Development of an Integrated Public Transport Network for Amajuba District Municipality

Conceptual Integrated Public Transport Network Report

Contract No.: ZNP 0018/12T

June 2014 REF: DN0004_Amajuba

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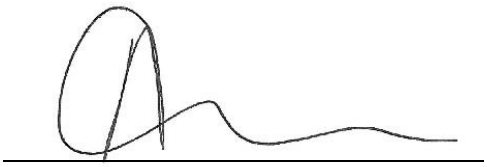
SMEC SOUTH AFRICA (PTY) LTD REPORT

QUALITY ASSURANCE ISSUE DATA

Report Title:	Amajuba District Municipality Demand Survey Report
Client:	KZN Department of Transport
Project Name:	Development of an Integrated Public Transport Network
Report Number:	DR2014/45
Revision Number	0

Revision History:

Date	Report Status	Written by	Reviewed by	Issued to	
				Name	Institution
June 2014	Final	R. Ackerman / M. Pretorius / E. Laabmayr	A. McKune	M. Mnomiya	KZN DoT



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EXECUTIVE SUMMARY

SMEC South Africa (Pty) Ltd was appointed by the KwaZulu-Natal Department of Transport (KZN DoT) to develop an Integrated Public Transport Network (IPTN) within the Amajuba District Municipality (DM). The concept of IPTN in South Africa originated in the Public Transport Strategy and Action Plan published by the National Department of Transport (NDoT) in 2007. IPTNs are seen to be high quality networks of public transport services that are fully integrated and regulated by a capable municipal transport entity. IPTNs are currently in various stages of planning and implementation in 12 Cities throughout South Africa.

Amajuba DM consists of three Local Municipalities (LM), namely: Emadlangeni, Dannhauser and Newcastle. Emadlangeni is geographically the largest LM, Newcastle LM is the second largest and Dannhauser LM the smallest. It is evident from the population statistics that the Amajuba DM is stable with minimal population growth. The provision of public transport is one of the main catalytic factors in re-generating economies. As a result, it is key for the population of the Amajuba DM to be provided with access to public transport.

Public transportation provision within the Amajuba DM is a combination of minibus-taxis, buses and non-motorized transport. The primary movement corridor in the Amajuba DM is the N11 linking Newcastle to Volksrust to the north and Ladysmith to the south and has developed into a transport and tourism corridor. The secondary movement corridor includes the R34 travelling east from Newcastle to Utrecht through to Vryheid and Richards Bay and the R621, linking Dannhauser and Hattingspruit to the N11 and Newcastle in the north and Dundee and Glencoe to the south. Three other tertiary roads include the R272 linking Osizweni and Madadeni, the R296 south-east from Osizweni and the R205-2 which runs from the N11 in a westerly direction.

The public transport status quo was derived from the information collected as part of the Current Public Transport Records (CPTR) with regards to facilities, the routes and the capacity utilisation of both the ranks and routes. 23 formal and informal ranks were inspected within the Amajuba DM. The purpose of the facility survey was to determine the physical location of all the facilities and their attributes.

All the ranks provide a service to commuters. The Newcastle Taxi Rank also functions as a long distance, interprovincial and cross-border rank. Both the Mdakane Cross Road Rank and the Dannhauser Taxi Rank provide an inter-provincial service to travellers. There is a lack of formal minibus-taxi ranks in the Amajuba DM as only 39% (9 out of 23) of the ranks are formally constructed with 48% of the ranks located on-street.

A total of 3 168 community based demand survey were conducted for the Amajuba DM in order to gain a better understanding of the public transport demands. One of the most significant questions asked during this survey was Q22: "*Name a Public Transport Destination that you would like a service to".* From the amalgamation of each of the individual survey responses, a high level demand trends were developed.

The public transport passenger volumes in Amajuba DM are not high enough to implement dedicated bus way systems. There are however sufficient passenger volumes to consider

higher order bus trunk services with minibus-taxi feeder services. As a result, one main corridor route and one main route have been identified to provide high quality LOS, as follows:

- Newcastle, Madadeni and Osizweni Corridor; and
- Osizweni to Mdakane Route.

The implementation of these proposed main corridor and routes incorporated operational concepts, together with financial implications based on a phasing plan:

- Key aspects of the National Land Transport Act;
- Law Enforcement; and
- Safety and Security.

In terms of the phasing plan, new services as such do not need any phased introduction there are certain tasks that will take time to complete before the service can commence. These time-related tasks are the following:

- Negotiations with the existing minibus-taxi operators to stop their operations. It is anticipated that there will be financial implications for the DM in this regard. Such negotiations could be protracted as operators will not want to give up their livelihoods easily;
- The new bus service will have to be designed and contract documents compiled. It is important that before the service is put out to tender the contracting authority ensure that there is sufficient land available for a depot and sleeping grounds for the bus operator;
- The tender process will also have certain associated time periods, such as the tender period itself, tender evaluation and appointment, and site establishment.

In determining the likely financial implications of the Amajuba IPTN the following components are taken into account:

- Road infrastructure costs;
- Capital and Operational Costs associated with the introduction of any new contract services;
- Public transport facility costs; and
- Non-motorised transport related costs.

The financial implications related to the Capital and Operational Costs generally consist of three main cost elements, namely running costs (variable costs that vary with the number of kilometres operated per day), fixed operational costs and overhead costs.

The intention of the KZN DoT is to improve mobility and accessible by the providing services that, as far as possible meet the quality criteria mentioned above. The design of the public transport services based on the identified IPTN and supporting feeder services begins to address the quality as well as the need of the communities serviced. These designs are

contained in the operational plan. This plan should not be seen as fixed but will need to be improved and fine-tuned based patronage as well as funding availability.

The current position in terms of funding for the public transport services, specifically IPTN services is that the fare-box must at least cover the operational cost. However this may not be feasible in the operations of rural public transport services due to the nature of the services and low levels of current demand. The level of the subsidy which is based on a rate per kilometre operated will have to be determined by the financial model and subject to negotiations with operators. It is therefore recommended that:

- The KZN DoT adopt the net based negotiated contract model;
- The contract document be adapted to incorporate the final empowerment model of current public transport operators
- The KZN DoT embark on a process of identifying all current affected operators in the DM that are not subject to subsidised services contracts and commence with a negotiation process to conclude a negotiated contract.

The takeaway from the analysis and recommendations for this IPTN is that both the National and Provincial Departments of Transport will have to be open to new approaches in implementing IPTN in a rural area, than has been par for the course in the 12 Cities. This would entail detailed engagements on a few key matters in order to move forward from the planning stage into the implementation stage.

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1 INTRODUCTION

SMEC South Africa (Pty) Ltd was appointed by the KwaZulu-Natal Department of Transport (KZN DoT) to develop an Integrated Public Transport Network (IPTN) within the Amajuba District Municipality (DM). The concept of IPTN in South Africa originated in the Public Transport Strategy and Action Plan published by the National Department of Transport (NDoT) in 2007. IPTNs are seen to be high quality networks of public transport services that are fully integrated and regulated by a capable municipal transport entity. IPTNs are currently in various stages of planning and implementation in 12 Cities throughout South Africa.

The legacy which the NDoT Public Transport Strategy aims to achieve is the phased but accelerated implementation of Integrated Rapid Public Transport Service Networks (IRPTNs) in metropolitan cities, smaller cities and rural districts (in the form of IPTN).

1.1 Background

The Amajuba DM is situated in the north-western region of KwaZulu-Natal (KZN), as presented in Figure 1. The main transportation route linking the district to its surrounds is the N11 which operates as an alternative route between Johannesburg and Durban. The R34 bisects the district in an east-west direction and provides a linkage from Richards Bay to the internal regions of Amajuba DM. Another main form of transportation is a rail line from the Durban port to Gauteng.

