

# THE CONTRIBUTION OF DISTRICT FREIGHT LOGISTICS STRATEGY TO LOCAL AND REGIONAL ECONOMIC DEVELOPMENT IN VHEMBE DISTRICT MUNICIPALITY: EXPERIENCES, PROSPECTS AND OPTIONS

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## ABSTRACT

Vhembe District Municipality's economy is largely based on agriculture, agribusiness, mining and forestry, wholesale and retail. Improved freight transport can effectively enhance socio-economic development and job creation in the area. Consequently, in 2012, Vhembe District Municipality (VDM) commissioned a study for the development of the District Freight Logistics Strategy. The key objective of the study was to unpack freight logistics operations in the District and to inform the District of the freight situation in terms of type, origin and destination of freight products, condition and capacity of key corridors and intervention measures required to address any bottlenecks. The argument presented in this paper is that the District could, with a clear freight strategy and action plan, become the most important gateway of general cargo at Musina servicing Zimbabwe, Botswana in the West, Zambia and further countries in central, eastern and northern parts of Africa. The outcome of the study is the positioning of the district to manage in a sustainable manner current and future freight demand across all modes in support of the broad goals of social-economic development.

### Key Words

*Freight logistics, strategy, interventions, region, Vhembe District Municipality*

## 1.0 INTRODUCTION

Traditionally, far more attention has been given to passenger travel than freight logistics in transport planning. This may have led, in part, to the stakeholders' perception that freight needs have not been fully considered. A closer dialogue is therefore required between passenger and freight modes in assessing the options of transport improvements, particularly on those road bottlenecks which have high proportions of lorries and vans, and in planning surface access to freight hubs for rail, air and shipping. In addition, freight logistics strategy planning has over the years not been comprehensively considered in Transportation Planning processes despite the fact that freight transportation system has essentially been a crucial element of successful economies in the world (Institute of Highways and Transportation, 2005). With respect to freight logistics funding, South Africa, national, provinces and municipalities, are faced with an imperative need for a paradigm shift as to:

- Use public funds to finance freight infrastructure projects or funding partnership between the public and private sector;
- Incorporate proactively, the private sector into planning processes; and
- Streamline environmental approval processes into planning to reduce delays.

Nevertheless, the South African transport planning regime has elevated freight issues in the transportation planning processes but the problem has been implementation and clear incorporation of freight issues into transport projects (National Department of Transport, 2005; 2011). Despite the preceding statements there are several specific issues faced by small and medium sized towns, cities and rural communities in relation to freight transport. Overall, little freight transport research and policy consideration has taken place in small and medium sized cities and rural communities in the past. In most cases, little or no resource is available in small and medium sized cities and rural communities for freight specific actions. This often means that there is no contact point within these authorities for logistics operators and other stakeholders. There is often relatively little co-operation between small/medium cities, and between such cities and the larger regional or national institutions concerning freight transport. Also, there is typically little awareness of freight issues in small/medium towns, cities and rural communities. Considering the arguments just presented in the section above, it becomes imperative to conduct a study that seeks to locate the contribution of district freight logistics strategy to local and regional economic development.

## 1.1 Background

The purpose of the development of the Freight Logistics Strategy was to inform the Vhembe District Municipality (VDM) of the freight situation in terms of type, origin and destination of freight products, condition and capacity of key corridors, and intervention measures required to address any bottlenecks that might be there. The Freight Logistics Strategy takes into account the complete supply and value chain processes involved in freight goods movement from, intra, inter and through the district. VDM is faced with the following freight logistics challenges, namely:

- Extensive through freight traffic that adds little value to the District;
- Infiltration of trucking on the district road network which has considerable negative impact on road network condition and life span;
- Extensive use of head loading, back loading, animal drawn cart loaded freight transport;
- Limited freight forwarding businesses and systems;
- Fragmented responsibility for freight planning and lack of logistics infrastructure;
- Formal and informal economy that leads to dualistic logistics divide;
- Poor access to markets that results in high freight transport and logistical costs;
- Under developed rural freight markets; and
- Lack of an appropriate freight institutional Structures among other challenges.

These challenges are not unique to VDM and the similarities are arguably captured in the Rural Transport Strategy and Action Plan (RTSSA) of 2007-2014. The RTSSA, similar and related research conducted in South Africa poignantly points to the need to go “beyond roads” and to look at innovative ways of improving passenger and freight transport (Mashiri & Naude, 2006; Chakwizira et al., 2008; Chakwizira & Mashiri, 2009; 2012). With regard to rail freight VDM is least serviced by even the rail line that goes through Makhado to Musina.

## **1.2 Aim of paper**

The aim of this paper is to argue that with a clear freight strategy and action plan, VDM can transform itself into the most important gateway of general cargo at Musina servicing Zimbabwe, western parts of Botswana, Zambia and further countries in central, eastern and northern parts of Africa.

### *1.2.1 Justification for generating a freight strategy in VDM*

The VDM freight strategy is to provide a focus for better partnership in terms of working with local people and industry itself to:

- Identify and understand the nature and requirements of local freight activity;
- Establish as far as possible a preferred freight route network (FRN); and
- Agree on the most appropriate ways to reduce the negative impacts of freight movement without moving problems elsewhere.

