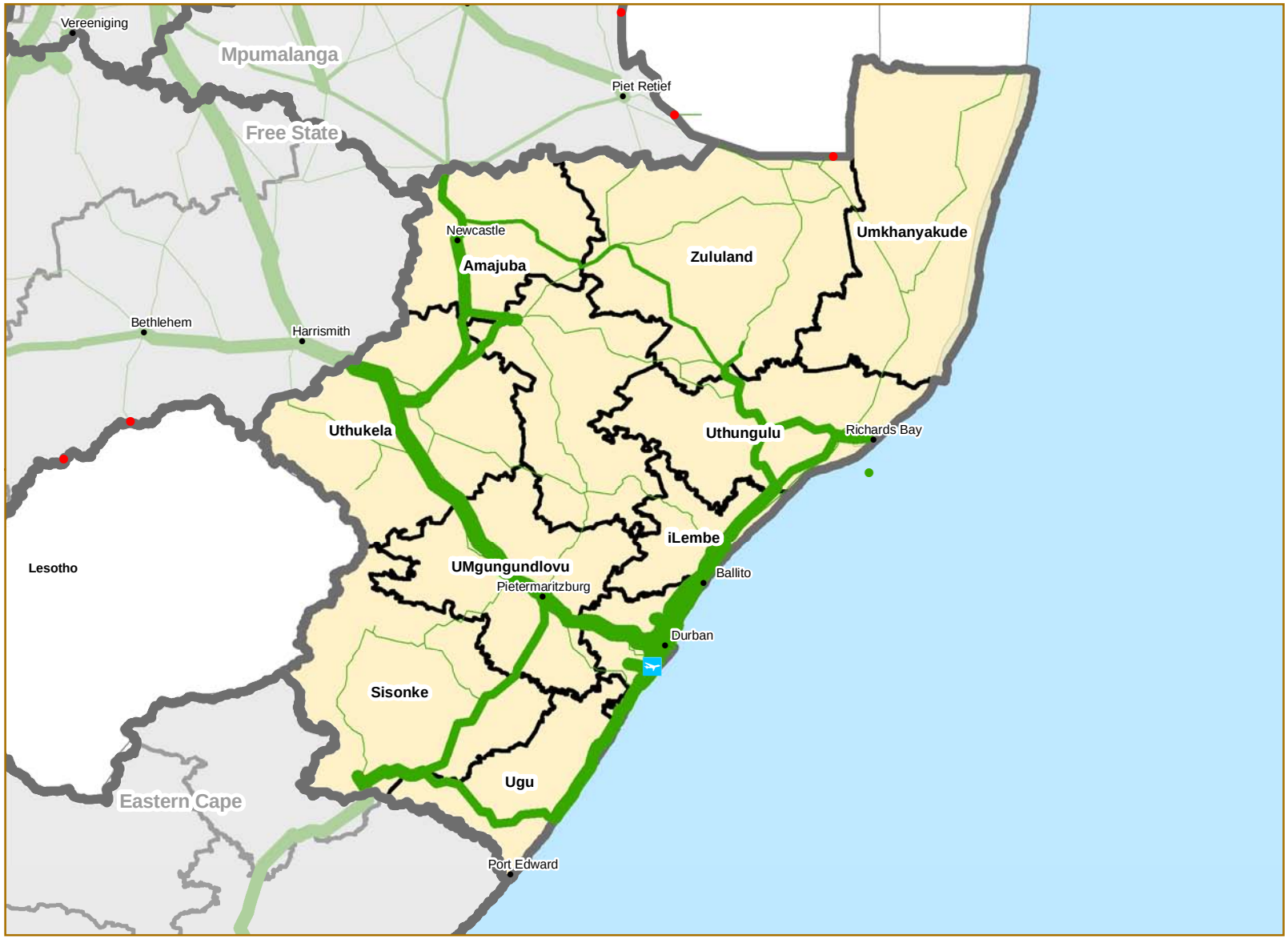
0-15% 25% 50% 75% 80% 90% 100%

February '09

MAP 5.3A Average Daily Passenger Link Volumes by Rail

NATIONAL TRANSPORT MASTERPLAN 2050

Kwazulu Natal Province: AVERAGE DAILY PASSENGER LINK VOLUMES BY BUS



PASSENGER LINK VOLUMES

BUS

- 0 - 250
- 251 - 500
- 501 - 1 000
- 1 001 - 2 000
- 2 001 - 10 000

BASEMAP LEGEND:

- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

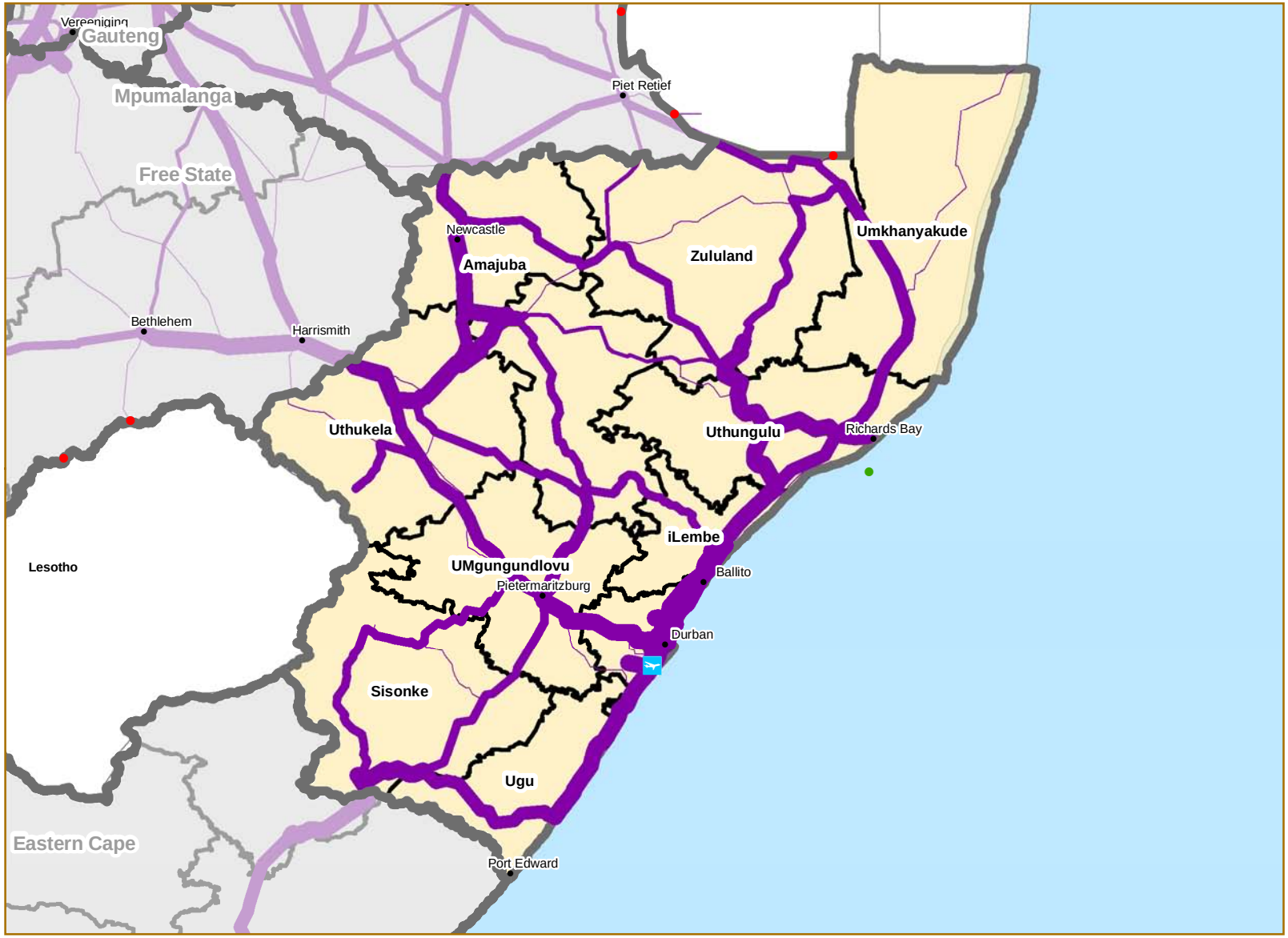
0-15% 25% 50% 75% 80% 90% 100%

February '09

MAP 5.3B Average Daily Passenger Link Volumes by Bus

NATIONAL TRANSPORT MASTERPLAN 2050

Kwazulu Natal Province: AVERAGE DAILY PASSENGER LINK VOLUMES BY MINI-BUS TAXI



PASSENGER LINK VOLUMES

MINI-BUS TAXI

- 0 - 250
- 251 - 500
- 501 - 2 500
- 2 501 - 5 000
- 5 001 - 120 000

BASEMAP LEGEND:

- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

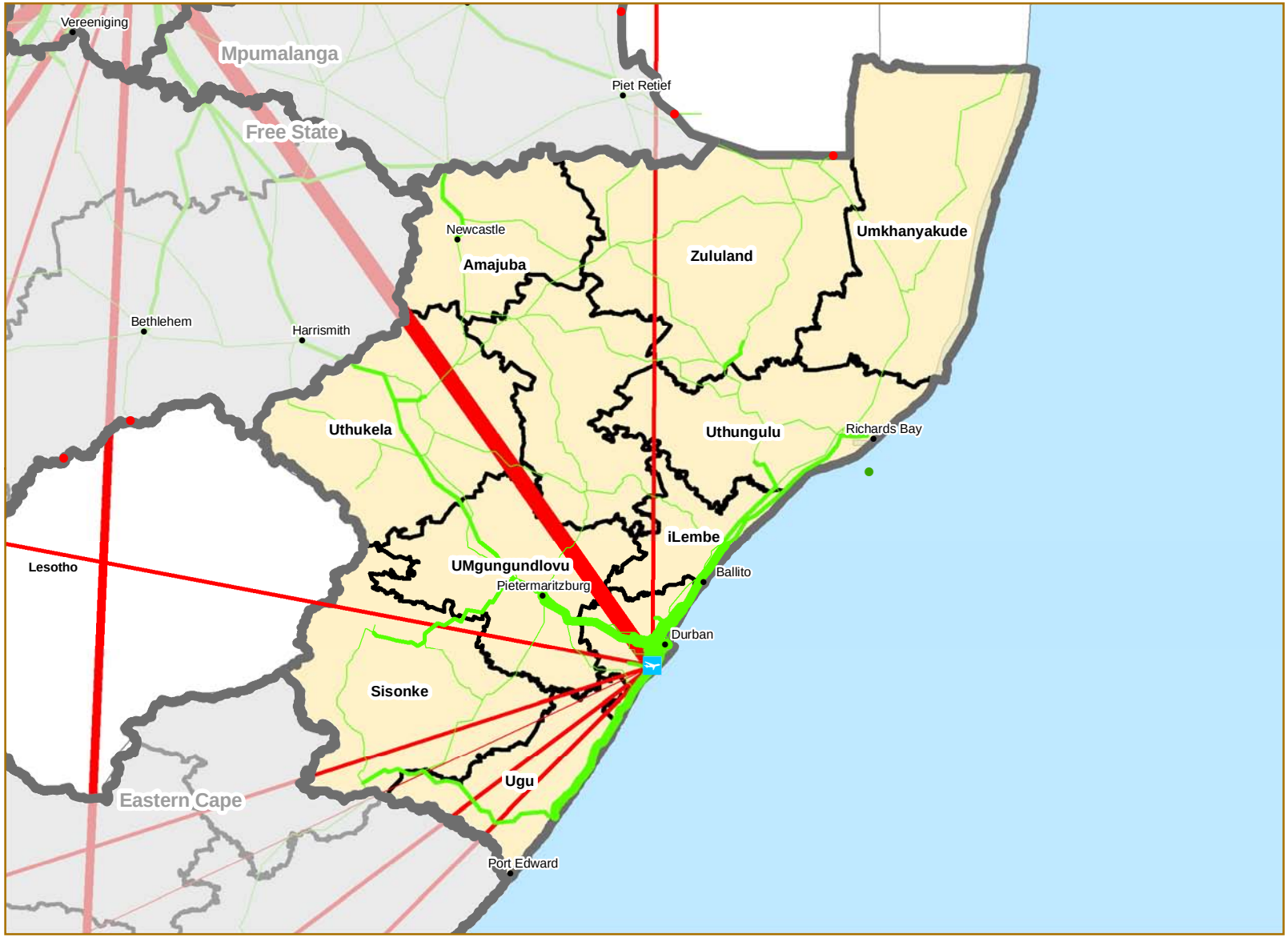
0-15% 25% 50% 75% 80% 90% 100%

February '09

MAP 5.3C Average Daily Passenger Link Volumes by Mini-Bus Taxi

NATIONAL TRANSPORT MASTERPLAN 2050

Kwazulu Natal Province: AVERAGE DAILY PASSENGER LINK VOLUMES BY AIR



PASSENGER LINK VOLUMES

AIR

Feeder Routes

- 0 - 250
- 251 - 1 000
- 1 001 - 2 500
- 2 501 - 5 000
- 5 001 - 15 000

Air Routes

- 0 - 250
- 251 - 1 000
- 1 001 - 2 000
- 2 001 - 5 000
- 5 001 - 10 000

BASEMAP LEGEND:

- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

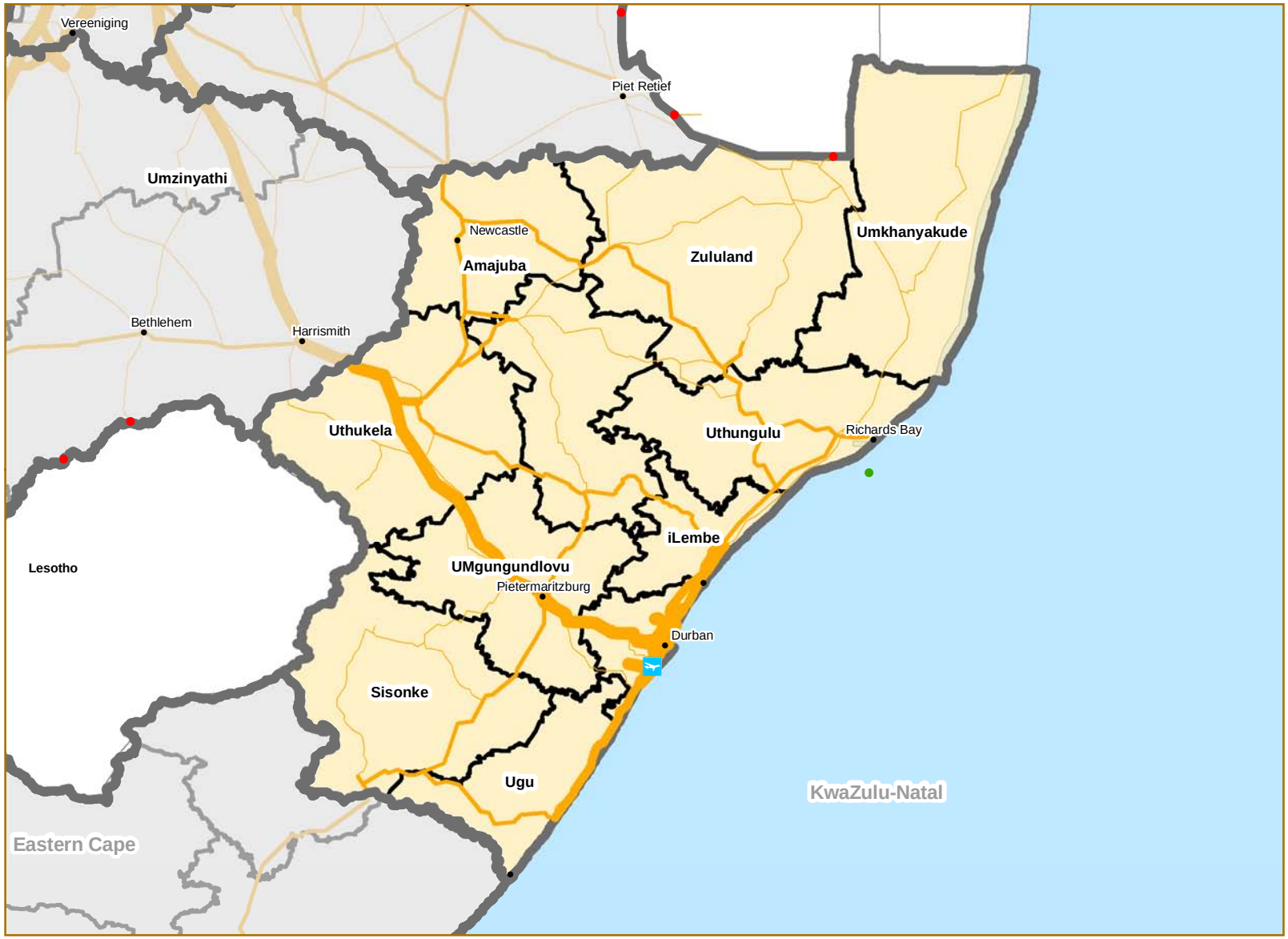
0-15% 25% 50% 75% 80% 90% 100%

February '09

MAP 5.3D Average Daily Passenger Link Volumes by Air

NATIONAL TRANSPORT MASTERPLAN 2050

Kwazulu Natal Province: AVERAGE DAILY PASSENGER LINK VOLUMES BY CAR



PASSENGER LINK VOLUMES

CAR

- 0 - 1 000
- 1 001 - 5 000
- 5 001 - 10 000
- 10 001 - 50 000
- 50 001 - 130 000

BASEMAP LEGEND:

- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

0-15% 25% 50% 75% 80% 90% 100%

February '09

MAP 5.3E Average daily Passenger Link Volumes by Car

NATIONAL TRANSPORT MASTERPLAN 2050

5.3.3 Implications of infrastructure bottlenecks on passenger operations

The impacts of infrastructure bottlenecks are limited. The two main problems relate to traffic congestion to access the Durban train station during peak times, and the high rate of traffic accidents caused by poor roads and rolling stock.

The eThekwini Transport Authority (ETA) is addressing road and rail access to the CBD as part of their 2010 SWC programs. The main Durban train station and Warwick modal transfer station are being upgraded. A major inner city public transport network and services are also being implemented.

A new international airport at La Mercy is being developed north of the city with proper raod access and multi-modal facilities.

Apart from the above problems, the main issue is actually the under-utilisation of public transport, which causes traffic congestion on long-distance routes during peak times of the year, and generally making transport unsustainable in the longer term. Major intervention is needed on the inter-regional (long-distance) public transport, similar to that planned for urban public transport. Interventions are more of an operational and management nature, rather than with infrastructure, except for rail.

Private coach and air services are being operated efficiently. The main problem is with passenger rail services. This needs to be given attention as part of the NATMAP forward plans, which will be integrated with the national master plan of the Passenger Rail Agency of SA (PRASA). Attention also needs to be given to modal integration.

Initiatives by the ETA to promote its north-south rail corridor was actually so succesfull that rail demand has exceeded supply, causing a drop in quality of service and negative impact on demand. Although this is a commuter rail problem, it also impacts on the long-distance rail services.

In terms of service capacity, the private road and air operators are monitoring demand and increasing rolling stock in line with demand. Again, rail rolling stock is the main problem to address. PRASA is in the process of major rolling stock upgrades and replacements. On inter-city routes, there is line and service capacity, but additional rolling stock would have to be provided when services are improved and demand increases as a result of improved servioces.

The condition of mini-bus and bus vehicles is a major problem. The DOT is busy with the Taxi Recap program, which is addressing the mini-bus taxi industry. However, the uptake is very slow and intervention is needed to meet deadlines.

Strict law enforcement and monitoring of bus, and even luxury coaches, are required to force operators to comply with minimum standards in their Operating License agreements.

5.4 SUMMARY OF ISSUES AND PROBLEMS OF PASSENGER OPERATIONS ANALYSIS

5.4.1 Introduction

A summary is given here of the isues and problems according to mode of transport, identified during the passenger operational analysis.

5.4.2 Rail Operational Problems

- There is only one inter-regional service in the province, while there is a potential for more services, given more funding and higher quality of service.
- Old rolling stock and signalling equipment becomes a safety problem.
- Lack of suitable facilities and infrastructure impact on efficient transfers at stations external to Durban.
- Under-utilisation of rail transport.
- Low quality services for the lower income markets.
- High and rising subsidies for rail
- Long-distance rail suffers from very old rolling stock, low demand and hence low profitability.
- Long-distance stations and termini external to Durban are in poor condition and generally not integrated with other supporting land-uses, such as shopping and employment centres.
- Security at stations and on trains is an ongoing concern, but are being addressed by the new rail way police strategy

5.4.3 Bus Operational Problems

- Traffic congestion during peak times makes it difficult for long-distance bus services to access the Durban station, and other congested areas in the metropolitan area.
- Duplicating and competing taxi services on certain routes
- There is potential for more services, given more funding and higher quality of service, and effective regulation of taxis so that they do not compete on routes best served by bus.
- Dispersed and hilly settlements served by gravel roads are difficult and costly to access. This becomes impossible during rainy periods
- Fragmentation of governance and operational structures.
- Lack of uniform standards in terms of safety or operational compliance.
- Lack of suitable facilities and infrastructure impact on efficient transfers at long-distance public transport stations external to Durban.
- Under-utilisation of bus / coach transport
- Low quality bus services for the lower income markets.
- High and rising subsidies for bus

- Existing public transport is not sustainable under present operating and management practices, targeting the lower income markets.
- Low profitability for many private operators, resulting in a failure to adequately maintain and recapitalise fleets.
- Long-distance stations and termini external to Durban are in poor condition and generally not integrated with other supporting land-uses, such as shopping and employment centres.
- Manpower capacity and ineffectual management are the main cause of low productivity in the transport system, apart from the ageing fleets of vehicles and rolling stock.

5.4.4 Minibus-Taxi Operational Problems

- Dispersed and hilly settlements served by gravel roads are difficult and costly to access. This becomes impossible during rainy periods
- Lack of suitable facilities and infrastructure impact on efficient transfers at long-distance public transport stations external to Durban.
- Over-utilisation of taxis during peak times
- Inefficent use of the minibus-taxi mode, for example, taxis undertaking long trips, which can be done more efficiently by means of bus and train.
- Low quality mini-bus taxi services for the lower income markets.
- Fragmentation of governance and operational structures.
- Lack of uniform standards in terms of safety or operational compliance, but is being addressed by Minibus-taxi Recap program. However, the Recap program experiences various problems and delays.
- Existing public transport is not sustainable under present operating and management practices, targeting the lower income markets.
- Low profitability for many private operators, resulting in a failure to adequately maintain and recapitalise fleets.
- High prices charged by taxis for tourists
- Long-distance stations and termini external to Durban are in poor condition and generally not integrated with other supporting land-uses, such as shopping and employment centres.
- Traffic safety is a major problem. This is often the result of poor driving, un-roadworthy rolling stock, long driving hours, and lack of effective law enforcement.
- Manpower capacity and ineffectual management are the main cause of low productivity in the transport system, apart from the ageing fleets of vehicles and rolling stock.

5.4.5 Analysis of Other Problems

The following problems are common to all modes of transport:

- Fragmentation of governance and operational structures.
- Lack of uniform standards in terms of safety or operational compliance.
- Lack of suitable facilities and infrastructure impact on efficient transfers at long-distance public transport stations external to Durban.
- Lack of a common fare structure, transfer agreements and protocols between the different modes and operators, and lack of an integrated ticketing system;
- Lack of a common livery (signage) for public transport in the province to facilitate efficient inter-modal changes.
- Rising car ownership and use are not sustainable in terms of their energy, environmental and road safety;
- Lack of adequate and affordable access to long-distance public transport
- Lack of modal integration of long-distance public transport services.
- There is traffic congestion on inter-regional roads during weekends and peak holiday times.
- Inadequate policing and law enforcement, particularly relating to unsafe driving and un-road-worthy vehicles and poor observance of traffic laws.
- Operating License Boards lacks capacity resulting in delays with issuing of operating licenses.
- Uncertainty with regard to future demand patterns depending on future changes in the economy, demographics and technology, such as information communication technology.

5.5 IMPLICATION OF EXISTING PLANS ON PHASE 3 FORWARD PLANS

5.5.1 Introduction

Existing plans were described in the Phase 1 Status Quo report. A summary of the plans are repeated hear for the sake of continuity. Additional comments are made n view of their implications for Phase 3 forward planning.

5.5.2 National Passenger Strategy and Action Plan

The Cabinet approved the release of the Draft Public Transport Strategy for public consultation in October 2006. The Public Transport Strategy maps out a framework to accelerate the transformation of public transport service delivery in 3 phases (Phase 1: 2007-2010, Phase 2: 2010-2014 and Phase 3: 2014-2020).

The Action Plan is a high-level plan that supplements the Public Transport Strategy. It maps out the Phase 1 (2007-2010) implementation programme and funding requirements for the next 4 to 7 years. It aims to initiate implementation of catalytic Integrated Rapid Public Transport Network (IRPTN) projects in up to 12 cities and 6 districts (including the nine 2010 World Cup venue cities) at an estimated cost of R12bn

over and above the current capital allocations to bus and rail subsidies and the Public Transport Infrastructure and Systems Fund (PTIS).

The Public Transport Strategy has two key thrusts as follows:

- Accelerated Modal Upgrading; and
- Integrated Rapid Public Transport Networks (IRPTNs).

Modal Upgrading focuses on the 3-7 year transitional period with regard to improving the quality of the public transport fleet and its current operations.

The Action Plan focuses on Integrated Rapid Public Transport Networks over the 4-20 year period and aims to implement high quality networks of “car competitive” public transport services that are fully integrated, have dedicated rights-of-way and are managed and regulated by a capable municipal transport department. In this regard, the aim is for major cities, such as Ethekwini, to upgrade both commuter rail services and bus and minibus services to a Rapid Rail and a Bus Rapid Transit (BRT) level of quality respectively. Ultimately, these services will be fully integrated to form a single system regardless of mode.

Whereas the National Passenger Strategy and Action Plan are focussed on urban areas, it makes sense that it it is also adopted for inter-city transport. This will imply implementing an integrated public transport network, linking up with the urban networks at the long distance modal transfer stations. The Strategy should deploy the best mode(s) for each of the primary routes between the major urban areas, with supporting links to towns of national significance.

5.5.3 Public Transport Plans in ITP’s and PLTF’s

Public Transport Plans for Ethekwini and the metropolitan and district municipalities have been completed. These plans mostly reflect the status quo of public transport in the municipalities in terms of the statutory Current Public Transport Records (CPTR). In view of the limitations of the CPTR’s, the data they contain are not a reliable indication of the demand for public transport in KwaZulu Natal, except for Ethekwini, where extensive CPTR’s have been conducted.

The implementation projects contained in the plans are mostly planning projects which involve further research and analysis and are, therefore, of little relevance to NATMAP in its search for locally generated infrastructure and services projects of provincial and national significance. Those infrastructure projects that were proposed in the 2005/06 plans, and subsequently in terms of the World Cup Legacy Projects do not go far enough to encapsulate the national Public Transport Strategy and Action Plan. There is little progress in the detailed planning and design of any of the PTP rationalised

networks, or corridor projects or even infrastructure upgrading. The only projects to be implemented are piecemeal projects, such as the Warwick Triangle project, which has little hope of success without comprehensive system-based, or network approaches to public transport improvements. Piecemeal upgrading of infrastructure, such as priority lanes, taxi ranks and modal transfger stations, will not improve the overall public transport system.

Most of the infrastructure implementation projects in the Metro and District PTPs proposed list of projects are new or upgraded interchanges, or minibus taxi ranks and facilities. These planning efforts have, furthermore, being piecemeal, and will have t be integrated by the network approach being proposed in the National IRPTN Action Plan.

5.5.4 Municipal operational plans and 2010 plans

Ethekwini - Introduction

The Ethekwini Transport Authority (ETA) is currently in the process of developing operational plans both for the IRPTN network implementation and for the 2010 Football World Cup, principally through its Inner City Distribution System. It is too early to state with any finality how these plans will finally turn out, or the extent to which the 2010 Plan will leave any lasting public transport legacy.

IRPTN Network

The north-south KwaMashu – Umlazi rail corridor will form the backbone of the future IRPTN network described in the following section.

The Draft IRPTN network for Ethekwini is still under analysis and may change significantly. The network will provide good public transport coverage for the entire city.

The first phases of the IRPTN are the following:

- The north-south rail corridor between KwaMashu and Umlazi;
- The CBD distribution system which forms a strong part of the ETA Operational Plan for 2010; and
- The east-west linkages between the Bluff and CBD on the one hand and Chatsworth and Westville on the other.

5.5.5 National Passenger Rail Plan

National commuter rail planning process

The main focus of the Passenger Rail plan was on the 6 commuter rail regions operated by Metro Rail. For rural rail, only a strategic plan was developed. The Rail Plan identified corridors in which rail is the most appropriate mode of public transport consistent with national transport policy. The Ethekwini Rail Plan was coordinated with the ITP with the aim of redefining local rail networks in terms of identifiable travel corridors. This involved close engagement between the Metrorail management team

and city transport planning officials. The refinement and development of the ETA Rail Plan and the ITP is an ongoing process which will be done within the framework of the Integrated Rapid Public Transport Network of the National Passenger Strategy and Action Plan.

KwaZulu-Natal commuter rail plan

The Rail Plan process in the KwaZulu-Natal was based on national policies and principles, provincial and local policies. The following general role was established for rail within KwaZulu-Natal:

Spatial Development Support: Existing rail corridors are to be supported by densified spatial development along their length. Corridors for future spatial development will also be supported by densified development irrespective of whether such corridors will eventually be served by road-based or rail transport modes.

Rail Network Operational Support: Existing rail services to continue to form the backbone of the Ethekwini Transport Authority public transport system. As such, the existing rail network will be served by feeders and distributors at railway stations.

Operational Network Efficiency: The investment in the existing rail system is to be protected and the rail system to be operationally enhanced. Rail network proposals should be considered in terms of the possibility of their improving the existing rail network and public transport network efficiency.

The role of rail is significant in the KwaZulu-Natal region on account of the fact that eThekwini ITP has determined that rail is the backbone of its public transport system. The Regional Rail Framework has identified KwaMashu – Umlazi rail corridor as a category A corridor for investment. The North – South corridor is the dominant element in the rail transport system, with east – west lines feeding this at varying degrees of intensity. The North – South corridor is a strong commuter line supporting existing development and able to support much future development along the route if adequate service levels can be provided. Of the four East – West inland rail routes, only the Umlazi – Isipingo transport corridor was sufficiently supported by current and proposed future land use patterns to warrant a clear cut case for ongoing commuter rail services.

Based on the numerous development proposals in the northern parts of the EMM area, including the Inanda/Ntuzuma/Kwa Mashu (INK) Regeneration Area and the proposed La Mercy Airport development, a strong land use planning case could be made for extending the existing North – South rail route into the proposed INK regeneration node.

Role of rail in rural passenger demand corridors

The Rural Passenger Plan determined the role of passenger rail in areas external to the metropolitan areas. These include commuter services in rural areas, commuter services

from towns and settlements outside metropolitan boundaries, as well as inter-city services, such as those of Shosholoza Meyl. The project was an extension of the SARCC Commuter Rail Master Plan (National Rail Plan), which covered the six metropolitan areas as well as Buffalo City. The strategy adopted was to focus on the upgrading of the existing rail network along priority corridors, before developing new rail lines. The same strategy was followed in the Rural Rail Master Plan.

Three types of development corridors were distinguished:

- national SDI's;
- national freight corridors identified by the National Freight Logistics Strategy; and
- provincial corridors from provincial spatial development frameworks.

A high-level list of priority rail passenger corridors were subsequently identified based on various criteria, such as population, employment, development corridors, etc. **Figure 14** below shows the priority rural rail passenger corridors. This will be refined in the next phase of NATMAP based on future demand projections.

When the National Transport Master Plan commenced, the SARCC decided to integrate their planning with that of the DOT. The Rural Rail Plan will therefore be developed as an integral part of the National Transport Master Plan.

5.5.6 Conclusions

The existing plans are mostly concerned about intra-urban commuter planning. A few implications for NATMAP Phase 3 have been pointed out, especially in terms of linking of the inter-city network with that of the urban areas.

It is clear from the analysis that there is no integration between plans of different municipalities, and also between provinces. This demonstrates the need for a national plan, which can integrate all these plans.

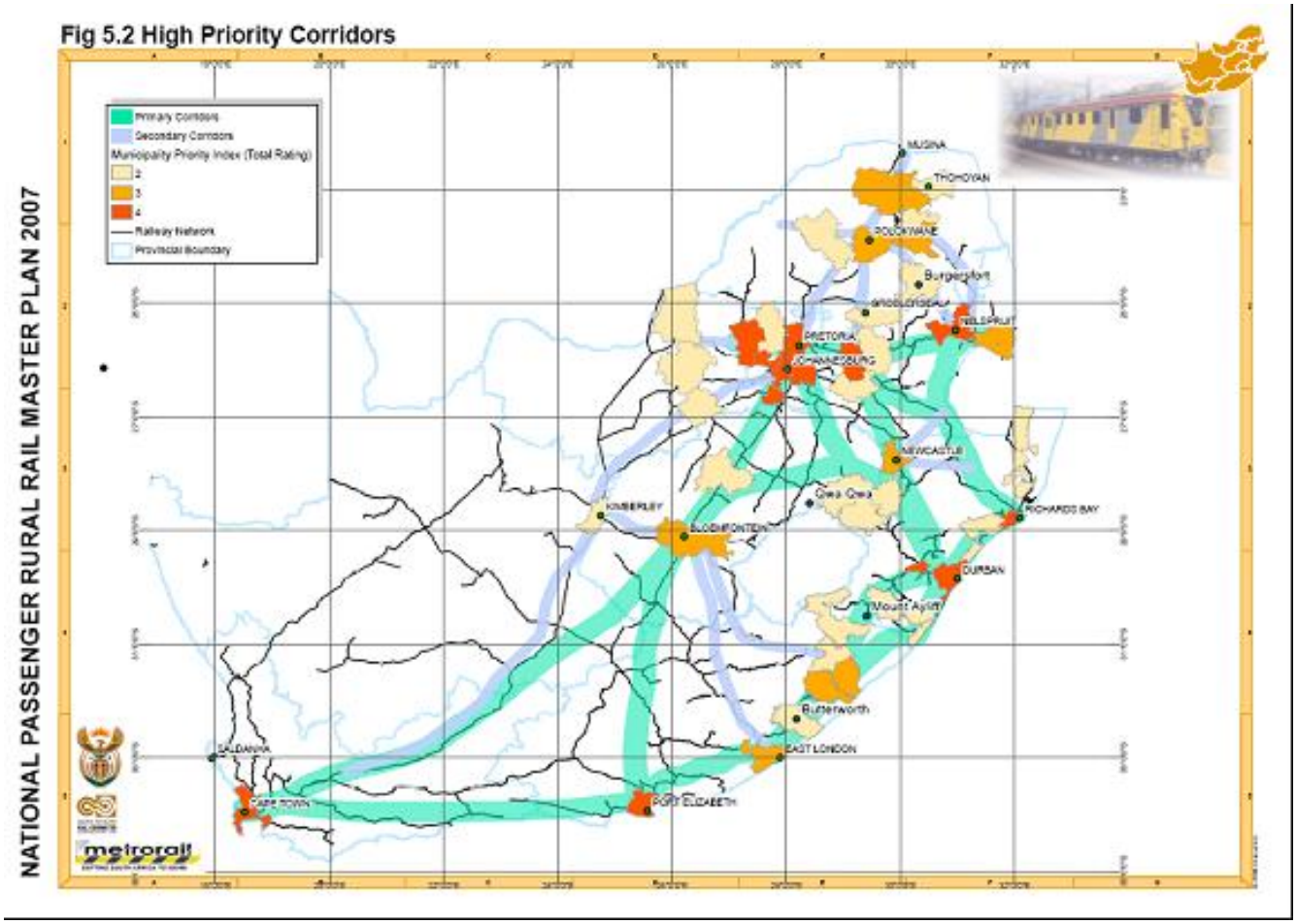


Figure 14: Priority Rural Rail Passenger Corridors Identified In the Sarcc Rural Passenger Rail Strategy

5.6 IDENTIFICATION OF ALTERNATIVE STRATEGIES TO BE INVESTIGATED IN PHASE 3

5.6.1 Introduction

In this Section a brief overview is given of possible alternative strategies that can be assessed in Phase 3. This is done in view of integrated passenger networks and services, as well as in view of concepts proposed by the DOT, KZN DoT and within the NATMAP team.

5.6.2 Integrated passenger networks and services

The Phase 3 modelling and forecasting will afford the opportunity to apply the passenger model to different forecasts of demand resulting from the 3 scenarios of population and economic activity produced in Phase 2. A crucial policy test will centre on the “role of passenger modes” under different demand scenarios. In this respect, crucial input

information will be required about the capital and operating costs of different types of mode. This will enable informed decisions about the following:

- Sustainability of different transport technology and system systems
- Affordability of different transport technologies;
- Value for money (return on investment) of different alternatives.

On account of the fragmentation and divided responsibility there is a tendency for vested interests to punt strategies only within their fields of responsibility. Thus the rail authorities push for rail solutions, road authorities for roads. Nowhere is there an effective “transport authority” which operates on principles of “best value for money”. Seldom, if ever, are schemes appraised against a full range of competing alternatives by means of cost-benefit analysis. Accordingly, there is a tendency to build one link at a time with insufficient attention being given to network and system considerations.

The DOT’s National Passenger Strategy and Action Plan focuses on Integrated Rapid Public Transport Networks aims to implement high quality networks of “car competitive” public transport services that are fully integrated, have dedicated rights-of-way and are managed and regulated by a capable municipal transport department. In this regard, the aim is for major cities, such as Ethekwini, to upgrade both commuter rail services and bus and minibus services to a Rapid Rail and a Bus Rapid Transit (BRT) level of quality respectively. Ultimately, these services will be fully integrated to form a single system regardless of mode.

The basis of the NATMAP Passenger Operations strategy will therefore be an integrated inter-regional route network and services, linking up with the urban networks at the long distance modal transfer stations. The strategy should deploy the best mode(s) for each of the primary routes between the major urban areas, with supporting links to towns of national significance.

It must be appreciated that the selection of the appropriate modes for each corridor requires detailed cost-benefit analysis and consideration of non-monetary factors, as well as practical constraints. Such analyses are outside the scope of the NATMAP project. However, a preliminary selection of modes will be made based on a high-level goal achievement matrix, which will be utilised for the evaluation of all plans in Phase 3 of the project.

5.6.3 Concept proposals and iniatives

A few proposals and iniatives have been discussed with the DOT and the KZN DOT, some of which are concepts under discussion within KZN. These need to be refined and evaluated in Phase 3. These proposals are in essence upgrading of infrastructure, but wil require improved passenger operations as well. The proposals are discussed in more detail in the Chapter 6 on Infrastructure. A list of these proposals is as follows:

- The Gauteng – KZN / Ethekwini corridor is the main freight and passenger corridor in the country, and as such need special attention. This corridor is already congested, with many road safety problems, and an under-utilised rail line. Possible alternatives are:
    - Upgrading the existing rail line and improve services, in order to attract freight from road and generate new traffic.
    - Build a high-speed standard guage rail line, which will require a special strategy to prevent freight and passenger rail services to impact on each other.
    - Building a parallel freight road, as an alternative to rail, is a controversial idea, which need to be compared to a rail solution.

- The north-south corridor along the tourist coastal route, where a lot of development is planned, also needs expanded infrastructure and proper public transport services. This corridor also links KZN with Swaziland and Mozambique. The Mozanbique government is considering a toll route from its southern border to Maputo, which wil strengthen the north south corridor even more.

- The N2 Wild Coast toll road is nearing the completion of the second EIA, and following that, the Record of Decision. This will strengthen the corridor between Cape Town, East London, Transkei to KZN and the eThikwini. The route will link up with the south coast road at Port Edward, instead of going through Kokstad and linking up with the south coast N2 at Port Shepstone. This will have a significant impact on the increased traffic growth along the South Coast route.

- With the developments to the north of eThekiwini, including the Dube Trade Port and La Lucia Airport, will require a new direct road from Pietermaritzburg to the North of ETA, also servicg Richards Bay.

- An urgent decision is needed on the expansion of Durban harbour, which is congested, and what freight should be moved to Richards Bay. Coupled to this is the use of the existing Durban airport, which will become available for new development. Transnet already has concept designs for a port at this site, which wills releive the congestion at Durban harbour, as well as along the road from the N3 to the Durban harbour.

- A “wild card” idea is introducing a hover-craft service from eThekwinini to Margate, and from eThekwinin to Richards Bay.

5.7 CONCLUSIONS PHASE 2 AND RECOMMENDATIONS FOR PHASE 3

KwaZulu-Natal province is not seriously affected by the problems of institutional fragmentation as some other provinces in the RSA. There is, therefore, less likelihood of functional bias affecting decisions about sustainable future transport systems and

technology. Nevertheless, in the development of a “blue-print” for future infrastructure development, there is a need for NATMAP to advocate decision-making on the basis of “value for money”.

Accordingly, it is recommended that the NATMAP Action Agenda should be rigorous in upholding the principles of economic evaluation in appraising long-term projects and schemes that are generated in Phase 3 of the project. Numerous problems and issues are evident from the analysis of the existing passenger transport system in KZN.

It is to be hoped that the IRPTN initiatives discussed in the Phase 2 analysis report will be the catalyst required to address the problems experienced in the KZN province. The initiatives will require political and financial support well beyond the 2010 target.

It is recommended that NATMAP should endorse and support the IRPTN initiative and assist in extending public transport service improvements into the realm of inter-city and rural transport.

It is recommended that NATMAP adopt a rigorous approach to technology evaluation from a position of “best value for money”. In this regard NATMAP needs to engage in the debates about:

- the most appropriate role of modes;
- safety, energy efficiency and the environment;
- the necessary regulatory response to achieve the desired vision for public transport in the RSA.

The issue of Government ownership of infrastructure and of service provision surfaces as the most important single constraint on South African transport. It appears in different ways in different modes. The position of monopoly is not serving industry and it is also apparent that in some cases it is defeating the strategic policies of the Government in such areas as rural development and food costs.

It is noteworthy that in the two transport areas where the Government has abandoned monopoly ownership namely air transport (but not airports) and road transport (but not roads) service levels have improved and there has been rapid expansion in a competitive environment.

This discussion has been prepared to conclude the analysis stage of Phase 2 of NATMAP. It highlights problems that have long bedevilled transport planning in the RSA, problems that are likely to impact on the “implementability” of the final NATMAP recommendations. Participants in NATMAP are urged to debate the limiting factors in decision-making and policy formulation that have prevented the South African transport sector from making progress in policy implementation.

6. FREIGHT TRANSPORT OPERATIONAL ANALYSIS

6.1 INTRODUCTION

6.1.1 Background to Freight Transport

This co-ordinated view of transport operations in all modes covers the freight operations on the KwaZulu Natal corridors of South Africa as well as national aspects common to all provinces. Urban transport and the local transport in the rural areas are excluded in the project brief, but branch line and some road haulage of freight on provincial roads, between major centres is described in this report

The focus of this section of the report is on the operational factors that promote or hinder the efficiency of the freight transport modes and the description of operations in sufficient detail to ensure that the evaluations to be done in later phases of the project are fully informed of current circumstances and practises.

The transport operations within KwaZulu Natal province are described by mode and by major corridor.

Land freight transport operations in South Africa are currently divided between roads, pipeline and rail freight transport.

The railways handle approximately 182 million tons p.a of mainly block train consignments of primary minerals [ores, coal] and primary and secondary commodities such as timber, steel, grains, fuels, and smaller proportions of industrial outputs, imports and exports such as motor vehicles, containers and chemicals.

Road transport on the major corridors and main provincial arterial routes amounts to approximately 180 million tons of a wide range of commodities including fuels, containers, industrial goods, consumer and household products, fruit, grains, and chemicals. In addition to the corridor traffic there are much larger volumes of goods transported for shorter distances in rural and urban areas by road.

The estimated overall land freight market in South Africa is approximately 1.4 billion tons p.a. with 182 million tons on rail, 14 million tons on pipeline and the balance on road. The proportion of road freight is increasing from year to year with increasing usage of road for primary and bulk commodities due to lack of rail capacity.

There is continual debate about competition between road and rail transport, and at national level, a stated official intention to reverse the trend towards increased road transport.

In order to evaluate the potential for achieving this development it is necessary to appreciate that the current situation is the logical result of policy decisions taken by the government over the past 20 years, and reversing the process will require some very difficult policy decisions in the future.

The development of transport in South Africa has followed a pattern very similar to that found in other countries, e.g. Canada, USA, Australia. All of these countries experienced a railway building period which was vital to the early development of the country and the establishment of agricultural and mining industries, as well as laying the sound infrastructural base for industrialisation.

Secondary industries such as spinning, tanning, smelting and forging were initially based on the agricultural and later the mining and extractive industries. As industrial development progressed, the production of finished industrial and consumer goods e.g. machinery, motor cars, household goods and clothing, increased. The early development of road transport gained momentum as roads were improved and the inherent advantages of the mode at that time in satisfying the needs of the industry, became increasingly apparent.

6.1.2 Objectives, and Extent of Current Freight Transport Operations

The objectives of the freight operations analysis are to:

- To summarise of problems and issues for analysis from phase 1
- To analyse problems and issues of freight operations in terms of service capacity bottlenecks, freight volumes by mode, transport operation costs, freight transport service providers, and implications of bottlenecks on freight operations
- To determine implications of existing plans on phase 3 forward plans
- To identify alternative strategies to be investigated in phase 3

6.1.3 Methodology

The main methodology involved the estimation of the 2005 freight and vehicle volumes by mode and commodity from the transport demand model. The volumes were compared with the supplied capacity of the networks for each mode, and volume - capacity ratios were determined. The location and severity of the bottlenecks could thus be determined, and hence their impacts on freight operations. These are discussed in Chapter 7 on Infrastructure.

The bottlenecks identified from the model were compared and supplemented with the status quo information, as well as the knowledge of the relevant agencies and authorities dealing with the transport infrastructure.

In view of the fact that the model is a strategic inter-regional model, it provides only average daily freight and vehicle volumes. In order to conduct capacity analyses, peak hour volumes are needed. Appropriate peak hour factors were therefore used to convert the daily volumes to peak hour volumes.

For information on the freight demand estimations, model assumptions, model specifications, modelling techniques and parameters should be consulted in the national report on the NATMAP transport model.

Many problems relating to freight operations and their solutions are not only a matter of demand and supply. The Phase 1 report identified a large range of problems dealing with policy, management, and freight rates. Therefore these problems were also analysed in conjunction with the service capacity problems with a view to identify integrated strategies dealing with all aspects of freight operations.

Authorities dealing with freight infrastructure and operations have developed their own modal plans, which have been summarised in the Phase 1 report. These have been assessed and incorporated into possible alternative strategies to be investigated in Phase 3 forward plans.

6.1.4 Structure of this chapter

The structure of this chapter is as follows:

Paragraph 5.2: Summary of problems and issues for analysis from Phase 1
Paragraph 5.3: Service capacity bottlenecks
Paragraph 5.4: Summary of issues and problems of freight operations analysis
Paragraph 5.5: Identification of alternative strategies to be investigated in Phase 3
Paragraph 6.5: Implication of existing plans on Phase 3 forward plans
Paragraph 6.6: Conclusions Phase 2 and recommendations for Phase 3

6.2 SUMMARY OF PROBLEMS AND ISSUES FOR ANALYSIS FROM PHASE 1

A summary is given below of all freight transport problems and issues identified in Phase 1.

General:

- Freight transport in South Africa is inefficient.
- Transport system dominated by state monopolies.
- Uncompetitive and un-commercial operations.
- Excessive manpower costs.
- Failure of funding mechanism leads to obsolescent and inefficiency.

- Management failure leads to lack of stewardship of assets.
- Lack of accountability leads to complacence and very poor customer relations.
- Rates and tariffs do not relate to commercial practice.
- Monopoly status implies captive customers.
- Excessive costs and low efficiencies inhibit industrial output.
- Institutional structure and monopoly control inhibits private sector investments in industry.
- Situation is aggravating national uncompetitiveness in international markets.
- Government ownership of transport operations thwarts government policy intentions.
- Lack of funding and management leads to withdrawal of services.
  Unavoidable result is total dependence of private sector road transport.
- Medium term prospects for fossil fuels makes road transport highly vulnerable.
- Overall failure of rail system makes it unlikely that electrified railways can be seriously considered as future alternative transport option, although this is vital.

Ports Issues

- Lack of planning and funding lead to obsolescence and inefficiency.
- Lack of management accountability adds to inefficiency.
- TNPA as landlord and TPT as operator exercise monopoly inhibition on efficient operations.
- TNPA costs make SA Ports uncompetitive.
- Lack of clear planning direction causes indecision and sub optimal decisions.
- TNPA planning fails to recognise private sector involvement and capitalisation.
- Planning does not recognise the logical logistical factors.
- Attempts at relocating containers to Ngqura are illogical.

Road Issues

- Failure to implement operator registration hampering control.
- Increasing road transport pricing will impact on economic growth.
- Inadequate funding likely to continue due to fiscal restraints.
- Increasing road transport – the results of railway inefficiency.
- Road re-planning tied up with rail restructuring.
- Liquid fuel shortage in medium term is a serious threat.
- Urgent need for planned alternative action.
- Economic impact of vehicle size and location of distribution centres.
- Urgent need for planned alternative action.
- Economic impact of vehicle size and location of distribution centres.
- Current capacity constraints will have economic consequences for interior.
- Ineffective planning process will impact on the economy.
- Monopoly profits by parastatal increase overall fuel costs to total economy
- Indecision regarding refining and importing.
- Illogical location of refining capacity.

- Revision of Sasol mandate to produce liquid fuels.
- Private sector pipelines development from Maputo.

6.3 SERVICE CAPACITY BOTTLENECKS

6.3.1 Introduction

In this Section the base year (2005) freight volumes by commodity and mode are discussed based on the outputs of the freight model. The national report on the NATMAP model provides the details of the model specifications, assumptions, calibration and validation procedures, and summary outputs. In the provincial chapters, the model outputs are considered in detail for each province.

It must be appreciated that the freight model is a very simplified representation of inter-regional freight transport, and heavy reliance still needs tio be made on freight data and analysis external to the model.

Following the discussion of the freight model outputs, a review is given of freight rates and assessment of problems caused by freight rates, a review is given of the freight transport service providers, and finally implications of bottlenecks on freight operations are given.

6.3.2 Freight Volumes by Mode

Map 6.3A and **B** give the 2005 road and rail link volumes in average daily tonnes for the WC province, across all commodities. The highest rail and road volumes, by far, is on the rail Sishen – Saldanha iron ore line. The other road and rail volumes are evenly spread between links.

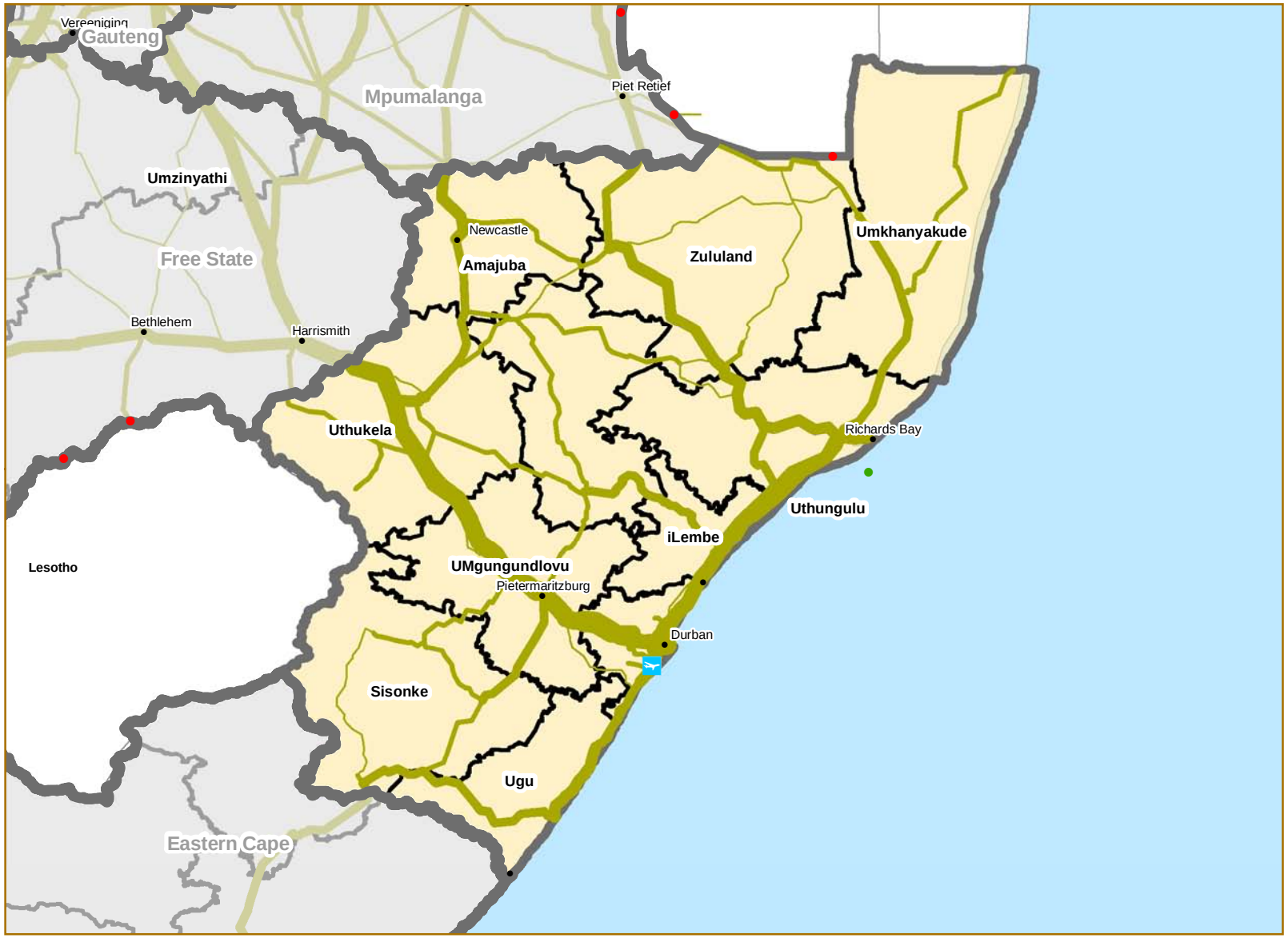
Map 6.3C gives the iron ore volumes in average daily tonnes by rail.

Map 6.3D and **E** give the coal volumes in average daily tonnes by rail and road respectively.

Map 6.3F and **G** give the agricultural volumes in average daily tonnes by rail and road respectively.

Map 6.3H and **I** give the container volumes in average daily tonnes by rail and road respectively.

Kwazulu Natal Province: DAILY ROAD FREIGHT VOLUMES IN TONNES - TOTAL



FREIGHT VOLUMES

TOTAL

- 1 - 1 000
- 1 001 - 5 000
- 5 001 - 10 000
- 10 001 - 20 000
- 20 001 - 40 000
- 40 001 - 50 000
- 50001 +

BASEMAP LEGEND:

- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

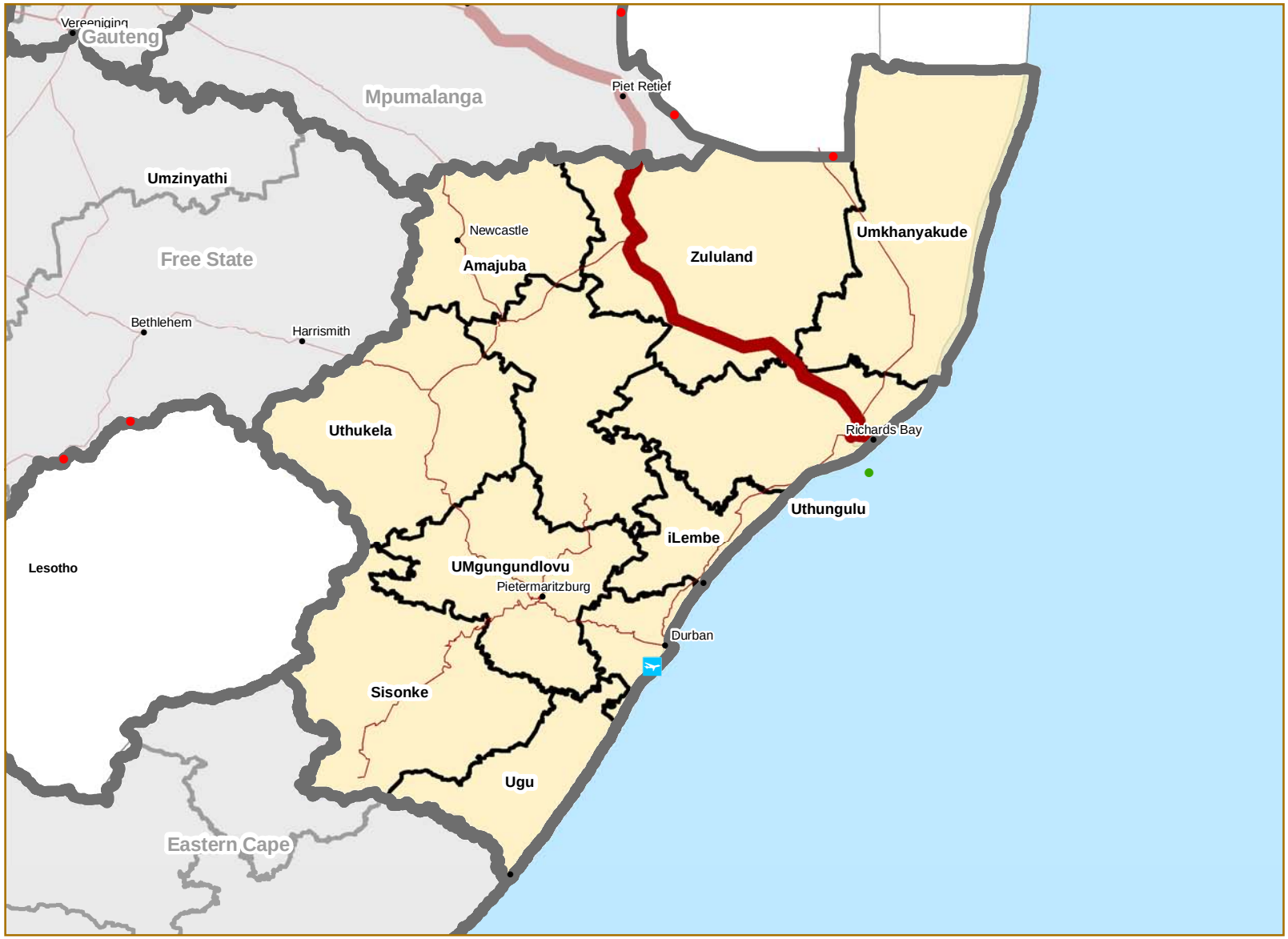
0-15% 25% 50% 75% 80% 90% 100%

February '09

MAP 6.3A Daily Road Freight Volumes in Tonnes - Total

NATIONAL TRANSPORT MASTERPLAN 2050

Kwazulu Natal Province: DAILY RAIL FREIGHT VOLUMES IN TONNES - TOTAL



FREIGHT VOLUMES

TOTAL

- 1 - 20 000
- 20 001 - 30 000
- 30 001 - 40 000
- 40 001 - 50 000
- 50 001 - 60 000
- 60 001 - 70 000
- 70 001 +

BASEMAP LEGEND:

- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

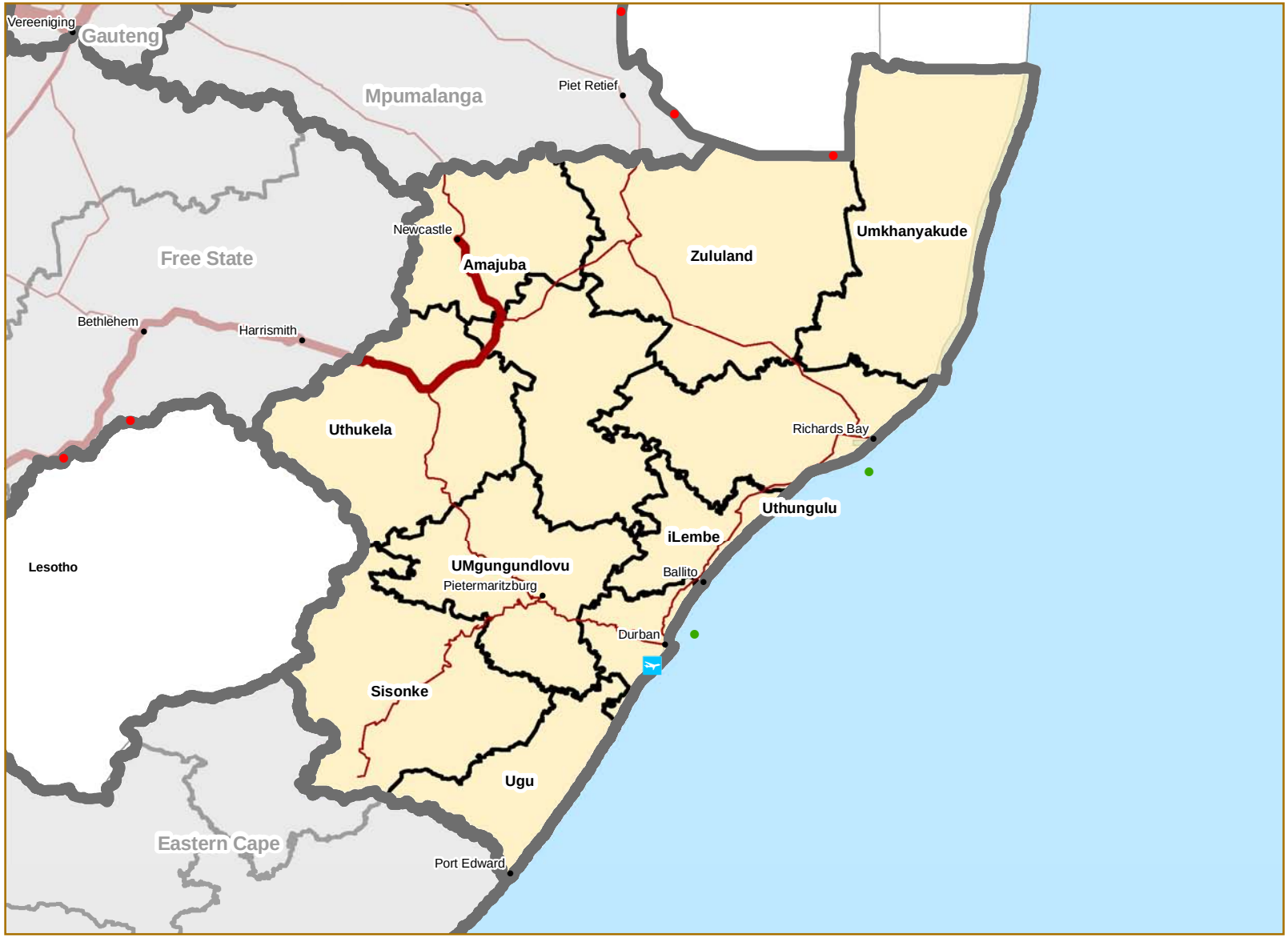
0-15% 25% 50% 75% 80% 90% 100%

February '09

MAP 6.3B Daily Rail Freight Volumes in Tonnes - Total

NATIONAL TRANSPORT MASTERPLAN 2050

Kwazulu Natal Province: DAILY RAIL FREIGHT VOLUMES IN TONNES - IRON ORE AND ROCK



FREIGHT VOLUMES

IRON ORE AND ROCK

- 1 - 1 500
- 1 501 - 5 000
- 5 001 - 10 000
- 10 001 - 15 000
- 15 001 - 30 000
- 30 001 +

BASEMAP LEGEND:

- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

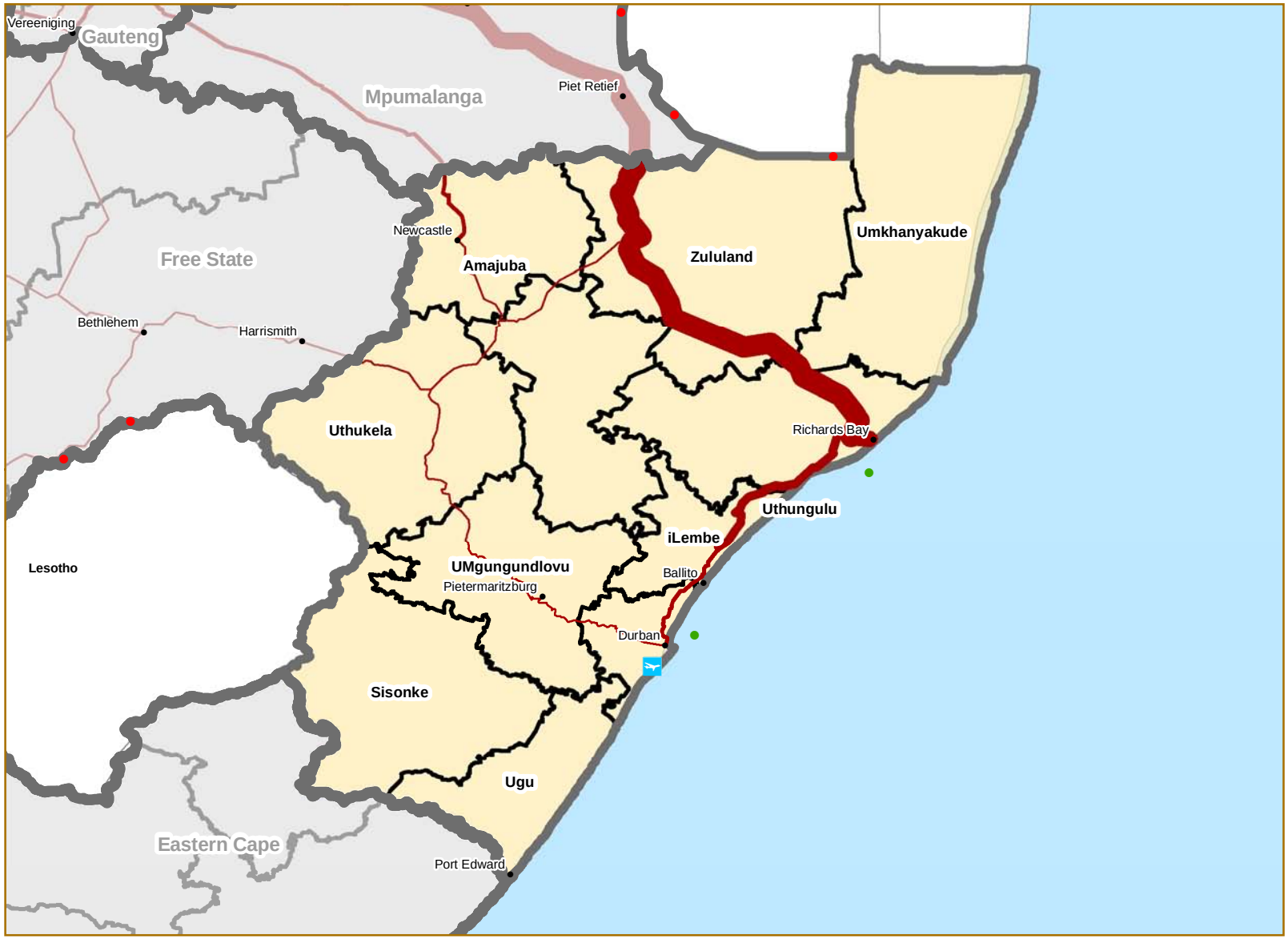
0-15% 25% 50% 75% 80% 90% 100%

February '09

MAP 6.3C Daily Rail Volumes in Tonnes - Iron Ore and Rock

NATIONAL TRANSPORT MASTERPLAN 2050

Kwazulu Natal Province: DAILY RAIL FREIGHT VOLUMES IN TONNES - COAL



FREIGHT VOLUMES

COAL

- 1 - 2 500
- 2 501 - 10 000
- 10 001 - 15 000
- 15 001 - 25 000
- 25 001 - 50 000
- 50 001+

BASEMAP LEGEND:

- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

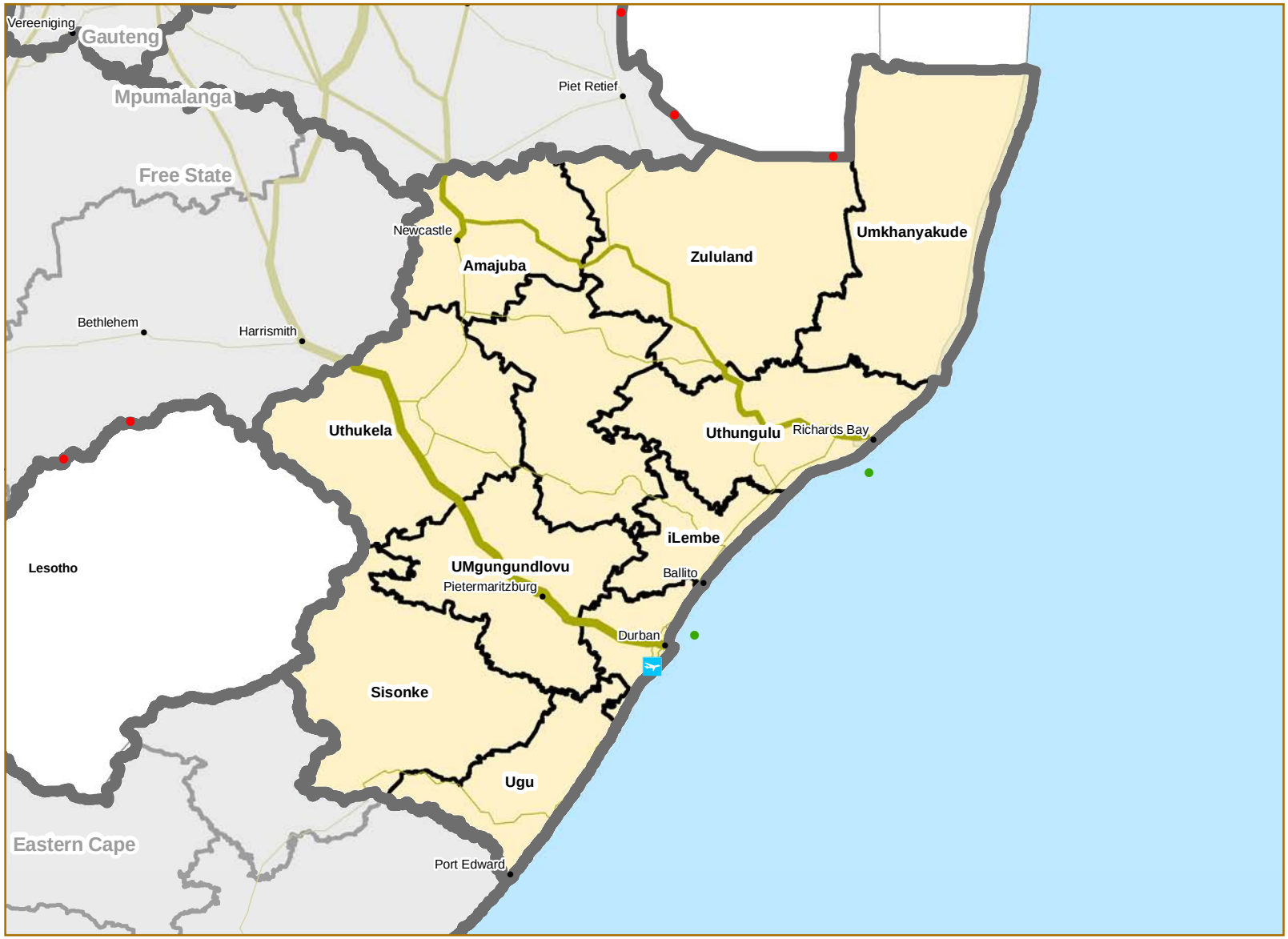
0-15% 25% 50% 75% 80% 90% 100%

February '09

MAP 6.3D Daily Rail Freight Volumes in Tonnes - Coal

NATIONAL TRANSPORT MASTERPLAN 2050

Kwazulu Natal Province: DAILY ROAD FREIGHT VOLUMES IN TONNES - COAL



FREIGHT VOLUMES

COAL

- 2 - 1 000
- 1 001 - 1 500
- 1 501 - 3 000
- 3 001 - 5 000
- 5 001 - 10 000
- 10 001 - 15 000

BASEMAP LEGEND:

- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

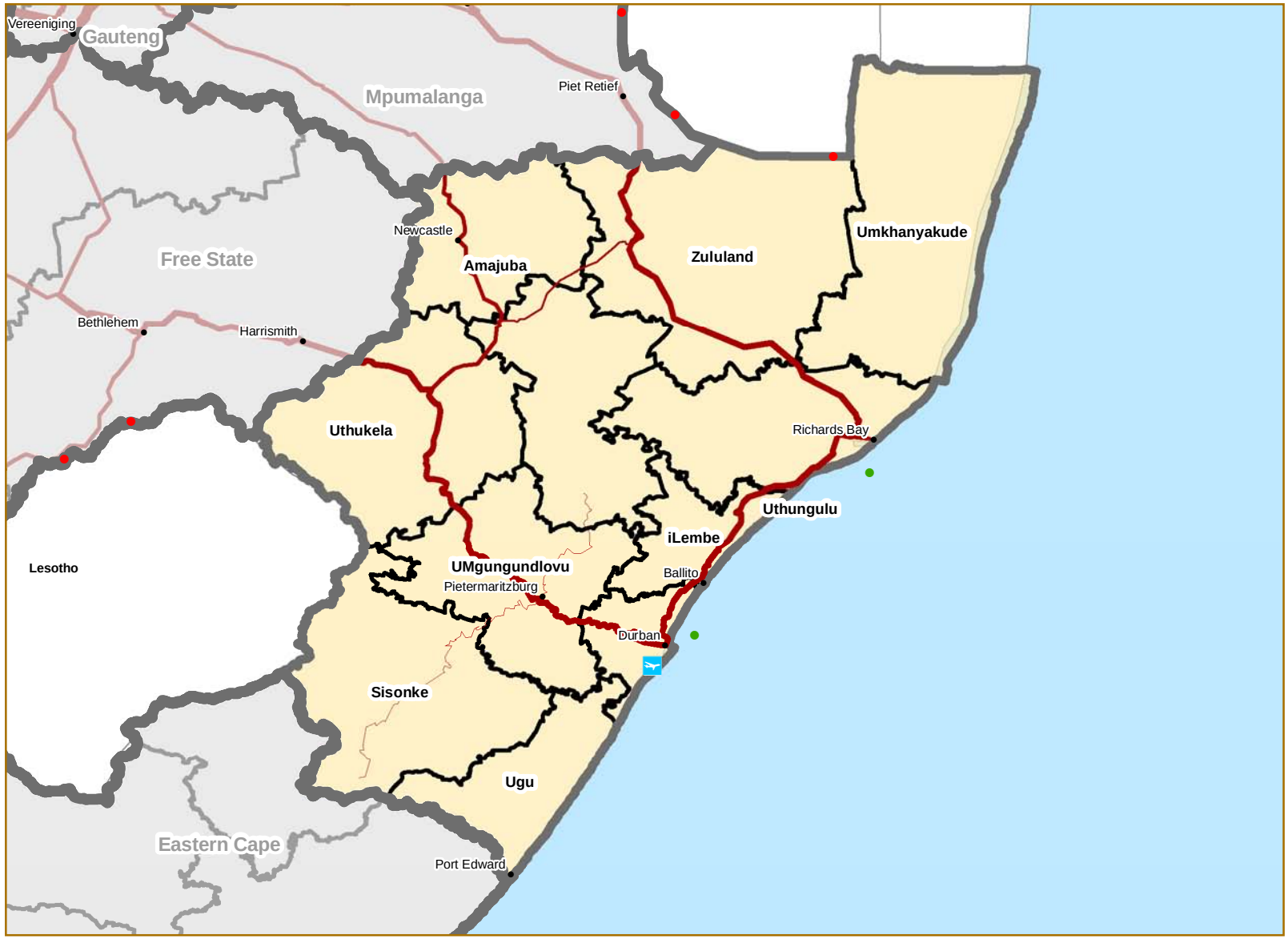
0-15% 25% 50% 75% 80% 90% 100%

February '09

MAP 6.3E Daily Road Freight Volumes in Tonnes - Coal

NATIONAL TRANSPORT MASTERPLAN 2050

Kwazulu Natal Province: DAILY RAIL FREIGHT VOLUMES IN TONNES - AGRICULTURE



FREIGHT VOLUMES

AGRICULTURE

- 1 - 50
- 51 - 100
- 101 - 500
- 501 - 1 000
- 1 001 - 1 500
- 1 501 +

BASEMAP LEGEND:

- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

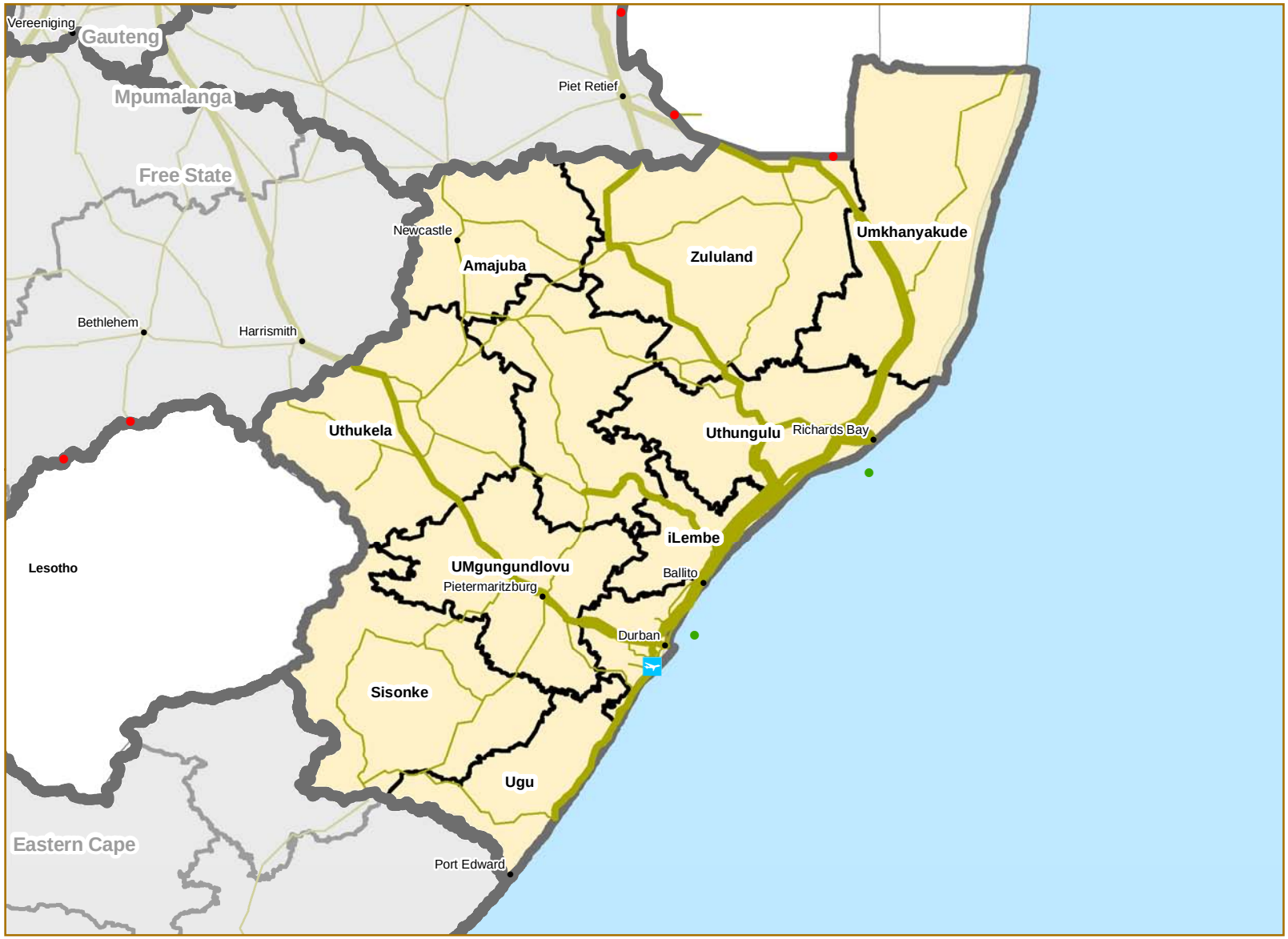
0-15% 25% 50% 75% 80% 90% 100%

February '09

MAP 6.3F Daily Rail Freight Volumes in Tonnes - Agriculture

NATIONAL TRANSPORT MASTERPLAN 2050

Kwazulu Natal Province: DAILY ROAD FREIGHT VOLUMES IN TONNES - AGRICULTURE



FREIGHT VOLUMES

AGRICULTURE

- 1 - 3 000
- 3 001 - 6 000
- 6 001 - 9 000
- 9 001 - 12 000
- 12 001+

BASEMAP LEGEND:

- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

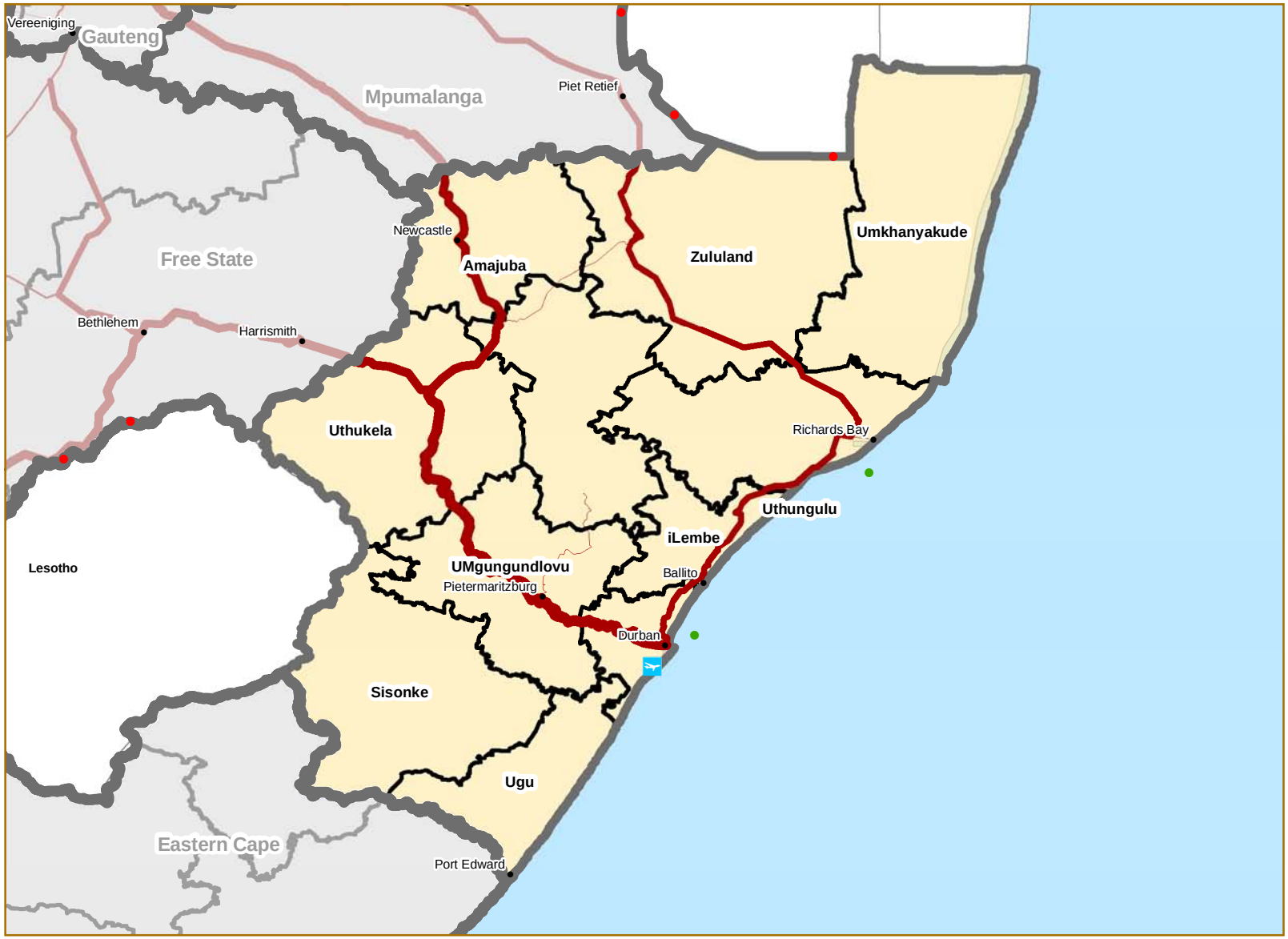
0-15%	25%	50%	75%	80%	90%	100%

February '09

MAP 6.3G Daily Road Freight Volumes in Tonnes - Agriculture

NATIONAL TRANSPORT MASTERPLAN 2050

Kwazulu Natal Province: DAILY RAIL FREIGHT VOLUMES IN TONNES - CONTAINERS



FREIGHT VOLUMES

CONTAINERS

- 1 - 50
- 51 - 150
- 151 - 500
- 501 - 1 500
- 1 501 - 3 000
- 3 001 - 5 000

BASEMAP LEGEND:

- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

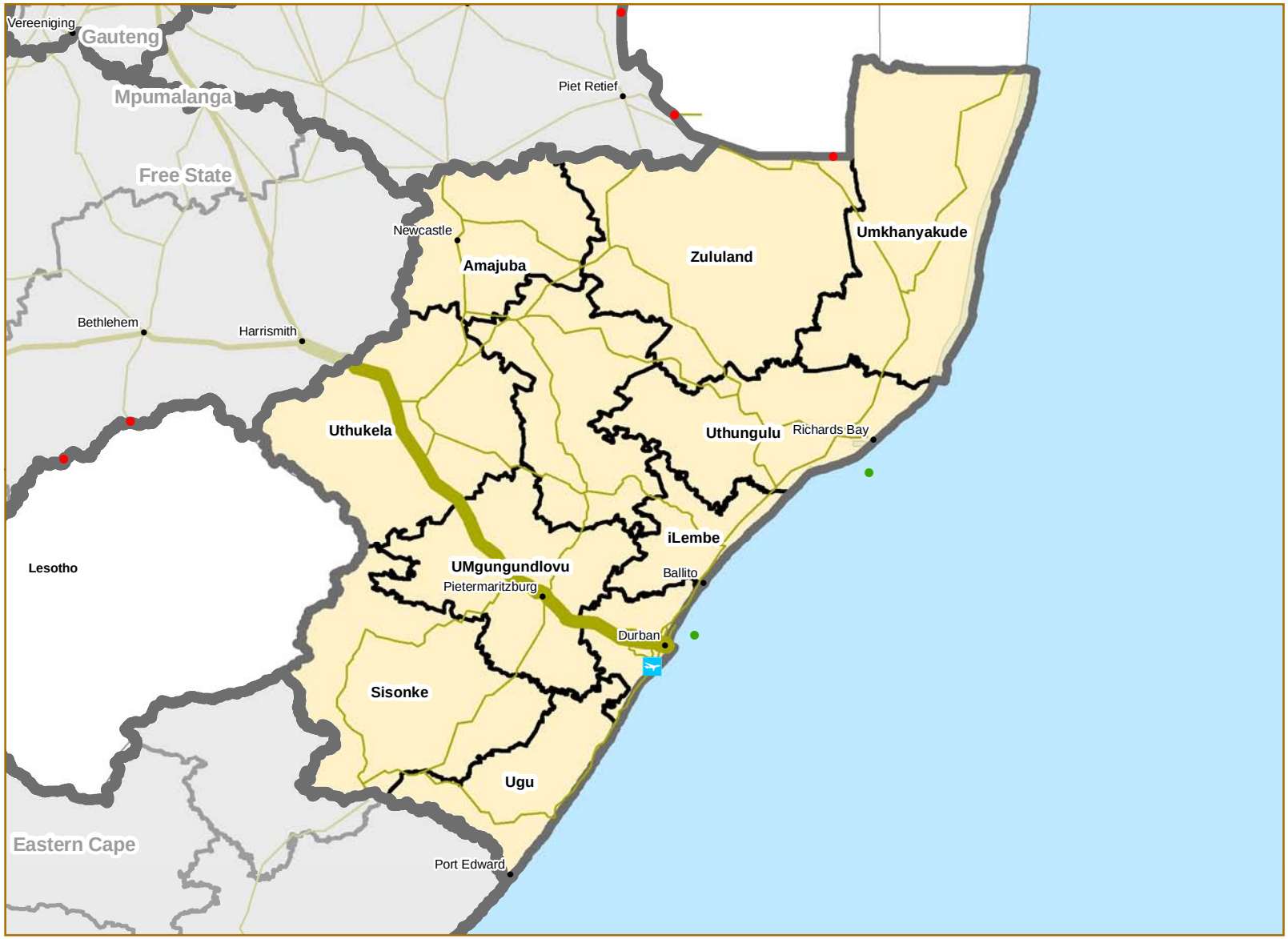
0-15% 25% 50% 75% 80% 90% 100%

February '09

MAP 6.3H Daily Rail Freight Volumes in Tonnes - Containers

NATIONAL TRANSPORT MASTERPLAN 2050

Kwazulu Natal Province: DAILY ROAD FREIGHT VOLUMES IN TONNES - CONTAINERS



FREIGHT VOLUMES

CONTAINERS

- 1 - 6 000
- 6 001 - 12 000
- 12 001 - 18 000
- 18 001 - 24 000
- 24 001 +

BASEMAP LEGEND:

- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

0-15%	25%	50%	75%	80%	90%	100%

February '09

MAP 6.3I Daily Road Freight Volumes in Tonnes - Containers

NATIONAL TRANSPORT MASTERPLAN 2050

6.3.3 Development of Freight Transport Policy and Freight Transport Service Providers

The depression years of the 1920's caused serious overcapacity in the transport sector in many countries, aggravated by the ease with which road transport enterprises could be started and run by virtually anyone with a truck and a licence to drive.

In the 1930's, legislation was enacted to protect established transport operations (of several modes), in the USA (Motor Carriers Act 1935), the UK (Road Traffic Act 1930 and the Road and Rail Act 1933), in Australia (Transport Act 1930 - New South Wales).

The first legislation to regulate the orderly (and economic) development of road transport in the Union, later the Republic of South Africa and the mandated territory of South West Africa, was the Motor Carrier Transport Act, No 39 of 1930. This Act was considered necessary to protect the South African Railways and Harbours (SAR & H) and to promote the concept that it should be run according to business principles. A differentiated tariff structure was in use at that time with relatively high tariffs for the transport of manufactured goods of high value and low tariffs for that of raw materials such as agricultural and mining products. This structure was not only meant to stimulate the local economy, but was in line with the Policy at that time of fixing tariffs in accordance with the means to pay.

As with any other piece of legislation, the Motor Transportation Act No 39 of 1930, though introduced for specific objectives, has received repeated amendment in order to provide a dynamic regulatory framework for the operation of the transport markets, which are many, diverse and complex.

In 1948 the Transport Co-ordination Act (No 49 of 1948) was enacted, and the National Transport Commission was established with the objectives stated in Section 7 i e:

(i) promoting and encouraging the development of transport in the Union;
(ii) where necessary, co-ordination of various phases of transport;
(iii) in order to achieve the maximum benefit and economy of transport service to the public.

In Section 9 (iv) the Commission was enjoined to promote the development of the transport industry in the Union in general, with the aim of obtaining the greatest advantage for the public.

The developmental and coordinative functions of the Commission were therefore clearly intended, accepted and implemented as can be seen, by the development of the transport industries in South Africa since 1948.

The creation of, and later extension of the exempted areas and the establishment of operating radii for private and public operators, as well as the increase in the number of types of operations which are excluded from the Act, are all evidence that *competition and normal pricing mechanisms were expected to operate in the market place, in response to the needs of the developing economy of the country.*

In 1969 the Commission of Enquiry into the Co-ordination of Transport in South Africa (Marais Commission) was appointed, and although their findings were never officially implemented, the commissioners recognised the need for competition and demand responsiveness to the needs of the public, and made their recommendations in this respect as follows (Clause 301):

> *"The Commission recommends that while a greater measure of freedom for the transport user should gradually develop, a form of controlled competition should remain. Such control should be dynamic, however, and should be reviewed from time to time to ensure efficient and economic services to the public".*

The recommendation of continuous review and development of the legislation was implemented in the activities of the Van Breda Commission, which resulted in the Road Transportation Act No 74 of 1977 with its further emphasis on deregulation of controlled competition, by providing for exempted goods and the deregulation of transportation by small vehicles.

The National Transport Policy Study of the mid 1980's was another stage in the evolution of transport regulation in South Africa. The approach of this study resulted from a directive by the Minister of Transport Affairs, *"to use as a basic point of departure the need for a more market orientated transport system with more effective competition*".

This directive indicated that transport policy should be revised to fall in line with current national goals and policy as defined in the Constitution Act of 1983, which describes the economic aspects of the phase: "to further private initiative and effective competition".

> *In summary, it can be seen that the development of transport regulation in South Africa has been aimed at providing the public with a variety of transport services necessary for the effective development of a modern, capitalistic, market based, economy.*

The emphasis of the regulations has been to stress controlled, co-ordinated competition in the interests of economic efficiency and stability. However, at the same time permitting the phased development of available transport services to match the changing needs of an economy in transition, from almost total dependence on agriculture and

primary industry, to an economy based on the former but progressing towards modern, technologically sophisticated manufacturing and processing.

The modern industrial and consumer based economy, with the emphasis on high commodity values, high stock turn ratios, marketing and customer transport services, created a need for more demand responsive transport services, but the government still retained monopoly control of parastatal transport operations.

Broad analysis of the operation of the market for freight transport services in South Africa shows the distribution of service providers in Error! Reference source not found.. The services in the area shaded brown are all provided by the national parastatal transport company.

The National Transport Commission accepted the recommendations of the National Transport Policy Study in 1987, which were as follows;

Pre-conditions to be met before the Implementation of the Recommendations.

"The recommendations presented in this white paper should be viewed as an integrated package of measures designed to achieve the prime goal of bringing transport policy in line with the current national policy. Various affected parties formulated requirements as pre-conditions to be met prior to the implementation of certain other recommendations. These requirements are included in the recommendations.

Pre-conditions were set by, among others, the SA Transport Services, the Public Carriers Association and the SA Ship-owners Association, and were still to be met prior to the implementation of a more market related freight transport policy.