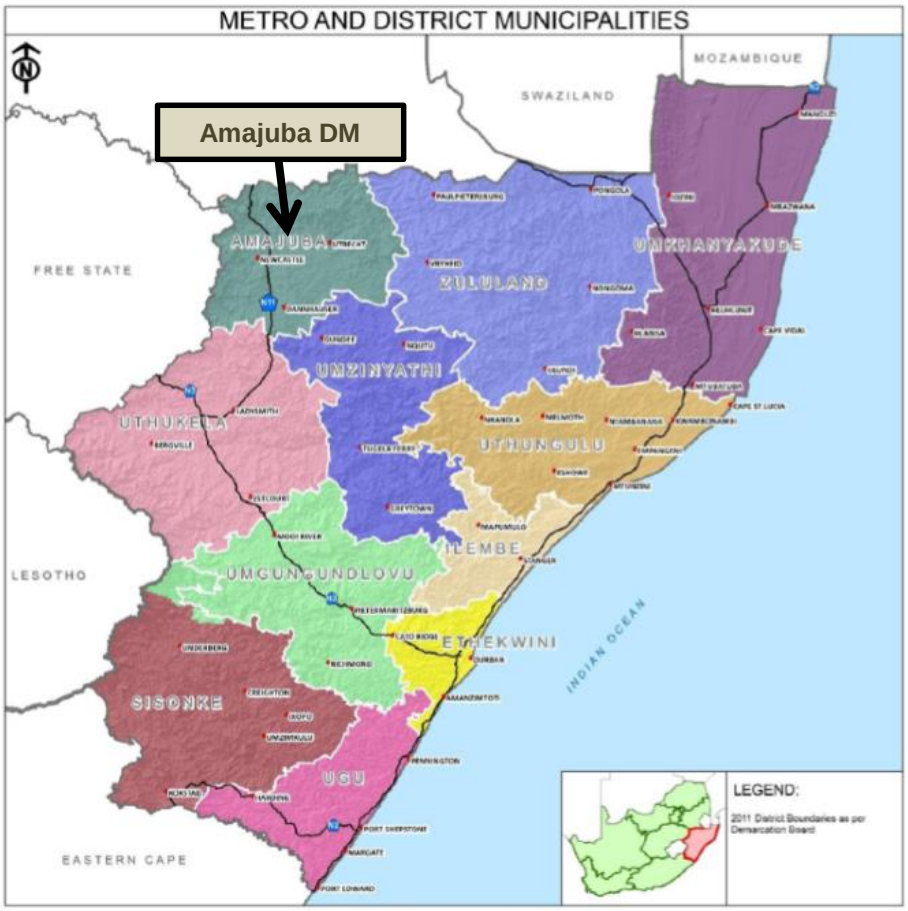


Figure 1: Location of Amajuba District Municipality

1.2 Policy Statement

Public transport modes; namely Bus, Taxi, Bakkie-Taxi and Non-motorised transport are currently not integrated to provide a seamless public transport system, which is sustainable, equitable and uncongested.

According to the NDoT Public Transport Strategy 2007, the envisaged transport system should be such that it displays the following characteristics:

- High quality networks that are fully integrated;
- Single integrated rapid commuter service;
- Mobility solution that is attractive to both current public transport users, as well as current car users;
- Modal shift of 20% from car work trips to PT by 2020;
- Improved quality of PT to a level of service that is car competitive; and
- Radical transformation of the PT service delivery system.

The current PT system is characterised by various shortcomings related to poor service quality in terms of services offered, efficiency, reliability and frequency.

Although some areas in KZN have regular public transport systems, a major part of the province still require a well-designed service with good coverage in order to ensure that all areas benefit from access to mobility. Key to the achievement of an integrated public transport plan is the establishment of integrated public transport service designs combining all available and applicable modes of transport.

1.2.1 Objectives

The main objectives of this report are:

- Development of IPTN for the Amajuba DM;
- Reducing travelling times for all commuters and public transport modes;
- Provide improved network coverage, connecting remote areas and reducing walking distances to nearest PT service;
- Improvement of service frequencies;
- Provision of a system that will result in extended hours of operation;
- Achievement of multi-modal integration;
- Provision of access for special need users (universal accessibility);
- Network image improvement;
- Improve needs for Non-Motorised Transport (NMT) networks;
- Design an IPTN based on the strong points of all the modes of transport, namely various types of buses, minibus-taxi and NMT; and
- Design supervision and monitoring processes that will ensure quality services.

The National Rural Transport Strategy describes the following strategic thrusts:

- Promote coordinated rural nodal and linkage development; and
- Develop demand-responsive, balanced and sustainable rural transport systems.

These strategic thrusts are to be incorporated into the development of an IPTN for the Amajuba DM.

2 STATUS QUO

Amajuba DM consists of three Local Municipalities (LM), namely: Emadlangeni, Dannhauser and Newcastle, as indicated in Figure 2. Emadlangeni is geographically the largest LM, Newcastle LM is the second largest and Dannhauser LM the smallest.

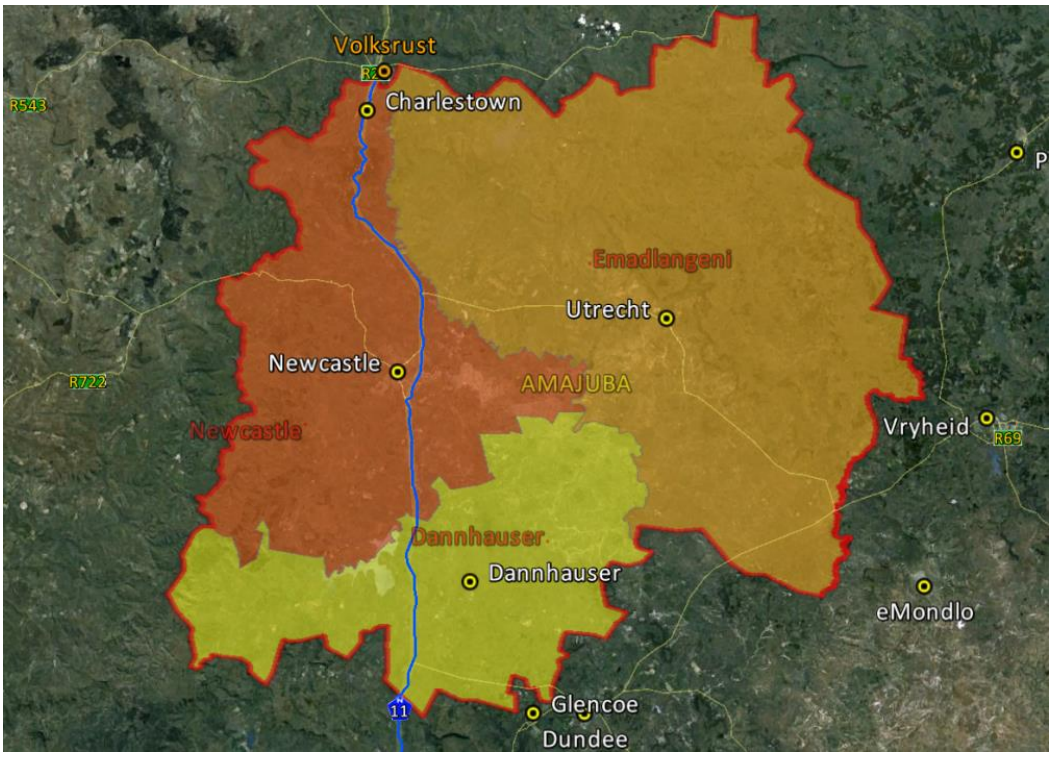


Figure 2: Local Municipalities and major towns within the Amajuba District Municipality

Emadlangeni LM is bounded by Newcastle LM in the west, Dannhauser LM in the south and Vryheid DM in the east. Emadlangeni LM is predominantly rural compared to Newcastle LM, consisting of approximately 1 400 commercial farms surrounding the town of Utrecht. The total population of Emadlangeni LM is 40 316 (Global HIS, 2008). The public transport infrastructure within the town of Utrech is acceptable, but minimal infrastructure exists in the rural areas.

The following is cited in Emadlangeni LM's 2012-2017 Integrated Development Plan (IDP) regarding transport: *"Emadlangeni Municipality is well accessible and has well developed transformational links. The R34 links the Local Council with Newcastle to the west and Vryheid to the east. The main district roads are reasonably well maintained and link Utrecht with Wakkerstroom, Paulpietersburg, Osizweni, Volksrust and Ingogo. Internal access roads between various areas have been developed and the only area with limited access to the rest of the district is the area of NkosiNzima. The only access available to this area is via a gravel road."*

Dannhauser LM is located along the southern boundary of the Amajuba DM. Dannhauser LM is bounded by Newcastle LM in the north-west, Emadlangeni LM in the north-east and uMzinyathi DM in the south-east. Dannhauser LM is also predominantly rural with only 2% of the LM considered to be urban. The total population of Dannhauser LM is 104 065. (Amajuba District Municipality Baseline Study, 2005).