### *1.2.2 Scope of paper*

The paper discusses the VDM freight logistics strategy with a view to assessing the levels of efficiency, effectiveness and sustainability that freight infrastructure and services play in socio-economic development of Vhembe District in particular and Limpopo Province in general. The freight logistics strategy is presented as a fulcrum in facilitating sustainable management of current and future freight demands and supply across all modes. This discussion provides a framework that guides and shapes investment in freight transportation and logistics, freight policy development, implementation and review including presenting reactive and strategic freight transport planning levers and options. Overall, the strategy is a tool to gauge the current logistics supply chain management systems opportunities and gaps including addressing the need for the integration of different freight modes.

## **1.3 Study area**

Vhembe District Municipality (VDM) is one of the five district municipalities of Limpopo Province. The District is located in the northern part of Limpopo. It shares the border with Capricorn and Mopani District Municipalities in the southern and eastern directions of the Province. The District also shares the border with Zimbabwe in the north and Botswana in the west as well as Kruger National Park in east. The district is estimated to be 21 407 square km in size and home to a population of around 1.2 million people (StatsSA, 2012).

## **2.0 RESEARCH METHODS**

A mixed research methodology was adopted. Primary data collection and secondary data sources were utilised to maximise data and information returns for detailed analysis. Secondary data sources reviewed included government policies, transport and development plans, logistics market and industry strategies. Literature on latest global logistics practices was also investigated and analyzed with a view to benchmarking project approach, methodology and deliverables.

Table 1 presents a synthesis of the research methodology and instruments used in the project.

**Table 1: research methodology and instruments**

<b>Instrument</b>	<b>Targeted Unit or Group</b>	<b>Motivation</b>
Questionnaire Interviews	<ul style="list-style-type: none"> <li>• Companies operating in the Vhembe District</li> </ul>	<ul style="list-style-type: none"> <li>• To determine the main business of the Company, the type and quantity of incoming freight and the mode of transport used to transport the incoming freight.</li> <li>• Identify main suppliers of the Company.</li> <li>• Establish type and quantity of the outgoing freight and main recipients of such out-bound freight.</li> <li>• Classify mode of transport used to transport in-bound and out-bound freight.</li> <li>• Company freight truck ownership or otherwise.</li> </ul>
	<ul style="list-style-type: none"> <li>• Truck drivers in Makhado, Thohoyandou, Levubu and Masisi.</li> </ul>	<ul style="list-style-type: none"> <li>• Data was collected using standard coding that was analysed to give traffic flow volumes by direction, by time of day, vehicle groups, types, commodities, containers and dangerous goods categories.</li> </ul>
Stakeholder Consultation	<ul style="list-style-type: none"> <li>• Freight Industry Clusters (Mining, Farming, Industry, Business, Forestry, Tourism, Road &amp; Rail Operators)</li> </ul>	<ul style="list-style-type: none"> <li>• Solicit issues, challenges and potential solutions to tackle freight transport matters in VDM in particular, the Province and Nation at large.</li> <li>• Mapping cargo movement, distribution, origin and destination including identifying the major freight generators in the District.</li> </ul>
Strengths, Weaknesses, Opportunities & Threats (SWOT) Analysis	<ul style="list-style-type: none"> <li>• Freight Corridors</li> <li>• Freight Industry Cluster</li> </ul>	<ul style="list-style-type: none"> <li>• Analysis and profiling of type of freight (loads) along the main corridors.</li> <li>• Analysis of both internally generated and destined as well as through traffic.</li> </ul>

### 3.0 LITERATURE REVIEW

Post 1994 the Department of Transport commissioned a number of transport and policy studies to address not only the freight and public transport policy vacuum but the role that freight transport should play in the socio-economic development in South Africa (NDoT, 2005; NATMAP, 2011). Table 3 presents a synthesis of key national goals in South Africa and their potential contribution from a freight strategy socio-economic development perspective.

**Table 3: some selected national goals and their potential contribution from a freight strategy socio-economic development perspective**

National Goals	Potential contribution from a freight strategy socio-economic development
To support economic competitiveness and growth.	The highway and rail networks are essential for the movement of goods and catering for regeneration and new development.
To reduce transport emissions of carbon dioxide and other greenhouse gases.	Promotion of efficient deliveries and mode shift from road to rail freight. Vehicle enhancements, alternative fuels and eco-driving.
To contribute to better safety, security and health.	Safe, good quality roads, rail, air, sea and parking is essential to drivers and communities well being.
To promote equality of opportunity.	Delivery of goods and services to disadvantaged groups/people can enhance social inclusion.
To improve quality of life and promote a health natural environment.	The allocation of freight routes to minimize social and environmental impacts are fundamental to the quality of life of VDM residents.

Sources: National Department of Transport, 2005; 2011; National Planning Commission, 2011

Table 4 presents a succinct review of mainstream freight logistics concepts/theories that underpinned this study.