Table 15: Provision of Transport Services

			INFRASTRUCTURE				OPERATIONS		
FREIGHT MODE	AREA		INSTITUTION RESPONSIBLE	OWNERSHIP	OWNERSHIP		INSTITUTION RESPONSIBLE	OPERATOR	OPERATOR
				Parastatal	Private			Parastatal	Private
PORTS									
CAPE TOWN	MOSSEL BAY		NPA	90.0%	10.0%		TERMINALS	90.0%	10.0%
SALDANHA BAY	EAST LONDON		NPA	90.0%	10.0%		TERMINALS	90.0%	10.0%
PORT ELIZABETH	DURBAN		NPA	80.0%	20.0%		TERMINALS	60.0%	40.0%
COEGA	RICHARDS BAY		NPA	70.0%	30.0%		TERMINALS	30.0%	70.0%
RAIL FREIGHT	**LINES**								
COALLINK	SISHEN		TRANSRAIL	100.0%	0.0%		TRANSRAIL	100.0%	0.0%
NATCOR	BOTSWANA		TRANSRAIL	100.0%	0.0%		TRANSRAIL	100.0%	0.0%
CAPE MAINLINE	MPUMALANGA		TRANSRAIL	100.0%	0.0%		TRANSRAIL	100.0%	0.0%
NORTHERN	OTHER LINES		TRANSRAIL	100.0%	0.0%		TRANSRAIL	100.0%	0.0%
WESTERN	BRANCH LINES		TRANSRAIL	100.0%	0.0%		TRANSRAIL	100.0%	0.0%
EASTCOAST			TRANSRAIL	100.0%	0.0%		TRANSRAIL	100.0%	0.0%
ROAD FREIGHT	**ROUTES**		SANRAL	100.0%	0.0%		CARRIERS	0.0%	100.0%
NATIONAL	LOCAL		MUNICIPAL	100.0%	0.0%		CARRIERS	0.0%	100.0%
PROVINCIAL	RURAL		PROVINCE	100.0%	0.0%		CARRIERS	0.0%	100.0%
	URBAN		COUNCIL	100.0%	0.0%		CARRIERS	0.0%	100.0%
PIPELINE	**ROUTES**		TRAN PIPE	100.0%	0.0%		TRAN PIPE	100.0%	0.0%
DBN-SASOL	SASOL-SECUNDA		TRAN PIPE	100.0%	0.0%		TRAN PIPE	100.0%	0.0%
SASOL-JNB	SASOL-KENDAL		TRAN PIPE	100.0%	0.0%		TRAN PIPE	100.0%	0.0%
SASOL-ORTI	GAS MOZ-MPU		SASOL	100.0%	0.0%		SASOL	100.0%	0.0%
AIR FREIGHT	**TERMINALS**		ACSA	100.0%	0.0%		SAA	100.0%	0.0%
OR TAMBO	P ELIZABETH		ACSA	100.0%	0.0%		SAA	100.0%	0.0%
DURBAN	E LONDON		ACSA	100.0%	0.0%		SAA	100.0%	0.0%
CAPETOWN	BLOEMFONTEIN		ACSA	100.0%	0.0%		SAA	100.0%	0.0%

The most notable of these conditions were:

(i) The Railways must be relieved of the financial burden of providing uneconomic socio-economic services.

(ii) The Railways must be allowed to introduce cost-related rail freight rates.

(iii) Private road hauliers must be made to contribute "their relative proportion" to the provision and maintenance of roads.

(iv) The Railways must be allowed to remain autonomous and be relieved of other obligations imposed on it. It must, for example, be given the right to refuse traffic or to suspend services.

(v) Appropriate and sufficient infrastructure for on-the-ground enforcement of road quality matters must be introduced (infrastructure implies testing centres, en route facilities, sufficient and adequately trained inspectors and so on).
(vi) The role and function of the SA Road Transport Services of Railways must be clarified.
(vii) The rates at which harbour charges, including ad valorem wharfage, are levied against coastal shipping must be brought onto a cost recovery basis and Railways should be relieved of its burden of inter-departmental cross subsidization
(viii) Operators in all modes should pay full taxes, licences and levies on inputs. Railways reciprocal agreements on these matters should be terminated."

Port and Pipeline charges have yet to be adjusted to the cost-recovery levels described in (vii) above, and cross subsidisation between departments in Transnet still occurs.

The present operational situation with port, pipeline, road and rail freight transport in South Africa reflects the logical and predictable result of the changed emphasis of government policy in the 1990s which created a commercially independent undertaking that has monopoly control of railways, ports and pipelines.

The railway, once relieved of the need to provide any but profitable services has effectively withdrawn rail services from large areas of the country [by closure of stations] and introduced operating policies that exclude Less-than-truckload [LTL] consignments and refuse to handle consignments of less than 10 wagons. This effectively bars most small industrial and commercial usage of rail transport.

Pricing and tariff increases are also apparently used to facilitate “load shedding” and exclusion of traffic that is problematic or unprofitable.

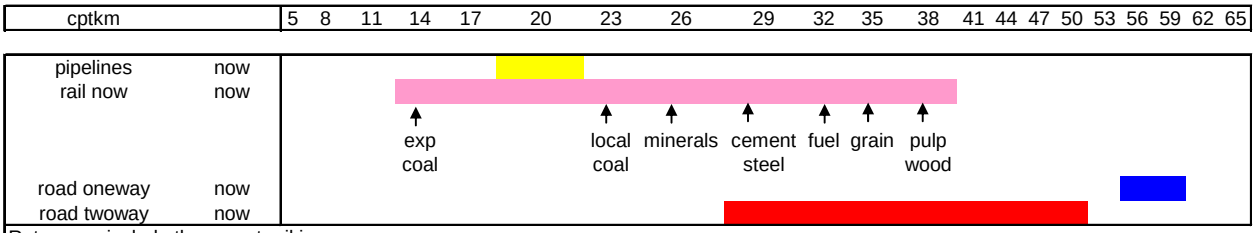
6.3.4 Transport Operation Costs

Freight Transport Rates, Tariffs and Competition

The rates for transport of goods in South Africa are skewed in respect of road, rail and pipelines, due to the institutional distortions mentioned in the section on constraints and problems in freight transport.

The table below shows the current comparison [2008 prices] between road, rail and pipelines in respect of rates actually being paid. It also shows the differing rates that major product groups pay for rail.

Table 16: Comparison between road, rail and pipelines



Rates now include the recent rail increase
Two way road rates are very flexible
It should be remembered that rail usually also has to include one or two feeder interchange costs as well

As pricing is always a sensitive issue, the above rates are generalised but the cost spreads are taken from actual current tariffs and rates.

In each mode of transport it is possible to highlight the issues that are causing the distortions.

Pipeline Tariffs

A common tariff book is published and all users are charged on the same basis

The Annual Report of Transnet confirms that the pipelines are making a margin of some 55% instead of a more normal 17%.

If there were competition it is likely that the rate would reduce to about 16.80 cents per tonne-kilometre [ptkm] between Durban and the Pretoria area.

Table 17: Pipeline Rates

Current Rate in Rands Per Tonnes	165
Current Rate in CPTKM	21.43
Lead Distance in KMS	770
Current Margin in %	55.1
More Reasonable Margin in %	20
Resulting rate in Rands a Tonne	127.66
Resulting Rate in CPTKM	16.58
Reduction %	29%
Pipeline Rate in India in RSA CPTKM	7.5

Present rates for pipeline transport in India are around 8.0 Cptkm, so there is a lot of scope for improving cost –efficiency.

Road Freight Rates

The table below shows the make-up of road transportation costs in respect of a transporter running 56 tonne GCM road freight combinations on South Africa's main roads.

Table 18: Road Freight Rates

Item	Cost per km in SAR	
	Flat deck	**Tanker**
Labour	0.45	0.46
Capital	1.68	2.67
Interest	0.61	0.97
Insurance	0.09	0.11
Licence	0.03	0.03
Fuel	3.9	3.9
Oil	0.16	0.16
Tyres	1.1	1.1
Spares	0.06	0.09
Workshop	0.06	0.56
Admin	0.65	0.65
Margin	1.23	1.44
Total	**10.02**	**12.14**

Note 1: The above rates are per KM travelled, loaded and unloaded, therefore the rate must be doubled in cases where the vehicle returns empty

Note 2: All hauliers are operating under different circumstances and therefore it is necessary to view the detailed component amounts as approximate. The total amount however is the current situation and applies to almost all haulage on Provincial and National roads with lead distances of above 200km each way.

Note 3: Current margins of about 12% reflect the fact that there is tight competition and it is unlikely that rates will reduce at all. This margin reduces to 6% in the absence of backhaul cargo. It is noteworthy that about 15% of HGVs recorded on most main corridor routes are running empty.

Note 4: Unlike Rail and Pipelines there is virtually no scope to reduce costs and rates in the future and these rates are shown unchanged in the following tables.

Railway Rates

The tables below are calculations which show what rates would likely be in the event that rolling stock was efficiently utilised and management was both efficient and imaginative. The rates include an operating margin similar to road freight carriers .

Table 19: Rates shown for sectors

Product	Export Coal	Local Coal	Minerals	Cement Steel	Fuel	Grain	Timber
Route	**Coalline**	**Natcor**	**N Cape**	**W.Tvl**	**Natcor**	**Free State**	**KZN Midlands**
Gradient	12	7	10	6	5	11	1
Loco type	11e	6e/1	10e/7e	6e	18e	34	35
Loco power	400	193	300	173	193	218	161
Axle load	26	20	20	20	20	18.5/20	18.5
Wagon Payload	80	53	60	60	60	44	38
Train size	200	40	100	40	40	15/40	20
Cptkm	11.5	24.45	19.47	26.4	31.61	26.34	89.32

Gradients expressed in TFR categories-low numbers are steeper
Loco power expressed as KN continuous tractive effort
Cptkm are derived using upgraded rolling stock efficiency and redesigned train plans

Rates are shown for sectors of the market so that they compare with the sectors used in the current cost table.

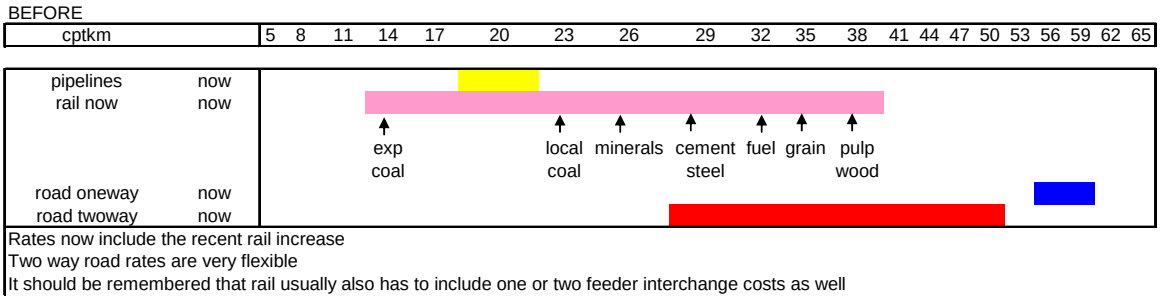
Comparative Rates

Calculation of the achievable comparative rates between the modes is shown in the table below.

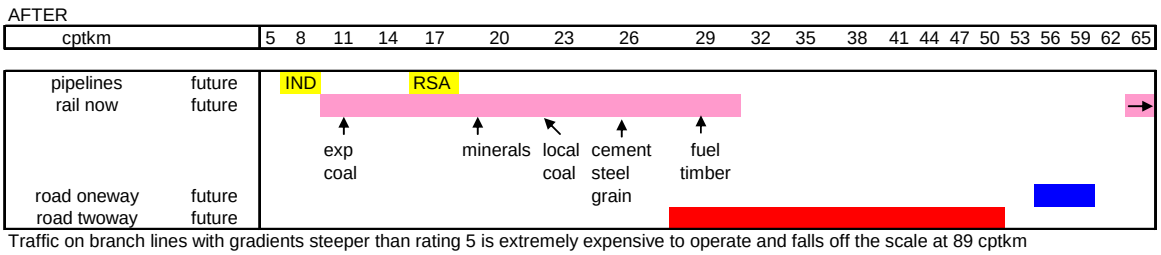
The rates shown in the "'BEFORE" section are the prevailing rates that should be used to calculate the current charges to users of freight modes.

The "AFTER" rates are the rates that should apply if the efficiency and margin improvements were achieved and adjusted.

Table 20: Skew of tariffs between modes



Rates now include the recent rail increase
Two way road rates are very flexible
It should be remembered that rail usually also has to include one or two feeder interchange costs as well



Traffic on branch lines with gradients steeper than rating 5 is extremely expensive to operate and falls off the scale at 89 cptkm
pipeline rates are reduced by the removal of excessive margin-Other pielines still cost a lot less to operate
The overlap of road and rail is largely eliminated since the exposed traffic on rail is one way traffic on road
autos and containers excluded since they are not weight cargoes

As shown, the skew of tariffs between modes is removed by introducing competitive efficiencies and monopoly margins.

The rates in the above tables can be used to calculate the BEFORE and AFTER costs for all long haul freight, and by using the OD pairs information developed in NATMAP 2, to evaluate the extent of the cost to the country of running a protected monopolistic freight transport system.

Road Freight Costs

In South Africa there is almost total dependence on the use of road haulage for agricultural inputs such as fertiliser and fuel and the transport of agricultural produce, grain, fruit, crops, livestock, and refrigerated produce.

Road haulage is currently 30% more expensive than rail transport for bulk commodities and costs are approximately 50% higher than the cost of effective rail transport.

Current rail service policies preclude the use of rail for most foodstuffs due to minimum consignment size parameters and the access points for consigning goods on rail have been abandoned and are largely destroyed.

Inter Modal Competition

There is potential for developing efficient private sector rail operations with effective marketing and customer liaison for general cargo but the current monopoly restrictions make this impossible, with the result that transport costs continue to be a significant factor in the overall cost of basic foods.

Rail Costs

The cost of rail freight transport in South Africa is generally considered to be too high, both in relation to other modes of transport and in relation to international best standards. There are many reasons that are advanced, for this state of affairs and it is relevant to analyse these to obtain some indications of whether it is possible in the short to medium term to improve this situation and if so what steps could be taken.

The major factors that have impact on the costs of rail transport in South Africa are;

- The asymmetric distribution of origins and destinations, as shown in previous sections of this report. There are very serious distortions of cargo availability with the major inland origins of bulk freight being approximately 500km from destinations at the ports.
- The deregulation of road transport in the 1990's was accompanied by legislation that permits some of the biggest road freight vehicles in the world for usage on the general road system of the country, without geographic restriction.

- This proliferation of 7 to 9 axle road freight combinations with carrying capacities with up to 40 tons means that their cost per ton kilometre of road freight is considerably lower than general cargo on rail.
- The railway has been deliberately restricted for capital expenditure for approximately 20 years. A large proportion of the equipment is over 20 years old and much of it is even older than that.
- The railway has for the last 14 years being rapidly depleted of skills in all disciplines due to labour policies beyond the control of the management.
- The international surge in the market for bulk commodities was not appreciated in the 1990's, so that inadequate preparations have been made for the scale of potential expansions.
- The continued evolution of the South African economy from an agricultural, mining and primary industry base into a more sophisticated import/export orientated manufactured goods economy, has left railways unable to compete for much of the higher rated more sophisticated traffic. It is significant that analysis of container traffic hauled by rail, shows that 15 destinations account for about 85% of the traffic, whilst the wide distribution of the remaining 15% to a further 200 destinations is probably uneconomical.
- The railway management has focused on provision of service to the major industrial customers, with the resources available. Services to other industries have been discontinued or priced to compensate for low volumes.
- The railway administration continues to be over-staffed, with high concentrations of supernumerary overhead positions that do not contribute to coal-face management decision making. A planned annual allocation of R1 billion for production bonuses, will further irritate customers.

Table 21 below are calculations which show what rates would likely be in the event that rolling stock was efficiently utilised and management was both efficient and imaginative. The rates include an operating margin similar to road freight carriers. Rates are shown for sectors of the market so that they compare with the sectors used in the current cost table.

Table 21: Estimate of optimal freight rates

Product	Export Coal	Local Coal	Minerals	Cement Steel	Fuel	Grain	Timber
Route	Coalline	Natcor	N Cape	W.Tvl	Natcor	Free State	KZN Midlands
Gradient	12	7	10	6	5	11	1
Loco type	11e	6e/1	10e/7e	6e	18e	34	35
Loco power	400	193	300	173	193	218	161
Axle load	26	20	20	20	20	18.5/20	18.5
Wagon Payload	80	53	60	60	60	44	38
Train size	200	40	100	40	40	15/40	20
Cptkm	11.5	24.45	19.47	26.4	31.61	26.34	89.32

Note:
Gradients expressed in TFR categories-low numbers are steeper
Loco power expressed as KN continuous tractive effort
CPTkm are derived using upgraded rolling stock efficiency and redesigned train plans

As shown in the table the effect of increased efficiency is to shift all rates some 20 to 30% lower than current rail rates.

The detailed analysis conducted to create this summary table shows that gradient has a very dramatic effect on rail freight costs. This is aggravated by the amount of marshalling and shunting required compiling trains, as well as the amount of empty running between collection points. The cost of operating branch lines where gradients are steeper than rating 5 is higher than road freight competitors. These KZN branch line sectors of the railway are in hilly topography serving timber and agricultural interests with poorer rural populations.

To continue these services to reduce road freight traffic on rural roads it will be necessary for the government to accept the unprofitability or to subsidise them for specific political objectives. Branch lines on the Highveld serving the coal, mining and grain industries should be capable of being operated cost-effectively at competitive tariffs as gradients are much flatter.

Rail Freight Limitations

What can be said is that in the area of general freight traffic, South African rail rates have increased disproportionately in recent years. The demand for train-load consignments is also not in the long term interest of rural development and has forced traffic in many places to road. This has had negative effects which are only beginning to be understood.

In the United States, where high density corridor traffic is also the desired goal, as it is in South Africa, wagon-load traffic is welcomed. Since the early 1980's some 300 new 'short line' railroads have been established (often taking over unwanted branch lines from the major railroads) and it is estimated that some 16% of major railroad revenue is generated on interchange with the small railroads.

There is also a mix of high-density 'Double-Stack' container traffic, Piggyback (Trailer on Flat Car), block load coal and mineral traffic, and wagon-load general traffic. The ability to successfully operate integrated services of different kinds on the same track is lacking in South Africa and it will be essential to correct this in order to optimise the use of the massive amount of unused rail resources that represent sunk investment in South Africa.

6.3.5 Implications of Bottlenecks on Freight Operations

The Chapter on Infrastructure identifies the bottlenecks by mode. Operations and infrastructure are intricately linked, and one cannot discuss the one without the other. The analysis below of operational problems discusses the impact of infrastructure bottlenecks on operations. It is important that operational inefficiencies first be resolved, before additional infrastructure capacity is created, as this will be very costly and unnecessary.

6.4 SUMMARY OF PROBLEMS AND ISSUES FOR ANALYSIS FROM PHASE 1

6.4.1 Introduction

In this chapter the operational problems and issues identified in Phase 1 are analysed for each mode of transport.

6.4.2 Road Freight Operational Problems

The total volume of road freight transport in South Africa is not known precisely due to the diversity of operations and the fact that there is no legal requirement to record or report any aspects of the activity. There is no central registry of Road Freight Operators.

Most of the information that is published has been derived from calculations based on road traffic volumes, surveys and industry data. A large proportion of road freight vehicles are owned and operated by manufacturers, wholesalers, retailers, farmers and other industries in the course of their business. The balance of vehicles is operated for hire and reward, by transporters that engage in the transport of a wide range of goods.

The proportion of own account operators is higher in the urban and rural areas whilst professional carriers are more prevalent on the major long distance routes and in areas where bulk and high volume commodities such as coal, timber, grains and sugarcane are transported.

The total freight vehicle population is shown in blue in the table below. The estimated total number of motorised vehicles [including some of the "other and unknown" category is 357,311 which amounts to 4.65% of the total motorised vehicles.

Table 22: Estimated Total Vehicle Population in South Africa - 2007

Motorised Vehicles	GA	KZ	WC	EC	FS	MP	NW	LO	NC	Total RSA
Motor Car	2,062,594	695,405	924,954	315,972	242,832	239,128	232,520	159,388	81,343	4,954,134
Minibus	103,579	42,263	40,280	21,468	12,939	18,824	20,752	18,830	3,687	282,616
Bus	10,524	5,382	4,553	2,240	1,567	2,754	2,962	2,394	782	33,159
Motorcycle	87,075	24,473	40,673	14,130	15,032	12,834	10,563	6,975	4,814	216,568
LDV - Bakkie	519,841	245,157	242,647	146,878	104,285	128,025	116,864	127,653	52,446	1,683,797
Truck+Trucktractor	**99,397**	**43,645**	**36,387**	**20,026**	**18,483**	**21,045**	**16,437**	**15,907**	**7,475**	**278,801**
Other & Unknown	**32,038**	**31,520**	**33,343**	**12,208**	**45,102**	**26,296**	**29,416**	**12,468**	**7,361**	**229,749**
Sub Total	2,915,048	1,087,845	1,322,837	532,923	440,240	448,906	429,514	343,615	157,908	7,678,825
Towed Vehicles										
Caravan	49,284	9,999	19,125	7,021	9,764	10,833	8,742	5,487	3,524	123,778
Heavy Trailer	**40,418**	**23,309**	**13,941**	**7,740**	**12,045**	**11,322**	**8,616**	**5,506**	**3,815**	**126,712**
Light Trailer	247,678	63,142	105,136	40,968	56,716	45,270	42,727	26,191	21,329	649,157
Unknown	3,626	2,290	3,325	1,556	3,307	2,768	3,380	1,584	752	22,584
Sub Total	341,006	98,740	141,527	57,284	81,832	70,193	63,465	38,768	29,419	922,230

From the numbers in the above table it is possible to categorise the freight vehicles by carrying capacity and typical annual kilometres and to derive an estimated annual potential tonnes conveyed. The estimated tonnes derived from such a calculation are approximately 1.4 billion tonnes which can be broken down as follows;

National Corridors	101 million tonnes
Provincial Main Routes	364 million tonnes
Urban Distribution	717 million tonnes
Rural	211 million tonnes
Total	1393 million tonnes

The main emphasis of the origin and destination analyses performed in Phase 2 of this project was the road freight on the National corridors and the main provincial routes. The estimated tonnage transported on the National Corridors is shown in the below table.

Table 23: Annual Tonnes on Road on National Corridors (2007)

	Route Numbers	Corridor Name	Tonnes p.a. (millions)
1	N3 / N11	GAUTENG - DURBAN	41.5
2	N1 SOUTH / N12	GAUTENG - CAPE TOWN	12.7
3	N1 NORTH	GAUTENG - MUSINA	6.5
4	N4 WEST	GAUTENG - LOBATSE	2.3
5	N4 EAST	GAUTENG - RESSANO GARCIA	3.2
6	N7	CAPE TOWN - NAMIBIA	2.5
7	N2 SOUTH	CAPE TOWN - PORT ELIZABETH	3.3
8	N2 CENTRAL	PORT ELIZABETH - DURBAN	6.5
9	N2 NORTH	DURBAN - PONGOLA	6.8
10	N5	WINBURG - HARRISMITH	5.8
11	N14	GAUTENG - UPPINGTON	2.1
12	N6	EAST LONDON - BLOEMFONTEIN	1.2
13	N9	GEORGE -COLESBURG	1.6
14	N10	COLESBURG - PORT ELIZABETH	2.8
15	N17	GAUTENG - SWAZILAND	2.6
16	N8	THABA NCHU - MASERU	2.5
		*	103.9

*Note: Addition of totals introduces double counting on several corridors

As shown in the above table, the “Corridor” concept includes both the main core national road and the peripheral parallel provincial routes that are also used by road transporters between the major centres. The relationship between the different roads and the estimated volumes and vehicle movements are described in more detail in the following sections of this report covering the freight transport operations in each province.
A complicating factor in any discussion of corridor tonnage is the fact that there are varying levels of traffic and tonnage at different points on the corridor and it is difficult to define the extent of the “corridor” traffic as opposed to local and short distance traffic only using a section of the route. This issue will be discussed further in the provincial sections of the report.

The estimated annual tonnes transported between main centres on both the national corridors and some of the major provincial routes, by commodity group, ranked by volumes, is shown in **Table 24** below.

Table 24: Estimated Annual Tonnes of Road Freight by Commodity Group on National and Major Provincial Routes

Estimated Major Commodity Road Freight Tonnes Per Annum			
Commodity Group Code	**Commodity Groups**	**Estimated Annual Tonnes**	**%**
AA	Crops/Fruit	30,150,000	16.6
O	Other-Miscellaneous	26,840,000	14.8
T	Containers	23,672,000	13.0
C	Coal	22,860,000	12.6
AA	Grains	14,670,000	8.1
F	Fuel	14,450,000	7.9
CC	Cement	9,260,000	5.1
P	Perishables	7,804,000	4.3
I	Iron	7,750,000	4.3
W	Wood	7,280,000	4.0
AAA	Agricultural Products	4,930,000	2.7
M	Machines-Vehicles	3,686,000	2.0
R	Rock-Stone-Ores	3,110,000	1.7
D	Drinks	2,910,000	1.6
K	Chemicals	2,573,010	1.4
		181,945,010	**100.0**

a) Durban – Gauteng (N3/N11/R103/R23

The Durban to Gauteng corridor includes the N3 national route, the N11 route from Ladysmith to Volksrust , the R23 from Volksrust to Heidelberg, the R103 route [the old road] which runs parallel to the N3 for long sections and provides an alternate route. There are also some diversion possibilities over short sections of the route such as the M13 at Pinetown via Fields Hill and the Ladysmith bypass via Ezakheni from the R103 onto the N11. The R74 via Bergville and Oliviershoek Pass to Harrismith is also used by heavy vehicles.

Some of the alternative routes are used extensively to avoid tolls and weighbridges, which are mainly located along the N3.

The route is the busiest road corridor in South Africa carrying approximately 1.4 million freight vehicles per annum. The estimated annual tonnage on the combined corridor has increased to 41.5 million tonnes in 2007/08. The proportion of traffic that originates at Durban and Gauteng is estimated to account for about 60% of the traffic on the corridor.

b) East London – Durban (N2 South)

The N2 national road from East London to Durban via Mthatha and Kokstad is the main link between KZN and the Eastern Cape with annual tonnage of approximately 5.0 million tonnes to the south of Kokstad and significant tonnage of timber on the section to Durban, as described in the provincial operations reports.

c) Durban – Pongola (N2 North)

The N2 North from Durban to Pongola is the busiest section of the route, with significant tonnage on the southern section to Richards Bay, as described in the provincial operations reports. Annual tonnes amount to about 7.4 million on the lower section with about 530,000 tonnes at the Golela border with Swaziland.

<u>Provincial Road Freight Operational Problems</u>

Road transport operations in KwaZulu Natal, are very extensive due to the fact that it has within it sections of the busiest national corridors and a large proportion of local commodities that are transported by road. The road transport operations within the province maybe divided into five different categories for the purpose of description.

National routes

The province has three major national corridors, the Durban/Gauteng corridor (N3/N11), the Durban/Piet Retief to Mpumalanga corridor (N2). The third important corridor is the Durban to East London southern routes via Kokstad (N2 Central section).

The N3/N11 route between Durban and Gauteng is the busiest road corridor in South Africa with an estimated 1.4 million HGVs using the corridor annually. The estimated

annual tonnes conveyed ranges from 50 million tonnes at the southern end near Durban to 35 million tonnes near Harrismith and 21 million tonnes at Villiers.

The significant feature of the corridor is the size of the vehicles operating with more than 50% of vehicles being 7 axles interlink combinations, and more than 80% being large articulated combinations. There are also 6-7% of interlink tipper combinations transporting bulk coal and ore in a southerly direction and returning to the interior with bulk grain and other commodities from the port of Durban. Liquid bulk tankers make up approximately 14% of the vehicles and transport an estimated 3.5 million tonnes of fuel northbound. The main vehicle types are the 40% of flat-deck combinations used for general cargo and containers. Container traffic amounts to approximately 500,000 TEUs p.a. as described in the Intermodal section of this report.

The reason that the corridor is so busy is that it is the most cost effective transport route in the country due to the ready availability of two-way loads for road carriers. The costs of transporting on this corridor are lower than elsewhere due to the fact that only 8% of general purpose vehicles are running empty.

Freight operations on the Durban-Gauteng corridor are experiencing severe disruptions as a result of the growing problems caused by the externalities of the heavy road traffic. Accident frequencies and severities are increasing; delays and congestion due to accidents, vehicle breakdowns, road works, and conflicts between light and heavy vehicle traffic are all giving cause for concern. The worst areas on the route are the sections from Marriannhill to Peacevale where accidents have been the cause of total road blockages for hours (and days), the sections between Ashburton and Hilton (around and through the city of Pietermaritzburg) and the section from Keeversfontein to Harrismith (the Van Reenen's Pass) have all had significant problems, that are a growing year by year as traffic increases.

Traffic on this route has increased by 35% since 2005 and appears to be increasing exponentially as the economy gives rise to increasing imports and exports. One cause of the increased vehicle traffic is the lack of pipeline capacity to meet the inland demand for liquid fuel, giving rise to tanker transport of approximately 3.5 million tonnes per annum. The pipeline transport situation is discussed in a separate section. The container movements on this route appear to have increased to 500,000 boxes per annum, for all the reasons discussed in intermodal transport in this report.

A fairly recent but increasingly disturbing development is the large number of bulk tipper configurations that deliver bulk commodities such as chrome, coal and manganese to the east coast ports and coastal areas and then collect back haul cargoes of grains and other bulk commodities for inland destinations. This trade is supported by the lack of rail service for these commodities and the relative flexibility of road haulage.

From an operational perspective there is urgent need for a review of the many problems on this corridor, and the planned construction of bypass and secondary routes that can be used in the event of total blockage of one or more lanes. On the routes between Umlaas Road and the South Durban basin and port there is a growing inefficiency of road haulage due to congestion and a need for very urgent steps by KZN province and / or SANRAL to secure servitudes for several sections of alternate routes for future development. Some sections of the route from Marrianhill Toll Plaza along the M7 [Queensburgh] and other approach roads to the port area are projected to reach total saturation within the next 5 years.

The N2 North, Durban to Richards Bay route has few problems of capacity but there is significant deviation by heavy traffic onto the M4 through Umhlanga to the port of Durban that is causing congestion and concern due to the implications for commuter traffic movements in the CBD and the Victoria Embankment area.

A further diversion area is the R103 via Ottawa, Tongaat, New Guelderland, Mtunzini which carries a significant amount of heavy traffic, diverting from the N2 to avoid weighbridges and toll plazas. The route carries 13 million tonnes p.a. at the Durban end and about 7 million tonnes north of Empangeni.

The N2 Central section via Port Shepstone, Kokstad and Mthatha to East London is a busy route due to the fact that there is no parallel rail line and it offers the most direct connection along the coast. The route is estimated to carry approximately 5.5 million tonnes p.a. but no surveys have been done on the Transkei section for some years. On the section north of Port Shepstone there is timber traffic that inflates the usage.

Local Agricultural and Forestry Traffic

A feature of KwaZulu Natal road transport operation is the extensive use of heavy vehicles for the transport of bulk sugar cane (19 million tonnes per annum) within approximately 30 km radius of the sugar mills. A few areas have longer lead distances such as Melmoth, Transkei, Mkuze, Muden and Kranskop. The impact of the heavy sugar traffic is very evident on the provincial roads in the cane growing areas where road deterioration is a major concern, giving rise to increasing road transport costs and adding to the danger of accidents by light vehicles.

The forestry industry in the province is another source of road transport usage with approximately 1.4 million tonnes of timber being transported from the Midlands area, South coast, Melmoth and Zululand to five major destinations at Richards Bay, Mandini, Durban Merebank, Umkomaas and the new export wood chip facility at the port of Durban. It is anticipated that the 2008 increases in rail tariffs may increase this tonnage of timber on road, by a further 1 million tonnes.

Extensive planting of timber in the foothills of the Drakensburg between Bulwer, Underberg and Swartberg will begin to be transported within the next few years, either by rail if price and availability are satisfactory, or by road, so that several provincial corridors can expect to receive significant traffic increases. Another industry that uses provincial roads and national routes extensively is the coal industry from the Hlobane and Utrecht areas, where local deliveries to the coast are mainly affected by road haulage. In addition several collieries use road haulage to transport coal to consolidation points from which rail wagons are loaded.

The petroleum industry in KwaZulu Natal uses road transport for all distribution to inland points, apart from a proportion that is railed to Pietermaritzburg and Ladysmith. Rail based distribution points at places such as Kranskop, Underberg and Creighton have been closed.

A feature of the road transport operations in KwaZulu Natal that has increased dramatically over the past ten years, is the distribution of consumer goods to wholesalers and retailers from distribution centres located in Durban (primarily) and Pietermaritzburg. Items such as white goods, groceries, hardware, motor spares, tyres, dry goods, fertilizer, refrigerated foods, and household items such as furnishings, electrical appliances, fittings and building materials are all transported by large vehicles from distribution centres and warehouses in the major centres to all the smaller towns in the province. This trend has caused the demise of most local shop keepers handling these products, who are unable to compete with the major chains who are the operators of this distribution system. This trend in distribution transport has been promoted by the increased vehicle carrying capacity that was granted in 1990 following the deregulation of road transport.

Another industry that is using significant amount of road transport is the automotive industry where national distribution is being done by purpose-built vehicle carriers, both from the coast and to distribution points all over the country.

Port Traffic

A significant amount of traffic is generated to and from the Port of Durban and there are severe operational constraints developing around the port, causing inefficiency, increasing costs and unsafe operating practices due to congestion, lack of parking space, the movement of dangerous fuels and chemicals through congestion traffic and residential areas, and lowered standards of monitoring and enforcement.

There is a critical need for a holistic assessment of the entire south Durban basin, the port, airport area, access routes and relocation of industries and facilities, in order to lay a sound framework for the next 40 years. Research done for eThekwini in 2006 showed that the N3 – M7 Queensburgh route would become operationally unworkable within the next 5-8 years. There is urgent need for planning to secure servitudes for a diversion

route from the Hammarsdale-Cliffdale area to the south of Durban to link to Prospecton, the current airport site [future logistics parks], petrochemical industry and automotive industrial areas with a direct route to the Bayhead area of the port

Current planning is fragmented between too many agencies and is therefore not coherent. The alignment of such a port access route is shown in the figure below.

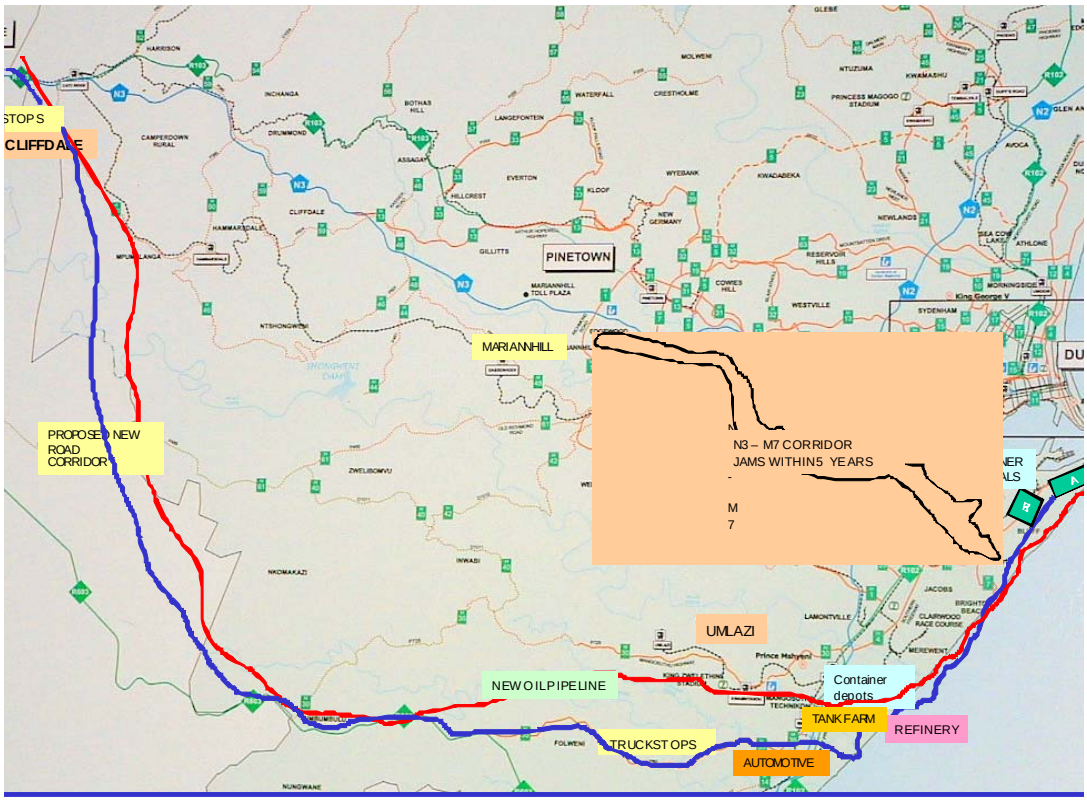


Figure 15: Alignment of proposed Durban port access route

Observations on Provincial Road Freight Operations

From analysis of road freight operations in the different provinces in South Africa there are several aspects that become apparent and significant. It is very evident that road freight is expanding very rapidly to fill areas of demand, serving a wide range of industries, with purpose built vehicle and trailer configurations.

The automotive industry in South Africa that supplies the freight vehicles for these operations has become very sophisticated with a wide range of models and makes from all around the world, many of which have had extensive periods of operation in Southern Africa and have become increasingly adapted to achieve high levels of performance and efficiency. The modern generation of 400 kW diesel engines are capable of moving 40-tonne payloads at 80 kms per hour with a diesel consumption of approximately 50 litres

per 100 km. Vehicle engines have been further developed to achieve more than 1 million km of life, before overhaul.

The extensive road network that has been developed in South African is one of major factors supporting the growth of the road freight industry. Inter regional main routes (national freeways) are of world standard and their specifications make them suitable for long distance large freight movement.

It is very evident in almost all the provinces that the increased vehicle weights and the numbers of vehicles are imposing road loading that exceeds the maintenance capacity of the authorities responsible for provincial roads. Nearly all the provinces have extreme problems with funding the levels of maintenance and rehabilitation necessary to support the extent of the road freight movements on their provincial pavements.

This situation is in turn having a negative impact on the cost effectiveness of road freight operations in many areas, with costs rising rapidly due to road conditions causing tyre and suspension damage, increase fuel usage, and accidents. In many areas, the number of road freight vehicles is far too high for the design standards of provincial roads so that light vehicle accidents are increasing due to the driver frustration with the obstruction caused by convoys of heavy vehicles moving at slow speed. This phenomenon is evident on both national and provincial routes.

The growth of the road freight sector has been largely caused by the withdrawal of rail services for general freight. This has been the unintended consequences of the restriction of funds for railway development by government, thereby forcing railways to focus on their main customers in the haulage of primary bulk commodities.

The increase in road freight traffic on most of the national routes ranges between 20% and 35% of the past four years. Although recent counts have not been performed in this project there appears to be similar increases in many areas, on provincial roads. This increasing congestion, usage and road wear, is patently unsustainable in the current situation where continual under-funding of road maintenance has now become the norm. From the information gathered in the provincial freight transport databanks, it can be estimated that the cumulative deficit in road maintenance exceeds R 40 billion.

The situation is further aggravated by the continued ineffectiveness of the overloading control system, in many areas. The level of deterrence achieved by the overloading system is totally dependent on three factors, the probability of being apprehended, the severity of the penalty, and the likelihood of actually being prosecuted for overloading, these three factors combined, represent the level of risk to a carrier for loading more than is legally permissible, for the purpose of increasing the profit per load. Current attempts at changing legislation to incorporate liability by consignors and consignees within the terms of the Road Traffic Act are likely to be fraught with successive

challenges and legal wrangling that will negate any useful results from the process and greatly increase the cost of enforcement.

A more pragmatic solution to overloading control is to install more weighbridges, carefully placed, and manned for extensive periods of time so that the apprehension rate becomes too high for carriers to take chances. The use of properly controlled PPP weighbridge operations could relieve the pressure on the supply of trained traffic officials and improve the management of the weighing and enforcement operations. Spending money on effective overloading control would be cost-effective for government, by reducing road damage. South Africa needs to legalise the use of weigh-in motion equipment so that random weighing is possible by small teams who are capable of monitoring carrier movements and thwarting the diversion tactics that are part of their normal defensive procedures.

From the research conducted in this and other projects, it is clear that road freight is expanding to fill unsatisfied demand for freight transport. The continued motivation for increasing the proportion transported by rail, it being driven by misconceptions that it is possible for authorities to improve on the practical and commercial decisions of cargo owners. For all the reasons outlined in the introduction to the freight section in this report, it is clear that for most of current road freight, rail does not present a viable alternative.

At the provincial level, the creation of viable railway operations is a very attractive proposition, in view of the current problems with funding road maintenance.

Current Road Freight Operational Problems and Constraints

Cost of Roads

The road freight transport system in South Africa is totally dependent on the availability of road space and roads of suitable condition for transport of goods. The transport of heavy loads on maximum dimension road vehicles is the main land transport mode of the country. One of the major causes for concern in the road freight system is the fact that it is evident that heavy goods vehicles do not at the present time contribute adequately to the wear, damage and externalities that they cause, on the country's roads.

Several studies have been done at various times to attempt to establish the actual road usage cost of different categories of vehicles, but these have not been effectively employed in determining the share of road costs that should be allocated to the operation of road freight vehicles. It has been pointed out that if all the road maintenance costs were calculated and recovered from road freight operators, the cost of road freight transport would rise by approximately 30%. As with all forms of transport, the overall costs of operations have eventually to be paid by the customer or user of the transport,

so that any discussion on road cost recovery from transport operators, effectively equates to the proportional inflation of transport costs that will be experienced by users.

The debate has in the past, to a large extent been academic but the reality is that failure to provide sufficient funds for roads will have increasingly negative impacts on the cost and efficiency of road freight operations due to the fact that operating costs rise rapidly when road conditions deteriorate. On the other hand, full recovery of all road usage costs from all operators of road freight transport would have an excessively inflationary effect on the prices of goods and would cripple some industry's export potential. The issue of equitable road pricing is critical and has severe implications for the economy as well as for intermodal competition.

Availability of Diesel

As described elsewhere in this report, there is an impending shortage of diesel fuel worldwide and South Africa, due to its current manufacturing trends and economics may become vulnerable in the near future. The implications of the present electricity shortages are very negative for road freight transport due to the rapidly escalating usage of diesel for power generation and the fact that when there are failures to the electrified railway system, the tonnage of freight moved to road transport causes additional pressures on fuel supplies.

Personnel and Staffing

One of the severe pressures being experienced by the road freight industry is the skills shortage and lack of adequately trained and competent personnel in a wide range of disciplines.

The national technical training structures are inadequate to ensure supply of competent technicians in the automotive trades. Management training for managers in road transport is ineffective, although some training courses are still available. The failure to connect academic training with industrial practice means that skills and experience shortages are experienced throughout the industry.

There is at the same time a growing concern about the ineffectiveness of the driver training systems and institutions in the country which are failing to supply adequate numbers of trained drivers of mature age (25-40) who are the typical candidates for employment as Code 14 drivers. This situation is being aggravated by the high level of mortality among younger and middle aged drivers, thereby aggravating the skills and experience shortage. An additional complication is the large number of illegal licences that have been fraudulently issued to untrained drivers.

Externalities

The externalities associated with the rapid increases in the road freight operations in South Africa are a growing cause for concern.

In the main cities there is considerable congestion, which is aggravated by the presence of very large vehicles in conflict with light passenger vehicles. The rising truck accident rates in the cities and on the main national corridors are caused partly by the competition for road space and partly by inadequate control of operating standards in the trucking industry, such as driving hours, driver training and control of speeds and loads.

Heavy Goods Vehicle exhaust emissions are a major cause of air pollution in cities and traffic jams and congested roads aggravate this situation.

Regulation of Road Freight Transport

Overloading

Throughout South Africa, there is a failure to adequately control the overloading of goods vehicles. The primary causes of this ineffectiveness of the control systems are; lack of personnel, unavailability of funds for sustained 24 hour operations, lack of weighbridges to achieve geographic coverage, and inadequate legal support for the overloading enforcement system, all of which allow operators to practice avoidance of the system. The control of overloading is delegated to provincial governments and levels of overloading control are highly variable from province to province, ranging from zero to consistent control in KZN and parts of Free State.

RTQS and Vehicle Condition

In many areas, the implementation of the Road Transport Quality System (RTQS) is rendered ineffective by lack of trained personnel, inadequate numbers of inspection staff, infrequent road side inspections and operator disregard for the requirements to maintain vehicle condition. The annual certificates of roadworthiness inspections do not provide sufficient control to ensure that freight vehicles are properly maintained, and have been the subject of extensive corruption and fraud.

Driving Hours

There is wide spread evidence that the extended hours worked by long distance truck drivers is one of the major causes of heavy vehicle accidents on the main corridors. In KwaZulu-Natal a CSIR study concluded that 25% of truck accidents were partly or fully to be blamed on driver fatigue.

In the 1980's when the road transport quality system was created by incorporation of all provincial road traffic ordinances into the Road Traffic Act, it was intended that driving hours would be regulated as part of the RTQS The operator licensing process was rendered ineffective by its inclusion in vehicle licensing and the driving hours legislation

was subsequently shelved for lack of agreement on the implementation procedures. The rising death toll from the heavy vehicles makes this an important issue to be addressed by the authorities.

Operator Fitness

In the design of the road transport quality system it was intended that operators would require a certificate of competence and that they would only be licensed when competent. The requirement was dropped due to pressure from the road freight industry; with a result that there are no entry qualifications required from road transport operators. This dilution of accountability is one of the reasons for the difficulties now experienced by the authorities in enforcing quality standards in the industry. The principles need revision and the introduction of an effective system of operator control in order to improve the quality of road freight operations in the country.

Dangerous Goods

In spite of extensive development of legislation for control of the transport of dangerous goods by road, there is very little effective control of these operations. The main problem is that the legislation has become so complex as to be incomprehensible to most casual operators and the enforcement officials, with the result that it is largely ignored until disasters occur.

Operational Responsibility

The responsible authorities have proposed that the Road Traffic Act will be amended to enforce responsibility by consignor and consignees for overloading and possibly other road freight offences. Implementation of such legislation will introduce some very contentious legal concepts, which will certainly be strongly resisted by a wide range of organisations.

From discussion with ports authorities, large scale liquid bulk terminal operators, coal producers and farmers, it is very apparent that their concerns will lead to extensive litigation to protect their positions. The potential for conflict in such legislation is very high due to a range of factors, such as responsibility for multi drop loads, responsibility when load weights are unknown because vehicles have not been weighed, responsibility for container weights, and the entire complex issue of calculating the legal carrying capacities of road vehicles, which are beyond the technical capability of most consignors and consignees.

It is likely that the authorities will eventually revert to the internationally established norm, which is that transport operators in all modes are fully responsible for the weight of all goods loaded onto their vehicles, planes, ships or trains, and cannot abrogate those responsibilities.

6.4.3 Rail Freight Operational Problems

Rail freight operations in KwaZulu-Natal [KZN] cover 3 main lines and a number of branch lines that feed commodities onto the main line system. The operations on the lines serve as the links from the interior [including SADC countries], to the ports of Durban and Richards Bay as well as connecting the Gauteng industrial areas to the coastal industries.

The main rail freight operations are:

a) **The Durban-Ladysmith-Volksrust Main Line** is the main line between Durban and Gauteng, and is known as Natcor by the railway administration. It is regarded as the most important general freight rail route in South Africa. It carries about 20 million tonnes of traffic on various portions of the line. Some traffic moves the full length of the route between Gauteng and Durban but other traffic enters the line from branch lines and Free State and is consigned to various destinations on the mainline. Traffic moved on the line between points to the north of Volksrust are not recorded as KZN traffic, for example, large volumes of coal are moved from the Witbank area to the Majuba power station at Palmford.

   The Free State line caters for export bulk chemical and containerised traffic between Sasolburg, Durban and Richards Bay as well as grain routed to various points on the line and for export. Grain mills and feed factories take about 340,000 tonnes and 230,000 tonnes of maize was exported through Durban and over 500,000 tonnes of wheat was imported and railed to various destinations, including countries to the north.

   Traffic from Newcastle, Glencoe, Vryheid includes import coking coal and export steel from Newcastle. The Bergville and Pietermaritzburg branch line clusters receive 650,000 tonnes of pulpwood and wood chips for the mills on the North and South Coast.

   Approximately 8 million tonnes are conveyed to the port of Durban, including containers, fuel, steel, coal and grains. Motor vehicles are conveyed on the line for import and export.

   Container trains are scheduled to run from Kings Rest in Durban to Kaserne in Gauteng in 14 hours although delays en-route can extend this to 19-20 hours.

b) **The Durban-Empangeni-Golela [North Coast] Main Line** serves to connect Durban and Richards Bay and provides a link to Swaziland via Golela.

This line carries through traffic to and from South Africa and the Matsapha industrial area, west of Manzini and provides a corridor for bulk magnetite and iron ore traffic from Phalaborwa to Richards Bay.

The other traffic on the North Coast line consists of imports and exports between Swaziland, Richards Bay and Durban; transit mineral traffic; coal ferro-manganese timber traffic and processed mineral sands in the form of rutile, titanium and zirconium.

c) **The Richards Bay-Vryheid-Ermelo-Piet Retief [COALLINK] line** is South Africa's premier 'heavy-haul' line, and currently moves some 70 million tonnes of export coal and 10 million tonnes of export mineral traffic and timber.

Current operations use about 30 to 35 trains per day in each direction on the line which has a theoretical capacity of 74 trains in each direction per day. The operational restrictions on this line are described in some detail in the description of rail lines in Mpumalanga.

d) **The Durban-Port Shepstone-Simuma Secondary Main Line** transports about 780,000 tonnes of cement clinker traffic from Simuma near Port Shepstone to a cement factory at Mount Vernon [Durban]

e) There are also a number of branches from the Natcor line and from the North Coast line that contribute to operations in the province, including:

- The **Glencoe-Dundee-Vryheid Main Line** that connects the Coalline to the Natcor line via Vryheid to Ladysmith.

- The Ladysmith**-Van Reenen (Free State) Main Line** branches from the NATCOR line at Ladysmith and provides a link to the Free State and [points to the west. Export traffic from Sasolburg is routed via Kroonstad to Ladysmith and Durban. During 2005/2006, this traffic exceeded 157,000 tonnes.

- **Branch lines** that feed 680,000 tonnes of timber traffic onto the NATCOR line via Pietermaritzburg for transport to Richards Bay, Mandini, Durban and Umkomaas pulp and paper mills, and for export as wood chips.

- The total annual tonnes handled by the rail freight operations in KZN are shown in **Table 25** below.

Table 25: Total Annual tonnes handled by all Rail Lines in KZN – 2005

Commodity	Fwd Tonnes	Received Tonnes	Intrastate Tonnes	Bridge Tonnes	Total Tonnes
Durban-Ladysmith-Newcastle-Volksrust and Gauteng	6,125,970	10,924,499		788,764	17,839,233
Durban-Empangeni-Golela and Swaziland	1,777,508	3,763,768		286,444	5,827,720
Durban-Port Shepstone and Simuma	629,334	879,458			1,508,792
Richards Bay-Vryheid East-Piet Retief and Ermelo	370,449	55,833,124		17,926,649	74,130,222
Glencoe-Dundee-Talana-Vryheid and Vryheid East	342,740	365		1,231,001	1,574,106
Ladysmith-Van Reenen and Free State	54,004			1,805,398	1,859,402
Pietermaritzburg Branchline Cluster and other KZN Branchlines	1,567,602	13,574			1,581,176
Richards Bay Coal Line	370,449	2,467,162			2,837,611
Total	**11,238,056**	**73,881,950**		**22,038,256**	**107,158,262**

- The continual competition from road transport is very evident in KZN where large areas of the province no longer has rail freight operations due to the fact that stations have been closed and lines abandoned.

- The extent of the disuse of rail loading facilities is shown in **Figure 16** below. The green points with labels were used in 2005 and the red points were disused.

Figure 16: Usage of rail freight loading points in KZN - 2005

As shown in the above figure there are many rural areas that no longer have rail service for any but bulk commodities. It is anticipated that up to 1 million tonnes of timber will move to road haulage from 2008 as the result of proposed tariff increases on the branch lines. This is likely to lead to closure of the remaining branch line operations in the province.

Main Line Freight Rail Operations

Current railway operations on the main corridor lines are described below.

a) Durban-Gauteng

This route is the main line between Durban and Gauteng, known as “Natcor” by the railway administration. It is regarded as the most important general freight rail route in South Africa, and carries about 20 million tonnes of traffic on various portions of the route made up of coal, fuel, iron ore, steel, grain, vehicles and containers.

The line delivers approximately 8 million tonnes of cargo to the Port of Durban and also carries traffic for Richards Bay that is forwarded on the North Coast line. Varying amounts of traffic feed on to and from the line at different points so that operations are different in the 3 provinces traversed by the line.

Table 26: Operations on the Durban – Gauteng Line

Route:	Durban - Gauteng via Volksrust
Route Distance:	730 km
Infrastructure:	Double track throughout, electrified at 3 KvA, CTC train control over entire route 21.5 tonne axleload for wagons.
Condition:	Fair to good. Track condition and geometry acceptable for current train speeds. Formation and drainage problems in some areas, particularly between Durban and Cato Ridge.
Major Commodities:	Containers, Liquid Fuel, Aggregates, Grain, General Cargo
Operation:	Block loads running between Durban and City Deep (Gauteng) on planned schedules.
Description:	Durban to City Deep via Volksrust
Annual Tonnes:	Varies for sections of line - 20 million in total: approximately 8 million tons to Durban
Daily Tonnes:	4900 to 5000 net tonnes
No of Trains:	3 to 5 southbound
Wagons per train:	50
Gross Tonnes per train:	2550 tonnes
Net tonnes per train:	1500 tonnes (when fully loaded, 100 TEU's)
Transit time:	14-19 hours
Wagons used:	S MLJ flat cars of various types
Locos used:	3 to 4 Class 18E electric locos
Wagon turnaround:	5-8 days
Capacity:	Total capacity of line for through traffic - 75 to 100 trains per day.
Capacity used %:	For all traffic, currently 23-28% depending on section.
Traffic Constraints:	Power cable theft, Eskom power outages, locomotive and staff shortages.

Current Rail Freight Operational Problems and Constraints

The railway operating company [Transnet Freight Rail - TFR] has seen operating efficiency decline for a number of years.

The reduction in efficiency can be ascribed to;

- a lack of short and long term maintenance has led to deterioration in equipment serviceability
- age of equipment
- reduced operating staff experience causing breakdowns, derailments and accidents
- reduced line capacities due to lack of maintenance
- deliberate reduction in rolling stock and locos to “downsize” the business
- lack of managerial motivation for investment to meet demand
- government resistance to providing capital to meet customer demand
- failure to modernise the rolling stock and locomotives leading to low levels of operational capacity
- lack of staff training and motivation

Examples of some of these problems are described below.

Locomotive and wagon shortages

During the planned streamlining of railway services between 1985 and 2000 many locomotives were taken out of service after having had relatively minor break-downs. With corporate downsizing these locomotives were seen to be surplus to future needs. The locomotives left at insecure locations suffered the theft of important, and sometimes costly or irreplaceable components. The company scrapped wagons – reducing from 120 000 in the early 1990’s to less than 80 000 now. Foreign consultants recommended reduction to 60 000 wagons; to be achieved when wagon utilisation was improved by reducing turnaround times.

As the result of poor or lack of maintenance to wagon journals, hot boxes and axle breakages were blamed on friction bearings which it was claimed were dangerous and prone to derailing; vacuum brake wagons were said to be obsolete. Railways had used friction bearings for over 100 years and while roller bearings have decided advantages, the claim that friction-bearing wagons were unsafe was totally misleading and the scrapping of wagons was unnecessary waste.

Air brake equipped wagons have many advantages over vacuum brake wagons and the plan had been to only use air brake wagons in the future but the programme to convert completely to air brake wagons was not completed. For the general freight business, many commodities can be effectively loaded in vacuum brake wagons and

there was no reason for not making better use of vacuum brake wagons until the conversion was completed.

The above mismanagement caused wagon shortages, which resulted in large quantities of chrome and ferrochrome, domestic coal and grain traffic switching to road transport. Bulk cement producers have been offered wagons, which are not effectively self-offloading, causing them to use road freight hauliers. No efficient custom wagons have been designed for years and in view of the recent steep tariff increases; it is unlikely that much of this cargo will be attracted back to rail.

Reduced line capacity

On the Gauteng – Cape Town route, the section between Kimberley (Beaconsfield) and De Aar, previously double track, has been electrified but reduced to single track. This could limit train movements should there be an upsurge in traffic. Re-instating the second line and electrifying should be considered as an urgent matter.

Between Bloemfontein and Noupoort, as section of main line serving both the East London and Port Elizabeth lines, some 50% of the interloops (crossing points) were eliminated several years ago. Again, if traffic returns to rail, this could create a bottleneck.

The arterial line from Orkney to Vierfontein was uplifted recently and because of this certain traffic must be routed over other lines and over much greater distances. This includes export grain traffic.

Many branch lines have operating restrictions in terms of speed and axle loading.

On the Ressano Garcia – Maputo line, the 18.5 tonne axle load and speed restriction was imposed because of the poor condition of some bridges. This has meant that only Class 35 diesel locomotives operating in pairs can be used and not the larger Class 33 locos owned by CFM. The earlier concessioning of this operation to Spoornet and resulting delays in implementing infrastructure upgrades reduced the capacity of this section for many years until it was recently restored. A mining company was reportedly planning a pipeline to Maputo to transport magnetite to avoid using the monopoly rail services.

Poor Operating Efficiency

An example of how operating efficiency can be compromised is in the North-South Corridor operation between Phalaborwa and Richards Bay. There is a designed turn time of 96 hours for the round trip but numerous problems have led to turn times of between 120 and 150 hours. Part of the problem has been the unreliability of both diesel and electric locomotives and the effect of traffic delays due to subsequent breakdowns.

There have been hold ups in the change from electric to diesel traction at Komatipoort because of poorly timed train connections and air brake test delays.

Container trains operating between Gauteng and Durban are often delayed due to electric loco breakdowns. A set of three 18E locos maintained in Gauteng is required to haul a normal 50 wagon container train but if one loco has become defective the other two cannot take the train which in consequence will miss its return slot. For this reason, the train may stand at the Kings Rest yard for 24 to 48 hours and this unreliability promotes the switch to road haulage.

Staff Problems

Railways are short of qualified and experienced staff, in maintenance, operations, planning, management and engineering. Training of staff within months instead of years results in drivers after three to six month training being put on main line duties. In the past, it took between 5 and 10 years before a person could qualify to drive main line trains. The result is inefficiency, derailments and accidents.

Many of the people that perform locomotive maintenance are poorly trained and not suitable for the physically demanding tasks. Private sector companies are available to provide professional maintenance services but the railway company does not use contracted maintenance providers, even where there are in-house problems.

Tariff Issues

Government policy includes promotion of rail traffic and TFR has a stated intention to increase the share of the general freight traffic market.

Recent tariff increases are forcing more traffic to road. This includes grain, sugar cane and forest products. The scale of increases was staggering – ranging from 40 to 90%, although TFR promised to spread the increase over two years.

Forestry Industry analysis shows that rail rates increased by an average of 66% from 2002 to 2007 and road had increased by 35% during the same time. The 2008 rate proposals will increase rail to 106% but road to only 45%.

Timber traffic volumes from the Pietermaritzburg branch line cluster, which was at a level of about 741 000 tonnes in 2005-2006, is now expected to drop to about 450 000 tonnes. The reduced volume may encourage TFR to demand substantial additional increases in 2009 which will hasten the closure of these lines and result in even more traffic being transferred to road.

In the case of grain traffic, TFR announced increases of 25 to 30% for 2008-2009- much of the traffic originated on branch lines. But several had already closed and in some cases had been badly vandalised. Grain millers and exporters threatened to move even more traffic to road.

In contrast, import container rates decreased marginally in 2007 for a 6-metre, 5 tonne payload container from Durban to the City Deep Container Terminal in Gauteng.

- 2007 R 3 432 + VAT+ Road delivery [10 kms] R 1 040 + VAT
- 2008 R3 228 + VAT + Road delivery [10 kms] R 1 196 + VAT

A fuel surcharge of 2.986% has also been added with the result that the total door to door rate has changed from R 5 098.08 to R 5 083.67 a reduction of R14.41, which is unlikely to attract any additional cargo.

The cost of rail freight transport in South Africa is generally considered to be too high, both in relation to other modes of transport and in relation to international best standards. There are many reasons that are advanced, for this state of affairs and it is relevant to analyse these to obtain some indications of whether it is possible in the short to medium term to improve this situation and if so what steps could be taken.

The major factors that have impact on the costs of rail transport in South Africa are;

- The asymmetric distribution of origins and destinations, as shown in previous sections of this report. There are very serious distortions of cargo availability with the major inland origins of bulk freight being approximately 500km from destinations at the ports.
- The deregulation of road transport in the 1990's was accompanied by legislation that permits some of the biggest road freight vehicles in the world for usage on the general road system of the country, without geographic restriction.

- This proliferation of 7 to 9 axle road freight combinations with carrying capacities with up to 40 tonnes means that their cost per tonne kilometre for two way haulage is comparable with current general cargo tariffs on rail.

- Capital expenditure by the railway has been deliberately restricted by the government for approximately 20 years. A large proportion of the equipment is over 20 years old and much of it is much older.

- The railway has for the last 14 years been progressively depleted of skills in all disciplines due to labour policies.

- The international surge in the market for bulk commodities was not appreciated in the 1990's, so that inadequate preparations were made for the scale of potential export markets.

- The continued evolution of the South African economy from an agricultural, mining and primary industry base into a more sophisticated import/export orientated manufactured goods economy, has left the technologically limited railways unable to compete for much of the higher rated more sophisticated traffic. It is significant that analysis of container traffic hauled by rail, shows that 15 destinations account for about 85% of the traffic, whilst the wide distribution of the remaining 15% to a further 200 destinations is probably uneconomical.

- The railway management has focused the resources available on provision of service to the major industrial bulk customers. Services to other industries have been discontinued or priced to compensate for low volumes.

- The railway administration continues to be over-staffed, with high concentrations of highly paid, supernumerary, overhead positions that do not contribute to coal-face management decision making.

6.4.4 Air Freight Operational Problems

Introduction

An air freight strategy study for ACSA completed by RAU in 2004 pointed out that there is a definite world wide trend towards the use of dedicated freighter aircraft for air cargo movement with newer aircraft capable of loads as high as 40,000 cubic metres and 150 tonnes (A380-F). The limiting factor to use of these highly economical aircraft will be the cargo volumes in and out of South Africa which are currently about 450-500 tonnes inbound and 300-350 tonnes outbound per day, to all destinations

South Africa has 6 major airports and a number of smaller ones in all Provinces. OR Tambo International Airport (ORTIA), as the most important airport in South Africa plays a vital role in the local Gauteng economy as well as in the national economy due to the extent of its passenger and cargo activities. The minor airports handle very little air cargo apart from post, parcels and some courier traffic. Charter services are used to supply urgent spares and equipment in the more remote parts of the sub-region but these are necessarily occasional and not recorded. The major airports situated in the provinces handle small amounts of air cargo, using the belly hold capacity of passenger aircraft on scheduled services. The exception is Cape Town Airport from which a small amount of international air cargo is consigned and received, mainly to and from Europe and the Americas.

Air cargo movements throughout South Africa are restricted by the available space in passenger aircraft. All movements of light mail and courier parcels are loaded in the belly hold of passenger aircraft, using any space available after passenger luggage has been loaded. This practice reduces the available capacity and adds an element of unreliability as passenger luggage always takes priority over air freight consignments.

In response to this situation a well developed “air cargo service industry” has been developed that includes suppliers of regular overnight dedicated road transport services to achieve fast and efficient movement of goods from all over South Africa to and from almost anywhere in the world.
There is only one centre in South Africa with sufficient long haul international capacity to a range of destinations, to provide airfreight services, and that is OR Tambo International Airport [ORTIA] in Johannesburg.

ORTIA, as the regional hub for international air freight, consigns and receives air cargo to and from centres like Namibia, Lesotho, Swaziland, as well as Zimbabwe and Botswana, all of which are served by connecting road services. On most of the road corridors there are dedicated overnight carriers operating between major centres and ORTIA, providing the necessary links to and from international air carriers’ services. The transport of freight destined for international air transport is more cost effectively done by road than it would be by local air carriers with limited volumes and small aircraft.

Estimated volumes of air cargo in South Africa are:

Cape Town	35,000 tonnes p.a.
Durban	9,000 tonnes p.a.
OR Tambo	350,000 tonnes p.a.

These estimated volumes are discussed further in the provincial air cargo sections of this report.

Main Air Freight Commodities
The main categories of regular international airfreight commodities are:

Cut Flowers and Plants
Locally grown cut flowers from the East and West Rand areas that are exported to Holland. This is augmented by flowers from Harare by road and from Kenya by air to the same destinations. There are also some exports of plants as un-rooted cuttings and slips, nearly all to Europe.

Automotive
Local automotive manufacturers export leather car seats (mainly to Europe), catalytic converters, wiring harness and looms, and brake components to USA, Europe and the Far East, when the normal maritime channels have caused delays in the supply chain. Components are also imported to make up deficiencies in the supply to local assembly lines.

Veterinary and Medical Supplies

Suppliers of vaccines and serums import all their requirements for distribution all over South Africa and the region.

Food and Beverage

Food additives and chemicals for food processing and production of beverages are received from Europe and USA. Numbers of local speciality importers supply the South African market with exotic foods air freighted from all over the world; e.g., cheese and yoghurt from Greece; chocolates from Spain and Holland; whiskey from UK. Exports to African destinations include water and foodstuffs.

Office Machines

Local branches of international office machine suppliers coordinate the import of computers, copiers, scanners, printers, cell phones and other electronic equipment via JIA, to supply the South African market. Spare parts for these machines, diodes, boards, screens and other components are air freighted from UK, Sweden, Holland, Japan, Korea, Taiwan, USA and Europe.

Pharmaceuticals

Imports of pharmaceuticals are mainly from Europe and exports from local companies, mainly into Africa, e.g. Hair preparations, skin creams and soaps. Occasional bulk consignments of household detergents have been made to Russia by local suppliers, flown out in Antonov mega-freighters.

Animals

There is irregular but frequent export of animals to African and European destinations (game go mainly to reserves and zoos), goats, cattle to Africa and Mauritius. Export of trophies (mainly to USA), and hides and skins for reworking (mainly to the Far East for belts and hand bags).

Mining Equipment

As Gauteng is the centre of excellence in respect of African mining supply services, there is regular use of air cargo, often with large freighters, for supply of equipment and spares to mines all over Africa and as far afield as Philippines, Malaya, Russia and South America.

Fish and Shellfish

Imports and exports of fish are coordinated in Gauteng from several areas; shellfish to Holland and Bulgaria, abalone to the East and crayfish and line fish to elsewhere in Europe; hake to Spain.

Fruit and Vegetables

A wide range of fruit products are exported through JIA, from all corners of South Africa; avocados, deciduous and citrus fruits and some exotics such as kiwi, berries and papaya. Export fruit makes up a major proportion of the total volume of air cargo handled at JIA.

Textiles

There are significant volumes of textiles being air freighted from local producers and from factories in neighbouring countries (Swaziland, Lesotho and Botswana) taking advantage of the US African Growth and Opportunity Act (AGOA) exemptions.

Air Cargo Operations

Airports Company of South Africa (ACSA) is the biggest airport management company in South Africa. The company is a public-private-partnership between the government of South Africa, private sector shareholder Aeroporti di Roma and others. The company operates ORTIA and 8 other South African airports including Durban, East London, Port Elizabeth, George, Cape Town and Bloemfontein. ORTIA is the most important airport accounting for about 70% of the groups' turnover and handling 86% of the cargo.

All airports are registered and controlled by the National or Provincial transport authorities in respect of facilities, standards and permitted operating and safety procedures.

Air Freight in KwaZulu-Natal

There are two main airports in KZN, Durban and Pietermaritzburg.

Air cargo movements are confined to Durban airport where approximately 9000 tonnes per annum is moved as belly cargo on scheduled passenger flights. The largest proportion is consigned to or received from ORTIA to and from international destinations.

Overnight road transport services provide regular transport of perishable and high value cargo from Durban and Pietermaritzburg to OR Tambo International Airport, for onward transfer to international flights. It is estimated that as much as 150 tonnes of air cargo per day could be transported by road between Durban and Johannesburg by road. . These movements are necessary because there are very few flights to international destinations from Durban

The construction of the new King Shaka International airport at La Mercy, which is due for completion in 2010, may improve the availability of air cargo capacity from Durban, if the Dube Trade Port initiative serves to stimulate further manufacturing and export agricultural production in the coastal belt.

With wide-bodied aircraft having cargo capacities of 150 tonnes or more, per flight it is clear that local volumes will need to increase significantly to interest international air freighter operators.

As the airport increases passenger volumes the belly capacity will offer increasing capacity, and may attract cargo if the tariffs can be made competitive with road haulage.

Constraints and Problems with Air Cargo Operations

Gauteng is without question the centre of the Air Cargo industry in South Africa with about 350,000 tonnes of international air cargo being handled at ORTIA in Johannesburg.

There is very little air cargo movement in any of the provinces other than Gauteng and in all cases there is reliance on overnight road transport services to provide regular transport of perishable and high value cargo to and from OR Tambo International Airport, for onward transfer to international flights.

Studies indicate that there will be gradual growth in the use of wide-bodied freighters, and continued dependence on belly-freight capacity in passenger airliners for some time to come.

It has been identified that the lack of outbound air freight from South Africa compared to imported goods by air is a major obstacle to growth of the market. This is only partly compensated by outbound consignments tending to be denser than inbound freight due the commodities involved.

6.4.5 Sea Ports Operational Problems

Overview

In South Africa There are eight ports operated by the parastatal ports authority, Transnet National Ports Authority (TNPA). In Western Cape there three ports, Cape Town, Saldanha and Mossel Bay. In Eastern Cape there are three ports, East London and Port Elizabeth As well as the Ngqura port development 30 kms north of Port Elizabeth. In Kwazulu-Natal there are the two busiest ports on the East African seaboard, Durban And Richards Bay. In this report the Port Of Maputo In Mozambique is also described as it is effectively an alternative to the South African Ports.

The port operational problems are described in some detail, but should be read in conjunction with Chapters 5 and 6 of the NATMAP Phase 1 Consolidated Report. The focus of this section is the description of operational issues for bulk and breakbulk cargoes as well as the trends in current container handling operations. The issues around providing capacity for containerised cargo are discussed for all ports in a later section of the report, as well the intermodal potential of maritime containers.

Aerial photographs of each port are included in the description for ease of reference between the text and the pictures.

The annual bulk and breakbulk tonnage handled at South African ports is shown in the the table and figure below

Table 27: Annual Tonnage of Bulk and Break Bulk Handled at South African Ports – (2003-2008)

National	2003	2004	2005	2006	2007	2008
Total Inward	42,845,815	43,823,777	43,840,708	47,974,283	49,693,601	55,264,668
Total Outward	128,448,227	124,370,762	129,095,315	129,488,092	133,268,261	127,855,388
Total	171,294,042	168,194,539	172,936,023	177,462,375	182,961,862	183,122,064

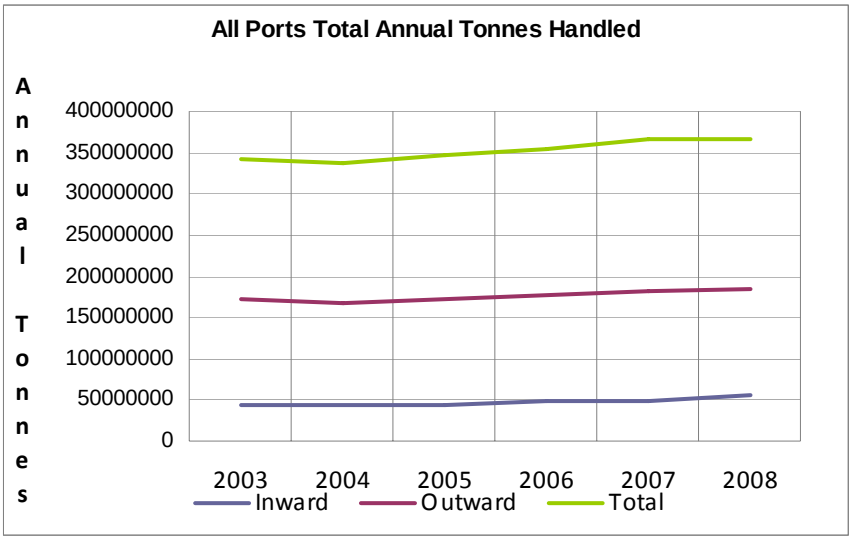


Figure 17: Annual Tonnage of Bulk and Break bulk Handled at South African Ports – (2003-2008)

The port descriptions in this section are arranged under the following headings;

- Photographic overviews
- Annual volumes handled per port
- Berth occupancy table
- Aerial photographs of specific sections of ports

- Port sectional operating issues
- Currently proposed upgrades
- Future upgrades under consideration

Port of Richards Bay

Introduction

The Port of Richards Bay is the largest bulk port in South Africa handling approximately 64 million tonnes of cargo per annum (2008).

The port of Richards Bay has the deepest draft on the east coast of southern Africa (entrance 17, 5 metres) and also has the spatial capacity for expansion into the low lying agricultural and unpopulated areas surrounding the port. Current estimates suggest that it could provide as many as 40 additional berths before its capacity is in any way constrained.

Figure 18: Port of Richards Bay

The main export commodities through Richards Bay are bulk coal and mineral ores. The annual tonnage handled at Richards Bay for the period 2003 to 2007 is shown in **Table 28** below. As shown, there has been a reduction in the overall throughput of the port over the period due to lack of bulk rail capability for coal and ores and the lack of road capacity for other cargoes from the interior. The trend has been compensated by a small increase in imports.

Table 28: Annual Tonnage Handled at Richards Bay

RICHARDS BAY	2003	2004	2005	2006	2007	2008
Inward bulk imports	5,057,407	5,432,877	5,244,696	5,612,996	5,661,100	6,052,297
Inward bulk coastal	274,647	321,080	376,113	294,930	269,862	374,825
Inward breakbulk imports	171,804	289,972	142,348	168,457	171,764	70,945
Inward breakbulk coastal	103	2,304	3,079			-
Outward bulk exports	78,197,903	75,105,682	76,646,350	72,212,666	74,103,777	73,910,899
Outward bulk coastal	18,435	12,502	7,731	169,534		26,823
Outward breakbulk export	4,051,631	4,523,207	4,203,367	4,556,244	4,306,030	4,097,733
Outward breakbulk coastal	18	4	0			-
Total Inward	5,503,961	6,046,233	5,766,236	6,076,383	6,102,726	6,498,067
Total Outward	82,267,987	79,641,395	80,857,448	76,938,444	78,409,807	78,035,455
Total	**87,771,948**	**85,687,628**	**86,623,684**	**83,014,827**	**84,512,533**	**84,533,522**

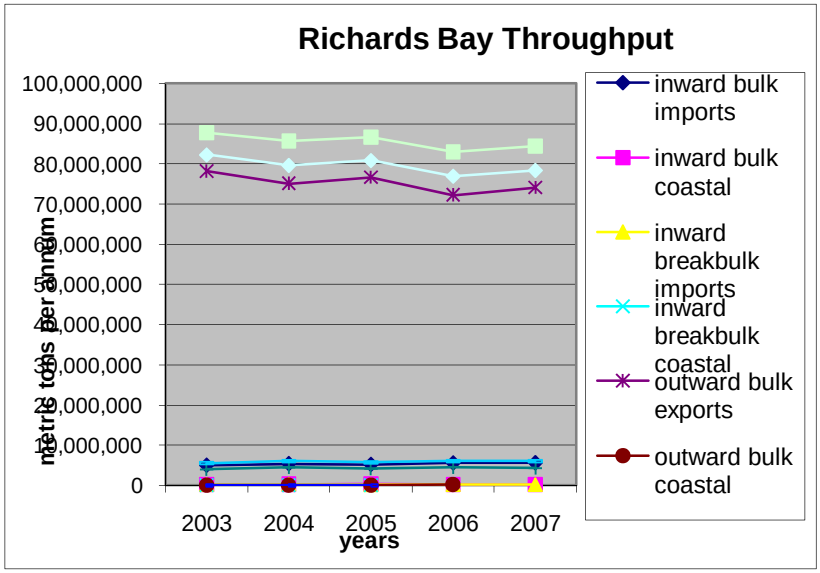


Figure 19: Annual Tonnes Handled at Richards Bay

The reduction in bulk exports is evident in the above figure.

The berth occupancy at Richards Bay is shown in the following table.

Table 29: Berth Occupancy

Entrance Draft m	Usage Group	Berth	Draft m	Length m	Berth Occupancy %
		301	17.5	350	65
		302	17.5	350	65
	coal	303	17.5	350	65
		304	17.5	350	65
		305	17.5	184	65
	genl purpose	repair quay	7.5	300	na
		705	17.5	280	70
		706	13.5	200	70
	break	707	13.5	200	70
	bulk	708	13.5	200	70
		606	13.5	220	50
		607	13.5	220	50
17.5		608	13.5	204	50
	woodchips	801	17.5	260	65
		804	17.5	260	65
	bulk	703	17.5	240	70
	export	704	17.5	240	70
	bulk	609	14	300	61
	import	701	14	300	61
		702	17.5	240	61
	liquids	209	12.5	300	42

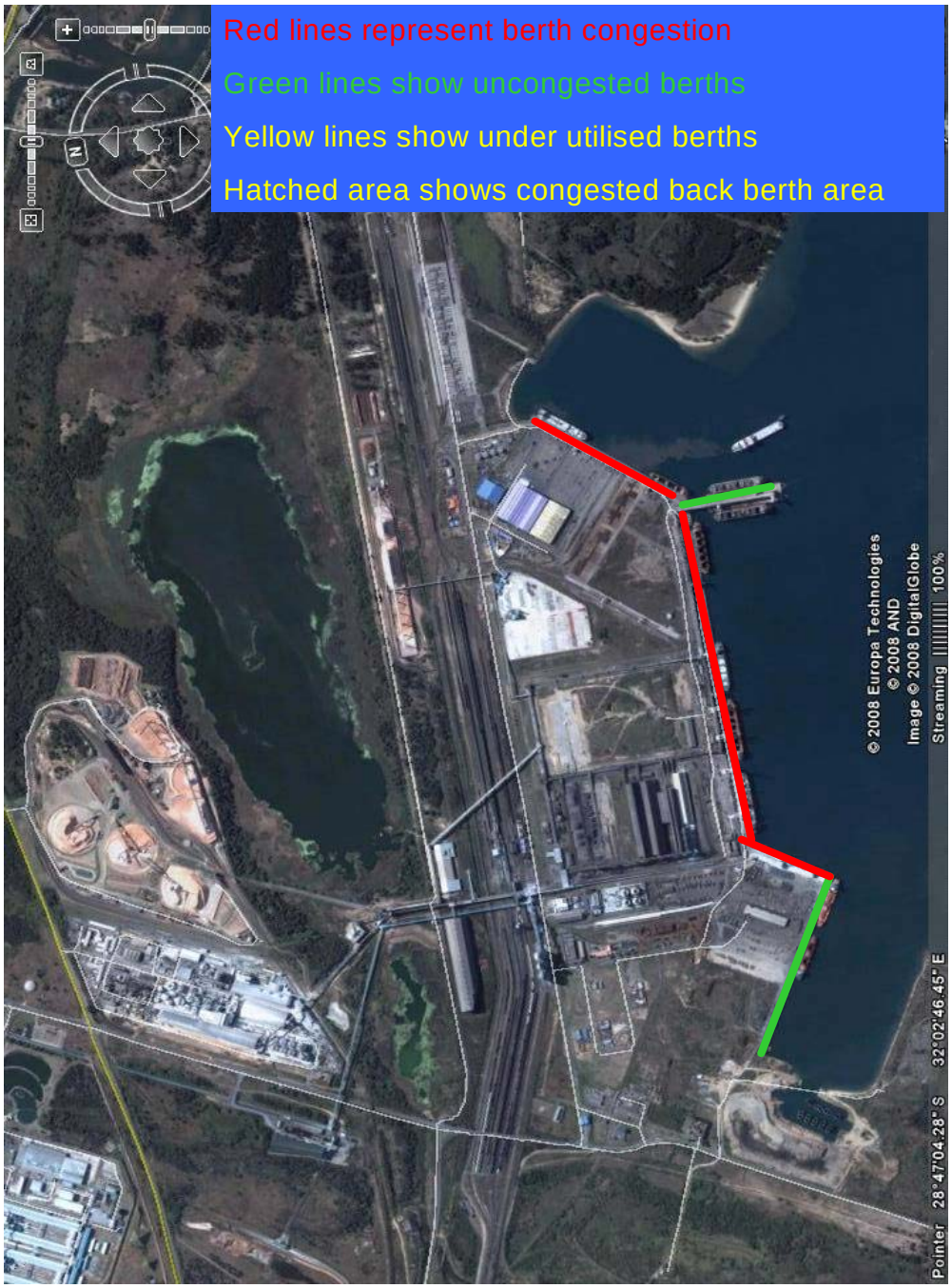


Figure 20: The Multi Purpose Break-bulk and Bulk Terminals

Figure 21: The Coal and Liquid Terminals

Operational Areas

Richards Bay Coal Terminal (RBCT)

The coal terminal handles approximately 68 million tonnes of coal and has adequate berth space and in general terms adequate stack space.

In recent years the ownership of coal at the terminal has been fragmented among a larger number of suppliers and there has been increasing demand for more but smaller

and separate stacks. With over 30 possible grades and sorts this poses huge problems for the management of the terminal. Coal owners have the intention to greatly increase the output from the terminal and plans for increasing to 91 million tonnes p.a. are in hand. The implications of this move will be discussed in a later section of this report.

Liquid Products Terminal

The Liquid bulk terminal has the use of one berth adjacent to the Coal Terminal and is supplied from a tank farm, as shown in the photographs below. Berth utilization on this berth is low and it is adequate for current purposes. There are plans by cargo owners to greatly increase throughput volume which will be dealt with later in the Report.

Multi-Purpose Break-bulk Terminal [MPT]

The multi-purpose terminal handles approximately 6.0 million tonnes p.a. of a range of break-bulk and bulk commodities including ferro-alloys, steel, pig iron, wood pulp, pitch pencil, granite, paper and copper, on a common user basis.

Current plans are in hand for expansion of the MPT by construction of a proposed liner extension to handle containers; 2 bagging sheds to increase capacity to bag manganese, and further shed capacity for steel storage.

Berth occupancy on this whole terminal has reach 70%, at which point congestion is already occurring. Berths are allocated on the basis of first come first served once the total cargo for the vessel is available.

The tendency by port authorities to ignore the costs of ship delays leads to maximising berth occupancy within reason, at the trade off of some delays to vessels. The costs of ship delays increase as berth occupancy rises and with vessel fixed costs now approaching US $50 000 per day, delays of two days at a port equates to as much as $8 per tonne of cargo loaded.

Due to variations in the design and lifting equipment of vessels and the fact that different cargoes have different handling characteristics, it is not practicable to compare best or average handling speeds in the MPT. The shipping fraternity generally considers that loading speeds are too slow, particularly for ferro-alloys.

Given that loading speeds are unlikely to change materially, and that volumes will slowly increase, there will certainly be a need for additional berths in the future. The reduction of berth occupancy to about 60% is seen to be necessary to improve the efficiency of the terminal.

In the photograph of the overview of the port it can be seen that there is a “repair berth” near the harbour entrance on the same side as the multi-purpose terminal. This berth is

actually used to load vessels of shallower draft and the designation “repair quay” is inaccurate.

Dry Bulk Terminal [DBT]
The Dry bulk terminal [DBT] handles approximately 16.0 million tonnes of chrome, magnetite, rock phosphate alumina, vanadium, sulphur and other dry bulk products The wharves are served by a series of conveyors that come from various sheds, factories and processing units both at the back of the berths and outside the port perimeter in nearby industrial areas.

Current plans to expand the terminal include the provision of two more open slabs for storage and a general purpose shed for anthracite.

The shipping and discharging systems on the berths handle the variety of products that are sometimes are on dedicated conveyors and at other times on common conveyors for short sections of the journey.

There is adequate space for more processing plants, sheds, etc., but there is inadequate berth space as existing berths have reached 70% occupancy.

The load and discharge speeds achieved by the handling equipment are satisfactory, for the products for berthed vessels. The problem is that increases in the tonnage are not being accompanied by construction of more berth space. There are already too few berths and no space within the current system to berth more ships, with the result that vessel delays are inevitable. Berth occupancy should be approximately 60%.

<u>Current Planned Port Upgrades</u>
RBCT
The coal terminal is currently expanding and adding one extra berth and the associated stack and handling equipment that is necessary. It is expected that throughput will rise during the next three or four years to 91 million tonnes per annum and the rate of expansion will be dictated by the ability of TFR to increase the rail capacity of the coal line (see the Richards Bay Corridor Report).

Liquids Terminal
Tenders have just been invited for the construction of the second berth alongside the existing one.

DBT
Increased stacking space.

MPT
Increased liner space and 2 bagging sheds.

Future Upgrades under Investigation

Multi-purpose Terminal

Feasibility studies are being conducted now as to how to increase the berth capacity of the terminal, but as the terminal is already experiencing delays these will undoubtedly get worse as it takes far too long to convert feasibility studies into reality.

Dry Bulk Terminal

Feasibility studies are also being conducted for increased berth capacity at this terminal and the same observations apply.

Containers

Plans are afoot for a feasibility study on a container terminal for this port that will of necessity include feasibility of providing inland linkages by road and rail for approximately 30% of containers and as well as links to the Durban area where 60% of container handling now takes place.

The magnitude of the required expansion of container capacity over the next 40 years will to a large extent depend on the market for imported manufactured goods from the east, which currently account for 60-70% of container imports.

The issues around the handling and transport of containers are discussed in the section on intermodal transport.

The Port Of Durban

Introduction

The Port of Durban is South Africa's busiest general cargo harbour and handles most of the container traffic in South Africa. The port handles approximately 41 million tonnes of general bulk and break-bulk cargo and approximately 2.3 million TEUs of container cargo.

Figure 22: Port of Durban

Table 30: Annual Tonnes Handled at Port of Durban

DURBAN	2003	2004	2005	2006	2007
Inward Bulk Imports	25,168,737	25,257,429	24,789,429	26,777,702	27,951,926
Inward Bulk Coastal	71,736	569,627	209,394	136,029	229,456
Inward Breakbulk Imports	1,895,193	2,520,148	3,562,477	4,344,867	4,280,315
Inward Breakbulk Coastal	5,649	3,957	10,664	10,552	19,122
Outward Bulk Exports	6,256,635	5,226,663	5,595,275	4,415,737	3,745,617
Outward Bulk Coastal	3,053,962	2,698,020	2,596,551	2,263,219	2,264,991
Outward Breakbulk Export	4,698,812	3,588,874	3,660,167	3,139,183	3,075,766
Outward Breakbulk Coastal	28,641	32,838	11,140	34,217	43,666
Total Inward	27,141,315	28,351,161	28,571,964	31,269,150	32,480,819
Total Outward	14,038,050	11,546,395	11,863,133	9,852,356	9,130,040
Total	**41,179,365**	**39,897,556**	**40,435,097**	**41,121,506**	**41,610,859**

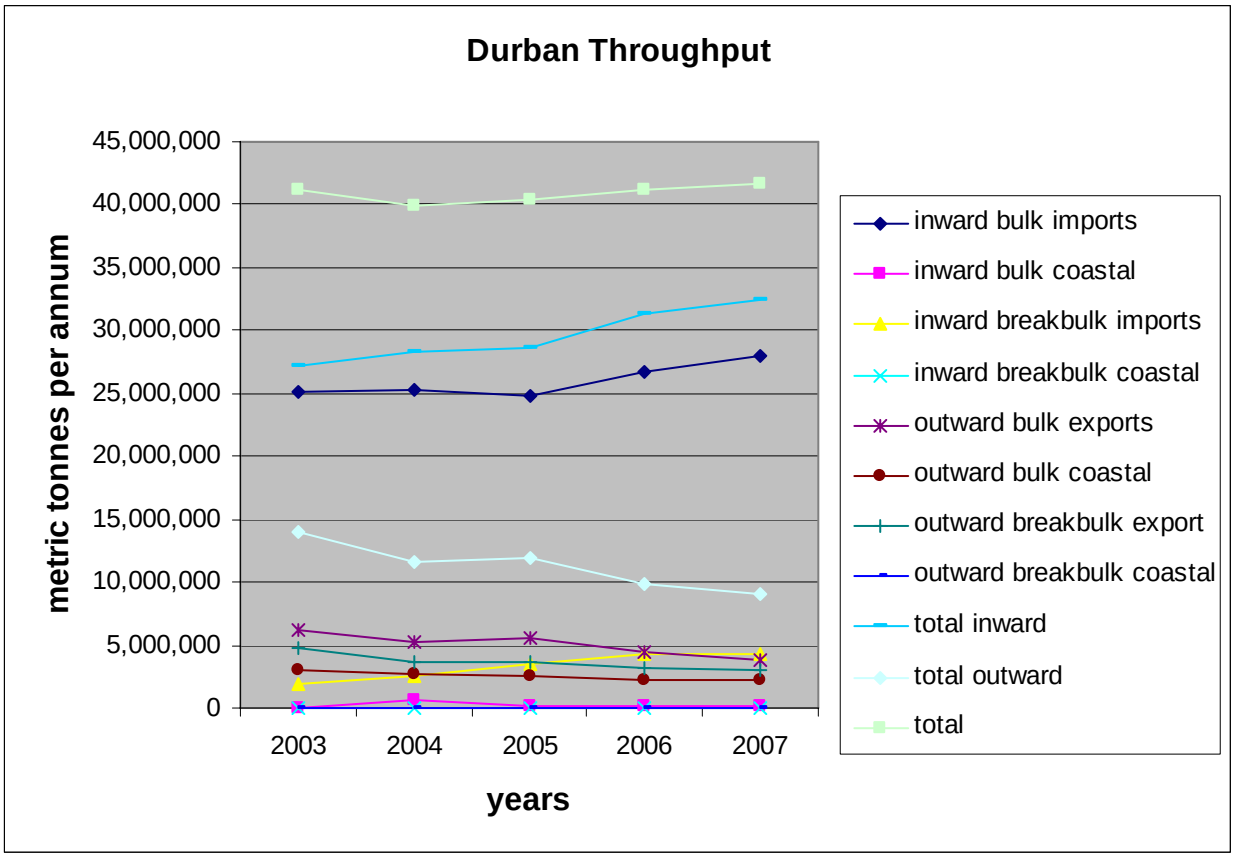


Figure 23: Annual Tonnes Handled at Port of Durban

The port berth occupancy and the dimensions of berths are in the following table.

Table 31: Durban Port Berth Occupancy

ENTRANCE DRAFT METRES	AREA GROUP	USAGE GROUP	BERTH	DRAFT METRES	LENGTH METRES	BERTH OCCUPANCY %
11.9	Point (City)	combi terminal steel/ferro granite	A	11.2	288	45
			B	9.9	329	45
			C	9.9	263	45
			D	13.7	239	45
			E	13.7	239	45
			F	13.7	239	45
			G	13.7	239	45
		general	M	11.1	305	?
		fruit	N	11.3	262	35
		fruit	O	11.6	310	35
		pax	P	10.6	310	?
		car	Q	10.1	183	44
		car	R	10.6	183	44
	Maydon wharf	sugar	1	8.8	152	29
		sugar	2	9.6	153	29
		general	3	9.6	152	?
		general	4	9.6	153	?
		bulk	5	9.3	200	48
		steel	6	9.6	154	46
		reefer	7	8.8	244	32
		maize/woodchips	8	10.3	172	36
		molasses/genl	9	9.6	180	36
		genl	10	9.6	226	34
		timber	11	10.3	190	34
		not used	12	5.8	275	0
		stainless steel	13	9.6	172	41
		soda ash	14	9.6	173	31
		pulp/paper	15	9.6	213	46
	New Pier 1	containers	100	8.2	276	
			101	11.6	229	
			102	11.7	213	
			103	11.9	235	
			104	11.6	351	60
			105	11.9	235	60
			106	11.5	213	60
			107	11.7	238	60
	Cross Berth	containers	108	11.6	273	70
			109	11.8	272	70
	New Pier 2	containers	200	11.6	236	70
			201	11.9	216	70
			202	12.3	216	70
			203	11.8	305	70
			204	11.5	305	70
			205	11.7	305	70

11.9	Island View	bunkers	1	11.9	230	31
		liquids	2	9	175	47
		liquids/grains	3	11.9	165	33
		liquids	4	10.3	175	47
		liquids	5	9.7	175	47
		liquids	6	10.3	175	47
		liquids	7	12.5	230	47
		liquids	8	11.8	230	47
		fuel oil	9	11.9	245	47
	Bluff	bulks	1	8.4	148	24
			2	10	177	24
			3	8.8	180	24
			4	10.3	238	24

Figure 24: Island View and the Bluff-overview

Figure 25: Maydon Wharf

Figure 26: Point Wharves and City Terminals at Harbour Entrance

The Point (City Terminals)

a) Point Multipurpose Terminal

The multi-purpose terminal at Point has been extended by the addition of apron and quay space newly constructed between the T Jetty and the port entrance. The stacking storage and berth capacity is adequate for current demand.

b) Citrus Terminal

The citrus terminal has storage capacity in 13 holding chambers for 17520 pallets [176 204 cu metres] as well as 72 rapid-cooling tunnels [(3 456 pallets) and 7 831 cu metres. The Container area is 2 356 cu metres and the Handling Rate is 2 000 pallets per day [2600 tonnes per day].

In spite of the above capabilities there is inadequate storage and pre-cooling facilities during the fruit season which lasts some six months, and it is sometimes necessary to divert fruit arriving from inland to Maydon Wharf overflow facilities and then back to vessels at the Point. The fruit berths at the back of the T Jetty at O and P berths are adequate.

c) Car Terminal

The car terminal is positioned between the T Jetty and the city and the back of the berth is restricted by the fact that the rail entrance to the area is immediately behind it. The problem is in the size of the batches of vehicles that need to be accumulated before the arrival of the large Ro-Ro vessels, and the empty space that must be available to unload the vessels before loading can commence.

Various solutions have been created to try to increase the parking area that these vessels require and currently the whole area on the seaward side of the railway lines has also been allocated and developed to its maximum. Berth occupancy is approaching the point where the occasional vessel is delayed, but the primary problem is the back of berth parking area which is now increasingly inadequate although it has been expanded on several past occasions.