Newcastle LM is located in the north-western region of KZN and borders the Free State and Mpumalanga. The total population of Newcastle LM is 327 637 (Government Community survey, 2007). 70% of the Amajuba DM's population is resides within Newcastle LM as the majority of job opportunities are based in Newcastle by means of wholesale & retail trade and catering & accommodation.

The primary movement corridor in the Amajuba DM is the N11 linking Newcastle to Volksrust to the north and Ladysmith to the south and has developed into a transport and tourism corridor. The secondary movement corridor includes the R34 travelling east from Newcastle to Utrecht through to Vryheid and Richards Bay and the R621, linking Dannhauser and Hattingspruit to the N11 and Newcastle in the north and Dundee and Glencoe to the south. Three other tertiary roads include the R272 linking Osizweni and Madadeni, the R296 south-east from Osizweni and the R205-2 which runs from the N11 in a westerly direction.

The highest traffic volumes in Amajuba travel along the N11 in a north-south direction. There are also high traffic volumes travelling along the main provincial road P483 between Newcastle, Madadeni and Osizweni.

In terms of road infrastructure, over 90% of the roads in the Amajuba DM are in a poor condition and a total of 732km are unpaved. The majority of the public transport facilities are informal and 57% of the roads used by public transport are unsurfaced. The road infrastructure indicates requirements of public transport facility upgrades and public transport route rehabilitation or resurfacing.

2.1 Demographic Status Quo

The demographic profiles of KZN, Amajuba DM and each LM are summarised in Figure 3 and Table 1. It is evident from the population statistics that the Amajuba DM is stable with minimal population growth. The provision of public transport is one of the main catalytic factors in re-generating economies. As a result, it is key for the population of the Amajuba DM to be provided with access to public transport.

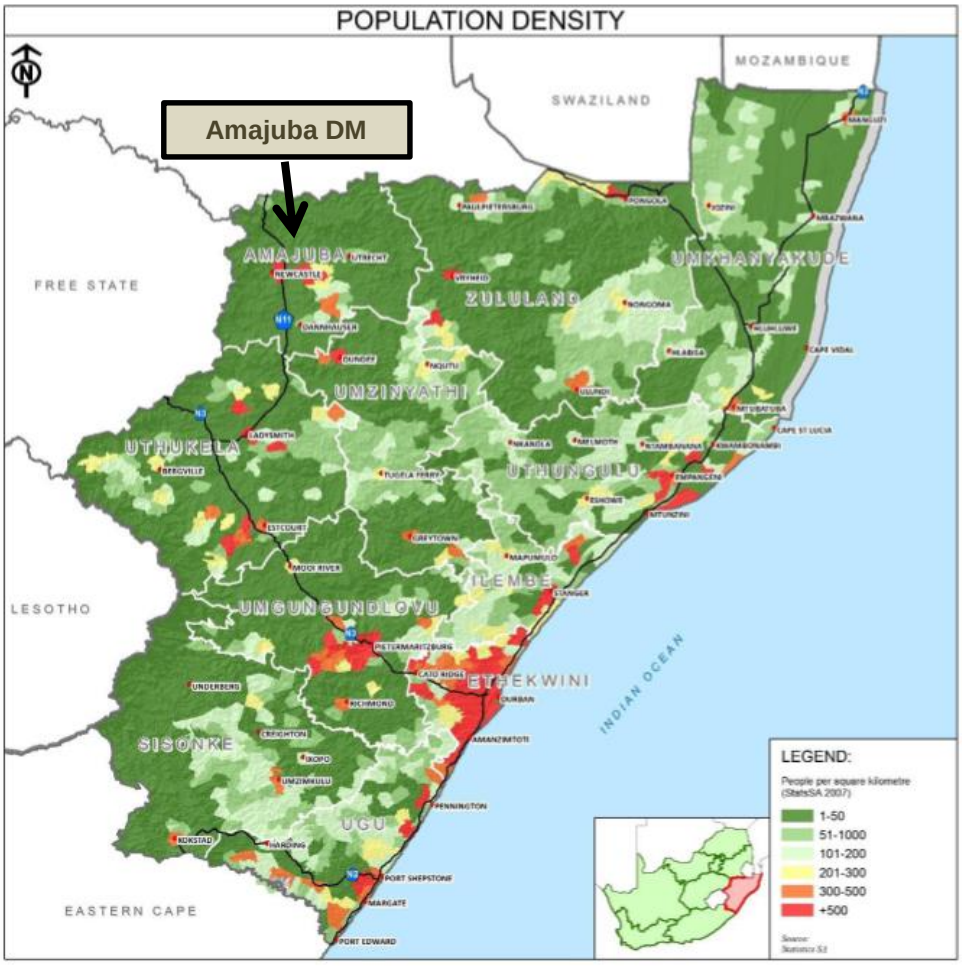


Figure 3: Kwazulu-Natal Population Density (KZN PGDP, 2012

Table 1: Demographics of the Amajuba District Municipality (Stats SA, 2011)

Municipality	Population 2001	Population 2011	Population growth (%p.a.)
DC24: Amajuba DM	468 036	499 839	0.66
KZN252: Newcastle LM	332 981	363 236	0.87
KZN253: Emadlageni LM	32 277	34 442	0.65
KZN254: Dannhauser LM	102 779	102 161	-0.06

An efficient public transport network is critical to enhancing and growing the economy within KZN and specifically within the Amajuba DM. It will reduce travel time, enhance the commuter experience and contribute towards greater productivity. It will also enable community members to gain access to education, health, leisure, recreation and other social services, thereby enhancing their quality of life.

2.2 Public Transport Status Quo

The existing public transport network within the Amajuba DM consists of minibus-taxis, buses, bakkie-taxis and NMT. The public transport facilities include minibus-taxi ranks and one bus terminus. The public transport status quo was derived from the information collected as part of the Current Public Transport Records (CPTR) in terms of current public transport operations at facilities and routes.

The complete records of public transportation consist of surveys of the following prescribed by the "Integrated transport plans: Minimum Requirements in terms of the National Land Transport Transition Act":

- A summary of the condition of the existing services with their geometric features;
- The physical location of the ranks in terms of latitude and longitude and an indication of the modes of transport they facilitate and the type of service they deliver. Additionally the ownership of the rank is also mentioned;
- A summation of the different facilities' status in terms of formal or informal and also the type of facility i.e. bus terminus, minibus-taxi rank or holding area;
- A route description;
- The route distance, trip time and turn around cycle time between ranks;
- Percentage utilisation of the ranks also stating the number of bays, max number of vehicles and the time of maximum utilisation;
- Utilisation was also determined in terms of the number of passengers in the vehicle compared to its service capacity, also stating the average capacity of the vehicle; and
- Passenger and vehicle waiting times were specified in terms of the number of passengers with their specific vehicle waiting time. Additionally their single, weekly and monthly fares were documented.

2.2.1 Public Transport Routes and Facilities

There were 23 formal and informal public transport facilities surveyed within the Amajuba DM as a part of the CPTR investigation. The surveys were conducted in person at the public transport facilities. The 23 facilities identified during the study are presented in Table 2.