**Table 4: review of freight logistics concepts for VDM – best practices and scenario building**

THEORY/CONCEPT	DESCRIPTION
URBAN CONSOLIDATION FREIGHT CONCEPT	Many shops in urban areas receive separate deliveries of small quantities from numerous suppliers. The lorries and vans delivering these orders are often loaded with a small amount of goods, but each vehicle still contributes to congestion in and around town centres. People could perceive opportunities to consolidate retail supplies at depots in the outskirts and thereby rationalise freight movement in towns.
HUB-AND-SPOKE FREIGHT SYSTEMS	When a Thohoyandou -based company wants to send 500kg of goods to a customer in Pretoria, a fast yet economical option to deliver this is through a hub-and-spoke system. A local lorry or van will come and collect the consignment, put it on a pallet, and drive it to a regional depot. During the evening this pallet together with many others from the depot is trunked, often moved by a double-deck articulated lorry to a central hub in the Polokwane. Every night thousands of pallet-loads arrive and they are then sorted by destination. As just-in-time pressures reduce average order sizes, more and more road freight is likely to be distributed through hub-and-spoke networks. While the route is usually more circuitous, the lorry carries far more goods on the road, particularly when trunking. This ensures that the total lorry-miles are lower than they would otherwise be. The development of computer based information systems have made it much easier to organise the loads and lorry movements, improving business efficiency.
DRIVESIM PROJECT: TRAINING OF LORRY DRIVERS	Truck simulators can be used to train and assess lorry drivers. To date, they have mainly been used to train experienced drivers so that their driving styles are safer and fuel efficient. They are particularly useful in creating driving experiences that would be difficult or dangerous to replicate on the road.
COLLABORATIVE LOGISTICS TURN	There is a limit to how much any individual company can do to improve the efficiency of its logistics. To maximize the utilisation of vehicle and warehousing capacity it is often necessary to collaborate with other companies and pool logistical requirements. Many companies have come to realize this, and they have been showing much greater willingness to collaborate. In some sectors, this has been partly a response to just-in-time pressures, which, in the absence of new collaboration, can reduce vehicle load factors. As a result, the companies have cut their logistics costs by 12-15% while responding to retailers' demands for faster and more frequent deliveries.
REVERSE LOGISTICS	Reverse logistics is the movement of products back along the supply chain either to capture what remaining value they have, or for disposal. With the growth of recycling and re-manufacture an increasing proportion of <b>waste products</b> are being channelled through various logistics channels for sorting, assessment and re-processing. A single journey to a landfill site can now be replaced by several movements. This generates new freight trips. In some cases it is possible to backload delivery vehicles with waste, for example cardboard from supermarkets. Often, however, it is necessary to organise separate trips. National and local waste strategies can therefore have a growing impact on freight

	transport. Reverse logistics also applies to the <b>customer return of new products</b> from shops or homes or <b>defective products requiring repair</b> . The growth of online retailing, for example, has increased returned purchases from the home.
TELEMATICS	<b>Telematics</b> , or the use of computers to control and monitor remote devices and systems, has found wide application in the road freight sector. In the UK, thousands of trucks and vans now have onboard tracking, navigation and communication systems. This gives companies greater visibility of their vehicle fleets, allowing them to manage haulage operations in real-time. Satellite navigation assists drivers with vehicle routing, while customers can receive alerts on which vehicles are about to arrive or are subject to delays. A European survey found that 80% of road hauliers using telematics were able to improve reliability and customer service, while 60% had managed to cut transport costs. The use of telematics can be particularly beneficial on congested road networks where it offers advance warning of delays and gives companies the means to direct vehicles after they have set off to avoid bottlenecks.
THE COMPACTTERMINAL CONCEPT	Compactterminal is a new modular design for a low cost, high performance intermodal handling facility, which is capable of handling containers, swap bodies and trailers transported by rail. It can speed up the turnaround of lorries and trains, and facilitate low cost transfers between warehouses, rail terminals and distribution centres. It requires a smaller site area, and thus has less environmental impact than conventional designs.
THIRD PLACES LOGISTICS CONCEPT	It is also essential to acknowledge the emergence of “third places”, flexible centres near housing, transport hubs and public spaces, which can serve as shared workspaces and points for the delivery and collection of goods.
SYSTEMIC FREIGHT LOGISTICS APPROACH AND THEORY	Overall, a systemic freight logistics approach and theory ties the above referred freight logistics concepts together. For example the MDGs, COP 17 and sustainable development targets (for air quality, reducing congestion, reducing the use of raw materials including energy resources) cannot be met if we limit ourselves to optimizing physical resources (infrastructure, vehicles etc.). It is difficult to do without systemic innovations in freight logistics. These new mobility systems that can be characterised as complex (linking automotive technologies with information and communication technologies, energy sources and infrastructure) must be piloted in a variety of territories that are just as complex, with users whose behaviour is evolving. All these solutions reduce the need for travel (home-work, collecting parcels etc.). Applying them involves eliminating obstacles in terms of the ways work, business and the management of people and organisations are arranged.

Sources: Browne et al, 2005; European Shippers Council, 2007a

Ultimately a thorough understanding and description of the freight logistics problems without a freight intervention focus will not help much in solving and reducing theory into practice.