Short-term arrangements have to be made to park vehicles further away in the multi-purpose terminal. It is reported that the port authorities are planning to curtail the use of the multipurpose terminal for general cargo in order to meet the commitment to Toyota South Africa to provide a rail service via the Embankment line for the large number of vehicles that are to be exported from 2008.

d) Maydon Wharf

The ownership of Maydon Wharf berths is unique in South Africa. Prior to Union in 1910 the Natal Government Railways agreed to lease berths in this area for the exclusive use of high volume throughput cargo owners. They also agreed to lease land in the area to those industries that wished to create storage or manufacturing facilities.

There are therefore now two types of lease, one affording berth priority and the other creating land leases. These leases were not all for the same period of time, but the longest of them lasts until 2040 and over the past 25 years portions of these leases have been expiring on a piece meal basis. The whole area has thus become a mixture of

private and port operated terminals and with the result that it has not been possible to plan cohesive development of the whole area.
The efficiency of the whole wharf is now marred by shallow berths, small aprons and inadequate sheds and storage facilities. Redevelopment is necessary but private logistics enterprises appear to be reluctant to join forces and create better overall facilities.

Generally the Maydon Wharf berths are recognized to the following users:

Maydon Wharf 1 and 2	Sugar
Maydon Wharf 3	Lever Bros.
Maydon Wharf 4	African Explosives
Maydon Wharf 5	Bidfreight Bulk
Maydon Wharf 6	Ensimbini Terminal (steel)
Maydon Wharf 7	Reverted to the port – general
Maydon Wharf 8	Reverted to the port – grain and wood Chips
Maydon Wharf 9	Molasses and general
Maydon Wharf 10	Reverted to port – general
Maydon Wharf 11	Reverted to port – timber
Maydon Wharf 12	Reverted to port – berth too shallow
Maydon Wharf 13	Grindrods – stainless steel
Maydon Wharf 14	Soda ash
Maydon Wharf 15	Bidfreight – pulp and paper

The matter is further complicated by the fact that land leaseholders behind the berths also have second priority on the berths themselves and the port is obliged to allocate spare berths wherever they occur for the use of these leaseholders.

e) Bluff Terminal

The four berths on the Bluff are allocated to a single private company who has created a sized coal handling terminal plus an ability to handle other products such as cement clinker and manganese. Much effort has been spent developing the back of the berth facilities, but berth occupancy remains very low and in general terms this section of the port is under utilized and in need of reconsideration from a cargo allocation point of view.

f) Island View

Berths 1 to 9 at Island View have become dedicated to the Liquid Bulk Products industry. The Island View berths initially handled South Africa's imported fuel oil for refining in the area. However the growth of VLCC oil tankers saw the development of the Single Buoy Mooring [SBM] at Reunion that is some way off the port limits, lying 12 km south of the harbour entrance. The SBM now handles about 60% of Durban's total crude oil intake thereby freeing the up the Island View's berths 1 to 9 for chemicals and fuels imports and exports.

Since then these berths have had a range of pipe manifolds situated at each and connecting various berths to various tank farms in the vicinity, and it has become a petrochemical berth complex handling specialized parcels of liquids for both import and export as well as the terminal for shipping diesel and petrol coastwise.

Berth occupancy at all these berths is not an issue. However inspection of the photographs will show that there are tank farms wedged into the whole area right up to the edge of the steep face of the Bluff and as far south as is permitted by other port development.

In the midst of these tank farms is one single bulk grain handling terminal which uses Island View 3 berth to load and discharge.

All these liquid and grain terminals generally receive and dispatch product by road (excluding internal pipelines) and because of the road design in the area these products also use the same road which provides sole access to the container terminal. Substantial road congestion takes place in Trinidad Road at the entrance to Island View, as well as in Bayhead Road from South Coast Road to the container terminals and Island View. The port accessibility issue is discussed in some detail in the road operations section of this report.

g) Railway Land

In the sixty years leading up to 1995 the South African Railways and Harbours held a monopoly on transport over 50 km lead distance and therefore all cargo owners, both import and export, were obliged to dispatch their produce by rail. This led to large areas of the Bayhead becoming the preserve of the railways, and large marshalling yards and carriage and wagon workshops were established in the area. When rail was the dominant mode of transport to the port all the marshalling yards were used and in fact lack of marshalling space often proved to be the bottleneck of the port.

In the last fifteen years with deregulation of road transport there was an immediate and extensive switch of general cargo from rail to road transport with current split being close to 80% road and 20% rail.

The result of this switch has been that most roads in the area are but railway facilities are now greatly under-utilised and the usage of this prime space needs to be incorporated into the future planning of the port.

h) Entrance Channel

The entrance channel currently permits 11, 9 metres of vessel draft under all conditions and with the permission of authorities this may be increased to 12, 2 metres. This is very

shallow for many modern ships and the port therefore suffers inefficiency from the economics of vessels that are smaller than they might otherwise be.

Current Upgrades

Port entrance

An amount of R5.8 billion is being spent at present to widen the port entrance by moving the entire north breakwater northwards by about 200 metres. The entrance is being deepened to 16,5 metres draft to permit larger vessels to enter. This work should be completed in 2010.

It must however be noted that the drafts in the port and alongside berths are considerably shallower than 16.5 metres and it will therefore be necessary for selected to be deepened to allow full advantage to be taken of the improved depth at the port entrance.

Island View

The draft at selected berths will be deepened.

Future Upgrades

Consideration is being given to a range of options for the container berths, which forms part of the separate report. These considerations involve very substantial alternations to the port structure and will have knock-on effects throughout the entire port.

The motor car terminal needs to be moved to an area where it can expand, and though it has been proposed to use Salisbury Island this area will also rapidly become inadequate. The more logical development will be to move the terminal to the Bayhead area and provide direct access from Prospecton and the existing airport site on road and rail. The local motor industry is talking about value adding sub-assemblies, etc [dependent on the future terms of the MIDP] with facilities in Durban so that port access may become even more critical.

In the longer term, if the current trend toward larger proportions of imported vehicles persists or accelerates, this may reverse the need for storage at the port as landed vehicles can be driven away immediately to more remote storage areas.

General Observation on Operations at KZN Ports

In Phase 2 the focus of the project is on the factors that restrict efficiency and increase costs. In this report on freight transport operations the focus is on the issues affecting operating efficiency and cost of ports and associated logistics operations.

The observations in this section of the report relate to break-bulk and bulk products but specifically exclude containers as these are more fully described in the section on containers at the end of this port review.

Integrating the Development of Richards Bay and Durban

Richards Bay is a modern port with deep water, large expansion capability and a cost efficient (albeit congested) railway. The port is currently isolated, for general cargo by the lack of effective road and rail connections to the interior and the fact that all facilities are designed to handle bulk products. The preferred mode at all terminals is bulk rail but there is a growing need to accommodate road transport of bulk products due to deficiencies in the rail services.

The bulk export tonnage has been reducing over the past few years due to rail restrictions in spite of growing international markets.

Conversely, Durban is now in need of extensive re-planning and redevelopment. To make optimum use of the extensive areas of under-utilised land owned by railways and incorporation of the airport property into the overall port planning process.

The city surrounds many of the berths and the harbour entrance and berth depths may limit future potential usage by the largest of container vessels. Current plans to deepen entrance and berths to 16.5 metres will accommodate vessels of 10,000 TEUs but it is recognized that there are even now container ships on the drawing board that will not fit into Durban harbour entrance after its expansion. Current Durban container handling is about 3200 boxes per day with expansion to 2040 estimated to be 20,000 per day [2 x 10,000 TEU vessels or 3 x 6000 TEU vessels] , that can easily be accommodated at present

The main railway line from Durban to the interior is far steeper and has narrower horizontal alignment than the bulk coal line from Richards Bay, but as it has about 60% spare capacity and as it is unlikely that bulk block trains will use the line there is more than adequate capacity for the foreseeable future.

Securing the future of Durban as a container and multipurpose port with effective transport linkages is essential to the economy of the city and province as well to the industrial interior of South Africa and the SADC region.

Failure to cater for future development of the container and break-bulk port facilities that have grown up to serve the needs of industry in the Durban area will be attended by excessive increases in the cost, of moving goods from Richards Bay to Durban as well the need for duplication of road and rail facilities from Richards Bay to the interior.

Duplication of the existing transport routes to Gauteng will be expensive, unnecessary and under-utilised, as is demonstrated by the section on intermodal transport in this report.

The Bayhead “Terminal B” container development and the expansion of the DCT Terminal to Salisbury Island could provide for expansion to 15 million TEUs projected by 2030, by which time the Richards Bay terminal will have been developed and attracting specific cargoes for the northern areas and possibly some interior industries.

There is urgent need to investigate and analyse the road and rail linkages to and from port of Durban as the current situation is untenable and inefficient.

Development of the car industry in South Africa will be largely dependent on the terms of the future MIDP and the economics of importing from the east versus manufacture. If the industry can stay competitive it will provide enormous employment opportunities for the KZN area as a whole.

Container Handling – All SA Ports

In this section on container handling capabilities, the KZN ports are covered under the heading reflecting relevant aspects of container port analysis.

To enable comparison of port statistics and performances so as to gain an understanding of where the shortfalls occur, the comparative situation with each port and the overall comparison of port capabilities is discussed under each heading.

Provincial and neighbouring ports are in competition with each other such as Maputo, Durban and Richards Bay and that it is therefore necessary to be able to understand the relative strengths and weaknesses of their container handling facilities.

The situation with all the container port is discussed in this section under each of the headings;

- Container Terminal Overviews
- Volume Throughput
- Terminal Assets And Berth Occupancy
- Berth Productivity
- Vessel Size Issues
- Port Specific Issues
- Inland Rail Indexed Comparisons
- Current Upgrades Underway
- Future Upgrades Under Consideration
- General Strategic Observations

Container Operations

Aerial photographs of the container terminal at Durban, are shown below as background to the discussion of volumes and physical capabilities of the ports in question.

Figure 27: Durban Container Terminal [DCT]

It should be noted that throughout this report, volumes are quoted in TEUs [twenty-foot equivalent units] which is the term used to describe 6 metre [20 ft containers]. It is noteworthy that much of South Africa's sea trade is conducted in 12 metre [40 ft] containers that are equivalent to two TEUs.

Table 32 and **Figure 28** below shows the remarkable growth in container traffic in South African ports during the past five years. At the peak the annual increases amounted to 17.8 % per annum.

Table 32: Container Movements All SA Ports 2003-2007

Containers Handled -All SA Ports - 2003-2008 **[TEUs]**

YEAR	Richards Bay TEUs	Annual Variance	Durban TEUs	Annual Variance	East London TEUs	Annual Variance	Port Elizabeth TEUs	Annual Variance	Cape Town TEUs	Annual Variance	Total TEUs	Annual Variance
2003	4494	0	1565606	0	45747	0%	288341	0	510379	0	2414567	0
2004	5538	23.2%	1686554	7.7%	53735	17%	313923	8.9%	573021	12.3%	2632771	9.0%
2005	5179	-6.5%	1899065	12.6%	49338	-8%	369759	17.8%	690895	20.6%	3014236	14.5%
2006	3332	-35.7%	2334999	23.0%	41836	-15%	407278	10.1%	764753	10.7%	3552198	17.8%
2007	4021	20.7%	2479232	6.2%	41986	0%	422846	3.8%	764005	-0.1%	3712090	4.5%
2008	9350	132.5%	2642165	6.6%	57418	37%	423885	0.2%	767501	0.5%	3900319	5.1%
5 Years		**134.3%**		**56.0%**		**31%**		**40.9%**		**43.9%**		**50.9%**

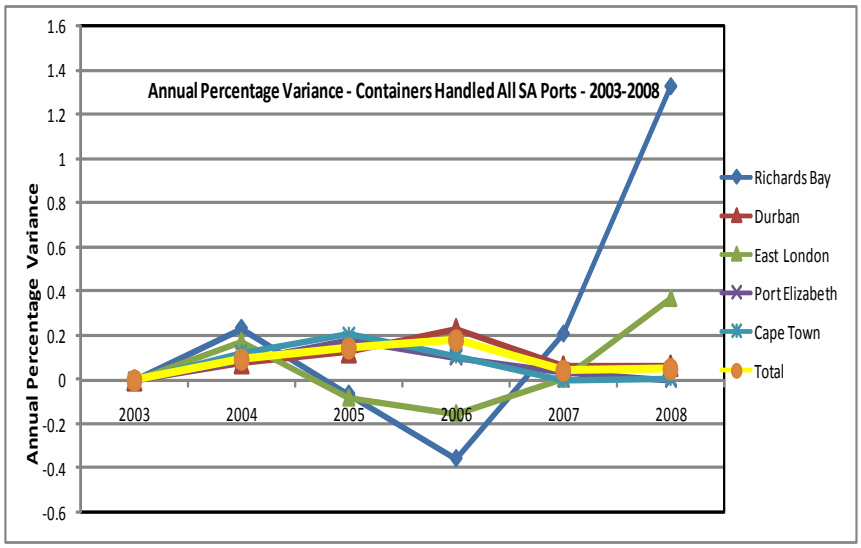


Figure 28: Annual Percentage Variance

As shown in the above table and graph the annual variances in container handling volumes have not been the same for all the ports and the overall average of approximately 9% p.a. compounded reflects the steady increases and high volumes in Durban and lower rates in other ports. The large increase in Richards Bay from a low base is an indication of the trend to exporting containerised minerals to obtain best possible rates.

It can also be seen that the rate of increase has slowed dramatically from the peak in 2006 as the economy has been impacted by inflation and increasing input costs. It is anticipated that this may reduce further on the back of the current economic crisis and world recessionary pressures.

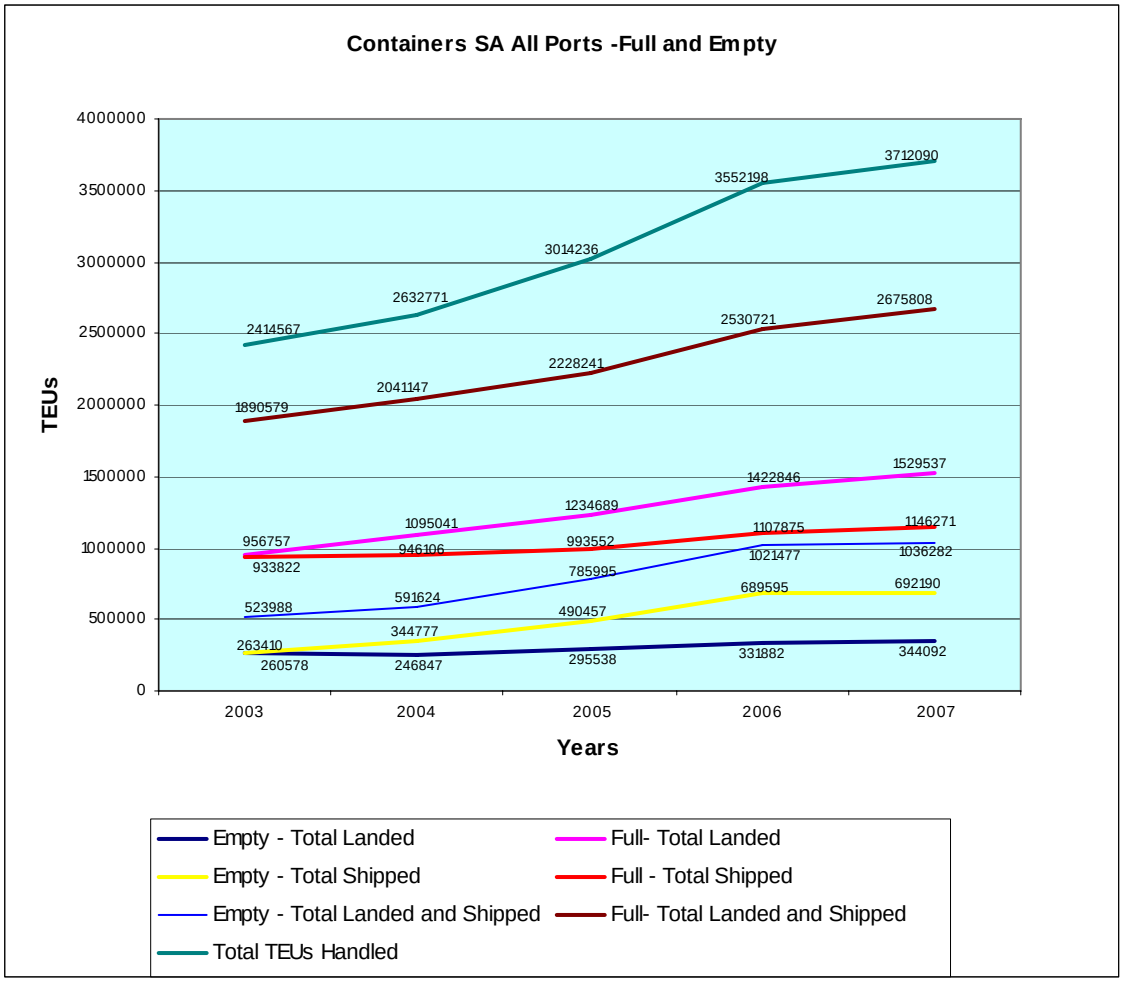


Figure 29: Container Movements all SA Ports 2003-2007

As shown in the table and graph above there has been considerable growth in the container volumes, mainly due to increasing imports of manufactured goods from China, Korea, Japan and India and as such is a reflection of the extent to which uncompetitive South African manufactured goods are being replaced by imports from the East.

For the past 5 years there has been a trend to import of increasing numbers of full boxes and the export of a high proportion of empty boxes due to lack of cargo. As shown in the above data there is in 2007 a change that gives an indication that local exports of bulk commodities are being loaded into the empty boxes, causing a reduction in the numbers of exported empties.

The trend to filling of the empty boxes with what was previously considered breakbulk cargo, such as minerals, steel coils, granite blocks and wood pulp is being driven by the fact that shipping lines are offering possible ocean rates for eastbound containers. One unintended consequences of the trend is that there is in 2008, for the first time in some years a shortage of 6 metre boxes for export commodities

Another consequence of the trend is that imported boxes from the east-west trade average 14 tonnes and the export boxes average 22 tonnes. This causes some further complications for shipping lines as they can land more boxes than they can load due to the weight variance. It is likely that this trend will continue as long as the rates are favourable, with more developments such as the planned construction of two additional bagging plants at Richards Bay MPT to facilitate the filling of empty containers with mineral sands and ores that will then be road-hauled to Durban for export.

Table 33: Berth Dimensions, Cranes and Occupancy

PORT	BERTH METRES	DRAFT	TOTAL CRANES	AREA	2007 VOLUME	BERTH OCC
Maputo	300	11	2	15	50,000	30%
Dbn np 104	300	11.9				70%
Dbn np 105/7	650	11.9	0			70%
Durban xb	545	11.9	5			70%
Durban 200/2	668	11.9	4			70%
Durban 2003/5	915	11.9	10			70%
Durban total	3078		19	125	2,479,232	
Port elizabeth	660	12.2	4	22	422,846	70%
Cape Town	1371	14	6	42	764,005	65%
National	5109		50	204		
		Metres CD		Ha	TEU	

The different ports have a range of berth dimensions and facilities and all experience varying levels of utilisation, expressed as berth occupancy.

In the above table the information is broken down into wharf sections, so as to illustrate the impacts of berth length relative to efficiency of crane operations.

It will be noted that there are limited data for Durban New Pier 104 because it was still under conversion and ships gear is being used. Ultimately the new pier 1 area will have 5 cranes installed..

The entrance to Durban is being deepened to 16.5 metres at the time of writing but the container berths are still about 12 metres draft have not yet been deepened to accept the vessels that will accommodated by the increased draft in the entrance channel..

Berth Productivity

Note 1: In the preparation of the productivity statistics in this section the effect of Durban Port's new Pier no 1 development which was recently converted from a break bulk to a container terminal, has been excluded as insufficient data was available to assess it impact on the port performance..

Note 2: The port statistics reflect 100% of all containers handled in a port as if they are processed through the container terminals. In practice a very small percentage is handled over the break-bulk wharves (about 3%) but the figure is not accurately known. As a result the terminal productivity figures are slightly overstated.

Table 34: Containers – Berth Performance - 2007

PORT	TEU ANNUAL THROUGHPUT	NUMBER OF CRANES	TOTAL BERTH METRES	TOTAL BERTH COUNT	TEU PER BERTH PER DAY	TEU PER CRANE PER DAY	TEU PER BERTH METER
Durban	2,479,232	19	3078	10	679	357	805
Port Elizabeth	422,846	4	660	2	579	290	641
Cape Town	764,005	6	1115	4	523	349	685
Natnl av/ttl	**3,666,083**	**29**	**4,853**	**16**	**628**	**346**	**755**

Throughput is last whole year (2007)

Note 3: The total berth count in Durban in actual practice varies because the number of vessels that can berth is a function of vessel length and the available wharf length into which to fit the vessels (see Durban port issues).

Note 4: The crane and berth performance data used was for 2005 because port berthing statistics for 2006-07 were not to hand.

Table 35: Crane Density – Some International Comparisons

Port	Wharf length	Crane Count	Metres per crane
Cape Town	1150	6	191.7
Port Elizabeth	660	4	165.0
Rotterdam	2800	18	155.6
Durban [108 -109]	**570**	**4**	**142.5**
Houston	1760	13	135.4
Algeciras	1470	11	133.6
New York	1050	8	131.3
Hamburg	1020	8	127.5
Hamburg	2050	17	120.6
Felixstowe	2290	19	120.5
Durban [105-107]	**680**	**6**	**113.3**
Colombo	1290	12	107.5
Durban [Total]	**2670**	**25**	**106.8**
Long Beach	1490	14	106.4
Durban [201-203]	**510**	**5**	**102.0**
Colombo	910	9	101.1
Shenzen	1560	17	91.8
Durban [204-207]	**910**	**10**	**91.0**
Hong Kong	1370	16	85.6
Singapore	2300	27	85.2
Long Beach	1020	12	85.0
Singapore	2270	28	81.1
Shanghai	2850	36	79.2
Hong Kong	1520	22	69.1

The table of crane density, measures sections of straight quay and the cranes available for use on each section.

It will be noted that Durban Container Terminal [DCT] does not fare well in this comparison as the port has relatively short sections of wharf and each has less cranes per metre than many other ports. In particular it is noticeable that Far Eastern ports, having been developed in the container era have better crane densities.

A further complication at DCT, due to the shape of the quays is that there are always a proportion of the berths that can not be used for unloading due to the process of building wharf-side stacks to prepare for incoming vessels. In practice the arrival pattern of container deliveries by road and rail, the numbers of working carriers and the available stacking space for export and transhipment containers also impose limitations on the ship-working capability of the terminal.

The increasing proportions of transhipment containers (about 21.5% in 2008) means that a considerable amount of carrier movements, restacking and sorting are required as “house-keeping” and this can also impact on ship-working and the rate of unloading landside transport.

Table 36: Container Handling: Ship-to-Shore Performance Comparison

PORT	MOVES PER CRANE HOUR	CRANES PER VESSEL	MOVES PER VESSEL HOUR
Singapore	40	5	200
Colombo	35	4	140
Durban	17	2	34

Note: Durban figure from Transnet annual report; may be less

The Transnet annual report for 2007 showed that container moves for that year averaged 19 per hour, indicating very slight improvement in the 2 years since 2004.It must also be noted that an average of 17 moves per hour implies that there are periods when the performance drops as low as 12 per hour, and in practice the average may lower.

From the data in the foregoing tables the South African ports compare very unfavourably with other container ports in the world.

Durban suffers from three major problems:

- There are too few berths for the number of container ships wishing to berth.
- When berthed, too few cranes are available per ship.
- When discharge or loading is in progress there are too few crane movements per hour.

The available space and equipment to remove boxes from the quay and to build ship stacks is inadequate at peak periods.

A comparison between the performance of handling the average large container vessel in Singapore and Durban seeking to move 1500 containers on a call, are that in Singapore the crane performance is twice as high per crane hour , there are more cranes and the overall effect is up to 600 % better efficiency than Durban.

The unfortunate side-effect of all these sub-standard conditions is that South African ports need more berths and more equipment than they would, if efficiency was improved, and if nothing is done to improve efficiency, a larger amount of capital equipment will have to be provided to handle the projected volumes.

Where expansion potential is constrained, such as at the port of Durban, inefficiency will necessitate even greater port extension to compensate for poor performance.

Container Vessel Issues

In the early 1970s the biggest container ships were of the order of 2 500 to 3 000 TEU slots in size. The first generation of ships built specifically for the South Africa Europe trade provided 2 400 slots.

For a period of twenty years thereafter little growth in ship size was noted but progressively the success of the container revolution brought more and more bigger ships into service. Natural competition on the major trade routes has over the last fifteen years brought about a revolutionary increase in the size of container ships to take advantage of the transport economic fact that costs per tonne-kilometre decrease with transport unit size.

This revolution in ship lengths, draft and widths has itself put strain on large numbers of port facilities throughout the world and South Africa is no exception.

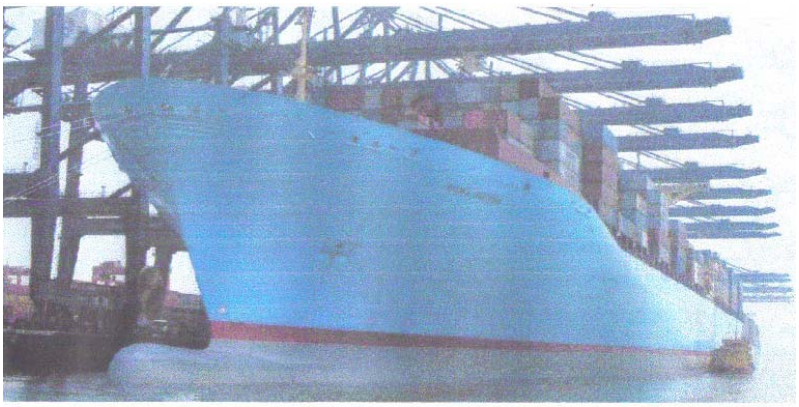
The table shows the extent of the growth in vessel sizes.

Table 37: Container Vessel Sizes

	Draft Metres	Tonnes DWT	Beam Metres	Length Metres	Timing
Panamax	12	3000	32.4	294	Current
Post Panamax	13	5000	39	330	Current
Super Post Panamax	14.5	7000	46	370	Current
Suez Max	15.5	13000	56	399	Current
Malacca Max	21	18000	60	450	Future

Note:

1. Container ships are broadly classified as above but there are many variations in existence
2. The present largest container vessel Emma Maersk is a Suez Max Vessel
3. The Suez canal is planning to dredge to Malacca Max



Emma Mærsk is the world's largest container ship — and, at 397 metres, is currently the longest ship — But its role may be less significant now.

It should be noted that that the planned improvements in Durban will be capable of handling the deepest ships afloat today (13 000 slots), but already Malacca-max container ships are on the drawing board and no South African port will not be able to handle them without further improvement. The recent slow-down in container volumes may provide the much needed period to recover efficiency levels in Durban, as described in a later section of this report.

It is of course debatable whether South African ports will need to handle vessels of such size but to exclude these vessels from the sub-continent may prove to be undesirable and possibly at least one South African port should be able to handle these vessels in due course.

Specific Issues Port of Durban
The port of Durban has a number of specific constraints and issues affecting future efficiency.

a) Quay Lengths and Vessel Size
When New Pier 1 is taken into service the Durban Container Terminal will have 5 separate short stretches of quay totalling 3078 metres.
The generally desired norm for major Container Terminals is that the straight sections should not be less than 1 000 m each and preferable longer.
Durban does not comply with this and is thus 5 little quays put together.

The matter of quay allocations and usage is complicated by the fact that vessels arrive in random order [even though they give notice] and the vessels themselves are of random lengths. It therefore follows that because of the inflexibility of cranked short sections of quay, there is often substantial amounts of wasted quay length, because the combination of ships that have arrived does not fit the combination of wharf length available.

This matter is compounded by the fact that some shipping lines in Durban have negotiated priority berthing and an undertaking that they will be able to work with a given number of cranes. This commitment means that the vessel in question may “soak up” all the cranes available on a section of wharf and as the cranes are unable to run round the corners it leaves other vessels on that section with far fewer cranes than they could have had on a straight quay.

b) Crane Capacities and Restrictions
A further complication is that not all the cranes on all the berths have identical outreach, thus certain ships need to berth under certain cranes irrespective of the issue of quay length utilisation.

In the quays at Durban Container Terminal there are 4 “right angles” as shown in the photographic overview at the start of this section, there are two working areas where vessels will be worked very close to each other “round the corner”, which makes for congestion and lack of freedom of movement for shore equipment compared to the situation in straight berths.

c) Container Movements

The Durban Terminal suffers from the fact that all recent developments to expand capacity have increased the distances over which containers must be transported within the terminal, to the rail siding and from loading onto road vehicles to the exit.

External congestion of road vehicles is being partly addressed by the new parking area but the issue of bunching of road vehicles is still an unresolved problem. This is complicated by the proportion of road vehicles that arrive at the port from inland areas , unscheduled and without any forward planning. These vehicles then park while the documentation and formalities are completed, sometimes occupying space in the port area for a few days.

d) Quay Design And Depths

A modern container terminal with the throughput of Durban should have straight line wharves that are at least 1000 metres long (preferably longer),they should be able to bring to bear on a single large vessels, 5 cranes without unduly prejudicing other vessels and they should have back of berth stack space of 1 hectare per 15,200 TEU annual throughput. The Durban Container Terminal currently complies with none of these, but redevelopment of the present “DCT Terminal A“ as described in a later section of this report, could create 3900 metres of straight quay, and with sufficient cranes the terminal could achieve international performance levels.

The drafts of modern container vessels exceeds 15,5 metres and although the redesigned harbour entrance will handle this, the approaches to and from the berths themselves cannot currently handle ships of that draft.

The port of Durban in its current configuration is nearing saturation point and after commissioning of the Pier 1 conversion and the building of “Terminal B” at Bayhead there will be a need for large scale redevelopment of DCT to handle larger vessels. It is to be hoped that this will include steps to address operational efficiency issues as well providing more quays and storage space

Current Upgrades

Major upgrades are under way to convert all New Pier 1 to a Container Terminal complete with gantry cranes and shore side straddle carriers. The berths are already in use utilising ships gear and it will shortly become a full addition to the existing Durban Container Terminal. In the process, however, berths 100, 101, 102 and 103 will be lost

to cargo handling because originally New Pier 1 was designed for general cargo and has inadequate container stack space to support all the berths.

Straddle carriers have also been renewed to allow higher lane stacking in the total Terminal. The port entrance is being widened to 200 metres and the draft increased to 16,5 metres. This increased draft is not matched by the berths as currently constructed and it will be necessary to successively rebuild them to handle bigger ships.

All the currently planned upgrades will not give sufficient capacity for the current throughput of the terminal when measured in conventional terms. Redesign, re-equipment and improved operating standards are urgently needed to increase efficiency and reduce the need for immediate further spatial expansion as is discussed the next section.

Future Upgrades

One of the primary requirements for planning the various aspects of port development for the period of 2005-2050 is the estimated movement of ISO containers, which have become the major international means of handling general cargo. In order to provide a basis for the planning process factual information is required, which can then be debated and extrapolated to provide various scenarios from selected options can be further researched. In 2007 the largest number of containers on the eastern seaboard was handled at Durban. **Table 38** below shows the analysis of container handling at Durban

Table 38: Monthly Containers Handled At Durban In 2007

Month	Total Full TEUs Handled	Ave Full TEUs per Ship call	Total Empty TEUs Handled	Ave Empty TEUs per Ship call	Total TEUs Handled	Total TEUs per ship call
Jan	149,354	**1,123**	58,958	**443**	208,312	**1,566**
Feb	144,133	**1,084**	69,344	**521**	213,477	**1,605**
Mar	127,934	**962**	51,370	**386**	179,304	**1,348**
Apr	159,494	**1,199**	62,954	**473**	222,448	**1,673**
May	159,362	**1,198**	41,962	**316**	201,324	**1,514**
Jun	139,297	**1,047**	49,829	**375**	189,126	**1,422**
Jul	154,023	**1,158**	49,691	**374**	203,714	**1,532**
Aug	155,411	**1,169**	46,723	**351**	202,134	**1,520**
Sep	162,364	**1,221**	44,525	**335**	206,889	**1,556**
Oct	174,001	**1,308**	53,381	**401**	227,382	**1,710**
Nov	172,593	**1,298**	52,242	**393**	224,835	**1,690**
Dec	156,677	**1,178**	43,610	**328**	200,287	**1,506**
	1,854,643	**13,945**	**624,589**	**4,696**	**2,479,232**	**1,540**

Analysis of the trend in containers per ship call shows a slight reduction in the packet size but an increasing proportion of full container arrivals and a corresponding decrease in the proportion of empty boxes. **Table 39** shows the numbers of container ships calling at Durban.

Table 39: Container Ship Calls and TEUs Handled Monthly-2007

Month	No.of Ships		Ave. Ship GRT	Total TEUs
Jan	133	3,386,823	**25,465**	208312
Feb	134	3,533,909	**26,372**	213477
Mar	117	3,033,785	**25,930**	179304
Apr	142	3,617,794	**25,477**	222488
May	132	3,377,621	**25,588**	201324
Jun	141	3,565,971	**25,291**	189126
Jul	115	3,057,886	**26,590**	203714
Aug	128	3,286,591	**25,676**	202134
Sep	148	3,846,753	**25,992**	206889
Oct	137	3,577,819	**26,115**	227382
Nov	145	3,885,776	**26,798**	224835
Dec	138	3,833,287	**27,777**	200287
	1,610	**42,004,015**	**26,089**	**2,479,272**

The table shows a slight increase in ship size and numbers over the course of the year, but the total boxes handled per month seem to be constant.

Table 40 shows some calculations of container handling under varying conditions

Table 40: Port of Durban Container Handling Performance Assumptions

Port Container Handling Performance Analysis

	TEUs per ship call	2 Cranes @ 20 lifts per hour	3 Cranes @ 20 lifts per hour
		Hours	Hours
Landed	768	19.2	12.8
Shipped	772	19.3	12.9
	1,540	38.5	25.7

Container berths		19						Capacity
@ 60% Occupancy		16	Berths / Vessels	**Berth Hours Available**	138240			Utilisation
Annual Hours		8640		**Berth Cap. 38.5 hrs/ship**	3591	Ships	[At Ave. TEUs p	42.9%
				Berth Cap. 25.7 hrs/ship	5386	Ships	[At Ave. TEUs p	28.6%

Cranes @ 100% Availability	19							Capacity
Cranes @ 85% Availability	16							Utilisation
Crane cap. @ 20/TEUs/ Hr	2764800			**Crane Cap.**	1795	Ships	[At Ave. TEUs p	85.8%
Crane cap. @30 /TEUs/Hr	4147200	[2 TEUs per lift for 12 m boxes]		**Crane Cap.**	2693	Ships	[At Ave. TEUs p	57.2%

Container Handling - 2007 [Assuming New Pier1 was not used]

		TEUs / Metre		TEUs			
Usable wharf metres	**Total cranes**	**Metres wharf usage**	**Berth occupancy gross**	**Crane usage TEUs p/h**	**Metres per crane**	**Annual gross hours**	**70% of gross hours**
1920	19	1920.0	70%	21.5	101.1	8760	6132

Calculation assuming NP1 available all year

		TEUs / Metre		TEUs			
Usable wharf metres	**Total cranes**	**Metres wharf usage**	**Berth occupancy gross**	**Crane usage TEUs p/h**	**Metres per crane**	**Annual gross hours**	**70% of gross hours**
3040	25	806.6	70%	16.0	121.6	8760	6132

Potential Crane Throughput at Berth Occupancy 70%

cranes avail	**crane speed**	net berth hours	**annual teu thruput**
25	**16**	6132	**2,452,800**
25	**20**	6132	**3,066,000**
25	**30**	6132	**4,599,000**
25	**40**	6132	**6,132,000**
25	**50**	6132	**7,665,000**
25	**60**	6132	**9,198,000**

Berth time with Varying Crane Handling Speeds

cranes avail	**crane speed**	net berth hours required	**annual teu thruput**	**berth occupancy**
25	**16**	6132	**2,452,800**	**70**
25	**20**	4904	**2,452,000**	**56**
25	**30**	3269	**2,452,000**	**37**
25	**40**	2452	**2,452,000**	**28**
25	**50**	1962	**2,452,000**	**22**
25	**60**	1635	**2,452,000**	**19**

the issue boils down to the number of cranes that can be concentrated on one ship at a given moment(the straighter the wharf the better) and then the rate at which that crane can operate and then the max swl of the crane--max 4 teu at a time

Average port crane movements are 25 per hour.
If that crane lifts 1 teu a time the rate will be 25 an hour
1 x 12 metre box per lift will give 50 TEUs per hour
Modern gantries it can lift as much as 4 x 12 metre boxes at a time
which will give an average of 3 TEUs per lift and a handling rate of 75 TEUs per hour

If a ship is given 5 cranes then the "ship handling rate" is as much as 300 TEUs per hour.
The average number of TEUs per ship call in Durban is 1539 containers
so would stay in port 6 hours , instead of 45 hours !!!!! , and the port would handle .....boxes p.a.
An analysis such as this is needed to reevaluate the need and timing of further berth contruction in Durban.

Table 41 shows a projection of numbers of containers that are expected at Durban or other possible ports on the South African eastern seaboard from 2003 -2050.

Table 41: Projected Container Growth in Durban [2000-2050]

EAST COAST CONTAINER PROJECTION 2003 - 2050

Years	Landed Full	Landed Empty	Total Landed	% Var.	Shipped Full	Shipped Empty	Total Shipped	% Var.	Landed Transhp Full	Landed Transhp Empty	Total Transship Landed	% Var.	Shipped Transhp Full	Shipped Transhp Empty	Total Shipped Transhp	% Var.	Total Transhp	% Var.	Total Handled	% Var.
2003	489548	139386	628934		502365	143779	646144		120403	30660	151063		120754	18711	139465		290528		1,565,606	
2004	565133	120658	685791	9.0%	469293	206821	676114	4.6%	143457	18231	161688	7.0%	149232	13729	162961	16.8%	324649	11.7%	1,686,554	7.7%
2005	619942	116073	736015	7.3%	469694	270436	740130	9.5%	180891	31184	212075	31.2%	182399	28446	210845	29.4%	422920	30.3%	1,899,065	12.6%
2006	777230	108885	886115	20.4%	532097	397178	929275	25.6%	196015	56073	252088	18.9%	210010	57511	267521	26.9%	519609	22.9%	2,334,999	23.0%
2007	**865560**	**120810**	**986370**	11.3%	**594082**	**398661**	**992743**	6.8%	**197603**	**52423**	**250026**	-0.8%	**197398**	**52695**	**250093**	**-6.5%**	**500119**	**-3.8%**	**2,479,232**	**6.2%**
2008	900182	125642	1025825	4.0%	617845	414607	1032453	4.0%	205507	54520	260027	4.0%	201346	53749	255095	2.0%	515122	2.0%	2,573,399	3.8%
2009	927188	129412	1056600	3.0%	636381	427046	1063426	3.0%	213727	56701	270428	4.0%	205373	54824	260197	2.0%	530625	2.0%	2,650,651	3.0%
2010	**955004**	**133294**	**1088298**	**3.0%**	**655472**	**439857**	**1095329**	**3.0%**	**222277**	**58969**	**281245**	**4.0%**	**211534**	**56469**	**268003**	**3.0%**	**549248**	**3.0%**	**2,732,875**	**3.1%**
2011	983654	137293	1120946	3.0%	675136	453053	1128189	3.0%	231168	61327	292495	4.0%	219995	58727	278723	4.0%	571218	4.0%	2,820,353	3.2%
2012	1013163	141412	1154575	3.0%	695390	466644	1162035	3.0%	240414	63781	304195	4.0%	228795	61076	289872	4.0%	594067	4.0%	2,910,676	3.2%
2013	1053690	147068	1200758	4.0%	723206	485310	1208516	4.0%	250031	66332	316363	4.0%	237947	63519	301467	4.0%	617829	4.0%	3,027,103	4.0%
2014	1095837	152951	1248788	4.0%	752134	504723	1256857	4.0%	260032	68985	329017	4.0%	247465	66060	313525	4.0%	642542	4.0%	3,148,187	4.0%
2015	1139671	159069	1298740	4.0%	782220	524911	1307131	4.0%	270433	71744	342178	4.0%	257364	68703	326066	4.0%	668244	4.0%	3,274,115	4.0%
2016	1185258	165432	1350689	4.0%	813508	545908	1359416	4.0%	281251	74614	355865	4.0%	267658	71451	339109	4.0%	694974	4.0%	3,405,079	4.0%
2017	1232668	172049	1404717	4.0%	846049	567744	1413793	4.0%	292501	77599	370100	4.0%	278364	74309	352673	4.0%	722773	4.0%	3,541,282	4.0%
2018	1281975	178931	1460906	4.0%	879891	590454	1470345	4.0%	304201	80703	384904	4.0%	289499	77281	366780	4.0%	751684	4.0%	3,682,934	4.0%
2019	1333254	186088	1519342	4.0%	915086	614072	1529158	4.0%	316369	83931	400300	4.0%	301079	80372	381451	4.0%	781751	4.0%	3,830,251	4.0%
2020	**1386584**	**193532**	**1580115**	**4.0%**	**951690**	**638635**	**1590325**	**4.0%**	**329024**	**87288**	**416312**	**4.0%**	**313122**	**83587**	**396709**	**4.0%**	**813021**	**4.0%**	**3,983,461**	**4.0%**
2021	1442047	201273	1643320	4.0%	989757	664180	1653938	4.0%	342184	90780	432964	4.0%	325647	86931	412578	4.0%	845542	4.0%	4,142,800	4.0%
2022	1499729	209324	1709053	4.0%	1029348	690748	1720095	4.0%	359294	95319	454612	5.0%	341929	91277	433207	5.0%	887819	5.0%	4,316,967	4.2%
2023	1559718	217697	1777415	4.0%	1070521	718378	1788899	4.0%	377258	100085	477343	5.0%	359026	95841	454867	5.0%	932210	5.0%	4,498,524	4.2%
2024	1622107	226405	1848512	4.0%	1113342	747113	1860455	4.0%	396121	105089	501210	5.0%	376977	100633	477610	5.0%	978820	5.0%	4,687,787	4.2%
2025	1686991	235461	1922452	4.0%	1157876	776997	1934873	4.0%	415927	110343	526271	5.0%	395826	105665	501491	5.0%	1027761	5.0%	4,885,087	4.2%
2026	1754471	244879	1999350	4.0%	1204191	808077	2012268	4.0%	436724	115860	552584	5.0%	415617	110948	526565	5.0%	1079150	5.0%	5,090,768	4.2%
2027	1824650	254674	2079324	4.0%	1252359	840400	2092759	4.0%	458560	121653	580213	5.0%	436398	116496	552894	5.0%	1133107	5.0%	5,305,190	4.2%
2028	1897636	264861	2162497	4.0%	1302453	874016	2176469	4.0%	481488	127736	609224	5.0%	458218	122320	580538	5.0%	1189762	5.0%	5,528,729	4.2%
2029	1973541	275456	2248997	4.0%	1354551	908977	2263528	4.0%	505562	134123	639685	5.0%	481129	128436	609565	5.0%	1249251	5.0%	5,761,775	4.2%
2030	**2052483**	**286474**	**2338957**	**4.0%**	**1408733**	**945336**	**2354069**	**4.0%**	**530840**	**140829**	**671669**	**5.0%**	**505185**	**134858**	**640044**	**5.0%**	**1311713**	**5.0%**	**6,004,739**	**4.2%**
2031	2134582	297933	2432515	4.0%	1465082	983149	2448232	4.0%	557382	147871	705253	5.0%	530445	141601	672046	5.0%	1377299	5.0%	6,258,045	4.2%
2032	2219965	309850	2529816	4.0%	1523686	1022475	2546161	4.0%	585252	155264	740516	5.0%	556967	148681	705648	5.0%	1446164	5.0%	6,522,140	4.2%
2033	2308764	322244	2631008	4.0%	1584633	1063374	2648007	4.0%	614514	163027	777541	5.0%	584815	156115	740930	5.0%	1518472	5.0%	6,797,488	4.2%
2034	2401115	335134	2736249	4.0%	1648019	1105909	2753928	4.0%	645240	171179	816418	5.0%	614056	163921	777977	5.0%	1594395	5.0%	7,084,572	4.2%
2035	2497159	348539	2845699	4.0%	1713939	1150146	2864085	4.0%	677502	179738	857239	5.0%	644759	172117	816876	5.0%	1674115	5.0%	7,383,899	4.2%
2036	2597046	362481	2959527	4.0%	1782497	1196151	2978648	4.0%	711377	188724	900101	5.0%	676997	180723	857720	5.0%	1757821	5.0%	7,695,996	4.2%
2037	2700927	376980	3077908	4.0%	1853797	1243997	3097794	4.0%	746946	198161	945106	5.0%	710847	189759	900606	5.0%	1845712	5.0%	8,021,414	4.2%
2038	2808964	392059	3201024	4.0%	1927949	1293757	3221706	4.0%	784293	208069	992362	5.0%	746389	199247	945636	5.0%	1937998	5.0%	8,360,727	4.2%
2039	2921323	407742	3329065	4.0%	2005067	1345508	3350574	4.0%	823508	218472	1041980	5.0%	783708	209209	992918	5.0%	2034897	5.0%	8,714,536	4.2%
2040	**3038176**	**424052**	**3462227**	**4.0%**	**2085269**	**1399328**	**3484597**	**4.0%**	**864683**	**229396**	**1094079**	**5.0%**	**822894**	**219670**	**1042564**	**5.0%**	**2136642**	**5.0%**	**9,083,467**	**4.2%**
2041	3159703	441014	3600717	4.0%	2168680	1455301	3623981	4.0%	907917	240866	1148783	5.0%	864038	230653	1094692	5.0%	2243474	5.0%	9,468,172	4.2%
2042	3286091	458654	3744745	4.0%	2255427	1513513	3768940	4.0%	953313	252909	1206222	5.0%	907240	242186	1149426	5.0%	2355648	5.0%	9,869,334	4.2%
2043	3417535	477000	3894535	4.0%	2345644	1574054	3919698	4.0%	1000979	265554	1266533	5.0%	952602	254295	1206898	5.0%	2473431	5.0%	10,287,663	4.2%
2044	3554236	496080	4050316	4.0%	2439470	1637016	4076486	4.0%	1051028	278832	1329860	5.0%	1000232	267010	1267242	5.0%	2597102	5.0%	10,723,904	4.2%
2045	3696406	515924	4212329	4.0%	2537049	1702496	4239545	4.0%	1103579	292774	1396353	5.0%	1050244	280361	1330605	5.0%	2726957	5.0%	11,178,831	4.2%
2046	3844262	536560	4380822	4.0%	2638531	1770596	4409127	4.0%	1158758	307412	1466170	5.0%	1102756	294379	1397135	5.0%	2863305	5.0%	11,653,254	4.2%
2047	3998032	558023	4556055	4.0%	2744072	1841420	4585492	4.0%	1216696	322783	1539479	5.0%	1157894	309097	1466992	5.0%	3006470	5.0%	12,148,017	4.2%
2048	4157954	580344	4738297	4.0%	2853835	1915077	4768912	4.0%	1277531	338922	1616453	5.0%	1215789	324552	1540341	5.0%	3156794	5.0%	12,664,003	4.2%
2049	4324272	603558	4927829	4.0%	2967988	1991680	4959668	4.0%	1341407	355868	1697275	5.0%	1276578	340780	1617358	5.0%	3314634	5.0%	13,202,131	4.2%
2050	**4497243**	**627700**	**5124942**	**4.0%**	**3086708**	**2071347**	**5158055**	**4.0%**	**1408478**	**373661**	**1782139**	**5.0%**	**1340407**	**357819**	**1698226**	**5.0%**	**3480365**	**5.0%**	**13,763,363**	**4.3%**
			37.2%				**37.5%**										**25.3%**		**100.0%**	

Table 42 below illustrates the situation from 2008 –2012 if South African ports are to handle a 4% annual growth of container throughput.

Table 42: Container Volume Growth

Ports	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Durban	1899065	2198600	2479232	2642165	2752343	2867116	2986675	3111219	3240957	3376105	3516888
Port Elizabeth	367759	392813	422846	423885	441561	459974	479155	499136	519950	541632	564218
Cape Town	690895	782868	764005	767501	799506	832845	867575	903753	941439	980697	1021592
Total	2957719	3374281	3666083	3833551	3993410	4159935	4333405	4514108	4702346	4898434	5102698
Growth		**12.35%**	**7.96%**	**4.37%**	**4.00%**	**4.00%**	**4.00%**	**4.00%**	**4.00%**	**4.00%**	**4.00%**

The 4% growth rate is possibly conservative, but the reduction in throughput due to reduced imports is already evident. The next table shows the extra berths that will be needed in the short term, up until 2015 and the extra cranes just to handle the increased volumes at the current efficiency.

Table 43: Growth in Demand for Berths and Cranes

Ports		2007	2008	2009	2010	2011	2012	2013	2014	2015
Durban	Berths	10	10.7	11.1	11.6	12.0	12.5	13.1	13.6	14.2
	Cranes	19	20.2	21.1	22.0	22.9	23.8	24.8	25.9	27.0
Port Elizabeth	Berths	2	2	2.1	2.2	2.3	2.4	2.5	2.6	2.7
	Cranes	4	4.0	4.0	4.2	4.4	4.5	4.7	4.9	5.1
Cape Town	Berths	4	4.0	4.0	4.2	4.4	4.5	4.7	4.9	5.1
	Cranes	6	6.0	6.0	6.3	6.5	6.8	7.1	7.4	7.7
Total	Berths	16	17	17	18	19	19	20	21	22
	Cranes	29	30	31	32	34	34	37	38	40
Cum. % Change from 2007			104.3%	107.3%	111.8%	116.5%	121.3%	126.4%	131.7%	137.2%

The growth alone will demand an extra crane in Durban almost every year and an extra berth every 2.5 years for the next 10 years. This is in addition to the fact that the port needs extra facilities now to comply with the generally accepted norms. This situation provides urgent motivation for the development of the Bayhead Terminal and associated marine capacity.

Development planning in Durban should fast-track the Bayhead Terminal, in order to provide additional capacity of 5-7 million TEUs per annum. Once the terminal is operational it will be possible to redevelop the DCT as shown in the **Figure 30** below to achieve 3900 metres of straight quay space.

Figure 30: Possibility to redevelop the DCT

This quay arrangement, provision of sufficient cranes and realigning and clearing of the working area will permit the terminal to handle 5-6 million containers p.a. Durban will then be able to handle 9-10 million containers but will need the arterial road and rail connections and space to create a logistics park [ideally within in the present airport area] to support the off-port activities necessary for an efficient container port.

Current plans for the next major development at the port of Durban, is the plan to create a basin with surrounding container stack areas in the Bayhead precinct of the port.

This will provide 3200 metres of berth in two sections of 1600 metres each, but to gain access to it for deep-water ships will require dredging the whole of the Maydon channel or, if environmental concerns can be allayed, by cutting through the sand bank that obstructs the centre of the harbour.

This development will logically include the repositioning of the car terminal, and complete re-planning of the road and rail system around the port to link it more effectively to the South Durban Basin industrial area, and the site of the current Durban airport, as discussed in the intermodal section of this report.

Future potential opportunities will be created by the vacation of the current Durban Airport site. The new airport at La Mercy will be ready in two years time.

It has been proposed that the current airport site is could be used to create a dig-out port by breaking through the sand dunes at Reunion and Isipingo to create a U shaped port. This would provide a deep water port at very great expense and will presumably take many tears to justify. It would also block development in the South Durban basin and may prevent the motor car and oil refinery industries in the area from expanding. In view of the situation at the port of Durban where future expansion space is limited and capability to handle the maximum ship size is in doubt, it is likely that development will be needed at Richards Bay to support or replace the container capacity in Durban over the period of the present planning framework.

Container handling at Richards Bay

Current container handling at Richards Bay is about 9000 TEUs per annum, up fom 4500 in 2006.Most of the growth is from use of containers for semi-bulk products to take advantage of the container rates for break bulk cargoes.

Current planning documents show that it is possible to create a 34 berth deep water container terminal in the area stretching inland from the existing dock. Concurrently with the development of Durban to full potential it will be prudent to plan and execute the development of the terminal facilities at Richards Bay as well as the road and rail linkages to the interior, to support or replace the Durban Container Terminals to in due course.

Figure 31: Possible long term expansion area at Richards Bay

Ports Operational Problems

The existing South African container terminals all have limitations that give rise to inefficiency, increased costs and unnecessary ship delays. Cape Town stack area is too small, Port Elizabeth stack area is too small, and Durban has too few berths and insufficient stack area.

Additionally all three ports are short of cranes for the number of berths they have and Durban suffers the peculiar problem of having 5 short sections of quay.

Both Durban and Cape Town facing the situation where future expansion will be increasingly expensive, as container throughput is increasing and ships are getting bigger and deeper.

There is therefore a clear need for in-depth analysis of the entire logistics of the movement of goods by container, break-bulk and bulk to and from Southern Africa by all modes, to provide a basis for planning the most cost-effective combinations of port developments and matching expansion of road and rail capabilities to match the needs of the South African economy.

It should also be noted that the current situation where there is no system for the reporting of the contents of containers handled through the ports is a cause for concern to the transport authorities

6.4.6 Pipeline Operations

Introduction to Pipeline Operations

The pipeline systems in South Africa have been created primarily to serve the petroleum industries. The pipelines have established their place in the transportation system as the most efficient and cost effective means of transporting large quantities of liquids and gases over long distances safely and efficiently. The cost of transporting bulk liquids by pipeline is lower than for other modes over extended periods but there is very high capital investment required to establish the infrastructure. In South Africa the pipeline system has been controlled and operated by the parastatal transport company Transnet and due to lack of competition, the costs to users are not as low as could be anticipated, in relation to road and rail transport. Durban is the main import point for crude oil and the main centre of pipeline activity on the coast.

Transnet Pipeline Operations

The pipeline division of Transnet, provides transport services for gas, crude oil, aviation turbine fuel, diesel, alcohol and various grades of petrol over varying distances, using over 3 000 km of high pressure pipelines. The table below indicates the current weekly capacity of pipeline sectors.

Table 44: Current capacity of pipeline sectors per week

Pipeline system	Pipeline section	Design Capacity ml/wk	Operational Capacity ml/wk
REFINED	Durban (S)	74	68
	Sasolburg (N)	104	95
	Sasolburg (W)	25	23
	Secunda (N)	128	115
	Secunda (E)	50	45
CRUDE OIL	Crude	141	134
AVTUR	Avtur	25	24
GAS/LILLY	Gas	-	23Mgj

Source: Transnet Pipelines

The location and connections between pipelines is shown in the figure below.

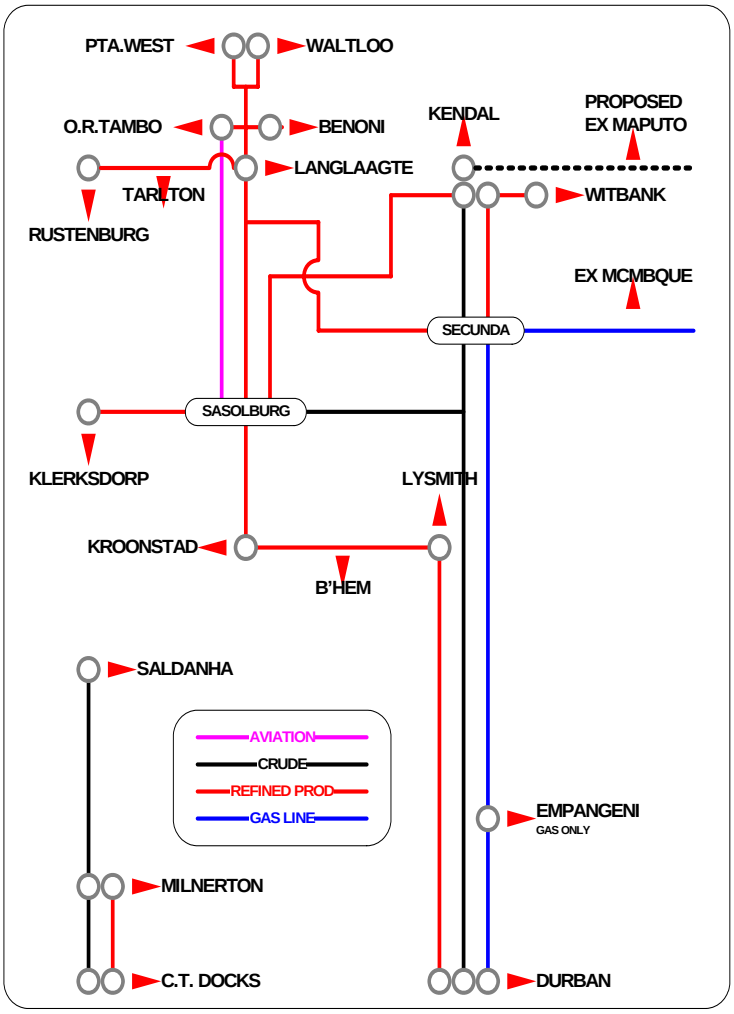


Figure 32: Location and connections between pipelines

Sasol Gas Operations

As a large scale producer with near monopoly powers Sasol Gas has significant influence over the pricing of all pipeline gas in South Africa. The cost of pipeline gas has historically been linked to the Singapore spot price of bunker oil and the PPI; but the company on occasions offered gas to certain large steam generating accounts at extremely attractive rates in order to secure a portion of the market in the KwaZulu-Natal and Durban coastal region.

Refineries

In South Africa, liquid fuels are produced at four crude oil based refineries and at the synthetic fuels plants at Secunda and Mossel Bay. The refineries that produce liquid fuel include Calref in Cape Town, Enref and Sapref in Durban, and Natref at Sasolburg.

The Sasol ll and Sasol lll plants at Secunda produce synthetic fuels (synfuels) using coal as feedstock. The Mossgas plant at Mossel Bay, which is owned and operated by PetroSA, produces liquid fuel from natural gas using a synfuel process similar to that of Sasol.

Distribution of petroleum products is done by inter-company coordination in an integrated fashion using road, rail, sea tanker and pipeline transport to move product in the most efficient manner and ensure uniformity of pricing and supply over the whole region.

Table 45: Total Transport of Fuels by Pipeline (2006-2007)

Volumes in tonnes

	Origin Depot																	
	Durban		Secunda			Coalbrook	Sasolburg	Fynnlands	SBM-Durban	Mozambique	ldanha SB	Saldanha	Port of C.Town	Port of M.Bay	Calref	PetroSA		Total
Destination Depot	Refined	Avtur	Refined	Gas	Synthetic	Avtur	Refined	Crude	Crude	Gas	Crude	Crude	Crude	Gas	Refined	Synthetic Alcohol	Refined	Tonnes
Diameters	300mm	150mm	300mm	450mm		150mm	300mm	400mm	400mm	450mm	400mm	400mm	400mm	450mm	300mm		300	
Alrode	420.000		623.000				752.000											1,795.000
Bethlehem	104.000																	104.000
Coalbrook	158.000		43.000	449.000	449.000			4,100.000										5,199.000
Durban				3,200.000			4.100		23,000.000									26,204.100
JIA		113.000				866.000												979.000
Kroonstad	639.000						81.000											720.000
Klerksdorp	50.000						423.000											473.000
Ladysmith	169.000																	169.000
Langlaagte	485.000		551.000				69.000											1,105.000
Pretoria West			32.000				68.000											100.000
Rustenberg	17.000		77.000				72.000											166.000
Tarlton	176.000		207.000				151.000											534.000
Watloo	330.000		527.000				432.000											1,289.000
Witbank			564.000															564.000
Secunda										21,750.000								21,750.000
Saldanha											3,000.000							3,000.000
Calref												3,000.000	632.000					3,632.000
PetroSA														2,000.000				2,000.000
Port of Cape Town															560.000			560.000
Voorbaai																150.000	2,000.000	2,150.000
Total	**2,548.000**	**113.000**	**2,624.000**	**3,649.000**	**449.000**	**866.000**	**2,052.100**	**4,100.000**	**23,000.000**	**21,750.000**	**3,000.000**	**3,000.000**	**632.000**	**2,000.000**	**560.000**	**150.000**	**2,000.000**	**72,493.100**

Current & future developments

Transnet Pipelines and Sasol Gas recently signed a contract committing the so-called Lilly pipeline from the Secunda to the coast to gas transportation, thereby effectively removing the additional capacity that could have potentially been available to transport liquid fuels from the coast to inland.

The National Energy Regulator of South Africa (Nersa) has awarded Petroline RSA, an empowerment company, a licence to build a liquid petroleum pipeline from Mozambique to Kendal in Gauteng, via Nelspruit. The pipeline will carry 3.5 billion litres of fuel a year and supply 25 percent of the fuel demand in Mpumalanga and Gauteng. The pipeline will run from an existing coastal fuel storage depot at Matola Harbour in Mozambique, to Gauteng via Nelspruit. In Nelspruit, an inland depot will be built, complete with rail and road loading infrastructure.

The construction of the 249 km-long, 30 cm pipeline will start at the end of 2007 or early 2008 and is expected to be fully operational by the end of 2009. Detailed design and environmental impact assessments for the project are already underway. The agreement between Mozambique and South Africa to use Matola harbour would reduce South Africa's reliance on Durban Harbour for liquid fuel. For safety and maintenance purposes, the pipeline will be buried about one metre below the surface. While some environmental impact is unavoidable, care will be taken to minimise the impact of construction operations. Petroline has also undertaken to rehabilitate the pipeline corridor after construction, so that there will be few visible surface signs that the soil has been disturbed. The pressure in the pipeline will be at about 125 bar at the inlet of the pipeline.

Transnet Pipelines Durban to Johannesburg pipeline (DJP) has reached its full capacity and is reaching the end of its useful economic life and requires replacement. The plans are therefore to replace the existing DJP and expand capacity with a NMPP (New Multi-Products Pipeline) from Durban to the inland market. The NMPP Project will also address the capacity constraints in the Transnet Pipeline Inland Network (IN) resulting from the future increased demand requirements placed on the pipeline network

Transnet subsidiary Transnet Pipelines has settled on the desirability of a 610-mm or 24-inch pipeline capable of transporting 6,5 billion litres a year of finished product to the country’s economic heartland. The initial design had been for a 406-mm or 16-inch pipeline, and had been based on historical economic growth rates, while the new configuration is in line with South Africa’s 6% growth target.

The pipeline also forms part of a bigger R78-billion, five-year capital programme at the freight logistics group, and construction of the pipeline is expected to begin in 2008. NERSA has granted Transnet Limited, trading as Transnet Pipelines, a licence to construct a petroleum pipeline and associated pipeline accumulator facilities consisting of-

a) a 24-inch (24") pipeline from Durban to Jameson Park
b) a 16-inch (16") New Multi-Products Pipeline (NMPP) from Jameson Park to Alrode and from Alrode to Langlaagte in Gauteng Province, a distance of approximately 70 km.
c) a 16-inch (16") pipeline from Kendal to Waltloo
d) a coastal pipeline accumulator facility in Durban and
e) an inland pipeline accumulator facility at Jameson Park

The pipeline development will raise overall capacity to 25-billion litres a year and will have to be installed before the current network reaches its full capacity in 2010.

With regard to gas, a new onshore exploration, appraisal and development drilling campaign will commence in 2007. Drilling will be concentrated in the Pande and Temane field areas and targeted at increasing annual gas production over the next few years beyond 120 M GJ.

Pipeline Constraints and Problems

The market demand for petroleum fuels in the inland market is over 12 billion litres per annum whilst the estimated capacity of the current pipelines are; the refined fuel line 3.5 billion litres and the crude oil pipeline [Durban to Coalbrook] is approximately 7.0 billion litres.

This raises concerns that any disruption of production causing reduction of refining capacity at the inland refineries will be an immediate threat to the industrial hub of South Africa's manufacturing and mining sectors.

One obvious result of the delayed expansion of pipeline capacity is the 3.0 – 4.5 million tonnes of fuels that are transported by road between Durban and the interior and the fact that all distribution of petroleum products is done all over Southern Africa by road.

Diesel Shortage

An additional complication is that diesel is anticipated to run short in South Africa in the near future, if there is no significant investment in critically needed infrastructure.

The demand for diesel already outstrips the capacity of South African refineries and there are as of 2008, no definite plans to increase capacity in the near future. Petroleum companies have stated that it will be uneconomical to create capacity to produce diesel as the product is available overseas at prices below SA production cost. PetroSA is reportedly looking to build an import based refinery at Ngqura, in spite of the dubious economics thereof.

Over the past two years, South Africa has imported more and more diesel and the supply could well be constrained in the near future by lack of pipeline capacity. The year on year growth in demand has over the past 10 years averaged approximately 4.5% per annum but the last year this rose to 12.5%.

Increasing electricity shortages have also aggravated the situation by promoting a surge in diesel fuel generators. A number of passenger vehicle manufacturers have started to offer diesel fuelled models, following their success in Europe, increasing per the pressure on the supply in South Africa.

Increasing the imports of fuel at times when international prices are expected to rise again, will be directly transferred to the operating costs of industry and farming. And will reflect in the balance payments. For inland users, there is a looming danger of shortages as pumps run dry due to supply constraints.

The pipeline network between Durban and Gauteng is already overloaded and current plans to begin construction on the R11.2 billion multi-products pipeline will not bear fruit until after 2010. It might be possible to produce diesel in South Africa but inland refineries will still need to access crude oil via the pipeline system so that shortages are still likely to occur.

The economics of diesel production are such that it is unlikely that local refineries will expand their capacity in competition with the international landed price. The world capacity for production of diesel has expanded by approximately 10% since 2005 so the product is available at prices which are likely to preclude the viability of increasing capacity in South Africa.

Being dependent on imports is theoretically not a problem as long as the fuel is available internationally. There is however a growing concern that the increasing usage of diesel by Eastern countries i.e. China and India will effectively make the product difficult to procure, or very expensive, on the international market.

In spite of the subsequent reduction in oil prices on the back of the global financial meltdown, it is critically important that South Africa reduces the growing national dependence on road transport and the failure to address the potential of electrified rail lines to carry general cargo may still prove to be a major barrier to future economic growth.

If fuel constraints are added to the current electricity constraints, there is a high potential for the South African economic progress to slow considerably until these problems are addressed.

KZN Provincial Pipeline operations

The origin of the pipelines in KZN is in close proximity to the port of Durban and the petrochemical complex in the Southern Industrial Basin. Sapref is southern Africa's largest crude oil refinery, producing 35 percent of the country's refining capacity, which equates to 180 000 barrels of crude oil per day or 8.5 million tonnes per year, in comparison, Enref produces approximately 125 000 barrels per day or approximately 6 million tonnes per year.

Eighty percent of South Africa's crude oil is received through the Single Buoy Mooring (SBM) anchored 2,5 km offshore at Reunion from which 23 million tonnes of crude oil is received in bulk and transferred via pipeline every year to the two refineries situated about 16 kilometres south of Durban in Prospecton.

The SBM is owned by a consortium of oil companies and is operated by Sapref. Sapref's facilities comprise seven underground fuel transfer lines running about 12 kilometres between the refinery and the Island View facility in the port of Durban. In addition, there is a considerable amount of movement of petroleum products through the port, with the main storage and handling complex located at the dedicated Island View installations and chemicals berths and tank farm.

In 2006/07, Transnet pipelines transported approximately 3,5 billion litres (2.6 million tonnes) of refined products, which included petrol and diesel from Durban to Gauteng via Ladysmith and the Free State.

During the same period, the 400 mm diameter crude oil pipeline conveyed approximately 5,15 billion litres (4,1 million tonnes) of crude oil from Durban to the Natref refinery in Sasolburg. A branch from this line enters Mpumalanga to the north of Vrede and terminates at Secunda.

The gas pipeline runs from Secunda to various places in KZN via Empangeni, connecting to Newcastle, Richards Bay and to the Durban refineries. A total of 14.0 MGJ (million gigajoules), approximately 3,2 million tonnes, is moved on this pipeline per annum.

Constraints at Port of Durban
It must be noted that the following comments exclude the Off-shore Single Buoy Mooring that is used to transfer crude oil from bulk tankers to the refinery in the Reunion-Isipingo area.

The operations within the port of Durban are an integral part of the petroleum products logistical value chain. The Durban port is used by a number of oil companies to ship finished petroleum products to other markets in other parts of South Africa via coastal shipping or to the inland markets via pipelines, road or rail. There were, however a number of challenges that were identified by the Energy Master Plan as creating constraints within the harbour for the movement of petroleum products, namely:

- Long queuing times for petroleum vessels outside of the harbour were attributed to prioritisation, by Transnet Port Terminals, of container vessels over those carrying petroleum products.

- Berth congestion: Storage facilities attached to the berths are an integral part of ports operations but some oil industry participants use the same tanks as part of their refining operations, thus resulting in much reduced port capacities.

- Inadequate offloading and loading equipment: Offloading and loading facilities, owned by the oil companies, have capacities well below global best practice. It is understood that some facilities operate as low as 400 cubic metres per hour when they should be operating between 1500 and 2000 cubic metres per hour.

In 2006 the pipeline network was operating at capacity – especially on the Durban-Gauteng line, resulting in large volumes of petroleum products to use road and rail transport. A new pipeline is needed, and there are current plans for the laying of a new 600 mm pipeline at a cost of approximately R11.5 billion.

6.4.7 Analysis of Other Problems

Intermodal Freight Transport

Introduction

There is in South Africa a continual debate about the potential for switching road freight cargo back to rail as a more desirable form of transport, from the perspective of fuel efficiency, environmental friendliness, reduction of externalities such as congestion and accidents and improvement to utilisation by the state owned railway system.

The major obstacles to development of intermodal transport have been identified as costs, accessibility, reliability of rail services, safety and security of goods in transit, and the time taken to affect deliveries. In practice, the major obstacle is the fact that there is at the present time virtually no available railway capacity and limited intermodal transfer facilities and discussion about promoting intermodal transport is therefore largely academic.

There is also the fact that South Africa's railways are built to Cape Gauge (1067 mm) and stability considerations impose limitations on the options for intermodal systems. The gauge to which the railways were constructed means that tunnels, bridges and catenary cables also impose height limitations. Within these constraints, there are however several potentially usable intermodal options including road-railers, containers and various transfer systems.

There has been a suggestion that the railway system should be rebuilt to the wider "Standard Gauge" to improve options for intermodality and increasing payloads, but there is little evidence that this would offer significant advantage for freight haulage. The Richards Bay and Orex lines are already world class operations on Cape Gauge.

In the longer term, it may be possible to develop systems for intermodal transport of a range of different commodities, but this would only be possible within a rail operation that is geared to customer demand in relation to general freight. As described elsewhere in this report, the focus of the state railway system has been developed by government policy and is unlikely to change without very significant institutional and organisational reform of the structure and management of the railway system of the country.

The term intermodal, in relation to freight transport can technically be applied to any form of transportation where goods transferred from one mode to another in a course of a single journey. In practice, most of intermodal transport in South Africa takes place between the maritime mode (at port container terminals) and the two main forms of land transport, being rail and road.

It must be noted however that Intermodal transfers of a large range of commodities between road and rail are normal practise in many industries including coal, minerals, timber, and grains.

Containers

The ISO maritime container has become the standard unit for international sea transport of manufactured and fragile goods, worldwide. Containers are used to transport almost any commodity that can be accommodated within the standard ISO dimension including liquids, machinery, motor cars, bagged and crated goods and in SA export containers of commodities in bulk bags, such fluorspar, mineral sands, and manganese.

The volumes of containers handled at South African ports in 2007 is shown
In the below table

Table 46: Total Containers by Category All SA Ports - 2007

				LANDED				SHIPPED			
CONTAINERS	2007	DEEP SEA	COASTWISE	TRAN SHIPPED	TOTAL LANDED	DEEPSEA	COASTWISE	TRAN SHIPPED	TOTAL SHIPPED	GRAND TOTAL
	FULL	695	1	0	696	2,288	23	0	2,311	**3,007**
RICHARDS BAY	EMPTY	854	0	0	854	129	31	0	160	**1,014**
	TOTAL	1,549	1	0	1,550	2,417	54	0	2,471	**4,021**
	FULL	857,595	7,965	197,603	1,063,163	578,142	15,940	197,398	791,480	**1,854,643**
DURBAN	EMPTY	110,494	10,316	52,423	173,233	386,460	12,201	52,695	451,356	**624,589**
	TOTAL	968,089	18,281	250,026	1,236,396	964,602	28,141	250,093	1,242,836	**2,479,232**
	FULL	19,270	802	16	20,088	3,110	203	49	3,362	**23,450**
EAST LONDON	EMPTY	923	0	0	923	17,313	300	0	17,613	**18,536**
	TOTAL	20,193	802	16	21,011	20,423	503	49	20,975	**41,986**
	FULL	177,104	1,666	23,439	202,209	64,413	262	22,863	87,538	**289,747**
PORT ELIZABETH	EMPTY	26,183	904	4,674	31,761	93,656	1,803	5,879	101,338	**133,099**
	TOTAL	203,287	2,570	28,113	233,970	158,069	2,065	28,742	188,876	**422,846**
	FULL	196,193	11,208	35,980	243,381	216,892	5,557	39,131	261,580	**504,961**
CAPE TOWN	EMPTY	105,515	11,679	20,127	137,321	95,826	2,818	23,079	121,723	**259,044**
	TOTAL	301,708	22,887	56,107	380,702	312,718	8,375	62,210	383,303	**764,005**
	FULL	**1,250,857**	**21,642**	**257,038**	**1,529,537**	**864,845**	**21,985**	**259,441**	**1,146,271**	**2,675,808**
TOTAL	EMPTY	**243,969**	**22,899**	**77,224**	**344,092**	**593,384**	**17,153**	**81,653**	**692,190**	**1,036,282**
	TOTAL	**1,494,826**	**44,541**	**334,262**	**1,873,629**	**1,458,229**	**39,138**	**341,094**	**1,838,461**	**3,712,090**

As shown in the above table, the biggest volumes of ocean containers are handled in the port of Durban, 2,479,232 in 2007. It is important to note that this figure relates to container movements in TEUs [6 metre equivalents); therefore 12 metre boxes represent 2 TEUs in one lift or load. To appreciate the complexities of the movement of containers it is essential to analyse the volumes into categories.

Transhipment Containers [*containers held in the port pending arrival of another ship*]
The number of transhipment containers that stay in the port is increasing with current proportions being approximately 500,119 [20.0%].

Landed and shipped TEUs [containers that must be removed from the port]
Landed container movements amounted to 986,370 TEUs [39.7%] and movements of shipped containers were 992,743 TEUs [40.0%].Approximately 6792 TEUs per day are, landed and shipped and about 5422 are transported to and from the port.

Durban Local Cargo [*containers consigned to addresses in KZN coastal areas*]
Approximately 35% of cargo consigned to Durban is destined for delivery to customers in the Durban-Pietermaritzburg area and coast, therefore only 65% of containerised cargo is likely to be transported inland;

Inland Cargo De-stuffed for Handling in Durban [*containers with cargo for inland areas but consigned to distribution centres in Durban area]*
Approximately 50% of containers with cargo consigned to the interior destinations are de-stuffed at consolidation warehouses in Durban. The cargo is then subjected to a range of activities that may include sorting, labelling, repacking, warehousing, load compilation and finally transport by fully loaded road vehicle to destination. The empty containers are returned to Durban container depots for reuse.

Long Haul Containers [*containers that are transported to interior destinations*]
If 50% of the cargo consigned to inland destinations is transported in containers this amounts to about 320,570 TEUs and the number of boxes likely to be received from the interior is 322,641 TEUs. This means that about 643,211 TEU p.a. is the approximate volume available for transport by road and rail between Durban and Gauteng.

Railed containers [*containers moved between Durban and Inland terminals and businesses]*
In the year 2005 the containers transported on rail in and out of the port of Durban were estimated at 95,000-100,000 TEUs despatched and 80,000-100,000 TEUs received, [the number depends on the average weight used to convert the reported tonnes to numbers of containers]. It can therefore be inferred that approximately 200,000 TEU movements take place by rail on the Natcor line.

Road Hauled Containers [full and empty containers transported by road vehicles between Durban and Inland destinations]
In 2006, the estimated movement by road on the N3-N11 corridors was 202,000 TEUs to the north and 200,000 TEUs to the south, making a total of 402,000 TEUs. Combining the road and rail totals confirms that approximately 602,000 TEUs are moved to and from the interior by land transport on the Durban-Gauteng corridor.

It must also be noted that from traffic counts, the indications are that the total containers on road had risen to 500,000 in 2007-08.

Any evaluation of the potential for diversion of inland containers from road to rail must take cognisance of the proportions described above as they are unlikely to change.

Optimising the Logistics of Containerised Cargoes
The reason for de-stuffing containers in Durban and transporting the deconsolidated goods by normal road transport is based on sound transport economic logic. The average weight of the content of containers imported in the east-west trade is approximately 14 tonnes for 6 metre containers and 22 tonnes for 12 metre containers.

The legal payload for a road combination of 6x4 truck tractor and 13.5 metre semi-trailer is approximately 31 tonnes. It is not possible to load two 6 metre boxes with a gross weight of 17 tonnes on this combination. If the containers are de-stuffed and the goods are transported without containers it is possible to load the contents of two 2.4 containers onto one vehicle. For maximum cube interlink combinations the economies are even more significant.

It should also be noted that the average weight of 6 metre export containers on the east-west trade is 22 tonnes and 12 metre containers weigh 18 tonnes.

The average weight on the north south trade are, import containers 18 tonnes for 6 metre, and 22 tonnes for 12 metre boxes. Export containers on the north-south trade weigh 20 tonnes for 6 metres and 22 tonnes for 12 metres.

The export weights make the boxes qualify as “Heavy” for the rail tariff, whereas road rates are more negotiable.

The reason for the anomaly in the weights of containers on the east-west trade is due to trade imbalance and the fact that there is a preponderance of empty containers, which need to be shipped to the east, empty. In order to optimise the availability of this low cost transport, South African exporters are loading a wide range of unusual commodities into containers including fluorspar, manganese ore, scrap metal and Zambian copper. Most of this container stuffing takes place into the empty boxes that accumulate in Durban as the result of destuffing containers of imported goods.

Another factor that favours road transport from inland to the coastal depots is that most of the newer container depots do not have rail facilities and road haulage avoids double handling.

Intermodal Problems

As the movement of large consignments of containers is theoretically more cost effective by rail than by road it is of relevance to note the relative cost of moving containers from SA ports to Gauteng

Charges for transport of containers between Durban and Johannesburg in 2007 are shown in the table below.

Table 47: Comparative costs of moving containers by road and rail

North and South Bound (Import and Export)					
	Empty	**6 Metre full**	**[+ 9 tons] Heavy**	**Empty**	**12 Metre Full**
Road Transport					
Cost of transport	3,850.00	3,850.00	5,700.00	5,700.00	5,700.00
Total cost of Road [1] [2]	**3,850.00**	**3,850.00**	**5,700.00**	**5,700.00**	**5,700.00**
Rail Transport					
Cost of transport	1,641.76	1,916.43	3,359.21	3,259.89	3,833.22
Cost of crosshaul (10 kms)	981.00	981.00	981.00	1,484.00	1,484.00
Total cost of Rail [2]	**2,622.76**	**2,97.43**	**4,340.21**	**4,43.89**	**5,317.22**

In addition to the terminal charges incurred by rail containers it must be noted that for rail transport there is an additional cost of cross haul, this usually includes the cost of recovering the empty container] for delivery back to the terminal. The cross-haul charge means that for customers outside of a 15- 20 kms radius from a terminal the costs of road and rail are almost the same. The present location of City Deep Inland Container Terminal in relation to newer industrial areas provides a disincentive to use of rail for containers.

There is always a certain proportion of containers with contents that are valuable or vulnerable for which customers will pay a premium for speed, safety, reliability, and simplicity of arranging the transport, and this proportion of the total, which could be as high as 30%, will almost certainly stay on road.

The competitive situation is aggravated by the imbalance of full and empty containers at inland depots as road hauliers, when they cannot find backhaul loads to Durban, take empty boxes at discount rates in order to earn a contribution towards the cost of the return journey and saving the shipping company some of the cost of repositioning the boxes to the coast.

Current Rail Transport Volumes

Total annual container tonnage on rail in 2005 amounted to 4.3 million tonnes [286,666 TEUs at15 tonnes per TEU], most of which are distributed to final destination by road haulage.

The distribution of containers on rail to the top 15 destinations from the top 15 origins in 2005, is shown in the below table.

Table 48: Containers Railed to top 15 destinations from top 15 origins - 2005

Origin	Tonnes	TEU	Destination	Tonnes	TEU
ALGOA BAY	258,978	176,265	BAYHEAD	19,305	1,287
ASHTON	37,435	2,496	BULAWAYO	39,038	2,603
BUFFALO HARBOUR	35,936	2,396	BELCON	119,093	7,940
BAYHEAD	48,459	3,231	CITY DEEP	433,235	28,882
CITY DEEP	455,881	30,392	DALCON (CX)	10,610	707
CPK-PRETCON	95,798	6,387	GARE DE MERCADORIAS	52,173	3,478
EASTCON	20,209	1,347	LOCON	89,439	5,963
KASERNE	536,073	35,738	KAZCON (CX)	68,879	4,592
KINGS REST	1,173,244	78,216	KING'S REST BERTH 105-107	1,631,661	108,777
SASOLBURG	72,585	4,839	MAYDON WHARF BERTH 15	37,948	2,530
TABLEBAY DOCKS	113,092	7,539	PRETCON	155,989	10,399
TRICHARDT	149,223	9,948	PAARDENEILAND SDG.CITY	215,440	14,363
VAALCON	96,523	6,435	RICHARDS BAY (SDG) 1	77,910	5,194
LIME ACRES	154,816	10,321	ROSSLYN CONTAINERS	209,587	13,972
MAITLAND	215,594	14,373	TABLE BAY HARBOUR	269,780	17,985
SAMPLE	3,463,46	230,923	SAMPLE	3,430,087	228,672
[15]			[15]		
Total	4,324,443	288,296	Total	3,937,095	262,473
[168]		80.1%	[256]		87.1%

As shown in the above table, 80-87% of containers were forwarded or received at a very limited numbers of destinations. The remaining 15% are consigned all over the country in very low volumes, such that they can hardly be regarded as suitable cargo for a bulk railway operation.

The geographic locations of the top 15 Origins and top 15 Destinations of containers on rail in 2005 are shown in **Figure 33** below.

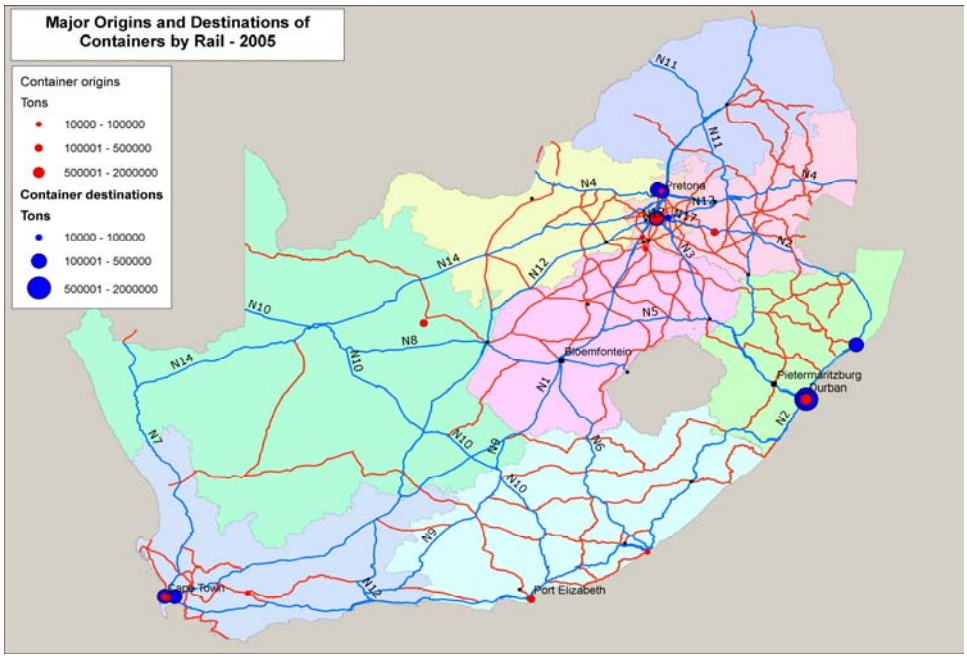


Figure 33: Container O & D - 2005

As shown in the above figure the dispersion of the O&D of the bulk of the containers on rail is very localised to container terminals in inland areas and ports

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- The cost of delivering containers by rail increases disproportionately as the road short haul increases from the terminal and thus for receivers beyond the 50 km short haul lead mark road is more cost effective

- Because of closer management of road vehicles, ports tend to give dispatch priority to road transport and thus urgent deliveries usually specify road delivery from the port. Road deliveries take about 3 days and rail deliveries take about 7 days ; the difference is mainly caused by terminal dwell time at the ports

- The container handling capacity of rail has not kept up with total demand and the increasing shortfall has been filled by road (See the Inward Flow diagram for detailed comparisons.)

- Road hauliers can compete with rail where return cargoes are available.The container flow to and from Johannesburg is an example of this. Due to the use of general purpose flat deck trailers for a range of cargo types, road transport have the largest market share and are able to compete effectively for the return of empty containers.

- Because the northbound capacity on rail is inadequate it follows that the southbound capacity is equally inadequate and the net effect is that road

transport has gained a substantial foothold in the container traffic flow partly because of inadequacies and inefficiencies of the rail and port service.

- one of the major issues in repositioning empties to the coast is that Durban empty container depots by and large have no rail facilities [a point to be considered in the redevelopment of the airport area], and therefore, to avoid double handling and short haul road costs in Durban the major proportion of empties are returned by road

The below figure, shows the flow of containers towards the Gauteng Terminals from the coast and the subsequent distribution of these containers in the Gauteng area. It should be noted that all volume figures mentioned are TEUs (6 metre equivalent units) and the transit times shown are in days from landed Durban.

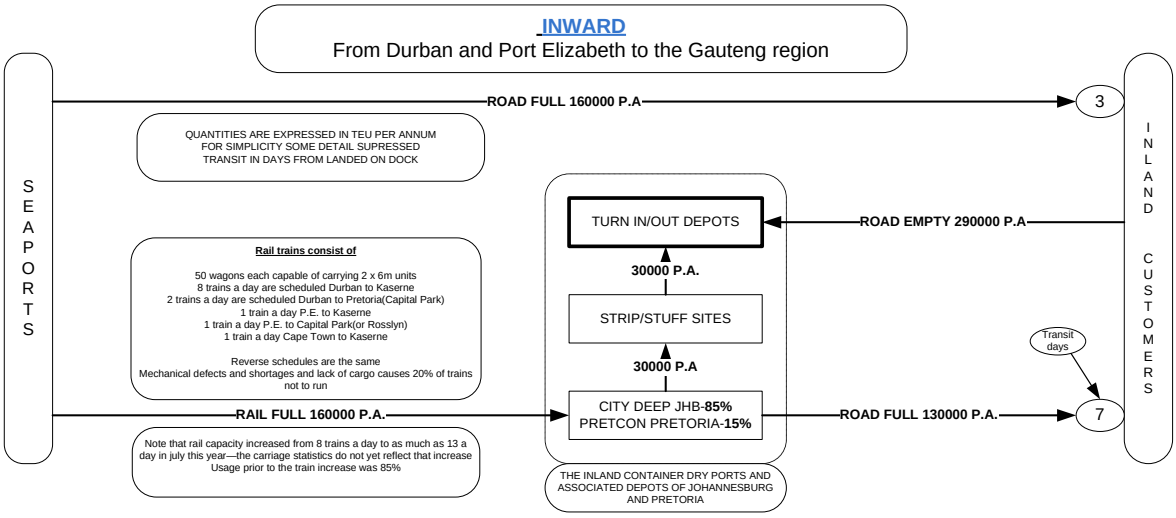


Figure 34: Flow of containers towards Gauteng Terminals

South Africa's inward import trade is largely high value industrial and consumer goods requiring high cube to mass ratios and the 40 ft. container is therefore the predominant unit in the import trade.

It is important to note that whether a container is railed inland or sent inland by road, all containers eventually arrive at a container terminal whether full or empty. And every container hire ends at a container depot for inspection, recording, cleaning, repair etc before rehiring to another user.

Thus the growth of the container trade inland still remains focused on the Hub area and the Hub still carries the full growth of the container market. Unusually this means that the flow does not fragment but in the end aggregates at the depots located in the hub areas

High Cube Containers

The basic ISO 12 metre container dimension was 12 x 2.5 x 2.5 metres. However demand in global trade sought greater cubic capacity and by the late 1990s High Cube containers with dimensions of 12 x 2.5. x 2.9 have become the new standard size. This has caused problems for road hauliers as the height of a HC container on a conventional flat deck truck exceeds the legal permissible height.

Ongoing investigations are in hand to amend the South Africa Road Traffic Act in line with international standards to accommodate the HC containers, of which about 500, 000 are estimated to be transported in the country annually.

The moving structure gauge of the South African Railways was able to handle the earlier dimension, but the High Cube container exceeds this gauge, and TFR has been obliged to conduct gauge clearance checks on all routes where these containers are transported.

Railway Gauge—the problem of out of gauge hi-cube containers is shown in the below figure - at rest the container is out of gauge [and is therefore taking up space in the safety envelope], and once it is moving the wagon deck “cuts the corner”

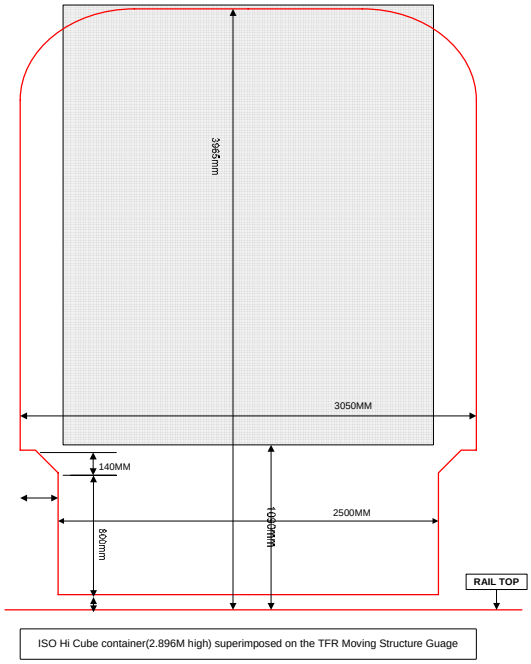


Figure 35: Railway Gauge

Outward Flows

The imbalances aggravate the large number of empty containers in the Durban area caused by the de-stuffing a large proportion of import containers in that area—the availability of empty boxes causes a substantial flow of export break bulk cargo to be transported to the coast by road to be containerised for shipment.

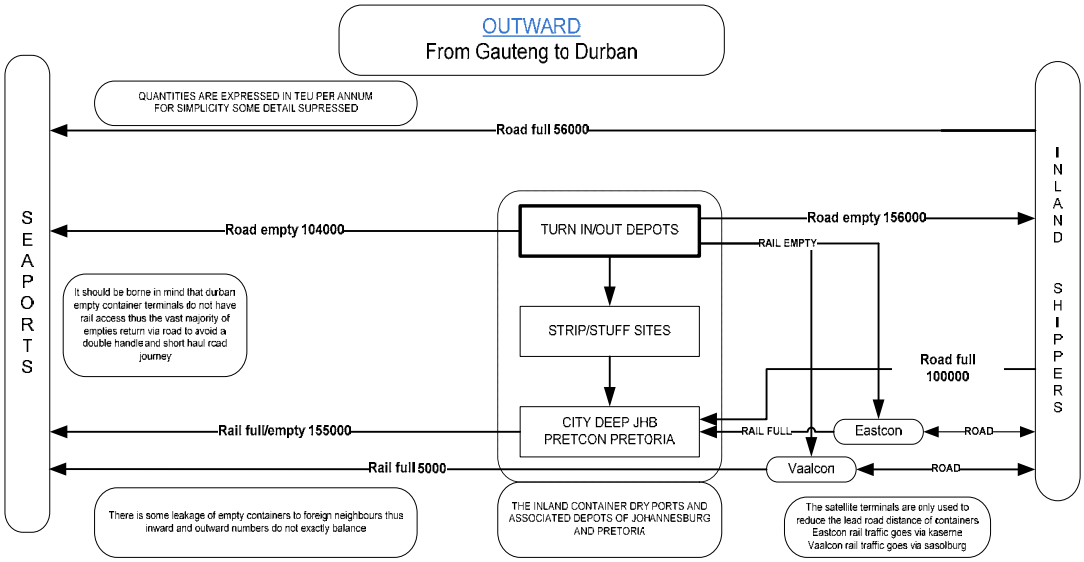


Figure 36: Outward Flows

South African goods exported in containers are mainly basic minerals, scrap iron, copper, ores and some liquids. The demand for export containers has been largely confined to 6 metre boxes as opposed to the higher level of imports in 12 metre containers. As a result, large numbers of 12 metre containers are obliged to be returned to the coast empty. Ship owners make every effort to find innovative ways to containerise product so as to utilise the excess of 12 metre containers

When the Railway constructed the wagons to carry containers, the maximum weight of a 20 ft. container was 24 tonnes and as two 20 ft. containers fit on one wagon the Railway constructed more than 7 000 container flat deck wagons with a maximum payload of 48 tonnes.

To meet the demand for greater payload, shipping lines have gradually introduced the 30 tonne gross weight 20 ft. container and although this suits both ship and cargo owner it has meant that only one 20 ft. container can be carried on a 12 metre railway wagon, which has caused real cost increases. The Railway has embarked, belatedly, on a programme to convert wagons from 48 to 60 tonne payload, but these improved wagons are not managed individually but simply returned to the pool. Thus it becomes hit and miss when matching containers to wagons on trains bound for the coast.

The bulk commodities that are transported in significant quantities in South Africa by road and subsequently transferred to rail include grains, containers, timber, and some bulk crops such as sugar cane.

The total amount of timber transported and transferred from road to rail is approximately 4.9 million tonnes. .

In addition to the state railway, there are fairly extensive rail operations owned by mines in the interior mining areas, used to transport ore from the shafts and workings to the processing plants.

A relatively new development in intermodal transport is the transport of bulk and break bulk commodities to ports by road for the purpose of bagging them for loading into containers. Commodities such as fluorspar, manganese, nickel and copper are increasingly being containerised to exploit the low rates offered for containers to the east.

This process is reportedly being inflated by the fact that whenever the railways experience the effects of power cuts due to load shedding, or when rolling stock is unavailable to meet ship stack dates large volumes are immediately diverted to road haulage in order to meet shipping schedules.

Freight Statistics

It has been a long-term problem in South Africa that freight information has been difficult to obtain, due to the reluctance of the parastatal transport company to release operational information for research purposes and the lack of road freight data.