Table 2: Amajuba Public Transport Facilities

No.	Facility Name	Facility Location
1	Makhanya Informal Taxi Rank	Osizweni
2	Khuzani / Manzana Intersection Taxi Rank	Osizweni
3	Bob Shopping Centre Informal Taxi Rank	Osizweni
4	Top Rank to KwaMdakane Informal	Osizweni
5	Top Rank to Newcastle Informal	Osizweni
6	Osizweni Formal Taxi Rank	Osizweni
7	Dicks & Manzana & Mdozo	Mdozo
8	Emadlangeni Minibus Taxi Rank	Utrecht
9	Spar Centre Informal Bakkie Rank	Utrecht
10	9 Mile Informal Taxi Rank	9 Mile Township
11	Ingogo Informal Minibus-Taxi Rank	Ingogo
12	Clevis Taxi Rank At Charlestown Clinic Gate	Charlestown
13	Charlestown Informal Minibus-Taxi Rank (Now called Phembindlela Taxi Rank)	Charlestown
14	Newcastle Formal Taxi Rank	Newcastle
15	Spar Parking Informal Taxi Rank	Newcastle
16	Central Car Park 4 + 1 Taxi Rank (Murchason Street)	Newcastle
17	Karbochem Taxi Rank	Vezubuhle
18	Madadeni Court Informal Taxi Rank	Madadeni
19	Madadeni Shoprite Checkers Informal Taxi rank	Madadeni
20	Madadeni Sec 4 & 5 Informal Taxi Rank	Madadeni
21	Mdakane Cross Roads Taxi Rank	Mdakane
22	Dannhauser Taxi Rank	Dannhauser
23	Newcastle Bus Rank	Newcastle

The locations of these ranks are indicated on plan DN0004-AM-024 (Part B: Amajuba DM Conceptual IPTN Map Book).

The purpose of the facility survey was to determine the physical location of all the facilities and document the public transport services provided at the facility and the available amenities.

Makhanya Taxi Rank

Makhanya Taxi Rank is an informal facility located in Osizweni, as indicated in Figure 4. The main mode of transport utilised at the rank is minibus-taxis providing a commuter service.

The rank is situated off-street with paving, which is in a good condition. The approximate size of the facility is 1 500m^2 with no defined loading bays. However, the rank does not have access to ablution facilities, lights and shelter. The facility serves 426 passengers that commute to two destinations and informal trading is situated in close proximity of the facility.

Figure 4: Makhanya Taxi Rank

Khuzani Manzana Intersection Taxi Rank

The Khuzani Manzana Intersection Taxi Rank is an informal facility predominantly used by minibus-taxis, as illustrated in Figure 5. The facility is currently under no ownership and provides a commuter service to the surrounding communities.

Figure 5: Khuzani Manzana Intersection Taxi Rank

The facility is an unpaved on-street facility with no shelter, lights or ablution facilities. Due to space constraints there are no formal loading bays, no formal structure and informal traders operate within the vicinity of the facility. The maximum number of 73 passengers uses the facility travelling to two destinations.

Bob Shopping Centre Taxi Rank

The Bob Shopping Centre Taxi Rank is an informal facility, as illustrated in Figure 6, predominantly used by minibus-taxis. The rank is currently under no ownership and provides a commuter service to the surrounding communities.

Figure 6: Bob Shopping Centre Taxi Rank

The facility is an informal on-street rank with no formal structures The facility is approximately 1 500 m^2 in size but does not consist of any demarcated loading bays. The facility serves a maximum of 244 passengers and routes to 2 destinations. A convenience shop is situated in close proximity of the Bob Shopping Centre Taxi Rank.

Top Rank to KwaMdakane

Top Rank (to KwaMdakane) is an informal facility predominantly used by mini-bus taxis for commuter services as illustrated in Figure 7.

Figure 7: Top Rank to KwaMdakane

The facility consists of an on-street loading area with no demarcated loading bays. A maximum number of 204 passengers use the rank travelling to two destinations. A convenience shop is situated in close proximity of the facility.

Top Rank to Newcastle

Top Rank (to Newcastle) is an informal taxi rank, as illustrated in Figure 8, currently under no ownership. The predominant mode of transport is minibus-taxis providing a commuter service.

Figure 8: Top Rank to Newcastle

The facility consists of an unpaved, on-street loading area. The facility has no access to amenities and is limited in terms of space. There are also no defined loading bays. The facility is used by a maximum of 417 passengers travelling to one destination.

Osizweni Taxi Rank

Osizweni Taxi Rank, as illustrated in Figure 9, is a formal facility under the ownership of the LM. The facility is mostly used by minibus-taxis, providing a commuter service.

Figure 9: Osizweni Taxi Rank

The facility consists of a paved, off-street loading area with a shelter. The paving and the shelters are however in a poor condition. The ablution block has been vandalised and there is no lighting available. The approximate size of the facility is 1 000m^2 and the loading area consists of five bays. There are also informal trading facilities, a rank structure and shelters for busses and taxis and pedestrian walkways. The rank used by a maximum of 814 passengers travelling to two destinations.

Dicks, Manzana & Mdozo Taxi Rank

The Dicks, Manzana and Modoza Taxi Rank, as illustrates in Figure 10, is a formal facility owned by the LM. It mainly facilitates commuter minibus-taxis.

Figure 10: Dicks, Manzana & Mdozo Taxi Rank

The facility is an off-street rank with a paved surface. There are no lights available, but the shelters are in a good condition. There is a problem with rainwater that leaks through the gutters on to the waiting bays and this problem needs some attention. The facility consists of five loading bays and the total area is 5 600m^2. Informal trading facilities and ablution facilities are available at the facility. There are shelters for the buses, taxis and pedestrian walkways. Additionally the rank provides lighting and water. 30 vehicles utilise the rank that serves two destinations.

Emadlangeni Mini-bus Taxi Rank

Emadlangeni Minibus-taxi Rank is a formal facility, as illustrated in Figure 11, under the ownership of the LM. It is predominantly used by minibus-taxis and buses providing commuter services.

Figure 11: Emadlangeni Mini-bus Taxi Rank

The facility consists of a paved, off-street loading area with partially sheltered seating. The waiting area has been identified as insufficient for the public transport demand and poorly designed as the passengers are required to stand on the seats to avoid rain. The ablution facilities at the rank requires maintenance as pipes are often blocked. The facility is 5 000m^2 in size and consists of 5 loading bays. The rank is used by a maximum of 207 passengers at peak hour travelling to six destinations.

Spar Centre Bakkie Rank (Utrecht Town)

The Spar Centre Bakkie Rank, as illustrated in Figure 12, is an informal, off-street facility under private ownership. The main mode of transport that use the rank are bakkies providing commuter services and transportation of goods.

Figure 12: Spar Centre Bakkie Rank (Utrecht Town)

The facility is 2 500m^2 in size with no structure, ablution facilities or defined loading bays. The facility serves four destinations and a convenience shop is situated in close proximity of the facility.

9 Mile Taxi Rank

9 Mile Taxi Rank, as illustrated in Figure 13, is an informal, off-street facility located on a municipal street. It is mostly used for commuter minibus-taxis trips.

Figure 13: 9 Mile Taxi Rank

The facility has no building structures, ablutions facilities, paving or defined loading bays. The facility serves two destinations and a convenience shop is situated in close proximity to the facility.

Ingogo Minibus-Taxi Rank

Ingogo Minibus-Taxi Rank, as illustrated in Figure 14, is an informal facility on a municipal street. The rank is mainly used for commuter minibus-taxis trips.

Figure 14: Ingogo Minibus-Taxi Rank

The facility has no building structures, ablutions facilities, paving or defined loading bays. The facility serves two destinations and a convenience shop is situated in close proximity to the facility.

Clevis Taxi Rank at Charlestown Clinic Gate

Clevis Taxi Rank, as illustrated in Figure 15, is an informal, on-street rank on a municipal street. The rank is mainly used for commuter minibus-taxis trips.

Figure 15: Clevis Taxi Rank at Charlestown Clinic Gate

The facility has no building structures, ablutions facilities, paving or defined loading bays. The facility serves one destination and a convenience shop is situated in close proximity of the facility.

Charlestown Minibus-Taxi Rank (Phembindlela Taxi Rank)

Charlestown Minibus-taxi Rank, as illustrated in Figure 16 is an informal, on-street facility on a municipal street. The rank is mainly used for commuter minibus-taxis trips.

Figure 16: Charlestown Minibus-Taxi Rank (Phembindlela Taxi Rank)

The facility has no building structures, ablutions facilities, paving or defined loading bays. The facility is used by 47 commuters travelling to one destination and a convenience shop is situated in close proximity to the facility.

Newcastle Taxi Rank

Newcastle Taxi Rank, as illustrated in Figure 17 is a formal, off-street facility owned by the LM. The rank is predominantly utilised by minibus taxis catering for commuter, long distance, interprovincial and cross-border services.