## **4.0 DISCUSSION OF FINDINGS & RESULTS**

### **4.1 Overview**

Limpopo Province forms a vital part of freight logistics in South Africa as it is situated within reach of three neighboring countries (Botswana, Zimbabwe and Mozambique). The Province, however, is faced with a number of challenges which if not addressed will impede the Province from fulfilling its key role as a gateway to Africa. Its strategic position as a potential regional hub brings a set of challenges with a lot of vehicles passing through the Province and using its facilities during the course of delivering goods in Southern Africa. The thriving agricultural and mining industries are the major drivers of freight and logistics sector. This is against the background of poor land based road and rail infrastructure. Big Freight Companies have a healthy presence in the Province, i.e. Value Group, Imperial Logistics etc., but this is not complemented by a comprehensive infrastructure investment strategy. The N1 which is the key transport corridor in Limpopo poses potential road safety challenges in particular after Makhado to Musina. All the identified transport corridors in Limpopo are of mixed use freight, private and some parts carts and the walk mode.

A large proportion (82 %) of the Provincial road network in the Limpopo Province is in the good to fair condition (Limpopo Freight Databank, 2012). The Limpopo provincial land transport framework (PLTF) proposed corridor development along the following corridors that originate, cross or end in the Vhembe District: namely, Polokwane to Makhado to Musina (N1 corridor) and Makhado to Thohoyandou to Kruger National Park (R524). High impact transport initiatives have been developed by the Limpopo Department of Transport aimed at addressing multiple problems affecting the freight industry in the Province. This includes the development of a new rail line – Makhado-Thohoyandou which links Thohoyandou to the main line at Makhado. The freight initiatives that are proposed included the establishment of a regional multimodal logistics hub in Polokwane and satellite hubs in Musina, Tzaneen, Lephalale and Steelpoort / Burgersfort. This connects with the concept of hubs and spokes including inland dry ports. This kind of future direction has also been explored by Chaitoo et al., 2012.

## 4.2 Legislative framework

A review of existing legislative frameworks in South Africa discovered that the impact of freight is not fully considered within either the planning or transport legislative frameworks. Table 5 below provides a summary of the key transport legislation and implications for freight and logistics planning in VDM.

**Table 5: a sample summary of freight and logistics legislative and planning issues in VDM**

<i>Transport Legislation Identity</i>	<i>Implications for freight and logistics planning in VDM</i>
<b>The National Land Transport Act (Act No. 5 2009)</b>	<ul style="list-style-type: none"> <li>• The Constitution and the National Land Transport Act is very clear that Municipalities must prepare a Freight Logistics Strategy.</li> </ul>
<b>National Transport Master Plan (NATMAP 2050)</b>	<ul style="list-style-type: none"> <li>• One of the major causes of concern for provinces in managing the impact of large numbers of freight vehicles on the provinces' roads is the lack of facilities for parking, fuelling, driver rest, ablution and sanitary facilities and the impacts that these have on the environment (The informal truck stops in Makhado, Thohoyandou and Musina are inadequate for the levels of truck traffic).</li> <li>• The National Land Transport Master Plan identified the freight route along the N1 from Polokwane to Musina as one of the main freight routes in South Africa. The route carries 8.6 million tonnes of freight per annum, 73.3 percent by road and 26.7 % by rail.</li> <li>• The major commodities that are transported along the N1, include containers, liquid fuel, coal, copper, asbestos, timber, seasonal freight (fruit).The condition of the rail line from Polokwane to Musina is in a good condition.</li> <li>• There is sufficient spare capacity on the rail line between Polokwane and Musina (only 30 % capacity is used) and also between Musina and Groenbult (50 % of capacity is used).</li> <li>• Exceptional traffic growth is expected on the N1 between Makhado and Musina, route R 524 from Makhado and Thohoyandou and route R 523 between R 521 and R 524.</li> <li>• Additional lane, per direction, required now to remove bottleneck on the N1 Section between Makhado and N1/R525 Junction; on the R37 Section between Polokwane and Lebwakgomo; and on the R524 Section at entry to Thohoyandou from Makhado.</li> <li>• The Musina consolidation and truck stop has been identified as a freight initiative by the Limpopo Department of Transport that should link to the proposed freight hub in Polokwane.</li> </ul>

	<ul style="list-style-type: none"> <li>• Freight Logistics issues in Vhembe include insufficient road signs, no fencing on some sections of the roads, animals roaming on the roads and the accident spot on N1 after Makhado to Musina.</li> <li>• The demand for air freight is too low to justify an air freight service.</li> </ul>
<b>National Freight Logistics Strategy (2005)</b>	<p>Most of the objectives set out in the NFLS are still yet to be achieved, especially at provincial and municipal level. For instance the following shortfalls can be highlighted in VDM:</p> <ul style="list-style-type: none"> <li>• Prior to this study there was no municipal level freight strategy; and</li> <li>• There is no municipal level freight regulatory regime.</li> </ul>