For Natmap, relatively compete information was received in respect of ports (2006-07), railway operations (2005), pipelines (2006/07), air cargo (various estimates).
The data in respect of road freight have been derived largely from the work done in the provincial databanks, supported by road traffic counts that are done by SANRAL (although these are becoming increasingly sporadic and dated).

The origins and destinations of road freight have been derived from provincial databank material, contacts with industries, association, and government publications. The lack of current road freight data is an ongoing cause for concern, and the fact that the provincial databank material is becoming outdated will make future estimates less reliable.

The potential for development of data on road freight transport, using econometric modelling, must be explored but it is contended that at some point, the resulting statistics need to be related to physical reality in order to provide cross checks and audits.

It must also be recognised that it is a feature of road freight operations that they are extremely flexible and demand responsive so that national economic data older than six to twelve months are very likely to be outdated and inaccurate. The seasonality of many commodities is a further complication in the annualisation of road freight data, as well as the fact that many loads transported by road are mixed commodities defying classification.

In the reports on road, rail and ports operations in this project, the combination of data analysis and current information has contributed to a higher level of current accuracy than would be possible by a more mechanistic process.

Institutional Problems

The State owns the major portion of the infrastructure in ports, pipelines, roads and railways.

The State also owns the service provider that operates port, railways, airlines and pipelines but not road freight. This situation results in services being provided by a monopolistic company, which the State as the owner has charged with the objective of making a profit. The monopoly is instructed to provide a profitable service without competition, and therefore regulates service levels and tariffs to achieve the objective.

This monopoly situation manifests itself in the different sections of South African transport in different ways and it is therefore relevant to address them by transport mode.

Railways

The monopoly pricing power and selective service results is excessive costs to industry and limitation of Government ability to use transport to achieve stated policies such as rural development; rural transport is generally unprofitable and the railway continues to withdraw services.

The railway has no opposition and therefore chooses to make profit by increasing freight rates whilst limiting attention to improving costs and operating efficiencies

Poor rolling stock management results in a situation where the railway is unable to carry the traffic which is on offer, even from those sectors of the economy which it has identified as core business.

The deliberate restriction of capital expenditure on railway rolling stock and locomotives has resulted in the general deterioration of services and inability to meet the transport needs of even the core rail-dependent industries let alone the large numbers of customers for general freight haulage.

The Tables below show the position regarding wagons and locomotives and the low usage.

Table 49: Categories

WAGONS	Export coal and all Iron ore and manganese	All other traffic hauled on rail	Total
Number of wagons	12,262	80,313	92,575
Total Tons hauled P.A.	118,000,000	66,800,000	184,800,000
Average lead dist in Kms	625	625	
Tkms per wagon per year	6,014,516	519,841	
Av tons per wagon per trip	73	41	
Av ton kms 1 trip	45,625	25,625	
Trips per wagon per year	132	20	
Days per annum	365	365	
Days between loads	2.77	17.99	

LOCOMOTIVES	Loco fleet performance
Average lead distance per trip	625
Average loco kms a month	6,713
Number of single trips a month	10.74
Average speed en route	32
Hours running per month	209.78
Total available hours a month	730
% Running hours utilised	28.74

The tables above show that the railway is particularly inefficient in respect of its traffic in the category it refers to as General Freight Business, where wagon turn time is very low and locomotives achieve well below the national average

The Government as owner of the railway, has not invested in the equipment needed to keep pace with economic growth and has limited the country's potential to exploit the world commodities boom.

Ports

The Table below shows the inadequate provision of container berths throughout the country which is causing congestion and surcharges.

6.4.8 Cranes and Berths

The Table below shows the slow handling speeds of container berths compared with typical international standards.

Table 50: Slow handling speeds

Containers - Berth Performance

Port	TEU Annual throughput	Number of Cranes	Total Berth Metres	Total Berth Count	TEU Per Berth Per Day	TEU Per Crane Per Day	TEU Per Berth Metre
Durban	2,479,232	19	3078	10	679	357	805
Port Elizabeth	422,846	4	660	2	579	290	641
Cape Town	764,005	6	1115	4	523	349	685
Natnl av/ttl	3,666,083	29	4853	16	628	346	755

Throughput is last whole year (2007)

Crane Handling Performance

Crane operating cycle times and performance are very low and this is aggravated by the shortage of equipment as shown below. With increasing vessel sizes 2 cranes per berth are totally inadequate, and provision must be made to equip the ports with at least 4 cranes per berth if they are to attempt to meet international port efficiencies.

Table 51: Containers – Ship Overall Performance Comparison

Containers-Ship Overall Performance Comparison

Port	Moves Per Crane Hour	Cranes Per Vessel	Moves per Vessel Hour
Singapore	40	5	200
Colombo	35	4	140
Durban	17	2	34

Poor forward planning and limited capital expenditure has resulted in Durban and Cape Town ports becoming generally congested. The Breakbulk Terminal in Durban was intended for steel, ferro-alloys, granite, etc., but within six months of its opening has become a car terminal extension.

The substantial growth of Durban Container Terminals has resulted in appalling road congestion leading to and from the terminal. Whilst it is understandable that exceptional growth is contributing to this, there is no doubt that planning has not been adequate and that response to changes in demand has been too slow.

The management structures of the ports are under pressure with limited skills, experience and managerial capacity to handle the complexities of the port environment.

The issues of equipment and lack of facilities and congested areas and poor management all combine to provide ports which are slow working and as a result are expensive by comparison with international standards.

The planning for increasing port capacity in Durban is muddled, with large expenditure on the entrance channel and no apparent plans to deepen berths, increase stack areas, or address the very inefficient port access from the land side. The need for extra container terminal capacity in Durban is being shuffled around between different ports instead of being focussed on the industry demand.

Pipelines

The pipelines operations have not invested in sufficient additional capacity and have been overtaken by demand, thereby causing about 3.4 million tonnes of fuels to be transferred to road haulage on the N3 corridor and 3 million tonnes by rail to the interior.

The current plan is to construct a new Durban to Sasolburg pipeline which will be in service sometime after 2010. Most pipelines in South Africa are owned by Transnet which also owns the railway and the ports, and the latest planned pipeline development entrenches the monopoly situation even further, instead of fostering competition.

The pipelines have no opposition except the railway (which is in-house) and as a result has adopted a pricing policy which charges its customers tariffs that are only slightly lower than railway rates.

Road Freight

The ownership of roads is vested in Government at National, Provincial and Municipality levels. Maintenance funding has been restricted and tax income from fuel, licensing etc has been diverted to other uses.

There is inadequate maintenance of roads to the point where damage is being caused to vehicles.

There is inadequate policing of roads, resulting in accidents and overloading.

The overloading adds to the damage to the road network which is not properly maintained and the problem compounds itself.

There is no operator registration and licencing system so enforcement is largely ineffective despite rigorous monitoring in a few areas of the country.

Driver training is inadequate and largely unprofessional and the poor standards are aggravated by numbers of foreign and local unlicensed drivers on the roads.

Summary Of Constraints

The issue of Government ownership of infrastructure and service provision surfaces as by far the most important single constraint on South African transport. It appears in different ways in different modes. The monopoly situation is not serving industry and it is also apparent that in some cases it is defeating the strategic policies of the Government in such areas as rural development and food costs.

It is noteworthy that in the two transport modes where the government has abandoned monopoly ownership namely air transport (but not airports) and road transport (but not roads) service levels have improved and there has been rapid expansion in a competitive environment.

6.5 IMPLICATIONS OF EXISTING PLANS ON PHASE 3 FORWARD PLANS

The Transnet Rail, Ports and Pipeline plans are mainly infrastructure plans considering demand supply patterns, and are not operational plans. The Transnet plans are reviewed in Chapter 7 and their implications for Phase 3 Forward Plans are subsequently discussed. The analysis of operational problems above is an

independent view of the problems, and solutions will be recommended during Phase 3. Section 6.6 below provides a basis for possible solutions to operational problems.

6.6 IDENTIFICATION OF ALTERNATIVE STRATEGIES TO BE INVESTIGATED IN PHASE 3

6.6.1 Introduction

A framework for seeking solutions to operational problems are given below. Alternative solutions will be evaluated and recommendations made in Phase 3.

6.6.2 Reorganisation of Rail Freight Operations

There is no effective rail service for of general freight traffic, South African rail rates have increased disproportionately in recent years. Limiting the railway services to block-load consignments is also not in the long term interest of industrial rail usage and rural development and has forced many potential rail users to consign goods by road and incur the additional costs of the road mode. This has had negative effects on industry, rural economics and social development which are becoming increasingly apparent and often only beginning to be understood.

6.6.3 Development of General Goods Freight

In other countries where high density corridor traffic is also the preferred cargo of railways, as it is in South Africa, wagon-load traffic is also a significant part of railway business. Since the early 1980's some 300 new 'short line' railroads have been established in the US (often taking over unwanted branch lines from the major railroads) and it is estimated that some 16% of major railroad revenue in US is generated on interchange with the small railroads.

6.6.4 Modernisation and Competitive Management

There has also been the development of a wide range of modern applications of railway technology that is totally absent in South Africa. Railways move mixed train loads of high-density 'Double-Stack' container traffic, Piggyback (Trailer on Flat Car), block load coal and mineral traffic, and wagon-load general traffic. The ability to successfully operate integrated services of different kinds on the same track is lacking in South Africa and it will be essential to correct this in order to optimise the use of the massive amount of unused rail resources that represent sunk investment in South Africa.

6.6.5 Competitive Railway Institutional and Operational Structures

It is also necessary to open up the operational opportunities for railway entrepreneurial activity on main lines and branch lines with income-earning potential before they fall into terminal disuse and deterioration. Open competition on the high

density main lines must become another goal as it will lead to greater efficiencies, lower operating costs and benefits to business and the community in general.

6.6.6 Restructure Port Institutional and Operational Framework

South African port efficiency and commercial competitiveness is hampered by the fact that the ports authority is linked to the parastatal rail, pipeline and port terminal operating company. The integrated monopoly has control of charges, level of service and provision of facilities with the result that the entire ports system is bogged down in the inertia of government funding and planning policies. There is critical need for more open private sector investment in competitive services in the ports free of the restraints of parastatal corporate objectives. Planning and management structures must be changed to reflect best international practices.

6.6.7 Pipeline Planning

In the pipeline sector delayed investment and the inertia caused by government control of the operations company has resulted in under supply of capacity , thereby forcing industry to use road and rail transport to move approximately 7 million tonnes of fuel per year from the coast to inland destinations.

6.6.8 Road Freight Regulation

The road freight sector is in need of improved regulation to ensure quality and reduce the externalities that are currently on the increase.

6.6.9 Air Cargo

The air cargo freight sector is rather small by comparison with other freight sectors and has the advantage of the services of private sector international airlines as the carriers of import and export air cargo. Internal cargo movements from all over South Africa and neighbouring states are nearly all by road haulage to OR Tambo airport. Small quantities of local import-export freight are moved through Cape Town.

6.7 CONCLUSIONS PHASE 2 AND RECOMMENDATIONS FOR PHASE 3

The following table provides a summary of current issues, a problem definition and likely solutions in all modes of freight.

Freight Transport Issues	Problem Definition	Likely Solutions
1. Freight transport in South Africa is inefficient.	Transport Policy has not been based on sound Transport Economic Criteria	Revision and integration of criteria for Freight Transport Policy in all modes
2. Transport system dominated by state monopolies.	Ineffective government regulatory, planning and institutional structures	Re-organisation of DOT-DPE- Transnet Government Agencies and provincial departments
3. Uncompetitive and un-commercial operations.	Lack of competition to the monopoly service permits monopoly pricing and poor service	Separation of operations and infrastructure management and introduction of competition
4. Excessive manpower costs.	Lack of competitive pressure permits inefficiency and salary inflation	Introduce competitive management
5. Failure of funding mechanism leads to obsolescent and inefficiency.	Past limitation of supply of transport to availability of government funds	Promotion of private sector fixed investment in all transport modes
6. Management failure leads to lack of stewardship of assets.	Lack of experience and management ability and motivation	Re-evaluation of job criteria and key result areas followed by training and selective appointments
7. Lack of accountability leads to complacence and very poor customer relations.	Centralised management has diluted line management responsibility for results and led to neglect of customer interests	Introduction of competition, customer focus and job losses as incentives
8. Rates and tariffs do not relate to commercial practice.	Monopoly allows rates to be inflated to match business size and costs, not customer based competitive rates	Competition in all operations
9. Monopoly status implies captive customers.	Lack of competition means that rail-captive commodities have no alternative [except road haulage]	Separate the infrastructure management from operations and allow competitors onto the rails, pipelines and ports
10. Excessive costs and low efficiencies inhibit industrial output.	Private sector investors are deterred from investment and business growth	Create competitive model for national transport system.

Table 52: Summary of current issues

Freight Transport Issues	Problem Definition	Likely Solutions
11. Institutional structure and monopoly control inhibits private sector investments in industry.	Monopoly control, lack of commitment and excess cost deters private sector fixed investment in rail-dependent industries	Disaggregate the monopolies and introduce competitive operations.
12. Situation is aggravating national uncompetitiveness in international markets.	Government inertia has caused SA to miss the greatest commodity boom of all time	Restructure governments involvement in transport and redefine policy to promote growth
13. Government ownership of transport operations thwarts government policy intentions.	The split responsibilities between DPE and DOT and other departments means that Transnet is nor responsible for policy implementation and DOT is ineffective	Redefine key policy issues into practicable and implementable goals and budget them for implementation
14. Lack of funding and management leads to withdrawal of services.	Government has created the environment where Transnet only does what they have funds and motivation for	Disaggregate Transnet and redefine objectives and responsibilities of the entities
15. Unavoidable result is total dependence of private sector road transport.	Government has failed to supply service so industry has developed road transport to avoid going out of business.	Promote private sector investment in competitive rail services
16. Medium term prospects for fossil fuels makes road transport highly vulnerable.	Past policy directions have created the dependence on diesel ; future problems are now imminent	Critical evaluation of the practicable options and available funding sources to develop alternatives to road freight
17. Overall failure of rail system makes it unlikely that electrified railways can be seriously considered as future alternative transport option[although this is vital].	The deliberate historical withdrawal from problematic , customer intensive services has left Transnet with very little capability in the realm of integrated logistics solutions	Extensive re-evaluation of options for creating an environment to promote competitive road and railway logistics entities

Issues	Problem Definition	Likely Solutions
Ports Issues		
18. Lack of planning and funding lead to obsolescence and inefficiency.	Government control of operations and funding	Restructuring ports authorities into single port locally based statutory Bodies
19. Lack of management accountability adds to inefficiency.	Redefine objectives of Port Authorities; terminal Operators and Economic Regulator	
20. TNPA as landlord and TPT as operator exercise monopoly inhibition on efficient operations.	Corporate interests	Restructure
21. TNPA costs make SA Ports uncompetitive.	Ports revenue is major factor in corporate profitability	Restructuring and competition
22. Lack of clear planning direction causes indecision and sub optimal decisions.	Corporate objectives supersede national demand for port service	Create cohesive port management authority including local and provincial commercial interests
23. TNPA planning fails to recognise private sector involvement and capitalisation.	Corporate focus	As above
24. Planning does not recognise the logical logistical factors.	Corporate focus on internal "model"	Restructure as above
a. Durban is closest port to Gauteng. b. Durban has highly developed logistical support facilities outside of the port. c. Durban has the largest container facility in Africa. d. Durban development requires extensive reorganisation of landside transport and logistics spatial arrangements. e. Illogical planning in Durban – deepen		

harbour mouth with no parallel improvement of berth draft. f. Interrogation of EIA needed to compare with economic impact. g. Redevelopment of old airport as logistics area. h. Need direct freeway route to Port.		
25. Attempts at relocating containers to Ngqura are illogical.	Disregard for realities of the container trade and shipping practise	Professional transport economic and industrial re-evaluation and re-planning the role of Ngqura
a. Ngqura 900km from Johannesburg. b. No direct connection. c. Ngqura unsatisfactory road connection. d. Ngqura has no hinterland. e. Ngqura has no private sector logistical facilities. f. Currently no adequate supporting infrastructure g. No current containerships are unable to enter Durban once the harbour entrance is 16 metres.		

Issues	Problem Definition	Likely Solutions
Road Issues		
26. Failure to implement operator registration hampering control.	Diversion form sound regulatory principles in the design of the operator permit system	Redesign and implement revised Operator Registration system and Criteria
27. Increasing road transport pricing will impact on economic growth.	Reallocation of road taxation to social objectives has allowed roads to deteriorate country-wide	Revision of road funding principles
28. Inadequate funding likely to continue due to fiscal restraints.	Uncoordinated transport planning	Re-development of rail for general cargo by private operators
29. Increasing road transport – the results of railway inefficiency.	Monopoly parastatal structures and corporate objectives	As above
30. Road re-planning tied up with rail restructuring.	Split between DPE and DOT and failure to retain competence and authority in transport planning departments	Restructure “Transport” in government
31. Liquid fuel shortage in medium term is a serious threat.	Dependence for food production and transport is seriously threatening	Redevelop private railways
32. Urgent need for planned alternative action.	Government inertia over policy is prolonging the period before any recovery action can begin	Create capability and structures to revise policies and regulatory framework
33. Economic impact of vehicle size and location of distribution centres.	Increasing the size of vehicles provides economies for long-haul cargoes, but promotes use of road haulage for distribution	Re-evaluate vehicle dimensions and possible route standards
34. Urgent need for planned alternative action.	Government inertia over policy is prolonging the period before any recovery action can begin	Create capability and structures to revise policies and regulatory framework
35. Economic impact of vehicle size and location of distribution centres.	Increasing the size of vehicles provides economies for long-haul cargoes, but promotes use of road haulage for distribution	Re-evaluate vehicle dimensions and possible route standards
36. Current capacity constraints will have economic consequences for interior.	Delays in planning , funding, authorisation	More road and rail up until 2012

	and now in the construction process	
37. Ineffective planning process will impact on the economy.	Delays and inertia may cause diesel shortage in interior in 2010-may affect agric production	More road transport
38. Monopoly profits by parastatal increase overall fuel costs to total economy	Independent review of the rates and profits from pipeline operations by a Pipeline regulator not NERSA	Restructure pipeline controls and agencies
39. Indecision regarding refining and importing.	Government as player and regulator in fuel industry confuses economic perspective on supply and demand	Fully privatise and regulate effectively
40. Illogical location of refining capacity.	Issues of crude imports, refinery split , market for petrol, diesel imports must define refinery economics and locations	Redefinition of role of government in fuel planning before major players reduce commitment due to confusion
41. Revision of Sasol mandate to produce liquid fuels.	Market realities dictate Sasol objectives	Government need to offer inducements to promote increased local fuel production
42. Private sector pipelines development from Maputo.	Positive development by private sector –first venture ;	Many other operators available in the market, should be encouraged
43. Relocation of Island View bulk liquids storage area and integration with new pipeline and development of back of port storage areas.	Lack of cohesive planning has current private and Transnet developments in Island View failing to integrate overall logistics of liquid bulk installations [especially petroleum] with necessary broader scale development of storage tank farms and pipelines	Urgent creation of competent overall planning team to review and coordinate integrated development of logistics facilities in all modes around the port and South Durban Basin.

7. INFRASTRUCTURE ANALYSIS

7.1 INTRODUCTION

Status quo data and information relating to roads, rail, airports, sea ports and pipeline networks and facilities of national importance was documented in the Phase 1 report. The purpose of this section is to describe how this data and information was analysed and used to determine service capacity bottlenecks and to formulate remedial alternative strategies which will be subjected to detail investigation in Phase 3. The implications of existing planning and proposed projects by the relative authorities in the Province will also be discussed in this section.

7.2 SUMMARY OF PROBLEMS AND ISSUES FOR ANALYSIS FROM PHASE 1

The main problems and issues relating to transport infrastructure which were identified in Phase 1 are as follows:

7.2.1 Road Network

- road capacity;
- road condition; and
- overloading of heavy vehicles.

These problems and issues are addressed in the the following sub-sections of the report.

7.3 ROAD NETWORK

7.3.1 Summary of Road Network

The total road network in the Province consists of approximately 42,123 km of roads. These roads are classified as:

- Primary distributor;,
- Regional distributor;,
- District distributor;,
- District collector; and,
- Access roads

The below table shows the distribution of these roads in the Province by class.

Table 53: RISFSA Classification : KZN National and Provincial Road Networks

Cl	Description	Conc	B/Top	Gravel	Earth	New Links	Mun. Links	Total
1	Primary Distributor	283	1 648	0	0	4	0	1 935
2	Regional Distributor	0	3 661	1 191	7	39	118	5 016
3	District	4	3 007	7 497	152	106	218	10 984

	Distributor							
4	District Collector	0	370	8 093	105	0	47	8 615
5	Access Roads	0	113	3 335	12 114	0	11	15 573
	TOTAL	**287**	**8 799**	**20 116**	**12 378**	**149**	**394**	**42 123**

The National Roads (with either blacktop or concrete surfaces) are categorised as the primary distributor roads in the Province, in accordance with the RISFSA classification system and consists of the following:

- N2 from Brook's Nek through to the Mpumalanga Border;
- N3 from Durban to Van Reenen;
- N11 from N3 (near Ladysmith) to Volksrust;
- R61 from Port Shepstone to Umtamvuna River;
- R22 from N2 (near Hluhluwe) to Mozambique Border at Farazelo; and
- P720 from Pongola to Golela.

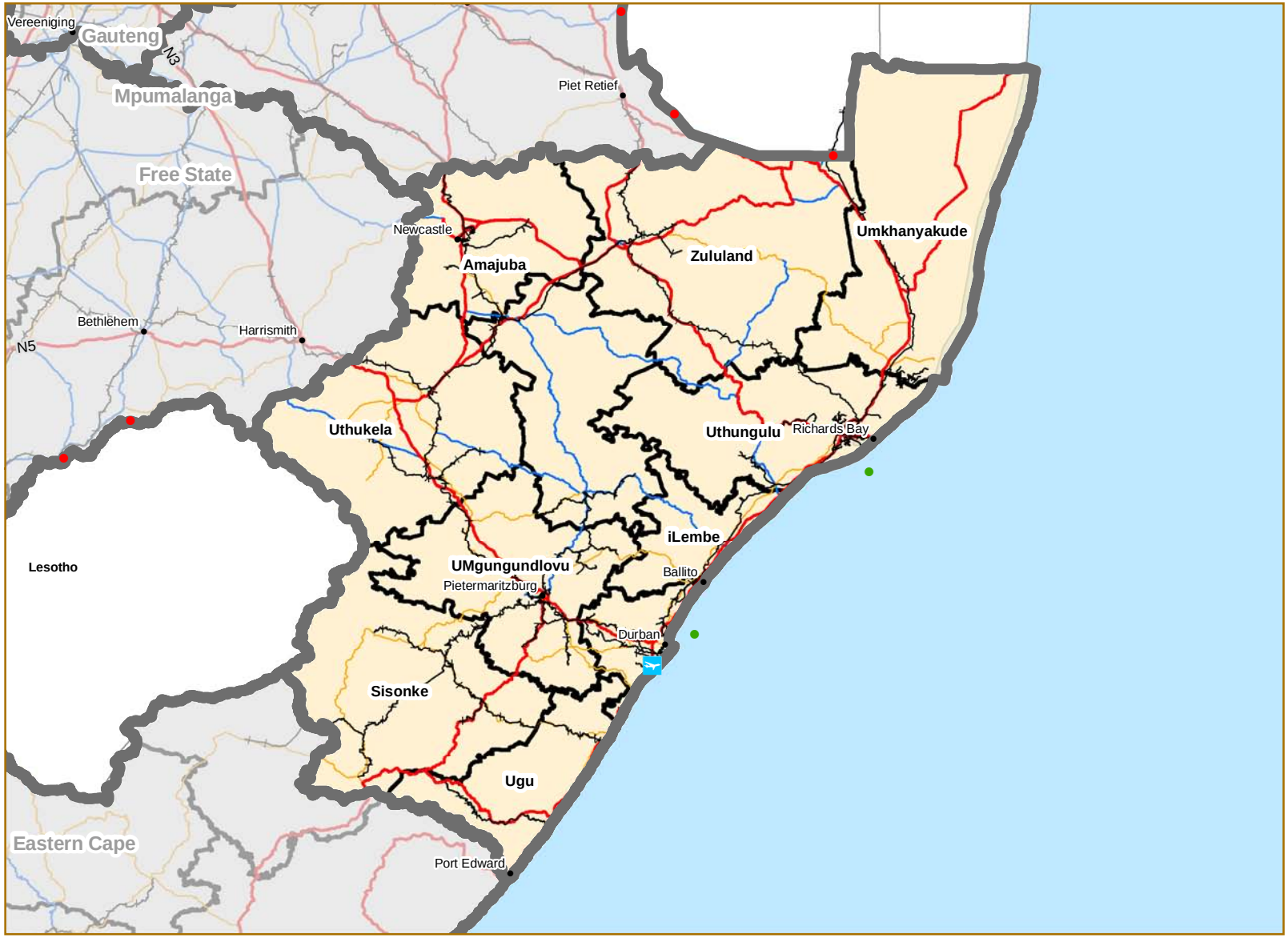
Most of the Regional Distributors are currently Provincial Main Roads, but some District and Local Roads are included where they form part of an identified Regional Distributor link. Certain Municipal Roads have also been included on a similar basis.

In a few instances there are missing links in the Regional Distributor network that are mostly earth tracks currently being utilised by traffic. These have been identified for future upgrading and incorporation into the Provincial Road network.

Map 7.3A on the following page shows the road network in the Province

The highest traffic volumes (AADT>80,000) occur on the the roads and streets within the Ethekwini metropolitan area. Traffic volumes of between 40,000 and 80,000 vpd are found on the N3 between Ethekwini and Pietermaritzburg and also on the N2 north of Ethekwini up to Phoenix.

Kwazulu Natal Province: ROAD NETWORK



ROAD

ROAD NETWORK

- SANRAL Road Network
- Main Road Network
- Secondary Road Network

BASEMAP LEGEND:

- SANRAL Road Network
- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

0-15% | 25% | 50% | 75% | 80% | 90% | 100%

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MAP 7.3A Road Network

NATIONAL TRANSPORT MASTERPLAN 2050

On the N3 north of Pietermaritzburg up to Free Sate border the traffic varies between 5,000 and 40,000.vpd. On the N2 north of Phoenix up to St Lucia and on the N11 from Ladysmith to Newcastle traffic volumes also vary between 5,000 and 40,000.vpd.

The rest of the network carries less tha 5000 vpd.

The highest number of heavy vehicles on the N2 is found at the EB Cloete interchange, namely 6,000 per day in both directions. From the EB Cloete Interchange the HVs per day decrease sharply to 2 109 at Umdloti. Between Umdloti and Salt Rock the number of HVs per day remains almost constant and then it decreases to 770 at Mkuze. This is basically the same as the 762 HVs per day as at the start of the N2 at Kokstad.
The directional split of the HVs on the N1 is 50/50for all practical purposes.

On the N3 the number of HVs per day increases from approximately 5 000 at the EB Cloete Interchange to ± 6 600 HVs/day at Paradise Valley. At Westmead it reaches a low of approximately 4 500 HVs/day and then increases again to approximately 6 800 HVs per day at Market Street and Greytown Road Interchanges. From there onwards it gradually decreases to 3 500 HVs per day at Van Reenen.

The directional split of the HVs on the N2 is 50/50 for all practical purposes.

Similar to the situation on the N2 and N3, the directional split of the HVs on the N11 is 50/50 for all practical purposes. The highest number of heavy vehicles per day, namely 960, is found between Elandslaagte and Ballengeich. The lowest HVs per day are found at Ladysmith (695 HVs per day).

When alternative strategies to address the capacity bottlenecks are developed during Phase 3 future traffic volumes as projected by the Traffic Model will be used. Projected traffic volumes on some of the roads of national importance in KwaZulu Natal are shown on Map 7.3B on the following page.

7.3.2 Service Capacity Bottlenecks

From the *status quo* traffic data collected during Phase 1 it was obvious that the high traffic volumes in and around Cape Town were causing serious bottlenecks on the road infrastructure, particularly during peak periods. The methods for analysing road capacity and level of service (LOS) as presented in the Highway Capacity Manual 2000 (HCM) were used to determine the road capacity and to project when a section of road is likely to reach its design capacity. These methods and the specified standard conditions and/or the adjustments to account for prevailing conditions that do not match the specifications are described in the following sub-section.

7.3.2.1 Road Capacity and Constraints

a. Methodology Selection Process

The determination of service capacity and bottlenecks on a provincial and national level presented significant challenges in terms of:

- data input requirements and
- the selection of a suitable methodology to process and model the data to produce capacity and level of service results.

Refer to **Map 7.3B.**

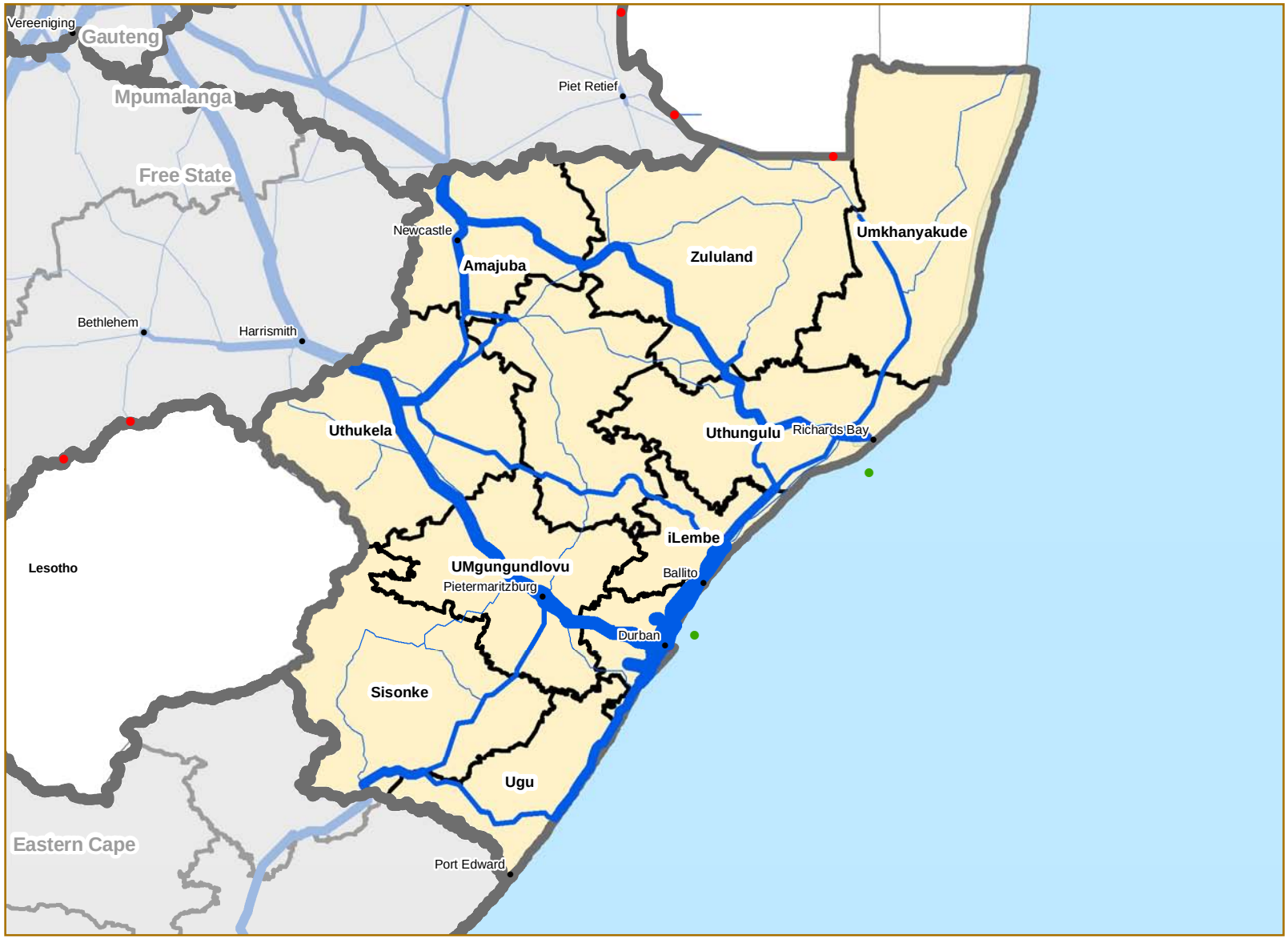
Currently, the development of a comprehensive transportation model is in an advanced stage (as part of this project). This model takes into account the numerous variables that impacts on future transportation behaviour on the county's major transport ways and will make strategic estimates on the demand for travel and transportation across a number of modalities. Socio-economic projections, future infrastructure plans and existing demand estimates are incorporated to estimate future demand.

There is however a need to determine the overall status of road-based transportation on the country's roads based on existing traffic demand and existing infrastructure to accommodate this demand. Information to develop a "snapshot" of the existing operating conditions on all of the country's major roadways was collated and formed the foundation of the development of a strategy to analyse and represent key performance indicators on a country-wide basis.

The strategic nature of the analysis had to be taken into account as well as realistic time-frames in which meaningful results could be produced. The methodology contained in the Highway Capacity Manual (HCM) of 2000 (published by the Transportation Research Board in Washing D.C.) was selected as the most appropriate methodology to adopt for this purpose. The specific methodologies prescribed for the analysis two-lane and multi-lane freeways are of relevance (Chapters 20 and 21 of the HCM).

The definition of a two-lane freeway is a single-roadway providing for two-way traffic. Traffic travelling in a particular direction, wishing to overtake slower moving vehicles, therefore has to make use of overtaking opportunities allowed by the absence of barrier (no-overtaking) lines (informed by the road's horizontal and vertical alignment) and gaps in the stream of opposing, oncoming traffic. Generally in the South African roads environment, rural roads tend to fall under this description.

Kwazulu Natal Province: MODELLED TRAFFIC VOLUMES ON ROAD NETWORK



ROAD

MODELLED VOLUMES

- 0 - 1000
- 1 001 - 2 500
- 2 501 - 50 00
- 5 001 - 25 000
- 25 001 - 100 000

BASEMAP LEGEND:

- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

0-15% 25% 50% 75% 80% 90% 100%

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MAP 7.3B Modelled Traffic Volumes on Road Network

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Multi-lane freeways on the other hand, generally tend to occur in the proximity of metropolitan areas. A multi-lane freeway provides for multiple lanes of travel per direction. This type of roadways generally is divided by a median barrier in the middle of the road although this is not a requirement for this particular classification. The major difference however lies in the traffic's ability to overtake slower moving vehicles without having to contend with oncoming traffic flowing in the opposing direction.

b. Measures of Effectiveness

The key performance indicator that is used to evaluate the status of vehicular operations on a roadway is expressed in terms of Level of Service (LOS). LOS is indicated by using the letters of the alphabet ("A" through to "F"), "A" representing the best operating conditions and "F" the worst. When new road infrastructure is designed, most public sector entities tend to require a design LOS of at least "C" in the design year – in other words, if a facility is designed to last for a period of seven years, in year seven the facility should preferably still operate at a LOS of "C". The reality within most countries, however, is at a level that is usually exceedingly lower than this ideal situation, especially in and around urban environments.

The LOS for different kinds of analysis is determined using different approaches as recommend by the HCM. For two-lane and multi-lane freeways the approaches to measure LOS also differs but provides the practitioner with results that are comparable on from one type of facility to the next.

- Two-lane facilities
  LOS is determined in terms of both percent time-spent-following and average travel speed. These two factors provide a representative measure of the efficiency of mobility. The worst of the two measures is taken as representative of the facility.
- Multi-lane facilities
  LOS is determined as a relationship between the average passenger-car speed and the traffic density. It provides an indication of the freedom of a vehicle to manoeuvre within the traffic stream as well as the vehicle's proximity to other vehicles.

c. Determining LOS

- Two-lane facilities
  The LOS is determined using the type of terrain traversed by the roadway under investigation (level, rolling or mountainous), the geometric design of the roadway (width, lateral clearances, etc.) and the prevailing traffic conditions. The methodology requires that the specific roadway segments selected are fairly homogenous with reference to the required input parameters for a particular section.

The process requires that the free-flow speed first be determined:

$$FFS = S_{FM} + 0.0125\frac{V_f}{f_{HV}}$$

Where:

FFS = estimated free-flow speed (km/h)

S_{FM} = mean speed of traffic measured in the field (km/h)

V_f = observed flow rate for the period when filed data were obtained (veh/h)

f_{HV} = heavy-vehicle adjustment factor

Across the network that were analysed, there were not sufficient data to provide values for S_{FM}. Even though selected counting stations for some of the roads do measure speeds, these speed measurements are not deemed sufficient as they represent a speed measurement at a particular point and not something that is representative of a section of road. Furthermore, the data-collection points that do have speed information are limited across the network.

For this reason, the free-flow speed had to be estimated based on the following formula:

$$FFS = BFFS - f_{LS} - f_A$$

Where:

FFS = estimated free-flow speed (km/h)

BFFS = base FFS (km/h) – the design speed and posted speed-limit were considered to estimate BFFS (recommended by HCM).

f_{LS} = adjustment for lane width and shoulder width

f_A = adjustment for the number of access points on the road (per km)

For the purpose of this analysis, a directional analysis was undertaken – this is the more complex methodology of the two alternatives suggested by the HCM and deemed more appropriate for the purpose it is applied for here, namely analysing the 30th highest hourly flow (design hour) for each facility (the design flow tends to be directional rendering the two-way methodology, which is less complex less desirable for this application).

The next step is to determine the demand flow-rate for a particular facility in the direction for which the analysis is undertaken:

$$v_d = \frac{V}{PHF * f_G * f_{HV}}$$

Where:

v_d = passenger-car equivalent flow rate for the peak 15-min period in the direction analysed.

V = demand volume for the full peak hour in the direction analysed (veh/h)

f_G = grade adjustment factor

f_{HV} = heavy-vehicle adjustment factor

Similarly, the demand flow-rate in the opposing direction is calculated:

$$v_o = \frac{V_o}{PHF * f_G * f_{HV}}$$

Where:

v_o = passenger-car equivalent flow rate for the peak 15-min period in the opposing direction.

V_o = demand volume for the full peak hour in the opposing direction (veh/h)

The heavy vehicle adjustment factor is calculated as follow:

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)}$$

Where:

P_T = proportion of trucks in the traffic stream

P_R = proportion of recreational vehicles in the traffic stream

E_T = passenger-car equivalent for trucks

E_R = passenger-car equivalent for recreational vehicles

Further refinement to the above formulae was made if the specific value for road gradient was known and if a reasonable assumption regarding the number of heavy vehicles that are likely to travel at crawl speeds on down hills could be made from the available data. The heavy vehicle adjustment factor could then, more accurately be calculated as follows:

$$f_{HV} = \frac{1}{1 + P_{TC} * P_T(E_{TC} - 1) + (1 - P_{TC})P_T(E_T - 1) + P_R(E_R - 1)}$$

Where:

P_{TC} = proportion of trucks in the traffic stream using crawl speed on specific downgrade

E_{TC} = passenger-car equivalent for trucks using crawl speeds (value is dependant on the actual flow-rate and the difference between free-flow speed (FFS) and the estimated truck crawling speed.

Values for v_d and v_o are calculated iteratively as the values of f_G, E_T and E_V are stratified in terms of flow rates. However, the flow rate is the value that is calculated and is therefore an unknown at the stage that it is required. An initial value for flow-rate is estimated by dividing the Peak Hour Factor (PHF) through the hourly flow rate. If the calculated values for v_d and v_o are less than the chosen

stratified flow value, a higher stratification of flow rate parameters should be used and the calculation be repeated until an acceptable demand flow is derived.

The information required to calculate the Average Travel Speed (ATS_d) is now available. The ATS_d is estimated using the free flow speed (FFS), the demand flow rate (v_d) and the opposing demand flow rate (v_o) and the percentage no passing zones in the direction being analysed (f_{np}):

$$ATS_d = FFS_d - 0.0125(v_d + v_o) - f_{np}$$

The LOS can be derived directly from value of ATS_d.

The second measure of LOS is derived by determining the Percent Time-Spent-Following ($PTSF_d$). This value is derived from the demand flow rate (v_d), the opposing demand flow rate (v_o), the percentage no passing zones and the directional distribution of traffic:

$$PTSF_d = BPTSF_d + f_{d/np}\left(\frac{v_d}{v_d + v_o}\right)$$

Where:

$f_{d/np}$ = adjustment factor for combined effect of directional distribution and percentage of no-passing zones.

and

$$BPTSF_d = 100\left[1 - \exp\left(av_d^b\right)\right]$$

The values for a and b is determined as coefficients from the flow rate in the opposing direction.

The LOS can be derived directly from value of $PTSF_d$.

- Multi-lane facilities

  The LOS for multi-lane facilities is determined using the flow rate of vehicles, the average passenger car speed and the density of vehicles in the traffic stream. This provides an indication of the freedom of vehicles to move around in the traffic stream and the proximity of vehicles in the stream relative to each other.

  As with the two-lane analysis, the free flow speed (FFS) is determined first:

  $$FFS = BFFS - f_{lw} - f_{lc} - f_M - f_A$$

  Where:

  f_{lw} = adjustment factor for lane width (narrower lanes cause a reduction in FFS)

  f_{lc} = adjustment factor for lateral clearance (lateral clearance to fixed obstructions causes a reduction in FFS)

  f_M = adjustment factor for median type (an element of friction is introduced by oncoming traffic if no median is present, the FFS therefore reduces somewhat)

  f_A = adjustment factor for access points (with more accesses on the roadway, more friction is introduced and the FFS is reduced)

BFFS = base free flow speed (km/h) – the design speed and posted speed-limit were considered to estimate BFFS (recommended by HCM).

The next step is to determine the flow rate:

$$v_p = \frac{V}{PHF * N * f_{HV} * f_p}$$

Where:

v_p = 15-min passenger-car equivalent flow rate (pc/h/ln)

V = hourly volume (veh/km)

PHF = peak-hour factor

$$= \frac{DesignHourFlow}{4 * Highest\_15MinFlow\_InDesignHourFlow}$$

N = number of lanes

f_{HV} = heavy vehicle adjustment factor

f_p = driver population factor (ranges between 1 for metropolitan traffic and 0.85 for holiday traffic)

The heavy vehicle adjustment factor is calculated as follow:

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)}$$

Where:

P_T = proportion of trucks in the traffic stream

P_R = proportion of recreational vehicles in the traffic stream

E_T = passenger-car equivalent for trucks

E_R = passenger-car equivalent for recreational vehicles

The next step is to determine the vehicular density (D):

$$D = \frac{v_p}{S}$$

Where

v_p = flow rate (passenger cars/hr/lane)

S = average passenger car travel speed (km/h)

The LOS can be derived directly from value of D.

d. Data

The data that was as input into the modelling process in order to obtain a set of network assessment results were obtained from existing databases that were made

available by the South African National Roads agency and the respective provinces and metros. The data included:

- a range of traffic counts that were collated over time by means of electronic counting stations (some permanent and some temporary) – this assisted in the determination of LOS for each road and providing the percentage heavy vehicles as well as the directional split;
- road cross section data (number of lanes, width of lanes, width of road shoulders and the presence of a median) – this assisted in the estimation of free flow speeds;
- geographical location of roads (based on a GIS or Geographical Information System) – this assisted with the stratification of results per province;
- the classification of the roads (National, Provincial or Metropolitan) – this assisted in making informed assumptions about the number of recreational vehicles and daily commuters within the respective traffic streams;
- the topography traversed by the road (rolling, flat or mountainous) derived from the GIS contour map – this assisted in estimating the effects on flow and capacity caused by heavy vehicles and recreational vehicles and provided input into the estimation of percentage no-passing zones per roadway;
- the percentage heavy vehicles and the percentage recreation vehicles (traffic counts always provide the percentage heavy vehicles directly, however, the percentage recreational vehicles had to be assumed based on the location and function of the road) – this assisted in the determination of actual traffic flow characteristics and capacity;

e. Typical Results

For each homogenous section of road, the following information was calculated:

- The LOS in the base year (selected base year was 2005);
- The LOS in the target year (selected target year was 2025);
- The estimated vehicular flow in the target year at an assumed growth rate in traffic of 3%;
- The estimated vehicular flow at which a threshold/target LOS of “D” will be reached for each roadway segment analysed;
- The year during which the threshold/target LOS will be reached assuming no upgrades and an assumed traffic growth rate of 3%;
- The number of additional lanes required per direction in order to achieve/maintain the threshold/target LOS for each road segment analysed;
- The LOS that will be achieved within the target year assuming that the additional required lanes are provided.

f. Method of calculation

A computer model was utilised to undertake the analysis based on the HCM methodology as described above. The data was prepared for processing making use of various electronic databases and a GIS system. A total of 12,800 individual, homogenous, directional links were identified for the process of analysis. The results were separated for each province and provided as set out in the previous section.

The benefit of following this methodology is that it aligns with international best-practice. It is probably the first time that an analysis of this nature is undertaken on the scale that it was done for this project. It allows for refinement of results on selected roadways by refining the accuracy of input data in order to achieve this. It provides a first-order estimate of the actual operating conditions on all of South Africa's major roadways and allows a quick insight into the scale of upgrading that would be required to maintain a nominal economic growth rate over time, assuming that for at least the next 20 years, that South Africa will remain dependant on road-based transportation as a fundamental part of commuter, recreational and freight transportation.

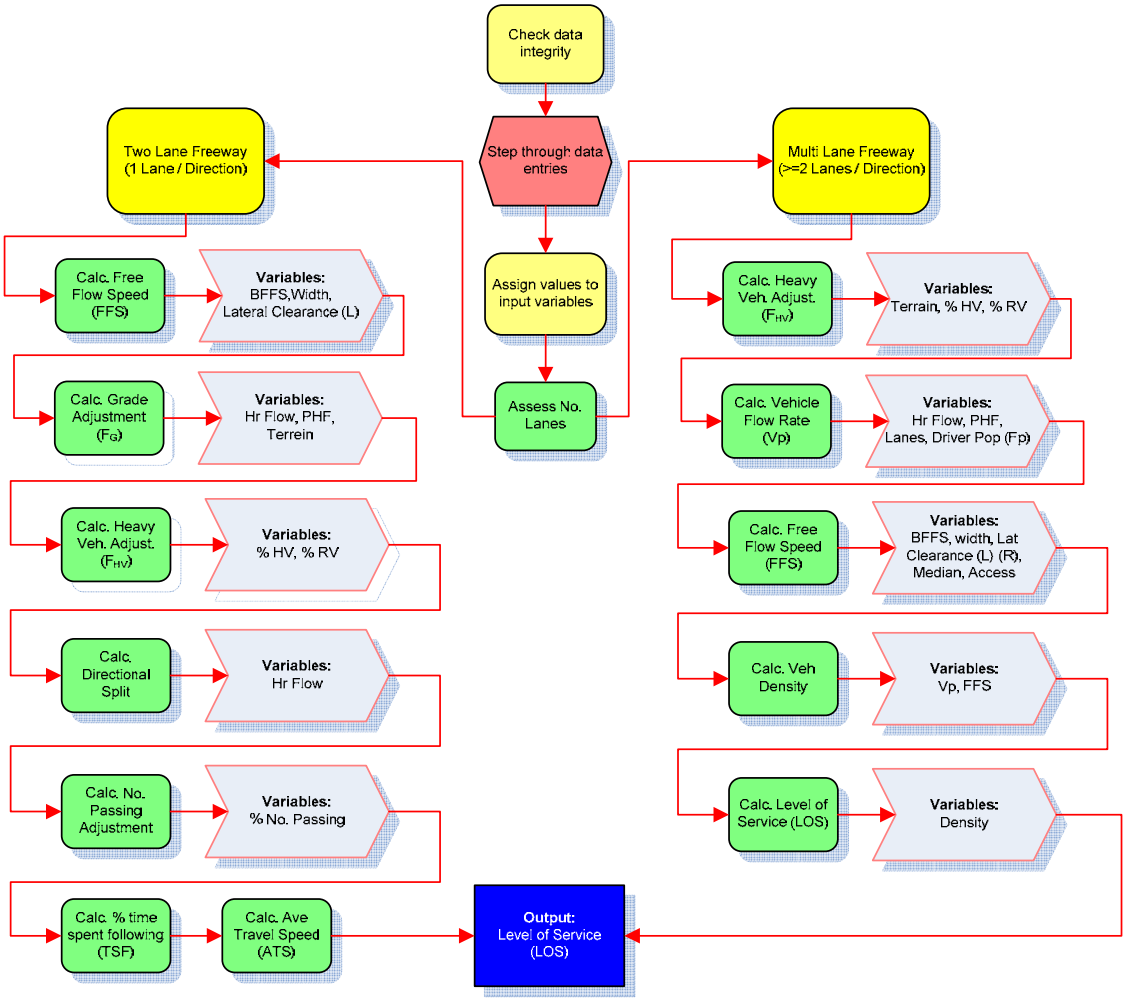


Figure 37: Calculation Process / Procedure

The base year (2005) service levels of the network (consisting of the 13,500 km of roads of national importance) is summarised in **Table 54** below:

Table 54: Base Year (2005) LOS

LOS	Links Counted	% Road Length in LOS	Road Length
A	94	8.2%	794.5 km
B	689	46.9%	4527.1 km
C	171	26.1%	2520.0 km
D	89	13.8%	1331.7 km
E	53	2.6%	259.3 km
F	40	2.0%	200.7 km

The majority of these roads (46.9%) operates at LOS B. In total 81.2 percent of the network operates at LOS C or better. Approximately 18.4 percent of the network (1,792 km) needs to be upgraded in order to bring the service level of the the whole network to LOS C or better.

Map 7.3C shows the current LOS on the KwaZulu Natal road network based on 2005 traffic counts.

Map 7.3D shows the years at which the roads will reach LOS D.

The capacity constraints experienced by the road network can be be summarised as:

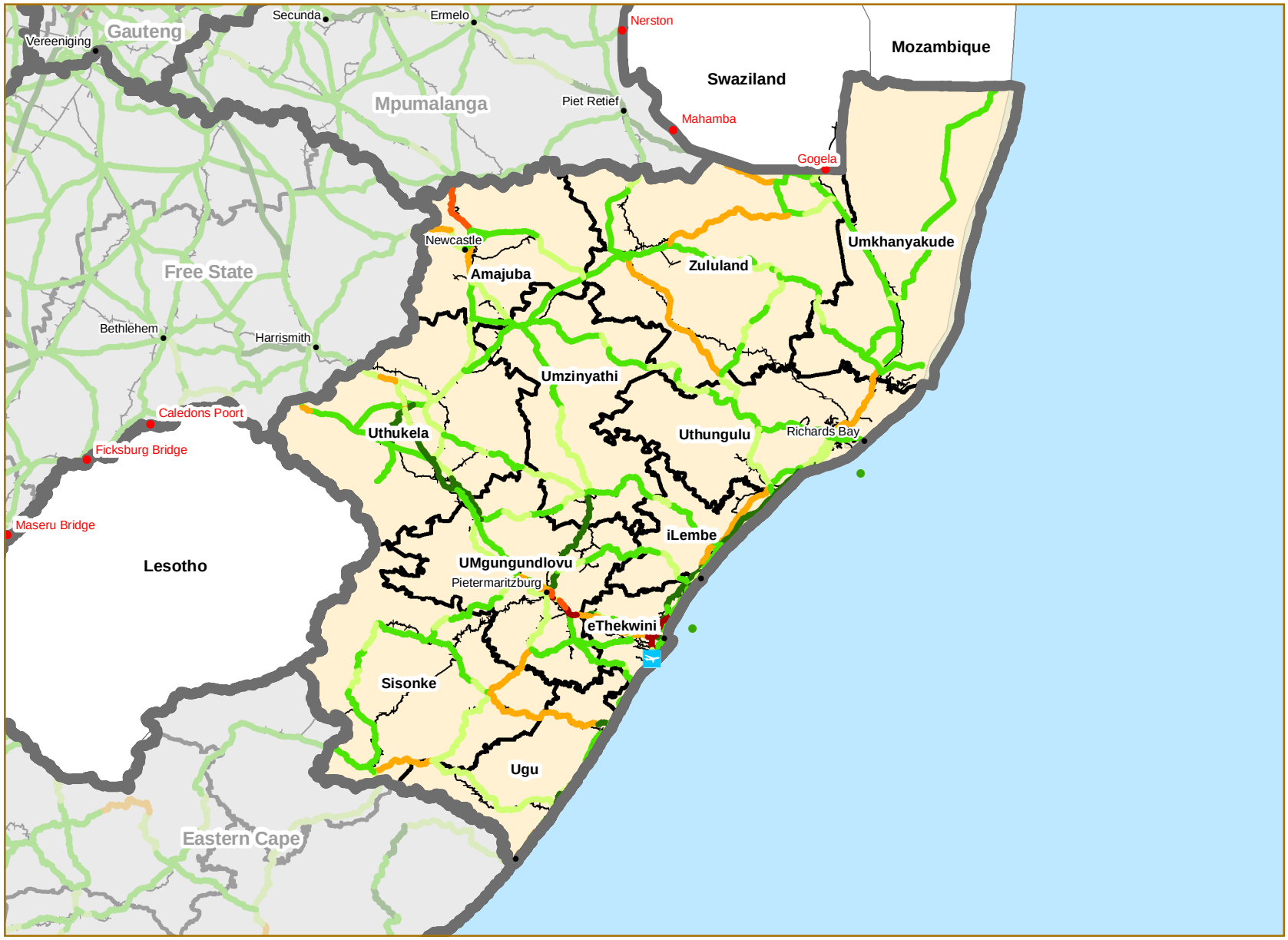
- High vehicle ownership and resulting high usage of private cars;
- Lack of public transport services as an alternative to private cars:
- Insufficient funds to address road capacity bottlenecks timeously; and
- Uncertainty of whom is responsible for which sections of the network of national importance.

These constraints will be addressed as part of the alternative strategies to be investigated during Phase 3.

7.3.2.2 Road Condition and Constraints

The capacity of a road (measured in terms of LOS) is only one of the criteria to determine the functionality of a road. Another important criteria is the condition of the road. A road may have sufficient capacity to operate at (say) LOS A, but if the pavement condition is very poor road users will not regard it as a highly functionable road.

Kwazulu Natal Province: LEVEL OF SERVICE ON ROAD NETWORK (2005)



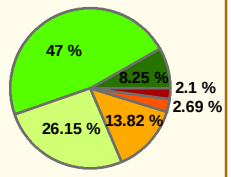
ROAD

LEVEL OF SERVICE (2005)

Level of Service

- A - 8.25 %
- B - 47%
- C - 26.15 %
- D - 13.82 %
- E - 2.69 %
- F - 2.1%

Percentage of LOS



BASEMAP LEGEND:

- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 12.5 25 50 75 100 Kilometers

Map and Data Current Status Completed

0-15% | 25% | 50% | 75% | 80% | 90% | 100%

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MAP 7.3C Level of Service on Road Network (2005)

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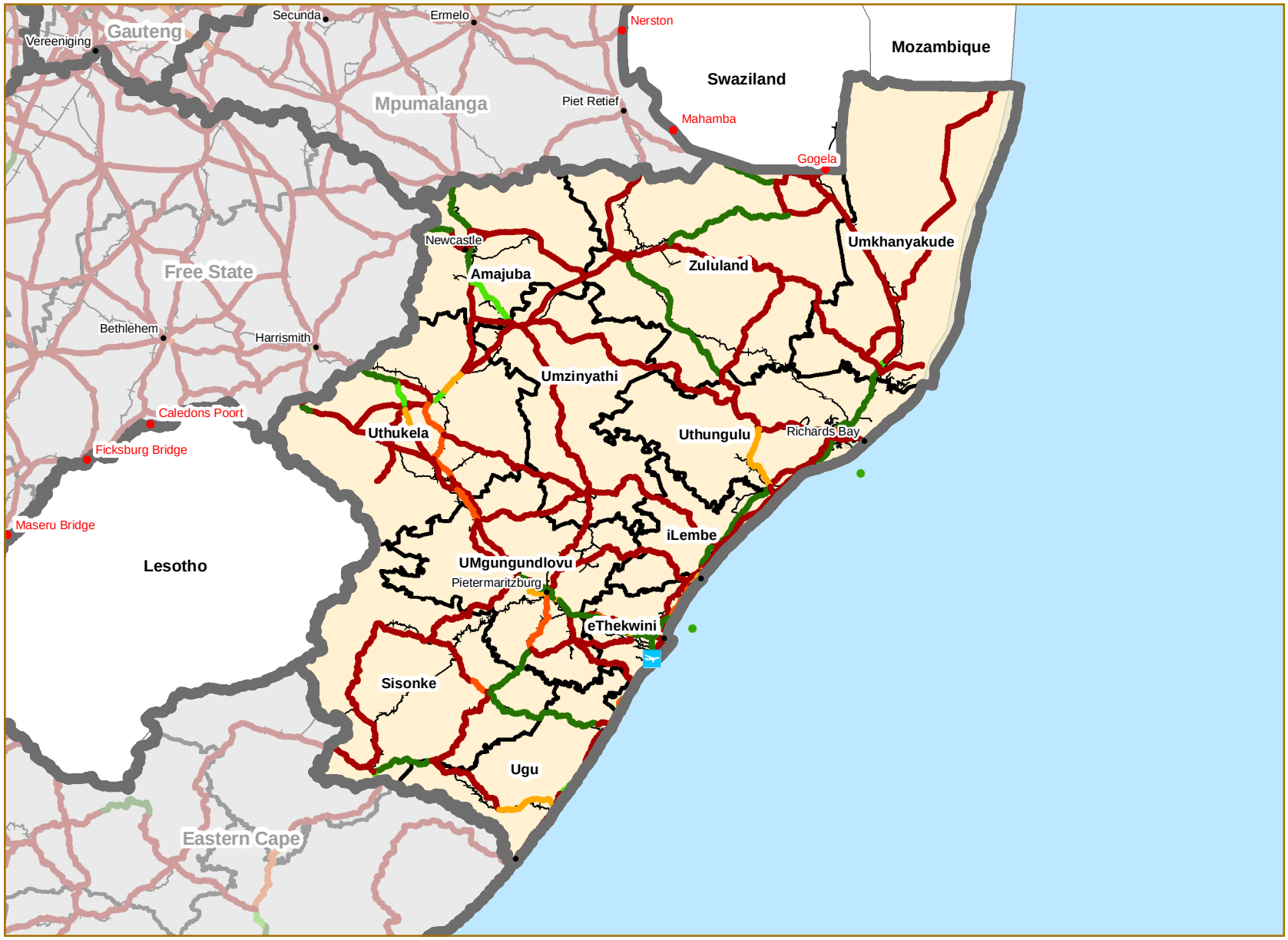
Kwazulu Natal Province: YEAR AT WHICH ROADS WILL REACH LOS D



ROAD

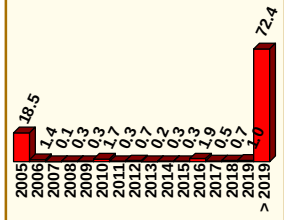
TARGET LOS

Road Target LOS

- 2005 - 2008
- 2008 - 2012
- 2012 - 2016
- 2016 - 2019
- > 2019

Road Network Spare Capacity Lifespan (Target LOS)

%Road at/worse that LOS D



BASEMAP LEGEND:

- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 12.5 25 50 75 100 Kilometers

Map and Data Current Status Completed

0-15% | 25% | 50% | 75% | 80% | 90% | 100%

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MAP 7.3D Year at which Roads will Reach LOS D

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The KZN Department of Transport is responsible for 7 153 km of Provincial blacktop roads. During 2005 visual assessments were undertaken on 5 936 km of these roads and the results are shown in **Table 55** below. The results of these assessments show that 52 percent of the blacktop roads are in a poor or very poor condition.

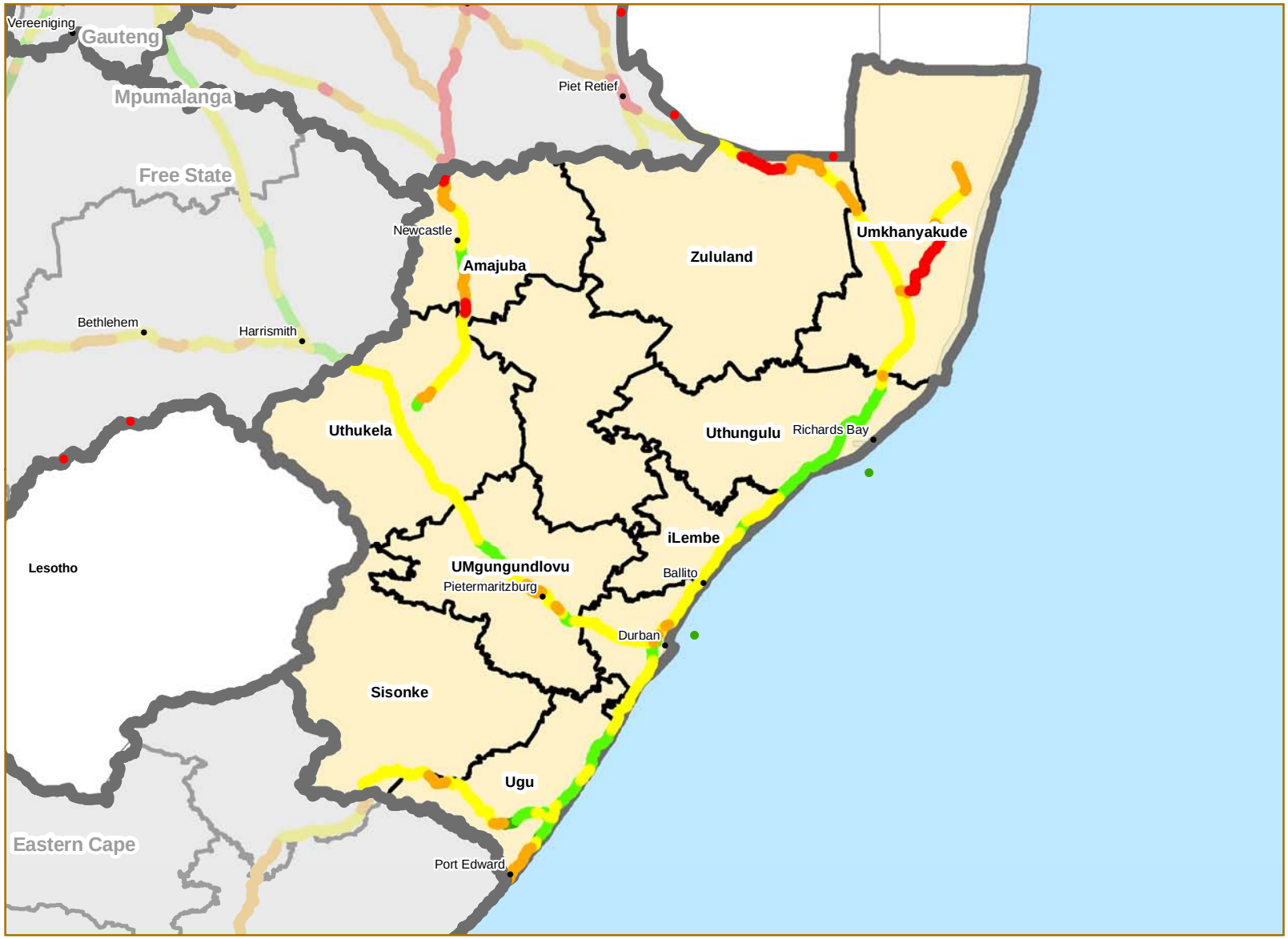
Table 55: Visual Condition Index for Blacktop Provincial Roads

VCI Category	Lengths (Km)	Percentage (%)
Very Poor	1,026	17 %
Poor	2,069	35 %
Fair	1,799	30 %
Good	780	13 %
Very Good	262	5 %
TOTAL	**5,936**	**100 %**

Map 7.3E on the following page shows the road condition in terms of the above VCI categories. A few sections on the N2 south beyond Kokstad and N2 North, the R42 near Volksrust, and the R22 near Swaziland are in a poor or very poor condition, while sections on the N2 south near Kokstad, R33 near Dundee and Vryheid, R42 south of Volksrust, are in a fair condition.

Two of the main constraints which prevent roads from remaining in a good to fair condition over their design life are a lack of funds for maintenance and overloading of heavy vehicles. These constraints will be addressed as part of the alternative strategies to be investigated during Phase 3.

Kwazulu Natal Province: ROAD CONDITION



ROAD

ROAD CONDITION

- Very poor
- Poor
- Fair
- Good
- Very Good

BASEMAP LEGEND:

- SANRAL Road Network
- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

0-15% | 25% | 50% | 75% | 80% | 90% | 100%

February '09

MAP 7.3E Road Condition

NATIONAL TRANSPORT MASTERPLAN 2050

7.3.2.3 Overloading Control Constraints

There are thirteen operational weighbridges in KwaZulu-Natal. Six of them are on the N2 at Empangeni, Groutville, Marburg, Park Rynie, Umhloti and Winkelspruit. On the N3 there are weighbridges at Westmead, Mkondeni and Midway. Two weighbridges are located on th N11 at Ladysmith and Newcastle. On the R33 there is a weighbridge at Greytown and on the R69 at Vryheid.

During 2006, a total of 185,798 vehicles were weighed at the 13 operational provincial weighbridges, of which 146,342 were weighed on the N3 corridor. There has been a continued significant decrease in the extent of overloading on the N3 corridor from approximately 16% to approximately 11%. When compared with 25% estimated for the rest of the country it is an excellent achievement.

Some constraints associated with overload control are:

- Lack of trained staff;
- Escape roads in the urban areas;
- Lack of weighbridges to achieve geographic coverage;
- Inadequate legal support for the overloading enforcement system,
- Possibility of corruption; and
- The profitability of overloading.

These constraints will be addressed as part of the alternative strategies to be investigated during Phase 3.

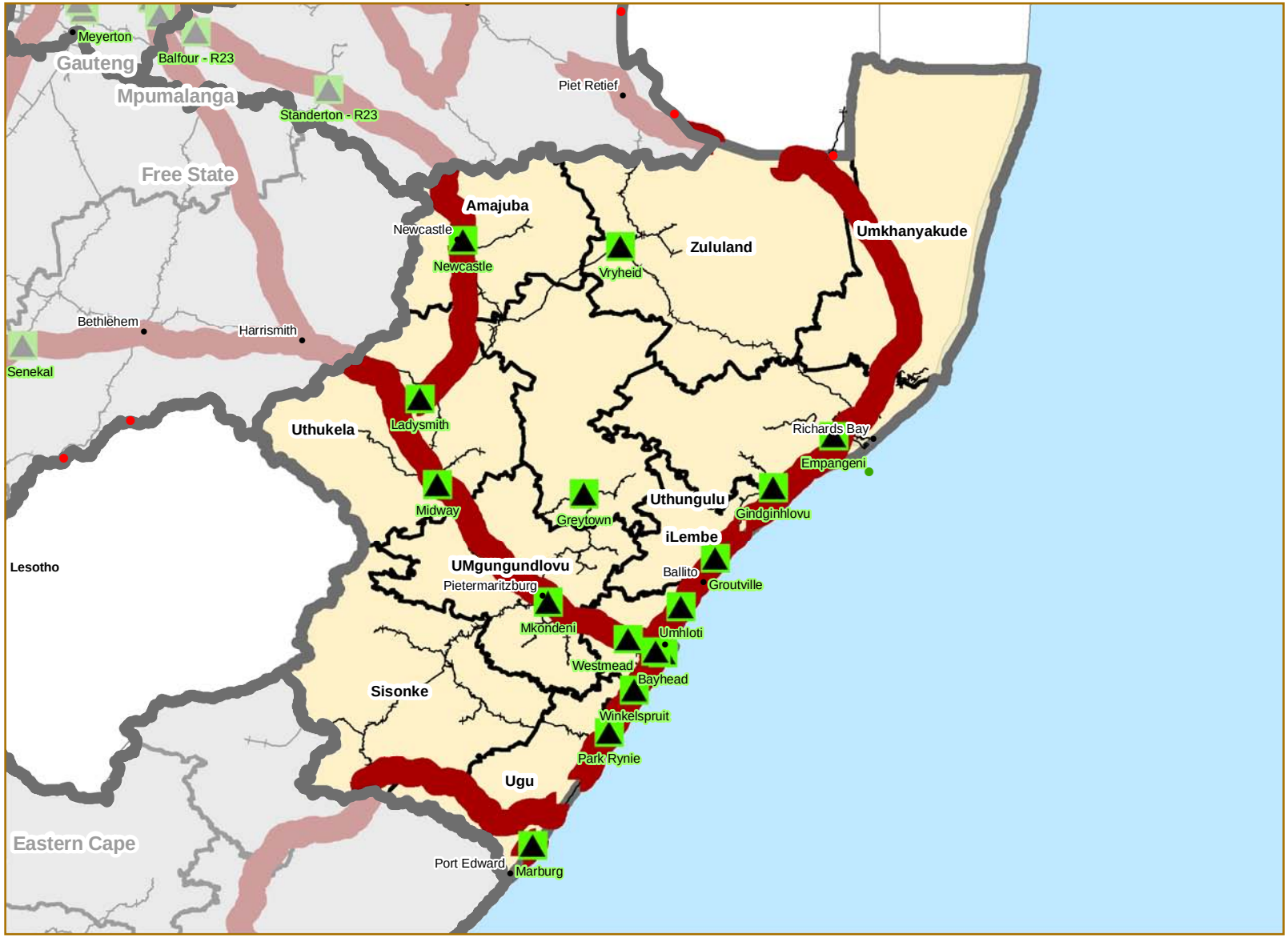
Refer to **Map 7.3 F** and **Map 7.3G** on the following page.

7.3.3 Implications of existing Plans on Phase 3 Forward Plans

The following are current and planned projects on roads of national importance in KZN:

- **Tolling on Sections of the N2 and N3**
  The feasibility of additional tolling along the N2 and N3 national roads is being investigated in order to finance upgrading work and capacity improvements.
- **Traffic Control Centres**
  Due to congestion created by the existing weighbridges at Westmead and Mkondeni, a direct access Traffic Control Centre is being investigated for the N3 between Durban and Pietermaritzburg. A site for a Traffic Control Centre on the N2 near Mtubatuba is also being investigated.
- **N2 Interchanges**
  Several existing interchanges on the N2 within KZN are due to be upgraded and new interchanges constructed to relieve some of the congestion bottlenecks, or improve road safety.

Kwazulu Natal Province: ANALYSIS OF OVERLOADING CONTROL CONSTRAINTS



OVERLOADING CONTROL CONSTRAINTS

WEIGHBRIDGES

- Weighbridges
- Heavy Vehicles (AADT >500)

BASEMAP LEGEND:

- SANRAL Road Network
- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

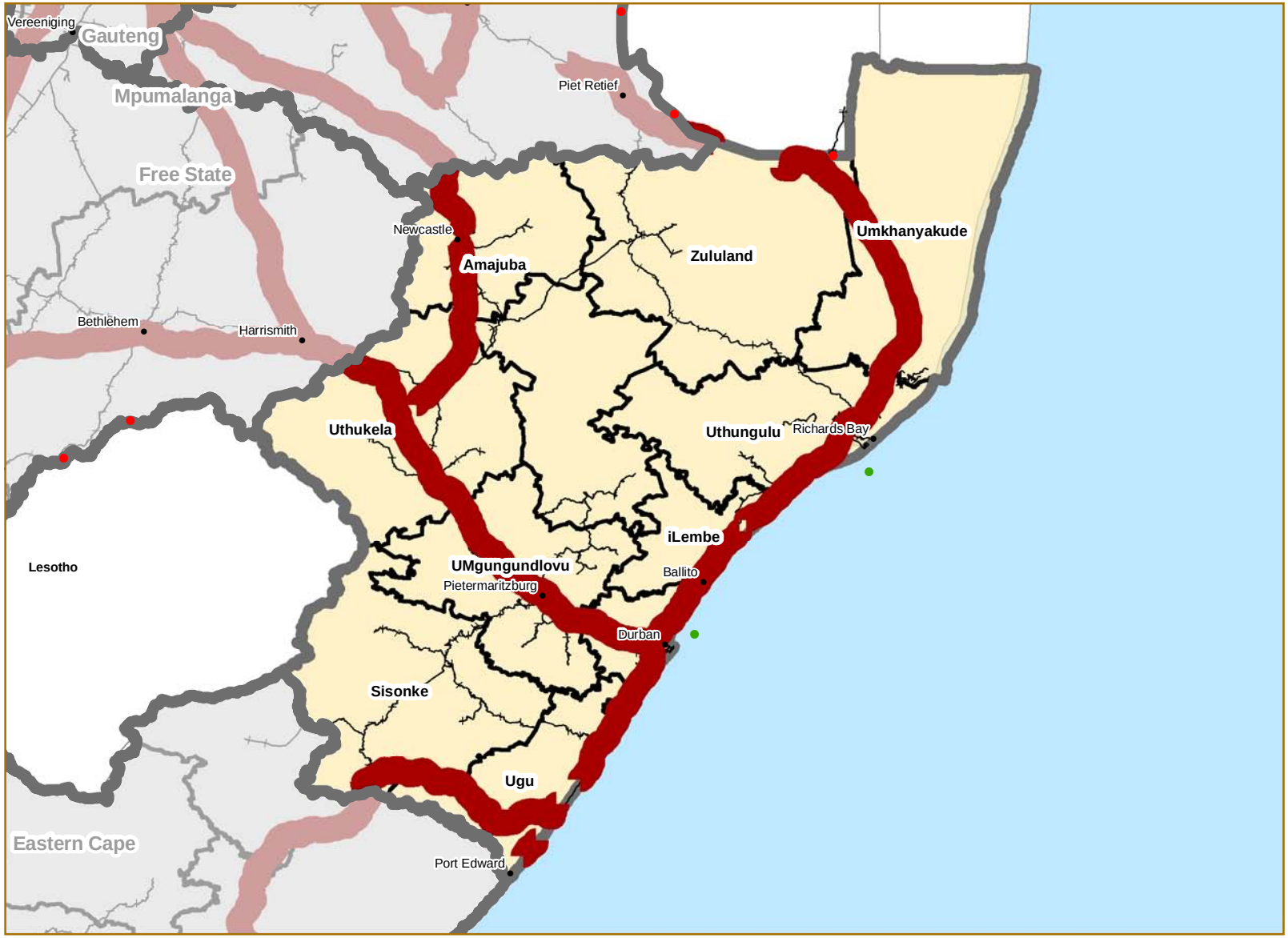
0-15% 25% 50% 75% 80% 90% 100%

February '09

MAP 7.3F Analysis of Overloading Control Constraints

NATIONAL TRANSPORT MASTERPLAN 2050

Kwazulu Natal Province: ANALYSIS OF ROAD SAFETY CONSTRAINTS



ROAD SAFETY CONSTRAINTS

AADT HEAVY VEHICLES

Heavy Vehicles (AADT >500)

BASEMAP LEGEND:

- SANRAL Road Network
- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

0-15% 25% 50% 75% 80% 90% 100%

February '09

MAP 7.3G Analysis of Road Safety Constraints

NATIONAL TRANSPORT MASTERPLAN 2050

- **N2 Pongola to KZN Border**
  Major rehabilitation and some improvements are to be undertaken between 2008 and 2011. However, this excludes any major upgrade work.
- **N2 / M19 Interchange (Inanda / Umgeni)**
  Upgrading of the interchange is planned during the next few years.
- **N3 Durban Central to N2 Interchange**
  Upgrading of this section is in progress
- **N3 Cato Ridge to Athlone**
  The design for additional lanes required to increase capacity is in progress, but funding still has to be secured for this project.
- **N3 Durban to Pietermaritzburg Interchanges**
  The Marianhill and Epworth Interchanges are to be upgraded, while the upgrading of the Church Street Interchange in Pietermaritzburg is being investigated.
- **N3 Pietermaritzburg Bypass**
  Upgrades to the existing Pietermaritzburg Bypass, including parallel service roads are being planned, while in the longer term a new route is proposed from Cato Ridge to Lions River. Funding has not been secured for the proposed new route.
- **N3 Wembezi Interchange**
  The design of the Wembezi Interchange has been completed, but funding still has to be secured.
- **N3 Keevers Fontein to Warden (De Beer's Pass)**
  A new route via De Beer's Pass that bypasses Van Reenen's Pass and Harrismith is currently planned for completion by 2015 and at this stage the route alignment is being refined.
- **N11 Newcastle to Volkrust**
  Major rehabilitation and some improvements are to be undertaken during the next few years. This includes the widening of the paved shoulders and a proposed new interchange at the Allen Street intersection
- **R68 Extension Babanango to Mtonjaneni (P250 and P432)**
  No funding has so far been allocated to upgrade and blacktop this road.
- **R33 Greytown to Helpmekaar**
  Plans have been prepared for the upgrading of selected sections, but no funding has been allocated yet.
- **R34 Link from Clontarf (N11) to Memel**
  A preliminary design was prepared a number of years back for this link and it still forms part of the KZN DoT long term plan. No funding has been allocated yet for this project.
- **R34 Richards Bay to Empangeni (P496)**
  This part of the R34 route is currently being upgraded to a dual carriageway.
- **R34 Northern by-pass to Empangeni**
  A route location report has recently been completed for a northern bypass to Empangeni. Basic planning for this bypass is due to commence soon.
- **R34 Empangeni to Melmoth**

The road from Ulundi to Empangeni is being upgraded to an 8.5m wide blacktop road and this is being considered as an alternative route for the R34. A new link from Ulundi through to the R34 on the western side of Ulundi is being investigated to provide a continuation of the route through Ulundi. A design is available for a high standard heavy haul route from Empangeni through to Melmoth

- **New Route: Link from the N2 near Tongaat to the N3 North of Pietermaritzburg**

  Preliminary planning has been initiated to determine the feasibility of constructing this new link to provide access to the King Shaka International Airport and the surrounding areas. Topography on this route is a major issue.
- **R74 Frere to Winterton to Bergville to Oliviershoek Pass**

  This important through route serves as an alternate to the N3 and as a link to the N5. Upgrading of this road is necessary, but no funding has been allocated yet for this route.
- **Himeville to Lesotho via Sani Pass (P318)**

  The DoT and the KZN Dot are jointly funding the construction of the road from Himeville through to the Lesotho border. This road links the Mokhotlong community in Lesotho through to Underberg that is their closest commercial centre. A co-operation agreement was signed between Lesotho and South Africa in 2005 and the construction of this road is seen to be significant in terms of this agreement.
- **Pinetown to Duff's Road (P577)**

  This road that is planned to form part of a new North to South route through the eThekwini Municipality is under construction and a section to the northern end has already been completed and opened to traffic.
- **R102 Duff's Road to Mount Edgecombe (P2)**

  This road is planned to have been upgraded within the next 5 years.
- **R102 Mount Edgecombe to Tongaat (P2)**

  Funding has been allocated over the MTEF period for capacity improvements, including additional lanes and interchanges between Mount Edgecombe and Tongaat as well as a bypass to Tongaat. This is required to serve the new King Shaka International Airport.
- **New Route: P579 and P455 Pinetown to R603**

  Preliminary designs have been prepared for P579 and P455 to link from Pinetown through to the R603. Funding has not yet been allocated for the project. However, it has been noted that this project, together with the P577 that is currently under construction, will provide an outer ring road through eThekwini and a new north-to-South link in the network. This will also link the residential area of Umlazi through to the industrial area of Pinetown.
- **M1 from N2 to Chatsworth**

  Public transport lanes are being planned for addition to the road.
- **M4 Durban Central to Airport**

  Public transport lanes are to be added to the road and it is anticipated that work will commence in 2009.
- **M7 Durban Harbour to N2**

Major upgrading and realignment of this section between the N2 and the container depot has been planned and is due to be undertaken within the next few years. Certain work has been identified as urgent and should commence fairly soon. However the extent and timing of the work is dependent upon developments in the harbour container depot.

- **R74 Oliviershoek Pass**

  No funding has been allocated to upgrade the pass

- **Swartberg to Matatiele (P604)**

  The Province of the Eastern Cape is upgrading and surfacing the road from Elliot to Matatiele via Maclear and Mount Fletcher. The extension of this route from Matatiele to Swartberg within KZN would complete an important link of National Importance No funding has been allocated yet to upgrade and blacktop this road.

- **N2 Wild Coast Toll Road**

  A new National Route is being planned and will provide linkage from the Airport Interchange, just south of the Durban International Airport, through to the Ganubie Interchange in East London. The route passes close to Port St Johns, then via Umthatha.

The status of these proposals will be confirmed during Phase 3 before alternative strategies are developed to address the road related bottlenecks and constraints as listed above. The implementation date and estimated costs of these proposals will also be established.

7.3.4 Identification of Alternative Strategies to be investigated in Phase 3

Potential alternative strategies which will be investigated during Phase 3 are:

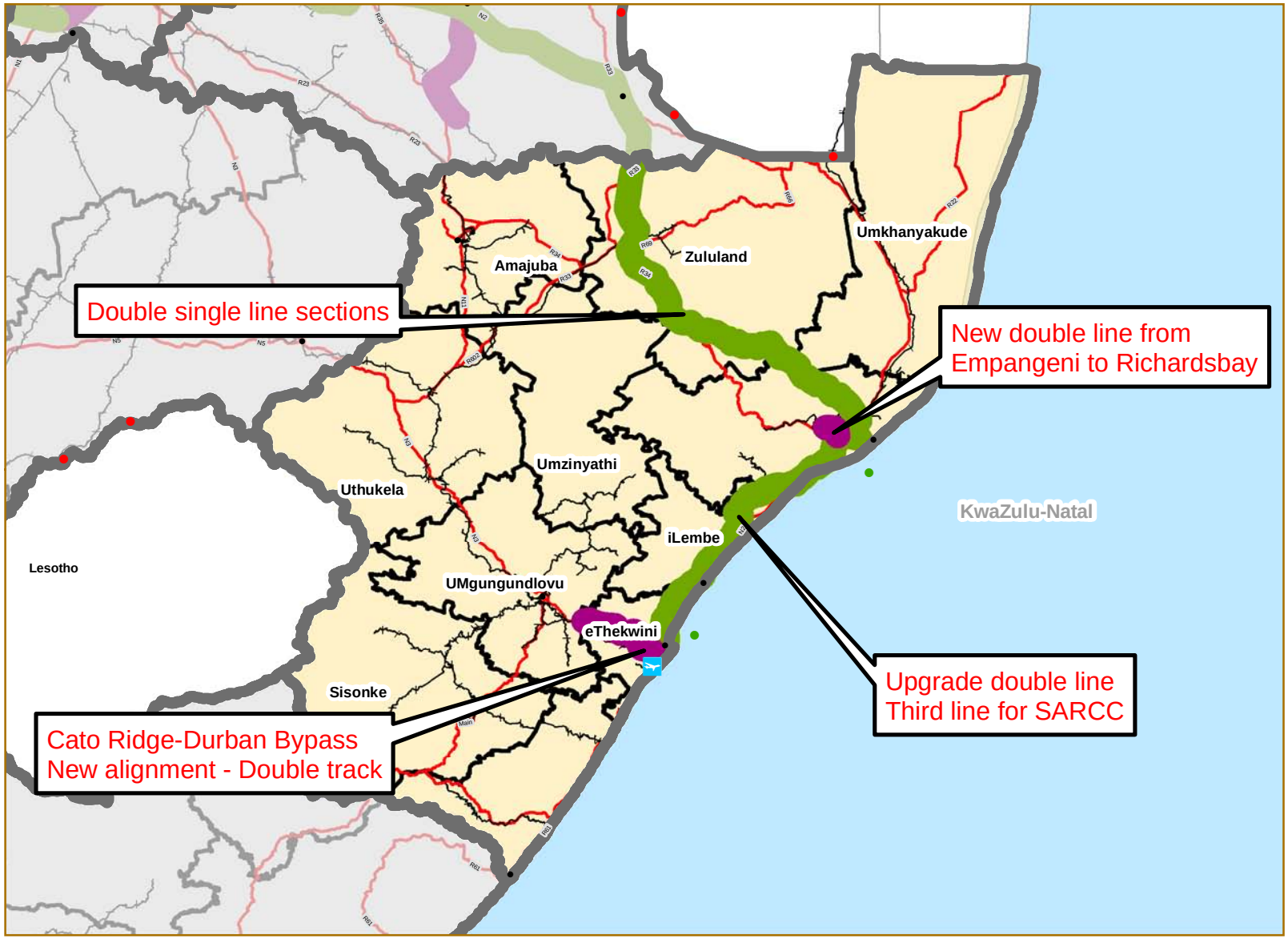
- Reduction of traffic volumes by introducing congestion charges together with the introduction of regular and reliable public transport (such as BRT schemes);
- Adding additional capacity through extra lanes;
- Introduction of a heavy vehicle fee (HVF) to cover externality costs incurred by HVs;
- Classifying transport infrastructure and services as either economic transport or social transport. The DOT (say) could then be responsible for economic transport and the province and District Municipalities can take responsibility for social transport;

7.4 RAIL NETWORK

7.4.1 Summary of Rail Network

The rail network is detailed in the phase 1 of the NATMAP reports. Refer also to **Map 7.4A**.

Kwazulu Natal Province: RAIL NETWORK



RAIL NETWORK

DEVELOPMENTS

- Upgrade
- New Lines

BASEMAP LEGEND:

- SANRAL Road Network
- Railway Network
- Border Posts
- Harbours
- Airports
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:3,500,000

0 15 30 60 90 120 Kilometers

Map and Data Current Status Completed

0-15% | 25% | 50% | 75% | 80% | 90% | 100%

February '09

NATIONAL TRANSPORT MASTERPLAN 2050

MAP 7.4 Rail Network

Suburban Network (SARCC)

The suburban rail network in the Durban Metro area belongs to the South African Rail Commuter Corporation (SARCC). The north-south corridor of the network extends from Duff's Road, 19 km north of Durban Station, through the CBD of Durban to Kelso on the South Coast, 73 km south of Durban Station.

The areas south-west of Durban are serviced with a 10 km line to Umlazi and a 13 km line to Crossmoor, both taking off at Merebank. Kwa-Mashu, north-west of Durban, is serviced by a 4 km line taking off at Duff's Road.

The western suburban areas are serviced with a 19 km section of the old main line to Pinetown, taking off at Rossburgh, as well as the 64 km section between Rossburgh and Cato Ridge of the Transnet main line to Gauteng. The line to the suburban train staging facilities at Springfield Flats also takes off from Durban Station.

Metrorail also uses 60 km of the Transnet line between Duff's Road and Stanger for the extended service on the north coast as well as the 11 km line to Wests in the south eastern area of the harbour. All the lines are electrified with 3kV DC. The train authorization on all the line is done by CTC (Centralised Traffic Control).

The total route km of the SARCC lines are 134 km. The SARCC also uses 167 route km of the Transnet lines, while Transnet uses 92 route km of the SARCC lines.
The SARCC is busy with the detail planning of a 3 km line from Duff's Road to the new complex at Bridge City.

Freight Network (Transnet)

The freight network in KwaZulu-Natal belongs to Transnet and is managed by Transnet Freight Rail (TFR), a division of Transnet.

The main line between Durban and Johannesburg stations, over Pietermaritzburg, Lady Smith and New Castle, is 725 km long. The Transnet section between Rossburgh and Vooruitsig within Kwazulu-Natal is 465 km long. The whole route is a double line with 3kV DC electrification and CTC train authorization. The allowable axle load is 20 tonnes. The ruling grade within KwaZulu-Natal is 1:50 (2%). The line is accessed from Durban Harbour with connections from Cato Creek, Maden Warf, Bayhead and Wests.

The 252 km section in KwaZulu-Natal of the 547 km coal line from Ogies, in the coal fields of Mpumalanga, to the Port of Richards Bay has a ruling grade of 1:160 in the direction of the harbour. The line is electrified with 25kV AC electrification. Train authorization is done with CTC. The allowable axle load is 26 tonnes.

A 22 km branch line from Vryheid to Hlobane services the coal mines in that area. This line has an allowable axle load of 20 tonnes.

The 398 km north coast corridor between Durban and Golela, on the Swaziland border, is a double line from Duff's Road to Darnell and single from there to Golela. The line is electrified with 3kV DC electrification between Durban and Empangeni. Train authorization is done with a combination of CTC, Colour Light Signalling and Radio Train Orders. The allowable axle load is 20 tonnes. This line is also used for traffic from Mpumalanga through Swaziland. A 64 km branch line to Nkwalini takes off at Empangeni and a 34 km branch line to Eshowe takes off at Gingindlovu. Both branch lines are built for 18.5 ton axle loads.

The 118 km south coast corridor from Durban Station to Port Shepstone is serviced with the SARCC lines to Kelso and then a 50 km single line that extends from Kelso to Port Shepstone. A 10 km branch line from Umtentwini to Simuna services the cement factory. All these lines are electrified with 3kV DC electrification. The allowable axle load is 20 tonnes. Train authorization is done with a combination of CTC and Radio Train Orders.

A 100 km line that takes off the main line at Danskraal, near Lady Smith, links the line from the Freestate at Harrismith. The line is electrified with 3kV DC electrification. The allowable axle load is 20 tonnes. Train authorization is done with CTC. The ruling grade is 1:50.

The main line between Durban and Gauteng is linked to the coal line with a 90 km line between Glencoe and Vryheid. This line is electrified with 3kV DC electrification. The allowable axle load is 20 tonnes on a 1:50 ruling grade.

The cluster of branch lines from the Pietermaritzburg area includes a 154 km line to Kranskop with a 45 km branch from Greyton to Mount Alida; a 19 km line to Glenside; a 24 km line to Bruynshill; a 42 km line to Richmond and a 343 km line to Matatiele. A 62 km line to Underberg takes off from the Matatiele line at Donnybrook. The ruling grades of the lines vary between 1:30 and 1:50. The allowable axle load varies from 16 to 18.5 tonnes.

Other branch lines are a 68 km line from Ennersdale to Bergville and a 48 km private line from New castle to Utrecht.

Operations on the narrow gauge (610mm) line between Port Shepstone and Harding has been terminated.

The core lines of Transnet in the KwaZulu-Natal Province cover a route distance of 1819 km, while the non-core and branch lines cover a route distance of 982 km. TFR uses 103 route kilometres of the SARCC lines.

7.4.2 Service Capacity Bottlenecks

7.4.2.1 Rail Line Capacity and Constraints

The capacity of a rail line is determined by the number of trains that can use the line over a 24 hour period, the configuration of the trains and the products to be transported. The number of trains is determined by the number of lines, spacing of crossing facilities, train authorization system and travelling speeds. The configuration of the trains is determined by the ruling grade (number of trucks that a locomotive or combination of locomotives can pull), crossing loops (length of trains that can cross), allowable axle loads and commodities to be transported.

Only the volumes of the ore export on the Sishen – Saldana line grew since 1997.

Transnet forecasted the rail freight for 2010, 2020 and 2030 based on the actual volumes in 2006. The maximum capacity of each sections of the network was compared with the estimated demand. The estimated utilization of the available current capacity is indicated in **Figures 38 - 41** below for 2006, 2010, 2020 and 2030 as follows:

- **green** when the available capacity is more than the estimated demand,
- **blue** when the available capacity will be fully utilised and
- **red** when the demand will be more than the available capacity.