Figure 17: Newcastle Taxi Rank

The facility is in a good condition, with a paved surface, lighting and shelters. The shelters and ablution facilities require maintenance as leakages have been reported during the rainy season. The facility is 27 676m^2 in size consisting of 30 loading bays, is used by 905 taxis and serves 31 destinations. The maximum required capacity of the rank at any stage is a total of 7 555 travellers.

Spar Parking Taxi Rank

The Spar parking lot serves as an informal rank on a municipal street. The rank caters for commuters utilising minibus-taxis, as seen below in Figure 18.

Figure 18: Spar Parking Taxi Rank

The rank is paved and it is in a good condition. Lighting of the rank is provided by the street lights. There are no ablution facilities available. The number of loading bays is not defined, because many of the taxis also load on-street and in an open field next to the street. The taxis also use the parking area as loading bays. The premise holds hawker facilities and there is a convenience store nearby. The size of the facility is 487m^2

The parking lot rank facility has a total of 78 taxis and serves 8 destinations. The maximum required capacity of the rank is 865 passengers.

Central Car Park 4+1 Taxi Rank (Murchason Street)

Central Car park 4+1 is a formal rank on a municipal street. The facility specialises in car-taxis for commuters. The rank is shown below in Figure 19.

Figure 19: Central Car Park 4+1 Taxi Rank (Murchason Street)

The facility is on-street, with good quality paving. Lighting is provided by the street lights and there are no ablution facilities available. There are a total of six loading bays and the rank is close to a convenient store. The facility covers an 85m^2 area. The rank contains six loading bays.

Karbochem Taxi Rank (at Vezubuhle)

Karbochem is an informal, on street rank at Vesubule on a municipal street. It is primarily used by minibus-taxis for commuters. The rank is shown in Figure 20.

Figure 20: Karbochem Taxi Rank (at Vezubuhle)

The rank has no building structures, ablution facilities or paving. The rank is located in an open field next to the street and therefore has no allocated loading bays. The total area of the taxi rank amounts to 390m^2.

Madadeni Court Taxi Rank

Madadeni is an off-street, informal rank on a municipal street. The rank caters for minibus-taxis and is used by commuters. The rank is shown below in Figure 21.

Figure 21: Madadeni Court Taxi Rank

The rank has no building structures or ablution facilities, but is paved. There are also no defined loading bays as the rank is in an open area next to the road. The rank is used by 514 commuters and serves three destinations.

Madadeni Shoprite Checkers Taxi rank

Madadeni rank at Shoprite checkers is an informal rank off of a municipal street. It caters for minibus-taxis that serve commuters. The rank is shown below in Figure 22.

Figure 22: Madadeni Shoprite Checkers Taxi rank

The rank has no building structures or ablution facilities. Because the rank is a loading area next to the road, there are also no defined loading bays.

Madadeni Sec 4 & 5 Taxi Rank

Madadeni rank is an informal rank, off a municipal street. It is a rank for commuters, and is used by minibus-taxis. The rank is shown below in Figure 23.

Figure 23: Madadeni Sec 4 & 5 Taxi Rank

The rank has no building structures, no ablution facilities and no paving. The loading area is found in an open area next to the road with no designated loading bays.

Mdakane Cross Roads Taxi Rank

Mdakane Cross Roads is a formal, off-street rank under the ownership of the municipality. The rank caters for minibus-taxis and serves commuters as well as inter-provincial travellers. The rank is shown below in Figure 24.

Figure 24: Mdakane Cross Roads Taxi Rank

The rank has shelters for the buses, taxis and also offers paved walking areas. The facility is a good condition and provides lighting and water taps to the travellers. The rank provides ablution facilities, however they need regular maintenance. The rank houses hawker facilities, shelters and is 5760m^2 in area. The rank has a maximum of 75 passengers and currently serves 1 destination.

Dannhauser Taxi Rank

Dannhauser is a formal rank under the ownership of the municipality. The rank is used by minibus-taxis and caters for commuters as well as interprovincial travellers. Dannhauser rank is shown below in Figure 25.

Figure 25: Dannhauser Taxi Rank

The rank has asphalt paving, but it is in a poor state. There are no ablution facilities available and the facility has inadequate lighting. The rank shelters have a high design and in stormy weather it becomes a problem. The rank provides offices on the premises. The area covered by the facility is 1080m^2.

There is plenty of loading space, but no defined loading bays. The rank is utilised by a maximum of 414 travellers and serves five destinations.

Newcastle bus rank

The Newcastle bus rank is a formal, off-street bus terminus, under the ownership of the municipality. The rank is mainly used by commuters. The facility has a holding area with informal business trading on an open informal trading area with good paving surfaces. The rank provides shelters for buses, taxis and NMT. The rank caters for 86 vehicles and can hold a maximum of 4181 travellers. The rank serves 46 different destinations.

There is one bus terminus, 21 minibus-taxi ranks and one bakkie rank, of which the Newcastle Taxi Rank and the Newcastle Bus Rank have holding facilities.

All the ranks provide a service to commuters. The Newcastle Taxi Rank also functions as a long distance, interprovincial and cross-border rank. Both the Mdakane Cross Road Rank and the Dannhauser Taxi Rank provide an inter-provincial service to travellers.

There is a lack of formal minibus-taxi ranks in the Amajuba DM as only 39% (9 out of 23) of the ranks are formally constructed. Another indication of this is that 48% of the ranks are on-street. In Table 3 the condition of the ranks in the Amajuba district can be seen by providing the percentages of the different facilities available at the ranks.

Table 3: Percentage available facilities at ranks in Amajuba

Facilities	%
Paving	48
Lighting	17.4
Ablution Facilities	17.4
Shelters	30.4
Hawker facilities	21.7
Rank Roof Structure	21.7
Shops or Convenience stores	30.4
Informal Business Trading	17.4
Wash Bays	4.4
Open informal trading area	4.4
Bicycle Storage	0
Park and Ride Facility	0
Offices	0
Rubbish Bins	26.1
Public phones	0
Disabled Facilities	0
Water Taps	26.1
Fire Horse	4.4
Holding area	8.7

Most of the ranks, especially the informal ranks, lack in the basic facilities provided for standard minibus-taxi ranks. Detailed public transport facility descriptions are presented in Annexure A.

2.3 Vehicle Legality in Amajuba District Municipality

Several mini-bus taxi ranks within Amajuba DM were examined in order to determine the legitimacy of the operational public transport. The legality of the operating vehicles is based on the registration numbers registered at five taxi associations. These taxi associations are legally operating within the public transport system. The databases of legal vehicles were supplied by the KZN DoT to the SMEC Project Team (December 2013).

Fourteen mini-bus taxi ranks were analysed to record both entering and exiting vehicles. The observations were interpreted and compared in order to determine the number of vehicles operating illegally. Each mini-bus taxi rank is discussed and the results are summarized to conclude all findings.

2.4 Vehicles Standards at Public Transport Facilities

The mini-bus taxi ranks have been analysed in order to determine the legitimacy of each vehicle entering and exiting the particular taxi rank. The registration numbers of the vehicles were recorded and compared to those provided by each of the five legal taxi associations. Each mini-bus taxi rank is discussed according to corresponding tables exhibiting the data obtained and the summaries concluded. The tables presented in Annexure B indicate the legitimacy of vehicles at each mini-bus taxi rank. The registered vehicles were assumed to operate legally with the necessary permits to operate on the routes of Amajuba.

The legitimacy of the recorded registration numbers for the public transport facilities in Amajuba DM is presented in Table 4. Majority of the operating vehicles are not captured on the registered database (KZN DoT December 2013) and these appear as illegal and do not operate with a valid permit from a legal taxi association.