### 4.3 Key economic clusters

According to the VDM local economic development (LED) strategy and integrated development plan (IDP), the economic growth potential of the District lies in the community services, tourism, mining, agriculture and manufacturing sectors. These sectors were also highlighted in the Limpopo Provincial Growth and Development Strategy (LPGDS) as the main contributors to the Province's economic growth. This is critical, given the high rates of unemployment in the district which currently stands at 53%. In addition to this, Statistics SA (2001) pointed out that about 67% of VDM households earn an average income of about R800.00 per month. Thus, there are, generally, high incidences of poverty in the VDM. The labour force in the VDM consists mainly of unskilled workers. This has been attributed to low education levels. The majority of the VDM population relies basically on primary sector (agriculture and mining) work opportunities, which fluctuate seasonally. In line with the Limpopo Provincial GDS, the VDM economic development is influenced by the following seven key economic clusters: the platinum mining cluster; the coal mining and petrochemical cluster; the fruit and vegetable (horticulture) cluster; the logistics cluster; the red and white meat cluster; the tourist sub-clusters; and the forestry cluster.

#### 4.3.1 Mining Cluster

Mining is divided into "the platinum mining cluster and coal mining and petrochemical cluster. Mining areas constitute one of the main employment centres in the VDM area. The most important mineral zones in Vhembe District include: The Beit Bridge Complex / Limpopo Belt; The Tuli, Mopane, Tshipise and Pafuri coal fields; The Tshipise Magnesite Field; The Musina Copper Belt; The Schiel Complex; and The Soutpansberg Group.

### 4.3.2 Agricultural Cluster

Vhembe District is endowed with fertile land. As a result two Agricultural Hubs have been established, namely Luvubu Valley and Nwadeni. Luvubu Valley occupies an estimated 10000ha of arable land and about 6000ha of land is economically active. The Valley produces a variety of sub-tropical fruits including bananas, avocados, mango, papaya as well as citrus like naartjie, lemon, oranges and crops like cabbage etc. The Limpopo Department of Agriculture, according to Vhembe LED, further identified three further hot-spots of potential agricultural hubs; Makhado;Nwadeni ; and Nandoni. According to the VDM spatial development framework (SDF), the Luvuvhu Valley cultivating crops under irrigation, has a turn-over of about R300m per annum and export 80% of their produce in fresh and processed form. The main market is the Gauteng Province.

### 4.3.3 Livestock Cluster

The livestock cluster consists of red and white meat sub-clusters. The red meat sub-cluster includes beef, goat and mutton meat. The white meat consists of poultry, fish and pork. Cattle production in Vhembe is divided into commercial farming and communal farming. Thumela has approximately 70 780 cattle; Makhado has 63 919 cattle; Mutale has 34 018 cattle; Musina has 11 956 while Vhembe has 18 673 cattle (Maneta Calculations, 2009 in VDM, 2013).

A synthesis of the agricultural activity in Vhembe confirms problems facing the farmers as follows:

- Limited access to markets due to poor transportation facilities results in most of the produce from smallholders being sold locally at lower prices;
- The most incurred marketing cost on product is identified as transportation costs;
- When farmers use hired transport they often incurred high transportation costs;
- The quantity of manure applied by farmers is insufficient mainly due to high transportation costs; and
- Assembling of produce to market largely depends on transportation costs.

#### 4.4 Corridor evaluation: origin & destination matrix of trucks

The origins and destinations of trucks in the Vhembe District were determined by means of tracking information of sample trucks of transport contractors operating in the study area. The tracked companies were selected by the VDM transport forum who motivated that these companies operations were representative of all typical operators/truck trips. The tracking information that was analysed, was for a period of 9 months, from 1 January 2012 to 31 September 2012. The tracking information comprised the origin and destination of the trip, date, time of day, origin and destination coordinates.

From the origin destination matrix it was clear that the most important origins in the Vhembe District are Western Makhado (the town of Makhado), Eastern Makhado (Thohoyandou and the area between Makhado and Thohoyandou), followed by Musina. The most important destinations in the Vhembe District are Mokopane, Polokwane, Bela Bela, Musina, Beit Bridge and Bandelierskop. The main origins and destinations are shown in Table 6, together with the connecting routes that are followed by trucks between origins and destinations. The three dominant routes that are followed by trucks include, N1 south (N1 south of Makhado), N1 north (N1 north of Makhado) and R 524 connecting Makhado and Thohoyandou.

**Table 6: origin, destination pairs & connecting routes for freight trucks of Vhembe Municipality**

Origin	Destination	Connecting Routes	Number of Trips	Percentage of Trips
Thulamela	Bode	Internal roads	10	0.33
Western Makhado	Mokopane	N1 south	211	6.96
Western Makhado	Polokwane	N1 south	180	5.94
Western Makhado	Bela Bela	N1 south	188	6.20
Western Makhado	Western Makhado	Internal roads	291	9.60
Eastern Makhado	Mokopane	R 524 and N1 south	154	5.08
Musina	Mokopane	R572 & N1 South	26	0.86
Eastern Makhado	Bandelierskop	R 524 and N1 south	111	3.66
Eastern Makhado	Western Makhado	R 524	176	5.81
Western Makhado	Musina	N1 north	129	4.26
Eastern Makhado	Bela Bela	R 524 and N1 south	107	3.53
Eastern Makhado	Beitbridge	R524 and N1 north	41	1.35