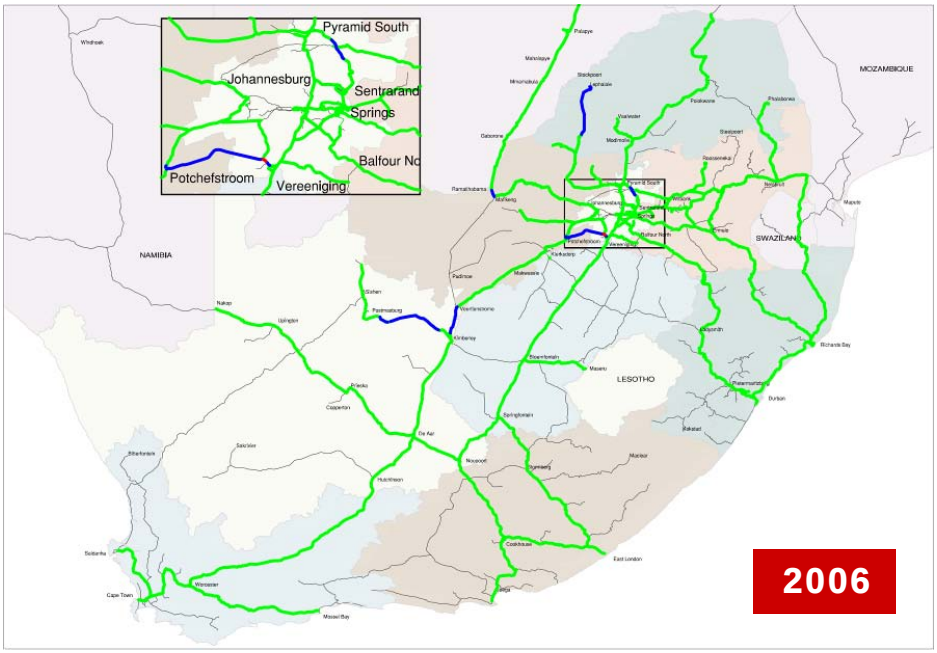


Figure 38: Utilization of the rail route capacity during 2006
(Source: Transnet National Infrastructure Plan: February 2008)

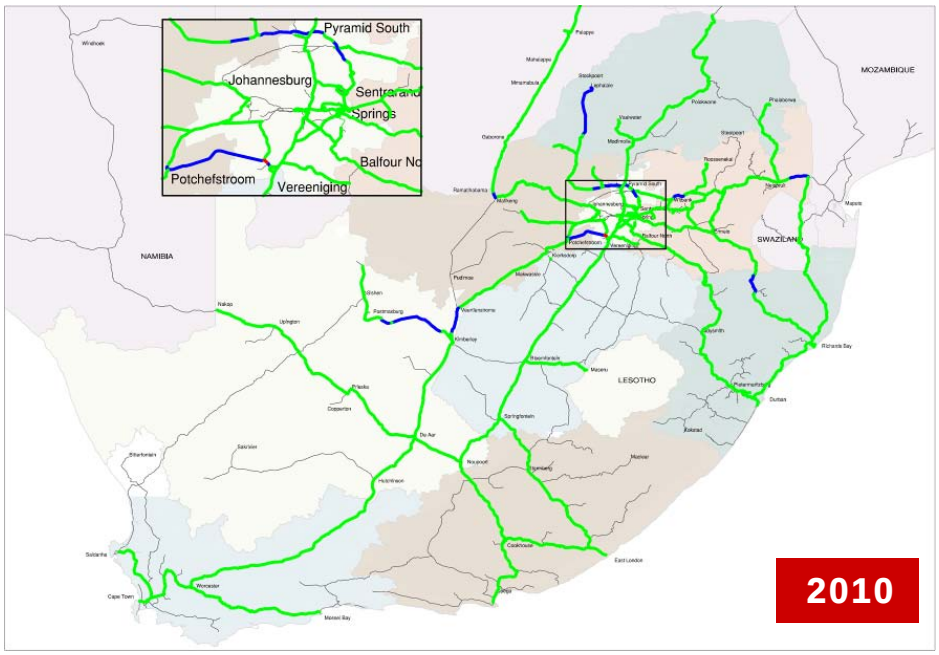


Figure 39: Estimated Utilization of the rail route capacity by 2010
(Source: Transnet National Infrastructure Plan: February 2008)

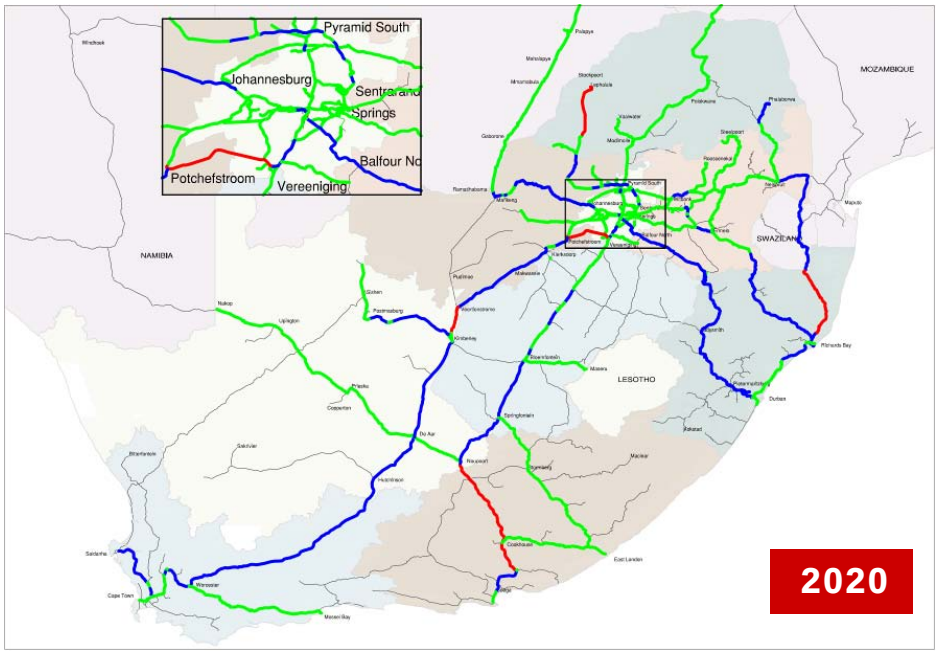


Figure 40: Estimated Utilization of the rail route capacity by 2020
(Source: Transnet National Infrastructure Plan: February 2008)

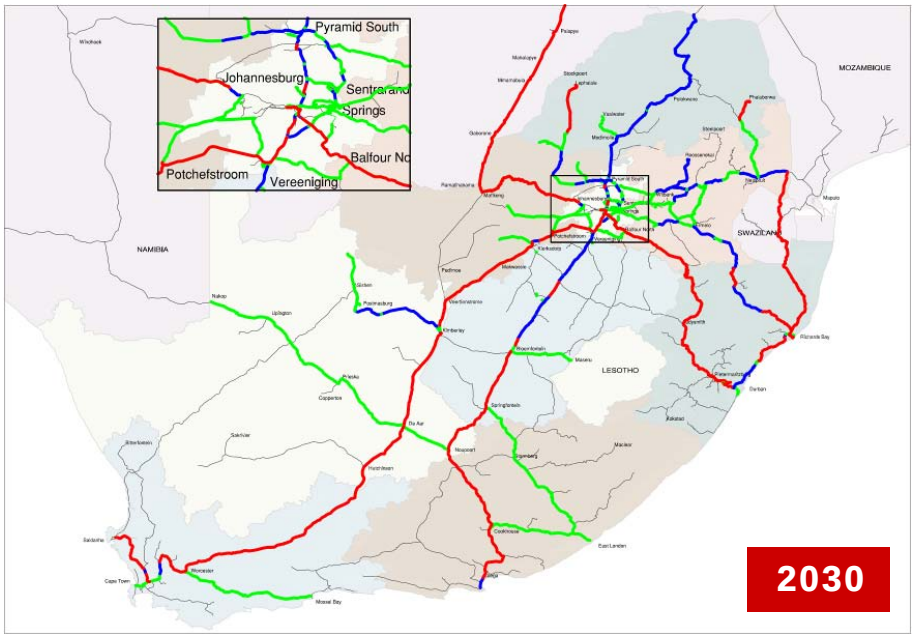


Figure 41: Estimated Utilization of the rail route capacity by 2030
(Source: Transnet National Infrastructure Plan: February 2008)

According to these forecast the following capacity constraints will developed for the network within KwaZulu-Natal:

- The capacity of the **main line** between Durban and Gauteng will be fully utilised by 2020 and will be exceeded by 2030.
- The ruling grade of the Kwazulu-Natal section of the main line is 1:50 while it is 1:80 between Vooruitsig and Gauteng. These steep grades limit the capacity of heavy freight trains. (Breaking capacity on the long down grades and traction requirements on the long up grades.)
- The capacity of the Richards Bay - Ermelo **coal line** is limited by the single Overvaal Tunnel (in Mpumalanga). The Transnet forecast indicated that apart from the Overvaal tunnel the capacity of the line will be adequate to 2020. The demand will exceed the capacity of most sections of the line in Kwazulu-Natal by 2030.
- The capacity of the **Durban – Swaziland** line will be adequate until 2010. The section between Stanger and Empangeni will reach capacity by 2010, while the estimated demand for the section between Empangeni and the Swaziland Border will be more than the available capacity by 2020. The section between Durban and Stanger will reach capacity by 2030.

Transnet used the above strategy to identify potential projects to increase the capacity of the lines in accordance with the growth in demand. The following projects were identified:

- An option only is to construct a new double line bypass between Cato Ridge and Durban on a complete new alignment.

- Upgrading of the Nsese yard to 150 wagon trains.
- Reroute the coal line at Richards Bay to allow for port expansions.
- Double the coal line from Nsese to Richards Bay.
- Power upgrading with new substations.
- Doubling of the Overvaal Tunnel in Mpumalanga.
- Upgrading of the double line between Durban and Empangeni.
- Provision of a third line for the SARCC to Stanger.
- Upgrading of the Signalling and Electrification on the North Coast line
- Provision of a new double line between Empangeni and the Port of Richards Bay.
- Transnet plans to invest R34.8 billion in the rail freight business as follows:

Coal line	– R4.9 bn
Ore Line	– R3.8 bn
General Freight	– R15.3 bn
Maintenance Capitalization	– R10.8 bn

The demand for line capacity for intercity passenger train is so low that the influence on the total utilisation can almost be neglected. There are currently two trains per week between Durban and Cape Town and six trains per week between Durban and Johannesburg.

The different options are indicated on **Figure 42** below.

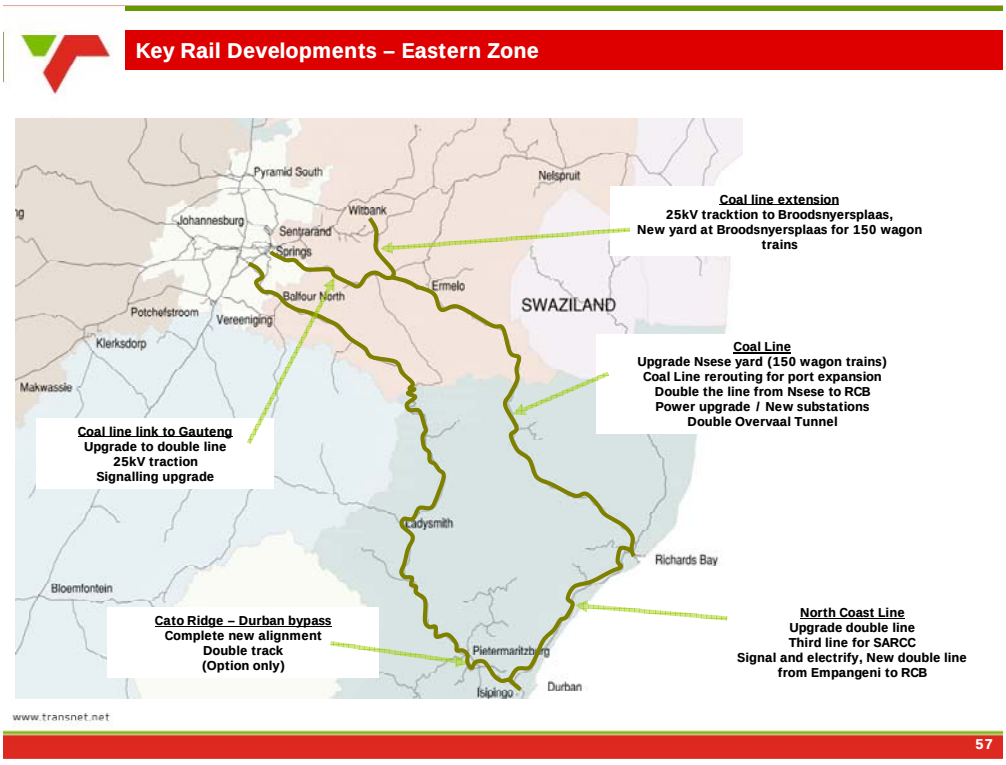


Figure 42: Key Rail Developments in the Eastern Zone of Transnet
(Source: Transnet National Infrastructure Plan: February 2008)

Suburban Network

The National Railplan Consolidated Report, dated August 2006, done by the SARCC/Metrorail and sponsored by the Department of Transport (DOT) together with the KwaZulu-Natal Railplan deals with the role and future of the Suburban Rail Services in KwaZulu-Natal.

Rail's function as the major mode, or backbone of public transport led to the following functional identification of corridors for the purpose of the Railplan evaluation process:

- Kwa Mashu - Durban CBD — Category A
- Umlazi – Isipingo – Durban CBD — Category A
- Pinetown – Rossburgh — Category C
- Cato Ridge – Rossburgh — Category C
- Crossmor – Merebank — Category B
- Duff's Road – Stanger — Category B
- Isipingo – Kelso — Category B
- Pinetown – Cato Ridge — Category C

The following future rail corridors were also identified based on land use and network integration considerations:

- Inanda - Bridge City – Durban CBD — Category A
- Pinetown – Westville – Durban CBD — Category C
- Crossmor - Pinetown — Category C

The Railplan stated the following:

> *"The North – South corridor is the dominant element in the rail transport system, with east – west lines feeding this at varying degrees of intensity. The North – South corridor is a strong commuter line supporting existed and development and able to support much future development along the route if adequate service levels can be provided. An ongoing role for rail on this transport corridor is a vital component of the suburban transport strategy.*
>
> *Of the four east-west rail routes, only the Umlazi – Isipingo transport corridor was sufficiently supported by current and proposed future land use patterns to warrant a clear cut case for ongoing commuter rail services.*
> *Based on the numerous development proposals in the northern parts of the eThekwini municipal area, including the Inanda/Ntuzuma/Kwa Mashu (INK) Regeneration Area and the proposed net La Mercy Airport development, a strong land use planning case could be made for extending existing the North – South rail route into the proposed INK regeneration node.* "

The SARCC plans to invest over the next 7 years R 1 387.3million of their total R9 550 million investment in the suburban rail services in KwaZulu-Natal. The investments are divided as follows:

Total Short Term Interventions for Category A Corridors:	R 280.3m
Total Short Term Interventions for Other Corridors:	R 505.7m
TOTAL Short Term:	**R 786.0m**

Total Medium Term Interventions for Category A Corridors: R 150.7m
Total Medium Term Interventions for Other Corridors: R 450.6m
TOTAL Medium Term: **R 601.3m**

Short term interventions are considered as those necessary to achieve recovery of service levels to those provided in the year 2000 and to provide the required services the Soccer World Cup. Completion is planned for 2010. These include amongst others:

- the upgrading of train sets
- the improvement of Reunion, Durban, Kwa-Mynandu, Kwa Mashu, Rossburgh, Isipingo Duff's Road
- Upgrading of signalling, electrification and track work at various sections.

The medium-term interventions were considered those to be necessary to increase service levels to allow for a 10% increase in passenger demand over and above recovery of the year 2000 passenger levels. These interventions were designed to consolidate the position of commuter, and were assumed to occur over a two-year period subsequent to the initial short-term intervention period of three years.

The long-term interventions were assessed to carry the year 2000 passenger demand plus 20%, and were assumed to occur in the two years after completion of the medium-term interventions.

7.4.2.2 Rail Network Condition and Constraints

The condition of the different sections of the rail network, as based on the SACIE classification of infrastructure in South Africa, was indicated in the phase 1 report. The condition of the coal line was indicated as good while the core lines were generally fair and the branch lines poor to very poor.

The strategy of the Transnet Freight Rail maintenance policy is to maintain the core network to be in a good condition. The condition of a line that carries substantial volumes could however deter deteriorate within a relative short period if the maintenance and replacement of components are not done to the desired standards. (The coal line for instance carries more than 100 million gross tonnes per year. The volume of coal transported on the coal line decreased from 68.7 million tonnes in 2005/6 to 63.5 million tonnes in 2007/8 which is believed to be due to capacity constraints rather than decreased demand by the coal export industry.

The major constraint regarding the condition of the rail network is that the maintenance is controlled by TFR which must balanced its cost with its income to optimize the profit. There is no obligation on TFR to maintain the network other than for its own interest and to satisfy the requirements of the Rail Regulator for safe operations.

The freight rail system encounters the following constraints:

- Rail is considered world wide to be competitive on commodities that are heavy and can thereby use the carrying capacity of rail, over longer distances (more than 600km) where the saving in running cost become more than the

end point handling cost. Most of the consumer goods fall outside these requirements.

- Transnet claims that the road competitors do not carry the full cost of the infrastructure while the rail must carry the full cost of the rail infrastructure and facilities.
- The rail system is inherent not competitive on short distances and with commodities that requires expensive en time consuming loading, off-loading and distribution processes.
- The system lacks products and services for general freight that can easily access the rail rolling stock, are reliable, consistent, delivered within a reasonable time and be price competitive.
- The rail system lacks rail competition that will drive innovation and customer conformance.
- The rail infrastructure in the KwaZulu-Natal of the general freight lines has significant spare capacity. The capacity of most of the lines can be increased with relative small investments.
- The role of the Province in the future of the branch lines is unclear.

7.4.2.3 Missing Links

The Transnet forecast is based on the services that Transnet Freight Rail (TFR) offers and their strategic intend to maintain current services and to develop future services. The perceived strategy of TFR is to concentrate on bulk commodities in full train loads (block trains) over longer distances where the cost benefit of rail transport is significant over that of road transport.

Changes in the TFR strategies or changes in the institutional framework for rail transport might however introduce services for other commodities and other customers that might require more line capacity and/or different connectivity to mining, industrial and commercial areas.

The branch lines are currently totally under utilised with virtually no demand for capacity. There are very little services currently available that conform to the requirements of potential customers (single truck loads) or that could compete with the road services.

7.4.3 Implications of Existing Plans on Phase 3 Forward Plans

Transnet as the sole owner and operator of the national rail network determines the services that they will offer. It is evident that they will balance their operating and infrastructure cost, expansions of the network and/or the closure of lines within their business strategies and risks.

Transnet also needs to recover the infrastructure cost from their customers which implies that the tariffs for lines with low volumes should be substantially higher than for lines with high volumes.

Transnet must carry the risk associated with the investment to increase the capacity. The capital cost must be born by Transnet even if the estimated volumes should not materialise.

It must be kept in mind that the forecasts and plans done by Transnet are based on their business strategies and the risks that they are prepared to carry rather than the needs of the country.

The possible future changes to the structure of the rail business in South Africa might change the demand for rail capacity significantly. Separation of the rail infrastructure and operations will introduce new operators. These operators might demand different infrastructure capacity than the current operations of Transnet. The infrastructure organisation should then provide these capacities as far as possible. The Phase 3 work will be substantially influenced by these strategies.

The strategies of the Provincial Governments in relation to branch lines and sidings to service industrial areas will also influence Stage 3.

The potential linking of the coal mines that might develop in the western areas of Limpopo Province to the Richards Bay coal line will increase the demand for capacity on the coal line significantly.

7.4.4 Identification of Alternative Strategies to be Investigated in Phase 3

- Vertical separation of the rail business to allow private sector operators to use the infrastructure.
- Assessment of the infrastructure condition assessment methodology use by Transnet to evaluate their condition assessment of the rail infrastructure.
- Assessment of the infrastructure demand as estimated by Transnet in relation to the total freight and passenger demand forecast for stage 3.

7.5 AIRPORTS

This section gives an overview of the capacity and constraints of the Kwa Zulu Natal airports of national importance.

The aspects for each airport that were analysed are:

- Service capacity bottlenecks;
  - Airspace capacity and constraints;
  - Airside capacity and constraints;
  - Landside capacity and constraints;
  - Airport condition and constraints;
- Implications for existing plans on Phase 3 forward plans; and
- Identification of alternative strategies to be investigated in Phase 3.

7.5.1 Summary of airports

The following functional airport categories in South Africa were identified in Phase 1:

- International Airports;
- Domestic Airports;
- Local Airports; and
- Military Airports.

International Airports: An international airport accommodates cross border and domestic flights and as a rule is served by scheduled airline services. These airports are usually located in the capital of the province and are limited to one or two per province. These airports are all equipped with the facilities to ensure immigration, customs, security, agricultural and health control.

Domestic Airports: These airports only accommodate domestic flights and serve to connect South African cities. These airports are served by scheduled airline services or they have a large number of tenants.

Local Airports: Local airports do not provide scheduled services and usually have a small number of tenants. Where we have identified these airports they are only listed and available information is presented. No assessment or write-up of these airports has been included in the Methodology.

Military airports: A military airport is usually referred to as an Air Force Base (AFB), is generally not utilised for public or private aviation. These airports facilitate military operations / aircraft movements and as such these airports are not of significant general public transportation interest and therefore will not be assessed and are only listed in the extent section of the assignment.

Map 7.5A of the Natmap Phase 1: Status Quo report is an indication of the location of the marot airports in the Western Cape of national importance.

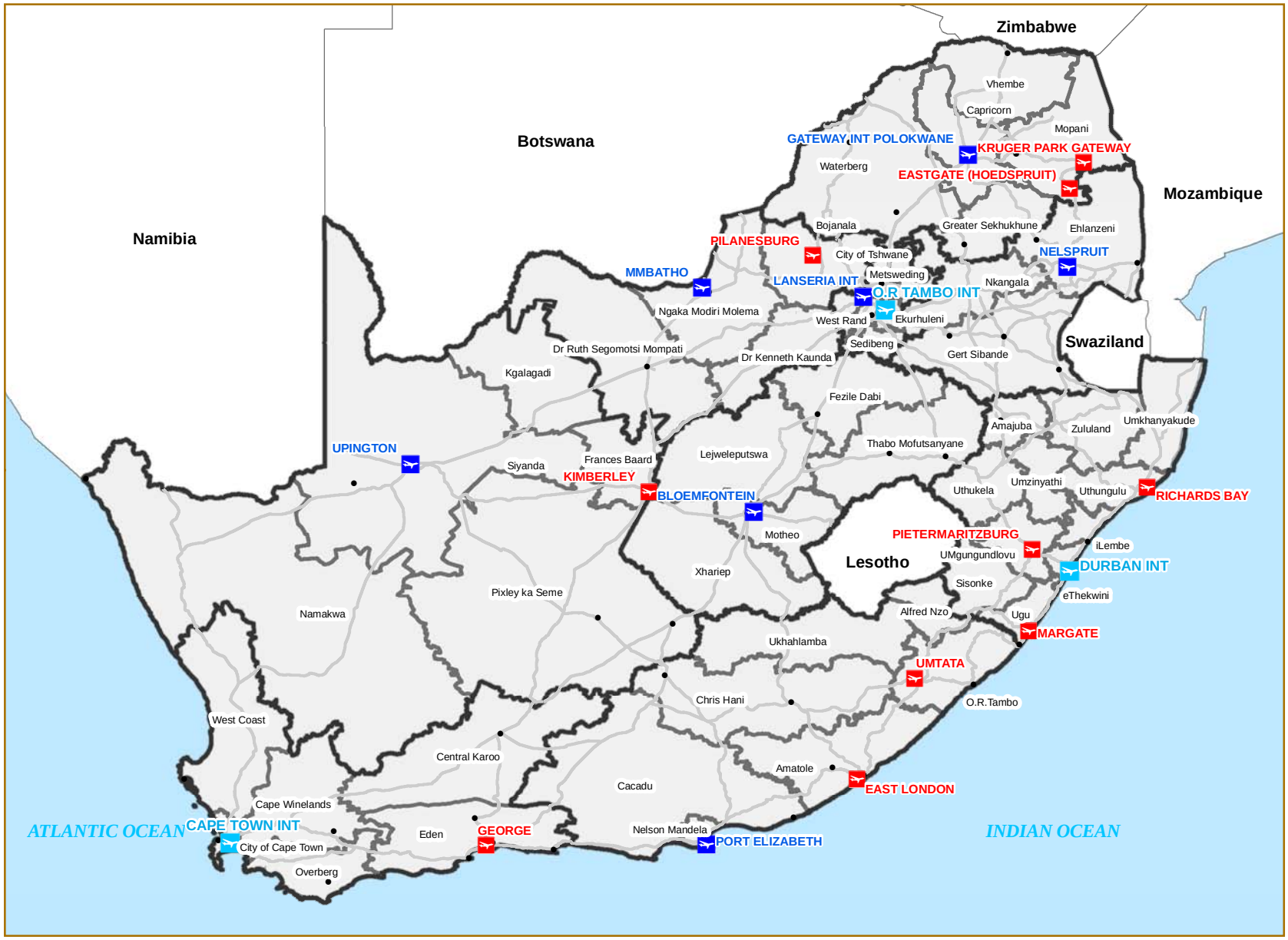
The aerodromes in KZN are listed in **Table 56** below**.** There are four airports of national importance:

- Durban International Airport,
- Pietermaritzburg Airport,
- Richards Bay Airport; and
- Margate Airport.

The proposed new International Airport at La Mercy near the Dube Tradeport (also referred to as the King Shaka International Airport) is planned to be commissioned in 2010. When the International Airport at La Mercy is commissioned, Durban International Airport will be decommissioned.

Only the four airports of national importance are analysed in this report.

South Africa: AIRPORTS



AIRPORTS

MAJOR AIRPORTS

- INTERNATIONAL SHEDULED SERVICES
- INTERNATIONAL UNSHEDULED SERVICES
- DOMESTIC

BASEMAP LEGEND:

- SANRAL Road Network
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:9,500,000

0 37.5 75 150 225 300 Kilometers

Map and Data Current Status Completed

0-15% | 25% | 50% | 75% | 80% | 90% | 100%

February '09

NATIONAL TRANSPORT MASTERPLAN 2050

MAP 7.5A Airports

Table 56: List of aerodromes in KwaZulu-Natal

CLOSEST TOWN	AIRPORT	OWNER	RUNWAYS	PRIVATE / PUBLIC OWNERSHIP AND USAGE	RUNWAY TYPE
Durban, South Africa	Durban International	ACSA	2438	Public	Paved
Durban, South Africa	Virginia	Ethekwini Municipality	914	Public	Paved
Empangeni, South Africa	Empangeni	Alton Aero Engineering	701	Private	Unpaved
Eshowe, South Africa	Eshowe		640	Public	Unpaved
Estcourt, South Africa	Estcourt		1219	Public	Unpaved
Harding, South Africa	Harding	Umuziwabantu Municipality	1097	Public	Unpaved
Harrismith, South Africa	Harrismith	Harrismith Municipality	1189	Private	Paved
Hluhluwe, South Africa	Hluhluwe	The Big Five False Bay Municipality	1189	Private	Unpaved
Howick, South Africa	Howick		823	Private	Unpaved
Ladysmith, South Africa	Ladysmith	Ladysmith Municipality	1189	Public	Paved
Margate, South Africa	Margate	Margate Airport Management Company	1341	Public	Paved
Newcastle, South Africa	Newcastle	Newcastle Municipality	1494	Public	Paved
Pietermaritzburg, South Africa	Pietermaritzburg	Msunduzi Municipality	1524	Public	Paved
Richards Bay, South Africa	Richards Bay	Richardsbay Airport Company	1280	Public	Paved
Ulundi, South Africa	Prince Mangosutho Buthelezi	Aviation Services, KwaZulu-Natal Government, Prince M Buthelezi Airport	1615	Public	Paved

(Source AIP, 2007

7.5.1.1 Overview of Durban International Airport

Durban International Airport is situated in eThekwini, one of South Africa's biggest cities. The coastal town is a popular tourist destination and attracts high numbers of international and local visitors, business people and general aviation. The airport is set to be de-commissioned when the new International Airport at La Mercy comes on stream.

Some fact on Durban International Airport:

- Current demand 4.8 MAP (2007);
- Daily average demand (2007) of 13,200 passengers;
- The airport is operating at its current capacity (4.5 MAP);
- Smallest of the three international airports in RSA;
- Main destinations are Johannesburg, Cape Town and Port Elizabeth.
- The runway is too short to cater for long haul aircraft with maximum load and international flights fly to Johannesburg (ORTIA);
- It will be replaced by the new International Airport at La Mercy which is planned to be completed by 2010 and will have a capacity of 7.5 MAP. The ultimate capacity of the new airport is 42 MAP which could be reached by 2040;
- A new international airport site should be identified by 2030 to allow 10 years for planning, design and construction;
- There is limited freight export and import movement. In 2006 about 16 tonnes of freight were handled;
- The domestic passenger growth rate was between 13% and 14% per annum during 2004 to 2007; and

A prediction of passenger demand was made by TRL (October, 2005), however the estimates was done before the boom in passenger growth due to low cost carriers and the demand prediction is considered on the low side.

The predicted yearly demand at DIA:

(Source: TRL, 2005)

- 2010 – 5.589 MAP;
- 2015 – 7.396 MAP; and
- 2020 – 10.240 MAP.

The predicted "busy day" traffic forecast:

(Source: TRL, 2005)

- 2005: 9,708 Pax, 113 ATM, 86 pax/ATM;
- 2010: 15,797 Pax, 139 ATM, 114 pax/ATM;
- 2015: 23,305 Pax, 176 ATM, 132 pax/ATM; and
- 2020: 33,400 Pax, 191 ATM, 175 pax/ATM

Predicted passenger growth rate:

(Source: TRL, 2005)

- 15.0% (2004 – 2007) based on historical data;
- 7.9% (2008 – 2010) based on TRL prediction;
- 5.8% (2010 – 2015) based on TRL prediction; and
- 6.7% (2015 – 2020) based on TRL prediction.

7.5.1.2 Overview of Pietermaritzburg Airport

Some salient figure on Pietermaritzburg Airport:

- Current demand 0.09 MAP (2007);
- There is almost no freight export and import via air;
- The capacity of the airport is 1 MAP;
- The capacity of the terminal will be reached by 2033 assuming domestic growth rates of 10%;
- Main destination is Johannesburg.

Pietermaritzburg Airport mainly hosts domestic flights and there are no international and regional flights. The scheduled flights are mainly from Johannesburg and Durban International Airports.

No formal growth forecasts have been conducted for Pietermaritzburg Airport. It is predicted that passenger volumes will almost double in June 2008 with the introduction of the airlink BAE146. This will increase the demand to about 0.2 MAP.

A 2% GDE growth has been achieved per year between 2005 and 2007. It is assumed that passenger volumes and freight volumes could grow at 10% pa over the next few years, based on the estimated ACSA planning figures.

7.5.1.3 Overview of Margate Airport

The following is a summary of the salient features of Margate Airport:

- Current demand 0.03 MAP (2007);
- Current capacity is 1 MAP;
- There is very limited domestic freight export and import;
- There is no rail access;
- Main destination is Johannesburg which is the only destination with scheduled flights.
- The airport handled on average 2 scheduled ATM's per day during 2007.
- terminal building (capacity of 1 MAP) is sufficient for the demand over next 50 years.

The number of passengers has not increased significantly due to the introduction of low cost carriers to DIA. Traffic forecast by Hibiscus Coast Development Agency predict a 6% annual growth from 2015 which is based on the Governments GDP

growth rate of 6%. This growth rate is also based on the assumption that low cost carriers will be operating code C aircraft to and from Margate by 2010.

The predicted passenger's volumes: (Source: Hibiscus Coast Development Agency)

- 2015: 60,000 pax per year; and
- 2020: 90,000 pax per year.

7.5.2 Richards Bay Airport

The following is a summary of the salient features of Richard Bay Airport:

- Current demand 0.001 MAP;
- Current capacity is 2 MAP;
- There is no freight export and import;
- There is no rail access;
- Main destination is Johannesburg which is the only destination with scheduled flights;
- current terminal capacity is sufficient for the 50 year demand assuming a 10% growth rate pa;
- About 70% of passenger volumes are attributed to business travel.

No available growth data could be obtained. There may be increased SA Express scheduled flights from April 2008. It is assumed that growth in air passengers will track the GDP of the area.

7.5.3 Durban International Airport

7.5.3.1 Service capacity bottlenecks

a) Airspace capacity and constraints

On the airspace no major constraints were identified. A "soft" constraint at the moment is the availability of air traffic controllers within South Africa.

b) Airside capacity and constraints

The declared airside capacity for DIA, taking runway capacity, parking capacity, taxiway capacity and air capacity into consideration is:

- Radar capacity: 32 ATM's per hour; and
- Non-radar capacity: 10 ATM's per hour.

The airport has one runway (06/24). The 4E runway can handle wide bodied aircraft with load limitations due to the shorter runway length.

The airport has 21 apron bays for narrow bodied aircraft. Six of these parking bays can be used to park three wide bodied aircraft.

The current airport capacity is 4.5 MAP. No further expansions will be done to increase the capacity as the airport will be replaced by 2010.

Table 57: Durban International Airport Terminals

TERMINAL	CAPACITY[1]	ATM'S[2]
International and Regional Departures	300 pax per hour	2
International and Regional Arrivals	300 pax per hour	2
Domestic Departure	900 pax per hour	6
Domestic Arrivals	900 pax per hour	6

Note 1: Information on terminal capacity provided by ACSA as estimated for 2010
Note 2: ATM's based on Cat C aircraft with 150 seats per ATM

Air traffic movements (ATM's):

Annual predicted air traffic movements:

(Source: TRL)

- 2005 – 40,405 (TRL);
- 2010 – 54,219 (TRL);
- 2015 – 62,231 (TRL); and
- 2020 – 78,554 (TRL).

At 32 ATM's per hour, with the airport operating for 24 hours, the scheduled ATM's (138 ATM per day for 2007) represents 18 per cent of the current ATM's capacity. However, the terminal buildings are at capacity.

c) Landside capacity and constraints

The Durban International Airport is at capacity. The airport will be replaced by the new International Airport at La Mercy. This is planned to happen around 2010/2011. The existing airport site is suitable for expansion, but only at tremendous cost.
The existing airport is located in the Durban South Industrial Basin. This is precious flat land in the hilly Durban topography for industrial development. The land that is currently occupied by the airport will be used for future industrial development in Durban.

The airport is located in the Durban South Industrial Basin. This is precious flat land in the hilly Durban topography for industrial development. The land that is currently occupied by the airport will be used for future industrial development in Durban.

d) Airport condition and constraints

The condition of the various components at the airport is as follow:
The condition of the various components at the Durban International airport is as follow:

- Main runway – fair, routine maintenance will be done before 2010;
- Aircraft parking – fair;
- Domestic arrivals terminal – fair, at capacity;
- Domestic departures terminal building – fair, at capacity;
- International departures terminal building – fair;

- International arrivals terminal building – fair;
- Landside (road access) – poor, N2 congested, and
- Landside (parking) – fair.

The airport is at capacity and is operating at a level of service below the recommended level of service of C. The existing airport is able to handle projected growth up to 2010 at substandard service levels.

Should the current air passenger demand of 4.8 MAP (2007) be grown at the predicted TRL growth rates, 40 MAP will be reached by 2040. The new international airport at La mercy with its two parallel independent runway system has a capacity of 42 MAP. This new airport will reach capacity by when a new international airport will be required. Assuming that the planning and construction of a new airport will take about 10 years, the site for the new airport should be identified by 2030. The growth rates and passenger numbers, will however, be investigated in more detail during phase 3 of Natmap.

The proposed new International Airport at La Mercy will have an ultimate capacity of 42 MAP. When opening in 2010, it will have a capacity of 7.5 MAP.

7.5.4 Pietermaritzburg Airport (FAPM)

7.5.4.1 Service capacity bottlenecks

a) Airport condition and constraints

None identified.

b) Airside capacity and constraints

The capacity of the airport terminal is 1 MAP.

The capacity of the terminal will be reached by 2033 assuming domestic growth rates of 10%. The terminal might therefore have to be expanded from 2028 to 2033 to handle the expected demand.

c) Landside capacity and constraints

None identified.

d) Airport condition and constraints

The condition of the various components at the Pietermaritzburg Airport is as follow:

- Main runway – fair;
- Aircraft parking – fair;
- Domestic arrivals terminal – fair;
- Domestic departures terminal building – fair;
- Landside (road access) – good;
- Landside (parking) – good

The ultimate capacity is 20 MAP. The airport will not reach capacity within the 50 year planning period.

7.5.5 Margate Airport

7.5.5.1 Service capacity bottlenecks

a) Airspace capacity and constraints
None identified.

b) Airside capacity and constraints
The runway can handle 30 ATM per hour.

The terminal building can handle about 200 passengers per hour.
The current capacity is therefore 1 MAP).

The ultimate capacity for a one runway system is 20 MAP.

c) Landside capacity and constraints

d) Airport condition and constraints
The condition of the various components at the Margate Airport is as follow:

- Main runway – fair;
- Aircraft parking – fair;
- Domestic arrivals terminal – fair;
- Domestic departures terminal building – fair;
- Landside (road access) – good, and
- Landside (parking) – good

7.5.6 Richards Bay Airport

7.5.6.1 Service capacity bottlenecks

a) Airspace capacity and constraints
No constraints identified.

b) Airside capacity and constraints
The runway can handle 30 ATM per hour.

The ultimate capacity for a one runway system is 20 MAP.

The terminal building can handle 80 departing passengers per hour. The arrival terminal building can handle 300 arriving passengers per hour.

The airport terminal building capacity is 2 MAP.

There are no immediate plans to expand the terminal building. The airport is considering building a paid parking area and garage facilities. The airport recently increased the car park area for the car rental companies.

None identified. The airport is situated on municipal land and sufficient land exists for the future expansion or upgrading of this airport.

c) Landside capacity and constraints

Sufficient for the demand.

d) Airport condition and constraints

The condition of the various components at the Richards Bay Airport is as follow:

- Main runway – fair;
- Aircraft parking – fair;
- Domestic arrivals terminal – fair;
- Domestic departures terminal building – fair;
- Landside (road access) – good;
- Landside (parking) – good

7.5.7 Implications of existing plans on Phase 3 forward plans

The current master plans for each major airport in Kwa Zulu Natal should be taken into account in the development of the forward plans.

7.5.7.1 Durban Capital-expenditure program

Proposed upgrades at DIA includes:

- Routine maintenance to maintain the runway capacity up to 2010.

Recently completed upgrades includes:

- New multi storey car park (MSP);
- Relocated and expanded car rentals area; and
- Remote parking area for staff

DIA will be decommissioned in early 2010 and major upgrades, bar from activities to maintain it as a support airport for the WC2010 is not feasible. There is also risk that the new International Airport at La mercy will not be completed by 2010 in which situation DIA will be the main airport for matches played at the Durban stadium (Kings Park Stadium).

The recent income and expenditure for DIA is included in **Table 58**.

Table 58: Expenditure at DIA

ITEM	2004	2005	2006	2007
Revenue	141,124	146,432	170,089	228,195
Expenditure	91,627	107,364	122,238	156,810
Operating profit	49,497	39,068	47,851	71,385
Capital expenditure	15,418	40,803	83,814	50,625

7.5.7.2 Pietermaritzburg Cap-expenditure program

Current development plans include the development of a hangar area to accommodate private aviation operators and a pilot training centre. It was estimated that the 17 new hangers could generate a revenue of R800,000 p.a. There are also plans to construct a parallel taxiway.

The airport receives a yearly subsidy of R1 million to cover operating deficit.

The yearly capital expenditure includes:

- R2.5m in 2007/2008; and
- R2.7m in 2008/2009.

7.5.7.3 Margate Airport capital expenditure

Margate Airport has initial plans to extend runway to allow bigger aircrafts (larger than a Category 4) to land and take off from Margate. The airport is looking to attract a low cost airline to fly schedule flights into Margate once the runway has been extended.

Breakdown of revenue for Margate Airport:

- Parking: 1%;
- Fuel: 71%;
- Landing fees: 8%;
- Passenger fees: 5%;
- Lease: 14%;
- Other: 1%.

Total revenue (2006): R3.1m;
Total expenditure (2006): R3.2m.

7.5.7.4 Richard Bay Airport capital expenditure

The information is considered confidential.

7.5.8 Identification of Alternative Strategies to be Investigated in Phase 3

The long term roles of some of the minor airports should be investigated.
An investigation into the development of new airports has been conducted and this should be examined. Information regarding the possible aviation developments should be attained from the National Airport Development Plan/Policy.

7.6 SEA PORTS

7.6.1 Summary of Sea Ports

On a coastline devoid of many naturally occurring harbours, subject to harsh weather and sea conditions generated in the Southern Ocean, KwaZulu-Natal is well served by two large ports at Durban and Richards Bay. Combined, they account for nearly 70% of the cargo shipped and landed at South African ports.
Durban was the first of the two to be developed, providing as it did the protecting headland of The Bluff, giving shelter to those early sailing vessels from the prevailing south easterly winds.
The limiting factor in those early days was the Bar, a naturally occurring sandbank formed by the ever-moving coastal sands that limited the draught of vessels entering the Bay. As vessels visiting the southern tip of Africa became more frequent, the size and draught of these vessels increased until it became too hazardous for them to cross this Bar, and they were required to anchor offshore, and passengers and goods had to be brought on shore by flat bottomed rowing boats. This in itself was a hazardous operation.

Port of Durban Entrance Channel widening 2008

This was clearly an unsatisfactory situation, and all manner of schemes were devised in an attempt to harness the energy of the tide to scour the entrance channel, but these all proved fruitless. Despite the construction of the breakwaters, which temporarily blocked the passage of sand that nurtured the Bar, it was not until the beginning of the 20th century, as steam replaced sail, and sand pumping suction dredgers become part of the port engineers arsenal did the early port operators get on top of the challenge of the Bar, and eventually provided a channel that could accommodate the draught of the vessels of the day at all states of the tide. The threat of the Bar forming across the entrance channels remains to this day to all the east coast port from East London northwards, and annually each of these ports must dredge vast quantities of sand to keep their entrance channels open.

The development of a safe, navigable entrance channel gave stimulus to the development of infrastructure within the Bay of Natal – the building of berths, increasing the depth of existing berths, the construction of storage sheds, hard surfacing of the quayside, roads, railway lines and mechanical cargo handling equipment. This evolution has resulted in the modern port we see in Durban today.

During the 1920's Durban outstripped the more established Table Bay Harbour, and by 1950 was handling more than twice the tonnage of Cape Town's port, with a throughput of over six million tons per annum. This tonnage increased nearly three-fold over the next 15 years, demanding the development of deep-water berths on the southern side of the Bay, Pier No 1, and later the Container Terminal at Pier No 2.
Durban is today a complex, multifaceted port, handling bulk cargoes, both dry and liquid, break-bulk cargoes, assembled motor vehicles, but predominantly handling containers. In 2007-08 the Port of Durban handled 76 451 000 tons of cargo, which is 33% of the total handled by all South African ports, and includes 2 511 704 TEUs – over 67% of the country's total.

Although the Umhlatuzi lagoon, named Richards Bay in 1879, was identified for its potential as a port at the turn of the 20th century, it was not until 1965 that the Government announced that a port would be built here. A number of factors contributed to the development of Richards Bay. It had become an urgency to provide additional rail links between the coast and the mining heartland of the country. It was also necessary to provide a deepwater port to accommodate the large bulk carriers. From three possible sites for a new harbour, the choice fell on Richards Bay for five important reasons:

- the large lagoon;
- the ease of dredging;
- direct link with the national rail network;
- an adjacent town, Empangeni, to stimulate initial development and
- ample fresh water

In May 1972, parliament authorised the construction of the harbour in Richards Bay, based on an agreement with the Transvaal Coal Owners Association to export 26 million tons of coal over a period of 10 years.

On the 1st April 1976 the first phase of the harbour was officially opened. Since its opening, the port of Richards Bay has expanded rapidly with the construction, on average, of one new berth every eighteen months. In 2007-08 financial year, Richards Bay handled in excess of 85 million tons, representing nearly 37% of South

Port of Richards Bay

Africa's seaborne cargo. This makes it South Africa's leading port in terms of volumes handled.

A dedicated railway line connects the port with Mpumalanga Province and Gauteng and was designed specifically to handle the majority of South Africa's coal exports. Other rail links connect Richards Bay with Durban in the south and Swaziland and Mpumalanga to the north. There is an adequate road system to Swaziland, Mozambique and Mpumalanga, and an excellent road south to Durban.

The Complimentary Ports of KwaZulu Natal

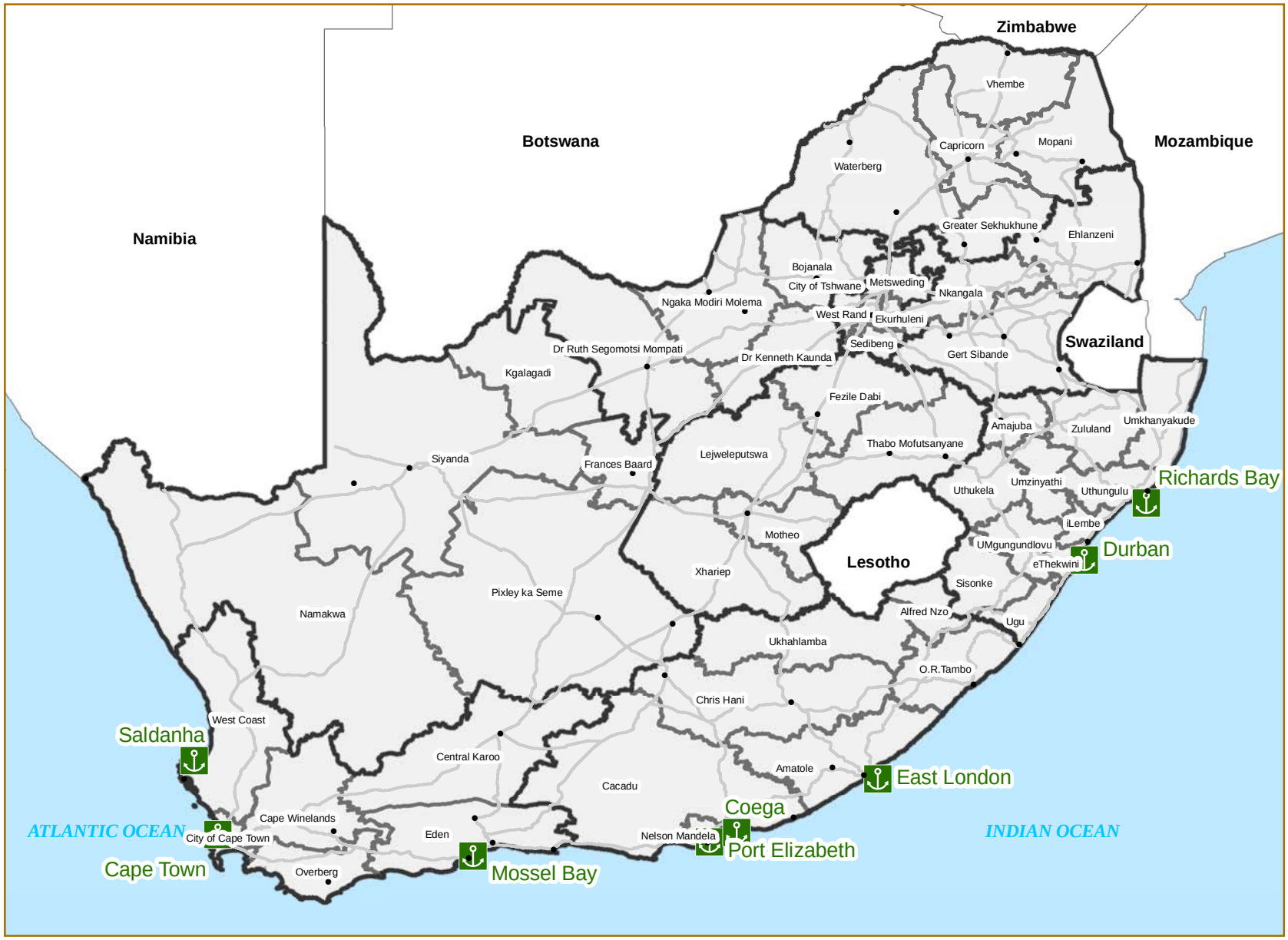
The Ports of Durban and Richards Bay are complimentary in that Durban focuses mainly on break-bulk cargoes, which includes containers, whilst Richards Bay is largely focused on bulk cargoes.

However, unless a decision is made to undertake a major expansion of the Port of Durban into the Bayhead area, on land now occupied by the Bayhead rail marshalling yards, or to develop a new port in Durban a site identified at the present Durban International Airport at Reunion, it is unlikely that the Port of Durban will be able to cope with the projected increase in break-bulk cargo, principally containers, into the future. Should such an expansion of port facilities not occur in Durban, Richards Bay will need to be developed increasingly to handle break-bulk cargoes.

This will necessitate the radical improvement of both road and rail links with the hinterland, especially Gauteng. This will pre-suppose the Port of Durban will be able to satisfy the needs of the Durban/Pinetown/Pietermaritzburg industrial corridor.
Notwithstanding the geographical spread of ports around the coastline of South Africa (see **Map 7.6A**) the two KwaZulu-Natal ports handle nearly 70% of the total tonnage throughput of South African ports, and the Port of Durban alone accounts for over 66% of the container throughput.

Making an assumption of each Twenty foot equivalent container (TEU) having a mass, on average of 13.5 tons, in 2006/07 the Port of Durban handled 73.0 million tons, whilst the Port of Richards Bay handled 83.1 million tons. In 2007/08 these figures rose to 76.5 and 85.3 million tons respectively. However, the assessed capacity of these two ports in 2007 was 81.4 and 95.3 millions per annum respectively.

South Africa: PORTS



PORTS

RSA PORTS

RSA Ports

BASEMAP LEGEND:

- SANRAL Road Network
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:9,500,000

0 35 70 140 210 280 Kilometers

Map and Data Current Status Completed

0-15% | 25% | 50% | 75% | 80% | 90% | 100%

February '09

NATIONAL TRANSPORT MASTERPLAN 2050

MAP 7.6A Ports

Port of Durban
Extent

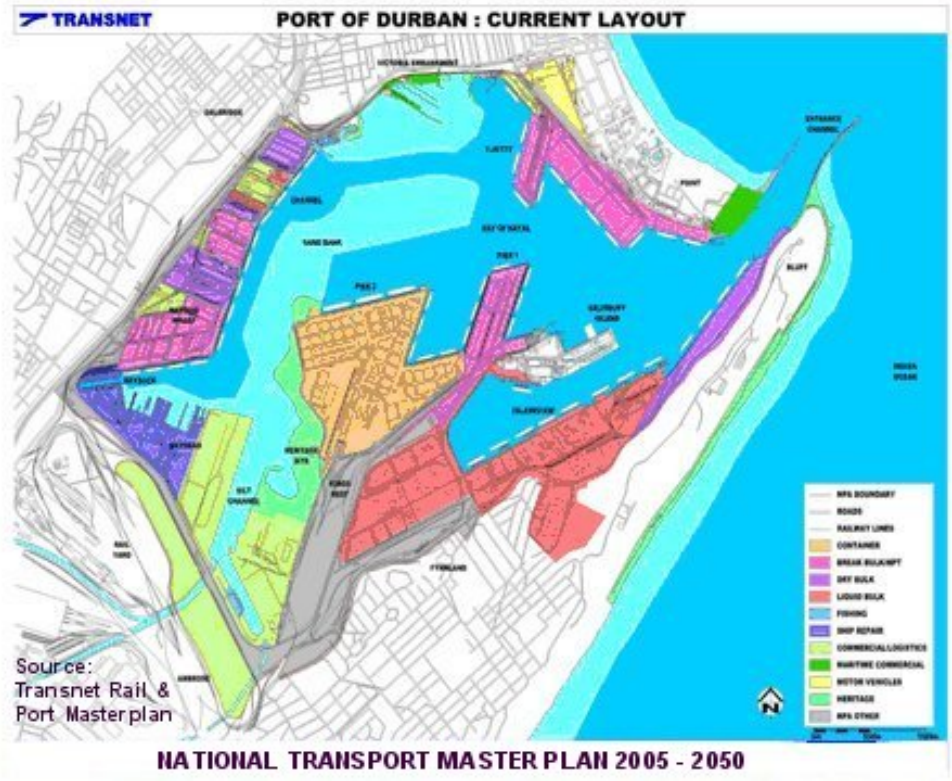


Figure 43: Port of Durban Layout

Entrance channel

The port is currently served by an entrance channel directly to the open water of the Indian Ocean. At its narrowest point it is 122 metres wide, and is dredged to a depth of 12,8 metres below Chart Datum. This channel, constructed in the 1890's no longer provides a safe passage to the large container vessels regularly visiting the port, and in consequence Transnet National Ports Authority is currently embarked on a major project to widen the entrance channel to 220 metres, with a depth of 16 metres in the inner channel, increasing to a depth of 19 metres in the approaches. The widened and deepened channel will be completed by 2009.

Ship handling limitations

At present vessels entering the port during daytime hours are limited to a length of 265 metres, beam of 32.5 metres, and draught of 11.9 metres. At night the length is limited to 200 metres. These restrictions will be amended on completion of the entrance channel widening.

Port working hours

The port, including pilotage and tugs, is available 24 hours per day, seven days per week.

Planned improvements

Planned improvements include the entrance channel widening and deepening mentioned above.

Roads accessing the port

The port has several road access points, being surrounded by the City as it is. The Point area is accessed by Margaret Mncadi Avenue (formerly Victoria Embankment) and Mahatma Ghandi (formerly Point) Road. Maydon Wharf is accessed by Maydon Road, and the Pier 1, Pier 2 and Island View areas are accessed by Bayhead Road.

Rail lines accessing the port

Durban is the rail hub for lines serving both North and South Coasts of KwaZulu-Natal, as well as the main Corridor serving the hinterland of the province and to Gauteng and the Free State provinces.

Marshalling yards serving the port

Whilst the main marshalling yard serving Transnet Freight Rail is the Bayhead Marshalling Yard, the port is served by its own Kings Rest Marshalling Yard, supplemented by local yards at Point, Fynnland and the Bluff. The marshalling yards have excess capacity to handle port freight.

Pipelines servicing the port

Durban is served by two pipelines serving the two refineries situated near the port.
A new R11.2 billion 610mm diameter pipeline is to constructed between Durban and Gauteng, commencing in 2008, for completion in 2010.

Berths

The port has the following berths:

Table 59: Port of Durban Berths

BERTHS	STRUCTURE	DREDGE DEPTH (M CD)	LENGTH (M)
Bluff Berth 1	Blockwork	-8.6	148
Bluff Berth 2	Blockwork	-9.0	177
Bluff Berth 3	Blockwork	-8.8	180
Bluff Berth 4	Blockwork	-10.3	234
Island View Berth 3	Piles	-10.8	165
Island View Berth 1	Caisson & piles	-12.5	230
Island View Berth 2	Caisson & piles	-10.0	175
Island View Berth 4	Piles	-9.4	175
Island View Berth 5	Sheet Piles	-10.6	175
Island View Berth 6	Sheet Piles	-8.9	175
Island View Berth 7	Piles	-11.9	230
Island View Berth 8	Piles	-12.0	230
Island View Berth 9	Piles	-12.2	245
Point A Berth	Blockwork	-11.2	288
Point B Berth	Blockwork	-9.9	329
Point C Berth	Caisson	-9.9	263
Point D Berth	Caisson	-13.7	239

BERTHS	STRUCTURE	DREDGE DEPTH (M CD)	LENGTH (M)
Point E Berth	Caisson	-13.7	239
Point F Berth	Caisson	-13.7	239
Point G Berth	Caisson	-13.7	239
Point M Berth	Caisson	-11.1	305
Point N Berth	Caisson	-11.3	262
Point O Berth	Caisson	-11.6	310
Point P Berth	Caisson	-10.6	310
Point Q Berth	Caisson	-10.1	183
Point R Berth	Caisson	-10.6	183
Pier 1 Berth 100	Blockwork	-8.2	276
Pier 1 Berth 101	Blockwork	-12.1	229
Pier 1 Berth 102	Blockwork	-10.7	213
Pier 1 Berth 103	Blockwork	-12.0	235
Pier 1 Berth 104	Blockwork	-11.9	351
Pier 1 Berth 105	Blockwork	-11.4	235
Pier 1 Berth 106	Blockwork	-11.7	213
Pier 1 Berth 107	Blockwork	-11.9	238
Crossberth Berth 108	Blockwork	-11.0	273
Crossberth Berth 109	Blockwork	-12.1	272
Pier 2 Berth 200	Blockwork	-11.7	236
Pier 2 Berth 201	Blockwork	-11.9	216
Pier 2 Berth 202	Blockwork	-12.3	216
Pier 2 Berth 203	Blockwork	-12.2	305
Pier 2 Berth 204	Blockwork	-11.1	305
Pier 2 Berth 205	Blockwork	-11.4	305
Maydon Wharf Berth 1	Sheet piles	-9.1	152
Maydon Wharf Berth 2	Sheet piles	-9.6	153
Maydon Wharf Berth 3	Sheet piles	-8.7	152
Maydon Wharf Berth 4	Sheet piles	-9.1	153
Maydon Wharf Berth 5	Piles	-9.6	200
Maydon Wharf Berth 7	Piles	-9.2	244
Maydon Wharf Berth 8	Piles	-9.2	172
Maydon Wharf Berth 9	Piles	-9.6	180
Maydon Wharf Berth 10	Piles	-8.3	226
Maydon Wharf Berth 11	Piles	-9.9	190
Maydon Wharf Berth 12	Sheet Piles	-5.1	275
Maydon Wharf Berth 13	Sheet Piles	-9.6	172
Maydon Wharf Berth 14	Sheet Piles	-9.6	173
Maydon Wharf Berth 6	Piles	-9.6	154
Maydon Wharf Berth 15	Mass concrete	-9.6	213

Ship Building / Ship Repair Facilities

- Dry docks:
  Prince Edward Graving Dock
  Length 352 metres, Width 33.5 metres, depth at entrance 12.5 metres MHWS
  Dormac
  Length 160 metres, Width 35 metres,
- Ship lifts / Syncrolifts:

None, except for Naval vessels

- Floating docks:
  Transnet dock
  Lifting capacity 4500 tons, length 109 metres, width 23.3 metres.
  Eldock
  Lifting capacity 8500 tons, length 155 metres, width 23.5 metres.
- Repair / fitting-out quays:
  Ship repair jetty 2 quays 206 metres long, dredged depth -7 metres CD
  Departmental quays, one 190 metres, one 160 metres, dredged to -6.5 metres CD
  Elgin, Brown & Hamer, one 165 metres, one 200 metres, dredged to -8 metres CD
  Dormac quays, one 195 metres, one 258 metres, dredged to -8 metres CD

Bunker facilities

- Quayside:
  Fuel and diesel oil are available ex pipeline at New Pier No 101 to 205 and Island View berths.
- Bunker berths:
  Gas oil ex pipeline is only available at Island View Berths 4,5,6,7 and 8. Fuel oil ranges from 60cst to 180cst. No bunkers are supplied outside the harbour. The bunkering barge, 'Durban Service', has a capacity of 140 tons of gas oil, 650 tons fuel oil and 280 tons diesel.
- Bunker barges:
  The Maydon Wharf and Point Berths are served with fuel oil, gas oil and blends from bunker barge.

Off-shore facilities

- Single buoy moorings (SBM):

  Eighty percent of South Africa’s crude oil is received through the Single Buoy Mooring (SBM) anchored offshore Duran from where 8.5 million tonnes of crude oil is received and transferred via pipeline every year. The SBM is owned by a consortium of oil companies and is operated by SAPREF.

Military installations in port

The South African Navy occupies and operates from its base on Salisbury Island, situated in the Port of Durban.

Usage

The Port of Durban is primarily a break-bulk port, including containers, but also handles significant volumes of bulk cargo, both dry and liquid.

Table 60: Berth Allocation per Type

BERTHS	TYPE	BERTHS	TYPE
Bluff Berth 1	Dry Bulk	Pier 1 Berth 102	General Cargo
Bluff Berth 2	Dry Bulk	Pier 1 Berth 103	General Cargo
Bluff Berth 3	Dry Bulk	Pier 1 Berth 104	General Cargo
Bluff Berth 4	Dry Bulk	Pier 1 Berth 105	Containers
Island View Berth 3	Dry Bulk	Pier 1 Berth 106	Containers
Island View Berth 1	Layby/Bunkers	Pier 1 Berth 107	Containers
Island View Berth 2	Bulk Liquid	Crossberth Berth 108	Containers
Island View Berth 4	Bulk Liquid	Crossberth Berth 109	Containers
Island View Berth 5	Bulk Liquid	Pier 2 Berth 200	Containers
Island View Berth 6	Bulk Liquid	Pier 2 Berth 201	Containers
Island View Berth 7	Oil Products	Pier 2 Berth 202	Containers
Island View Berth 8	Oil Products	Pier 2 Berth 203	Containers
Island View Berth 9	Oil Products	Pier 2 Berth 204	Containers
Point A Berth	General Cargo	Maydon Wharf Berth 1	General Cargo
Point B Berth	General Cargo	Maydon Wharf Berth 2	Dry Bulk Sugar
Point C Berth	General Cargo	Maydon Wharf Berth 3	General Cargo
Point D Berth	General Cargo	Maydon Wharf Berth 4	General Cargo
Point E Berth	General Cargo	Maydon Wharf Berth 5	Dry Bulk
Point F Berth	General Cargo	Maydon Wharf Berth 7	General Cargo
Point G Berth	General Cargo	Maydon Wharf Berth 8	Dry Bulk Grain
Point M Berth	General Cargo	Maydon Wharf Berth 9	General Cargo
Point N Berth	Passenger	Maydon Wharf Berth 10	General Cargo
Point O Berth	Pre-cooling	Maydon Wharf Berth 11	General Cargo
Point P Berth	Pre-cooling	Maydon Wharf Berth 12	General Cargo
Point Q Berth	Motor vehicles	Maydon Wharf Berth 13	General Cargo
Point R Berth	Motor vehicles	Maydon Wharf Berth 14	General Cargo
Pier 1 Berth 100	General Cargo	Maydon Wharf Berth 6	General Cargo
Pier 1 Berth 101	General Cargo	Maydon Wharf Berth 15	Forest products

Port of Richard Bay

Extent

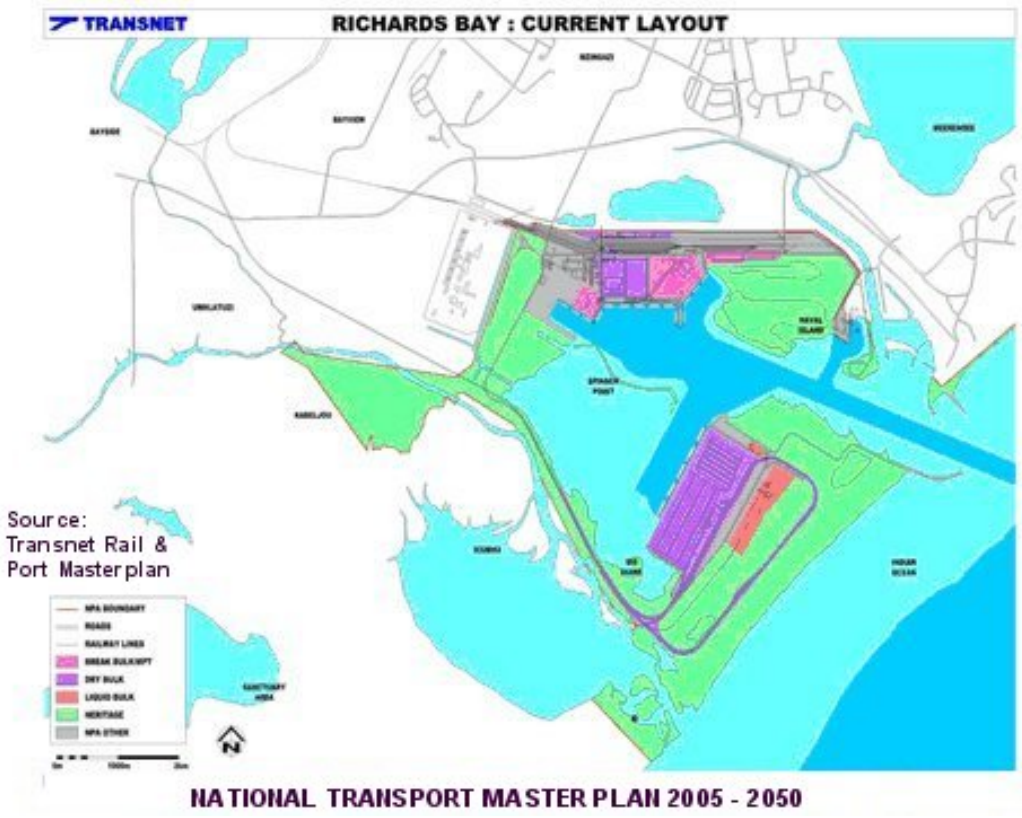


Figure 44: Port of Richards Bay Layout

Entrance channel

Situated at Longitude 32º 02' E and Latitude 28º 48' S, Richards Bay, South Africa's most northern-most and easterly port, is 87 nautical miles (160 km) northeast of Durban and 252 nautical miles (465 km) southwest of Maputo. The entrance channel is dredged to a permissible draught of 17.5 metres with a -19.5m depth in the entrance channel. Draught within the port varies according to location and berthing varies between 8m (small craft berth) and 19m (coal berths). Dredging is performed by the Transnet National Ports Authority (TNPA) on an ongoing basis inside the port and immediately outside the entrance using a trail suction hopper dredger.

The outer anchorage is situated approximately 3 - 5 nautical miles south-east of the port entrance. An inner anchorage is available for emergency use only.

Ship handling limitations

The maximum permissible draft is 17.5m.

Port working hours

The port, including pilotage and tugs, is available 24 hours per day, seven days per week.

City/Town Roads Access to the Port

The port of Richards Bay has a single entry road, the John Ross Highway that is currently being upgraded to relieve the congestion that has been hampering road freight efficiency. The port receives large volumes of timber, steel and general cargo by road. There is an adequate road system with the R34 John Ross highway linking Richards Bay to the N2 on route to Gauteng, Swaziland, Mozambique and Mpumalanga, and an excellent road south to Durban. The road route from Gauteng is circuitous and includes the very steep Melmoth - Nkwalini section. There are current plans to investigate a more direct connecting route between the N11, the Tugela Basin and the port.

Constraints

The movement of road freight between Gauteng and Richards Bay is not efficient due to the lack of a direct road route for break-bulk and container services.

Rail Lines Access to the Port

Access to Richards Bay Harbour is via Nseleni yard, about 10 km north of Empangeni. The Coal line crosses the Empangeni – Golela route at this point and there is a locomotive and wagon maintenance facility, as well as a yard at this point. Two lines run from the yard to Richards Bay, one of which gives assess to the Alton industrial area and the Bulk Cargo quay. The other line runs to the south and connects with the Richards Bay Coal terminal. The coal-link main line from the interior to Richards Bay requires a considerable amount of upgrading and replacement of rolling stock to keep pace with the continual gross export coal from Richards Bay port. The rail market share has been eroded due to costs, operating policies, speed of delivery, service and safety. The port has extensive rail and conveyor belt systems servicing the berths from nearby factories and workshops.

Pipelines Servicing the Port

There is a gas pipeline which runs from Secunda to various places in KwaZulu-Natal, including Newcastle, Richards Bay and Durban refineries via Empangeni. A total of 14 million giga joules are moved on this pipeline per annum. The pipeline in service will not be able to satisfy future demand. Development of a 450 mm diameter gas pipeline from Secunda is planned to increase the availability of gas from Mozambique Temane fields, for use by Richards Bay industries such as aluminium smelting.

Port Facilities

The port occupies 2,157 ha of land area and 1,495 ha of water area at present, but has the potential of expanding when required, making Richards Bay potentially one of the largest ports worldwide. Richards Bay serves the coalfields of KwaZulu-Natal and Mpumalanga Province as well as timber and granite exporters from as far away as the East Cape and Northern Cape Provinces.

Berths

The port has the following berths:

Table 61: Berth Characteristics

BERTH	STRUCTURE	DREDGE DEPTH (M CD)	LENGTH (M)
Berth 209	Piled	-14.0	300
Berth 301	Counterfort	-19.0	350
Berth 302	Counterfort	-19.0	350
Berth 303	Caisson	-19.0	350
Berth 304	Caisson	-19.0	350
Berth 305	Caisson	-19.0	350
Berth 606	Mass Concrete	-14.5	220
Berth 607	Mass Concrete	-14.5	220
Berth 608	Caisson & Mass Concrete	-14.5	204
Berth 705	Block Work	-19.0	280
Berth 706	Block Work	-14.7	200
Berth 707	Block Work	-14.7	200
Berth 708	Block Work	-14.7	200
Berth 609	Counterfort	-14.5	300
Berth 701	Counterfort	-14.5	300
Berth 702	Counterfort	-19.0	240
Berth 703	Counterfort	-19.0	240
Berth 704	Counterfort	-19.0	240
Berth 801	Piled	-19.0	260
Berth 804	Piled	-19.0	260
Repair Berth	Counterfort	-8.0	300
Reclaim	Reinforced Concrete	-	-

Ship Building / Ship Repair Facilities

Ship repair is undertaken at the quayside (usually the small craft berth), as the port currently has no ship repair facilities. A fully equipped diving service is available for ship inspection.

Dry docks

None. Development of a new ship repair facility with a dry-dock capable of handling very large crude carriers is under consideration within a public-private partnership modality.

Ship lifts / Syncrolifts

None

Floating docks
None

Repair / fitting-out quays
None

Bunker facilities

- Quayside
  Fuel and diesel oil
- Bunker berths
  Bunkering is provided by bunker barge or from the chemical and coal berths - berths 209, 301 and 302.

Off-shore facilities

- Single buoy moorings (SBM)
  None

Military installations in port

- SA Navy
  None

Usage
The Port of Richards Bay is primarily a bulk port, but also handles break bulk cargo in limited volumes.

Table 62: Berth Allocation per Type

BERTH	TYPE
Berth 209	Bulk Liquids
Berth 301	Coal
Berth 302	Coal
Berth 303	Coal
Berth 304	Coal
Berth 305	Coal
Berth 606	Break Bulk
Berth 607	Break Bulk
Berth 608	Break Bulk
Berth 705	Break Bulk
Berth 706	Break Bulk

BERTH	TYPE
Berth 707	Break Bulk
Berth 708	Break Bulk
Berth 609	Bulk Import
Berth 701	Bulk Import
Berth 702	Bulk Import
Berth 703	Bulk Export
Berth 704	Bulk Export
Berth 801	Woodchips
Berth 804	Woodchips
Repair Berth	Small Craft Harbour
Reclaim	Sand Bypassing

7.6.2 Service Capacity Bottlenecks

7.6.2.1 Port Capacity and Constraints
Port of Durban

Table 63: Port Throughput and Capacity

BERTHS	TYPE	BERTH OCCUPANCY 2005/06	TONNAGE HANDLED 2005	TEUS HANDLED 2005	VEHICLES FBU 2005	CAPACITY TONS/ TEUS/ FBUS
Bluff Berth 1	Dry Bulk	23.7%	1,910,000			4,800,000
Bluff Berth 2	Dry Bulk					
Bluff Berth 3	Dry Bulk					
Bluff Berth 4	Dry Bulk					
Island View 3	Dry Bulk	32.6%	1,050,000			2,100,000
Island View 1	Layby/Bunkers	30.7%				1,700,000
Island View 2	Bulk Liquid	47.6%	1,970,000			5,100,000
Island View 4	Bulk Liquid					
Island View 5 Island View 6	Bulk Liquid					
Island View 7	Oil Products	45.4%	5,330,000			12,000,000
Island View 8	Oil Products					
Island View 9	Oil Products					
Point A Berth	General Cargo	20.2%	1,070,000			4,250,000
Point B Berth	General Cargo					
Point C Berth	General Cargo					
Point D Berth	General Cargo					
Point E Berth	General Cargo					
Point F Berth	General Cargo					
Point G Berth	General Cargo					
Point M Berth	General Cargo					
Point N Berth	Passenger		N/A			N/A
Point O Berth	Pre-cooling	34.4%	447,123			700,000
Point P Berth	Pre-cooling					
Point Q Berth	Motor vehicles	43.9%			311,353	330,000
Point R Berth	Motor vehicles					
Pier 1 Berth 100	General Cargo	36.6%	76,000			85,000
Pier 1 Berth 101	General Cargo					
Pier 1 Berth 102	General Cargo					
Pier 1 Berth 103	General Cargo					
Pier 1 Berth 104	General Cargo					
Pier 1 Berth 105	Containers	48.4%	Converted to containers 2007	140,000		72
Pier 1 Berth 106	Containers					
Pier 1 Berth 107	Containers					72,000
Crossberth 108	Containers	70.1%		1,740,000		2,400,000
Crossberth 109	Containers					

BERTHS	TYPE	BERTH OCCUPANCY 2005/06	TONNAGE HANDLED 2005	TEUS HANDLED 2005	VEHICLES FBU 2005	CAPACITY TONS/ TEUS/ FBUS
Pier 2 Berth 200	Containers					
Pier 2 Berth 201	Containers					
Pier 2 Berth 202	Containers					
Pier 2 Berth 203	Containers					
Pier 2 Berth 204	Containers					
Pier 2 Berth 205	Containers					
Maydon Wharf 1	General Cargo	29.1%	866,510			1,700,000
Maydon Wharf 2	Dry Bulk Sugar					
Maydon Wharf 3	General Cargo	39.1%	640,000			900,000
Maydon Wharf 4	General Cargo					
Maydon Wharf 5	Dry Bulk	48.2%	1,050,000			1,100,000
Maydon Wharf 7	General Cargo	31.8%	26,000			32,000
Maydon Wharf 8	Dry Bulk Grain	35.5%	620,000			700,000
Maydon Wharf 9	General Cargo	33.9%	1,990,000			3,800,000
Maydon Wharf 10	General Cargo					
Maydon Wharf 11	General Cargo					
Maydon Wharf 12	General Cargo					
Maydon Wharf 13	General Cargo	41.2%				
Maydon Wharf 14	General Cargo	31.2%	210,000			280,000
Maydon Wharf 6	General Cargo	45.8%	105,000			1,300,000
Maydon Wharf 15	Forest products					

Port of Durban Capacity Constraints

The chief constraints to the Port of Durban, once the Entrance Channel widening and deepening is completed in 2009, are as follows:

- Lack of space for further major expansion
- Road access, both via the City to the Point area, and increasing so to the Bayhead area where the increase in containers moved by road transport is causing major congestion. Access through the City to the Point area is often congested, particularly and morning and evening peaks. Bayhead Road, although doubled recently remains a bottleneck to vehicles accessing the Container Terminal.
- A rapidly expanding motor vehicle import/export programme is stretching current port facilities to its limit.

Refer **to Map 7.6B**.

Port of Richards Bay

Table 64: Port Throughput and Capacity

Berth	Berth Occupancy 2005	Tonnage handled 2005	Capacity Tons
Berth 209	42%	1,784,442	1,100,000
Berth 301	65%	68,206,213	72,000,000
Berth 302			
Berth 303			
Berth 304			
Berth 305			
Berth 606	50%	4,395,043	6,650,000
Berth 607			
Berth 608			
Berth 705	70%		
Berth 706			
Berth 707			
Berth 708			
Berth 609	61%	5,347,688	6,000,000
Berth 701			
Berth 702			
Berth 703	70%	7,419,715	4,000,000
Berth 704			
Berth 801	65%		5,500,000
Berth 804			
Repair Berth	N/A	N/A	N/A
Reclaim	N/A	N/A	N/A

Port of Richards Bay Capacity Constraints

7.6.2.2 Port Condition and Constraints

The condition of the berths, assesses in 2005, is as follows:

Table 65: Port of Durban: Conditions of Berths

BERTH	CONDITION/ MAINTENANCE OVER NEXT 30 YEARS	BERTH	CONDITION/ MAINTENANCE OVER NEXT 30 YEARS
Bluff Berth 1	Fair, major repairs	Pier 1 Berth 102	Good, minor maintenance
Bluff Berth 2	Fair, major repairs	Pier 1 Berth 103	Good, minor maintenance
Bluff Berth 3	Fair, major repairs	Pier 1 Berth 104	Good, minor maintenance
Bluff Berth 4	Fair, major repairs	Pier 1 Berth 105	Good, minor maintenance
Island View Berth 3	Good, minor repairs	Pier 1 Berth 106	Good, minor maintenance
Island View Berth 1	Fair, major repairs	Pier 1 Berth 107	Good, minor maintenance
Island View Berth 2	Fair, major repairs	Crossberth Berth 108	Good, minor maintenance
Island View Berth 4	Good, minor repairs	Crossberth Berth 109	Good, minor maintenance
Island View Berth 5	Good, major repairs	Pier 2 Berth 200	Good, minor maintenance
Island View Berth 6	Good, major repairs	Pier 2 Berth 201	Good, minor maintenance

Island View Berth 7	Good, minor repairs	Pier 2 Berth 202	Good, minor maintenance
Island View Berth 8	Good, minor repairs	Pier 2 Berth 203	Good, minor maintenance
Island View Berth 9	Good, major repairs	Pier 2 Berth 204	Good, minor maintenance
Point A Berth	Good, minor repairs	Pier 2 Berth 205	Good, minor maintenance
Point B Berth	Good, minor repairs	Maydon Wharf 1	Poor, major repairs
Point C Berth	New, excellent	Maydon Wharf 2	Poor, major repairs
Point D Berth	New, excellent	Maydon Wharf 3	Poor, major repairs
Point E Berth	New, excellent	Maydon Wharf 4	Poor, major repairs
Point F Berth	New, excellent	Maydon Wharf 5	Good, minor repairs
Point G Berth	New, excellent	Maydon Wharf 7	Good, minor repairs
Point M Berth	Good, minor repairs	Maydon Wharf 8	Good, minor repairs
Point N Berth	Good, minor repairs	Maydon Wharf 9	Good, minor repairs
Point O Berth	Good, minor repairs	Maydon Wharf 10	Good, minor repairs
Point P Berth	Good, minor repairs	Maydon Wharf 11	Good, minor repairs
Point Q Berth	Good, minor repairs	Maydon Wharf 12	Poor, major repairs
Point R Berth	Good, minor repairs	Maydon Wharf 13	Fair, major repairs
Pier 1 Berth 100	Good, minor repairs	Maydon Wharf 14	Fair, major repairs
Pier 1 Berth 101	Good, minor repairs	Maydon Wharf 6	Good, minor repairs
		Maydon Wharf 15	Good, minor repairs

Port of Durban Condition Restraints

The only berths which are constricted by virtue of their condition are as follows:

Maydon Wharf Berths 1 to 4 : Loading restriction on quayside due to poor condition of steel sheet piles.

Maydon Wharf Berth 12 : Loading restriction on quayside due to poor condition of steel sheet piles.

Island View Berth 5 : Berthing restrictions due to poor sheet piles and ties (Berth 6 has recently been rebuilt)

Port of Richards Bay

Condition

The condition of the berths, assesses in 2005, is as follows:

Table 66: The Condition of the Berths, assessed in 2005

BERTH	CONDITION/MAINTENANCE OVER NEXT 30 YEARS	BERTH	CONDITION/MAINTENANCE OVER NEXT 30 YEARS
Berth 209	Good, major repairs	Berth 707	Good, minor maintenance
Berth 301	Good, minor maintenance	Berth 708	Good, minor maintenance
Berth 302	Good, minor maintenance	Berth 609	Good, minor maintenance
Berth 303	Good, minor maintenance	Berth 701	Good, minor maintenance
Berth 304	Good, minor maintenance	Berth 702	Good, minor maintenance
Berth 305	Good, minor maintenance	Berth 703	Good, minor maintenance
Berth 606	Good, minor maintenance	Berth 704	Good, minor maintenance
Berth 607	Good, minor maintenance	Berth 801	Good, minor maintenance
Berth 608	Good, minor maintenance	Berth 804	Good, minor maintenance
Berth 705	Good, minor maintenance	Repair Berth	Good, minor maintenance
Berth 706	Good, minor maintenance	Reclaim	Good, major repairs

Port of Richards Bay Condition Restraints

There are no condition restraints on the berths.

7.6.3 Implications of Existing Plans on Phase 3 Forward Plans

Transnet , the owner, manager and in most instances terminal operator of the commercial ports of South Africa, have developed their National Infrastructure Plan (NIP) to provide the basis for a holistic development for the ports, rail network and pipeline infrastructure under their stuartship. The NIP is informed by an Integrated Demand Forecast developed to assess the anticipated demand for its services for a 30 year time span to 2036.

In respect of the seven commercial ports (Mossel Bay has not been included) Transnet have adopted a principal of grouping ports into Zones – Eastern, Central and Western Ports. For each port Transnet has developed a suite of Infrastructure Development Plans – the Current Layout, a Future Layout to satisfy the short to medium term needs, and the Long Term Potential.

Transnet's NIP is the result of extensive analysis, and the consideration of various physical options. In certain instances, options have been developed to provide for the development of the required facilities in alternative ports in the same zone, in the event of extraneous circumstances preventing the development in the port of choice.
In Phase 3, all of the Transnet Infrastructure Development Plans will be reviewed in the light of the Transnet Integrated Demand Forecast, and the projections developed by the NATMAP Freight Transport Operational Analysis. Cognisence will be taken of Transnet's Hub Strategy Anaysis, where the various physical options are evaluated to assess which option is most beneficial to Transnet. It is in this regard that careful attention will be paid in assessing whether the decisions reached by Transnet were in the interests of the country as a whole, taking into account all modes of land freight transport, rather than the Transnet focus of rail transport.

Analysis will also take into account internationally benchmarked productivity norms in ports to evaluate whether operational efficiencies are achieved before infrastructure provision is adopted.

7.6.4 Identification of Alternative Strategies to be Investigated in Phase 3

The alterantive strategies to be investigated in Phase 3 will mainly comprise the analysis of Transnet's Hub Strategy Analysis, although any alternative layouts considered by the Working Group to be a viable option will be assessed and included as such.

7.7 PIPELINES

7.7.1 Summary of Pipelines

The main pipeline network in South Africa presently spans five provinces, namely KwaZulu-Natal, Free State, North West, Mpumalanga and Gauteng. The lines from KZN are:

- The refined products pipeline, a 300 mm diameter multi-product pipeline which transports from the coastal refineries to the interior refinery at Sasolburg; These include petrol, diesel, and synthetic fuel. A total of approximately 9,8 billion litres of refined products per annum is moved. Most of these products are transported from Durban to Gauteng – via Ladysmith and the Free State.

- The crude line, a 400 mm diameter crude oil pipeline which conveys product from the coast to the Reef storage and inland refinery. A branch from this line enters Mpumalanga to the north of Vrede and terminates at Secunda;

- Approximately 5 billion litres of crude oil per annum is moved on this pipeline. Crude oil is moved from Durban to the NATREF refinery in Sasolburg.

iii) PETRONET uses a dedicated jet fuel pipeline from NATREF to OR Tambo International. A total of 1,2 billion litres per annum is moved on this line. Approx. 200 million litres of this is moved from Durban refineries to O.R. Tambo International.

- The gas line, a 450 mm diameter pipeline which transports gas from Secunda to KwaZulu-Natal, via Empangeni to Durban.The gas pipeline runs from Secunda to various places in KZN, including Newcastle, Richards Bay and Durban refineries via Empangeni. A total of 14 MGJ (million giga joules) is moved on this pipeline per annum.

All liquid products are transported via pipeline to their customer's storage tanks, and from there are distributed by their customers via road using tankers.

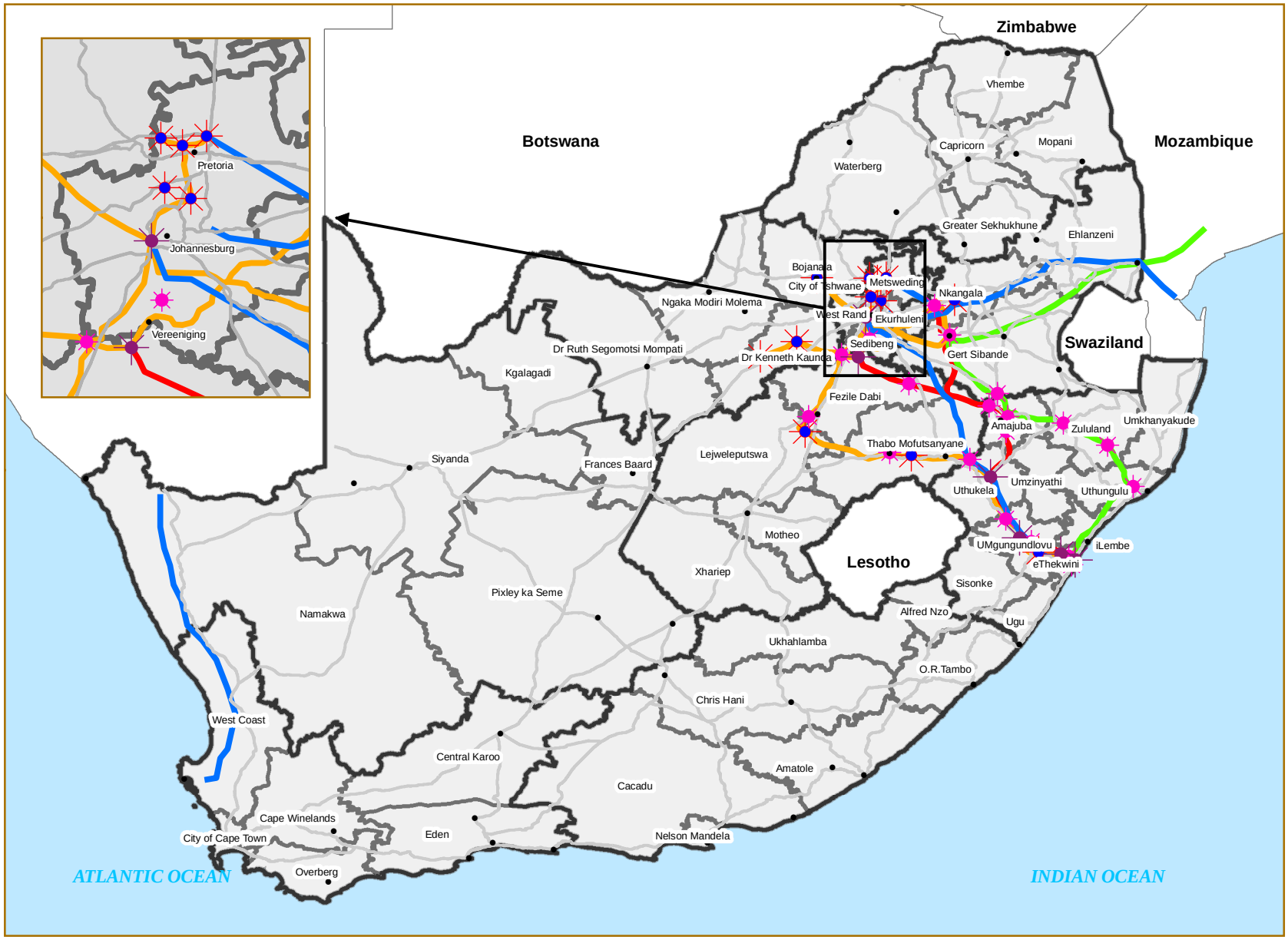
Refer to **Map 7.7**.

7.7.2 Service Capacity Bottlenecks

7.7.2.1 Pipeline Capacity and Constraints

Pipelines are running at near capacity – especially the Durban Gauteng refined products line. A new 24 inch pipeline is needed, and will cost approx. R9,4 billion rand.

South Africa: PIPELINE



PIPELINES

PIPELINES AND PUMPS

Pumps

- Delivery Station
- Double Pump Station
- Pump Station

Pipeline

- Crude Oil
- Gas
- Refined Products
- Future Pipeline

BASEMAP LEGEND:

- SANRAL Road Network
- Towns
- District Municipal Boundary
- Provincial Boundaries

1:9,500,000

0 35 70 140 210 280 Kilometers

Map and Data Current Status Completed

0-15% | 25% | 50% | 75% | 80% | 90% | 100%

February '09

NATIONAL TRANSPORT MASTERPLAN 2050

MAP 7.7 Pipeline

Due to the capacity problems on the pipeline and the poor services of rail, a lot of liquid fuel tankers are running to provide adequate fuel to the Northern provinces. This not only damages the roads, but is also a road safety problem.

7.7.2.2 Pipeline conditions and constraints

The conditions of the pipelines are not known. However, due to the capacity problems, a new Multi-Purpose Products (MPP) line is planned to be completed in 2010.

7.7.2.3 Missing Links

There are no missing links, although Transnet has a long-term plan to provide a new pipeline from Coega to Gauteng, when demand warrants it. This will only be done once the MPP line runs at capacity. Until such time, fuel will be shipped from Coega to Durban and then piped from there.

7.7.3 Implications of Existing Plans on Phase 3 Forward Plans

The plans of TRANSNET are adequate and will be incorporated into the NATMAP Forward Plans. However, the TRANSNET plans only cater for a design year of 2036. Beyond this date strategies will be developed in consultation with TRANSNET.

7.7.4 Identification of Alternative Strategies to be Investigated in Phase 3

Alternative strategies are not needed.

KZN Pipelines

7.7.5 Pipelines

The tonnage of commodities transported by pipeline (petroleum products and gas) is 6.9 million tonnes p.a. in comparison to the 48,0 million tonnes carried by rail and road.

7.7.5.1 Pipelines:

The transportation of liquid fuels by pipelines is a major transportation undertaking in South Africa with nearly all long distance pipelines being owned and operated by the specialist pipeline division of the parastatal transportation organisation.

The products currently transported by pipeline are gas, crude oil, aviation turbine fuel, diesel, alcohol and various grades of petrol.

7.7.5.2 Pipeline network

There is only one commercial pipeline operator in South Africa operating high pressure underground pipelines. These pipelines are at least 1 metre underground.

7.7.6 Commodities and Tonnages

Total liquid products tonnages (combined) moved on the pipelines amount to approximately 16,8 billion litres per annum.

i. Crude Oil:
ii. Refined Products:

iii. Jet Fuel (also a refined product):
PETRONET uses a dedicated jet fuel pipeline from NATREF to OR Tambo International. A total of 1,2 billion litres per annum is moved on this line. Approx. 200 million litres of this is moved from Durban refineries to O.R. Tambo International.

iv. Gas Pipeline:
The gas pipeline runs from Secunda to various places in KZN, including Newcastle, Richards Bay and Durban refineries via Empangeni. A total of 14 MGJ (million giga joules) is moved on this pipeline per annum.

All liquid products are transported via pipeline to their customer's storage tanks, and from there are distributed by their customers via road using tankers.

7.7.6.1 Constraints

Pipelines are running at near capacity – especially the Durban Gauteng line. A new 24 inch pipeline is needed, and will cost approx. R9,4 billion rand.

7.8 OTHER INFRASTRUCTURE

In this chapter long-distance public transport facilities are considered. In terms of the agreed Terms of Reference, only facilities of national significance are included. These are the facilities at the main Durban station, the Durban International Airport, and other economic nodes of national significance, such as Msunduzi District Municipality, Richards Bay and Margate. In most towns there are long-distance taxi ranks, and towns on the rail lines, have stations service long-distance passengers. However, if these towns are not of national significance, these facilities must be addressed in provincial and municipal plans. In Chapter 7.8.3 an approach is proposed to identify relevant facilities of national significance.

7.8.1 Service Capacity Bottlenecks

7.8.1.1 Public Transport Facilities

In general, long-distance facilities are not well addressed by CPTR's and information on these facilities is poor. They are normally in a poor condition and congested on Friday afternoons when migrant workers travel to their homes in the country. Facilities are not integrated between modes, and serves only a single mode.

The major long-distance facilities in KZN at the Durban main station, Durban airport, and Msunduzi, are being upgraded, or have been upgraded. These facilities are

therefore already being addressed, and the short-term plan for NATMAP should focus on the other facilities of national significance.

7.8.2 Implications of Existing Plans on Phase 3 Forward Plans

The upgrading and development of long-distance facilities are addressed in the ITP process, subject to available funding. As indicated above, NATMAP will address facilities that have not yet been upgraded with 2010 SWC funds, or as part of the ITP's.

7.8.3 Identification of Alternative Strategies to be Investigated in Phase 3

In South Africa the biggest challenge is not building high-quality integrated facilities. The main challenge is to provide high-quality integrated services. Merely building integrated facilities will not imply integrated services.

In Chapter 5, it is proposed that the development of a long-distance, integrated public transport network (IPTN) and services, similar to that proposed in the DoT's Public Transport Strategy for urban areas, form the basis for the forward plans for public transport. The network will be defined in order to serve national corridors and nodes. Long-distance facilities situated at these nodes will be identified and the plans will address their upgrading and development. Feeder-distributor services will take passengers to the long-distance facilities, from where they would be able to access public transport to any other national node.

The corridors and nodes for KZN have been identified in Chapter 4.4. A detailed network will be formulated in Phase 3 as well as identification of facilities at national significant nodes. Infrastructure strategies will include upgrading of road and rail infrastructure on the IPTN, as well as upgrading of stations and road-based facilities. As far as possible, facilities will be located at train stations, in order to give maximum support to rail.

8. FINANCIAL ANALYSIS

8.1 INTRODUCTION

Transportation funding is a concurrent function, with the three spheres of government enjoying disparate capacities to finance their mandates. As the dominant institution in terms of current fiscal arrangements in the country, National Treasury retains the overwhelming funding role – in excess of 95% of provincial revenue is provided for through transfers – for transportation capital and operational investments. The nature of roles and responsibilities vis-à-vis planning, operation, and regulation amongst different government departments, agencies and private operators in all three spheres of government and institutional hierarchies is fragmented.

Provincially, transportation investments – infrastructure, facilities, public transport services and subsidies, rolling stock and equipment - compete with other public services sectors of the province for funding.

From a review of International Road Federation statistics, South Africa should be spending approximately 5% of GDP on road infrastructure for a country at its stage of development. In fact, it is spending about 2%, which suggests, as with many other countries, that the road system is under some stress.

Government's R416 billion infrastructure programmes is a fundamental part of the modernising impetus, contributing to a steadily rising gross domestic fixed capital formation ratio – now at 18.4% of GDP. Transportation funding is integral and a pivotal component of this impetus. The FIFA 2010 World Cup has served to both elevate transportation (particularly public transportation) into the spotlight and so fast-track investment plans into this sector. Public resources are finite, and, in the face of urgent and deserving demands on the fiscus that a fair share of financial resources flow into socio-economic services – other than transport, NATMAP 2050 has factored into the funding analysis the potential and opportunities that a Public-Private Partnership (PPP) involvement may offer.

Whatever mix may be applied, all possibilities will have to meet the macro objectives of the national government which are sustainable economic growth and development. In terms of transportation systems, this translates into seeking stable, reliable, and predictable funding sources in order to have cost effective and uninterrupted transport infrastructure facilities and services capital intensive, improvement, and maintenance programmes from now until 2050.

At a regional level, the SADC Protocol on Transport, Communications and Meteorology, Articles 4.5 and 4.6, commit countries to implement road funding policies and harmonised national road user charging systems, as well as harmonised cross-border road user charging systems respectively. Currently, a Regional Cross Border Road User Charges (RUC's) Collection Association is contemplated by the SADC countries. The expectations are that this will go a long way to harmonising

RUC in the region following the implementation of the Draft Memorandum of Understanding on harmonisation of these cross-border RUCs.

8.2 SUMMARY OF PROBLEMS AND ISSUES

Generally, provincial funding is critically (95%) depended on national transfers. Competitive allocation means roads infrastructure receives an average of between 4.53% (historically recorded for the budget periods 2002/3 to 2005/6, rising to 5.0% in the medium term estimates between 2006/7 and 2008/9) from provincial Treasuries. Clearly, a multi-modal view of transportation funding, which factors in the enabling role of transportation in the economy as well as transportation's fair share in the creation of the country's GDP has to be taken into account for NATMAP to succeed.

KwaZulu Natal Province currently relies more on provincial allocations in the form of equitable shares, conditional grants and other infrastructure transfers from Treasury. However, other sources mainly in the form of tax receipts (motor vehicle registration and licensing fees, sale of personalised and specific number plates) as well as non tax receipts (traffic fines, sale of capital assets like vehicles) also contribute to the provincial funds. The province, however, incurred deficits amounting to R2.4 million in the 2006/07 period mainly as a result of unforeseen road damage from storms in December 2006 and January 2007.

The apparent acceleration of provincial capital expenditure (referred to as payments for capital assets and projected to grow at 15.6% average for all provinces over the MTEF) is encouraging, but needs to be 'unpacked' to tease-out the share for transportation and its significance.

8.3 ECONOMIC ROLE OF TRANSPORTATION

A review of the economic role of transportation, incorporating the wider catalytic impact of transportation investments, both infrastructure and operational investments, is a subject of a dedicated analysis and will be documented in a separate working paper, whose findings will be incorporated into the funding analysis with future revisions of this report.

Nonetheless, it is important to record here-in two findings reported to the Technical and Finance Committee of NATMAP 2050, at their meeting of the 18th June 2008, viz. that,

As **Figure 45** below depicts, the gross capital formation in South Africa, taking into account both public and private capital formation over the 46-year period to 2007, it is remarkable that – perhaps, contrary to popular perception, the private sector capital formation is the highest now than it has ever been over the period. More recent public sector efforts (including government agencies) have still to be captured and will reflect in the future as the investment ramp up accelerates.