Table 4: Vehicle Legitimacy in Amajuba District Municipality

Public Transport Facility	Total Number of Taxies	Permitted Vehicles	Illegal Vehicles
Bob Shopping Centre Informal Taxi Rank	65	26%	74%
Charlestown Informal Taxi Rank	12	0%	100%
Dannhauser Taxi Rank	60	22%	78%
Emandlangeni Mini-Bus Taxi Rank	27	44%	56%
Khuzani Manzana Intersetion Rank	31	26%	74%
Madadeni Court Informal Taxi Rank	66	12%	88%
Makhanya Informal Taxi Rank	29	17%	83%
Mdakane Cross Road Informal Taxi Rank	18	50%	50%
Newcastle Bus Rank	86	1%	99%
Newcastle Spar Taxi Rank	94	32%	68%
Newcastle Taxi Rank	992	25%	75%
Osizweni Formal Taxi Rank	76	24%	76%
Top Rank to Mdakane	47	9%	91%
Top Rank to Newcastle	70	30%	70%

The vehicle legitimacy indicated that majority of the public transport facilities in the Amajuba DM are operating with over 75% illegal vehicles. As a result it is noted that the public transport demand is being met by unlicensed vehicles.

2.5 Taxi Associations

The taxi association play a key role in the determination of legitimacy of the operating vehicles. It is assumed that only operators that are affiliated to certain taxi associations own valid operating licenses.

The database of the legal taxi associations in the Amajuba DM is the foundation of this analysis. The registration numbers recorded in the database can be considered as the minibus-taxis permitted to operate legally on the routes of Amajuba DM. The registered taxi associations according to the provincial government are listed below:

- Intuthuko Taxi Association;
- Madadeni Taxi Owners Association;
- Masihambisane Bara Buffalo Flats Taxi association;
- Osizweni Taxi Association; and
- Osizweni Utrecht B Taxi Association.

These associations are required to provide registered taxis with a valid operating license and the associations need to ensure that the registered taxis possess roadworthy certificates. As discussed in Section 2.4, the majority of taxi operators operate without legal permits and operating licenses.

Table 5 presents a summary of the associations, the number of operating licenses issued, and the number of vehicles currently possessing operating licenses.

Table 5: Issued and Used Operating Licenses at Taxi Associations

Taxi Association	Number of vehicles operating with an operating license	Number of issued operating licenses	Percentage
Intuthuko Taxi Association	23	88	26%
Madadeni Taxi Owners Association	116	303	38%
Masihambisane Bara Buffalo Flats Taxi Association	26	126	21%
Osizweni Taxi Association	61	96	64%
Osizweni Utrech B. Taxi Association	164	375	44%

Table 5 indicates that only 1 taxi association operates with more than 50 % of their vehicles being licensed on the KZN DoT database.

3 PUBLIC TRANSPORT NETWORK ANALYSIS AND DESIGN

3.1 Public Transport Passenger Demand Analysis

3.1.1 Latent Demand Resident Surveys

A blanket survey was done in all the settlements within the District Municipality. A questionnaire was presented to residents, but filled in by the staff of SMEC during a personal interview with 20-30 permanent residences of each settlement. The SMEC staff moved from house to house in order to complete the survey, which took about 10 minutes to complete per house. This survey method ensured a statistically significant view amongst the communities of the Amajuba DM.

In normal English, "significant" means important, while in Statistics "significant" means probably true (not due to chance). A research finding may be true without being important. When statisticians say a result is "highly significant" they mean it is very probably true. They do not (necessarily) mean it is highly important.

Statistical significance plays a pivotal role in statistical hypothesis testing where it is used to determine if a null hypothesis can be rejected or retained. A null hypothesis is the general or default statement that nothing happened or changed. For a null hypothesis to be rejected as false, the result has to be identified as being statistically significant, i.e., unlikely to have occurred by chance alone.

To determine if a result is statistically significant, a researcher would have to calculate a *p*-value, which is the probability of observing an effect given that the null hypothesis is true. The null hypothesis is rejected if the *p*-value is less than the significance or α level. The α level is the probability of rejecting the null hypothesis when it is true and is usually set at 0.05 (5%), which is the most widely used. If the α level is 0.05, then the probability of committing a type I error is 5%. Thus, a statistically significant result is one in which the *p*-value for obtaining that result is less than 5%, which is formally written as $p < 0.05$.

If the α level is set at 0.05, it means that the rejection region comprises 5% of the sampling distribution. This 5% can be allocated to one side of the sampling distribution as in a one-tailed test or partitioned to both sides of the distribution as in a two-tailed test, with each tail (or rejection region) comprising 2.5%. One-tailed tests are more powerful than two-tailed tests, as a null hypothesis can be rejected with a less extreme result.

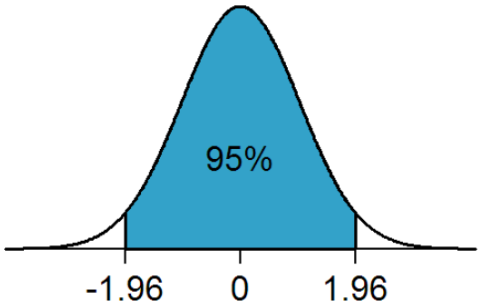


Figure 26: Normal Distribution of statistical information

In order for a statistically significant sample to be achieved, the decision was made to interview between 30 and 50 residents in each village. A total of 3168 survey forms were completed for the Amajuba DM. Census 2011 data shows that the population of the Amajuba DM is in the region of 499 000 people.

The table below shows acceptable sample sizes for various levels of confidence (accuracy).

Table 6: Required sample size

Confidence = 95%				
Population Size	Margin of Error			
	5.0%	3.5%	2.5%	1.0%
5 000	357	678	1176	3288
7 500	365	710	1275	4211
10 000	370	727	1332	4899
25 000	378	760	1448	6939
50 000	381	772	1491	8056
75 000	382	776	1506	8514
100 000	383	778	1513	8762
250 000	384	782	1527	9248
500 000	384	783	1532	9423
1 000 000	384	783	1534	9512

With the 3168 surveys completed for the Amajuba DM, and for a 95% confidence level, the margin of error is close to 2%. Additional to this is the fact that every single settlement was included, with a statistically significant sample size within each settlement. In other words, a true reflection of what is currently the situation in the District Municipality can be obtained from the survey results. The survey questionnaire consists 24 questions and is presented in Annexure C.

As this information may also be of use in other planning endeavours, a bespoke website was created for the presentation and analysis of these surveys. The website address is: http://www.tr-ims.co.za/home.aspx. For login information please contact the author of this operational plan.

One of the most significant questions asked during this survey was Q22: "*Name a Public Transport Destination that you would like a service to".* From the amalgamation of each of the individual survey responses, a high level trend could be developed. Figure 27 (Part B: Amajuba DM Conceptual IPTN Map Book) shows these latent demand desire lines.