Western Makhado	Beit bridge	N1 north	103	3.40
Musina	Musina	Internal roads	102	3.37
Eastern Makhado	Musina	R 524 and N1 north	71	2.34
Eastern Makhado	Polokwane	R 524 and N1 south	110	3.63
Western Makhado	Polokwane	R 524 and N1 north	180	5.94
Musina	Polokwane	R 524 and N1 north	42	1.39
Eastern Makhado	Tshwane	R 524 and N1 south	69	2.28
Western Makhado	Tshwane	R 524 and N1 south	57	1.88
Eastern Makhado	Johannesburg	N1 north	32	1.06
Western Makhado	Johannesburg	R 524 and N1 north	42	1.39
Eastern Makhado	Makhado	R524	115	3.80
Western Makhado	Makhado	R 524 and N1 north	176	5.81
Thulamela	Maluleke	Internal roads	54	1.78
Eastern Makhado	Skelmwater	N1 north & R 524	29	0.96
Eastern Makhado	Thohoyandou	N1 north & R 524	26	0.86
Eastern Makhado	Tzaneen	R37 & R 524	48	1.58
Western Makhado	Tzaneen	N1 south & R37	28	0.92
Khambele	Thulamela	Internal roads	23	0.76
Musina	Belabela	N1 north and R572	36	1.19
Musina	Beit bridge	N1 north	63	2.08
<b>Total</b>			<b>3030</b>	<b>100</b>

## 4.5 SWOT ANALYSIS

Strengths, weaknesses, opportunities and threats (SWOT) analysis have been undertaken to determine the Freight and Logistics Strategy for the Vhembe District and are shown in Table 7.

**Table 7: strengths, weaknesses, opportunities and threats**

<b><i>VDM Freight Logistics Strengths</i></b>	<b><i>VDM Freight Logistics Weaknesses</i></b>
<ul style="list-style-type: none"> <li>• Tarred Provincial Road network in a fair to good condition</li> <li>• Tarred Municipal Road Network in a fair condition</li> <li>• Adequate road hierarchy for Provincial Road Network</li> <li>• Makhado and Musina have rail access to the Transnet Rail Network</li> <li>• The rail line from Polokwane to Musina is in a good condition</li> <li>• There is sufficient spare capacity on the rail line between Polokwane and Musina (only 30 % capacity is used) and also between Musina and Groenbult (50 % of capacity is used)</li> <li>• Adequate number of rolling stock is available</li> <li>• Underutilised Fresh Produce Market in a very good condition.</li> </ul>	<ul style="list-style-type: none"> <li>• Mutale and Thulamela have indirect access to the Transnet Rail Network</li> <li>• Gravel Provincial Road network in a poor to very poor condition</li> <li>• Gravel Municipal Road Network in a poor to very poor condition</li> <li>• Design of intersections, some of them do not have adequate turning circles to accommodate trucks</li> <li>• Inadequate truck stops at Makhado and Thohoyandou</li> <li>• Lack of funding to enforce the Road Transport Management System</li> <li>• Lack of staff to police overloading of trucks</li> <li>• Lack of qualified staff to implement the interventions that are proposed.</li> <li>• Airports at Musina, Makhado and Thohoyandou are in a bad condition</li> </ul>
<b><i>VDM Freight Logistics Opportunities</i></b>	<b><i>VDM Freight Logistics Threats</i></b>
<ul style="list-style-type: none"> <li>• More freight can be moved to Transnet Freight Rail, since spare capacity is available</li> <li>• There is an opportunity to reduce the operating costs of trucks, if the main roads are well maintained and drivers do not have to travel detours to avoid travelling on roads in a poor to very poor condition</li> <li>• The implementation of the Road Transport Management System (RTMS) will ensure compliance with Road Traffic Regulations resulting in improved road safety and preserving infrastructure</li> <li>• Improve the turning circles on roads used by trucks</li> <li>• Progressive institutional strengthening</li> <li>•</li> <li>• Establishment of a Transport Brokerage Organisation to optimize freight that has to be transported to the market</li> <li>• Utilisation of the Musina, Makhado and Thohoyandou Airports when high value freight</li> </ul>	<ul style="list-style-type: none"> <li>• Seasonal fluctuations in the production of fruit, vegetables and livestock making it difficult to predict transport demand</li> <li>• Delays at border posts for trucks travelling to SADC countries</li> <li>• Volatility and increase in fuel prices</li> <li>• Damage to the roads as a result of overloading of trucks</li> <li>• Poor communication to Stakeholders</li> <li>• Increasing trend of transporting agricultural produce by means of trucks</li> </ul>

justifies a

Source: VDM, 2013

## 5.0 STUDY RECOMMENDATIONS

Table 8 presents VDM preferred strategic freight logistics transport options and levers.