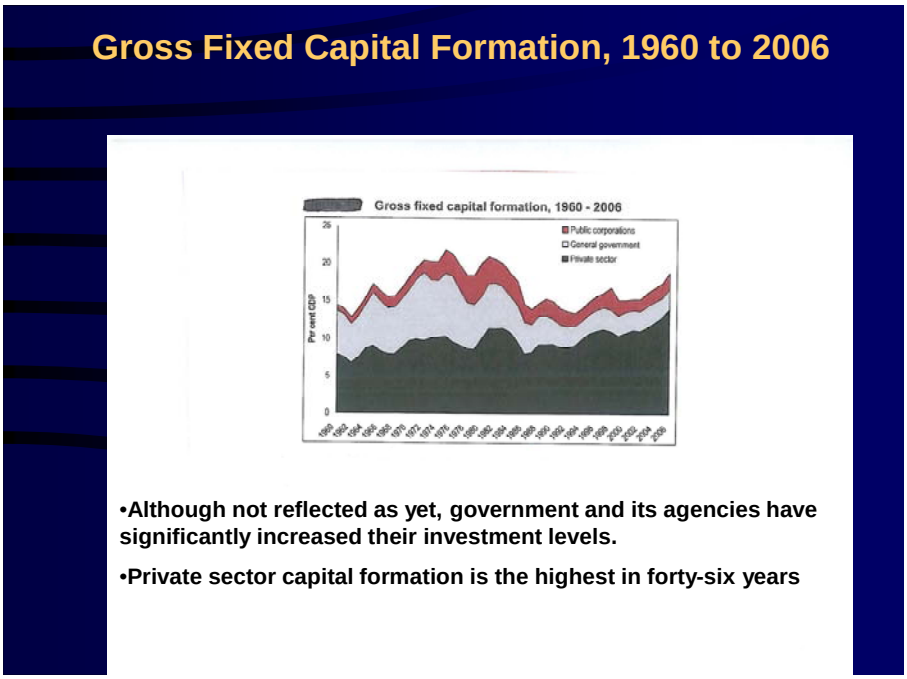


Figure 45: Gross Capital Formation 1960 to 2006

Further, in its own right, transportation as a sector, plays a significant role in the composition of the country's gross domestic product, accounting for a 10.7% share of same in 2007, in addition to transportation's role as a catalyst for the real economy as depicted on **Figure 46**, below.

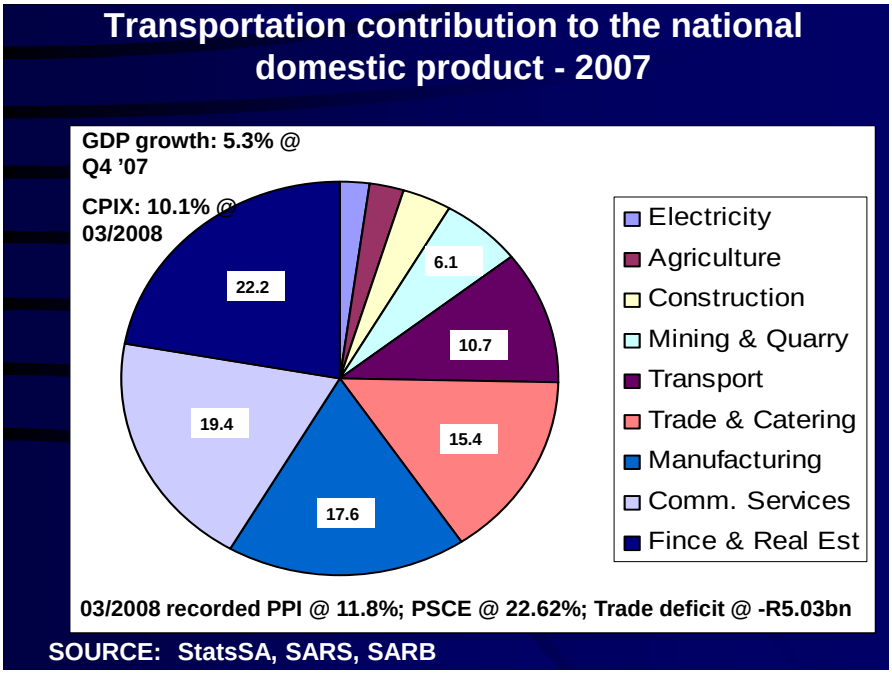


Figure 46: Transportation Contribution to the National Domestic Product - 2007

It is frequently assumed that all transport improvements stimulate economic development. The sad truth is that some do, some do not, and that even some of those that do may not be economically justified in the sense that there may be better investment opportunities. Each project must therefore be investigated individually …. (Adler, 1971, p.29)

Notwithstanding Adler's caution cited above, broad consensus exists that transportation is essentially a 'tool', and, that investments in transportation generate benefits in lowering logistics costs. The cost reduction may manifest in numerous ways, i.e., typically when one or more (or a combination) of the following occurs, a decrease in travel time, increase in safety, decrease in fuel consumption and/or other operating costs and a reduction in pollution (noise, air, water, etc). From a national perspective, lower travel and freight costs help productivity which, in turn, increases income to firms and individuals. Pivotally, the attendant productivity gains also help the nation's goods to be more competitive in international markets. The key point here is that for transportation investments to contribute to national economic growth, they must significantly reduce transportation costs. Transfers of economic activity from one location within the nation to another do not constitute economic growth. Equally, mode switching does not constitute economic growth. Key is the resultant net gains to society as a whole.

NATMAP 2050 is therefore concerned with the creation of, and – in a catalytic sense - inducing the creation of net gains to society over the planning period and beyond from future transportation investments, across all modes of transport.

8.4 NATMAP 2050 TRANSPORTATION FUNDING CRITERIA

The analysis of the status quo of transportation funding in SA confirms that funding resources are finite and the different spheres of government tasked with various responsibilities of providing transportation infrastructure and operation often do not have the funding wherewithal to discharge their functions at adequate levels and on sustainable bases.

Since taxation is a fundamental source for transportation funding, applicable taxes must exhibit a fair structure to enjoy universal legitimacy among South Africans. To achieve this, the structure must contain elements of the following criteria – equity, efficiency, adequacy and ease of administration and compliance. There may, of course, and often there will be conflict between the criteria, but such conflicts only serves to underline the imperative, which is, to give sufficient consideration to them to guide the design/evaluation of taxes and/or user charges levied to fund transportation investments.

8.4.1 Equity

In modern, democratic SA, there does seem to be general acceptance that each taxpayer should pay his/her fair share of the cost of government. This 'consensus' rests on the 'twin-notions' of "benefits received" and "ability to pay". NATMAP 2050 advocates that both notions should apply when deriving equity in the funding of transportation investments, i.e., the amount that a user pays should be proportional

to the benefits received and, payments should be in accord with some measure of capacity to pay.

8.4.2 Efficiency

Efficiency is concerned with the avoidance of undesirable economic side effects, i.e., the tax/charge is neutral in its effects on market behaviour, and does not introduce any "excess burden" or loss in economic welfare above that resulting from the tax/charge payment itself. Such effects should be kept at a minimum, unless, the objective is to induce a change in economic behaviour.

Departure from efficiency in transportation investments for the purpose of inducing societal desirable economic behaviour is foreign to South Africa, but is gaining currency and momentum elsewhere, e.g., the congestion pricing in London – UK, for the purpose of curbing congestion and reducing the need for expensive capacity expansion. Whilst NATMAP 2050 endorses the departure from efficiency to achieve wider societal goals, any purpose of a tax/charge other than to raise revenues to fund transportation infrastructure and/or operations should be clearly delineated, its distorting economic effects carefully examined, clearly understood and factored into the decision.

8.4.3 Adequacy

A tax/charge must raise sufficient revenues to support the programme it is designed to support. Limited value transportation charges/taxes do not provide stable and predictable sources of revenue.

Whilst most adequate taxes are generally levied on a broadly-defined base, and are thus difficult to circumvent, a narrowly defined and/or dedicated transportation tax/charge is not difficult to avoid through a change of economic behaviour. Nonetheless, South Africa's only 'quasi' dedicated tax - the fuel tax - is stable, but, given the conclusions of the energy and environmental analysis, it also is likely to undergo structural changes which will affect its adequacy during the NATMAP 2050 planning period.

The adequacy criterion is further entangled by the multi-modal and integrated approach to transportation planning that NATMAP 2050 prescribes. Indeed, any perception of inequity may render politically sensitive the pooling of funding for one mode to the perceived benefit of another. Consequently, attendant potential political trade-offs that may ensue are bound to dilute any envisaged economic net gains inherent in an integrated approach to delivering transportation benefits to society at large, as discussed under 2 above.

Hence, the adequacy norm, whether in form of taxes or user charges requires that these bear a degree of correspondence to the costs of providing target facilities/services for which funds are being raised.

8.4.4 Ease of Administration and Compliance

The second World Bank report – "Paying Taxes 2008: The global picture", measures how easy it is for companies to pay tax (SA at 61st of 178 countries). It also ranks countries according to tax burden on companies' corporate income (SA at 65% of a

company's total tax rate – against a global average of 37%). At an average of 350 hours a year spent on compliance against less than 50 hours in countries generally considered as our traditional trading partners, SA's compliance cost is singularly uncompetitive. It is against this background that the significance of transportation related taxes/charges must be evaluated, and, NATMAP 2050 proposals take due regard of compliance and charge/tax collection costs.

8.5 BASE-YEAR TRANSPORTATION FUNDING INSTRUMENTS

Funding instruments have specific application and in general are more applicable to one sphere of government than another. Local government has different instruments of collecting additional funding for Transport infrastructure than National Government has at its disposal. The spread of transport funding is however a matter of national importance and the main funding transfers follow a top down approach.

- The funding instruments reflected under road mode are the most significant instruments currently being applied by National Government. Provincial and Local Governments then receive annual grant transfers flowing directly from the funding instruments and others, mentioned under item 8.4.1.

8.5.1 Road Mode

8.5.1.1 The Fuel Levy

The collection of the fuel levy increases from year to year and provides a steady and reliable source of income for national government. The increase in the fuel levy is directly linked to the growth in private vehicle ownership and utilisation as well as the continuous increase of fuel prices which is related to international crude oil prices. **Table 67** indicates the actual revenue generated from the fuel levy over a period of eight years. The aggregate growth rate of revenue from 2001/02 to 2008/9 is 77,13%. The average annual growth rate is approximately 8,5% over the same period.

Table 67: Fuel Levy revenue collected by National Government

Financial Year	Actual Amounts Collected	Estimates	Year on Year Percentage Increase
2001/02	R 14 923 196 000	-	
2002/03	R 15 333 757 000	-	2,75%
2003/04	R 16 652 388 000	-	8,60%
2004/05	R 19 190 431 000	-	15,24%
2005/06	R 20 506 668 000	-	6,86%
2006/07	R 21 844 642 000	-	6,52%
2007/08	-	R 24 000 000 000	9,87%
2008/09	-	R 26 434 000 000	10,14%

Source: National Treasury: Estimate of National Revenue (2001 – 2008)

The logic of a fuel levy is that it could be viewed as a form of user charge for all road users and could contribute to the shift from private to public transport use. The downside of this financial instrument is that, firstly, as vehicle use falls so does the revenues. Secondly, provinces have recently been permitted to levy a piggy back tax on fuel sales, and the Western Cape has thus introduced such a tax. Using this source to finance public transport complicates accountability between provincial and local governments.

The initial intention was to utilise a portion of the Fuel Levy to finance new capital formation and to top-up existing operational funding sources. Capital funding to upgrade and expand existing infrastructure resources has not kept track with the country's economic growth rate, and, as a result infrastructure development has lagged behind demand. Serious shortcomings of public transport infrastructure has led to a marked dependency on private vehicular usage and a shunning of public transport. The lack of adequate funding sources being dedicated towards transport infrastructure means other funding alternatives must be explored, such as the current toll strategy.

The National Land Transport Transition Act (NLTTA) is being reviewed and will in due course be replaced by the National Land Transport Bill (NLTB). The NLTB has undergone a public comment, parliamentary debate to include aspects previously excluded from the Bill. With particular reference to transportation funding, the issues under consideration relate to the inclusion and entrenchment of funding streams such as the Municipal Infrastructure Grant (MIG) as well as the Public Transport Infrastructure and Systems Fund (PTIS).

8.5.1.2 The Equitable Share

The objective of the provincial equitable share is to divide revenue transfers from Treasury among provinces. The division consists of six components that capture the relative demand for services between provinces, taking into account their

circumstances. For the latest Budget -2008, the distribution of the weights by component is as follows:

- Education share 51%;
- Health share 26%;
- Basic share 14%;
- The institutional share of 5% is devided equally between provinces;
- The poverty component 3%, and
- The economic output component based on the GDP by region at 1%.

Provincial executive councils retain discretion in determining departmental allocations for each function.

Table 68: Provincial equitable share, conditional grant & own funds – 2006/07 to 2010/11. Outcome Budget Medium-term estimates

R million	2006/07	2007/08	2008/09	2009/10	2010/11	Average Transport ES share & Own Funds
Eastern Cape	24 643	27 074	31 383	35 343	38 446	
Free State	9 595	10 745	12 413	13 932	15 104	
Gauteng	23 362	28 217	33 064	37 638	41 384	
GPTRW Alloctn	3 211	3 156	3 863	4 542	4 637	11.86%
Tpt Cond.Grant	3 015	3 029	3 266	2 507	318	7.42%
Own funds	752	619	815	872	933	2%
KwaZulu-Natal	33 476	39 821	46 971	55 512	58567	
Equitable Share	21 886	25 470	30 926	36 984	38 681	
Conditional Grants	3 482	5 730	6 627	8 347	8 961	
Tax Receipts	7 179	7 510	8 258	8 878	9 544	
Non Tax Receipts	929	1 111	1 160	1 303	1 381	
Limpopo	20 616	22 340	25 935	29 252	31 869	
LPR&T Alloctn	1 439	1 703	1 725	1 902	2 109	6.83%
Tpt Cond.Grant	292	440	486	646	778	2%
Own funds	157	167	210	219	232	0.7%
Mpumalanga	11 227	14 140	16 436	18 562	20 250	
Northern Cape	3 452	4 598	5 341	6 028	6 571	
North West	12 347	11 973	13 821	15 500	16 790	
Western Cape	13 459	15 118	17 739	20 189	22 214	
Total ES	150 753	171 271	199 377	225 466	246 306	

Source: Treasury, Revenue trends and tax proposals, 2008

8.5.1.3 Conditional Grants

"Conditional grants are used to fund national priority programmes aimed at speeding the realization of basic social rights". (Revenue trends and tax proposals, page 126). Conditional grants in KZN have continued to increase over the years as provided in **Table 68** above.

8.5.1.4 Motor Vehicle Licences

Vehicle licences are collected by Local Government and allocated to the applicable Provincial Governments. Revenue generated from this source of funding has also gradually increased over the years in the KZN province. This is provided in the below table.

Table 69: Revenue Generation through Vehicle License Fees (2001-2010)

Provinces	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
KZN	515 828	624 302	706 000	745 000	785 000	821 688
Northern Cape	56 229	60 597	66 210	75 955	79 810	84 200
Eastern Cape	108 124	303 590	250 194	185 952	204 546	225 002
Western Cape	558 960			75 995	79 810	84 200
Gauteng	814 655	959 577	1 130 346	1 128 950	1 506 234	1 611 671
Limpopo	123 074	127 946	133 064	140 021	167 817	176 618
Free State						
North West	10 855	74 497	101 516	122 315	144 414	
Mpumalanga	121 387	126 225	169 764	178 460	185 833	

Source: National Treasury: National & Provincial budget statements: Revenue (2001 – 2008)

8.5.1.5 Government Grants to SANRAL

Founded by Act of Parliament – The South African National Roads Agency Limited and National Roads Act, No. 7 of 1998, SANRAL is bankruptcy remote, and may not be placed in liquidation – unless authorised by an Act of Parliament. The portion of Government grants received by SANRAL as reflected in **Table 70** below relates to the provision of transport infrastructure, in particular, roads infrastructure of National and Provincial importance. The government grants received co-finance infrastructure development projects, specifically where Public Private Partnerships (PPP)'s, Build Operate Transfer (BOT)'s and toll concessions are involved. Government grants are an important source of income for SANRAL together with toll fees.

Table 70: Government Grants to SANRAL – Capital (2001 – 2008)

Year (s)	Government Grants Received	% annual Growth
2001/02	R 526 741 000	-
2002/03	R 668 295 000	26,9%
2003/04	R 457 451 000	-31,5%
2004/05	R 657 861 000	43,8%
2005/06	R 213 914 000	-67,5%
2006/07	R 440 427 000	105,9%
2007/08	R 906 212 000	105,8%

Source: SANRAL: Audited Annual Financial Statements (2001-2007)

Table 71 indicates the multi-year capital and operational budgets of SANRAL as well as the percentage growth rates between financial years.

Table 71: SANRAL Capital & Operational Budget Allocations (2001 – 2008)

Year	Capital Budgets	% Growth	Operational Budgets	% Growth
2001/02	R 205 871 000	-	R 461 575 000	-
2002/03	R 269 011 000	30,67%	R 582 637 000	26,23%
2003/04	R 644 863 000	139,71%	R 830 880 000	42,61%
2004/05	R 1036 102 000	60,67%	R 758 977 000	-8,65%
2005/06	R 338 349 000	67,34%	R 917 996 000	20,95%
2006/07	R 467 470 000	38,16%	R 1 566 692 000	70,66%
2007/08	R 1 068 190 000	128,50%	R 1 828 072 000	16,68%

Sources: SANRAL: Audited Annual Financial Statements (2001-2008)

8.5.1.6 Tolling

In terms of the SANRAL Act, SANRAL is obliged to operate its toll roads separately from its other national roads. Hence, SANRAL maintains separate accounting records for toll and non-toll operations, and there is no cross subsidization between the two businesses. Toll roads are deemed to be self-funding and to amortize over a 30-year period. They are funded through debt capital market, raised in ZAR, in form of bonds and loans (also termed Loan Supportable by Revenue Principle, or 'LER').

The growth in revenue from toll collection is attributable to mainly three factors, namely:

- The inflation linked tariff adjustment that occurs annually on 1 March;
- The traffic growth, which has been positive over the past few years;
- It should also be noted that the Operator under the CTROM model pays the actual gross income to the Agency and then claims discounts, concessions

and violations as a cost, as per the cost matrix. This methodology will thus also increase the revenue collected.

Table 72: Toll Revenue - SANRAL (2001 – 2007)

Year (s)	Toll Revenue Generated	Annual Growth Rate (%)
2001/02	R 421 560 000	-
2002/03	R 472 368 000	12,05%
2003/04	R 539 736 000	14,26%
2004/05	R 686 950 000	27,28%
2005/06	R 812 657 000	18,30%
2006/07	R 914 333 000	12,51%
2007/08	R 1 045 337 000	14,33%
2008/09	n/a	-

Source: SANRAL: Audited Annual Financial Statements (2001-2007)

The above table indicates an average growth rate of 16,5% in toll revenue collected by SANRAL on a year-to-year basis. Toll income is utilised to refinance further infrastructure developments or to finance upgrades of road infrastructure.

It must borne in mind that, as attractive as the LSR funding mechanism may be, it requires rigorous financial viability to be proved/demonstrated. This is determined by calculating the NPV of the project over the time period (typically, 30 years), using a projected real interest rate, expected traffic growth and all forecast expenditures

8.5.1.7 Municipal Infrastructure Grant (MIG)

MIG fund is administered by the Department for Provincial and Local Government (DPLG) and the aim with MIG is to consolidate all previous funding streams into one manageable fund. It is of interest here-in as far as consideration must be given to funding of “last-mile” solutions for both passenger and freight transport. The funds which are consolidated into the MIG fund is funding channelled from cabinet via the DPLG (Provincial Municipal Infrastructure task Team (PMITT) to a Local Municipal level. This is done in order to provide all South Africans with at least a basic level of service by the year 2013 through the provision of grant finance aimed at covering the capital cost of basic infrastructure for the poor. An array of services receive annual funding allocations from the MIG, including municipal roads and street lighting.

The allocation of MIG funding is distributed to Local Municipalities on an annual basis according to the approved project business plans for the various services as mentioned above. The Division of Revenue Act, gazetted by National Treasury on an annual basis reflects the funding allocation to Local Municipalities as a single annual amount for infrastructure development of the services mentioned above.

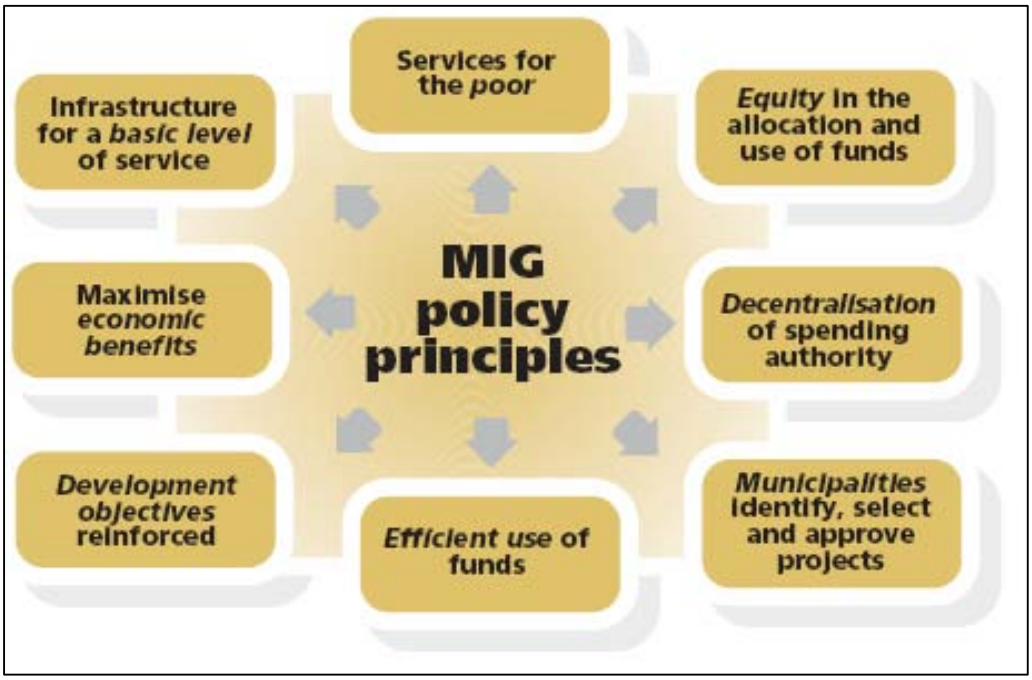


Figure 47: MIG Policy Principles

The below table indicates the historic MIG allocations provided for in the National budget for further distribution to municipalities. The functional areas covered include various facets of transportation infrastructure.

Table 73: National MIG Allocation (2001 – 2009)

Financial Year (s)	Amount Allocated R' 000
2001/02	R 994 000
2002/03	R 104 478
2003/04	R 2 246 253
2004/05	R 2 841 028
2005/06	R 3 113 470
2006/07	R 6 265 300
2007/08	R 7 548 564
2008/09	R 8 053 090
2009/10	R 9 130 230

Source: DORA (Government Gazette) (2001 – 2009)

The drastic increase in funding allocations since 2003/04 relates to the conversion of the Consolidated Municipal Infrastructure Programme (CMIP) to the Municipal Infrastructure Grant (MIG) which is consolidated to include the following individual funding sources, namely:

- Consolidated Municipal Infrastructure Programme
- Water Services Project
- Community Based Public Works Programme
- Local Economic Development Fund
- Urban Transport Fund
- Building for Sport and Recreation Programme
- National Electrification Programme

8.5.1.8 Public Transport Infrastructure and Systems Fund

The PTIS fund has been created in view of allocating government capital funding towards the development of transport infrastructure to facilitate the hosting of the 2010 FIFA SWC. The PTIS Grant is intended to finance all transport modes ie(rail, bus, minibus-taxi, and non-motorised transport (NMT) and their subsequent infrastructure requirements. Funding allocations are made to Host Cities based on approved priority statements (business plans) which are consolidated into a Transport Action Plans for infrastructure development to successfully host the 2010 FIFA Soccer World Cup, from a transport perspective.

By the end of 2005, the PTIS Fund allocated R 2.112 billion in new and additional funds for public transport improvements. The PTIS Grant allocation for the two major metropolitan municipalities in KZN in comparison with other provinces is provided in the below table

Table 74: PTIS Grant Allocations per Province and Government Agencies

Provincial Government	Organisation	Amount Allocated
GAUTENG	City of Johannesburg Metro	R 615 million
	Ekurhuleni Metro	R 40.5 million
	Gauteng Prov	R26 million
	City of Tshwane Metro	R 24.15 million
	West Rand DM	R1.5 million
WESTERN CAPE	City of Cape Town Metro / Western Cape	R 290 million
	Stellenbosch LM	R20 million
KWAZULU-NATAL	KwaZulu-Natal Metro	R 102.2 million
	eThekweni Metro	R 34.4 million
EASTERN CAPE	Nelson Mandela Metro	R 198.45 million
	Amathole DM	R20.86million
	King Sabata Dalindyebo DM	R9.0 million
	Eastern Cape Prov	R1.4 million

FREE STATE	Mangaung LM	R 57.83 million
LIMPOPO	Polokwane LM	R 13.9 million
	Limpopo Prov	R 0.5 million
MPUMULANGA	Mbombela (Nelspruit)	R4.83million
NORTH WEST	Klerksdorp/Orkney	R 56.5 million
	Potchefstroom	R 1.0 million
NORTHERN CAPE	Sol Plaatjie / Northern Cape Prov	R 12.5 million
SARCC/MetroRail	JOHANNESBURG, TSHWANE, CAPE TOWN, ETHEKWINI	R563.22 million

Source: DoT: Transport Action Plan for 2010 –(Version 1) –(2006)

Table 75 below indicates total allocations to eThekwini in comparison with other venue city municipalities. The PTIS grant up to 2009/10 is over R9.13bn in total. Of this R4.84bn was allocated to host city municipalities for defined projects, with another R2.34bn to phase 1 BRT systems to be allocated to selected venue cities. SARCC capital funding has been increased through the PTIS by R1.31bn, and SANRAL's by R0.43bn for national road access improvements to venues.

Table 75: PTIS Grant Allocations to Host Cities (Rounds 1 – 3)

Hosting Cities	Initial Allocation PTIS (Rounds 1 & 2) (R' 000)	Additional Recommended Allocation PTIS (Round 3) (R' 000)	Totals (R' 000)
City of Tshwane	24,150	670,000	694,150
City of Johannesburg	614,900	705,000	1,319,900
City of Cape Town	292,150	378,100	670,250
Mangaung	57,830	240,000	297,830
Rustenburg	4,000	52,930	56,930
Polokwane	13,900	165,000	178,900
eThekwini	139,360	713,700	853,060
Nelson Mandela	198,750	320,000	518,750
Mbombela	2,640	208,800	211,440

Source: DoT: Initial Transport Operational Plan for 2010 FIFA World Cup (Oct 2007)

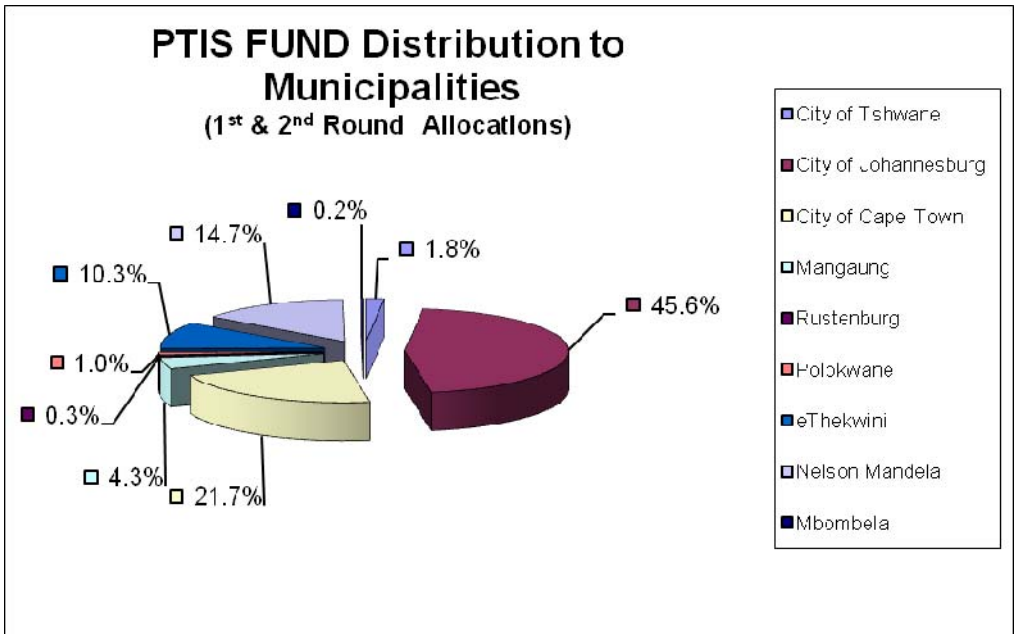


Figure 48: Percentage Allocation to Metropolitan Municipalities (1st & 2nd Rounds)

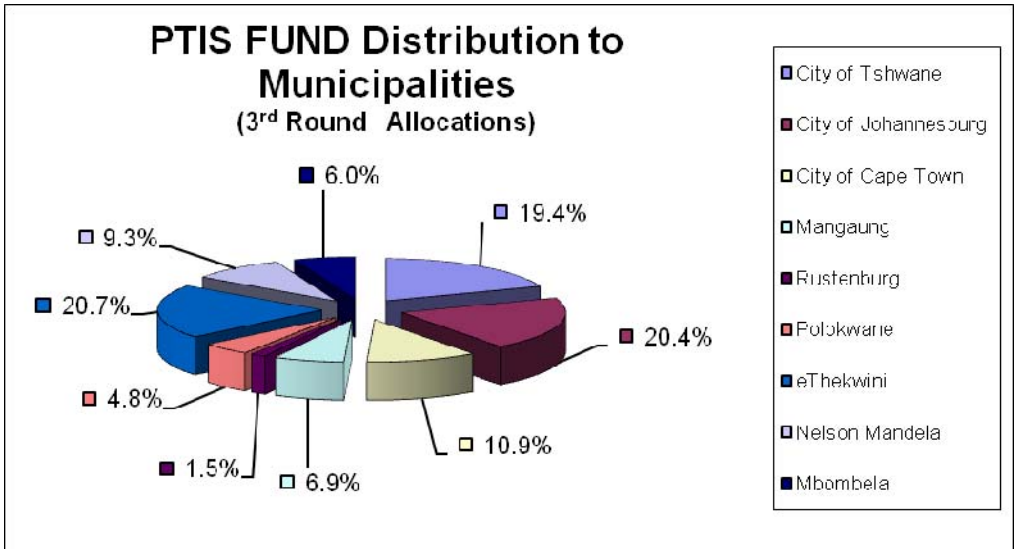


Figure 49: Percentage Allocation to Metropolitan Municipalities (3rd Round)

Provincial Allocations – Bus Subsidies

8.5.1.9 Bus subsidies

The bus subsidy programme aims to allocate funding to tendered bus services on dedicated bus routes in order to subsidize the operational cost of the services and by doing so, to reduce the fare cost to the commuter. Table 76indicates the bus subsidies allocated on a national level for further distribution to the various provinces, implementation and monitoring agencies.

Table 76: Provision for Bus Subsidies – National

Year (s)	R' 000
2001/02	1 722 031 000
2002/03	1 846 909 000
2003/04	2 068 500 000
2004/05	2 172 740 000
2005/06	2 297 753 000
2006/07	2 460 335 000
2007/08	n/a
2008/09	n/a

Sources: SANRAL: Audited Annual Financial Statements (2001-2008)

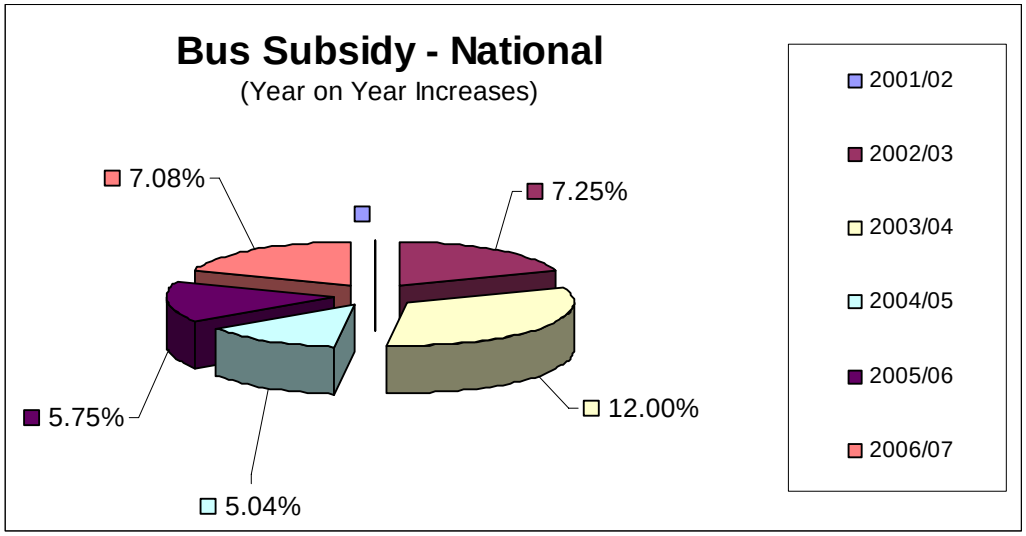


Figure 50: Percentage Allocation to Metropolitan Municipalities (3rd Round)

The bus subsidies in **Figure 50** above indicates a maximum increase of 12% during 2003/04 and thereafter a steady annual reduction to levels of between 5% and 7%.

8.5.2 Rail Mode

Transnet published comparable financial data for period 2003 - 2007 is only available for the Rail segment as a whole.

Table 77: Total Revenue figures – Rail Segment (2004 – 2007)

Year (s)	Total Segment Revenue R Million
2003/04	18 176
2004/05	19 934
2005/06	19 936
2006/07	22 213

Source: Published & Audited Financial Statements - Transnet

Table 78: Total Operational Expenditure - (2004 – 2007)

Year (s)	R Million
2003/04	17 754
2004/05	18280
2005/06	17912
2006/07	17633

Source: Published & Audited Financial Statements – Transnet

The Rail segment figures include those for Freight Rail, Rail Engineering, Shosholoza Meyl, Luxrail and Metrorail

8.5.2.1 Transnet - Freight Rail

The Transnet capex spend for freight rail includes buying 404 locomotives for R4.9bn. Of the R34.8bn to be spent on rail, R15.3bn would be for upgrading and equipping the general freight business, including containers, cars, manganese and steel.

Table 79: Expenditure on Infrastructure

Year (s)	Audited Outcome R' 000
2004/2005	504,276
2005/2006	565,333
2006/2007	832,952
2007/2008	1,429,350 (Adjusted appropriation)
2008/2009	1,806,944
2009/2010	2,731,982
2010/2011	3,695,901

(Source: Transnet Financial Statement - 2007)

The rail division accounts for most of Transnet's R16bn capital budget in the current financial year. The following capacity expansions have been achieved:-

- Capacity expansion on the coal line has been improved to 78-million tons a year, at a cost of R628m.
- The ore line has been expanded to 47-million tons a year, at a cost of R1,37bn.
- A total of R4bn was spent on the rolling stock and maintaining infrastructure.

Further, R. 225m is to be spent on 110 dual-voltage locomotives for the coal line. Another R849m will be spent on modernising and renewing Transnet's rail fleet and R365m on upgrading 200 locomotives.

Fifty new locomotives have been ordered.

(Source: Business Day article, posted on web - 24 April 2008 – extracts from speech – Transnet CEO – 23/04/2008)

Categorized by business line, Freight Rail capital expenditure over the next 5 years is as follows:

Table 80: Freight Rail 5-year Capex

Business Sector	R million
General Freight	24 603
Coal Line	4 911
Ore Line	3 764
Ngqura	753
Other	791

(Source: Transnet Financial Statement - 2007)

The financial performance for 2007 was impacted by decreased production, with unstable mine supplies affecting volumes. The group aims to spend over R38-billion between 2008/9 and 2012/13 to recapitalize its freight business.

(Source: Transnet Funding article from Transnet CEO speech – 23/04/2008)

8.5.2.2 South African Rail Commuter Corporation

SA Rail Commuter Corporation (SARCC) control SA's rail network. Metrorail, a division of Transnet Ltd, is responsible for operating the metropolitan commuter system in seven regions: Durban, Cape Town, Port Elizabeth, Pretoria, East London, Berlin (Uitenhage) and Wits Greater Johannesburg. It is contracted to the SARCC, which owns the rolling stock and most of the infrastructure.

SARCC is incorporated as a private company and maintains financial records accordingly (although the 2005 statements were qualified). The group financial position includes Intersite (Pty) Ltd, a wholly-owned subsidiary.

Table 81: Group Abbreviated Balance Sheet (R bn)

Item	Group	
	'05	'06
Assets	7.8	8.1
Non-current	6.7	6.6
Current	1.2	1.5
Equity/Liability	7.8	8.1
Capital/reserves	4.1	3.0
Non-current	3.1	3.9
Current	0.6	1.2

The book value of the company's fixed assets is in the order of R6.6bn. Given that the accumulated loss amounted to some R1.3bn at the end of FY2006, these losses were financed by the share capital invested in the firm, as well as ongoing capital subsidies.

The Chairman's report accompanying the 2007 annual report notes that Government has committed itself to investing in rail infrastructure development and maintenance. SARCC has adopted the National Passenger Rail Plan, which includes the objectives of rolling out and extending new rail services networks where required.

Table 82: SARCC Group Abbreviated Income Statement (R bn)

Item	Group	
	2005	2006
Revenue	2.1	2.3
Net operating cost	-2.4	-3.0
Sundry income	0.1	0.1
Finance cost	0	0
Investment income	0.1	0.1
Loss before tax	-0.2	-0.5
Taxation	0	0
Net loss after tax	-0.2	-0.5

On a turnover of R2.3bn, SARCC made a loss of some R0.5bn in 2006. Revenues included some R268m of fare revenue (about 11% of total revenues). The major contributor to revenues is the State compensation (subsidy). The State provided annual compensation to finance SARCC's operating deficit to the tune of R1.6bn in 2006. The subsidy, although not guaranteed, is budgeted for in the MTEF. The subsidy includes a component payable to Metrorail in accordance with contractual provisions to provide rail commuter services. In 2006, this amounted to some R1.088bn.

Table 83: Expenditure on Infrastructure – SARCC

Year (s)	Audited Outcome R' 000
2004/2005	655,000
2005/2006	688,300
2006/2007	1,029,598
2007/2008	1,696,078 (Adjusted appropriation)
2008/2009	2,367,686
2009/2010	3,684,144
2010/2011	4,393,193

Special Projects (1) – 2010 Soccer World Cup

• Co-ordinate investment in transport infrastructure and systems by monitoring and supporting the implementation of the 2010 action plan in accordance with FIFA guarantees.

(Source: Programme 4 : Integrated Planning and Inter-sphere Co-ordination)

The 2008 Budget highlights the following with respect to spending on public services

- R8.2 billion for public transport, roads and railway infrastructure.

In this regard, the SARCC is further allocated R1.3bn from the Passenger Transport Infrastructure Fund (PTIS) for the 2010 Soccer World Cup.

Table 84: Passenger Transport Infrastructure Fund allocations – Soccer World Cup

Year (s)	Fund Allocation R' 000
2007/2008	476,000
2008/2009	210,000
2009/2010	450,000

Special Projects (2) – Gautrain Rapid Rail Link

A grant has been allocated for the Gautrain Rapid Rail Link.

Table 85: Expenditure on Gautrain

Year (s)	Special Projects - Gautrain R' 000
2006/2007	3,241,000
2007/2008	3,029,411 (Adjusted appropriation)
2008/2009	3,265,993
2009/2010	2,507,211
2010/2011	317,526

The national passenger rail plan, which guides investment in key corridors to improve service levels, was approved by Cabinet in December 2006. Metrorail has been consolidated into the South African Railway. Commuter Corporation and the second phase of passenger rail consolidation will incorporate Shosholoza Meyl long distance passenger rail services.

8.5.3 Maritime Mode

Table 86: Total Revenue (2004 – 2007)

Year (s)	Total Segment Revenue R Million
2003/04	7 512
2004/05	8 557
2005/06	8 740
2006/07	10 204

Source: Published & Audited Financial Statements - Transnet

Table 87: Total Expenditure (2004 – 2007)

Year (s)	Revenue R Million
2003/04	4 216
2004/05	4 342
2005/06	4 402
2006/07	4 016

Source: Published & Audited Financial Statements – Transnet

NB.: Maritime includes National Ports Authority and Port Terminals

8.5.3.1 Transnet - National Ports Authority

The coastal area is divided into seven sub regions under the control of the NPA, Harbour Masters of Saldanha Bay, Cape Town, Port Elizabeth, East London, Durban, Richards Bay, as well as the Port Captain of Walvis Bay. Within each sub-region the Harbour Master's office acts as a Rescue Sub Centre (RSC). The main activities are in containers, break-bulk, general cargoes.

Table 88: Revenue NPA (2006 – 2008)

Year (s)	Revenue R million	% Increase
2005/06	5 438	
2006/07	6 107	12 %
2007 / 2008 (Projected)	6 881	12.67%

Source: Published & Audited Financial Statements – Transnet – National Port Authority

NPA's strategic direction includes enhanced maintenance and expansion of the national ports infrastructure. The overall capital expenditure has increased accordingly.

Table 89: Capital Expenditure (2006 – 2008)

Year (s)	Capital Expenditure R Million
2005/06	783
2006/07	1026
2007/2008	3948

(Source: Transnet National Ports Authority : Operational Report - 2007)

Table 90: NPA Capital expenditure to 2011

Ports	Ports – SAPO R billion	Ports – NPA R billion
Durban	0.9	7.6
Richards Bay	0.7	0.8
Ngqura	1.5	4.7
Cape Town	0.4	3.8
Saldanha	2.9	
Floating Craft		0.7
Totals	6.4	17.6

(Source: Transnet Financial Statement - 2007)

The group would spend some R16,4-billion on harbour infrastructure over the period 2008 - 2013 another R9,6-billion on port-operations equipment and (R26 billion) infrastructure; and nearly R12-billion on upgrading its fuel pipeline from Durban to Gauteng.

(Source: Business Day article, posted on web - 24 April 2008 – extracts from speech – Transnet CEO)

8.5.3.2 Transnet – Port Terminals

Table 91: Port Terminals Revenue (2006 – 2008)

Year (s)	Revenue R million	Percentage Increase
2005/06	3 585	
2006/07	4 098	14 %
2007 / 2008 (Projected)	4 740	

Source: Published & Audited Financial Statements – Transnet – Port Terminals

Containment of cost increases whilst growing revenue resulted in operating margin increasing from 25.4% to 33.0%.

8.5.4 Air Mode

8.5.4.1 Air Traffic Navigation Services (ATNS)

The Air Traffic and Navigation Services Company Limited (ATNS), a schedule 2 public entity in terms of the PFMA, was established in terms of the Air Traffic and Navigation Services Act (1993). Its core mandate is to provide safe, orderly and efficient air traffic and navigational and associated services.

Table 92: ATNS P&L (2004 – 2007)

Year (s)	Revenue R '000
2003/04	363 078
2004/05	452 745
2005/06	545 337
2006/07	576 923

Source: Published & Audited Financial Statements – ATNS

Table 93: ATNS Capex (2004 – 2007)

Year (s)	Capital Expenditure R '000
2003/04	149 400
2004/05	105 500
2005/06	131 974
2006/07	218 657

Source: Published & Audited Financial Statements – ATNS

Despite tariffs remaining flat during the 2007 financial year, revenue increased due to an increase in air traffic movements and training given to third parties. Profit margins, however, fell for the period.

8.5.4.2 South African Airways

Table 94: Revenue (2004 – 2007)

Year (s)	R Million
2003/04	17 106
2004/05	18 116
2005/06	20 593
2006/07	21 960

Source: Published & Audited Financial Statements - Transnet

Published figures include SAA Airways & Express Airways

Table 95: Operational Expenditure (2004 – 2007)

Year (s)	R Million
2003/04	(20 883)
2004/05	(17 272)
2005/06	(20 038)
2006/07	(21 883)

Source: Published & Audited Financial Statements – Transnet

(includes South African Airways (Pty) Ltd and South African Express Airways (Pty) Ltd)

Although revenue increased 6.8% in the 2007 financial year to R 20.6 billion, competitive pressure from low-cost carriers resulted in lower passenger yields. Net operating expenses increased by 12.8% mainly as a result of fuel price increases totalling 14.5% over the previous year.

Fuel levies collected amounted to R 2.4 billion, compared to R 2.2 billion in 2006.

(Source: Transnet CFO Report – 2007)

8.5.4.3 Airports Company of South Africa

Table 96: Revenue (2003 – 2007)

Year (s)	R '000
2002/2003	1 588 866
2003/04	1 864 883
2004/05	1 941 292
2005/06	2 174 845
2006/07	2 564 271

Source: Published & Audited Financial Statements - ACSA

Table 97: Operational Expenditure (2003 – 2007)

Year (s)	Operational expenditure R '000
2002/2003	835 553
2003/04	971 228
2004/05	
2005/06	1 206 016
2006/07	1 396 340

Source: Published & Audited Financial Statements – ACSA

ACSA, without doubt, exhibits a successful track record in fulfilling its mandate. The infrastructure entrusted to it has been consistently enhanced and capital expenditure has tracked demand. All three major entry airports have been allocated a portion of the capex during 2007, viz.,

- O.R. Tambo International – R 1.235 billion
- Cape Town International – R 278 million
- Durban International – R 203 million

Other airports in ACSA's stable have also received a proportional share of the capex. ACSA invested up to R1,7 billion in infrastructure development to kick start a programme that will see its infrastructure capacity improved in readiness for the FIFA WC. Further, ACSA has committed a total of R19,5 Billion for airports upgrading including the Greenfield La Mercy Airport in Durban.

Source : Report - Issued by: Department of Transport, 16 August 2007

Revenue has grown by almost R1bn over the period 2002/3 to 2006/7, and grew by a 18 percent to R2,564 billion during 2007. The growth was fuelled by consistent passenger growth as well as significant revenue from commercial and other non-aeronautical revenues. The latter increased by 20,7 percent to R1,189 billion in 2007.

Source: Published & Audited Financial Statements – ACSA

Airport Taxes

Tariffs are approved by the Regulating Committee. The Passenger Service Charge (PSC) is normally reflected on airline tickets as "airport taxes", and is often included along other non-ACSA related charges.

The PSC is independently regulated in a manner that ensures protection for both the passenger and ACSA. Over the past five years to 2008, the average passenger service charge has only increased by an annual 5%.

The Regulator has managed to keep the PSC relatively low through the utilization of a single till economic regulatory model, which allows for non-aeronautical revenues to subsidize the airline and passenger fees resulting in a reduction of these charges

over time. In this model, regulators take all sources of revenue into one till as input into the determination of a tariff base.

8.5.5 Provincial Perspective

Total national transfers (equitable share and conditional grants) to Gauteng have increased by 29.54% from the 2005/6 to 2006/7 budget periods, and are set to rise further in the medium-term estimates - 2007/8: 16.46%, 2008/9: 12.25%, 2009/10: 8.97%. Of the total allocation to the Transport, Roads and Works Department of R6.5 billion in the 2007/8 year, R4.5 billion goes towards the implementation of the Gautrain project. With respect to revenue generation in Gauteng licence fees constitute 97.1% of GPTRW own revenue.

8.6 CONFORMANCE OF CURRENT TRANSPORTATION FUNDING INSTRUMENTS WITH THE NATMAP 2050 FUNDING CRITERIA

8.6.1 Equity

8.6.1.1 Road Mode

FUEL LEVY

Although the fuel levy as levied in South Africa is a general tax (not earmarked for dedicated funding of transportation investments), it conforms to the notion of equity as it nonetheless constitutes a fair mechanism as it approximates a direct charge through which users pay for the benefits they receive i.e., air- and road-based and transportation. Fuel levies further comply with the user pay principle, although it is by no means certain that its quantum reflects the benefits received by users. Being a general tax, the fuel levy cannot be used to measure and gauge affordability and adequacy (fit-for-purpose) i.t.o delivering air- and road-based transportation. In fact, few users are aware of the fuel levy share of the price/cost build-up of fuel.

The equitable distribution of the revenue generated by means of the fuel levy remains a controversial matter, with some technocrats arguing that most – if not all – revenue raised through the fuel levy must accrue to funding transportation infrastructure, in particular roads. Such argument would be difficult to ignore were the quantum raised through the fuel levy equal to that required to create and maintain the entire roads and air networks of the country – which it does not. Even if such a quantum were achievable, there would remain the question of equitable access which would still be constrained by affordability. At any rate, as it is and taking into account public transport subsidies, the fuel levy is largely spent on the provision of transportation.

There looms, within the NATMAP 2050 planning horizon, a probable exhaustion of fossil fuels as non-renewable resource is finite. With this prospect, it is safe to assume that a levy based on this type of energy will - in absolute terms – decline, even if its quantum were to be ratcheted upwards as a proportion of the fuel price build-up to reflect its growing scarcity.

TOLLING

Tolling was introduced by government with a view to mobilize private sector funding for the creation and maintenance of road transport infrastructure, and where realistic financial viability is proven to transfer risk for said provision to the private sector.

Tolling presents an opportunity to more realistically reflect the cost of maintaining road infrastructure through differentiated charges, e.g., to reflect the relative intensity of use generated by heavy vehicles. Exceeding allowable axle loads also causes undue damage. Although the latter is more of law enforcement concern, tolled roads have seen a marked decrease in incidents of overloading through more rigorous implementation of weighbridges on tolled roads. Also, toll avoidance channels costs to parallel roads that are frequently not designed to carry the traffic or loads. Despite these reservations, tolling – using improved management practices – has the potential to achieve greater equity in the application of user pays principles. A direct derived benefit would be a better allocation of traffic to the most suitable mode – for freight, in particular.

The socio-economic impacts of tolling remains obscure, is not adequately investigated and quantified. Long run negative impacts should be considered so that tolling of national and provincial corridors does not create unwanted barriers between regions and isolate entire populations who partake in active economies elsewhere. In this respect, the integrated and multi-modal delivery of transportation for passengers that NATMAP 2050 advocates levels the playing field by responding to competing demands for transportation through the holistic approach that seeks to provide alternatives which allow equitable and affordable consumption and so improve overall access to passenger transportation.

The road regulator has an economic role, but current focus is on safety

8.6.1.2 Rail Mode

The provision of rail infrastructure and operations thereon are the preserve of two government agencies – the South African Rail Commuter Corporation (SARCC) – for passenger rail, and Transnet – for freight. Both entities are undergoing extensive reform to turn around their fortunes.

For the SARCC, equity in access is meant to be achieved through subsidized charges for passenger services, whilst Transnet aims not only to recover costs, but to make a profit to re-invest in infrastructure and operations. The combined mandates (to create and maintain the networks as well as operate distinct services thereupon) has seen both entities fail to adequately deliver on both counts. Ultimately, with deteriorating infrastructure and operational standards, both entities have lost market share to road (private minibus vehicles in the case of SARCC and road hauliers, in that of Transnet). This has happened at the cost of equitable access for users.

8.6.1.3 Maritime & Pipeline Mode

The maritime mode is a part of Transnet. Again, the two mandates are consolidated in that entity. Equitable access is less of an issue in this mode as the bulk of the services delivered hereupon are to business. However, increases in the tariffs have been limited in percentage terms due to the increasing bulk volumes handled at all major ports. Tariff rates are based on tonnage / volumes thereby generating additional revenue according to cargo volumes for both import and exports.
A regulator has recently been appointed and the applicable approach is still to emerge.

8.6.1.4 Air Mode

Access to this mode is regulated – both i.t.o safety and economics. Price caps (CPI-X) of tariffs are regulated on a 5 year permissions cycle and access is considered equitable.

Tariffs are approved by the Regulating Committee. The Passenger Service Charge (PSC) is normally reflected on airline tickets as “airport taxes”, and is often included along other non-ACSA related charges.

The Regulator has managed to keep the PSC relatively low through the utilisation of a single till economic regulatory model, which allows for non-aeronautical revenues to subsidise the airline and passenger fees resulting in a reduction of these charges over time. In this model, regulators take all sources of revenue into one till as input into the determination of a tariff base.

8.6.2 Efficiency

8.6.2.1 Road Mode

Both the fuel levy and tolls are a form of user charges conforming to the “user pay principle”.

The collection of a fuel levy is effective, creates no resistance and or avoidance by users and efficient i.t.o cost of collection. It directly affects the price of fuel at the pump. The user pays according to the amount of fuel consumed, and hence there is a direct link to either the user’s economic activity or/and level of affordability. With recent price increases of fuel, direct behavioural changes have been experienced that suggest a level of elasticity of demand – at least for private vehicle usage.

Although frequently seen as an additional burden on the user, tolls are collected efficiently. Some users go to some lengths to avoid tolls. The impact of this practice is felt both at the loss of revenue to the toll road operator, and strain on parallel roads built to lesser standards whose maintenance costs rise considerably. Some international best practice may provide some relief to limit toll avoidance as NATMAP 2050 advocates. Where Public Private Partnerships are the basis of toll road operation, tolls reflect the cost of provision and maintenance of the road –

irrespective of the institutional arrangements of compensation of the private sector operator.

The practice of providing an alternative route to a tolled road has been abandoned. However, at a socio-economic level, anecdotal evidence of an undesirable side effect of tolling of national toll roads that bypass rural agglomerations suggests some measure of economic dependency on through traffic by said communities. NATMAP 2050's cost benefit evaluation template of transportation investments will take such unintended outcomes into account in order to minimize collateral inefficiencies.

8.6.2.2 Rail Mode

Investment efficiency in this mode forms a great part of a dedicated Rail Working Group and the funding efficiency conclusions are included there-under. However, the current mismatch i.t.o mode appropriate use of road versus trail mode indicates a degree of inefficiency(ies).

8.6.2.3 Maritime & Pipeline Mode

To the extent that some measure of cross-subsidization from the maritime mode to the benefit of loss-making divisions in the Transnet stable has been suggested, a certain degree of investment efficiency must be concluded – despite reported capacity constraints experienced at national ports.

8.6.2.4 Air Mode

The air mode infrastructure is generally considered efficiently funded, the portion of national significance under ACSA's mandate, in particular. The difficulties experienced at mode operating level are managerial, as evidenced by thriving new entrants.

8.6.3 Adequacy

8.6.3.1 Road Mode

A constant and predictable stream of revenue is generated by means of the fuel levy. As the levy is not meant to be a dedicated source for the road mode, its adequacy is moot. At any rate, taking a country-wide view, capex for creating new infrastructure and opex for maintaining the existing network far exceed the quantum of the fuel levy.

Notwithstanding, and, even taking into account fuels from the indigenous coal-to-liquid or factoring in the gas-to-liquid from fields in Mozambique, the current and predicted cost of fossil fuel puts the levy under threat as users adjust their consumption patterns in response to affordability pressures. Factoring the finite nature of fossil fuels, the conclusion can only be that a significant structural adjustment lies ahead.

Tolls provide an opportunity to apply the user pays principle. Like the levy, tolls are price-elastic and cannot be dependent upon beyond certain affordability thresholds.

However, it is not foreseen that current tolled infrastructure is under any threat. The expansion of privately funded tolled roads is reliant on vehicle counts that are frequently not available outside of currently already tolled corridors. Hence, the potential for toll road expansion using public private partnerships through the build-operate-transfer formula are limited, leaving public (both directly from the fiscus and through government agencies) the only viable/reliable source. In the long-term horizon of NATMAP 2050 and in view of competing demands on the fiscus of a developmental state, the public source cannot be relied upon to significantly increase resources ploughed into transportation. A review and recasting of current funding practice is thus mandatory.

8.6.3.2 Rail Mode

Rail is the preserve of Transnet and SARCC, both, state-owned enterprises. Despite current surge in the funding of rail infrastructure and operations, adequacy and sustainability of said investment increases is moot. A review and recasting of current funding practice is thus mandatory.

8.6.3.3 Maritime & Pipeline Mode

Maritime is the preserve of Transnet. Indications are that the country's national ports and harbours as well as pipelines are profitable, and provide a source for cross-subsidizing other activities within the Transnet stable. This practice is opaque and the basis (or even fairness to users) of the infrastructure cannot be assessed conclusively. A holistic and transparent process of resource allocation to the maritime mode is necessary within a multi-modal environment that NATMAP 2050 advocates.

In other environments, the profitability of the maritime and pipeline modes has attracted private funding – often in PPPs. Recent reports suggest that there may be scope to factor in private funding to achieve the port development plans that Transnet's National Ports Authority has in mind for each of its commercial ports. NPA's 30-year cargo forecast suggests that, for port infrastructure alone, a R.230bn investment level would be required during that time. Consistent with Transnet's current drive to focus on high volume core transport businesses, it would be equally feasible for the NPA to sub-contract the dry dock and wet ship repair function that is currently provided in-house and benefit from competitive bidding for its business and potential landlord annuities. Although the dual mandate to provide the infrastructure and operate makes decisive conclusions difficult, a prima facie argument for mandate separation to facilitate a transparent resource allocation in a multi-modal environment is indicated. Hence, a review and recasting of current funding practice is thus mandatory.

8.6.3.4 Air Mode

The air mode infrastructure of national significance is adequately funded and air mode facilities enjoy sustainable and adequate funding.

8.6.4 Ease of Administration and Compliance

Current funding administration and compliance for all modes is judged fit-for-purpose within current practices. However, for the road mode, the ease of administration and compliance varies across a spectrum covering – typically, 0.1% for collecting the fuel levy up to 30% for manual toll collection.

8.7 LESSONS FROM FUNDING BEST PRACTICE – WITH PARTICULAR REFERENCE TO THE ROAD MODE

Table 98: Road Mode Revenues and Expenditures in Europe

	Fr	Ger	UK	W.Europe
Sources of road user revenues (percentage total)				
Taxes related to ownership(a)	27	22	47	33(b)
Fuel tax	57	78	53	55
Tolls and permits	8	-	-	4
Other	8	-	-	8
Road user revenues(c) (ECU billions)		38.4(d)	23.3(d)	119(d)
Expenditures (ECU billions)		15.0	8.3	60.0
Revenue/expenditures		2.6	2.8	2.0
Distribution of expenditures by level of gov.('90)				
Central	23	39	60	48(e)
Regional	12	15	-	12
Local	65	46	40	40

SOURCE: Farrell 1999, pp44-66

NOTE: - indicates negligible. (a): includes vehicle purchase taxes, import duties, registration and licence fees; (b): Fourteen countries, about 1993; (c): includes fuel taxes annual vehicle registration fees, tolls and permits; (d): for Germany and the UK, 1994 – for western Europe, 11 countries, various years; (e): seventeen countries

Whereas the relative importance of various kinds of fees is roughly similar to that in the USA, with fuel taxes generating over half of revenues and tolls about four percent on average, road user fees and highway finance in the US show a marked contrast to the European practices in a number of areas, viz.,

- Road user derived revenues generally exceed highway spending by 2:1, and in some cases, by up to 3:1;
- Most European governments credit fuel tax and vehicle fee revenues to general funds, but Germany, Switzerland, the Netherlands, Belgium, and Greece dedicate specific shares of these revenues to roads. Further, the Netherlands, Belgium and Greece have set up infrastructure funds with dedicated revenues and with disbursements limited to certain types of projects; and,
- With few exceptions, toll roads were operated by public or quasi-public entities, but the dawn of the 21st century saw many European countries privatize their major toll roads provision, and, in many instances through public stock offerings.

Significant is also that, until the privatization trend mentioned above, the national government has always been directly involved in road construction and operation throughout Europe, i.e., the 'base load' infrastructure was publicly funded.

8.7.1 User charges

The four major criteria used to assess user charges follow NATMAP 2050 Postulates discussed under chapter three above, viz., equity, efficiency, stability and ease of implementation and administration.

Generally, three tiers of user charges are identified. The first and second tier mirror South African practices. The first is related to vehicle ownership (such as registration fees, sales taxes, permissions and licences). Second tier charges concern the use of the vehicle (such as fuel and tire taxes, parking, tolls, etc). The third tier accounts for the difference in benefits derived or/and costs occasioned by various vehicle classes (e.g., ton-mile or axle-mile taxes, weight-distance tax). The relative budgetary impact of these charges – as in the case of the USA (US Department of Transport: Federal Highway Administration) – is edifying, viz.,

- User charges as a percentage of total revenues ……. +-57%
- Motor fuel as a percentage of total user charges ……...…. +-65%
- Federal motor fuel taxes as a percentage of federal user charges +-87%
- State motor fuel taxes as a percentage of State user charges … …+-54%
- State registration fees as a percentage of State user charges … …+-29%

New Zealand and France have an axle-mile form of tax based on vehicle type and axle type configuration. Portugal has a ton-mile tax which is trip-specific and based on the actual distance travelled and the type of load carried by the vehicle of given characteristics. The Portuguese system charges differently on a route where there is inter-modal competition, an effort at achieving equity not only between various classes, but also between different modes – in particular truck and rail.

The European Commission of the EU in the White Paper on "Fair Payment for Infrastructure use: a phased approach to a common transport infrastructure charging framework in the EU" advocates, among other, that:

- Pricing should be seen as a complement of regulatory and other market policies;
- The main aim of a fairer and more efficient pricing policy is to use price signals to curb congestion, accidents and pollution;
- Prices should reflect underlying scarcities to ensure sustainable transport; and

- The transport price structure should be: clear to transport users, differentiate across time, space and modes, non-discriminatory between modes.

Further, in its White Paper on “European transport policy for 2010: time to decide” the Commission follows this path with a proposal for a framework which will “include a common methodology for setting price levels which incorporate external costs, and will specify the conditions for fair competition between modes” (EU Commission 2001).

8.7.2 Weight-distance tax

Weight-distance merits a more detailed examination as it presents the best potential to achieving all of NATMAP 2050 Postulates, and, given the modern management tools available today, also the best yield ratio, and promises transparent redress i.t.o TDM imperatives to ration scarce and finite funding for all transportation modes.

In the USA, weight-distance was first investigated the 1930s and many states used it then as a form of user charge. But, it was ahead of its time and was soon repealed in many states, because of problems with the administration of the tax which was too complex, time consuming and costly at the time. Also, as it was State-based, usage by out-of-state vehicles was a thorny issue, with many retaliatory charges levied on users or reciprocity arrangements made to deal with this issue. Also, the damage to facilities related to vehicle weights and that related to environment were a source of much controversy in the determination of cost responsibility and equity.

Emerging technologies that can greatly improve the identification of the vehicle and collection of its relevant characteristics (classification, axle-weights, distance travelled, speed, fuel consumption) along with data on facility type, location, and time of vehicle travel have matured. These technologies can be effectively utilized in monitoring facility use by various vehicle classes and charging according to the facility type, location, time of use, and other factors. To be effective, weight-distance charges must collect and relate only basic data elements on a particular facility/network during a specific time period, viz., vehicle kilometres travelled, vehicle weight or axle weights, and a means of identifying and relating a particular vehicle to the owner and to the mileage and weight measurements. An extensive survey of new technologies to support vehicle charges has been documented (AEP Associates, 1984). More recently, in Taiwan, (Chia-pei, Yi-hsien and I-Chang, 2004), where Weigh-In-Motion (WIM) has been widely applied and incorporated into commercial vehicle operations with Automatic Vehicle Identification (AVI) technologies for more than ten years. With the integration of WIM and AVI technologies, the weight and safety check of commercial vehicles and drivers can be done in real-time, on highway main lanes, and at normal speeds.

8.7.3 User Charge Evolution

The analysis offered under the energy & environment section of NATMAP 2050 indicates that a user charge structure heavily dependent on fuel tax could be face some instability when considering both rising input prices for fuel as well as environmental considerations into the future. In the South African context, the three

spheres all have some roles and responsibilities to provide transportation. This entails some participation in revenues raised for transportation. The analysis in chapter 4, section 4.1 above reveals a rather limited funding raising ability at provincial and local government levels. A restructured user charge along the following lines, therefore, appears to be in order, viz., a 'normalized' (to pre-empt economic distortionary effects) four-level charge structure, i.e.,

- Ownership or licence fee accruing at local level. This would really be an entry fee into the system, taking into the value of the vehicle, type and usage – commercial or non-commercial ;

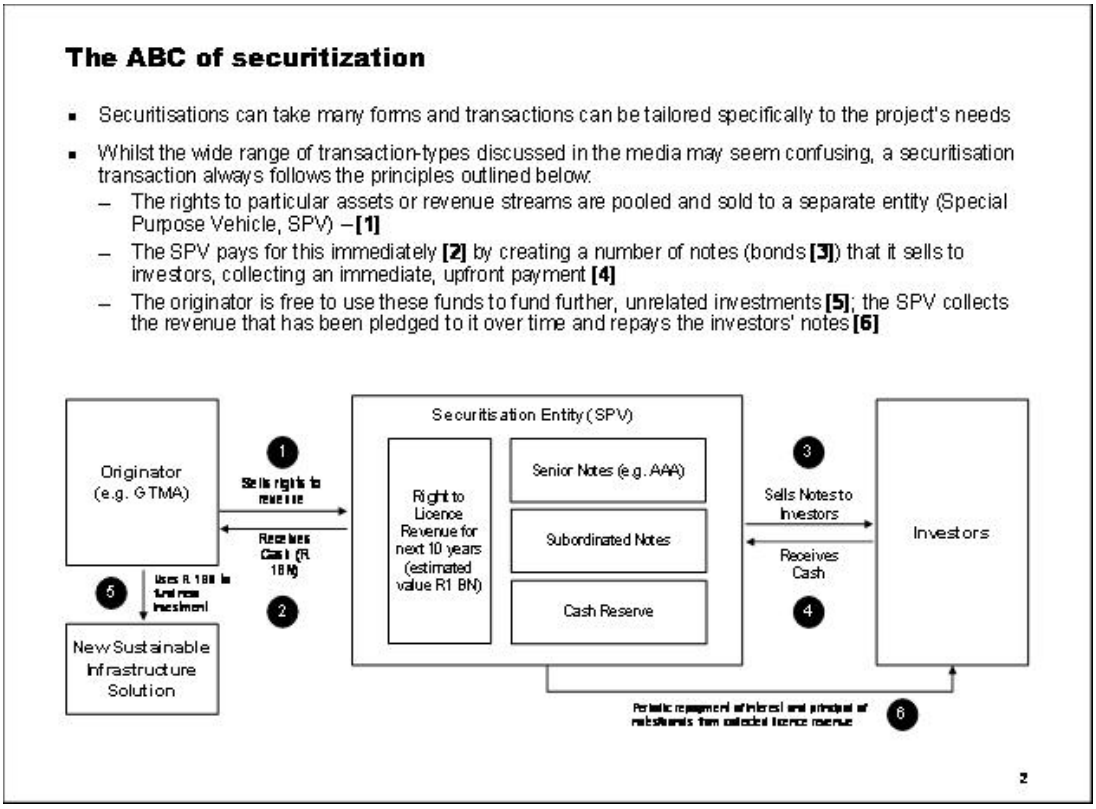
- Facility use tax (access) accruing at local and provincial levels. This level should reflect facility usage – benefit derived, hence allows charges according to mileage. Through marginal costing of usage (e.g., particular facility at a particular time), would allow available capacity can be rationed, and usage varied according to type of facility, its location and time of use, size of vehicle (not weight) to reflect prevailing circumstances;

- Weight-distance tax accruing at provincial and national levels. This would reflect actual axle weight, type of facility, location, distance and time of travel so as to cater for pavement wear (research has shown that it is not the vehicle gross weight, but axle load that determines extent of damage); &

- Environmental degradation charge accruing at national level. The fuel levy, stable as it may have been in the past – growing with traffic, is bound for structural adjustment in the face of escalating prices, environmental concerns, alternative motive power and, hence, fuel sources, energy conservation concerns, etc. Although NATMAP does not see any combination of mentioned structural pressures on the fuel levy leading to an abrupt reduction of the absolute quantum i.t.o the fuel levy capacity to generate revenue, it maybe timely to re-orientate its use towards the concerns of the times. With 27% of energy demand in South Africa coming from transportation, and 84% of this demand generated by the road mode, it may be prudent to commence the process of designing interventions to curb said demand and reduce transportation consumption of fossil fuels, and, ultimately, attendant carbon emissions and greenhouse effects. The fuel levy holds promise as a fairly targeted intervention in this regard and would easily translate into an effective and transparent pollution charge making up the fourth level of a restructured user charge regime.

8.7.4 Securitization

Securitization can take many forms, and transactions be tailored specifically to the project's needs. Essentially, securitization always involves the following principles as depicted below:



Source: Mr Dan Arapoglou – GTMA, Gauteng Province

Figure 51: The ABC of securitization

8.8 CONCLUSIONS

Efficient pricing means that pricing should fully reflect all individual and long-term marginal social costs, with all external costs being internalized. Under social marginal costs we thus include:

- Private marginal costs, i.e., variable costs such as fuel, time, wear and tear, etc;
- Variable infrastructure costs, i.e., wear and tear of infrastructure, maintenance, etc;
- User costs, i.e., external congestion costs; and
- Costs outside of the transport system, i.e., noise, pollution, accidents, etc.

One main advantage of pricing measures compared to – for example – regulatory measures is that they continually adapt to individual preferences of each user, instead of only being binary (allowed/prohibited). By allowing use of any particular infrastructure to those whose individual benefit from use is higher than the price levied and discourage others whose individual benefit is rather low, they increase the overall benefit of society.

However,

- Equity stipulates that access to transportation be maintained, i.e., that affordable alternatives be provided. Also,
- The best practice sketched above has some practical difficulties which point to an evolutionary implementation, rather than a revolutionary one. Firstly, the valuation of social costs – particularly external costs – is a nascent science and estimates differ widely reflecting a wide margin of uncertainty. Secondly, charging marginal social costs requires a highly sophisticated form of pricing, some with (for time being) high implementation and operational costs that would infringe upon NATMAP's fourth Postulate, viz., ease of administration and compliance. There may also entail substantive political considerations, such as data collection and privacy protection needs.
- All this may point to gradual adoption and incremental implementation. It does not negate the vision of efficient pricing as a primary NATMAP goal, but merely indicates that implementation should be cautious and gradual, a consideration that – in truth – serves to support and emphasize the timeliness of a consolidated institutional dispensation for the allocation of scarce finance for transportation infrastructure and operations in South Africa.

Private funding of transportation infrastructure holds promise, beyond current activities by government agencies, which, in the main, employ bond-type debt instruments. More innovative solutions emulating those discussed under 8.7.4 above will be evaluated during Phase 3 and viable (in the real circumstance of South Africa) put forward for use in funding NATMAP 2050 rolling 5-year investment programmes.

8.9 RECOMMENDATIONS FOR PHASE 3

As a country, South Africa is currently experiencing unprecedented capital formation across the entire spectrum of transportation modes and in both infrastructure and operations. The bulk of said spend is by the public sector – both fiscus and government agencies (including corporatized entities). Perhaps the most recent telling evidence of this upsurge in transportation investments is found in the National Treasury's Medium Term Budget Policy Statement (MTBPS) delivered to Parliament on the 21st October 2008. This commitment is underpinned by the resolve to move from a budget surplus in 2007/8 to a borrowing requirement of about 3% over the medium term. Capital expenditure should reach almost 11% of total government spending by 2011/12. This comes in the wake of increased overall capex as a percentage of government spending from 6.3% in 2004/5 to 9.3% in 2007/8.

Except for the air mode, transportation investments have trailed economic growth and, in fact, come in the wake of general 'divestment' when considered against requisite spend just to maintain installed infrastructure and operational capacity. It is fair to conclude that current flurry of investments are – for the most – a very necessary attempt to restore lost capacity and as such must be lauded. As a longer term planning and investment programme, NATMAP 2050 builds on these efforts, but seeks to ensure sustainability and capacity expansion to 2050. In this respect, a

fundamental recast of funding solutions along the lines proposed below is mandatory, alongside a review and recalibration of the institutional dispensation to support and sustain transportation investments as the country prepares to face a future weaned of fossil fuel dependency, long-term environmental degradation and the finite nature of funding resources available to address a larger demand accruing from a fairer and more equitable access regime to transportation for all citizens than was policy in the past.

International experience in market economies indicates some common practices, i.e., that public funding of transportation infrastructure is much more common than for transport operations. Further, that private ownership of transportation services is broadly common for freight than for passenger transport; predominant in road haulage, freight forwarding and air travel, but exceptional for railway services. Except for road passenger services, South Africa mirrors these international tendencies.
Government provision of transport services faces a number of constraints which distort optimal funding options adopted, and are exacerbated in a developmental state, viz.,

- Competition for resources from core government functions, and the inherent contradictions in trying to be policy maker or/and regulator of the subject operations;

- Managerial tensions of seeking commercial viability concurrently with social goals. This is further pronounced where subsidies underpin operational sustainability or/and where public service norms and procedures rather than operational needs drive/influence management practices;

- Technical efficiency losses/compromises where the activity creates surpluses which are then used to cross-subsidize other – often at the expense of capital formation and re-investment in the profitable activity, etc.

Fundamental to above issues is the reality that governments pursue many policy objectives in transportation – sometimes even parallel objectives that embody dynamic tensions, if not contradictions.

With regard to transport infrastructure, NATMAP 2050 recognises that much of it has attributes of natural monopolies, and, that the costs of provision more often than not are difficult to recover from users and hence engender distributive outcomes. As such, the funding options adopted for infrastructure provision impact more significantly on the achievability of NATMAP 2050 Funding Postulates prescriptions than is commonly the case for operational investments.

Notwithstanding the above, public ownership and operation of transport infrastructure is a legitimate and common policy choice. However, if chosen, the state-owned infrastructure provider must be subject to tests of efficiency and sustainability that NATMAP Funding Postulates prescribe. It is in this light that contributions calling vertical separation must be evaluated. Indeed, there is a prima facie case for vertical

separation where the infrastructure is seen as a natural monopoly, but the service provision thereupon may be rendered competitively or, at least, periodically contestable. International evidence supports such a stance, for example, in port and airport infrastructure. However, in the case of rail, and mass transit (metros and tram systems), the evidence is more complex. The technological and economic interface between the infrastructure and the rolling stock that uses it is complex. When separated, the management of this interface can be difficult and/or costly. Also, international practice does not provide incontrovertible best practice of long-term sustainable on-track competition - especially for passenger rail. Of course, this does not preclude the introduction of periodic contestability of concessions or franchises.

SECTORAL FUNDING PRINCIPLES

Deriving from efficiency imperative as well as from the NATMAP 2050 Funding Criteria:

8.9.1 Road Mode

Road haulage should continue to be provided by the private sector in a competitive environment. However, user charges should increasingly reflect the cost of access to the publicly funded infrastructure. In line with international best practice outlined under section 8.6 above, user charges should also increasingly incorporate and reflect social marginal costs.

Passenger users should also be levied user charges, however, care should be taken not to engender access and affordability constraints which would violate the Equity Criterion. This will entail taking cognizance of the country's 3-sphere institutional and governance structure in devising user charges that follow the 4-level user charge evolution contemplated under section 8.6 above, viz., ownership fees (network access fee) accruing at local level, facility use fee accruing at local and provincial levels, weight-distance tax accruing at provincial and national levels, and environmental degradation charges accruing at national level.

Consequently, charges should reflect benefits that accrue to freight users relative to non-commercial passenger users.

8.9.2 Rail Mode

Rail infrastructure includes tracks, marshalling yards, power supply and catenaries, telecommunications and control systems, bridges and tunnels. International experience with vertical separation is not compelling, to a great extent due to the operational complexity that ensued where it was attempted.

For both passenger and freight operations on existing infrastructure, the integrated formula is best left in tact. However, access financial arrangements between SARCC and FreightRail must be regulated, with access charge regime biased in favour of passenger transport, and freight gradually migrating towards an economic rates regime to better reflect the cost of infrastructure provision. As a matter of policy and deference to rail efficiency for mass goods/passenger transportation, the charge regime should be consciously favoured against road.

The Gautrain and Moloto Corridor high speed rail on standard gauge lead the rail rejuvenation in SA. The momentum must be sustained. Future green-field rail projects such as high speed lines, new freight lines, major station developments and re-developments must consider incorporating PPPs and/or concession parties other than incumbents to instil a measure of competition in the provision of service – as well as infrastructure, where financially feasible.

In the meantime, branch line infrastructure needs to be housed in a dedicated rail infrastructure agency and alternative funding and operation sought.

8.9.3 Maritime Mode

NATMAP 2050 favours the landlord model. In this model, the infrastructure provision is for a corporatized and commercially run ports landlord to provide navigation infrastructure, channel maintenance, wharves, utilities and common areas – such as the internal roads. However, the incumbent should look to enhance efficiency through outsourcing non-core/support activities tug services and maintenance. Shipping/barge and stevedoring services would be leased and/or competitively concessioned.

8.9.4 Pipeline Mode

The existing pipeline mode infrastructure and operation may remain vertically integrated, but new capacity must continue to be competitively concessioned. This is already practice.

8.9.5 Air Mode

Current ACSA – airport infrastructure and operation, and ATNS – air navigation infrastructure and operation should be retained under the regulated regime. As already the case, airport services – baggage handling, catering, aircraft refuelling, etc should be competitively concessioned. Car parks should be also tendered out. In essence, save for the ATNS function at airports, the preferred airport infrastructure provision model would simulate that of the maritime ports under 8.8.3 above.

8.9.6 Cross-modal instruments & PPPs

In the South African environment, the following should be further explored:

8.9.6.1 Securitization

As discussed under 8.7.4 above.

8.9.6.2 Build-Operate-Transfer (BOT)

This is well known and has been used with some success. Further opportunities will be actively sought within the development proposals of the 5-year investment programmes.

8.9.6.3 Value capture

This instrument capitalizes on the well-known fact that transport infrastructural developments bring with them increased economic activity and value enhancements to the underlying land-use. This increase in “private value” can be taxed/levied in support of the transportation development entity

8.9.6.4 Lease-Develop-Operate (LDO)

This is a variation on the Value Capture model, allowing the public entity lease an existing public facility - a station or transfer facility and the like – and adjacent land which it has then the obligation to develop further and operate under a revenue-sharing arrangement.

9. INSTITUTIONAL AND LEGAL ANALYSIS

9.1 INTRODUCTION

9.1.1 Terms of Reference

The terms of reference (TOR) define the scope of work for phase 2 as follows:

> *"Theoretically it is desirable to establish functional and homogenous transportation institutions in all transportation aspects by land and sea and air, and to remove counterproductive overlaps characterizing current institutional setup. In reality, transportation departments, organization in the world vary widely from nation to nation, and to a lesser extent region to region, reflecting different economic or political philosophies, and/or political evolutions. Whilst, our current set up was promulgated by both the Constitution and Cabinet policy decisions, there is a need to review and analyze the advantages and the disadvantages of current fragmented transportation fraternity and indicate cost effective remedial measures to provide a homogenous transport institutional hierarchy and jurisdiction which will minimize amongst other things duplication and waste of resources".*
>
> *In brief the Consultant's task is therefore to analyze current institution framework and indicate a demand responsive policy framework, institutional capacities, performance indices, and jurisdiction interactions necessary for the provision and operation of qualitative, efficient, and integrated transportation systems and their networks."*

9.1.2 Approach to Phase 2

The proposed approach followed by the Institutional Working Group in addressing the requirements of the TOR was to distinguish between short and long distance transportation for passengers and freight.

From an institutional point of view, the reasons for this approach are as follows:

- Short distance transport aspects, such as, policy formulation, regulation, planning and operations, are better dealt with on a local basis. This is consistent with the provisions of the Constitution in terms of which decision-making powers should be devolved to the appropriate sphere of government. The transport of passengers and freight over short distances (0 to 40 – 50 km) effects local communities and needs to be resolved by that sphere of government.
- Long distance transport activities, on the contrary, takes place across local and provincial boundaries and affects the national well being of the country. It therefore asks for a different approach toward policy, planning, regulation and operations.

9.2 SUMMARY OF PROBLEMS AND ISSUES FOR ANALYSIS

9.2.1 General Issues Arising Out of Phase 1

Access to **public transport** has a major impact on people's lives, particularly on poorer people who do not have access to private cars. However, South Africa is facing a decline in the efficiency of transport systems. The trend over the years is for people to switch from the bus and rail modes to taxis or, if they can afford it, private cars. The National Household Travel Survey, 2003 found that only 26% of households have access to a private car. Being unsubsidised, taxis are relatively expensive and in many cases are not profitable if replacement of the vehicle is factored into the cost structure.

With rapid rises in private car ownership, roads are becoming gridlocked in many areas, most notably Gauteng. The cost to the country in longer travel times, wasted fuel etc. is enormous. Rapid improvement of the public transport system is needed which requires, among other things, an overhaul of public transport financial arrangements, and particularly of subsidies.

As stated above, the position regarding the **need for additional funding for the road system** is critical at this stage.

Current subsidy arrangements create serious problems of co-ordination. **Rail** subsidies are paid by the DoT to the Passenger Rail Agency (PRA), formerly known as the SARCC. The PRA does its own planning, most importantly the National Rail Plan published in August 2006. This plan is corridor based, and was drafted in consultation with municipalities and other role players, but is essentially a rail corridor plan and has largely become a business plan for the merged entity, PAC (SARCC and Metrorail).

The need has been identified to analyse the roles and responsibilities of the various role-players with a view to the **rationalisation of transport systems**, **through institutional amendments**, including:

- Clarify and contextualise the transport roles and responsibilities of the three spheres of government, in order to achieve **integrated transport management**
- Comprehensive **review/rationalization of legislation / institutional parameters to be undertaken**, such as maritime issues.
- There is a need for **more focused capacitation** internally to Government.
- Institutions need to be **more responsive to external innovations and requirements** (international, environmental, land use, etc.)

Within the context of the issues that had to be highlighted per institution identified, the second phase focuses on the following problem areas that have already been identified:

- Linkage between policy, legislation and implementation

- General performance in relation to allocated mandate, capacity and/or relationship to the Department of Transport;
- Gaps and Overlaps
- Failure of cooperative governance
- Institutional silos
- Problems in procurement
- Separation of planning, implementation and maintenance functions
- Linkage to government

9.2.2 Policy and Legal Issues

9.2.2.1 Roads

The following issues were identified with respect to policy:

The White Paper on National Transport Policy, 1996

- Developing and funding road infrastructure has made many advances in regard to national roads, but the same cannot be said for provincial and municipal (mainly inter-urban) roads. Although constitutionally the latter are provincial and local issues, the DoT should intervene to encourage legislation and institutional co-operation to ensure improvement of provincial and municipal-regional road networks and the funding thereof.

The Moving South Africa Action Agenda, 1999

- A portion of the fuel levy should be dedicated exclusively to roads, not necessarily only to national roads. The legislation should be amended to provide for this.
- A designated institution should be given specific responsibility to co-ordinate efforts to improve and provide rural roads, or legislation should give more specific duties to provinces and district municipalities in this regard.
- Legislation should establish an institutional structure to integrate funding and regulatory decisions for roads or allocate this function to an existing structure.

The National Freight Logistics Strategy, 2005

- Legislation should provide for limiting freight transport to designated national routes, or measures such as pre-tolling should be used to counter the problem of abuse of provincial and regional roads.
- Legislative efforts should be made through the new proposed Rail Act to provide incentives to move freight back from the road to the rail mode, provided rail infrastructure and operations are sufficiently improved.

The Draft Road Infrastructure Strategic Framework for South Africa, 2006

- The Strategic Framework proposes various models and solutions to the identified problems.
- These should be analysed for implementation in Phase 3.
- The Framework also identifies the need for dedicated funding sources for roads.

The National Land Transport Strategic Framework, 2006

- It is not clear what institutional entities the Strategy has in mind. Options should be explored in Phase 3.
- As recommended above, funding mechanisms will have to be developed and incorporated into legislation.

The following issues were identified with respect to legislation:

Constitution of the Republic of South Africa, 1996

- Legislation is needed to define provincial roads and municipal roads more clearly, and to provide for responsibilities for planning, providing and maintaining them.

The South African National Roads Agency Limited and National Roads Act 7 of 1998 (SANRAL Act)

- The question of overall road planning in the context of national policy needs to be clarified. The SANRAL Act is in the process of being amended to deal with the other problems.

The National Roads Act 54 of 1971

- Legislation is needed to provide more specifically for dedicated funding sources for national roads (SANRAL) in particular and also for provincial and municipal roads.

The National Land Transport Transition Act 22 of 2000 (NLTTA)(Shortly to be replaced by the National Land Transport Bill (NLTB))

- The NLTTA plans provide for infrastructure, but are focused on public passenger transport. More focused guidance is needed in legislation as to who is responsible for overall co-ordination of road planning, and as to the content of transport plans in relation to roads.
- Allocation of planning responsibilities for roads in planning requirements and guidelines also needs to be clearer.

The National Road Traffic Act 93 of 1996 (NRTA)

- The NRT Regulations may require amendment to promote more flexibility in relation to HOV lanes and to accommodate the other issues mentioned above.

9.2.2.2 Rail

The following issues were identified with respect to policy:

The White Paper on National Transport Policy, 1996:

- Infrastructure has not been financed through a combination of user chargers and public/private sector investments (as quoted in 1.7.4 above)
- In terms of 1.7.5 above, no provision for adequate accessibility together with safety and security within the constraints of social affordability has been achieved;
- There is no well managed, integrated, safe, efficient and sustainable rail infrastructure or operation;

- Insufficient investment in railway infrastructure exacerbates the problems mentioned above.

The Moving South Africa Action Agenda, 1999

- "This is where the Action Agenda provides the transition from the White Paper to delivery on the ground" - this is clearly not the case as it has not been achieved – we are still sitting nine (9) years later with a lack of implementation. The Agenda has the necessary plans in place yet the infrastructure challenges are still challenges which have not been solved. It also states that transport planning, funding and regulation should devolve to local level but rail transport has not yet been devolved to local or provincial level and is still a national concern. This devolution of rail transport will aggravate as we already have so many institutions in place that disintegration and 'clashing' plans, ideas and land use have become a huge concern. This devolution should not occur and the regulation should remain with the National sphere.

The National Land Transport Strategic Framework, 2006

- Although this section, there are plans to link all three spheres of government with regard to land transport in the three spheres of government have not yet been adequately integrated. The implementation mechanisms, although, have not been enforced.
- In terms of safety plans, this has been successfully implemented with the Railway Safety Regulator Act (discussed below).
- In terms of the paragraph above dealing with "Intermodalism and integration of transport planning" the different modes of transport have not been integrated and intermodalism has not been affected at all. There are too many role players involved in the transport network.

Rail transport infrastructure and service levels have deteriorated to levels that threaten the future existence of this strategic national asset. There are high levels of user dissatisfaction with deteriorating service levels as well as operational safety concerns

- The strategies mentioned under "Rail Institutional Framework" are hugely important and thus should get immediate attention – i.e. that a rail policy be finalized (this is necessary as there is no main rail policy/Act dealing with the various issues with regard to rail), and that the national sphere will have an oversight function over rail - they should however be the regulator as well.
- The plans to upgrade and improve the railway infrastructure are in place but the investment issue and the required funding must be obtained first in order to implement these strategies.

From Cape Gauge to International Gauge – A Policy Heritage for our National Future and Children

- The policies regarding transport in South Africa are outstanding – they are forward thinking and could be highly effective IF they are implemented. Once implemented, we believe it will have a hugely positive effect on the ideals, plans and strategies of the NDoT to reintegrate, invest in and restructure transport in

the Republic. However, should the above recommendations regarding investment, the establishment of a national Railway Act and ministry and the conversion of the railway network into a standard gauge not be implemented, South Africa's Rail network and infrastructure will remain in the highly deteriorated state in which it currently finds itself. Implementation is the key word and one of the MOST important aspects lacking in transport planning and infrastructure provision.

The following issues were identified with respect to legislation:

Constitution of the Republic of South Africa, 1996

- The Constitution contains provisions that will aid in the restructuring of transport in our country, by not only amending sections to allow for integration of the three spheres of government, a problem currently being encountered, but also for ensuring that the environment is carefully preserved. As clearly identified above, the spheres of government need to co-ordinate, inform and consult one another – specifically on matters of common interest.
- The Constitutional structure providing for three different spheres of government each exercising its own powers and functions in a manner "not to encroach upon the geographical, functional or institutional integrity of the other spheres" creates various problems relating to the proper integration of transport planning and the implementation of integrated transport systems.

National Land Transport Transition Act 22 of 2000

- The NLTTA being the most updated legislation (soon to be replaced by the National Land Transport Bill) has, as many of its objectives, those of the white paper and National Transport Strategic framework – it re-iterates that investment in infrastructure and operations must give priority to public transport and that the environment, the economy and finances must be sustainable.
- If this happens it will only exacerbate the "co-ordination of planning and implementation activities which may detrimentally affect the provision of efficient rail services.
- It however notes that the control and regulation of rail will be devolved from national to another sphere of government.

National Railway Safety Regulator Act 16 of 2002

- This Act ensures that the rail infrastructure and operation thereof remains safe and thus enforces the safety requirements highlighted in the NLTSF, 2006 as well as the White Paper on National Transport Policy, 1996. Apart from the problem stated under paragraph 4 above, the provisions of this Act are adequate in terms of giving effect to policy objectives.

Legal Succession to the South African Transport Services Act 9 of 1989

- This Act regulates the commercial and developmental aspects of, and the relations between, the PRA (SARCC), the State formed company and any competent local authority dealing with land zoning.

- The NDOT is currently considering the revision of the Rail Policy in the country and if approved the legislative framework regulating rail will also be reviewed and changed.

9.2.2.3 Aviation

The following issues were identified with respect to policy:

Moving South Africa Action Agenda

- Of interest to note is that the Action Agenda, in the Chapter on freight transport, does not specifically recognise air freight as a key implementation target. This stands in sharp contrast with the development of dedicated air freight hubs with the associated infrastructure, operating in other parts of the world.

The Draft White Paper on National Civil Aviation Policy, 2005[1]

- Since the draft White Paper, containing recommendations on dealing with issues identified in terms of policy statements or a strategic action plans, does not have any official status, it can only be assumed that the issues raised are still unresolved. The following issues or problem areas have been identified:

- Airports:
    - With all three spheres of Government involved one way or another with integrated planning involving, inter alia, airport planning, there is little or no proper direction for co-ordinating the responsibilities in this area. Current government perception is inconsistent with the needs of the communities while private sector initiatives are hampered by uncertainties about the relative potential of investments;
    - Indications are that most airports are not financially viable or sustainable and therefore not commercially justified;
    - The funding of publicly owned airports is currently perceived as a major issue;
    - The current airport licensing system does not fully comply with international requirements accepted by Government in terms of the Chicago Convention,1944;
    - The number of international airports in South Africa is restricted to one per province with the exception of Gauteng which has two. Major misconceptions exist in the industry about the future expansion of the system; or where the appropriateness of granting certain airports international status may be questionable;
    - ACSA airports are currently regulated on economic terms. The need for economic regulation of other airports in South Africa, such as Lanseria Airport, should be determined;

[1] After an extensive review process involving the DOT, the civil aviation industry as well as a consultancy service, the final draft of the White Paper on National Civil Aviation Policy was tabled with the DOT in August 2005. The document has not been published since and its status remain uncertain

- Lack of integrated metropolitan and local planning involving airports by provincial and local authorities as well as the owners and developers of airport facilities;
- Clarification is required regarding the responsibility for road and public transport access to and from airports to existing transport systems as well as parking and traffic facilities and arrangements at major airports;
- Guidance is required about the responsibilities and powers of airport licensees in connection with the development of land uses not related to aviation land-use on the airport precinct;
- There is a growing concern that the environmental impact at airports is not being addressed fully and holistically, and is therefore not adequately controlled;
- There is a need to ensure that sufficient and effective stakeholder participation takes place during any phase of airport development.

- Airspace:
  - A proper communication system between government, service providers and the users of airspace should be established that will ensure appropriate collaboration and participation in the planning and implementation of new air navigation systems;
  - National Airspace Master Plan to remain up to date in relation to air navigation infrastructure;
  - The basis on which Government should ensure that the provision of air traffic and navigation services is provided will be safe, sustainable and viable in the long term (which is not the case at the moment);
  - Allocation of air traffic responsibilities among ATNS, the Military, provinces and private operators is a major problem;
  - The maintenance, upgrading and calibration of air navigation systems
  - Planning and installation of new air navigation equipment and the role of the ATNS Company as the dominant player;
  - The maintenance, upgrading and calibration of air navigation systems;
  - Planning and installation of new air navigation equipment and the role of the ATNS Company as the dominant player;
  - Congested airspace and associated airport operations is a major concern over the Johannesburg terminal airspace, both from an equipment and airspace management point of view;
  - Government needs to confirm its continued support for the ICAO regional structures in ensuring the most effective application of acquisition and application of air navigation equipment which will also impact positively on the African Indian (AFI) Ocean Region.

- Aircraft noise:
  - The establishment of a dedicated airport environmental committee that will, inter alia, deal with issues on aircraft noise at the airport;
  - There are claims that uncontrolled increase of aircraft noise is sterilising major areas for development. There is an absence of a clear policy on aircraft noise and restricting the use of old generation (so-called chapter

2) aircraft from entering and operating in the South African airspace in line with international guidelines;
- Noise control measures and equipment at airports are not in place due to lack of a proper policy in this regard;
- Guidance on noise prediction and monitoring equipment and procedures as well as the establishment of noise contours to be installed at selected airports;
- Noise and track conformance monitoring around airports and the funding of such systems have not been resolved.

- Aircraft engine emissions;
  - It is not clear how extensive the influence of aircraft engine emissions is on the biophysical environment in the vicinity of South African airports;
  - Establishment of a proper monitoring system that would enable measurement and data collection regarding engine emissions;
  - Policy on fuel dumping required.

The following issues were identified with respect to <u>legislation</u>:

The Constitution of the Republic of South Africa, 1996
- It is clear that the Constitution does not provide detailed solutions for the allocation of functions and responsibilities between the three spheres of government, but only provides the principles and broad guidelines. Some of the problems and ambiguities are:
  - The terms “international airport” and “national airport” are not defined, nor are there any criteria to be guided by;
  - The ownership of international airports is currently vested in national Government, some provincial governments and some private owners
- Although it is recognised that the Constitution provides for situations where conflict may exist among the three spheres of government, and while the Ministers responsible for civil aviation agreed that the term “international and national airports” will refer to those airports owned and operated by ACSA, it is clear that this ambiguity should be addressed in order to avoid misunderstandings about the allocation of functional responsibilities and to be able to deal effectively with future development.

The Aviation Act 74 of 1962
- Two broad areas for improvement of aviation legislation can be identified:
  - Emanating from the issues and problem area and the recommended policy statements and other resolving strategies or action plans it is evident that some primary enabling and regulatory legislation needs to be drafted to promote and strengthen the civil aviation infrastructure objectives;
  - The improvement and updating of regulations and technical standards affecting aviation infrastructure should receive continuous attention. It is recognised that institutional structures are in place to give attention to this aspect. It can furthermore be acknowledged that significant strides have

been made by these structures to ensure a firm foundation of regulations (Parts 39, 141, 145,148 and 172 of SA-CARS) and technical standards (SA-CATS-AH and SA-CATS-ATS). Shortcomings and voids exist that need to addressed.

- In addition the opinion is held that the Act has become rather outdated due to other developments in the civil aviation industry and a complete review of this legal instrument should be considered in order to align it with the needs of the industry.