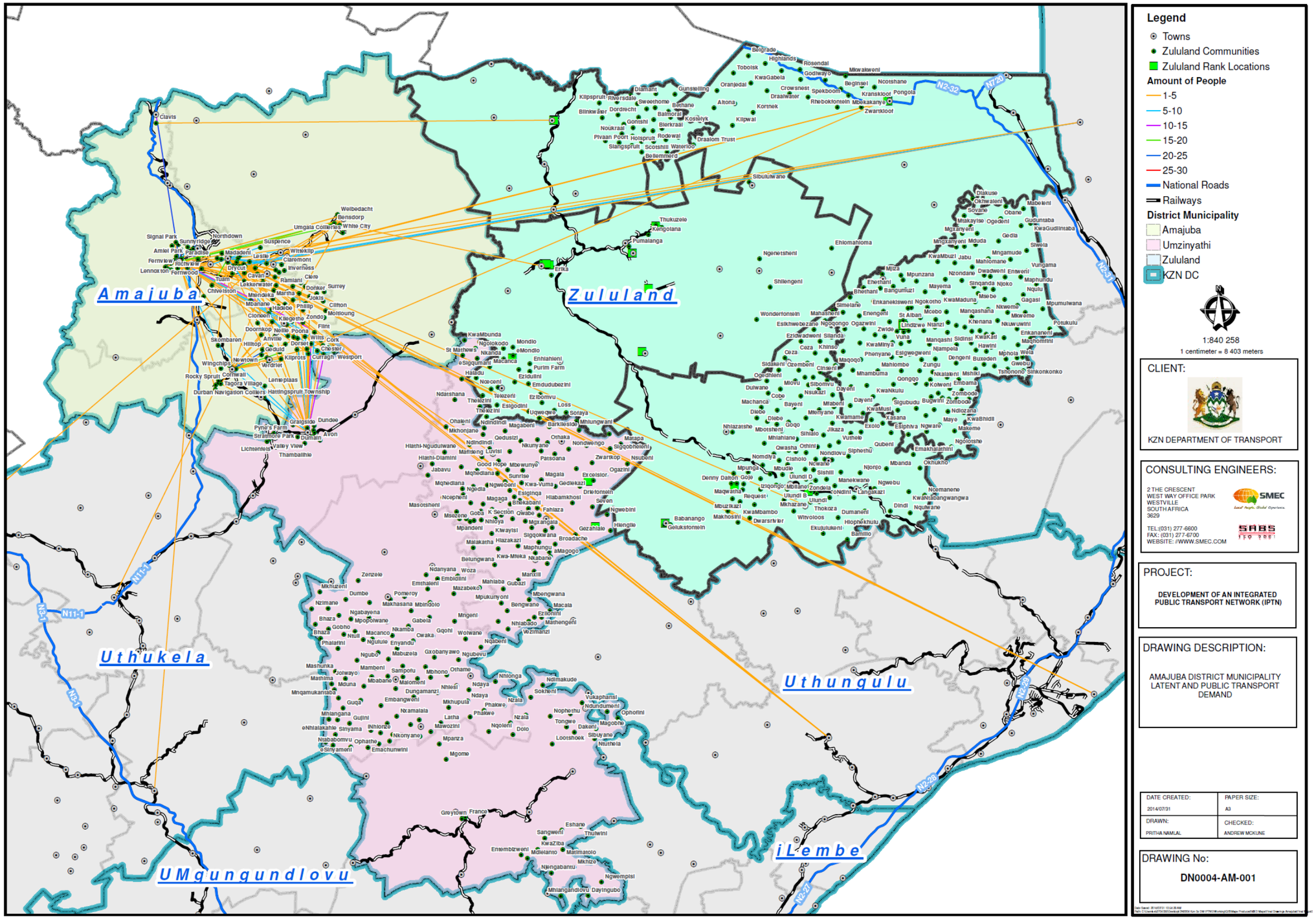


Figure 27: Amajuba DM latent demand desire lines

The 30 most important latent demand origin-destination pairs are presented in Table 7.

Table 7: Thirty most important latent demand origin-destination pairs

Nr	Origin	Destination	Number of Demands	Range
1	New Castle	Pioneer Park	25	20-25
2	Mathukuza	Clavis	23	20-25
3	Dannhauser	Twhatgwha	23	20-25
4	Madadeni	Tuam	20	15-20
5	Dannhauser	Sleevedonald	19	15-20
6	New Castle	Paradise	17	15-20
7	New Castle	Bensdorp	17	15-20
8	New Castle	Utrecht	16	15-20
9	Dundee	Chester	15	10-15
10	Dundee	Wilts	12	10-15
11	Charlestown	Mathukuza	12	10-15
12	Newcastle	Faileigh	11	10-15
13	New Castle	Flint	11	10-15
14	Madadeni	Claremount	10	5-10
15	Dannhauser	Dundee	10	5-10
16	New Castle	Milford	9	5-10
17	Madadeni	Nellie	9	5-10
18	Madadeni	Dicks Halt	9	5-10
19	Dundee	Flint	9	5-10
20	New Castle	Westport	8	5-10
21	New Castle	Nyanyadu	8	5-10
22	New Castle	Amiel Park	8	5-10
23	Madadeni 7P	Jozini	8	5-10
24	Madadeni	Jokis	8	5-10
25	Madadeni	Jakkalspan	8	5-10
26	Dundee	Path Farm	8	5-10
27	Utrecht	Welbedacht	7	5-10
28	New Castle	Skombaren	7	5-10
29	Madadeni	Suspemce	7	5-10
30	Madadeni	Mathukuza	7	5-10

3.1.2 Natural evolution of services

During the surveys for the Current Public Transport Record (CPTR), it became evident that certain routes are currently operational, additional to the routes described on the minibus-taxi registrar database. The routes presented in Table 8 were surveyed that is currently not on the database.

Table 8: Additional routes to that of the minibus-taxi registrar

Route	No of vehicle trips
Newcastle to Madadeni	279
Newcastle to Osizweni	201
Newcastle Spar Taxi Rank to Ncandu	51
Newcastle to Mthukuza	27
Newcastle to Mdakane	26
Newcastle to Bloubosch	18
Newcastle to Mdakane Springbok	17
Newcastle to Bloubosch Esqodipola	13
Danhauser to Skopi Allen	10
Danhauser to Mdakane	8
Newcastle to Bhallaybasha	8
Newcastle to Karbochem	8
Newcastle to Philisiwe	8
Danhauser to Verdit	7
Mdakane Cross Road to Dundee	7
Newcastle to Bhallay Township	7
Top Rank to Springbok	4
Newcastle to Osizweni Hudula	3
Newcastle to Pietermaritzburg	3
Makhanya to Madadeni	2
Newcastle Spar Taxi Rank to Emxhakeni	2
Newcastle to Bahlokazi	2
Newcastle to Ingogo	2
Newcastle to Ulundi	2
Newcastle Spar Taxi Rank to Vereeniging	1
Newcastle Spar Taxi Rank to Harrismith	1
Emdlangeni to Emdlangeni	1
Emdlangeni to Embutho	1
Emdlangeni to Izimbuthu	1
Emdlangeni to Nolokazane	1
Newcastle to Inkandla	1
Newcastle to Nchutu NTU	1
Newcastle to Richards bay	1

From the above information it is clear that the highest demand for public transport if between Newcaste, Madadeni and Osizweni.

3.2 Public Transport Infrastructure Demand Analysis

Surveys were conducted at 23 of the public transport facilities within the Amajuba DM. These surveys recorded the current utilisation and the level of infrastructure provided. Facility Utilisation description presented in Annexure D.

From the information gathered it has become apparent that the provision of ranking infrastructure is a challenge in the Amajuba DM. The upgrading process will need to start with the possible integration of ranking areas.

In light of integrating all modes of transport, it is inevitable that ranks in close proximity of each other should be consolidated for passenger comfort and simplification of the system. It is proposed that each major urban centre should have one major facility which will host minibus taxis, buses as well as possible rail stations. Currently, some areas have three or four facilities located in close proximity of each other.

As can be seen from Figure 28, a total of 11 facilities are located solely in the areas of Madadeni and Osizweni. Certain routes require transfer points within Madadeni and Osizweni, increasing travel time and proving inefficient.

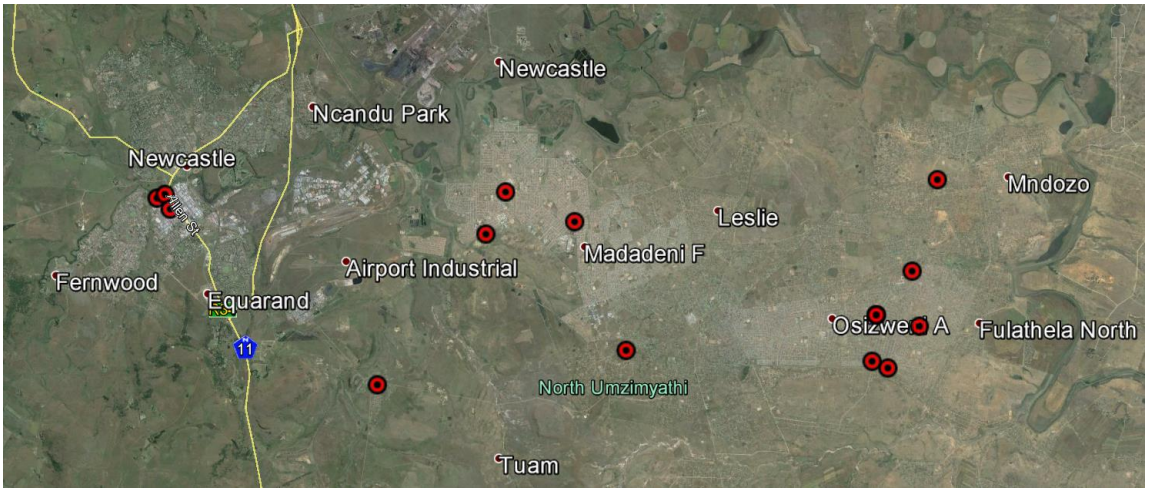


Figure 28: Existing Public Transport Facilities

3.3 Non-Motorised Transport Analysis and Design

Non-motorised transport (NMT) includes all forms of transport that are either human or animal driven. More specifically this includes walking, cycling, rollerblading, skateboarding, bicycle taxis, horse riding, donkey carts, wheel barrows etc.