**Table 8: sample summary of strategic freight logistics transport options and levers**

<b>Theme</b>	<b>Approach</b>	<b>Broad Description</b>
Freight Consolidation	Conventional	Work with freight operators and businesses on a voluntary and ad-hoc basis to achieve shared deliveries where possible.
Freight Routing	Balanced	Develop and adopt an advisory freight network based on national, regional and country routes or equivalent with local routes to town centres and business/industrial estates/activity nodes.
Freight Management	Balanced	Manage local freight issues through the freight assessment and priority mechanism.
Freight Information	Radical	Utilise a package of traditional (e.g. paper mapping) and electronic (e.g. interactive mapping) measures to disseminate VDM specific freight information to hauliers, business, stakeholders and public.
Freight parking	Conventional	Maintain a minimum standard of lorry parking facilities on a requirement basis.
Rail freight	Conventional	Support the development of a freight interchange facility at Thohoyandou, Musina & Makhado railway and road transport terminals including adequate provision of all necessary associated highway infrastructure.
Freight governance institution	Conventional	Build, develop and strengthen existing transport forums to have a strong freight and logistics focus or sub-committee.

In order to operationalise the strategic freight thematic areas, VDM has identified the following catalytic freight logistics projects for implementation. Table 9 presents a summary of freight logistics projects for implementation in the short, medium and long term.

The recommendations of the freight logistics strategy are summarized in Table 9. The success of the recommendations hinges on the availability of finances, partnerships as well as political will.

**Table 9: summary sample of freight logistics projects for implementation**

Project Focus Area	Logistics Strategy & Levers	Project Description	Estimated Cost (R Million)	Implementation Agent/Champion
Freight Logistics Strategy Vision for VDM	Road Infrastructure & Services	Make land available for truck stops and enlist private sector to finance and operate Truck stops	1,5	Makhado, Musina and Thulamela Local Municipalities
		Engage in Strategic Road network Improvements project to improve supplier and markets contact.  Consolidate the implementation of the Road Transport management system to improve safety and preserve infrastructure.	120	Roads Agency Limpopo
		Maintain tarred and gravel roads network to reduce vehicle operating costs.	82	Roads Agency Limpopo
		Regravel Road P 277-1 from Tshikondeni Mine to the Makuya Police Station	40	Limpopo Department of Roads and Transport Vhembe District Municipality
		Addressing the overloading problem		
Freight Transport Governance	Upgrade Skills of Transport Staff & Increase Staffing Levels in Transport Department.	Transport Hub in Musina.	20	Limpopo Department of Roads and Transport
	Establishment of a Transport Management Organisation to optimise freight including upgrading	Transport Brokerage Organisation.	0, 5 per annum	Vhembe District Municipality

		skills of transport staff & increase staffing levels in transport Department.			
Enhancing High Freight Value Logistics	Maintain condition of freight rail infrastructure and acquire freight wagons when necessary .  Monitor volume of high value freight in order to determine when flights from Musina & Thohoyandou airports can be justified.	Investigation into the upgrading of the Musina, Makhado and Thohoyandou Airports.	1,5		Limpopo Department of Roads and Transport Vhembe District Municipality
Promotion of Rail Based Freight	Increase market share of Transnet Freight Rail.  Maintain condition of freight rail infrastructure and acquire freight wagons when necessary .	Promoting Freight Rail Transport	5		Transnet Freight Rail Limpopo Department of Transport
		Promote the processing of Agricultural Produce	17		Vhembe District Municipality
		Investigate the containerisation of freight for Small Farmers (LDV, animal drawn carts)	0,7		Vhembe District Municipality
		Investigate an Integrated freight solution for deep rural transport	0,5		Vhembe District Municipality

Source: VDM, 2013

Overall, the recommendations revolve around the following major policy and action points, namely;

1. VDM will work continuously towards securing multiple options for moving people and freight within and among VDM's urban and rural areas, working together with freight logistics stakeholders to provide an integrated transportation system solution package.
2. There is need to generate city freight strategies for Makhado, Musina and Thohoyandou. This will entail updating existing SDF and ITP to reflect in greater detail freight logistics issues.
3. VDM acknowledges that *bypasses* have been used to overcome problems associated with through traffic (including freight) in small and medium sized towns and cities such as Musina, Makhado and Thohoyandou. Nevertheless, a

considerable number of these same towns and cities still do not have such bypasses, which tend to be expensive schemes.

4. The smaller number of companies involved in urban freight in small and medium sized cities can provide better opportunities to form meaningful partnerships than in larger cities with so many companies.
5. Both small and medium sized cities and the freight transport problems related with them have received very little research attention in recent decades. This paper recommends that further research is carried out into the following issues related to small and medium sized cities:
  - Comparison of the nature and scale of freight transport problems in different small and medium sized cities
  - Compilation of case studies of freight transport solutions implemented in different small and medium sized cities.
6. It is recommended that policy makers in small and medium sized cities need to place freight transport considerations higher on their agenda. This will require that freight logistics is given more priority and publicity. These responsible authorities should also have the necessary know how and experience to deal with freight logistics topics at different scales.