The Airports Company Act44 of 1993

- In considering the provisions in the Act the following matters are not clear: Section 6 provides for the transferral of aerodromes to the Company "of all the aerodromes which have been or are in the process of being established…." The same section specifically mentions that such airports have been established in terms of section 6 of the Aviation Act, 1962. In terms of the ACSA Act (section 20), however, Section 6 of the Aviation Act is being repealed in its entirety. The uncertainty which exists is that at the time of transferral the DOT also had jurisdiction over land in the vicinity of La Mercy for the construction of a new airport to eventually replace the Durban International Airport. In fact at the time the DOT incurred considerable cost to prepare the site for the construction of the airport, but due to the costs involved decided to postpone the completion of the airport. The development has been dormant for more than 25 years. This airport, to be called the King Shaka International Airport, will in the near future become a reality. Section 6 (1)(a)(ii) refers to the transfer of assets owned "as may be necessary for the effective management…" which can be interpreted as all fixed and moveable assets. At present .ACSA is part of the development initiative and one can assume that the ownership of the land had been transferred to the Airports Company. What is not clear is firstly whether in terms of sub-section 6(a) (i) the development on the La Mercy land constituted an airport at the time of transferral and secondly whether 6(a) (ii) can still apply to an asset which has been dormant for so long and which had in the mean time been leased out to farming activities.
- The confusion which exists in the Constitution regarding "national and international airports" is also reflected in the ACSA Act (refer definition of a "Company Airport" under section1).
- If it is decided to introduce economic regulation for airports other than ACSA airports, it will be necessary to introduce appropriate legislation in this regard.

The Air Traffic and Air Navigation Services (ATNS) Act 45 of 1993

- Apart from the ATNS Company there are several service providers of air traffic services (ATS). These include provincial governments, the South African Air Force (SAAF) and some private organisations or persons. The ATNS is by far the biggest provider of ATS.
- At present the ATNS owns and operates all en route and approach control facilities, whereas airport licensees/operators are responsible for the provision of landing aids. Other ATS service providers are engaged in approach control, aerodrome control and flight information services. In addition the SAAF in some

instances and for practical and economic reasons may provide services to civilian aircraft in non-military airspace.
- There is no clear indication at present as to the allocation of responsibilities towards the provision of air navigation infrastructure or air traffic services and whether more than one service provider may be allowed to utilise infrastructure belonging to another authority or organisation.

The South African Civil Aviation Authority (SACAA) Act 40 of 1998
- An aviation safety audit was conducted by ICAO on the civil aviation safety system of South Africa during 2007. The audit normally deals, among other matters, also with primary aviation legislation and safety related issues of aviation infrastructure. The Report is submitted to the SACAA to respond on non-conformances and requires an action plan for remedial measures to be undertaken by the SACAA. Unfortunately the Report is marked “confidential”, but for the purposes of this report it would be beneficial if some of the audit results on legislation and aviation infrastructure could be released.

9.2.2.4 Maritime transport

The following issues were identified with respect to policy:

The White Paper on National Transport Policy, 1996
- The issues in the 1996 White Paper have either been addressed through legislation or have been taken up in the concept White Paper on National Maritime Transport Policy, as appears from the discussion below.

The concept White Paper on National Maritime Transport Policy, 2006
- In terms of the recommendations of this concept White Paper, maritime legislation needs to be revised as indicated. Legal impediments to achieving the objects of the policy need to be removed. An example is customs and entry restrictions on foreign tourists visiting South African ports and harbours.
- Institutional arrangements and relationships also need to be revised as recommended to prevent inconsistencies and overlaps.
- Legal impediments to coastal shipping need to be investigated.

The National Freight Logistics Strategy, 2005
- Legal and institutional impediments to seamless transport along corridors, i.e. factory to ship and ship to destination, need to be identified and removed, by legislation where appropriate.
- The DoT in collaboration with the NPA should see that infrastructure challenges are addressed.

The National Land Transport Strategic Framework, 2006
- Future revisions and updates of the NLTSF should deal more specifically with developing freight corridors to and from ports and integration of freight modes.

The Moving South Africa Action Agenda, 1999

- The DoT needs to take responsibility for planning these types of issues, such as the East-West consolidation recommended by the MSA report. The appropriate place to deal with this would be in the NLTSF.

The following issues were identified with respect to legislation:

Constitution of the Republic of South Africa, 1996

- As recommended above, the NLTSF should provide for corridor development and interfaces, and deal with institutional co-ordination.
- Provinces and metropolitan municipalities should deal with port linkages in their transport plans.

The National Ports Act 12 of 2005

- It may be necessary to put legislative or planning instruments in place to ensure co-ordination between the NPA and other role players in relation to ports and related infrastructure.

The National Land Transport Transition Act 22 of 2000 (NLTTA)

- The plans formulated in terms of the NLTTA should give attention to freight corridor development, involving ports where relevant, as well as port-road and port-rail interfaces. The requirements and guidelines published by the DoT on how plans should be prepared should provide for this. As stated above, the NLTTA will shortly be replaced by the National Land Transport Bill.

The National Railway Safety Regulator Act 16 of 2002

- The issue of responsibility for safety in ports in relation to rail infrastructure should be clarified, if necessary by amending legislation.

The Sea-Shore Act 21 of 1935

- Institutional responsibility for the sea (territorial waters) and sea-shore should be clarified in legislation (see above in relation to maritime legislation in general).

The South African Maritime Safety Authority Act 5 of 1998

- As indicated by the concept White Paper on National Maritime Transport Policy, institutional responsibilities in the maritime sphere need investigation and possible revision.

The Merchant Shipping Act 57 of 1951

- As indicated by the concept White Paper on National Maritime Transport Policy, this Act requires revision and rationalisation.

9.2.3 Financial Issues

Each sphere of government is entitled to an equitable share of revenue raised nationally. Each year a national act is passed called the Division of Revenue Act

(DORA) providing for the allocation of revenue under section 214 of the Constitution.2

In addition, special grants are made to provinces and municipalities each financial year. For example, the Gauteng Rapid Rail Link Grant to Gauteng Province for the latest financial year is approximately R3bn. The Public Transport Infrastructure and Systems Grant (PTIF) is approximately R1.1bn and is designed to "provide for accelerated planning, establishment, construction and improvement of new and existing public transport and non-motorised transport infrastructure and systems". There is also an annual Infrastructure Grant to Provinces and a Municipal Infrastructure Grant (MIG). According to a National Treasury (NT) report, 15% of the funding allocation for MIG is for the "P window", i.e. public transport infrastructure. The purpose of the MIG is to "supplement capital finance for basic municipal infrastructure for poor households, micro enterprises and social institutions".

The SA National Roads Agency (SANRAL) is funded by a percentage of the fuel levy, money appropriated by Parliament and tolls levied by it on national roads. It may also raise funds by loans, interest on cash balances or investments, income derived from leasing or selling its assets, fines payable for offences under the SANRAL Act, and other grants or donations. The Road Infrastructure Strategic Framework (December 2004) states that "The [funding] situation remains very serious and, if urgent action is not taken soon, one of South Africa's major assets [i.e. the road system] will decline to the point where it will be virtually impossible to stop a massive and widespread deterioration in the road network".

Provinces and municipalities also have their own revenue sources. Provinces raise money by way of motor vehicle licence fees, hospital fees etc. and in the Western Cape, tolls on certain roads. In the case of user charges like hospital fees and tolls, there is usually a separate trading account in the Provincial Revenue Fund. Municipalities' main source of own-income is property rates. Recently the RSC levies (tax on payroll and on gross income) were abolished, and the NT is working on a draft bill to empower municipalities to raise these types of taxes to replace the lost RSC levies. In the case of provinces these own sources are severely limited: it was announced by the Minister of Finance in a recent address to the National Council of Provinces that provinces raise only about 3,5% of their own revenue. This is despite the fact that theoretically the equitable share is designed to top up own revenue sources.

A provincial legislature may impose taxes, levies and duties other than VAT, income tax and customs duties. This must be regulated by a national act. The Provincial Tax Regulation Process Act 53 of 2001 regulates the process by which a province may impose provincial taxes. It must make a submission to the Minister of Finance, who can approve or disapprove the proposed tax, levy or duty. The tax must be collected by SARS. A similar Act has been passed for the raising of municipal taxes: the

[2] See for example the DOR Act 1 of 2007 and the Local Government Frameworks and Allocations published in *Government Gazette* 29797 of 14 April 2007.

Municipal Fiscal Powers and Functions Act 12 of 2007. As stated above, this is designed to facilitate the collection of local taxes to replace the regional services council levies that were abolished in June 2006. Any new local taxes will have to be approved by the NT in terms of the Act.

The NLTTA provides for no dedicated funding sources. If a transport authority (TA) is established under Part 5, the Minister, province or relevant municipality/ies may provide it with funds. The Minister may provide funds to provinces, TAs or municipalities for performing functions under the Act or provincial laws (section15). The MEC may provide funds to TAs and municipalities in the province for the same purpose (section 16). Municipalities may appropriate funds for a TA of which they are a part (section 17). The concept of TAs will be abolished when the NLTB comes into operation (expected April/May 2009). Instead, TA powers will be allocated to municipalities.

9.2.4 The Need for Institutional Change

At this point, it is useful to do a "first-order" identification of some fundamental reasons institutional issues arise. Among those reasons are:

Concern with autonomy. Creating linkages among organisations and potentially creating new organisations be they virtual or real can lead to a loss of autonomy for the participating organisations. Those organisations may feel they are unable to discharge the responsibilities they were chartered to do if that autonomy loss occurs.

Mission mismatch. Different organisations such as national departments of transport, law enforcement agencies, and so forth, have different core missions. The missions may, in fact, be complementary, but the different mindsets these organisations bring to the table may cause institutional difficulties.

Differences in resources. Budgets may be different in various jurisdictions, leading to difficulty in all organisations being able to perform as equal partners.

Funding sources. Institutional issues will occur if funding sources are not consistent with the organisation's mission. If traditional funding sources are directed to, say, capital spending and an additional mission focuses on operations, that disconnect generates an important institutional issue between funders and funded.

Ideology. This point has ideological content, particularly in an environment in which a traditionally public service -- highway and public transportation -- is being offered. Such a conceptual change to basic principles will certainly generate institutional concerns.

Technology. Different organisations take different technological approaches to meet their missions. This may lead to difficulties in making technical systems interface properly. Further, these organisations may have different staff capabilities in technical areas, making sharing responsibilities equitably difficult.

Information. The operations approach runs on information. There may be concern among various organisations about sharing that information, and in some cases there may be difficulties (or reluctance) for some organisations in delivering the necessary information to their partners. Integrating information may present a difficult technical problem.

9.2.4.1 Institutional Change Success Factors

FUNDED: First and fundamentally, of vital importance is *continuing reliable financial support for operations*.

Funding for Operations: Conventional infrastructure projects have front-loaded costs for construction and then maintenance costs occur cyclically. Benefits accrue to users, but then may deteriorate between maintenance cycles and during maintenance procedures. The "coalition" for a conventional infrastructure project need be put together but once. A continuing stream of funds is not necessary, except for maintenance.

Operations funding is of a different character. Some up-front costs may be needed -- for example, some initial capital investment for ITS -- then there are year-to-year operations costs associated with transportation operations centre staffing and the like. It is suggested here that benefits associated with such initiatives may grow over time, in the sense that an operations focus allows modification to network processes as conditions change, while conventional infrastructure systems are unable to respond flexibly.

It is essential to have a continued flow of funds from year to year for operations. It is all too easy, from deferred maintenance of conventional infrastructure, for operations funds to be cut in time of financial difficulty. It is quite difficult to extract value from an already-built piece of infrastructure and, conversely, quite simple to make a "temporary" cut in operations. If that occurs, the operations-based transportation services will quickly atrophy and customer service will deteriorate.

FLEXIBLE: Operations are different every day. Organisations that can respond flexibly to the many, diverse issues that arise are required. O*perations*' planning is the way this flexibility is achieved.

There are substantial differences between transportation planning and transportation operations. Most critically, they differ in time frame. Operations are ongoing; every day, operations begin anew. Planning deals with the strategic shaping of the transportation system. The product of planning is documents, while the product of operations is successful performance for another day.

However, within the planning framework, one should make an additional distinction between *strategic planning* and *operations planning*. Strategic planning deals with the development of plans that will guide the deployment of the transportation system over long periods of time, perhaps decades. Operations' planning is planning for

actually operating the transportation system. Operations planning guides the day-to-day operation of the transportation network.

FOCUSED: Discipline and focus is the required organisation ethos for operations.

Operations Are Different: There are critical differences between operations planning and the act of *operations* itself. Organisations that have focused on strategic planning and operations planning may well have to undergo substantial organisational change to permit them to be effective *operators* of the transportation system. Operations are a fundamentally different set of activities and require a different organisational approach when compared with planning, construction or maintenance.

INTEGRATED: An integrated organisational response is required to deal with operations in complex, geographically-diffused transportation networks.

The interconnections -- physical, informational and political -- in the regionally-scaled transportation enterprise determine their performance. Feedback dominates the mechanisms by which the transportation system creates value for customers. This suggests that operations for the transportation systems need to be similarly integrated. This is a challenge. Organisations that have previously operated independently will now have to consider themselves as part of an integrated team, and perhaps additional feedback loops will need to be put in place. While difficult, this integration is a precondition for effective system performance. A basic requirement for transportation services quality is the system's integration:

- Image integration: mass transit as a whole to provide a global service
- Operations integration: lines, stops, trains frequency, timetables
- Tariff integration: it is intended to allow travelling in different transit systems with a single combined ticket to avoid the use of new tickets or, generally, additional cost. This can be achieved in different ways that enclose from combined tickets that allow travelling in different transport systems during a set length of time or multiple tickets and even monthly personal travel passes that authorise any number or type of trips within a specific area.

Regions in developed countries show the best examples of transit systems integration. The *Syndicat de Transport de Paris* was set up in 1959; the Hamburg Transit system Federation, the first German Verkehrsverbund, was established in 1965. Transportation systems in Toronto were already integrated in 1954 and the bus system was restructured when new stretches of the underground transit were opened for service. For over 30 years now, the *Greater London Council* has co-ordinated *London Transport* with the other transit systems. But for Brazil and, now, Bogota and other Colombian cities the development of corridors with separate infrastructures for buses or guided systems of intermediate capacity has been introduced with a large measure of success.

The lack of integration is evident at all levels: such as physical integration, promotion and information about the system, services (routes and timetables) as well as tariffs. This is basically due to the lack of institutional integration that would allow government agencies to perform their "Transport Authority" role and promote co-ordination between operators under a structure that may be informal and similar to the interesting Brazilian and Colombian developments. The tough competition between operators makes it actually impossible to bring them together. In terms of the NLTB, the functions will be consolidated at municipal level (planning, financing and implementation) with provinces playing a co-ordination role.

INTERMODAL: Operations should be based on an intermodal concept. The traveller and freight customers often view services as intermodal, so there is a need to deal with transportation operations on this basis as well.

For many years on the freight side, and more recently on the passenger side, the idea of creating superior customer service through effective intermodal operations has gained currency. Each mode has its distinctive advantages and disadvantages. The challenge of transportation operators is to put those modes together in such a way that advantages are maximized and disadvantages are minimized for each mode. An integrated trip chain is constructed.

The Achilles heel of intermodalism has always been that the "hand-overs" between the modes are less than effective, thereby dissipating the inherent advantages of each mode. But new technologies -- and especially information and communications technologies -- allow these "hand-off" questions to be effectively addressed.

INFORMATION- AND CUSTOMER-BASED: New technology has put into our hands the ability to collect process and disseminate information to *customers* and to the *partner agencies* concerned with the transportation network.

Information provides an important opportunity to measure performance using *customer-oriented metrics* and to greatly improve the quality of the service that is provided.

The new technologies available to us through ITS can be a great help in customer-oriented performance measurement. At the same time, it is important to *ask the customers* how they think the system is performing on various dimensions from time to time, and to ask them how *they* would measure performance from their perspective. Periodic surveys and focus groups are mechanisms for getting at the customer viewpoint.

REAL-TIME: Operating situations are ongoing, dynamic and driven by random factors. Real-time is the temporal scale on which operating organisations need to respond.

Professional activity in transportation has long focused on strategic planning -- based on the time-scale of years or even decades -- and tactical planning. Transport

requires a real-time perspective as the response to changing conditions must be very fast if congestion and safety and security hazards are to be ameliorated or avoided. Fortunately the technology exists, and more and more is in place to allow us to do real-time operations, but a change in professional training and in organisational and institutional perspective will be necessary for the real-time vision to be achieved.

ROUTINE: While individual stresses on the operating environment cannot be predicted, one can plan for generic kinds of service interruptions and treat them in a routine and decisive manner.

We should minimize ad hoc-ism in the response to operating situations. Operations require planning. Knowing the chains of command and having contingency plans for "standard" situations is fundamental to transportation operations. If *performance* is to be achieved, the operations mindset, supported by effective *operations planning*, is a requirement.

9.2.4.2 Best Practice

Our recommendations will be guided by best practices from international experience.

Best practices depend on the level of management (firm, city, region, nation, global) and the type of freight to be managed. The discipline of logistics provides a wide range of management guidelines and techniques to optimize freight transport efficiency. Below are guidelines for increasing freight transport system efficiency:

- *Integration*. Develop integrated freight transport networks. For example, facilitate intermodal systems that use rail and marine for longer-distance links, and trucks and human-powered delivery for shorter-distance links.

- *Objectives*. Establish specific objectives for freight transport activity that support sustainability, such as reduced energy consumption per ton-mile, encouraging use of less polluting modes, and placing a limit on total freight transport impacts in an area.

- *Priorities*. Give priority to planning and investment decisions that support more sustainable freight modes. Use a bundle of management instruments to encourage more efficient freight transport.

- *Level Playing Field*. Correct market distortions that favour less sustainable modes over more sustainable modes. For example, tax, pricing and investment policies should not favour truck over rail or marine transport.

- *Pricing.* Implement the user pays principle, which means that prices reflect all costs unless a subsidy is specifically justified.

- *Services*. Encourage competition and entrepreneurial freedom in freight transport markets by allowing open access to rail networks and minimizing barriers to competition.

- *Reduce Freight Volume*. Encourage policies that reduce total freight traffic volume, including more local production, reduced product weight and packaging, reduced empty backhauls, and reduced waste production.

9.2.5 Specific Provincial Issues Arising Out of Phase 1

9.2.5.1 Institutional issues

The National Land Transport Strategy, 2007, and other policy documents, have identified the problem that the transport-related functions in Schedules 4 and 5 of the Constitution, e.g. provincial roads, municipal roads, public transport, municipal public transport, are not defined or clearly spelled out in the legislation. This remains a problem with roads, as it is not clear where the dividing line is, for example between provincial roads and municipal roads of a regional nature. As regards public transport, the NLTB addresses this issue by defining the roles of the spheres in clause 11. The role of provinces will change, with the responsibility for public transport and establishing integrated rapid public transport networks (IRPTNs) shifting to the municipalities. The Minister may also assign the operating licensing function from provinces to particular municipalities.

The Gauteng Transport Management Authority (GTMA) has been established by Gauteng Act 3 of 2008. Its functions are widely defined, and include the establishment of a provincial roads portfolio. It thus appears that this Authority is intended to take over provincial road functions from the Provincial Department. In the recent draft White Paper, the North West Province proposes the establishment of a provincial Transport Infrastructure Agency and a Public Transport Operating Agency. In Limpopo, the provincial Roads Agency was established some time ago. These agencies will hopefully improve the state of the various provincial roads, but underline the need for national co-ordination identified above.

The Phase 1 report also emphasised the need for co-ordination between provincial departments responsible for land use with the relevant transport departments.

In the planning of infrastructure, the need was identified to accommodate the infrastructure for IRPTNs being established by various cities, and their links with regional services. Transport infrastructure and facilities should be planned and regulated so as to promote public transport. This has not happened in most areas, where private cars still enjoy pre-eminence. It will take a concerted effort by the three spheres of government.

The Phase 1 investigation revealed a lack of co-ordination, by way of example, between infrastructure planning in the Western Cape as regards road and rail infrastructure from the Airport to the city centre, with various conflicting proposals on

the table. National legislation should provide more strongly for co-ordination, and possibly empower the Minister to intervene.

The NLTTA plans provide for infrastructure, but are focused on public passenger transport. More focused guidance is needed in legislation as to who is responsible for overall co-ordination of infrastructure planning, and as to the content of transport plans in relation to infrastructure. The same situation will apply under the NLTB.

Allocation of planning responsibilities in planning requirements and guidelines published by the DoT also needs to be clearer.

Powers to advertise on and along provincial roads also require clarification in provinces without roads legislation (i.e. still using outdated ordinances). Municipalities have powers under the Constitution over billboards and the display of advertisements. The overlap between this power and the powers of SANRAL and the provinces to control advertising along roads are unclear and need clarification in legislation.

9.2.5.2 Policy and legal issues

A major problem identified was the need for co-ordination of national and provincial legislation. The NLTTA, for example, allows provinces to pass legislation to replace or amend Chapter 3. The existence of various pieces of provincial legislation on "Chapter 3 issues" leads to confusion and lack of uniformity. The NLTB addresses this issue and will provide for more uniform national legislation.

The principle of integrating public transport modes through the provision and regulation of facilities and infrastructure has not received much attention in legislation. This should be remedied. This is now provided for in the NLTB, but the provisions will need to be implemented.

The Phase 1 report identified the need for provincial roads legislation to introduce or strengthen measures for co-ordination between land use policy and laws and transport laws, for example in the planning of provincial roads.

Changes to road infrastructure must be put in place to accommodate the IRPTNs. This could involve HOV lanes, introduction of toll roads or tolled lanes, electronic tolling systems etc. Existing legislation will have to be examined to see that it provides for these aspects (for example only one province – Western Cape – has toll roads legislation and the powers of municipalities to toll roads is unclear).

The Cross-Border Road Transport Act, 1998 does not deal with ranking issues. The need has been identified to provide adequate and separate ranks for cross-border operators in relevant urban areas.

The objective to protect road infrastructure through enforcement of laws on overloading has largely been ineffective. This is particularly so in relation to provincial

roads. The AARTO system will decriminalize traffic offences, but although this Act was passed in 1998, it has still not been fully implemented. The system is legally in force in areas of Gauteng, but the roll-out process has been slow. New, more innovative systems are needed to control overloading. In the USA, for example, authorities do agreements with large hauliers. They are then exempted from having to enter weighbridges, but penalties are very harsh of they are caught overloading.

The Constitution leads to overlapping of road traffic functions, which has caused problems. There are various role players, such as provincial and municipal road traffic departments, the RTMC and the Infringement Agency. The provisions of Chapter 3 of the Constitution on co-operative government, and the Intergovernmental Relations Framework Act, 2005 have proved inadequate to address the situation.

The RTMC is proceeding with its mandate to improve and co-ordinate road traffic law enforcement. It should be asked to formulate a specific strategy for countering overloading offences in the National Road Traffic Law Enforcement Code. The NLTTA (and later NLTB) provisions could be used to provide for appropriate agreements between authorities to have co-ordinated law enforcement campaigns to counter overloading and other offences that damage road infrastructure.

In some provinces, outdated provincial roads ordinances are still being used. These are not suited to the current situation and are often in conflict with the Constitution. In North West a Roads Bill has been proposed for some time, but has not yet been promulgated. Western Cape is in the process of enacting a Transport Infrastructure Bill. These Bills should be expedited, and provinces that do not have updated roads acts should produce them.

As regards toll roads, only one province, Western Cape, has toll roads legislation. There should be close co-ordination between the provinces and SANRAL on toll road issues. Currently the Acts merely provide for consultation with other spheres. Also, there have been indications that the City of Cape Town may be considering municipal toll roads. This would have to be done via the Municipal Fiscal Powers and Functions Act 12 of 2007 as there is no specific legislation on municipal toll roads. If this happens, it will increase the need for co-ordination.

9.3 ANALYSIS AND CONSTRAINTS

9.3.1 Identification of Main Constraints in the Transport Sector

The following table presents the main constraints from an institutional and a legal point of view for all main transportation institutions:

Table 99: Main Constraints of all main transportation institutions

MODE	SPHERE	INSTITUTION	LEGISLATION	FUNCTIONS	MAIN CONSTRAINTS (Legal/Institutional)
ROAD	**National**	**NDoT**	**Constitution & various Acts** **e.g. NLTTA**	**Policy formulation & co-ordination** **Prepare NLTSF**	**• Lack of capacity to perform legislative functions** **• Not clear about who is responsible about advertising along the roads (usually roads authorities, too)** **• National legislation needed to provide with more definite collaboration between Government Spheres** **• Co-ordination between National, Provincial & Municipal (planning & operation)** **• Interaction are unclean regarding National, Provincial toll roads (and possibly future Municipal TOLL Roads)** **• No National Toll Road Policy (Needed?)** **• No clear distinction between Provincial & Municipal roads/streets**
		SANRAL	**SANRAL Act, 1998**	**Full responsibility for National Roads**	
	Provincial	**Prov Road Dept**	**Provincial Roads Acts (when exist)**	**Full responsibility for Provincial Roads**	
		Limpopo Roads	**NP Roads Agency & Provincial Roads Act, 1998**	**Full responsibility for Limpopo Provincial Roads**	
	Municipal	**Metropolitan Municipalities**	**Municipal Structures Act, 1998**	**Responsible for all Municipal Roads in their areas of jurisdiction**	
		District Municipalities	**Municipal Structures Act, 1998**	**Responsible for "Regional" Roads**	
		Local Municipalities	**Municipal Structures Act, 1998**	**Responsible for all other Municipal Roads**	
		Transport Authorities	**NLTTA**	**May take over Municipal Road functions (ETA only TA currently)**	

MODE	SPHERE	INSTITUTION	LEGISLATION	FUNCTIONS	MAIN CONSTRAINTS (Legal/Institutional)
ROAD (Traffic)	**National**	**NDoT**	**National Road Traffic Act, 1996**	**National Road Traffic Act, 1996**	
		Road Traffic Management Corporation	**Road Traffic Management Corporation Act, 1999**	**Better manage, co-ordinate and operate road traffic enforcement**	
		Road Traffic Infringement Agency	**AARTO Act, 1998**	**Manage the administrative adjudication of road traffic offences**	
	Provincial	**Provincial Departments**	**National Road Traffic Act, 1996 & Provincial Road Traffic Act**	**Manage provincial road traffic issues**	
	Municipal	**Metros**	**Municipal Structures Act & by-laws**	**Responsible for municipal road traffic functions**	
		District Municipalities	**Municipal Structures Act & by-laws**	**Responsible for municipal road traffic functions in their areas of jurisdiction**	
		Local Municipalities	**Municipal Structures Act & by-laws**	**Responsible for municipal road functions in the Local Municipal**	

MODE	SPHERE	INSTITUTION	LEGISLATION	FUNCTIONS	MAIN CONSTRAINTS (Legal/Institutional)
RAIL	**National**	**NDoT**	**National Road Traffic Act, 1996**	**National Road Traffic Act, 1996**	**• Rail is a national function BUT provinces & municipalities are expected to do integrated transport planning** **• Long distance passenger lines being neglected because Transnet is no longer responsible for them** **• Major under investment in rail infrastructure** **• SARCC responsibly to provide commuter transport but NLTTA states that in terms of LS Act the municipal sphere must do integrated transport planning** **• Serious need for national rail policy & national rail act** **• Institutional factors are hampering rail/road integration** **• Lack of clarity on tariff calculation by Transnet**
		Transnet Ltd	**Legal Succession Act, 1989**	**Originally all rail except commuter rail, now only rail freight**	
		SARCC	**Legal Succession Act, 1989**	**Responsible to ensure that commuter rail services are provided – took over Metrorail, Shosholoza Meyl (long distance passenger rail)**	
		National Rail Safety Regulation	**National Rail Safety Regulation, 2002**	**Responsible for railway safety**	
		Proposed Railway Economic Regulation	**National Rail Act (still to be drafted)**	**Unknown at this stage**	

MODE	SPHERE	INSTITUTION	LEGISLATION	FUNCTIONS	MAIN CONSTRAINTS (Legal/Institutional)
RAIL (contd)	**Provincial**	**Gautrain Management Agency**	**Gautrain Management Agency Act, 2006**	**Responsible for managing the Gautrain project**	**• Need for legislation clarification on infrastructure & operation** **• Lack of clarity on devolution of rail transport to municipal spheres** **• Lack of clarity in application of MFMA as regards to split** **Between capital & operating costs (Note: NLT Bill)**

MODE	SPHERE	INSTITUTION	LEGISLATION	FUNCTIONS	MAIN CONSTRAINTS (Legal/Institutional)
AVIATION	National	NDoT	National Road Traffic Act, 1996	Steering all aviation Strategic planning & policy regulator Compliance with international standard & regulations	• Airspace master plan not regularly updated (in relation to infrastructure) • Little or no proper direction for co-ordination between the 3 spheres of Government • Guidance is required about the powers & responsibilities of airport licences in regards to the development of land use not related to aviation land use • Lack of proper communication between government, service provider, land users in planning, implementation of new air navigation system • Need for economic regulation of non ACSA airports (e.g. Lanseria) to be determined • Lack of national airport development planning • Lack of integrated metropolitan & local planning
		South African Civil Aviation Authority	South African Civil Aviation Authority Act, 1998	Responsible for safety aspects	
		Airports Company of SA	Airports Company Act, 1993	Responsible for international and national airports	
		Air Traffic & Air Navigation Company	ATNS Act, 1993	Maintenance of air navigation infrastructure and services	
	Municipal	Municipalities	Constitution & by-laws	Responsible for municipal aerodromes	

MODE	SPHERE	INSTITUTION	LEGISLATION	FUNCTIONS	MAIN CONSTRAINTS (Legal/Institutional)
MARITIME	National	NDoT	National Road Traffic Act, 1996	National Road Traffic Act, 1996	• Draft White Paper: "Legislation needs to be cleaned up/tidied up" • Institutional situation to be clarified (comprehensive legislation is required) • Overlapping of responsibilities (e.g. pollution – DoT, DEAT & SMASA • Lack of co-ordination between NPA & planning authorities (e.g. Cape Town & Durban port expansion; road access to Durban port)
		DEAT	Environmental legislation impacting on maritime	Enforcement of Environmental legislation	
		SAMSA	SAMSA Act, 1998 Merchant Shipping Act, 1951	Responsible for maritime safety & related issues	
		National Port Authority	National Port Act, 2005	Total responsibility for seven main ports	
		Ports Regulator	National Port Act, 2005	Regulate the ports system in line with government strategic objectives	
	Municipal	Municipalities	Constitution (Pontoons, ferries, jetties & harbours)		

SPHERE.	INSTITUTION	LEGISLATION	FUNCTIONS	MAIN CONSTRAINTS (Legal/Institutional)
National	NDoT	Constitution NLTTA	Policy setting & preparing the NLTF, co-ordination of provinces	• Overlapping of responsibilities • Some issue not being addressed by competent institutions ITPS supposed to integrate modes (planning) but rail planning sits at national level
	SARCC	LSA, 1989	Responsible for rail commuter planning	
	Transnet Ltd	LSA, 1989	Responsible for rail infrastructure planning (freight/passenger)	
Provincial	Prov Depart	NLTTA, provincial Acts	Provincial policy setting & preparing PLTF	
Municipal	Municipalities & TAs	NLTTA, provincial Acts, land use acts by-laws	Responsible for ITPs (part of IDPs)	

9.3.2 Passenger Transport

9.3.2.1 Introduction

According to the terms of reference, the guiding principle for developing institutional structures to support the proposed National Transport Master Plan, are as follows:

- Transportation institutions should be functional and homogenous
- Institutions should ensure the provision and operation of qualitative, efficient, and integrated transportation systems and their networks.

There are transport-related structures in all three spheres of government, as follows:

- **National**: National State departments in the executive branch of government and national public entities. These entities can be statutory, i.e. established by an act of Parliament or be set up as companies under the Companies Act. In the passenger field these include the Cross-Border Road Transport Agency, ACSA and the Transport Appeal Tribunal.

- **Provincial**: Departments in the executive branch of government in each province, and provincial entities. These entities can also be statutory, i.e. established by an act of a provincial legislature or be set up as companies. These include the operating licensing boards, provincial transport registrars, the Gautrain Management Agency and the Gauteng Transport Management Authority.

- **Municipal**: Category A, B and C municipalities, transport authorities established under the NLTTA (to be abolished by the NLTB) or municipal entities established in terms of the Local Government: Municipal Systems Act 32 of 2000. The latter can be private companies, or service utilities set up by by-laws of the relevant municipality.

In the passenger arena, **long distance services should also be separated from short distance ones**. However, the situation is more complicated, as illustrated below:

- In terms of current policy, **services in city areas** should be managed as part of **integrated rapid public transport networks** (IRPTNs). The Public Transport Strategy and Action Plan, 2007 recommends that they be planned and managed as integrated networks, incorporating **bus rapid transit** (BRT) and other **bus, rail and taxi services**.

- **Commuter or regular services** between metro areas, such as Johannesburg and Ekurhuleni, should be **planned and managed by the cities** in co-operation with each other. The **province** should play a **co-ordinating role** on a regional basis.

- **Intercity**, **long distance services** should be planned and managed, insofar as they need planning or management, nationally as part of the **National Land Transport Strategic Framework** (NLTSF) and provincially as part of the **provincial land transport frameworks** (PLTFs). On **intercity routes** there is **competition** between long distance coaches, long-haul rail, long distance taxis and airlines.

- Cross-border (international) transport is managed by the **Cross-Border Road Transport Agency** and bilateral and multilateral agreements with other African countries.

9.3.2.2 Guiding Principles for Institutional Reform

Proper institutional arrangements are vital to ensure **effective service delivery** in the passenger field. This applies to the correct **positioning** within the spheres of government of transport functions, as well as the **appropriate institutions** properly mandated and equipped to perform the functions. The institutional model needs to satisfy a number of **essential requirements**, not least to ensure **clarity of accountability** between spheres of government, the **integration of transport** and **land use** and **integration between modes**, and, ideally, sufficient, reliable and predictable **financial streams**.

There has been a long-standing interest in **transport authorities** as an appropriate institution for the development and **overall management of transport**. This followed a number of study tours to cities overseas to study world best practice for an appropriate model for South African cities. The policy principles were captured in the *White Paper on National Transport Policy* in 1996, and subsequently provided for in legislation.

The **National Land Transport Transition Act** 22 of 2000 (NLTTA) provides for the establishment of **transport authorities at the municipal sphere** to be responsible for transport functions. After the enactment of the legislation, the option of a transport authority was pursued with great enthusiasm in a number of metropolitan municipalities and district municipalities. The reality, however, has been that **only a single such authority** was established in eThekwini. The findings of a series of investigations to establish transport authorities revealed a number of concerns which frustrated the efforts of other cities. These include **lack of dedicated funding sources**, **fears** that municipalities will lose control over transport issues and

problems with **municipal legislation**. As a result, after intensive interaction with the Department of Provincial and Local Government (DPLG) and the National Treasury, the concept of transport authorities will be abolished by the NLTB, which will assign the relevant functions to municipalities.

The co-ordination problem relating to passenger transport is well summed up in a report done for the National Treasury by the Palmer Development Group and P. van Ryneveld, dated 22 May 2006:

> "From the point of view of municipalities, particularly cities, which have the responsibility for creating effective built environments, the public transport sector is highly **fragmented**. For example, cities are responsible **for integrated transport planning** and, presumably, for ensuring that their citizens get access to an effective service. Yet they have **no control over the rail service** and **limited control over bus and taxi operators**. This leads to a lack of accountability."

A further problem is that the **bus subsidy system is managed at provincial level**. The report states that each province applies its own policies for allocating those subsidies. The NLTB provides for municipalities to establish integrated rapid public transport networks, and to take over the subsidy function for those networks. Such networks will initially be established in the 12 cities identified by the Public Transport Strategy, 2007, and later in other areas, with municipalities taking the lead.

9.3.2.3 Scope and Issues Relating to Passenger Transport

The institutional issues are as much about the **correct positioning of transport functions** as the appropriate institution to perform the function. A fundamental question is to what extent functions should be consolidated and in which sphere.

Section 156(4) of the **Constitution** indicates that functions should to be assigned to the lowest competent sphere of government. This principle is called "subsidiarity" in the 1996 White Paper, which advocates the "devolution of public passenger transport functions, powers and duties to the lowest appropriate level of government". This gave rise to the transport authority (TA) model in the NLTTA. The option of establishing institutions at the **provincial sphere** to be responsible for a wide range of transport functions has recently been considered in two provinces, i.e. Gauteng and Western Cape, as an **alternative model**. The two models differ: in the case of Gauteng a provincial transport authority has been established (the Gauteng Transport Management Authority - GTMA), while in the Western Cape the option that was considered is to establish a provincial entity with responsibility for public transport operations, with representation from all three spheres of government, called the Public Transport Operating Entity. Gauteng has promulgated legislation to establish the GTMA. It is not known what the outcome of the Western Cape proposals will be.

In the current environment in South Africa of subsidised public transport, it would seem that there are **four essential elements** which need to be placed at a single sphere of government for effective delivery:

- **Planning and co-ordination**
- **Service delivery**

- **Regulation and market entry**
- **Monitoring**

The **planning** function is currently placed at the **municipal sphere** while the other three lie at the **provincial sphere**, namely the service delivery (bus subsidy function), regulation (Operating Licensing Boards), and monitoring. Logic and current policy suggest that all these should ideally be positioned at the municipal sphere

The regulation function, i.e. the functions of the Operating Licensing Boards, as far as internal trips are concerned, should also be assigned. A consideration however is that the whole role of Boards should be reviewed, given that operating licences should be driven by transport plans, and the role of the Board becomes more of an administrative function based on transport plans (ITPs).

It would seem that these functions are designated as **municipal functions** in terms of the Constitution, which lists *"municipal public transport"* in part B of Schedule A as a local government matter. This view is reinforced by the definition now given to "*municipal public transport services"* in the NLTTA i.e. – *"any public transport service that is rendered for a consideration within the area of a planning authority."* In the case of **funding**, especially the subsidy funds, the money should be allocated directly from the DoT budget to the TAs/metropolitan municipalities.

For **effective service delivery**, key functions need to be positioned at the **same sphere of government** namely the functions of planning, service provision, regulation and monitoring. The latter three functions are currently located at the **provincial sphere**.

The Public Transport Strategy and Action Plan, 2007, which was approved by Cabinet in March 2007, thus proposes that the following functions should be consolidated with the TAs or Metropolitan Municipalities:

- The **road-based subsidy function**, including design, award, and subsidy management of subsidised service contracts
- Monitoring of **subsidised service contracts**
- The **regulation function** and the functions of the Operating Licensing Boards
- The funds for subsidised service contracts should be transferred directly to the **TAs/Metropolitan Municipalities**
- More extensive responsibility for the planning and service level specification of **commuter rail services** should be taken by the TAs/metropolitan municipalities. A statutory committee should be established under the chairmanship of the TA/Metropolitan Municipality with representation from the PRA (SARCC/Metrorail), for rail planning, and determination of service levels.

The NLTB provides for these issues.

9.3.2.4 Best Practice - International Experience

International experience shows that co-ordination and integration of passenger transport modes and services is best achieved by dedicated public transport authorities. These authorities sometimes deal with a wider range of transport issues, which is the case with the Greater Vancouver Transport Authority for example. However, TAs are usually dedicated public passenger institutions. A few case studies

are given below. Some of the information may be outdated, but serves as a useful comparison.

THE NETHERLANDS

In Amsterdam, the **Regionaal Orgaan Amsterdam** (ROA) undertakes the co-ordination of public transport, among various other functions, for the greater Amsterdam area. The area consists of 16 local authorities ("gemeenten") with some 1,3 million inhabitants. The area does not correspond with provincial boundaries. It was indicated in 1998 that the three spheres of government in Holland were restructuring, and that the regions concerned would consolidate into a provincial model.

Public transport in Amsterdam is by buses, trams and trains, with a small underground metro rail service. Metered taxis are regulated by the Province in terms of numbers and quality, not by the ROA, are not subsidised and do not form part of public transport planning. A new law was being considered to deregulate taxis and remove economic regulation. All vehicles carrying more than nine persons are classified as buses.

Ordinance 1893/91 of the European Economic Community (EEC) dated 20 June 1991 forbids member states, with some exceptions, from imposing social obligations on transport companies. These functions must be put to tender in future and paid for at commercial rates. This has supported the packaging of the organisation of **regional public transport systems** into regional units, in a move to localise the responsibility for public transport. The Ordinance has also led to a new way of doing things in that the transport authorities (TAs) must and are gearing themselves towards tendering and open markets, and the avoidance of monopolies. It is not known how far the process has progressed. The ROA and other European TAs were adapting their functions to comply with this legislation.

The ROA is a separate legal entity and was established by statute and by a written agreement between the 16 local authorities (LAs), one of which is Amsterdam proper. The agreement is revised regularly. The management of the ROA consists of a controlling board ("Regioraad"), an executive committee called the "dagelijks bestuur" and a chairperson. The Board is made up of elected councillors. The functions of the Board are to oversee the authority and it mainly concerns itself with politically sensitive matters such as tariff increases. The Board may form specialist committees, and has done so for public transport and traffic.

There is an Executive Committee (Exco) whose functions are to implement decisions of the Board, to control the income and expenditure of the ROA, to appoint and dismiss staff and to exercise general control over the affairs of the ROA.

The chairperson of the ROA must be the mayor of Amsterdam, who is a member of the Board. The mayor also chairs Exco. Where the chairperson is unable to act, a

member of the Exco must be chosen to take his or her place. The chairperson represents the organisation and signs official documents.

The **functions of the ROA** are to undertake specified functions and to implement laws relating to

- spatial planning ("ruimtelijke ordening")
- housing ("volkshuisvesting")
- transport and traffic
- land use policy
- environment ("milieu")
- economic development
- youth support.

It has taken over many functions previously carried out by the national government. Most of the actual work in these areas is done by the LAs, with the ROA being responsible for co-ordination.

The ROA is responsible for **issuing public transport permits** and for **scheduling**. Undertaking of surveys is outsourced to consultants. Some services provided by LAs fall outside of the ROA network, but will be centralised. Most operators in the area are owned by municipalities, but are moving towards privatisation to comply with the abovementioned EU Ordinance. Exact methods of **privatisation** are still being formulated. There are some small private operators, mainly for tourist services and to fill gaps in the network. Permits must be obtained and a need for the service proved. The Noord-Zuid Holland Vervoermaatskappij (NZH) undertakes about 90% of regional services. This company is state owned but will be privatised. Privatisation in general will be phased in, with corporatisation as a first step. The question of privatising planning functions is also being considered.

Heavy rail functions are undertaken by the Nederlandse Spoorwegge, which is **state owned** (national government). This organisation will also be **privatised**. The ROA does not co-ordinate services with heavy rail services: this is done by the individual companies.

The ROA is responsible for **passenger infrastructure projects** and bicycle paths, but **not roads**. Some contributions are made to road projects that support passenger transport, but the ROA owns no roads. It is considering taking over some roads in the future.

The ROA is responsible for administering public funds: about 700 million guilders in 1998 (approximately two billion rand). Of this amount some 447 million guilders is for public transport and 33 million for infrastructure. Approximately 1,5 million is for transport management. The ROA pays subsidies to the municipalities out of funds it obtains from the national government. Finances of municipalities are not required to

be ringfenced. The LAs contribute an amount of three guilders per inhabitant per year to ROA costs.

The policy of the Dutch Government is to **promote public transport**, but at the same time to **reduce subsidies**. New legislation has been introduced into parliament on **methods to grant and implement concessioning**. Subsidies paid by the national government amount to 60% of the total over the bus, tram and metro modes. The goal is to reduce this to 50% over the next five years. There is pressure from national government to reduce services to a lower level, and to get **local government to subsidise any additional services** that they want. The other 40% of subsidies come from **fare revenue**. Subsidies for concessionary fares for disabled persons are paid by the LAs.

Subsidies are paid by the ROA on a ticket basis. The ROA determines costs and revenues, and pays the difference. Operators have an **incentive to cut costs**.

The ROA seems to be "finding its feet" in a milieu of changing government structures. Its functions are wider than those envisaged for TAs in South Africa. It seems to have achieved a large measure of **success in integrating modes and time tables**. It is also introducing measures to comply with the EU legislation on **competition and tendering**.

GERMANY

The **Rhein-Main-Verkehrsverbund** (RMV) was established in 1994 to organise all public transport within a rather large area (roughly the size of Belgium). The area includes Frankfort, Wiesbaden, Fulda and Marburg. The area is made up of 26 local authorities (LAs) of three types:

- four "county boroughs" or large urban municipalities, such as Frankfurt am Main and Darmstadt (in addition, the city of Mainz is associated but not part of the area);
- seven "special status cities" such as Bad Homburg and Fulda;
- 15 "rural counties" which are similar to district councils, having towns and villages in their areas.

The main aim of the RMV, which has already been achieved, is to **use bus, light rail and local and regional heavy rail services** in the area with **one set of timetables**, a **uniform fare rate** and a **single ticket**. Public road and rail transport services are also **co-ordinated with air services**.

The RMV was established as a company by agreement between the State of Hessen and the LAs concerned, who are all shareholders. (Germany has a federal government structure, similar to that of the USA, with Hessen being one of the States.) The LAs remain responsible for the provision of services in their areas and may decide on their own ranges of services, as long as the standards laid down by the RMV are met.

The RMV consists of a **Supervisory Board** of politicians from the LAs and the State Government of Hessen (one representative each). The Board must take **fundamental decisions**, including **strategic** questions, **fare structures** and the **financial plan**. Account is taken of **regional planning**, **environmental protection** and **transport policy**.

The tasks of the RMV are carried out by approximately 80 officials and staff. The RMV has established or will establish **subsidiary companies** for specific tasks. This takes the form of a service company offering various services such as **cleaning** and **security services**, and a **traffic management company** to undertake projects involving **park-and-ride schemes**, **traffic guidance** and **traffic acceleration**. They are assisted by a **Technical Advisory Board**, consisting of representatives of transport companies and associations and a **Passenger Advisory Board** consisting of passenger working groups from local areas and from special events.

At the operational level, the RMV has operating agreements with municipal transport authorities, local transport associations, Deutsche Bahn AG (heavy rail) and Hessen State Railways.

The German government has a policy to support SMMEs but recognises that small firms are not ideal for providing all forms of public transport services. The prevailing view is that small firms do not always provide good market results, for example because they lack economies of scale.

The functions of the RMV are to organise **regional transport** and to **interface with long-distance transport** and **with local networks**. It also undertakes **sales** and **marketing** of public transport, sets fares in a uniform fare structure, maintains a **uniform information system** and determines timetables.

The **granting of concessions** to private bus companies is undertaken by a regional level of government between the State (Hessen) and local levels, of which there are two in the area called "presidia". This situation is seen as unsatisfactory, and there are talks to eliminate this level of government. Concessions are granted for eight years, with automatic extensions for good performance.

Previously the Federal Government paid subsidies to the railways for local services, but now it pays **contributions to the federal States**, and the State of Hessen passes on the **funds to the RMV**. The State of Hessen also makes a contribution. In 1995, 39% of the cost of public transport in the area was covered by fares, and the proportion of subsidies was: Federal Government 24%, State of Hessen 16% and local communities 21%. The **cost recovery rate** has recently been improved to 53% and the goal is to increase it further. The level of services was pegged in 1994 for this purpose, and where member LAs request additional services, these subsidies are financed only 50% by the State and the remainder by the relevant LAs.

The State currently pays an amount of DM 157 million per annum to the RMV. (States may generate their own funds: they receive a percentage of income tax and also vehicle licence fees.) The Federal Government contributes DM 500 million. Some DM 200 million is paid by LAs for additional services, infrastructure etc. The remaining income is from fares. Purely local transport is subsidised by LAs on a deficit basis.

The RMV pays subsidies to 140 firms or institutions. Passengers can purchase tickets for their whole trip from any operator in the chain. Operators keep fares. Each operator submits details of ticket sales on a monthly basis, and the RMV undertakes income distribution by means of sophisticated computer software. The relevant programme was developed with some difficulty in trying to please all role players. There was initial dissatisfaction, but now all parties have accepted the **distribution system**.

The costs of running the RMV are covered by the LAs at the rate of DM 1.06 per inhabitant per annum. These amounts are paid to the State, which makes up any deficit there may be.

The RMV has fully **achieved its goal of integrating modes and time tables and providing for through ticketing**, thus providing an excellent service to passengers in the area. These aspects provide the focus of its activities. The fact that passengers may purchase tickets on any vehicle to any destination in the area is a significant achievement. The **model for re-imbursing operators** that has been established with some difficulty, could probably be adapted and used by any transport authority. It appears that the RMV will provide advice and input in this regard, at a fee.

UNITED KINGDOM

The **Greater Manchester Passenger Transport Authority** (GMPTA) was established by statute to determine policies in respect of public transport provision in the Greater Manchester area. The Greater Manchester Passenger Transport Executive (GMPTE) was also established to secure appropriate public transport services to implement those policies. The GMPTA is made up of 33 councillors from the 10 district councils in the area. Operators are from the private sector, and set their own fares according to market forces.

The "key objective" of the GMPTA is "to provide the people of Greater Manchester with the **best possible public transport network**: integrated, accessible, high quality, and which provides an attractive alternative to the private car".

The Authority sets the level and quality of services on the **local train** and **tram services**, and for much of the **bus network**. It provides a **concessionary fare scheme**, bus stations, shelters and stops and travel information. It plans major strategic investments and promotes the public transport network.

Commercial operators decide what services to run and what fares to charge under the Transport Act of 1985, which brought about deregulation of the public transport system in Great Britain outside Greater London. The Authority has the responsibility for **providing services and facilities that the market does not provide**. Through **ticketing** arrangements are provided commercially by individual operators or via a joint venture controlled by bus and train operators. There are no legal requirements for through ticketing.

The Executive (**GMPTE**) is **independent from the Authority** (GMPTA) and may carry out the policies of the Authority either by **providing and managing facilities** itself or by **contracting** with bus, tram and train operators. It does not run buses, trams or trains itself. The Executive monitors the bus network and subsidises journeys that are not commercially viable, usually as additions to commercial services. The GMPTE **owns the tram system** called Metrolink. A commercial operator carries out the day to day operation of the system, and the GMPTE is responsible for **planning and future development of the system**.

The GMPTE **monitors the local rail network**. It provides 27 bus stations, 12500 bus stops, 3500 bus shelters and is responsible for their upkeep. At major bus stations it provides Travelshops which sell pre-purchase multi-journey tickets and provide information on bus, train and tram services. The GMPTE provides a comprehensive and impartial **transport information service**. It also produces posters, maps and leaflets. Special services are provided for disabled persons, such as a ring and ride door to door service, special ticketing such as vouchers for use in taxis, and grants to operators to upgrade buses. Publications are available in Braille, large print and on tape. The GMPTE administers the country's free and concessionary travel scheme.

The GMPTE also undertakes data collection and planning.

The **Authority provides funds** for the GMPTE to implement its policies. Revenue funding of the GMPTA is secured by a levy on each of the 10 district councils, paid from local taxes. Capital funding is from grants and contributions from various public and private sector sources, and from borrowing. These sources include central government, the European Union, operators, council tax payers and passengers (fares).

The GMPTA is interesting because it operates in an **environment of deregulation**. Its functions accordingly differ from the continental models. The split in functions between the Authority and the Executive **corresponds with South African thinking**, and echoes the structures of the continental models (i.e. a split between policy making and "political" aspects on the one hand, and implementation on the other).

NEW ZEALAND

New Zealand is a small country with a population of 4 million. Auckland, the largest city, has approximately 35% of the country's population, with Wellington and Christchurch being the only other large cities. It is a Constitutional Monarchy. Without any sub-national legislatures (only regional and territory local governments) all power is concentrated with the national government.

For national transportation issues, the Minister of Transport is responsible for all aspects of the country's transportation needs. The Minister can give some jurisdiction to the local level of government, but they still rely on funding from above and can have these responsibilities taken away at any point. New Zealand has also created a number of crown agencies for transportation, including Transfund, which is responsible for transportation funding allocation decisions, Transit NZ, which is responsible for the development and management of state highways, and the Land Transport Safety Authority. The Energy Efficiency and Conservation Authority also assume some transport responsibilities. Among transportation modes, responsibility between levels of government is quite varied, with rail activities being privately owned, local roads being managed by territorial authorities, and other passenger transport services owned and operated by the private sector, regional councils, territorial authorities and other ad hoc bodies.

The examples studied indicate the **importance of consolidating transport functions in a single entity that controls planning, funding, co-ordination, monitoring etc**. **Through ticketing** and **modal integration** need to be applied so that passengers can move easily from point to point in the system and have the information to enable them to do so. These concepts have been talked about for years in South Africa, and will hopefully now be implemented through the IRPTNs.

9.3.2.5 Proposed Institutional Arrangements

In the passenger field, co-ordination and integration of transport modes, as well as of land use and development planning with transport planning are vital. At a city level there should be **one institution** responsible for planning, co-ordinating, managing, monitoring and, where appropriate, allocating subsidy funds. This should happen as follows:

- At **city level**, the municipality should, in its ITP, undertake the basic functions mentioned above. **Rail functions** are still located at national level, but the **municipal authority** should take **responsibility for operational planning**, in close collaboration with the PRA (SARCC). The National Land Transport Bill (NLTB) provides for the establishment of planning co-ordination committees at municipal level. It also proposes that **municipal planning authorities**, basically the 12 largest cities, take over the operating licence function, and that, in addition, **bus subsidies** allocated by the DoT be managed at this level.

- **Provinces** should be responsible for the following (see clause 11 of the NLTB):

(i) more detailed provincial policy and strategy formulation;
(ii) more detailed transport planning and co-ordination in the provincial sphere;
(iii) co-ordinating between municipalities and transport;
(iv) liaising with other government departments in the provincial sphere with portfolios that impact on transport issues and brings together key players;
(v) assisting municipalities that lack capacity or resources and to see that gaps left by those authorities are filled.

- The **national sphere** should be responsible for the following:

(i) overall policy and strategy formulation;
(ii) overall strategic transport planning and co-ordination in the national sphere;
(iii) co-ordinating between provinces and addressing arrangements between the three spheres of government and public entities;
(iv) allocating functions to the most appropriate sphere of government by promoting legislation and promoting or concluding agreements, as appropriate;
(v) liaising with other government departments in the national sphere with portfolios that impact on transport issues and brings together key players;
(vi) assisting provinces that lack capacity or resources and to see that gaps left by them are filled;
(vii) intervening where provinces fail to perform their functions;
(viii) co-ordinating transport relations between the Republic and other countries and implementing international agreements.

9.3.3 Long Distance Freight Transport

This section presents an approach for long distance freight transport.

9.3.3.1 Guiding Principles for Institutional Reform

According to the terms of reference, the guiding principle for developing institutional structures to support the proposed National Transport Master Plan, are as follows:

- Transportation institutions should be functional and homogenous
- Institutions should ensure the provision and operation of qualitative, efficient, and integrated transportation systems and their networks.

With specific reference to long distance freight transport, the above-mentioned guiding principles translate to:

- '**functional**' is interpreted as being focused on the roles and responsibilities allocated to such institutions with clearly defined objectives and deliverables.
- '**homogenous**' implies a consistent approach to issues affecting the market segment under consideration. In terms of long distance freight transport it is

interpreted that the approach towards issues such as energy efficiency and environmental impacts should be similar irrespective of the mode of transport and the geographic location.

- '**qualitative systems**' addresses the quality of services as well as the social and environmental impact of such services. Quality of services therefore should refer to safety of vehicles and operations and the impact on the environment through emissions and noise.
- '**efficiency**' implies amongst others the efficient utilization of resources, for instance, energy, human, financial and economic resources.
- '**integrated**' again implies a holistic approach as opposed to a silo approach albeit geographically or by mode.

9.3.3.2 Scope and Institutional Issues Associated - Long Distance Freight Transport

Currently, the **institutional arrangements dealing with long distance freight transport are fragmented** in that various institutions are involved in the decision-making processes concerning this sector. For instance, infrastructure investment decisions are taken in different spheres of government and government owned institutions. The **regulation of operations** as far as safety standards, environmental impacts and energy efficiencies are concerned, to name a few, are **done by different institutions**, for instance:

- The **Department of Environmental Affairs and Tourism** is responsible for promoting the conservation and sustainable utilization of our natural resources to enhance economic growth, for protecting and improving the quality and safety of the environment and for promoting a global sustainable development agenda. Since transportation has a major impact on the environment through emissions and noise, future institutions should, as part of their agendas, address the **impact of transportation on the environment**.
- Similarly, the **Department of Minerals and Energy** ensures the optimal utilization and safe exploration of mineral and energy resources. Again, the transportation sector is a **major user of energy resources** in the country.

9.3.3.3 Best Practice – International Experience

AUSTRALIA

In February 2008, Australia embarked on the formulation of a National Transport Framework.

Australia is a large country and has a political dispensation in terms of which individual state governments have extended powers to govern the affairs in their respective states, including transportation matters. As far as transportation in general is concerned, the current situation is that state governments determined that an issue is 'national' if it crosses a border, or interfaces with the Commonwealth's constitutional responsibilities. This has led to a fragmented approach towards transportation matters. A fundamental shift in the new approach is that a national

transport matter is one that materially impacts on the national economy or society. It is no longer defined by state borders or Constitutional responsibilities.

Furthermore, it is recognized that experience has shown **small ad-hoc decisions** don't add up to smart infrastructure use. Again, it is stated that the **silo approach**, as defined by geographical boundaries and individual modes of transport, has to end. The **national policy framework/approach** will now ensure Australia's road, rail, air and sea transport systems are planned and operated as an **integrated network**. To this effect, the new approach is driven by a number of **guiding principles**, namely:

- To promote the **efficient movement** of people and goods
- To provide a **safe transport system**
- To promote **social inclusion**
- Protect the **environment** and improve **health**
- Promote effective and efficient **integration** and **linkage** of Australia's transport system
- **Transparency** in funding and charging.

From an institutional point of view, the new approach indicates that it is not the role of government to intervene where the **market** can provide the most **efficient solution**, but where markets 'fail', the transport sector may continue to require significant **public sector intervention** through appropriate policy levers to meet transport objectives. In this regard the proposal is that governments may intervene in transport to:

- **Address market failure**, including undesired externalities, natural monopolies and information asymmetry; and/or
- **Address equity issues**, e.g. to deliver socially desirable outcomes.

Furthermore, governments need to clearly articulate and **support transport policy objectives** such as improved **safety**, greater **social inclusion** (accessibility), **less noise and lower emissions**. The market alone cannot deliver these objectives.

The **National Transport Commission** (NTC) has a key role in ensuring that the **regulatory and operational environment for road, rail and intermodal transport** meets this challenge, now and into the future. In establishing the NTC, it was recognized that **consistency of regulation of freight transport** is a national issue. The view is that freight does not recognize geographical boundaries and rail wagon manufacturers and truck designers don't build these for only one state—their product needs to transcend borders. In a similar fashion, it is argued that **regulations and standards should address the sector as a whole**. The objective of the NTC is to improve **transport productivity**, **efficiency**, **safety and environmental performance** and **regulatory efficiency** in a uniform or nationally consistent manner. The NTC, therefore, has the mandate and obligation to provide national leadership through **regulatory reform in delivering freight transport outcomes consistent with national objectives**. It is furthermore notable that this institution

has to consider issues, such as, **environmental impacts and energy efficiency**, as part of its mandate.

In brief, the Australian framework calls for a **national approach** in the case of so called 'long distance transport' matters. It further advocates an integrated and **homogenous approach in intervening with market forces**. The NTC is tasked with this.

THAILAND

In a paper on The Development of the National Transportation Strategic Plan in Thailand: Lessons Learned from the Past and Directions for the Future, Mr. Prapatpong Upala, Assoc. Prof. Dr. Sorawit Narupiti and Dr. Kasem Choocharukul of the Department of Civil Engineering, Chulalongkorn University in Thailand investigated processes in developing **transport strategies** in Thailand. A brief overview of developments was presented, especially from an institutional point of view.

They concluded that approaches in the past led to several **conflicting imbalances between policies and implementations** with specific reference to an era, i.e. from 1963 to 1996, despite the existence of the Ministry of Transportation, when most of transportation plans and policies in were established by the National Economic and Social Advisory Council via the so-called National Economic and Social Development Plan. After that, the Office of the Commission for the Management of Land Traffic established the 1st and 2nd Traffic and Transportation Master Plans. Even during this period, they concluded that issues such as **inequity of investment and planning** in all of transport modes were still found when the plans were implemented.

The government, through the Ministry of Transport, then established the **Office of Transport and Traffic Policy and Planning** to be accountable for developing and formulating the **integration of transport and traffic strategy and master plan** to promote **efficiency and effectiveness of transport sector** in that country. The new body is tasked to give effect to three main strategic objectives, namely,

- **Competitiveness**—the development of transport sector shall support and promote the competitiveness of the country
- **Efficiency**—the development of the transport sector shall utilize resources efficiently and its services shall provide transportation alternatives that are effective in terms of both users' and government's viewpoint
- **Governance**—the regulatory framework shall be established based on the 'good governance' approach.

The basic approach in this country is the creation of an institution with a mandate to take a **consistent approach toward transport**, encompassing all aspects and impacts.

NEW ZEALAND

In February 2007, The Ministers of State Services, Finance and Transport asked the State Services Commission to lead a **multi-agency review of the land transport sector**. The *Next Steps in the Land Transport Sector Review* (Next Steps) report makes recommendations to the government on **proposed changes to the land transport sector in terms of investment planning, funding and structure** with a view to enhancing agency responsiveness, performance, capability and value for money. The Report concludes that a **lack of sector collaboration and integration** underpins many of the issues present in the sector. The lack of role clarity, sector leadership, and common expectations about how the sector should engage has helped perpetuate a **fragmented sector culture**.

Apart from the consideration of planning and funding issues, the review also addressed **structural/institutional issues**. The review considered a number of **structural/institutional options** in detail. Two viable options emerged as the most appropriate – the first would retain the **existing three agency model**, but with the required changes to their roles and functions, while the other would merge the two Crown entities to form **one land transport agency**. Although final decisions have not yet been taken on the direction to go, it transpires from the report that **decision-making should be integrated and collaborative**, meaning that a **holistic approach** should be taken in **ensuring efficient transport systems**.

9.3.3.4 Proposed Institutional Arrangements

To give effect to the guiding principles, as derived from the terms of reference, there is a need, as far as long distance freight transport is concerned, that South Africa moves toward a **dispensation where decision-making is homogenous and consistent for the various land transport modes** and across geographical boundaries.

In line with trends observed elsewhere, it is evident that decision-making on long distance freight transport should be consolidated with a view to **harmonizing the approach regarding infrastructure investment and provision**, **regulation of safety standards and impacts on the environment** and the **efficient use of scarce energy** and other resources.

In this regard it is proposed that **an institution should be responsible to formulate policies regarding the transportation of freight over long distances** and to implement action to achieve the policy goals to be agreed upon. Such policies should be neutral as far as mode and geographical/political boundaries are concerned, and should focus on the end results, i.e. to serve the freight end users.

9.3.4 Urban & Urban-Regional Freight Transport

This section presents an approach for urban and urban-regional freight transport. The Institutional WG has decided to **give particular attention to intra-city short**

distance freight issues. In order to resolve freight transport problems in urban areas, NATMAP must indeed place a greater emphasis on the logistics of collection and delivery services in town and city centres across South Africa.

Within the urban areas, goods movements mainly use roads because the trip distance is relatively short and for reasons of connectivity. For shipments into and out of the urban areas there is more scope for some degree of modal choice but **road is still by far the dominant mode**. Road freight vehicles clearly play an important role in the functioning of towns and cities, distributing goods to numerous locations that are **vital to urban life**.

Urban freight is important for the following reasons:

- The total cost of freight and logistics is significant, especially in the metropolitan areas and has a direct bearing on the **efficiency of the economy**;
- The role it plays in **servicing and retaining industrial and trading activities** which are essential for major wealth generating activities;
- It is a **major employer** in its own right;
- The contribution that an efficient freight transport sector makes to the **competitiveness of industry** in the region concerned;
- It is fundamental to **sustaining our existing lifestyles**;
- The negative **social and environmental effects** of urban freight transport.

9.3.4.1 Guiding Principles for Institutional Reform

The guiding principles identified in the previous section on long distance freight transportation also apply here. The urban freight is directly linked to long range freight transportation. The **interface between long range freight and urban freight** must provide an **excellent connection** to a (multi-modal) transport network via an Urban Distribution Centre. Single **urban freight platforms** enable the transition between local economy and national/international goods.

A specific guiding principle would be the **improved efficiency of urban distribution** and that would translate, among others, in the **reduction of truck traffic in urban and metropolitan areas** and concomitant decrease of CO_2 emissions.

a) Efficient Usage of Road Infrastructure

The use of urban road infrastructure in terms of time and space must be managed. Measures to **regulate the use of this infrastructure** must be enforced. This will require the cooperation between city planners, freight transport companies and other businesses. Urban planners may need to **influence or control the movement of goods vehicles**.

Transport companies must **optimise their operational efficiency** to reduce traffic congestion and environmental impacts.

The **types of policy measures** required depend on factors including:

- the economic, social and environmental objectives of the urban authority;
- the level of freight transport and other road traffic;
- the size, density and layout of the urban area.

It is very important to distinguish the possibilities and chances of **technical** (vehicle technology, telematic applications, etc.), **organisational** (co-operation, etc.), **operational** (route planning, etc.) and **political** (time windows, weight limits, etc.) approaches.

Possible **models and methods** to deal with the complexity of **urban freight transport chains** and the shared responsibilities are presented below:

- Improved management of the urban road space and the kerbside access
- Relationship and harmonisation between the urban, regional, and national legislation
- Innovative urban freight transport ideas
- Intelligent transport systems (ITS), transport telematics applications and systems
- Public-private-partnerships (PPP) and stimulation e.g. via freight forums
- Enhanced signage and information systems (e.g. variable message signs - VMS)
- E-commerce and distribution (home shopping)
- Vehicle technology and functionalities (e.g. low-emission vehicles)
- Land use, infrastructure and regulations planning
- Enhanced usage and maintenance of infrastructure (e.g. via a road map for transport vehicles)
- Intermodal transfer facilities
- Integration of distribution centers and traffic management
- Goods transport efficiency, assessment and pricing (e.g. how to identify costs?)
- Infrastructural solutions (e.g. to improve loading and unloading).

b) Groups Capable of Implementing Changes to the Urban Freight System

Unlike the long distance freight transportation, urban and urban-regional freight transport is best managed at local or/and provincial levels.

c) Urban Municipalities / Provinces

Changes occur through the **introduction of policy measures** that force or encourage companies to change their actions. Strategies available include **improvements in signage and information provision**, **vehicle access and loading/unloading regulations**, **traffic management schemes**, **infrastructure developments**, and **road pricing**.

d) Freight Transport Companies

They tend to implement initiatives that will reduce the impact of their freight operations, because they will derive some internal benefit from this change in behaviour. These benefits can be **internal economic advantages** from operating in

a **more environmentally or socially efficient manner**, either through improved **economic efficiency** or through being able to **enhance market share** as a result of their environmental stance.

Instances of company-led initiatives include **increasing the vehicle load factor** through the **consolidation of urban freight**, making **deliveries before or after normal freight delivery hours**, the use of **routing and scheduling software**, improvements in the **fuel efficiency** of vehicles, in-cab communication systems, and improvements in collection and delivery systems.

Some of these initiatives are **technology related**, some are concerned with **freight transport reorganising** their operations, and some involve **change in the supply chain organisation**.

9.3.4.2 Scope and Institutional Issues Associated With Urban and Urban-Regional Freight Transport

The main issues related to urban freight are **goods vehicle access to** as well as **loading / unloading in urban areas**.

Goods vehicle operators and drivers face a range of difficulties when carrying out freight operations within urban areas. These include:

- Traffic flow and congestion issues caused by traffic levels, traffic incidents, inadequate road infrastructure, and poor driver behaviour;
- Transport policy-related problems including for example vehicle access restrictions based on time and/or size/weight of vehicle and bus lanes;
- Parking and loading/unloading problems including loading and unloading regulations, fines, lack of unloading space, and handling problems;
- Customer/receiver-related problems including queuing to make deliveries and collections, difficulty in finding the receiver, collection and delivery times requested by customers and receivers.

9.3.4.3 Best Practice – International Experience

a) BESTUFS

The section on best practice has made extensive use of the studies carried out by the **European Co-ordination Action** for "**Best Urban Freight Solutions**". BESTUFS is funded by the European Commission through the DG Transport and Energy. It is basically a think tank of which the main objective is **to identify, describe and disseminate best practices, success criteria and bottlenecks of urban freight transport solutions**. Furthermore, BESTUFS aims to maintain and expand an open European network between urban freight experts, user groups/associations, ongoing projects, the relevant European Commission Directorates and

representatives of national, regional and local transport administrations and transport operators in order to identify, describe and disseminate best practices, success criteria and bottlenecks with respect to City Logistics Solutions (CLS).

b) Urban Freight Platforms (UFP)

Among the projects collected and studied, two main **categories of freight platforms** can be distinguished: (Multi-company) **Urban Distribution Centers** (UDCs) and **Freight Villages**[3].

Although they pursue rather different objectives and dispose of rather different characteristics, some common aspects are described below.

c) Location

For both Distribution Platforms as for freight villages, the location of the platform is one of the key factors for success. Being a turntable for goods transports an excellent connection to a (multi-modal) transport network is indispensable.

The location also has a substantial influence on the **traffic generated by the platform**, and thus on its **environmental performance**. Choosing a smart location consequently involves acertain **know-how about the main goods flows** delivered and collected to and from the platform.

Land prices and concentrated local emissions through traffic attracted by the platform make it even more difficult to find a suitable location. In order to reduce the roadside distribution transport mileage the platform would preferably be located close to the city and its commercial centers (short distribution legs, longer rail leg in intermodal transport). On the other hand a central location usually involves high land prices and conflicts with the neighbouring residential areas that are sensitive to the traffic attracted by the platform. Due to the high land costs, establishing a freight platform in the city centre will generally only be possible when public areas are provided or subsidies are obtained. Because of the traffic involved, a location in the outskirts is often preferred or sometimes legally stipulated anyway (e.g. in the UK). In any case, areas suitable for a future freight platform should be identified early enough and secured by land use planning measures.

d) Collaboration of Public and Private Role-Players

A clear point made by many projects, successful or failing ones, UDCs or freight villages, is the involvement of all parties, public and private. It is one of the main conclusions from over a decade of experience with UDCs in the Netherlands that **durable solutions cannot be imposed by one side**, but that improvement must be sought together with all players involved. Success is reinforced when the project is embedded in a **larger partnership between private actors and public authorities**.

[3] The Freight Village is nodal and focuses on bi- or multimodal transport. A Freight Platform refers to areas with different transport related companies. An Urban Distribution Centre is a place of transhipment from long distance to short distance traffic.

The international experience reveals that the **degree of public intervention varies from one city to another**. Projects range from an **entirely private initiative**, based on optional participation and the assumption that operators will be rational enough to co-operate, to a **local authority initiative** quite coercive and often based on a "distribution licence" with strong incentives attached to it (extended delivery schedules for example).

Particularly the latter might imply the **risk of monopoly** (one carrier being given exclusivity for inner city distribution) or the risk of over-regulation. All this multiplies the number of small vans which is not really what is best for the environment.

A freight village can only be established successfully when private companies can be attracted to the platform. Therefore, the **sustainable profitability** associated to operating within a freight platform has to be proved to private companies. This profitability for transport companies can result from a variety of impacts:

- suitable spaces with efficient transport infrastructure
- efficiently used combined transport
- location nearby other transport companies in order to facilitate cooperation
- benefits from additional services provided directly on site
- benefits when distances to customers are reduced.

When a large amount of transport operators and industries are established on the platform the service sector (logistics, customs, restaurants, post office, hotels) will, naturally, be drawn to site.

Freight villages (and also UDCs) are often organised as **Public Private Partnerships**. Public support for freight villages is justified by the freight village pursuing twofold **public aims, an economic and an ecological one**:

- freight villages increase the **region's competitiveness** and may help to attract industry;
- intermodal freight villages promote **modal shift reducing long distance road transport**.

Operating a transhipment terminal for modal shift is only profitable when a large freight volume is transhipped. At freight platforms, this volume can be expected when

- the region of the platform is **widely integrated into the national and international market** (e.g. Gauteng and Durban);
- a **high regional freight volume** with a strong affinity to freight platforms exists;
- the platform is directly linked to **a main railway route**;
- a large number of forwarders are established on site;

Public support of freight villages can take various forms, such as providing land at low costs, securing of appropriate areas, direct subsidies, etc.

e) Requirements for Successful UFPs

Given the mentioned requirements the implementation of freight villages and logistics areas to strengthen the competitiveness of the railway and to attract new industries to the region will only be successful when:

- strong economic links to other regions or neighbouring countries exist;
- the platform is directly connected to the international rail and road infrastructure network.

The transport industry, the public and the consignee alike can benefit from Urban Distribution Centers. Indeed, for the transport economy a specialised city distribution offers **efficiency benefits** as for the average transport operator distribution is less profitable (or not profitable at all) than long distance haul. Furthermore they benefit from **co-operation agreements and other on-site services** (synergies). The public (residents, inhabitants) benefit from a **reduction of delivery traffic** achieved by better bundling and higher load factors resulting in less noise and air emissions. Finally, the consignees benefit from bundled deliveries and from shopping streets more attractive to customers.

On the other hand UDCs also impose **costs**, particularly on the involved transport companies, but also e.g. on the residents in the areas surrounding the platform (increased traffic): every **transhipment increases transport costs** substantially.

There is no clear answer to the question whether the mentioned benefits outweigh the costs. To complicate things, those who benefit are not necessarily those who bear the costs. An answer would probably be case dependant anyway. The public benefits for instance depend on values and on local framework conditions.

Among the regarded case studies there are both profitable UDCs and others depending on public subsidies. In either case it seems important that those who benefit also pay for the costs. UDCs can and must generate added value. If the UDC creates **substantial benefits for the public**, it should also be actively supported by the public. This can be either by providing permanent **subsidies**, by active **participation** (co-ordination, promotion, initial financing), by establishing **supportive legal framework conditions** such as a lorry ban in the city centre or by **supportive operational measures** such as an extension of access time windows or the utilisation of reserved roadspace and parking/loading space for the transport companies participating in the scheme. The latter explains why UDCs are often mentioned in connection with access regulations. In general it can be stated that UDCs should preferably be **integrated into general mobility planning**.

Restricting legislation includes urban planning regulations (location, emissions, etc.) and restrictions for particular goods (bundling, insurance).

Supporting legislation includes governmental (co-)funding, city access regulations favouring UFPs, road pricing favouring intermodal transport and transport bundling.

Main **barriers for transport operators to participate in UDC schemes** proved to be:

- Increase in transhipment raising costs, risks and delays
- Fear of losing competitive advantages and contact to customer
- Fear of new dependencies
- Large initiations and co-ordination efforts
- Difficulties in splitting costs, jobs and responsibilities

Often mentioned in the literature on urban freight was the **lack of support by public authorities**. As a UDC also improves the general situation of urban traffic for the benefit of everybody, the public should also be prepared to support the project.

Urban Distribution Centers can **contribute to solving urban freight problems**. However, they are just **one among many tools**. In order to see if they are of use, a community needs to identify what problems or opportunities it has, and then consider a UDC only as one of several possible options.

f) Promoting Cooperation Between Public and Private Sectors

Various examples of public-private partnerships (PPP) exist in urban freight transport in recent years. **PPPs in urban freight transport** have been used for the **financing**, **building** and **operation of infrastructure projects**, as well as for the **negotiation** and **setting of framework conditions and agreements** between the public and private sectors (e.g. city logistics schemes).

However, in Europe **most of these city logistics schemes have since failed**. The main reasons for these "failures" were that the **profitability** of such approaches was overestimated and the **critical mass on consignments** to be bundled for city distribution was never reached.

The lesson learnt from these city logistics experiences was that PPPs which do not provide **sufficient commercial benefits** are not sustainable over time.

The **Freight Quality Partnerships** in the UK are being implemented and provide an interesting model. Within a co-operative partnership the government (local and national) is expected to play a responsible role for many reasons including: - coping with negative externalities (e.g. road congestion and air pollution); co-ordination with other public purposes such as city planning, regional economic development and environmental management; cross-border administration. Moreover, it promotes a greater role for the urban freight transport operators in decision-making.

9.3.4.4 Proposed Institutional Arrangements

The purpose of these new institutional arrangements shall be **to improve urban freight transport** and to give effect to the guiding principles, as derived from the terms of reference.

There is a need to adopt an **adequate approach for urban and urban-regional freight transportation**. The spheres of government that should manage and oversee the implementation of the approach for urban and urban-regional freight transportation are the **provincial and municipal spheres**. With the future *National Land Transport Act*, new institutions will be created to drive land transportation. Urban and urban-regional freight transport responsibilities could be devolved to the future **provincial regulatory entities** (PREs), as well as **planning authorities** (PAs) (larger cities).

An in-depth **knowledge of the urban mobility system** (offer, demand, logistics chain organisation, stakeholders, etc.) should be acquired by the PREs and PAs. This knowledge of the urban mobility system is necessary for understanding what kind of Urban freight platforms could possibly be realised.

Different tools, regulations etc. should be attentively applied together and harmonised in order to identify “integrated solutions”. Once the solution is identified, it should be implemented step by step, trying to generate consensus among retailers, transport and logistics operators, citizens.

An **integrated approach taking into account access regulations, PPP, vehicle technology** etc. is what these new institutions should aim at as it has proven to be successful elsewhere.

Before defining urban freight solutions, City-level municipalities should develop a **good understanding of the freight transport systems** which is a complex system of actors and decisions. International experience reveals that when city authorities try to impose a solution on the market players without a prior understanding of its freight transport system, it leads to failures.

South African metropolitan municipalities as well as other large urban municipalities should be encouraged to **facilitating and supporting the co-operation between market actors**. This is essential in establishing city logistic solutions and providing multi-modal hubs for freight transfer.

In terms of land use planning, Cities must identify suitable sites at an early stage and secure them by appropriate land use planning measures. They should be responsible to **shape the framework conditions of the transport market through appropriate regulations that internalise external effects and ideally make the individual decisions of the competing actors converge in a socially optimal solution**.

Provinces and municipalities would be responsible to provide the **necessary transport infrastructure** in order to guarantee the platform efficient access to the multimodal transport network (e.g. rail and intermodal access).

Policy-based encouragements could possibly take the form of **direct financial support**, e.g. a start-up grant for the establishment of bi-modal transhipment terminals. The use of **low emission vehicles** is also likely to need some **policy-based incentives**. Whether society is prepared to pay for the environmental benefits it receives from a UDC (by subsidising it) or whether all costs are imposed on the market players (by establishing the necessary legal framework conditions) is a political question that in the end depends on the actual distribution of power.

The **concerted action of the different stakeholders** - haulers, logistic service providers, clients, provincial regulatory entities, the National Public Transport Regulator, and municipal planning authorities - is necessary in order to elaborate a clear strategy for the integration of the different planning activities on all levels concerning freight platforms.

Open questions such as profitability and success factors of urban freight platforms are very much dependent on local framework conditions as well as many of the identified success factors like PPP tradition, communication culture, personal commitment, innovative players etc.

9.4 CONCLUSIONS AND RECOMMENDATIONS FOR PHASE 3

- In the institutional chapter for Phase 2, we have made the distinction between passenger and freight transportation as well as between long distance and short distance transportation. However, and to be consistent with the work produced by the other Working Groups and our Phase 1 report, our last section will summarise the main issues according to the transport modes:- road; rail; civil aviation and maritime.

- The responsibility for infrastructure used by different transport modes is fragmented between different government departments, spheres of government and parastatal organisations and different legislation.

- The absence of co-ordination and strategic planning of infrastructure can lead to “mismatches” in infrastructure provision, inefficiencies in operation and duplication of facilities with concomitant sub-optimal utilisation.

- Current legislation needs to be reviewed and amended in order to ensure and promote the proper integration of transport modes. The National Land Transport Act will go a long way towards achieving this goal.

- The biggest problem from a legislative point of view is that some important principles contained in policies drafted by municipalities/provinces and national government and various legislation are not implemented.

  If implemented correctly, they could be of great effect.

  – For example in Mpumalanga, the MDORT's strategic plan - which seeks to implement co-ordination and integration - has not been implemented and co-ordination barely exists.

- However, in the Free State, the Public Transport Act has encapsulated the Provincial Department,s policies. Their strategic goals are to uphold their policies.

- It is imperative, in terms of section 41 of the Constitution, that the different spheres of government co-coordinate their actions and legislation with one another.

- However, not every Act regulating transportation specifies that co-ordination must take place, for example the Mpumalanga Land Administration Act 5 of 1998 grants the MEC powers without stipulating that such must be exercised in co-ordination with the local or national government and thus exacerbates the issue of incorrect and conflicting land use and a lack of transport integration.

9.4.1 Road

Role of South African National Roads Agency (SANRAL)

The South African National Roads Agency Limited (SANRAL) is established as a public company in terms of the South African national Roads Agency Limited and National Roads Act 7 of 1998.

Within the framework of government policy, the Agency is responsible for all strategic planning with regard to the South African national roads system, as well as the planning, design, construction, operation, management, control, maintenance and rehabilitation of national roads in the Republic, and responsible for the financing of all those functions in accordance with its business and financial plan, in order to ensure that government's goals and objectives concerning national roads are met.

In addition to the Agency's main powers, the Act empowers it, among other functions, to perform the following:

- Undertake any work in connection with any road (whether national road, provincial road or municipal road) at the request of such other road authority;
- Perform any of the core functions mentioned above in any other country;

- Appoint any private person, institution or body, in terms of a contract concluded for that purpose, to perform any work on behalf of the Agency;
- Participate in ventures involving national roads jointly with other road authorities or private persons or institutions;
- Provide facilities on national roads for the convenience and safety of road users;
- Operate any national road or part thereof as a toll road and levy toll on the users of such road;
- Charge a levy, fee or rent for any authorisation, approval or permission that may be granted or given by the Agency to any person for the provision, construction, erection, establishment, carrying on or operation on, over or underneath any national road;
- Provide vegetation as may be appropriate in the road reserve;
- Establish and operate an information management system.

SANRAL, dedicated to the network of national roads, as a single institution controls by far the largest proportion of transport infrastructure in the country.

Issues:

- Efficiency in the provision, maintenance and operation of the primary economic road infrastructure network will be facilitated by a professionally managed Roads Agency (SANRAL) with a Board of Control consisting mainly of users from the private sector.

- The primary road network should preferably be financed through dedicated levy on fuel and toll charges. Further innovative ways of securing finance for the development of road infrastructure will be explored, such as Build-Operate-Transfer (BOT) or Fund-Rehabilitate-Operate-Maintain (FROM). Other rural and inter-city and urban infrastructure will be the responsibility of provincial and local authorities and be funded from a variety of tax sources.

9.4.2 Rail

Incorporation of Transnet passenger divisions into PRA (SARCC)

The SARCC was established by the Legal Succession Act, 1989 with the responsibility to ensure that rail commuter services are provided in the public interest. This Act was amended by Act 38 of 2008 to change its name to the Passenger Rail Agency of South Africa. The PRA is thus the responsible authority for rail commuter services. Rail operations were provided to the PRA by Transnet's Metrorail Division. The latter has been merged with the PRA, and the Shosholoza Meyl (long-haul passenger) division will soon also be merged with the PRA.

Issues:

- Responsibility for passenger rail will still reside in the PRA, while municipalities must produce ITPs, i.e. integrated transport plans. The new National Land Transport Bill (NLTB) proposes to establish Intermodal Planning Committees to co-ordinate.

- With the merging of the other entities with the former SARCC, the roles of "referee and player" now become blurred.

Proposed establishment of a Rail Economic Regulator (RER)

The DoT proposes to establish the RER to promote issues such as equitable use of rail infrastructure by a multitude of operators. Its other functions are still under discussion and have not yet been formulated or made known.

Issues:

- If the RER will regulate rail operations on an economic basis, this could interfere with market forces. On the other hand the Transnet monopoly may also not be advisable. In Germany, road hauliers also have locomotives and operate trains.

- Will or should the RER's functions be confined to ensuring fair access to state-owned rail infrastructure? Will this apply to passengers and freight?

- The interaction of rail systems between South Africa and other SADC countries may make it advisable to have a regional or multinational rail economic regulator.

Ownership of rail infrastructure

In 1989, the former SA Transport Services was split into 2 entities: - Transnet and the SARCC. These entities currently own the national rail infrastructure between them (tracks, stations, freight terminals, cargo depots, signalling equipment, etc.). There are also private sidings and some infrastructure owned by private operators, such as Rovos Rail. The 1996 White Paper provides that "ownership and regulation of transport infrastructure should be separated" and "the national transport authority will own the commuter rail infrastructure, rail infrastructure, rolling stock and land associated with rail reserves, until the provincial or metropolitan transport authorities are able to take over this responsibility".

Issues:

- The DoT has been talking about establishing a national entity to own all strategic rail infrastructure. Operators (public and private) would then be charged fees for using it. However, this was done in France, and in the UK where it was seemingly not successful. The DoT is talking about vertical and/or horizontal unbundling. This aspect is in a state of flux at present.

- One of the challenging issues is that some Transnet freight branch lines are not economically viable but are important from a strategic national perspective. Transnet is tasked with the duty to make a profit, or minimise losses, and government will have to step in to address this situation.

- Incentives or other measures are needed to divert freight from the roads mode back onto rail. The problem is that Transnet has to pay to maintain and expand its infrastructure, while road operators are not required to pay for infrastructure, except in the case of toll roads.

9.4.3 Civil aviation

The Department of Transport and its roles in the Civil Aviation sector
The establishment of an effective institutional arrangement at state department level is critical to ensure that proper effect can be given to the implementation of all civil aviation matters as contemplated in the Constitution. The Department of Transport has been entrusted with that role.

Figure 52 below gives a diagrammatic perspective of the roles and responsibilities of the respective role players in the current institutional arrangement:

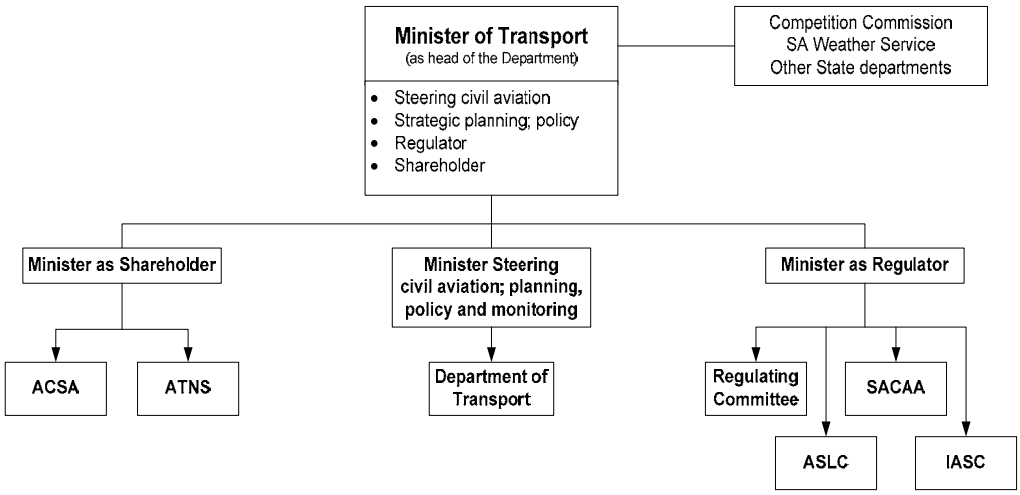


Figure 52: DOT and Civil Aviation

The Minister is responsible and accountable for all transport matters at national level, including civil aviation. This includes:

- Developing and steering civil aviation in line with the Government's stated national objectives and strategy;
- Formulating policy to guide civil aviation towards achieving objectives;
- Planning the strategic development of civil aviation;
- Ensuring that the enabling legal instruments are in place to give effect to policy;
- Regulating aviation safety and security;
- Regulating economic and social/environmental matters in relation to air transport and aircraft operations;
- Being the shareholder of the State-owned enterprises, ACSA and the ATNS Company;
- Administering the civil aviation functions within the DOT; and
- Liaising internationally.

Issues:

- The development of civil aviation could not have been possible without the international co-ordination which is necessary for the development of a unified and efficient air transport route network supported by a system of international airports to facilitate the effective and safe movement of people and goods.

- When considering the institutional frameworks governing civil aviation in South Africa, it is important to recognise the role played by the international institutional framework and the impact that it has on the establishment, management and operation of local institutional structures.

The South African Civil Aviation Authority (CAA)

The South African Civil Aviation Authority (CAA) is established as a juristic person in terms of the South African Civil Aviation Authority Act 40 of 1998. As the regulator of civil aviation safety and security the objectives of the CAA are to control, regulate, oversee and promote the functioning of the civil aviation industry in South Africa, to oversee the functioning and development of the civil aviation industry with particular emphasis on safety and security.

The Airports Company South Africa (ACSA)

The Airports Company South Africa (ACSA) is established as a public company in terms of the Airports Company Act 44 of 1993.

Issues:

- The continuation of the Airports Company to provide and manage the airport infrastructure at the former State Airports is confirmed.

- South Africa also has many smaller airports and aerodromes, many of which are not viable, or duplicate others close by. Airports should in future be developed in accordance with an integrated national airport development master plan.

9.4.4 Maritime

Role of National Ports Authority (NPA)

The function of the NPA is to own, manage, control and administers ports. In this regard, the National Ports Act 12 of 2005 lists a number of specific functions, which include the following:

- Plan, provide, maintain and improve port infrastructure
- Prepare a port development framework for each port
- Control land use in ports, and lease land
- Provide and arrange for rail and road access within ports
- Regulate and control navigation in ports, entry vessels, loading, pollution and the environment in port limits, and safety and security in ports
- Facilitate the performance of the functions of any organ of state in a port. It must conclude a memorandum of understanding with relevant organs of state.

The NPA is described as "operator of last resort" of ports.

Issues:

- As a national government business enterprise, the NPA must keep an eye on its "bottom line". However, national policy is to establish integrated corridors for ship-to-destination and factory-to-ship. This raises issues of co-ordination. Will the memoranda of understanding proposed by the Act be sufficient?

- The role of the Ports Regulator is to exercise economic regulation of the ports system in line with government's strategic objectives, promote equity of access to ports and monitor the activities of the NPA. It must also hear appeals and complaints against decisions or activities of the NPA and approve the NPA's tariffs and "promote regulated competition". Should the role of this Regulator be expanded to include oversight of other maritime functions and institutions?

- The legislation stops ports competing with each other - this could be a problem area.

- The issue of co-ordination arises with Durban Port. The Airport is moving to the North Coast, which will free up land that the Port needs. However, there are other demands on the land, e.g. from the municipality, while ACSA owns the land.

- Co-ordination with "non-transport" departments is also a concern, e.g. the DTI is looking at developing nodes, which could fly in the face of integrating transport.

- In Western Cape, the Province and Metropolitan Council are refusing to talk to each other.

Role of SA Maritime Safety Authority (SAMSA)

SAMSA has a whole range of functions in terms of the SAMSA Act, 1998 and various other Acts, such as the Merchant Shipping Act, 1951. According to the 2006 Concept White Paper on National Maritime Transport Policy, these functions need to be inventoried and rationalised.

Issues:

- Should SAMSA play a broader role, or be confined to issues of safety, training and accreditation?

Role of DoT

Constitutionally, as regards maritime transport issues, the DoT is the main player and the institution where "the buck stops".

- The DOT's role in this regard has never been clarified or even properly formulated.

- The interaction with other role-players, such as the DEAT and the Navy, have also not been clarified, e.g. when there is an oil spill, the DoT/SANSA are responsible while the oil is on the ship but the DEAT takes over when it spills out of a ship. When it reaches a beach, provinces and municipalities have responsibilities.

- The need has been identified to promote intercoastal shipping. This would presumably be a DoT function.

Role of international organisations

To what extent do we need to deal with the role of international organisations such as the IMO and SADC? This also applies to aviation.

10. CONCLUSIONS AND WAY FORWARD

10.1 MAIN CONCLUSIONS

Land Use Analysis

The KZN Provincial Economic Growth and Development Strategy (PGDS) and the Provincial Spatial Economic Development Strategy (PSEDS), as the spatial representation of the PGDS, were briefly discussed, as well as the eThekwini Metropolitan Spatial Development Framework (MSDF).

The PSEDS set-out to amend the apartheid space-economy of the Province by establishing a hierarchy of selected development nodes and corridors. This entails that future settlement and economic development opportunities should be channelled into activity corridors and nodes that are adjacent to, or link the main growth centres in order for them to become regional gateways to the global economy.

The Province is characterised by an extensive mosaic blanket of scattered rural settlements and villages. Vast numbers of these settlements and villages occur within the Zululand, Umkhanyakude, Umzinyathi and Ugu District Municipalities. These municipalities have been earmarked as Rural Development Nodes by the Government's ISRDS programme.

The nodes and corridors selected include existing well established nodes and corridors, as well as nodes and corridors which do not exist in the contemporary, or are very weak. Currently, only the primary and secondary nodes of the Province have been identified for priority interventions. These nodes all display some sort of potential as set out by the NSDP, and include the following:

- Metropolitan Node – eThekwini.
- Primary Node (PN) – Richards Bay.
- Secondary Nodes (SN) – Pietermaritzburg/Msunduz, Newcastle, Port Shepstone, Estcourt and Ladysmith.

National Corridors: The N3 corridor, the N3/N11, the N2 North, and the N2 South.

Provincial Corridors: The R33 link and the R34 corridor

Provincial Development Corridors: The eThekwini / uMhlatuze Corridor (N2 North), the eThekwini / Msunduzi / uMngeni Corridor (N3 The uMhlatuze / Ulundi / Vryheid), (P 700) Corridor (R34), the Lebombo SDI Corridor (N2, R22), the Port Shepstone / St Faiths / Ixopo Corridor (N2, R612, and R617), the Battlefields Route Corridor (Umzinyathi) (R33, N11).

Demographic Analysis

There are large numbers of people travel to work on a daily basis because of the concentration of job opportunities in the eThekwini Metropolitan Municipality. Thus, the need for effective public transport facilities in the contemporary and even more so in the future is clearly evident. High levels of unemployed people are found in villages scattered throughout the Province. Thus, the provision of access (public transport) to community facilities and job opportunities in centrally located nodes should become a priority.

Economic Analysis

It is concluded that various factors are constraining economic development in the province. These are high poverty and unemployment levels, aggravated by the current financial and economic decline, dispersed and inaccessible settlements far from economic centres, and the unbalanced concentration of economic opportunities in a few major centres. However, the KZN has many economic opportunities, such as a supportive policy environment to develop the economy, high tourist potential, international trade infrastructure and opportunities and abundant natural resources.

Passenger Operations

KwaZulu-Natal province is not seriously affected by the problems of institutional fragmentation as some other provinces in the RSA. There is, therefore, less likelihood of functional bias affecting decisions about sustainable future transport systems and technology. Nevertheless, in the development of a “blue-print” for future infrastructure development, there is a need for NATMAP to advocate decision-making on the basis of “value for money”.

Numerous problems and issues are evident from the analysis of the existing passenger transport system in the KZN province. Some of these include:

- Rising car ownership and use on inter-regional roads, give rise to congestion during peak holiday times, unacceptable levels of air pollution, and wasteful use of valuable urban land.
- Aged and, in some cases unsafe, rolling stock
- Existing public transport is not sustainable under present operating and management practices.
- Low profitability for many private operators, resulting in a failure to adequately maintain and recapitalise fleets.
- Limited modal integration of public transport services
- Modes are not used where most appropriate.
- Most households in KwaZulu-Natal have limited access to public transport, or cannot afford it.
- Long-distance rail suffers from very old rolling stock, low demand and hence low profitability.
- Long-distance stations and termini are in poor condition and generally not integrated with other supporting land-uses.
- Long-distance rail suffers from very old rolling stock, low demand and hence low profitability.

- Traffic safety is a major problem, due to old rolling stock, some poor roads, poor driving skills, etc
- Inadequate policing and law enforcement, particularly relating to unsafe driving and un-road-worthy vehicles and poor observance of traffic laws.
- Operating License Boards lacks capacity resulting in delays

Freight Operations

Freight transport in the KZN and in South Africa is generally inefficient, and suffers from many problems. Some of these are:

- Uncompetitive and un-commercial operations.
- Failure of funding mechanism leads to obsolescent and inefficiency.
- Rates and tariffs do not relate to commercial practice.
- Excessive costs and low efficiencies inhibit industrial output.
- Institutional structure and monopoly control inhibits private sector investments in industry.
- Unavoidable result is total dependence of private sector road transport.
- Medium term prospects for fossil fuels makes road transport highly vulnerable.

The Gauteng-Durban freight corridor is the corridor with the highest freight volumes, while most (80%) of freight exports go through the Durban harbour. Richards Bay serves as the coal export harbour of the country. As such, freight solutions and investments should be given a priority on these corridors and harbours.

It is recognised that due to the organisational structures and institutional framework of the major proportions of freight transport in South Africa, future development of a demand oriented logistics system will require significant policy changes. In particular the monopoly position of the major service provider of rail, port and pipeline services is having a negative impact on the operational efficiency, provision of adequate equipment and facilities, and extent of services to meet present and future demand.

The latent demand for rail service on corridors as well as urban and rural areas is being met by rapid expansion of road freight transport, causing severe un-recovered externalities in the form of road deterioration, congestion, accidents, pollution and excessive freight transport costs.

Cost comparisons indicate that there is urgent need for independent research to fully quantify the additional costs being incurred by lack of competition and to define the options for institutional, organisational and operational reforms to meet the freight transport needs of the country.

Rail infrastructure

According to Transnet forecasts the following capacity constraints will developed for the network within the KZN:

- Currently there are no capacity constraints

- The capacity of the **main line** between Durban and Gauteng will be fully utilised by 2020 and will be exceeded by 2030.
- These steep grades limit the capacity of heavy freight trains of the Kwazulu-Natal section between Vooruitsig and Gauteng.
- The capacity of the Richards Bay - Ermelo **coal line** is limited by the single Overvaal Tunnel (in Mpumalanga). The demand will exceed the capacity of most sections of the line in Kwazulu-Natal by 2030.
- The capacity of the Durban – Swaziland line will be adequate until 2010. The section between Durban and Stanger will reach capacity by 2030.
- The branch lines are currently totally under utilised with virtually no demand for capacity. There are very little services currently available that conform to the requirements of potential customers (single truck loads) or that could compete with the road services.

The condition of the coal line is good while the core lines are generally fair and the branch lines poor to very poor.

Transnet Rail (Freight Rail and Rail Engineering) is making good progress in terms of:

- Turnaround in rolling stock efficiency and utilisation (major progresses in backlog maintenance and operational initiatives have produced efficiency gains and greater asset utilisation).
- Large-scale capital investment is happening (long lead times on loco purchases).

South Africa must scale up its freight rail network capacity in order to stay ahead of demand and provide a stimulus to economic growth.

Road Infrastructure

The majority of KZN roads (46.9%) operate at LOS B. In total 81.2 percent of the network operates at LOS C or better. Approximately 18.4 percent of the network (1,792 km) needs to be upgraded in order to bring the service level of the whole network to LOS C or better.

Visual condition surveys showed that 52 percent of the blacktop roads are in a poor or very poor condition. A few sections on the N2 south beyond Kokstad and N2 North, the R42 near Volksrust, and the R22 near Swaziland are in a poor or very poor condition, while sections on the N2 south near Kokstad, R33 near Dundee and Vryheid, R42 south of Volksrust, are in a fair condition.

Two of the main constraints which prevent roads from remaining in a good to fair condition over their design life are a lack of funds for maintenance and overloading of heavy vehicles.

There are various constraints regarding overload control, such as lack of trained staff, lack of weighbridges to achieve geographic coverage, lack of the overloading enforcement system, and inadequate legal support.

Airport Infrastructure

Durban International Airport: The current airport capacity is 4.5 MAP. No further expansions will be done to increase the capacity as the airport will be replaced by 2010. The airport is at capacity and is operating at a level of service below the recommended level of service of C. The existing airport is able to handle projected growth up to 2010 at substandard service levels.

The proposed new International Airport at La Mercy will have an ultimate capacity of 42 MAP. When opening in 2010, it will have a capacity of 7.5 MAP.

Pietermaritzburg Airport: The capacity of the terminal will be reached by 2033 assuming domestic growth rates of 10%. The terminal might therefore have to be expanded from 2028 to 2033 to handle the expected demand.

- Margate Airport: No capacity constraints
- Richards Bay Airport: No capacity constraints.

Port and pipe line Infrastructure

The chief constraints to the Port of Durban, once the Entrance Channel widening and deepening is completed in 2009, are as follows:

- Lack of space for further major expansion
- Road accesses are congested, both via the City to the Point area, and increasing so to the Bayhead area.
- A rapidly expanding motor vehicle import/export programme is stretching current port facilities to its limit.

The only berths which are constricted by virtue of their condition are as follows:
Maydon Wharf Berths 1 to 4, Berth 12, Island View Berth 5

Port of Richards Bay: There are no capacity or condition restraints on the berths.

Financial Analysis

As a country, South Africa is currently experiencing unprecedented capital formation across the entire spectrum of transportation modes and in both infrastructure and operations. The bulk of the expenditure is spend is by the public sector – both government and government agencies.

Except for the air mode, transportation investments have trailed economic growth and, in fact, come in the wake of general ‘divestment’ when considered against requisite spend just to maintain installed infrastructure and operational capacity. It is fair to conclude that current flurry of investments are a very necessary attempt to restore lost capacity.

Generally, provincial funding is critically (95%) depended on national transfers. Clearly, a multi-modal view of transportation funding, which factors in the enabling role of transportation in the economy as well as transportation's fair share in the creation of the country's GDP has to be taken into account for NATMAP to succeed.

KwaZulu Natal Province currently relies more on provincial allocations in the form of equitable shares, conditional grants and other infrastructure transfers from Treasury. However, other sources mainly in the form of tax receipts (motor vehicle registration and licensing fees, sale of personalised and specific number plates) as well as non tax receipts (traffic fines, sale of capital assets like vehicles) also contribute to the provincial funds. The province, however, incurred deficits amounting to R2.4 million in the 2006/07 period mainly as a result of unforeseen road damage from storms in December 2006 and January 2007.

The apparent acceleration of provincial capital expenditure, projected to grow at 15.6% average for all provinces over the MTEF, is encouraging, but needs to be 'unpacked' to determine the share for transportation and its significance.

Institutional and Legal Analysis

The need has been identified to analyse the roles and responsibilities of the various role-players with a view to the rationalisation of transport systems, through institutional and legal amendments, including:

- Clarify and contextualise the transport roles and responsibilities of the three spheres of government, in order to achieve integrated transport management
- Comprehensive review/rationalization of legislation / institutional parameters to be undertaken, such as maritime issues.
- There is a need for more focused capacitation internally to Government.
- Institutions need to be more responsive to external innovations and requirements (international, environmental, land use, etc.)

The second phase focuses on the following problem areas that have already been identified:

- Linkage between policy, legislation and implementation
- General performance in relation to allocated mandate, capacity and/or relationship to the Department of Transport;
- Gaps and Overlaps
- Failure of cooperative governance
- Institutional silos
- Problems in procurement
- Separation of planning, implementation and maintenance functions
- Linkage to government

At present the Department administers payment of the subsidies and monitoring of the contracts. Substantial sums of money are involved. In terms of the NLTTA the

eThekwini Transport Authority must take over this function for its transport area, i.e. be allocated the money for subsidies in its area that are currently administered by the provincial Department.

KwaZulu-Natal is unique at the moment in having the country's only transport authority (TA).

The problems experienced by the ETA will probably also apply to other transport authorities when they are established, and are being addressed by the replacing legislation to the NLTTA. These are mainly a lack of own funding sources and the confusion created by the local government legislation that has post-dated the NLTTA.

A problem with the ETA is the fact that there are too few councillors on the Governing Body (only three), and they reportedly have too many other duties to be able to devote sufficient time to TA transport matters.

Another "unique" structure is the KZN Transport Appeals Tribunal, although some other provinces have also established provincial Appeal Tribunals. The Appeals Tribunal is dealt with below.

As regards roads, the KwaZulu-Natal Provincial Roads Act focuses on provincial roads and leaves municipal roads issues to be dealt with by municipal by-laws. However, it has been found in some other provinces that there is a need to regulate some aspects of municipal roads, e.g. on standards, by provincial legislation.

The KwaZulu-Natal Road Traffic Act 7 of 1997 needs to be amended or replaced to respond to the amendments to the National Road Traffic Act and to the AARTO and RTMC Acts. In the case of public transport, the NLTTA has given rise to the situation where there are different and diverse laws in the provinces replacing Chapter 3, which makes for a lack of uniformity and consistency, and is confusing for people who must implement the legislation. This aspect is under discussion with the revision of the NLTTA.

A serious problem appears to be the fact that regulations for the KwaZulu-Natal Public Transport Act have not been promulgated yet. This makes it impossible to implement many of the provisions of the Act.

10.2 ISSUES AND STRATEGIES TO ADDRESS IN PHASE 3

Land Use Analysis

In Phase 3, the Land Use task will be reactive in terms of the infrastructure plans that are proposed. The necessary land use framework within which infrastructure plans can be developed, has been provided. Once the spatial, type and size of planned infrastructure have been identified, these will be assessed in terms of land use impacts, and how transport can be used as a catalyst for development.

Demographic Analysis

The results of the three socio-economic scenarios developed in Phase 2 will serve as input to the transportation demand model. Phase 3 will thus focus on the impact of these scenarios on sustainability in general (rural and urban) as well as on the integration of land use and transport in future e.g. the need to develop one-stop community centres in rural (poor) areas, to create jobs at such centres (poverty alleviation) and to improve public transport to these areas.

Passenger Operations

The DOT's National Passenger Strategy and Action Plan focuses on Integrated Rapid Public Transport Networks aims to implement high quality networks of "car competitive" public transport services that are fully integrated, have dedicated rights-of-way and are managed and regulated by a capable municipal transport department. In this regard, the aim is for major cities, such as Cape Town, to upgrade both commuter rail services and bus and minibus services to a Rapid Rail and a Bus Rapid Transit (BRT) level of quality respectively. Ultimately, these services will be fully integrated to form a single system regardless of mode.

The basis of the NATMAP Passenger Operations strategy will therefore be an integrated inter-regional route network and services, linking up with the urban networks at the long distance modal transfer stations. The strategy should deploy the best mode(s) for each of the primary routes between the major urban areas, with supporting links to towns of national significance.

Freight Operations

The following issues will be addressed in Phase 3:

- Reorganisation of Rail Freight Operations
- Development of General Goods Freight
- Modernisation and Competitive Management
- Competitive Railway Institutional and Operational Structures
- Restructure Port Institutional and Operational Framework
- Pipeline Planning
- Road Freight Regulation

Infrastructure

In Phase 3, alternative infrastructure plans will be developed to satisfy the projected demand and also to improve the condition of the infrastructure. An integrated and balanced infrastructure plan will be developed for the various future time periods. In addition, the infrastructure problems within each mode will be addressed, as follows:

Rail infrastructure

- Vertical separation of the rail business to allow private sector operators to use the infrastructure.
- Assessment of the infrastructure condition assessment methodology use by Transnet to evaluate their condition assessment of the rail infrastructure.

- Assessment of the infrastructure demand as estimated by Transnet in relation to the total freight and passenger demand forecast for Phase 3.

Road Infrastructure

- Reduction of traffic volumes by introducing congestion charges together with the introduction of regular and reliable public transport (such as BRT schemes);
- Adding additional capacity through extra lanes;
- Introduction of a heavy vehicle fee (HVF) to cover externality costs incurred by HVs;
- Classifying transport infrastructure and services as either economic transport or social transport. The DOT (say) could then be responsible for economic transport and the province and District Municipalities can take responsibility for social transport;
- Revision of the overload control programme with the view to differentiate between urban an inter-urban overload control;

Airport Infrastructure

The long term roles of some of the minor airports should be investigated.

An investigation into the development of new airports has been conducted and this should be examined.

Information regarding the possible aviation developments should be attained from the National Airport Development Plan/Policy.

Ports

In Phase 3, all of the Transnet Infrastructure Development Plans will be reviewed in the light of the Transnet Integrated Demand Forecast, and the projections developed by the NATMAP Freight Transport Operational Analysis. Cognisance will be taken of Transnet's Hub Strategy Analysis, where the various physical options are evaluated to assess which option is most beneficial to Transnet. It is in this regard that careful attention will be paid in assessing whether the decisions reached by Transnet were in the interests of the country as a whole, taking into account all modes of land freight transport, rather than the Transnet focus of rail transport.

The alternative strategies to be investigated in Phase 3 will mainly comprise the analysis of Transnet's Hub Strategy Analysis, although any alternative layouts considered by the Working Group to be a viable option will be assessed and included as such.

Financial Analysis

NATMAP will seek to ensure sustainability and capacity expansion to 2050.

The Goal Achievement Matrix will be developed, which is essential for the evaluation of alternative plans and strategies. Cost estimates will be made of the forward plans

for each mode, and alternative plans will be evaluated against the goal achievement matrix.

Various funding strategies per mode have been assessed in Phase 2, and final recommendations in this regard will be made in Phase 3.

Institutional and Legal Analysis

In Phase 3, recommendations will be made on how to address the many problems identified and analysed in Phase 2. Institutional and legal reform is clearly needed in order to establish the required institutional structures and enabling legislation to deliver a high quality transport system for South Africa. This will be a major challenge to overcome the many constraints identified. Some of these are lack of capacity, gaps and over laps in roles and functions between various role players, and in legislation. Such reform normally takes long, but with good coordination and communication, as well as the necessary political will, the required reforms can be made, and existing institutions can cooperate to start implementing the NATMAP plans.

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ANNEXURE A:
DEMOGRAPHIC TABLES
LOCAL MUNICIPALITIES

Table 1: KZN opulation by Income Group by Local/District Municipalities, 2005, 2025, 2050

LOCAL/DISTRICT MUNICIPALITY	NATMAP TRAFFFIC ZONE NO	2005 POPULATION BY INCOME GROUP					2025 POPULATION BY INCOME GROUP					2050 POPULATION BY INCOME GROUP				
		HIGH	MEDIUM	LOW	TOTAL	%	HIGH	MEDIUM	LOW	TOTAL	%	HIGH	MEDIUM	LOW	TOTAL	%
KZN211: Vulamehlo Local Municipality		3,859	14,196	45,437	63,492		2,475	14,094	28,686	45,255		3,572	19,388	40,474	63,434	
KZN212: Umdoni Local Municipality		10,923	18,096	38,677	67,697		13,168	19,858	42,690	75,715		13,106	22,484	42,704	78,294	
KZN213: Umzumbe Local Municipality		5,947	23,865	169,288	199,099		7,078	31,860	183,600	222,538		9,180	37,313	235,503	281,995	
KZN214: uMuziwabantu Local Municipality		4,879	12,886	75,525	93,289		6,049	10,736	83,483	100,268		7,369	10,979	100,410	118,758	
KZN215: Ezingoleni Local Municipality		2,950	7,606	45,804	56,360		3,622	9,203	49,499	62,324		4,353	10,836	58,702	73,891	
KZN216: Hibiscus Coast Local Municipality		48,449	60,664	121,824	230,936		59,932	67,255	128,519	255,706		64,483	82,291	136,118	282,892	
KZN - DC21 Ugu District Municipality	**50201**	**77,006**	**137,313**	**496,554**	**710,873**	**7.1%**	**92,325**	**153,005**	**516,475**	**761,805**	**7.1%**	**102,063**	**183,290**	**613,911**	**899,264**	**7.5%**
KZN221: uMshwathi Local Municipality		8,080	21,745	79,007	108,831		8,952	25,085	83,065	117,102		10,527	29,657	101,078	141,263	
KZN222: uMngeni Local Municipality		21,813	22,605	33,874	78,292		24,511	24,324	33,963	82,799		25,290	28,023	34,771	88,083	
KZN223: Mooi Mpofana Local Municipality		2,499	6,663	31,180	40,342		3,115	5,808	37,916	46,839		3,369	7,097	42,922	53,388	
KZN224: Impendle Local Municipality		2,889	6,280	20,141	29,310		2,550	6,119	17,214	25,882		3,511	7,735	24,039	35,285	
KZN225: The Msunduzi Local Municipality		135,492	137,683	295,309	568,484		159,799	145,907	294,657	600,363		176,596	163,212	313,856	653,663	
KZN226: Mkhambathini Local Municipality		3,611	8,352	50,820	62,782		4,422	11,055	56,242	71,718		5,134	15,040	64,910	85,084	
KZN227: Richmond Local Municipality		4,589	11,302	45,004	60,895		4,548	13,206	43,763	61,516		5,185	15,825	51,644	72,654	
KZN - DC22 uMgungundlovu District Municipali	**50301**	**178,973**	**214,628**	**555,334**	**948,935**	**9.5%**	**207,895**	**231,504**	**566,819**	**1,006,219**	**9.4%**	**229,612**	**266,589**	**633,219**	**1,129,420**	**9.4%**
KZN232: Emnambithi-Ladysmith Local Municipality		28,272	56,859	168,044	253,174		39,468	60,729	202,840	303,037		45,139	73,681	227,294	346,113	
KZN233: Indaka Local Municipality		4,143	9,775	104,403	118,321		5,185	12,644	114,509	132,338		6,634	13,553	143,113	163,300	
KZN234: Umtshezi Local Municipality		7,745	12,577	47,148	67,470		10,563	11,356	58,401	80,321		11,988	12,257	65,583	89,827	
KZN235: Okhahlamba Local Municipality		4,217	13,225	129,302	146,744		5,327	13,099	148,943	167,369		6,625	13,615	181,333	201,574	
KZN236: Imbabazane Local Municipality		4,440	17,369	95,832	117,642		4,829	19,153	95,802	119,785		6,057	19,841	117,874	143,771	
Emnambithi/Indaka/Umtshezi/ Imbabazane /Okh	50401	48,395	108,482	531,799	688,676		64,841	115,672	605,601	786,114		75,780	131,586	717,063	924,428	
KZN235: Okhahlamba Local Municipality (excluding Gaints Ca		3,795	11,903	116,372	132,069		4,795	11,789	134,048	150,632		5,963	12,254	163,200	181,417	
KZNDMA23: Giants Castle Game Reserve	50402	422	1,323	12,930	14,674		533	1,310	14,894	16,737		663	1,362	18,133	20,157	
KZN - DC23 Uthukela District Municipality		**48,817**	**109,804**	**544,729**	**703,351**	**7.1%**	**65,373**	**116,982**	**620,496**	**802,851**	**7.5%**	**76,443**	**132,947**	**735,196**	**944,586**	**7.9%**
KZN241: Endumeni Local Municipality		7,054	9,926	38,245	55,225		8,857	9,835	43,987	62,679		10,045	11,191	49,609	70,846	
KZN242: Nquthu Local Municipality		5,753	18,438	145,930	170,121		7,183	17,615	157,562	182,360		9,524	15,553	199,303	224,380	
KZN244: Msinga Local Municipality		4,725	13,741	145,207	163,673		5,535	13,362	148,282	167,179		7,374	10,636	186,191	204,201	
Endumeni/Nquthu/Msinga SUBTOTAL	50501	17,533	42,105	329,382	389,020		21,575	40,812	349,831	412,218		26,943	37,380	435,104	499,427	
KZN245: Umvoti Local Municipality	50502	6,827	16,929	64,059	87,815		6,458	17,722	59,415	83,596		7,154	20,224	68,306	95,684	
KZN - DC24 Umzinyathi District Municipality		**24,360**	**59,035**	**393,440**	**476,834**	**4.8%**	**28,033**	**58,534**	**409,246**	**495,813**	**4.6%**	**34,097**	**57,605**	**503,410**	**595,112**	**5.0%**
KZN252: Newcastle Local Municipality		60,685	78,553	215,632	354,870		78,573	91,633	231,876	402,083		92,417	115,386	265,037	472,839	
KZN253: Utrecht Local Municipality		1,935	4,263	31,712	37,910		2,605	4,092	41,480	48,177		3,039	4,780	51,236	59,054	
KZN254: Dannhauser Local Municipality		2,578	5,235	91,738	99,551		2,700	6,716	92,266	101,682		3,530	8,186	120,417	132,134	
KZN - DC25 Amajuba District Municipality	**50601**	**65,198**	**88,052**	**339,082**	**492,332**	**4.9%**	**83,879**	**102,441**	**365,622**	**551,942**	**5.1%**	**98,986**	**128,352**	**436,690**	**664,027**	**5.6%**
KZN261: eDumbe Local Municipality		3,443	10,376	76,333	90,152		4,397	10,405	91,433	106,235		5,279	11,429	111,645	128,352	
KZN262: uPhongolo Local Municipality		3,805	13,898	111,335	129,038		4,695	12,639	130,012	147,346		5,570	13,610	153,275	172,456	
KZN263: Abaqulusi Local Municipality		16,308	30,325	153,297	199,931		19,463	30,414	171,296	221,173		23,931	34,997	210,500	269,428	
KZN265: Nongoma Local Municipality		7,190	20,962	162,077	190,229		8,035	20,072	159,392	187,498		10,696	16,526	201,534	228,757	
KZN266: Ulundi Local Municipality		12,271	26,521	149,591	188,383		15,183	25,985	160,274	201,442		19,924	25,523	203,410	248,857	
KZN - DC26 Zululand District Municipality	**50701**	**43,017**	**102,082**	**652,633**	**797,732**	**8.0%**	**51,773**	**99,514**	**712,406**	**863,693**	**8.0%**	**65,400**	**102,085**	**880,364**	**1,047,849**	**8.8%**
KZN271: Umhlabuyalingana Local Municipality		4,770	14,517	127,582	146,870		5,952	14,115	141,858	161,925		7,153	13,496	165,191	185,840	
KZN272: Jozini Local Municipality		6,370	19,590	168,574	194,534		7,901	17,939	186,463	212,303		9,183	16,210	210,385	235,777	
KZN273: The Big Five False Bay Local Municipality		1,280	3,022	28,856	33,158		1,540	3,513	31,845	36,898		1,759	4,586	35,760	42,105	
KZN274: Hlabisa Local Municipality		6,395	22,135	142,365	170,894		6,973	23,193	146,199	176,365		8,942	23,933	188,400	221,275	
KZN275: Mtubatuba Local Municipality		3,337	7,352	29,109	39,798		4,341	8,468	35,442	48,251		4,253	9,642	35,060	48,956	
KZNDMA27: St Lucia Park District Management Area		914	2,040	3,858	6,812		925	3,289	3,545	7,759		1,256	3,624	4,717	9,597	
KZN - DC27 Umkhanyakude District Municipalit	**50801**	**23,066**	**68,656**	**500,343**	**592,065**	**5.9%**	**27,631**	**70,517**	**545,352**	**643,501**	**6.0%**	**32,547**	**71,491**	**639,512**	**743,550**	**6.2%**
KZN281: Mbonambi Local Municipality		12,008	27,888	67,431	107,327		14,105	34,296	63,186	111,587		16,158	41,808	69,846	127,812	
KZN282: uMhlathuze Local Municipality		89,086	79,835	185,060	353,980		134,342	84,095	222,403	440,840		138,109	96,872	222,508	457,489	
KZN283: Ntambanana Local Municipality		5,315	17,492	65,253	88,060		6,805	23,479	68,205	98,489		8,224	28,261	80,191	116,676	
Mbonambi /uMhlathuze/Ntambanana SUBTOTA	50901	106,408	125,214	317,745	549,367		155,252	141,870	353,793	650,916		162,491	166,941	372,545	701,977	
KZN284: uMlalazi Local Municipality		19,799	37,774	142,473	200,045		19,498	39,628	126,846	185,973		25,006	46,825	160,285	232,115	
KZN285: Mthonjaneni Local Municipality		3,066	5,506	50,045	58,617		4,293	5,564	64,084	73,941		4,895	6,818	74,338	86,051	
KZN286: Nkandla Local Municipality		4,781	16,177	105,205	126,163		5,701	15,550	107,747	128,998		8,396	13,843	148,486	170,725	
uMlalazi/Mthonjaneni Nkandla SUBTOTAL	50902	27,646	59,457	297,722	384,825		29,492	60,742	298,677	388,912		38,297	67,486	383,108	488,892	
KZN - DC28 Uthungulu District Municipality		**134,054**	**184,671**	**615,466**	**934,192**	**9.4%**	**184,744**	**202,612**	**652,471**	**1,039,827**	**9.7%**	**200,789**	**234,427**	**755,653**	**1,190,869**	**10.0%**
KZN291: Mandeni Local Municipality		9,326	25,413	99,624	134,363		10,871	30,481	104,941	146,294		11,954	37,266	115,501	164,721	
KZN292: KwaDukuza Local Municipality		23,633	41,699	111,061	176,393		29,725	50,714	120,970	201,409		30,065	61,935	123,893	215,893	
KZN293: Ndwedwe Local Municipality		9,571	29,226	99,697	138,493		8,409	39,546	81,699	129,655		11,224	50,483	108,011	169,718	
KZN294: Maphumulo Local Municipality		5,301	16,859	90,114	112,274		5,227	22,296	80,820	108,342		6,885	26,931	105,381	139,197	
KZN - DC29 iLembe District Municipality	**51001**	**47,830**	**113,197**	**400,497**	**561,523**	**5.6%**	**54,232**	**143,037**	**388,431**	**585,700**	**5.5%**	**60,128**	**176,615**	**452,786**	**689,530**	**5.8%**
KZN431: Ingwe Local Municipality		2,432	9,863	97,701	109,996		2,791	10,194	105,825	118,810		3,344	9,521	128,306	141,171	
Ingwe/Greater Kokstad/UbuhlebezweUmzimkhulu	51102	16,347	50,412	393,400	460,158		19,390	51,465	443,269	514,125		24,200	55,688	535,011	614,899	
KZN432: Kwa Sani Local Municipality	51101	1,530	2,989	11,488	16,007		1,515	3,502	11,386	16,402		1,640	4,527	12,867	19,034	
KZN433: Greater Kokstad Local Municipality		1,438	4,267	64,581	70,285		1,956	3,174	85,708	90,838		1,921	3,206	90,141	95,269	
KZN434: Ubuhlebezwe Local Municipality		3,178	9,045	100,134	112,356		4,025	10,071	120,838	134,935		4,933	12,246	149,221	166,400	
KZN435: Umzimkhulu Local Municipality		9,299	27,237	130,985	167,521		10,618	28,026	130,898	169,542		14,001	30,715	167,343	212,059	
KZN - DC43 Sisonke District Municipality		**17,877**	**53,401**	**404,888**	**476,165**	**4.8%**	**20,905**	**54,967**	**454,655**	**530,527**	**4.9%**	**25,840**	**60,215**	**547,878**	**633,933**	**5.3%**
METRO (Link City)	50101	57,806	173,904	620,515	852,225		77,648	223,808	612,046	913,501		77,993	206,452	633,120	917,565	
METRO (Hammarsdale / Hillcrest)	50102	8,116	26,146	169,385	203,648		8,205	26,433	171,245	205,884		8,114	26,140	169,342	203,596	
METRO (Durban / Pinetown)	50103	306,918	161,536	339,225	807,678		315,573	166,091	348,791	830,455		312,492	164,469	345,385	822,346	
METRO (Tongaat / Dube)	50104	151,977	79,607	130,266	361,850		167,129	87,544	143,254	397,927		169,421	88,744	145,218	403,383	
METRO (CBD / Port)	50105	172,566	109,815	109,815	392,196		174,022	110,741	110,741	395,504		171,699	109,263	109,263	390,225	
METRO (Amanzimtoti / Umgababa)	50106	19,495	29,503	129,827	178,824		20,592	31,163	137,135	188,890		20,605	31,184	137,225	189,014	
METRO (Umbumbulu / Umlazi)	50107	28,527	74,271	376,630	479,427		36,962	100,326	390,743	528,031		41,567	95,201	399,575	536,343	
KZN - eThekwini Metropolitan Municipality		**745,403**	**654,780**	**1,875,663**	**3,275,847**	**32.9%**	**800,131**	**746,106**	**1,913,955**	**3,460,192**	**32.2%**	**801,890**	**721,453**	**1,939,129**	**3,462,472**	**28.9%**
KZN TOTAL		**1,405,601**	**1,785,618**	**6,778,630**	**9,969,849**	**100%**	**1,616,921**	**1,979,220**	**7,145,928**	**10,742,069**	**100%**	**1,727,793**	**2,135,069**	**8,137,748**	**12,000,610**	**100%**
%		**14%**	**18%**	**68%**	**100%**		**15%**	**18%**	**67%**	**100%**		**14%**	**18%**	**68%**	**100%**	

Table 2: KZN Employment Status by Local/District Municipalities, 2005, 2025, 2050

		2005				2025				2050			
	NATMAP	ECONOMICALLY ACTIVE				ECONOMICALLY ACTIVE				ECONOMICALLY ACTIVE			
LOCAL/DISTRICT MUNICIPALITY	TRAFFFIC ZONE NO	EMPLOYED	UNEM-PLOYED	TOTAL	%	EMPLOYED	UNEM-PLOYED	TOTAL	%	EMPLOYED	UNEM-PLOYED	TOTAL	%
KZN211: Vulamehlo Local Municipality		11,396	13,628	25,024		20,093	19,412	39,505		28,220	10,482	38,702	
KZN212: Umdoni Local Municipality		11,072	5,786	16,858		14,336	2,488	16,824		18,313	822	19,135	
KZN213: Umzumbe Local Municipality		25,735	31,967	57,702		40,523	30,776	71,300		52,192	13,223	65,415	
KZN214: uMuziwabantu Local Municipality		4,572	8,760	13,332		5,989	4,099	10,088		7,271	1,347	8,618	
KZN215: Ezingoleni Local Municipality		5,193	5,001	10,194		7,630	3,828	11,458		9,775	1,655	11,430	
KZN216: Hibiscus Coast Local Municipality		46,456	24,626	71,082		63,271	11,716	74,988		81,960	5,088	87,048	
KZN - DC21 Ugu District Municipality	50201	104,424	89,768	194,192	5.9%	151,843	72,320	224,163	6.2%	197,730	32,617	230,348	5.9%
%		53.8%	46%	100%		67.7%	32%	100%		85.8%	14%	100%	
%				27%				29%				26%	
KZN221: uMshwathi Local Municipality		16,351	15,804	32,155		23,383	12,035	35,419		29,374	5,204	34,578	
KZN222: uMngeni Local Municipality		18,818	10,876	29,693		25,914	6,076	31,990		33,655	2,517	36,172	
KZN223: Mooi Mpofana Local Municipality		6,809	4,433	11,242		7,041	1,048	8,090		8,443	331	8,774	
KZN224: Impendle Local Municipality		2,867	5,115	7,981		4,504	4,629	9,134		5,962	2,347	8,309	
KZN225: The Msunduzi Local Municipality		125,526	114,554	240,081		183,481	72,487	255,969		240,697	29,409	270,106	
KZN226: Mkhambathini Local Municipality		16,729	7,082	23,812		23,838	4,751	28,590		31,323	2,543	33,866	
KZN227: Richmond Local Municipality		11,946	9,429	21,375		17,489	8,295	25,784		22,481	3,827	26,308	
KZN - DC22 uMgungundlovu District Municipality	50301	199,046	167,293	366,339	11.2%	285,652	109,323	394,975	11.0%	371,936	46,177	418,113	10.8%
%		54.3%	46%	100%		72.3%	28%	100%		89.0%	11%	100%	
%				39%				39%				37%	
KZN232: Emnambithi-Ladysmith Local Municipality		38,123	30,764	68,887		48,613	12,576	61,189		61,917	4,654	66,571	
KZN233: Indaka Local Municipality		12,558	20,299	32,857		20,188	18,711	38,900		25,875	7,649	33,524	
KZN234: Umtshezi Local Municipality		6,140	7,743	13,883		7,288	2,871	10,159		8,961	850	9,811	
KZN235: Okhahlamba Local Municipality		9,750	17,052	26,802		13,463	9,672	23,135		16,603	3,243	19,846	
KZN236: Imbabazane Local Municipality		10,919	20,330	31,249		17,324	17,279	34,603		22,343	6,930	29,274	
Emnambithi/Indaka/Umtshezi/ Imbabazane /Okhahlamb	50401	76,515	94,482	170,997		105,530	60,142	165,672		134,039	23,003	157,042	
KZN235: Okhahlamba Local Municipality (excluding Gaints Castle Ga		8,775	15,347	24,122		12,117	8,704	20,822		14,943	2,919	17,862	
KZNDMA23: Giants Castle Game Reserve	50402	975	1,705	2,680		1,346	967	2,314		1,660	324	1,985	
KZN - DC23 Uthukela District Municipality		77,490	96,187	173,678	5.3%	106,876	61,109	167,986	4.7%	135,699	23,327	159,026	4.1%
%		44.6%	55%	100%		63.6%	36%	100%		85.3%	15%	100%	
%				25%				21%				17%	
KZN241: Endumeni Local Municipality		6,438	6,366	12,804		8,147	2,925	11,072		10,193	1,032	11,225	
KZN242: Nquthu Local Municipality		7,337	24,234	31,571		12,001	16,042	28,043		14,681	4,987	19,668	
KZN244: Msinga Local Municipality		4,061	18,278	22,339		7,545	13,811	21,355		9,305	4,298	13,603	
Endumeni/Nquthu/Msinga SUBTOTAL	50501	17,836	48,878	66,714		27,693	32,777	60,470		34,179	10,318	44,496	
KZN245: Umvoti Local Municipality	50502	11,474	10,352	21,826		16,022	8,706	24,728		20,245	4,419	24,664	
KZN - DC24 Umzinyathi District Municipality		29,310	59,229	88,539	2.7%	43,714	41,484	85,198	2.4%	54,424	14,737	69,161	1.8%
%		33.1%	67%	100%		51.3%	49%	100%		78.7%	21%	100%	
%				19%				17%				12%	
KZN252: Newcastle Local Municipality		77,837	55,663	133,500		112,187	33,190	145,378		146,329	14,600	160,929	
KZN253: Utrecht Local Municipality		4,179	4,340	8,518		4,661	1,614	6,275		5,443	519	5,962	
KZN254: Dannhauser Local Municipality		12,930	16,828	29,759		20,763	17,339	38,101		27,422	8,339	35,760	
KZN - DC25 Amajuba District Municipality	50601	94,946	76,831	171,777	5.3%	137,611	52,143	189,754	5.3%	179,194	23,457	202,651	5.2%
%		55.3%	45%	100%		72.5%	27%	100%		88.4%	12%	100%	
%				35%				34%				31%	
KZN261: eDumbe Local Municipality		8,669	11,517	20,186		11,007	5,958	16,965		13,228	2,106	15,334	
KZN262: uPhongolo Local Municipality		11,599	16,409	28,008		14,381	7,515	21,896		17,547	2,550	20,097	
KZN263: Abaqulusi Local Municipality		22,238	28,259	50,497		29,454	16,043	45,498		36,599	6,210	42,809	
KZN265: Nongoma Local Municipality		4,863	23,008	27,871		9,391	17,851	27,242		11,921	5,903	17,825	
KZN266: Ulundi Local Municipality		11,168	28,163	39,331		17,490	18,616	36,106		21,765	6,313	28,078	
KZN - DC26 Zululand District Municipality	50701	58,537	107,356	165,893	5.1%	81,723	65,983	147,707	4.1%	101,060	23,082	124,142	3.2%
%		35.3%	65%	100%		55.3%	45%	100%		81.4%	19%	100%	
%				21%				17%				12%	
KZN271: Umhlabuyalingana Local Municipality		7,351	14,864	22,214		10,606	8,894	19,500		13,124	2,965	16,089	
KZN272: Jozini Local Municipality		8,379	18,434	26,813		11,929	10,354	22,283		14,627	3,305	17,932	
KZN273: The Big Five False Bay Local Municipality		3,211	1,651	4,862		4,234	909	5,142		5,521	486	6,007	
KZN274: Hlabisa Local Municipality		12,399	24,734	37,133		18,981	19,053	38,033		23,559	7,043	30,602	
KZN275: Mtubatuba Local Municipality		4,359	1,933	6,292		5,320	657	5,976		6,719	193	6,912	
KZNDMA27: St Lucia Park District Management Area		1,094	1,232	2,326		1,867	2,230	4,096		2,482	926	3,409	
KZN - DC27 Umkhanyakude District Municipality	50801	36,793	62,848	99,641	3.0%	52,936	42,095	95,031	2.6%	66,032	14,917	80,950	2.1%
%		36.9%	63%	100%		55.7%	44%	100%		81.6%	18%	100%	
%		73,586		17%				15%				11%	
KZN281: Mbonambi Local Municipality		23,130	16,280	39,410		37,246	14,675	51,921		49,849	7,686	57,536	
KZN282: uMhlathuze Local Municipality		52,338	34,729	87,067		66,735	9,874	76,609		85,872	2,760	88,632	
KZN283: Ntambanana Local Municipality		13,680	11,822	25,502		21,965	10,909	32,874		28,777	5,039	33,817	
Mbonambi /uMhlathuze/Ntambanana SUBTOTAL	52901	89,147	62,831	151,979		125,946	35,458	161,404		164,498	15,486	179,984	
KZN284: uMlalazi Local Municipality		26,336	36,243	62,580		41,426	32,598	74,023		54,501	15,052	69,553	
KZN285: Mthonjaneni Local Municipality		4,855	4,091	8,946		5,687	1,399	7,086		7,028	494	7,522	
KZN286: Nkandla Local Municipality		3,067	13,863	16,930		5,715	10,236	15,951		7,141	3,213	10,354	
uMlalazi/Mthonjaneni Nkandla SUBTOTAL	50902	34,258	54,197	88,455		52,828	44,232	97,061		68,670	18,759	87,429	
KZN - DC28 Uthungulu District Municipality		123,406	117,028	240,434	7.4%	178,775	79,690	258,465	7.2%	233,168	34,245	267,413	6.9%
%		51.3%	49%	100%		69.2%	31%	100%		87.2%	13%	100%	
%				26%				25%				22%	
KZN291: Mandeni Local Municipality		24,995	14,629	39,624		35,620	9,672	45,293		45,954	4,600	50,554	
KZN292: KwaDukuza Local Municipality		51,130	17,667	68,797		69,509	7,605	77,114		88,980	3,417	92,397	
KZN293: Ndwedwe Local Municipality		19,135	20,598	39,733		33,499	32,359	65,858		46,418	17,481	63,899	
KZN294: Maphumulo Local Municipality		9,868	12,428	22,296		16,412	16,591	33,003		22,090	8,631	30,721	
KZN - DC29 iLembe District Municipality	51001	105,128	65,321	170,449	5.2%	155,040	66,227	221,268	6.2%	203,442	34,129	237,571	6.1%
%		61.7%	38%	100%		70.1%	30%	100%		85.6%	14%	100%	
%				30%				38%				34%	
KZN431: Ingwe Local Municipality		6,171	12,666	18,837		9,068	8,976	18,044		10,928	3,038	13,966	
Ingwe/Greater Kokstad/UbuhlebezweUmzimkhulu SUBT	51102	39,513	54,492	94,005		50,066	32,041	82,106		61,325	11,785	73,110	
KZN432: Kwa Sani Local Municipality	51101	4,644	1,277	5,921		5,947	1,079	7,026		7,429	648	8,077	
KZN433: Greater Kokstad Local Municipality		12,373	11,656	24,029		11,179	2,341	13,520		12,685	364	13,049	
KZN434: Ubuhlebezwe Local Municipality		11,020	10,544	21,564		14,098	5,875	19,973		17,440	2,322	19,762	
KZN435: Umzimkhulu Local Municipality		9,950	19,625	29,575		15,720	14,849	30,570		20,271	6,061	26,332	
KZN - DC43 Sisonke District Municipality		44,157	55,769	99,926	3.1%	56,013	33,120	89,132	2.5%	68,753	12,433	81,186	2.1%
%		44.2%	56%	100%		62.8%	37%	100%		84.7%	15%	100%	
%				21%				17%				14%	
METRO (Link City)	50101	198,644	190,854	389,497		365,271	89,046	454,317		497,942	31,953	529,895	
METRO (Hammarsdale / Hillcrest)	50102	48,399	44,676	93,074		82,324	20,069	102,393		110,487	7,090	117,577	
METRO (Durban / Pinetown)	50103	239,866	129,272	369,138		332,065	80,951	413,016		446,269	28,637	474,906	
METRO (Tongaat / Dube)	50104	145,533	19,845	165,378		174,155	23,748	197,903		218,907	14,047	232,954	
METRO (CBD / Port)	50105	157,738	21,510	179,248		173,095	23,604	196,699		211,766	13,589	225,355	
METRO (Amanzimtoti / Umgababa)	50106	42,499	39,230	81,729		75,529	18,413	93,942		102,574	6,582	109,156	
METRO (Umbumbulu / Umlazi)	50107	111,968	107,147	219,115		211,138	51,471	262,609		291,061	18,677	309,738	
KZN - eThekwini Metropolitan Municipality		944,646	552,534	1,497,180	45.8%	1,413,577	307,303	1,720,880	47.9%	1,879,005	120,575	1,999,580	51.6%
%		63.1%	37%	100%		82.1%	18%	100%		94.0%	6%	100%	
%				46%				50%				58%	
KZN TOTAL		1,817,883	1,450,166	3,268,048	100.0%	2,663,760	930,797	3,594,557	100.1%	3,490,443	379,697	3,870,140	100.0%
%		55.6%	44%	100%		74.1%	26%	100%		90.2%	10%	100%	
%				33%				33%				32%	

Source: Global Insight SA, 2008

Table 3: KZN Employment by Main Industrylities, 2005

		2005														
NAME	TRAFFIC ZONE NO	Agriculture, Hunting, Forestry, Fishing	Mining , Quarrying	Manufacturing	Electricity, gas, water	Construction	Wholesale, Retail,Catering, Accomodation	Transport, Storage, Communication	Finance, Insurance, Real estate, Business	Community, Social, Personal services	Other service activities	Total Formal	Informal	Domestic	Unemployed	TOTAL JOBS
KZN211: Vulamehlo Local Municipality		1,015	6	522	31	91	281	96	188	1,500	102	3,831	1,473	1,002	13,628	19,933
KZN212: Umdoni Local Municipality		1,105	5	1,006	32	166	520	170	352	1,246	105	4,706	3,105	691	5,786	14,287
KZN213: Umzumbe Local Municipality		2,707	70	1,660	95	402	1,365	363	871	2,706	268	10,508	5,496	2,377	31,967	50,348
KZN214: uMuziwabantu Local Municipality		898	22	594	21	70	574	123	109	1,174	25	3,610	1,686	395	8,760	14,451
KZN215: Ezingoleni Local Municipality		407	15	305	14	58	336	69	100	516	23	1,841	1,320	322	5,001	8,484
KZN216: Hibiscus Coast Local Municipality		6,145	497	3,984	436	2,086	6,892	1,233	4,031	6,823	990	33,116	16,064	5,734	24,626	79,540
KZN - DC21 Ugu District Municipality	**50201**	**12,276**	**614**	**8,071**	**629**	**2,872**	**9,967**	**2,055**	**5,650**	**13,964**	**1,513**	**57,611**	**29,143**	**10,521**	**89,768**	**187,044**
%		**21.3%**	**1.1%**	**14.0%**	**1.1%**	**5.0%**	**17.3%**	**3.6%**	**9.8%**	**24.2%**	**2.6%**	**100.0%**				
%												**31%**	**16%**	**6%**	**48%**	**100%**
KZN221: uMshwathi Local Municipality		5,893	107	2,480	61	167	505	257	462	1,727	135	11,795	4,137	1,047	15,804	32,783
KZN222: uMngeni Local Municipality		2,662	28	2,046	146	382	1,088	355	1,249	2,938	349	11,244	4,810	2,478	10,876	29,409
KZN223: Mooi Mpofana Local Municipality		2,871	1	658	41	69	454	147	142	779	159	5,321	1,193	500	4,433	11,448
KZN224: Impendle Local Municipality		1,004	0	69	0	57	107	21	61	444	60	1,824	1,022	235	5,115	8,195
KZN225: The Msunduzi Local Municipality		2,789	164	16,233	1,397	3,972	13,325	4,493	14,260	28,462	2,914	88,008	29,769	14,596	114,554	246,928
KZN226: Mkhambathini Local Municipality		1,641	9	970	79	162	559	199	579	1,552	192	5,942	1,789	739	7,082	15,551
KZN227: Richmond Local Municipality		3,205	3	402	59	47	222	80	307	1,118	118	5,561	2,402	763	9,429	18,154
KZN - DC22 uMgungundlovu District Municipality	**50301**	**20,066**	**312**	**22,859**	**1,784**	**4,856**	**16,260**	**5,552**	**17,058**	**37,021**	**3,926**	**129,695**	**45,121**	**20,358**	**167,293**	**362,468**
%		**15.5%**	**0.2%**	**17.6%**	**1.4%**	**3.7%**	**12.5%**	**4.3%**	**13.2%**	**28.5%**	**3.0%**	**100.0%**				
%												**36%**	**12%**	**6%**	**46%**	**100%**
KZN232: Emnambithi-Ladysmith Local Municipality		1,278	20	7,470	245	1,110	3,306	2,086	2,641	6,818	664	25,638	12,882	2,698	30,764	71,980
KZN233: Indaka Local Municipality		813	42	1,023	52	265	783	413	570	2,070	206	6,237	2,886	1,333	20,299	30,756
KZN234: Umtshezi Local Municipality		485	4	663	42	101	463	102	219	1,032	68	3,180	1,304	446	7,743	12,674
KZN235: Okhahlamba Local Municipality		1,231	1	350	167	96	389	109	235	1,654	79	4,310	2,609	428	17,052	24,399
KZN236: Imbabazane Local Municipality		710	8	1,319	84	158	908	208	443	1,869	115	5,822	2,888	1,071	20,330	30,110
Emnambithi/Indaka/Umtshezi/ Imbabazane /Okhahla	**50401**	**4,394**	**75**	**10,790**	**573**	**1,720**	**5,612**	**2,908**	**4,084**	**13,278**	**1,123**	**44,557**	**22,308**	**5,934**	**94,482**	**167,281**
KZN235: Okhahlamba Local Municipality (excluding Gaints Castle Ga		1,107	1	315	151	86	151	98	211	1,488	71	3,680	2,348	386	15,347	21,761
KZNDMA23: Giants Castle Game Reserve	50402	123	0	35	17	10	237	11	23	165	8	630	261	43	1,705	2,639
KZN - DC23 Uthukela District Municipality		**4,517**	**75**	**10,825**	**589**	**1,729**	**5,850**	**2,918**	**4,107**	**13,444**	**1,131**	**45,187**	**22,569**	**5,976**	**96,187**	**169,920**
%		**10.0%**	**0.2%**	**24.0%**	**1.3%**	**3.8%**	**12.9%**	**6.5%**	**9.1%**	**29.8%**	**2.5%**	**100.0%**				
%												**27%**	**13%**	**4%**	**57%**	**100%**
KZN241: Endumeni Local Municipality		718	64	272	39	98	295	158	207	1,574	150	3,575	1,501	664	6,366	12,106
KZN242: Nquthu Local Municipality		394	27	99	17	110	211	120	81	2,897	26	3,982	2,033	480	24,234	30,728
KZN244: Msinga Local Municipality		131	7	38	12	11	54	37	80	1,452	12	1,834	1,186	343	18,278	21,641
Endumeni/Nquthu/Msinga SUBTOTAL	**50501**	**1,244**	**98**	**409**	**68**	**219**	**560**	**315**	**368**	**5,923**	**188**	**9,391**	**4,720**	**1,487**	**48,878**	**64,475**
KZN245: Umvoti Local Municipality	50502	3,870	30	753	7	161	410	121	341	1,472	140	7,305	3,244	1,240	10,352	22,140
KZN - DC24 Umzinyathi District Municipality		**5,114**	**128**	**1,162**	**75**	**379**	**970**	**436**	**709**	**7,395**	**328**	**16,696**	**7,963**	**2,727**	**59,229**	**86,615**
%		**30.6%**	**0.8%**	**7.0%**	**0.5%**	**2.3%**	**5.8%**	**2.6%**	**4.2%**	**44.3%**	**2.0%**	**100.0%**				
%												**19%**	**9%**	**3%**	**68%**	**100%**
KZN252: Newcastle Local Municipality		1,413	155	17,673	535	1,413	5,478	2,505	5,195	11,681	916	46,965	28,194	5,544	55,663	136,365
KZN253: Utrecht Local Municipality		1,656	209	66	7	16	21	17	76	1,150	24	3,242	511	481	4,340	8,573
KZN254: Dannhauser Local Municipality		420	753	587	49	87	280	103	181	1,222	81	3,764	2,350	937	16,828	23,880
KZN - DC25 Amajuba District Municipality	**50601**	**3,489**	**1,117**	**18,326**	**592**	**1,516**	**5,780**	**2,624**	**5,453**	**14,053**	**1,022**	**53,971**	**31,055**	**6,961**	**76,831**	**168,818**
%		**6.5%**	**2.1%**	**34.0%**	**1.1%**	**2.8%**	**10.7%**	**4.9%**	**10.1%**	**26.0%**	**1.9%**	**100.0%**				
%												**32%**	**18%**	**4%**	**46%**	**100%**
KZN261: eDumbe Local Municipality		2,365	98	432	99	114	404	143	235	1,102	55	5,048	2,240	672	11,517	19,476
KZN262: uPhongolo Local Municipality		1,075	87	264	20	83	256	42	130	1,481	67	3,506	2,164	707	16,409	22,785
KZN263: Abaqulusi Local Municipality		4,491	922	790	167	370	1,177	700	927	4,935	234	14,713	5,942	2,476	28,259	51,390
KZN265: Nongoma Local Municipality		202	104	41	14	77	64	34	112	2,225	17	2,890	1,478	528	23,008	27,905
KZN266: Ulundi Local Municipality		403	216	167	21	157	322	142	449	6,064	172	8,112	1,936	1,026	28,163	39,238
KZN - DC26 Zululand District Municipality	**50701**	**8,537**	**1,427**	**1,694**	**321**	**801**	**2,222**	**1,061**	**1,854**	**15,807**	**545**	**34,270**	**13,760**	**5,409**	**107,356**	**160,795**
%		**24.9%**	**4.2%**	**4.9%**	**0.9%**	**2.3%**	**6.5%**	**3.1%**	**5.4%**	**46.1%**	**1.6%**	**100.0%**				
%												**21%**	**9%**	**3%**	**67%**	**100%**
KZN271: Umhlabuyalingana Local Municipality		539	87	111	22	50	159	63	231	2,464	397	4,123	1,747	538	14,864	21,272
KZN272: Jozini Local Municipality		586	129	118	22	52	158	66	249	2,931	489	4,800	1,859	669	18,434	25,762
KZN273: The Big Five False Bay Local Municipality		260	2	40	9	18	55	22	53	589	78	1,125	827	113	1,651	3,716
KZN274: Hlabisa Local Municipality		4,131	64	588	73	227	454	259	279	3,805	425	10,305	3,286	939	24,734	39,264
KZN275: Mtubatuba Local Municipality		571	37	120	13	45	91	55	62	552	63	1,609	1,035	147	1,933	4,725
KZNDMA27: St Lucia Park District Management Area		138	5	27	4	11	29	14	29	272	38	566	307	90	1,232	2,195
KZN - DC27 Umkhanyakude District Municipality	**50801**	**6,224**	**323**	**1,003**	**142**	**404**	**945**	**478**	**904**	**10,614**	**1,491**	**22,529**	**9,061**	**2,497**	**62,848**	**96,934**
%		**27.6%**	**1.4%**	**4.5%**	**0.6%**	**1.8%**	**4.2%**	**2.1%**	**4.0%**	**47.1%**	**6.6%**	**100.0%**				
%												**23%**	**9%**	**3%**	**65%**	**100%**
KZN281: Mbonambi Local Municipality		1,569	1,608	3,882	178	1,353	2,785	2,017	2,534	2,967	387	19,280	6,958	1,858	16,280	44,375
KZN282: uMhlathuze Local Municipality		4,500	2,461	8,055	316	2,606	4,759	3,359	4,306	7,369	817	38,548	12,492	2,825	34,729	88,594
KZN283: Ntambanana Local Municipality		1,090	548	1,532	76	500	1,058	747	915	1,298	190	7,956	3,118	858	11,822	23,753
Mbonambi /uMhlathuze/Ntambanana SUBTOTAL	**52901**	**7,159**	**4,617**	**13,469**	**571**	**4,459**	**8,602**	**6,124**	**7,755**	**11,634**	**1,395**	**65,784**	**22,567**	**5,540**	**62,831**	**156,722**
KZN284: uMlalazi Local Municipality		3,118	228	4,410	94	531	984	398	951	4,515	282	15,510	6,902	1,839	36,243	60,495
KZN285: Mthonjaneni Local Municipality		894	0	303	25	59	161	90	81	464	94	2,172	1,050	185	4,091	7,497
KZN286: Nkandla Local Municipality		192	0	32	5	15	46	15	34	1,774	41	2,153	815	378	13,863	17,209
uMlalazi/Mthonjaneni Nkandla SUBTOTAL	**50902**	**4,204**	**229**	**4,744**	**123**	**606**	**1,191**	**503**	**1,066**	**6,753**	**416**	**19,836**	**8,767**	**2,402**	**54,197**	**85,201**
KZN - DC28 Uthungulu District Municipality		**11,362**	**4,845**	**18,214**	**694**	**5,064**	**9,793**	**6,627**	**8,820**	**18,388**	**1,811**	**85,619**	**31,334**	**7,943**	**117,028**	**241,924**
%		**13.3%**	**5.7%**	**21.3%**	**0.8%**	**5.9%**	**11.4%**	**7.7%**	**10.3%**	**21.5%**	**2.1%**	**100.0%**				
%												**35%**	**13%**	**3%**	**48%**	**100%**
KZN291: Mandeni Local Municipality		2,537	90	2,298	51	304	621	251	557	2,152	163	9,024	5,060	1,167	14,629	29,880
KZN292: KwaDukuza Local Municipality		12,304	0	8,343	130	1,316	3,511	1,374	2,740	3,079	450	33,246	13,763	2,979	17,667	67,655
KZN293: Ndwedwe Local Municipality		2,095	3	728	18	154	361	178	286	2,016	68	5,907	3,533	895	20,598	30,933
KZN294: Maphumulo Local Municipality		1,083	1	412	0	145	82	78	164	1,195	85	3,246	2,996	407	12,428	19,077
KZN - DC29 iLembe District Municipality	**51001**	**18,020**	**94**	**11,781**	**199**	**1,920**	**4,574**	**1,880**	**3,748**	**8,442**	**765**	**51,423**	**25,352**	**5,448**	**65,321**	**147,544**
%		**35.0%**	**0.2%**	**22.9%**	**0.4%**	**3.7%**	**8.9%**	**3.7%**	**7.3%**	**16.4%**	**1.5%**	**100.0%**				
%												**35%**	**17%**	**4%**	**44%**	**100%**
KZN431: Ingwe Local Municipality		1,627	0	292	15	72	211	97	121	1,364	17	3,819	1,724	626	12,666	18,835
Ingwe/Greater Kokstad/UbuhlebezweUmzimkhulu SU	**51102**	**8,057**	**59**	**1,242**	**100**	**354**	**1,220**	**332**	**500**	**7,614**	**300**	**19,780**	**9,040**	**3,202**	**54,492**	**86,514**
KZN432: Kwa Sani Local Municipality	51101	1,615	0	201	0	6	272	55	79	401	41	2,670	1,661	542	1,277	6,150
KZN433: Greater Kokstad Local Municipality		3,282	0	94	51	28	362	29	119	1,946	112	6,022	792	1,356	11,656	19,826
KZN434: Ubuhlebezwe Local Municipality		2,023	0	354	10	0	188	122	162	1,305	68	4,234	3,272	383	10,544	18,433
KZN435: Umzimkhulu Local Municipality		1,125	59	501	24	254	459	84	99	2,998	103	5,705	3,252	837	19,625	29,420
KZN - DC43 Sisonke District Municipality		**9,672**	**59**	**1,443**	**100**	**360**	**1,492**	**387**	**579**	**8,015**	**342**	**22,450**	**10,701**	**3,745**	**55,769**	**92,664**
%		**43.1%**	**0.3%**	**6.4%**	**0.4%**	**1.6%**	**6.6%**	**1.7%**	**2.6%**	**35.7%**	**1.5%**	**100.0%**				
%												**24%**	**12%**	**4%**	**60%**	**100%**
METRO (Link City)	50101	605	15	1,963	377	7,176	2,494	4,966	2,372	27,288	6,015	53,270	15,463	5,927	190,854	265,514
METRO (Hammarsdale / Hillcrest)	50102	9,077	225	1,963	60	422	1,247	463	1,186	1,347	231	16,221	4,709	832	44,676	66,437
METRO (Durban / Pinetown)	50103	0	0	49,073	786	16,039	37,406	6,483	11,858	28,845	5,783	156,274	45,364	31,471	129,272	362,381
METRO (Tongaat / Dube)	50104	638	24	33,370	377	4,221	12,469	6,483	1,186	20,817	4,627	84,210	24,445	15,584	19,845	144,084
METRO (CBD / Port)	50105	43	0	102,072	4,031	11,818	63,591	18,579	99,607	32,231	1,157	333,130	96,703	17,695	21,510	469,037
METRO (Amanzimtoti / Umgababa)	50106	638	15	7,852	117	2,110	6,234	6,483	1,186	5,446	1,157	31,237	9,068	1,999	39,230	81,534
METRO (Umbumbulu / Umlazi)	50107	1,210	21	0	254	422	1,247	7,739	1,186	18,768	4,164	35,010	10,163	2,925	107,147	155,246
KZN - eThekwini Metropolitan Municipality		**12,210**	**299**	**196,292**	**6,001**	**42,209**	**124,688**	**51,195**	**118,580**	**134,743**	**23,134**	**709,351**	**205,914**	**76,434**	**552,534**	**1,544,232**
%		**1.7%**	**0.0%**	**27.7%**	**0.8%**	**6.0%**	**17.6%**	**7.2%**	**16.7%**	**19.0%**	**3.3%**	**100.0%**				
%												**46%**	**13%**	**5%**	**36%**	**100%**
KZN TOTAL		**111,488**	**9,294**	**291,669**	**11,127**	**62,110**	**182,543**	**75,215**	**167,464**	**281,885**	**36,007**	**1,228,802**	**431,973**	**148,018**	**1,450,166**	**3,258,958**
%		**9.1%**	**0.8%**	**23.7%**	**0.9%**	**5.1%**	**14.9%**	**6.1%**	**13.6%**	**22.9%**	**2.9%**	**100.0%**				
%												**38%**	**13%**	**5%**	**44%**	**100%**

Source: Global Insight SA, 2008

KZN Employment by Main Industries, 2025

		2025														
NAME	TRAFFIC ZONE NO	Agriculture, Hunting, Forestry, Fishing	Mining , Quarrying	Manufacturing	Electricity, gas, water	Construction	Wholesale, Retail,Catering, Accomodation	Transport, Storage, Communication	Finance, Insurance, Real estate, Business	Community, Social, Personal services	Other service activities	Total Formal	Informal	Domestic	Unemployed	TOTAL JOBS
KZN211: Vulamehlo Local Municipality		1,135	4	600	45	201	345	127	274	2,369	154	5,254	1,797	714	19,412	27,176
KZN212: Umdoni Local Municipality		1,149	2	1,243	46	396	697	244	609	1,820	148	6,354	3,788	773	2,488	13,404
KZN213: Umzumbe Local Municipality		3,694	83	2,721	181	1,263	2,409	686	1,776	5,203	496	18,512	6,707	2,657	30,776	58,652
KZN214: uMuziwabantu Local Municipality		1,006	21	868	32	190	885	202	204	1,900	38	5,348	2,057	425	4,099	11,928
KZN215: Ezingoleni Local Municipality		494	16	503	23	176	584	128	211	898	37	3,070	1,610	357	3,828	8,865
KZN216: Hibiscus Coast Local Municipality		6,447	470	5,603	650	5,556	10,298	1,989	7,375	10,037	1,408	49,833	19,602	6,349	11,716	87,500
KZN - DC21 Ugu District Municipality	**50201**	**13,925**	**596**	**11,538**	**977**	**7,783**	**15,219**	**3,376**	**10,449**	**22,228**	**2,282**	**88,371**	**35,560**	**11,274**	**72,320**	**207,526**
%		**15.8%**	**0.7%**	**13.1%**	**1.1%**	**8.8%**	**17.2%**	**3.8%**	**11.8%**	**25.2%**	**2.6%**	**100.0%**				
%												**43%**	**17%**	**5%**	**35%**	**100%**
KZN221: uMshwathi Local Municipality		6,923	118	3,705	101	465	789	433	898	2,877	215	16,524	5,048	1,126	12,035	34,734
KZN222: uMngeni Local Municipality		2,859	28	2,952	212	956	1,521	537	2,208	4,483	509	16,265	5,870	2,621	6,076	30,831
KZN223: Mooi Mpofana Local Municipality		2,979	1	733	57	155	570	199	230	1,151	223	6,297	1,456	581	1,048	9,382
KZN224: Impendle Local Municipality		1,302	0	101	0	161	169	36	123	812	105	2,808	1,246	208	4,629	8,892
KZN225: The Msunduzi Local Municipality		3,177	191	23,057	2,197	10,414	19,491	7,112	26,028	45,473	4,501	141,641	36,324	15,415	72,487	265,867
KZN226: Mkhambathini Local Municipality		1,769	9	1,210	116	392	755	290	963	2,359	281	8,144	2,182	844	4,751	15,922
KZN227: Richmond Local Municipality		4,060	3	576	99	126	334	130	572	1,999	202	8,101	2,931	771	8,295	20,098
KZN - DC22 uMgungundlovu District Municipality	**50301**	**23,068**	**350**	**32,334**	**2,783**	**12,669**	**23,629**	**8,736**	**31,021**	**59,154**	**6,036**	**199,781**	**55,057**	**21,565**	**109,323**	**385,726**
%		**11.5%**	**0.2%**	**16.2%**	**1.4%**	**6.3%**	**11.8%**	**4.4%**	**15.5%**	**29.6%**	**3.0%**	**100.0%**				
%												**52%**	**14%**	**6%**	**28%**	**100%**
KZN232: Emnambithi-Ladysmith Local Municipality		1,332	20	9,171	360	2,738	4,573	3,116	4,533	10,075	938	36,857	15,718	3,229	12,576	68,381
KZN233: Indaka Local Municipality		1,090	51	1,696	88	833	1,387	782	1,170	3,883	374	11,354	3,522	1,491	18,711	35,078
KZN234: Umtshezi Local Municipality		529	4	786	62	237	606	144	352	1,590	100	4,409	1,591	531	2,871	9,403
KZN235: Okhahlamba Local Municipality		1,387	1	456	254	236	531	162	409	2,695	120	6,250	3,184	489	9,672	19,594
KZN236: Imbabazane Local Municipality		938	10	1,885	149	450	1,443	356	866	3,503	206	9,806	3,523	1,090	17,279	31,698
Emnambithi/Indaka/Umtshezi/ Imbabazane /Okhahla	**50401**	**5,137**	**86**	**13,948**	**887**	**4,469**	**8,217**	**4,545**	**7,288**	**21,477**	**1,726**	**67,782**	**27,220**	**6,782**	**60,142**	**161,925**
KZN235: Okhahlamba Local Municipality (excluding Gaints Castle Ga		1,248	1	410	228	212	208	146	368	2,426	108	5,355	2,866	440	8,704	17,365
KZNDMA23: Giants Castle Game Reserve	50402	139	0	46	25	24	323	16	41	270	12	895	318	49	967	2,229
KZN - DC23 Uthukela District Municipality		**5,276**	**86**	**13,994**	**912**	**4,493**	**8,540**	**4,561**	**7,329**	**21,746**	**1,738**	**68,676**	**27,539**	**6,830**	**61,109**	**164,155**
%		**7.7%**	**0.1%**	**20.4%**	**1.3%**	**6.5%**	**12.4%**	**6.6%**	**10.7%**	**31.7%**	**2.5%**	**100.0%**				
%												**42%**	**17%**	**4%**	**37%**	**100%**
KZN241: Endumeni Local Municipality		743	59	327	49	204	346	197	316	2,263	211	4,714	1,831	753	2,925	10,223
KZN242: Nquthu Local Municipality		496	29	143	28	302	329	200	153	5,177	44	6,901	2,481	515	16,042	25,937
KZN244: Msinga Local Municipality		181	8	61	21	31	86	64	162	2,881	22	3,517	1,447	351	13,811	19,126
Endumeni/Nquthu/Msinga SUBTOTAL	**50501**	**1,419**	**96**	**531**	**98**	**537**	**760**	**460**	**631**	**10,321**	**277**	**15,131**	**5,759**	**1,619**	**32,777**	**55,286**
KZN245: Umvoti Local Municipality	50502	4,703	31	1,019	12	420	590	190	635	2,511	231	10,343	3,958	1,180	8,706	24,188
KZN - DC24 Umzinyathi District Municipality		**6,123**	**128**	**1,550**	**110**	**957**	**1,350**	**651**	**1,266**	**12,832**	**508**	**25,474**	**9,717**	**2,799**	**41,484**	**79,474**
%		**24.0%**	**0.5%**	**6.1%**	**0.4%**	**3.8%**	**5.3%**	**2.6%**	**5.0%**	**50.4%**	**2.0%**	**100.0%**				
%												**32%**	**12%**	**4%**	**52%**	**100%**
KZN252: Newcastle Local Municipality		1,539	168	28,034	861	3,875	8,434	4,146	9,902	18,003	1,353	76,316	34,402	6,281	33,190	150,189
KZN253: Utrecht Local Municipality		1,810	200	81	8	34	28	22	114	1,687	36	4,019	623	611	1,614	6,867
KZN254: Dannhauser Local Municipality		540	848	927	71	231	414	163	334	2,234	142	5,904	2,868	957	17,339	27,067
KZN - DC25 Amajuba District Municipality	**50601**	**3,889**	**1,216**	**29,042**	**941**	**4,139**	**8,875**	**4,332**	**10,350**	**21,924**	**1,530**	**86,239**	**37,893**	**7,849**	**52,143**	**184,123**
%		**4.5%**	**1.4%**	**33.7%**	**1.1%**	**4.8%**	**10.3%**	**5.0%**	**12.0%**	**25.4%**	**1.8%**	**100.0%**				
%												**47%**	**21%**	**4%**	**28%**	**100%**
KZN261: eDumbe Local Municipality		2,594	89	622	141	293	572	217	409	1,723	82	6,741	2,733	791	5,958	16,223
KZN262: uPhongolo Local Municipality		1,203	53	307	26	181	315	55	190	2,371	102	4,804	2,640	807	7,515	15,766
KZN263: Abaqulusi Local Municipality		4,992	927	1,010	221	863	1,537	980	1,531	7,742	352	20,154	7,250	2,739	16,043	46,186
KZN265: Nongoma Local Municipality		278	104	60	24	202	97	53	204	4,352	31	5,405	1,803	521	17,851	25,580
KZN266: Ulundi Local Municipality		497	242	225	30	387	447	210	771	10,269	289	13,367	2,363	1,097	18,616	35,443
KZN - DC26 Zululand District Municipality	**50701**	**9,564**	**1,416**	**2,224**	**442**	**1,926**	**2,967**	**1,516**	**3,106**	**26,455**	**856**	**50,471**	**16,789**	**5,955**	**65,983**	**139,199**
%		**18.9%**	**2.8%**	**4.4%**	**0.9%**	**3.8%**	**5.9%**	**3.0%**	**6.2%**	**52.4%**	**1.7%**	**100.0%**				
%												**36%**	**12%**	**4%**	**47%**	**100%**
KZN271: Umhlabuyalingana Local Municipality		605	50	130	31	110	196	82	352	3,932	605	6,094	2,132	594	8,894	17,713
KZN272: Jozini Local Municipality		658	75	135	31	111	189	83	370	4,682	745	7,079	2,268	730	10,354	20,432
KZN273: The Big Five False Bay Local Municipality		292	2	46	13	40	69	28	81	935	119	1,625	1,009	125	909	3,668
KZN274: Hlabisa Local Municipality		4,615	71	681	105	502	564	337	416	5,973	643	13,907	4,009	969	19,053	37,938
KZN275: Mtubatuba Local Municipality		545	40	128	16	88	100	64	85	741	81	1,888	1,263	179	657	3,986
KZNDMA27: St Lucia Park District Management Area		154	4	33	5	25	37	18	45	432	58	812	374	103	2,230	3,518
KZN - DC27 Umkhanyakude District Municipality	**50801**	**6,868**	**242**	**1,153**	**202**	**877**	**1,154**	**614**	**1,350**	**16,695**	**2,251**	**31,405**	**11,056**	**2,700**	**42,095**	**87,256**
%		**21.9%**	**0.8%**	**3.7%**	**0.6%**	**2.8%**	**3.7%**	**2.0%**	**4.3%**	**53.2%**	**7.2%**	**100.0%**				
%												**36%**	**13%**	**3%**	**48%**	**100%**
KZN281: Mbonambi Local Municipality		1,856	2,211	6,961	306	4,069	4,723	3,666	5,047	4,971	622	34,432	8,489	1,932	14,675	59,528
KZN282: uMhlathuze Local Municipality		4,620	2,918	12,221	473	6,839	7,042	5,331	7,840	10,755	1,138	59,177	15,242	3,518	9,874	87,811
KZN283: Ntambanana Local Municipality		1,372	802	2,863	138	1,589	1,893	1,435	1,924	2,314	325	14,656	3,804	959	10,909	30,329
Mbonambi /uMhlathuze/Ntambanana SUBTOTAL	**52901**	**7,848**	**5,932**	**22,045**	**917**	**12,497**	**13,657**	**10,433**	**14,812**	**18,040**	**2,084**	**108,265**	**27,536**	**6,409**	**35,458**	**177,668**
KZN284: uMlalazi Local Municipality		3,963	337	6,864	164	1,509	1,565	677	1,868	8,127	485	25,560	8,422	1,710	32,598	68,289
KZN285: Mthonjaneni Local Municipality		950	0	419	36	152	229	140	140	698	136	2,899	1,281	233	1,399	5,812
KZN286: Nkandla Local Municipality		264	0	41	9	39	71	23	63	3,502	76	4,087	994	387	10,236	15,704
uMlalazi/Mthonjaneni Nkandla SUBTOTAL	**50902**	**5,177**	**338**	**7,324**	**209**	**1,700**	**1,865**	**840**	**2,070**	**12,327**	**697**	**32,546**	**10,697**	**2,330**	**44,232**	**89,805**
KZN - DC28 Uthungulu District Municipality		**13,025**	**6,270**	**29,369**	**1,126**	**14,197**	**15,522**	**11,273**	**16,882**	**30,367**	**2,781**	**140,811**	**38,233**	**8,738**	**79,690**	**267,473**
%		**9.2%**	**4.5%**	**20.9%**	**0.8%**	**10.1%**	**11.0%**	**8.0%**	**12.0%**	**21.6%**	**2.0%**	**100.0%**				
%												**53%**	**14%**	**3%**	**30%**	**100%**
KZN291: Mandeni Local Municipality		3,155	129	3,659	89	893	1,020	442	1,126	3,789	274	14,576	6,174	1,271	9,672	31,693
KZN292: KwaDukuza Local Municipality		12,800	0	12,306	203	3,682	5,530	2,324	5,292	4,509	634	47,280	16,793	3,401	7,605	75,080
KZN293: Ndwedwe Local Municipality		2,497	3	1,046	30	418	550	291	530	3,408	110	8,884	4,311	838	32,359	46,392
KZN294: Maphumulo Local Municipality		1,380	1	624	0	472	157	153	378	2,183	146	5,493	3,656	393	16,591	26,132
KZN - DC29 iLembe District Municipality	**51001**	**19,832**	**134**	**17,634**	**323**	**5,466**	**7,256**	**3,210**	**7,325**	**13,889**	**1,165**	**76,234**	**30,934**	**5,902**	**66,227**	**179,297**
%		**26.0%**	**0.2%**	**23.1%**	**0.4%**	**7.2%**	**9.5%**	**4.2%**	**9.6%**	**18.2%**	**1.5%**	**100.0%**				
%												**43%**	**17%**	**3%**	**37%**	**100%**
KZN431: Ingwe Local Municipality		2,004	0	410	26	195	322	160	229	2,354	29	5,729	2,103	676	8,976	17,485
Ingwe/Greater Kokstad/UbuhlebezweUmzimkhulu SU	**51102**	**9,123**	**59**	**1,761**	**145**	**1,104**	**1,667**	**512**	**823**	**12,760**	**470**	**28,424**	**11,031**	**3,736**	**32,041**	**75,232**
KZN432: Kwa Sani Local Municipality	51101	1,828	0	264	0	15	385	84	140	638	63	3,419	2,026	556	1,079	7,079
KZN433: Greater Kokstad Local Municipality		3,535	0	74	62	45	316	28	138	2,900	163	7,262	967	1,752	2,341	12,322
KZN434: Ubuhlebezwe Local Municipality		2,125	0	440	14	1	250	172	261	1,969	98	5,330	3,993	460	5,875	15,657
KZN435: Umzimkhulu Local Municipality		1,458	59	837	42	863	779	152	194	5,538	181	10,103	3,968	847	14,849	29,768
KZN - DC43 Sisonke District Municipality		**10,951**	**59**	**2,025**	**145**	**1,119**	**2,052**	**596**	**964**	**13,398**	**534**	**31,843**	**13,057**	**4,292**	**33,120**	**82,311**
%		**34.4%**	**0.2%**	**6.4%**	**0.5%**	**3.5%**	**6.4%**	**1.9%**	**3.0%**	**42.1%**	**1.7%**	**100.0%**				
%												**39%**	**16%**	**5%**	**40%**	**100%**
METRO (Link City)	50101	659	16	2,896	544	19,297	3,752	8,101	4,385	43,584	8,876	92,109	20,011	7,835	89,046	209,001
METRO (Hammarsdale / Hillcrest)	50102	9,880	239	2,896	94	1,135	1,876	755	2,192	10,070	341	29,479	6,404	828	20,069	56,780
METRO (Durban / Pinetown)	50103	0	0	72,392	1,204	43,134	56,277	10,574	21,923	43,303	8,535	257,341	55,908	31,842	80,951	426,043
METRO (Tongaat / Dube)	50104	696	25	49,227	579	11,351	24,387	17,816	2,192	19,044	6,828	132,144	28,709	16,864	23,748	201,465
METRO (CBD / Port)	50105	49	0	150,576	6,456	31,783	86,291	22,317	184,154	56,267	1,707	539,599	117,230	17,559	23,604	697,993
METRO (Amanzimtoti / Umgababa)	50106	696	16	11,583	174	5,675	9,379	10,574	2,192	9,276	1,707	51,272	11,139	2,078	18,413	82,902
METRO (Umbumbulu / Umlazi)	50107	1,317	22	0	360	1,135	5,628	12,631	2,192	25,123	6,145	54,554	11,852	3,730	51,471	121,607
KZN - eThekwini Metropolitan Municipality		**13,297**	**318**	**289,569**	**9,411**	**113,509**	**187,590**	**82,768**	**219,231**	**206,667**	**34,139**	**1,156,499**	**251,254**	**80,736**	**307,303**	**1,795,791**
%		**1.1%**	**0.0%**	**25.0%**	**0.8%**	**9.8%**	**16.2%**	**7.2%**	**19.0%**	**17.9%**	**3.0%**	**100.0%**				
%												**64%**	**14%**	**4%**	**17%**	**100%**
KZN TOTAL		**125,816**	**10,815**	**430,433**	**17,372**	**167,134**	**274,154**	**121,633**	**309,273**	**445,356**	**53,819**	**1,955,804**	**527,089**	**158,641**	**930,797**	**3,572,331**
%		**6.4%**	**0.6%**	**22.0%**	**0.9%**	**8.5%**	**14.0%**	**6.2%**	**15.8%**	**22.8%**	**2.8%**	**100.0%**				
%												**55%**	**15%**	**4%**	**26%**	**100%**

Source: Global Insight SA, 2008

KZN Employment by Main Industries, 2050

		2050														
NAME	TRAFFIC ZONE NO	Agriculture, Hunting, Forestry, Fishing	Mining , Quarrying	Manufacturing	Electricity, gas, water	Construction	Wholesale, Retail,Catering, Accomodation	Transport, Storage, Communication	Finance, Insurance, Real estate, Business	Community, Social, Personal services	Other service activities	Total Formal	Informal	Domestic	Unemployed	TOTAL JOBS
KZN211: Vulamehlo Local Municipality		1,518	3	870	72	356	553	209	500	4,077	240	8,398	2,304	1,001	10,482	22,185
KZN212: Umdoni Local Municipality		1,149	1	1,339	55	526	833	301	823	2,322	172	7,522	4,858	799	822	14,001
KZN213: Umzumbe Local Municipality		3,864	76	3,099	225	1,752	3,009	886	2,531	6,961	604	23,006	8,601	3,367	13,223	48,197
KZN214: uMuziwabantu Local Municipality		1,033	20	970	39	258	1,092	255	285	2,581	46	6,580	2,638	503	1,347	11,068
KZN215: Ezinguleni Local Municipality		562	16	626	31	266	798	179	325	1,343	49	4,197	2,065	423	1,655	8,340
KZN216: Hibiscus Coast Local Municipality		7,058	459	6,825	848	8,065	13,454	2,700	10,905	13,932	1,793	66,039	25,138	7,024	5,088	103,289
KZN - DC21 Ugu District Municipality	**50201**	**15,184**	**575**	**13,729**	**1,270**	**11,222**	**19,741**	**4,530**	**15,370**	**31,216**	**2,904**	**115,742**	**45,603**	**13,117**	**32,617**	**207,079**
%		**13.1%**	**0.5%**	**11.9%**	**1.1%**	**9.7%**	**17.1%**	**3.9%**	**13.3%**	**27.0%**	**2.5%**	**100.0%**				
%												**56%**	**22%**	**6%**	**16%**	**100%**
KZN221: uMshwathi Local Municipality		7,333	104	4,372	128	653	984	562	1,292	3,936	265	19,628	6,474	1,359	5,204	32,665
KZN222: uMngeni Local Municipality		3,139	29	3,764	278	1,391	1,989	726	3,319	6,326	649	21,611	7,527	2,788	2,517	34,443
KZN223: Mooi Mpofana Local Municipality		3,155	1	823	71	217	721	259	331	1,591	275	7,445	1,867	662	331	10,304
KZN224: Impendle Local Municipality		1,492	0	126	1	244	229	53	195	1,202	140	3,682	1,598	283	2,347	7,911
KZN225: The Msunduzi Local Municipality		3,461	212	28,107	2,851	15,036	25,266	9,528	38,593	62,390	5,701	191,145	46,583	16,783	29,409	283,920
KZN226: Mkhambathini Local Municipality		1,984	9	1,475	156	583	1,013	399	1,474	3,366	366	10,825	2,799	1,001	2,543	17,167
KZN227: Richmond Local Municipality		4,449	4	701	129	183	439	174	854	2,796	258	9,987	3,758	910	3,827	18,482
KZN - DC22 uMgungundlovu District Municipality	**50301**	**25,013**	**359**	**39,369**	**3,614**	**18,308**	**30,640**	**11,700**	**46,059**	**81,606**	**7,654**	**264,322**	**70,607**	**23,787**	**46,177**	**404,893**
%		**9.5%**	**0.1%**	**14.9%**	**1.4%**	**6.9%**	**11.6%**	**4.4%**	**17.4%**	**30.9%**	**2.9%**	**100.0%**				
%												**65%**	**17%**	**6%**	**11%**	**100%**
KZN232: Emnambithi-Ladysmith Local Municipality		1,428	21	10,404	460	3,891	5,831	4,081	6,575	13,927	1,169	47,787	20,157	3,688	4,654	76,286
KZN233: Indaka Local Municipality		1,182	48	1,998	114	1,197	1,803	1,038	1,716	5,341	472	14,908	4,517	1,840	7,649	28,914
KZN234: Umtshezi Local Municipality		536	4	858	74	319	732	178	482	2,078	118	5,378	2,041	594	850	8,863
KZN235: Okhahlamba Local Municipality		1,411	1	510	307	318	643	201	575	3,642	142	7,750	4,083	589	3,243	15,665
KZN236: Imbabazane Local Municipality		1,018	10	2,194	192	647	1,868	470	1,273	4,925	260	12,857	4,518	1,308	6,930	25,614
Emnambithi/Indaka/Umtshezi/ Imbabazane /Okhahla	**50401**	**5,433**	**84**	**15,911**	**1,117**	**6,340**	**10,485**	**5,946**	**10,562**	**29,550**	**2,147**	**87,576**	**34,908**	**7,961**	**23,003**	**153,447**
KZN235: Okhahlamba Local Municipality (excluding Gaints Castle Ga		1,269	1	459	276	286	251	181	517	3,278	128	6,646	3,675	530	2,919	13,770
KZNDMA23: Giants Castle Game Reserve	50402	141	0	51	31	32	393	20	57	364	14	1,103	408	59	324	1,895
KZN - DC23 Uthukela District Municipality		**5,574**	**84**	**15,962**	**1,147**	**6,372**	**10,878**	**5,966**	**10,620**	**29,914**	**2,162**	**88,679**	**35,316**	**8,019**	**23,327**	**155,342**
%		**6.3%**	**0.1%**	**18.0%**	**1.3%**	**7.2%**	**12.3%**	**6.7%**	**12.0%**	**33.7%**	**2.4%**	**100.0%**				
%												**57%**	**23%**	**5%**	**15%**	**100%**
KZN241: Endumeni Local Municipality		782	53	389	62	285	439	254	444	3,003	258	5,968	2,348	851	1,032	10,200
KZN242: Nquthu Local Municipality		524	26	169	36	423	413	257	218	7,059	54	9,178	3,181	633	4,987	17,980
KZN244: Msinga Local Municipality		197	8	73	27	46	114	85	245	4,136	28	4,957	1,856	428	4,298	11,539
Endumeni/Nquthu/Msinga SUBTOTAL	**50501**	**1,504**	**86**	**630**	**124**	**753**	**966**	**596**	**906**	**14,198**	**340**	**20,104**	**7,385**	**1,913**	**10,318**	**39,720**
KZN245: Umvoti Local Municipality	50502	5,199	29	1,213	15	614	759	259	948	3,502	297	12,835	5,076	1,351	4,419	23,681
KZN - DC24 Umzinyathi District Municipality		**6,703**	**115**	**1,843**	**140**	**1,367**	**1,725**	**855**	**1,854**	**17,701**	**637**	**32,939**	**12,461**	**3,264**	**14,737**	**63,401**
%		**20.3%**	**0.3%**	**5.6%**	**0.4%**	**4.2%**	**5.2%**	**2.6%**	**5.6%**	**53.7%**	**1.9%**	**100.0%**				
%												**52%**	**20%**	**5%**	**23%**	**100%**
KZN252: Newcastle Local Municipality		1,679	188	34,927	1,118	5,602	10,988	5,527	14,686	25,089	1,716	101,520	44,118	7,386	14,600	167,624
KZN253: Utrecht Local Municipality		1,838	170	97	10	46	34	28	157	2,060	42	4,481	799	749	519	6,548
KZN254: Dannhauser Local Municipality		625	814	1,241	98	354	569	231	525	3,346	191	7,995	3,678	1,243	8,339	21,254
KZN - DC25 Amajuba District Municipality	**50601**	**4,141**	**1,171**	**36,265**	**1,226**	**6,002**	**11,592**	**5,785**	**15,368**	**30,496**	**1,949**	**113,996**	**48,595**	**9,379**	**23,457**	**195,427**
%		**3.6%**	**1.0%**	**31.8%**	**1.1%**	**5.3%**	**10.2%**	**5.1%**	**13.5%**	**26.8%**	**1.7%**	**100.0%**				
%												**58%**	**25%**	**5%**	**12%**	**100%**
KZN261: eDumbe Local Municipality		2,671	77	729	173	399	686	272	559	2,319	98	7,984	3,505	956	2,106	14,551
KZN262: uPhongolo Local Municipality		1,212	43	345	31	242	380	68	257	3,139	119	5,836	3,386	945	2,550	12,716
KZN263: Abaqulusi Local Municipality		5,281	815	1,216	278	1,210	1,951	1,263	2,210	10,501	433	25,160	9,298	3,336	6,210	44,004
KZN265: Nongoma Local Municipality		303	81	76	31	292	128	71	307	6,168	40	7,498	2,313	636	5,903	16,349
KZN266: Ulundi Local Municipality		514	207	261	37	531	555	266	1,093	13,103	347	16,913	3,030	1,356	6,313	27,612
KZN - DC26 Zululand District Municipality	**50701**	**9,982**	**1,224**	**2,627**	**551**	**2,675**	**3,700**	**1,940**	**4,427**	**35,229**	**1,037**	**63,391**	**21,531**	**7,228**	**23,082**	**115,233**
%		**15.7%**	**1.9%**	**4.1%**	**0.9%**	**4.2%**	**5.8%**	**3.1%**	**7.0%**	**55.6%**	**1.6%**	**100.0%**				
%												**55%**	**19%**	**6%**	**20%**	**100%**
KZN271: Umhlabuyalingana Local Municipality		542	34	132	33	131	211	90	435	4,526	630	6,763	2,734	681	2,965	13,143
KZN272: Jozini Local Municipality		589	50	137	34	132	203	91	457	5,391	775	7,858	2,909	811	3,305	14,883
KZN273: The Big Five False Bay Local Municipality		272	2	49	14	49	77	32	104	1,119	129	1,848	1,294	143	486	3,771
KZN274: Hlabisa Local Municipality		4,475	58	736	121	645	647	400	542	7,400	726	15,750	5,142	1,216	7,043	29,150
KZN275: Mtubatuba Local Municipality		598	44	158	21	129	130	86	125	1,039	104	2,434	1,620	181	193	4,428
KZNDMA27: St Lucia Park District Management Area		206	5	49	9	45	59	30	83	741	90	1,316	480	127	926	2,849
KZN - DC27 Umkhanyakude District Municipality	**50801**	**6,682**	**192**	**1,260**	**232**	**1,130**	**1,327**	**729**	**1,747**	**20,215**	**2,454**	**35,969**	**14,178**	**3,160**	**14,917**	**68,224**
%		**18.6%**	**0.5%**	**3.5%**	**0.6%**	**3.1%**	**3.7%**	**2.0%**	**4.9%**	**56.2%**	**6.8%**	**100.0%**				
%												**53%**	**21%**	**5%**	**22%**	**100%**
KZN281: Mbonambi Local Municipality		2,066	2,576	9,012	405	6,001	6,263	4,969	7,656	7,054	805	46,808	10,887	2,212	7,686	67,594
KZN282: uMhlathuze Local Municipality		4,952	3,266	14,980	604	9,718	9,003	6,962	11,414	14,874	1,418	77,192	19,547	3,651	2,760	103,150
KZN283: Ntambanana Local Municipality		1,515	927	3,644	181	2,326	2,484	1,930	2,892	3,264	418	19,580	4,879	1,136	5,039	30,634
Mbonambi /uMhlathuze/Ntambanana SUBTOTAL	**52901**	**8,533**	**6,769**	**27,636**	**1,191**	**18,045**	**17,750**	**13,862**	**21,961**	**25,192**	**2,640**	**143,580**	**35,313**	**7,000**	**15,486**	**201,378**
KZN284: uMlalazi Local Municipality		4,388	392	8,510	217	2,216	2,076	914	2,826	11,598	625	33,762	10,801	2,134	15,052	61,749
KZN285: Mthonjaneni Local Municipality		986	0	472	44	209	276	177	193	932	164	3,454	1,643	271	494	5,861
KZN286: Nkandla Local Municipality		284	0	47	11	55	93	31	94	4,935	95	5,647	1,275	512	3,213	10,647
uMlalazi/Mthonjaneni Nkandla SUBTOTAL	**50902**	**5,659**	**392**	**9,028**	**273**	**2,480**	**2,445**	**1,123**	**3,113**	**17,465**	**884**	**42,862**	**13,718**	**2,917**	**18,759**	**78,257**
KZN - DC28 Uthungulu District Municipality		**14,192**	**7,162**	**36,665**	**1,464**	**20,525**	**20,195**	**14,985**	**25,074**	**42,657**	**3,524**	**186,442**	**49,032**	**9,917**	**34,245**	**279,635**
%		**7.6%**	**3.8%**	**19.7%**	**0.8%**	**11.0%**	**10.8%**	**8.0%**	**13.4%**	**22.9%**	**1.9%**	**100.0%**				
%												**67%**	**18%**	**4%**	**12%**	**100%**
KZN291: Mandeni Local Municipality		3,469	149	4,497	116	1,303	1,339	595	1,686	5,366	351	18,871	7,918	1,431	4,600	32,820
KZN292: KwaDukuza Local Municipality		14,066	0	15,082	266	5,366	7,226	3,141	7,868	6,337	811	60,162	21,536	3,646	3,417	88,761
KZN293: Ndwedwe Local Municipality		3,123	3	1,461	45	693	822	446	904	5,526	160	13,184	5,529	1,097	17,481	37,290
KZN294: Maphumulo Local Municipality		1,621	1	731	1	734	223	218	614	3,341	200	7,684	4,688	505	8,631	21,508
KZN - DC29 iLembe District Municipality	**51001**	**22,279**	**153**	**21,772**	**428**	**8,096**	**9,610**	**4,400**	**11,072**	**20,570**	**1,521**	**99,902**	**39,671**	**6,678**	**34,129**	**180,379**
%		**22.3%**	**0.2%**	**21.8%**	**0.4%**	**8.1%**	**9.6%**	**4.4%**	**11.1%**	**20.6%**	**1.5%**	**100.0%**				
%												**55%**	**22%**	**4%**	**19%**	**100%**
KZN431: Ingwe Local Municipality		2,056	0	465	32	265	395	199	322	3,067	35	6,836	2,697	804	3,038	13,375
Ingwe/Greater Kokstad/UbuhlebezweUmzimkhulu SU	**51102**	**9,437**	**53**	**2,047**	**179**	**1,548**	**2,097**	**655**	**1,163**	**17,130**	**571**	**34,880**	**14,146**	**4,269**	**11,785**	**65,080**
KZN432: Kwa Sani Local Municipality	51101	2,006	0	312	0	21	505	117	211	894	81	4,148	2,598	645	648	8,039
KZN433: Greater Kokstad Local Municipality		3,584	0	78	75	61	377	35	187	3,683	192	8,273	1,240	1,838	364	11,714
KZN434: Ubuhlebezwe Local Municipality		2,239	0	514	18	1	315	220	377	2,720	120	6,523	5,120	567	2,322	14,533
KZN435: Umzimkhulu Local Municipality		1,558	53	990	54	1,221	1,010	201	277	7,661	224	13,249	5,089	1,060	6,061	25,458
KZN - DC43 Sisonke District Municipality		**11,443**	**53**	**2,359**	**179**	**1,570**	**2,602**	**772**	**1,374**	**18,024**	**652**	**39,028**	**16,745**	**4,913**	**12,433**	**73,119**
%		**29.3%**	**0.1%**	**6.0%**	**0.5%**	**4.0%**	**6.7%**	**2.0%**	**3.5%**	**46.2%**	**1.7%**	**100.0%**				
%												**53%**	**23%**	**7%**	**17%**	**100%**
METRO (Link City)	50101	725	18	3,614	716	28,173	4,907	10,974	6,558	62,855	11,370	129,911	26,630	7,858	31,953	196,351
METRO (Hammarsdale / Hillcrest)	50102	10,881	263	3,614	123	1,657	4,907	1,020	3,279	14,257	437	40,439	8,289	817	7,090	56,636
METRO (Durban / Pinetown)	50103	0	0	90,355	1,582	62,974	73,612	14,282	32,792	60,909	10,933	347,439	71,221	31,483	28,637	478,779
METRO (Tongaat / Dube)	50104	765	28	86,741	760	16,572	34,352	14,282	3,279	27,700	8,746	193,226	39,609	17,069	14,047	263,951
METRO (CBD / Port)	50105	53	0	162,639	8,462	46,402	103,057	39,624	275,451	73,094	2,187	710,970	145,740	17,298	13,589	887,597
METRO (Amanzimtoti / Umgababa)	50106	765	18	14,457	229	8,286	14,722	14,282	3,279	13,276	2,187	71,501	14,657	2,076	6,582	94,815
METRO (Umbumbulu / Umlazi)	50107	1,451	25	0	474	1,657	9,815	17,179	3,279	36,646	7,872	78,397	16,070	4,188	18,677	117,332
KZN - eThekwini Metropolitan Municipality		**14,639**	**350**	**361,420**	**12,347**	**165,722**	**245,375**	**111,644**	**327,918**	**288,737**	**43,731**	**1,571,882**	**322,216**	**80,789**	**120,575**	**2,095,462**
%		**0.9%**	**0.0%**	**23.0%**	**0.8%**	**10.5%**	**15.6%**	**7.1%**	**20.9%**	**18.4%**	**2.8%**	**100.0%**				
%												**75%**	**15%**	**4%**	**6%**	**100%**
KZN TOTAL		**135,833**	**11,439**	**533,271**	**22,597**	**242,988**	**357,384**	**163,307**	**460,883**	**616,365**	**68,226**	**2,612,292**	**675,955**	**170,250**	**379,697**	**3,838,194**
%		**5.2%**	**0.4%**	**20.4%**	**0.9%**	**9.3%**	**13.7%**	**6.3%**	**17.6%**	**23.6%**	**2.6%**	**100.0%**				
%												**68%**	**18%**	**4%**	**10%**	**100%**

Source: Global Insight SA, 2008