## 6.0 CONCLUSIONS

The outcome of the study is the positioning of the district to manage in a sustainable manner current and future freight demand across all modes in support of the broad goals of social-economic development. By developing a freight logistics strategy in collaboration with constituent Local Municipalities and the Limpopo Provincial Government, VDM is positioned to play a pivotal role in unblocking developmental obstacles in the area thereby placing the District in an important position to anchor economic development. Consideration of Musina as an inter-modal freight Hub/Dry port for stuffing and de-stuffing/Container Depot, will go a long way in reducing the cost of doing business with neighbouring countries.

The future development of freight transport and logistics is likely to offer a number of opportunities that can make a significant contribution to the economy, society, and the environmental sustainability of VDM, Limpopo Province and South Africa in general. These opportunities, however, can only be turned into benefits when supported by appropriate policies. This is because the developments also contain risks that may, if not well anticipated, turn into threats. Whilst the VDM recognises the need to achieve a more sustainable distribution of freight and to support priority themes such as climate change, it should be recognised that the overwhelming majority of freight distribution within the county is made by road, and that this is likely to remain so in the foreseeable future. The transfer of road freight to rail would of course be advantageous in attempting to tackle these priority themes, particularly climate change. However, although often heralded as the panacea for freight distribution, rail freight does have a number of barriers to cross before achieving any mode shift (i.e. high financial costs; the extent of physical infrastructure required; and the inflexibility of the service offered). However, this should not detract from still attempting to promote mode shift to rail where achievable and to recognise its importance in achieving the priority themes in the longer term.

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## 7.0 REFERENCES

1. Browne, M., Sweet, M., Woodburn, A. and Allen, J. (2005). **'Urban Freight Consolidation Centres: Final Report'** Report prepared for the Department for Transport, London: Transport Studies Group, University of Westminster
2. Chaithoo, D., Mashiri, M., & Chakwizira, J. (2012, October). **The 'Gateway to Africa' Concept: Prospects for a Transshipment Hub at Musina in Limpopo Province** Logistics Challenges in Optimising Inter-Regional Intermodal Freight Traffic. In *1st National Conference on Intermodal Transportation: Problems, Practices, and Policy*.
2. Chakwizira J, Mashiri M (2009) **The contribution of transport governance in socio-economic development in South Africa**, Sustainable Transport: 28th Annual Southern African Transport Conference (SATC) 2009, Pretoria, South Africa, 6-9 July 2009, pp 1-18 ISBN: 9781920017392
3. Chakwizira, J, Nhemachena, C & Mashiri, M. (2008) **Using the Integrated Rural Mobility Access Programme to Prospering Rural South Africa**, 2nd Biennial CSIR Conference, 17-19 November, 2008, Pretoria, South Africa, ISBN 9780798855730.
4. **Chakwizira James AND Mashiri Mac** (2012), **Rural Transport and freight Governance Crossroads in South Africa**, Abstracts of the 31st Southern African Transport Conference (SATC 2012) 9-12 July 2012 Proceedings ISBN Number: 978-1-920017-53-8 Pretoria, South Africa, pages 187-197
5. Chakwizira J. and Mahapa S.(2013) **Unravelling Limpopo rural freight transport challenges and opportunities: The obvious, the not so obvious and the unknown** Abstracts of the 32nd Southern African Transport Conference (SATC 2013) Proceedings ISBN Number: 978-1-920017-62-0, 8-11 July 2013 Pretoria, South Africa, pp 579-589
6. European Shippers Council (2007a), **Identifying Bottlenecks and Their Solutions in Freight Transport Logistics**, Brussels.
7. Institute of Highways & Transportation (2005). **Moving Freight: how to balance economy and environment**. In association with Freight Transport Association. London: IHT.
8. Mashiri, M. & Naude, A. (2006). **Improving rural transport & service delivery: Pre-implementation studies for the integrated rural mobility and access (IRMA) pilot project**. Department of Transport
9. National Department of Transport. (2005). **National Freight Logistics Strategy**. Pretoria.
10. National Department of Transport (2007) **Rural Transport Strategy Action Plan (2007 – 2014) SA**, Pretoria, South Africa
11. National Department of Transport (2009) **NLTA – DoT 2009**, Pretoria, South Africa
12. National Department of Transport (2011) **NATMAP 2050**; Pretoria, South Africa

13. National Planning Commission (2011) **National Development Plan**, Pretoria, Government printers ISBN: 978-0621-40475-3
14. Provincial Government of Limpopo (2009) **Provincial Growth and Development Strategy 2009**, Polokwane, South Africa
15. RSA (1996) **The Constitution of the Republic of South Africa 1996**, Pretoria, South Africa
16. Limpopo Department of Transport (2012) **Limpopo Freight Databank 2012**, Limpopo
17. Statistics South Africa (2001) **StatsSA: Census 2001**, Pretoria, South Africa
18. Statistics South Africa (2007) **StatsSA: Community Survey 2007**, Pretoria, South Africa
19. Statistics South Africa (2012) **StatsSA: Census 2011**, Pretoria, South Africa
20. VDM (2009) **VDM Integrated Development Plan 2009**, Thohoyandou, South Africa
21. VDM (2012) **VDM Integrated Transport Plan 2012**, Thohoyandou, South Africa
22. VDM (2013) **Freight Transport Strategy**, Thohoyandou, Limpopo