The effects of inefficient transport systems in rural areas, which rely on non-motorised transport in its most basic form, are manifested in a lack of market integration, poor provision of education and health services, low productivity and low rates of regional and local economic activity. Despite the growth in motorised transport in developing countries such as South Africa, a large portion of the population depends on non-motorised forms of transport, and this will continue for some time.

Walking is the cheapest, consumes the least amount of space and is the most economical means of transport for short distances. This relates to the Amajuba District, especially as it is as very rural area. It is therefore very important to make sure measures are taken to integrate provisions for non-motorised transport into the newly developed transportation system for it to function as effectively as possible.

Walking is the most common and popular means of transport. This mode is almost always the end and start mode of a journey and is usually the “bridge” to connect different modes of transport. The Amajuba District Municipality includes a high number of rural settlements, some of which have a high level of poverty.

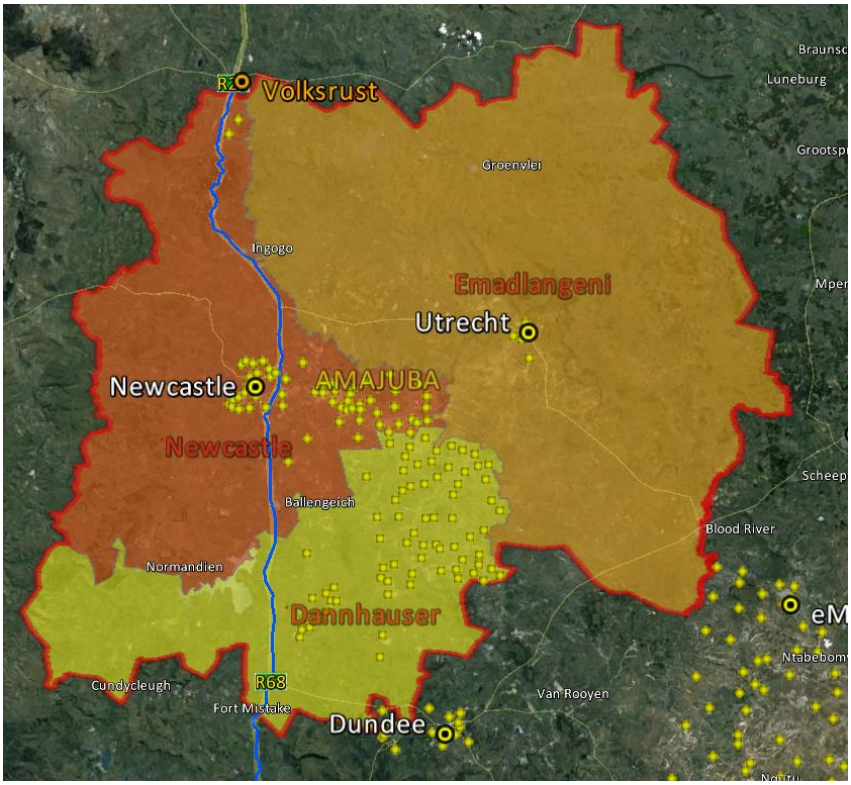


Figure 29: Settlements within the Amajuba DM

An effective and efficient method should be sought to connect these settlements. Traditional thinking proves to be the stumbling block when working with dispersed communities such as in Amajuba. The vast accumulated distances to be travelled in proportion to the number of passengers makes it a challenging task for a profitable service to be operated by public transport service providers.

According to the rural transport policy the development of a balanced rural transport system requires the following:

- Investment in access roads;
- Improvement of other forms of rural transport infrastructure (RTI) - such as local connector or district roads, suspension bridges, pontoons, paths, tracks, trails and public transport interchanges;

- Concerted actions to redress the relative neglect of all non-motorised as well as intermediate motorised transport (such as tractor-trailers); and
- Strengthening as well as regulating the role of the bakkie sector as a viable, demand-responsive means to address a variety of rural freight and passenger transport needs

It is therefore clear that NMT form part of developing a sufficient transport system. The emphasis in this Operational Plan is thus primarily on the provision of walking strips to and from public transport ranking infrastructure in order to accommodate the first and last elements of the total journey.

3.3.1 Non-Motorised Transport Policy

The Constitution of the Republic of South Africa, Act 108 of 1996 Section 85 (1) (b) mandates the Department of Transport with the role of developing a transport policy. This mandate places a huge responsibility on the Department's role to ensure that transport policy development addresses the mobility needs for all citizens. This calls for the need to develop a Non-Motorised Transport Policy. This NMT is governed by the White Paper on National Transport Policy (1996), National Land Transport Transition Act, Act No. 22 of 2000, National Land Transport Strategic Framework, Public Transport Action Plan (2007) and other legislations such as the National Road Traffic Act, Act 93 of 1996, and Animal Protection Act 71 of 1962. These and other relevant policies follow bellow:

White Paper on National Transport Policy 1996

The White Paper on National Transport Policy (1996) sets out a number of relevant policy principles. The transport system will aim to minimise the constraints to the mobility of passengers and goods, maximising speed and service, while allowing customers the choice of transport mode or combination of transport modes where it is economically and financially viable to offer a choice of modes.

The National Land Transport Transition Act (NLTTA), No 22 of 2000.

In line with the assertion of the neglect of NMT, there is no elaboration of NMT as part of legislation and policy framework. In terms of planning, however, there is reference to the integration of rural areas in the integrated transport plans. The Act also grants the Minister, in consultation with the Member of the Executive Council (MEC) for Transport, to allow for exceptional cases of transportation medium.

Rural Transport Strategy for South Africa 2007

The rural transport strategy is seen as a stimulant to social development and economic growth of rural areas, which would in turn grow the economic resource of district municipalities. The strategy calls for the Rural Transport Service; this includes services provided by users themselves (e.g. head loading, private vehicular transport) and by operators of all modes of motorised and non-motorised transport, and the promotion of non-motorised and intermediate modes of transport.

3.3.2 Objectives and Principles of Non-Motorised Transport

The objectives of a NMT Policy include, inter alia:

- Integration of NMT into the transport system including transport and spatial planning;
- Development of infrastructure and maintenance standards that recognise NMT as an essential mode of transport;
- Facilitation of NMT as a feeder system to other modes of transport;
- Allocation of adequate and sustainable funding for promotion and development of NMT;
- Promotion of NMT as reliable, healthy, affordable, accessible and safe transport mode;
- Reduction of the number of traffic fatalities of vulnerable non-motorised road users;
- Ensure that traffic calming is part of the overall transport strategy for the area;
- Ensure that traffic is accommodated and applied at the correct road hierarchy level;
- Provide communication channels for the public to participate in the “calming” process;
- Improve the efficiency and safety of the road network without compromising costs;
- Protect residential areas and the residents from unwanted through traffic and associated dangers;
- Moderate extraneous traffic behaviour, and
- Promote road safety.

In striving to meet the NMT policy objectives, the transport planning authorities should be guided by the following broad principles:

1. To integrate non-motorised transportation into the transport system.
2. The need to improve the quality of life of marginalised people.
3. To adhere to the principle of environmental protection, and energy conservation.
4. The integration and connectivity of the first and second economies and the connectivity and integration of the rural and urban areas.
5. The need for economic revitalization of the rural areas.
6. The promotion of safety as a critical facet of public and freight transport.
7. The need to increase accessibility and mobility.

It needs to be recognised that there is a latent demand for NMT mobility. In other words, poor facilities and lack of awareness discourage its use, and improving conditions may increase demand. One of the key strategies to increase NMT activity and to improve the perception of NMT usage is through the creation of a high quality NMT environment. This requires a review of the quality of NMT infrastructure and should include the following components:

- Quality of infrastructure provision (sidewalks, road crossings, cycle rental facilities, cycle parking facilities, landscaping and lighting)
-

- Development and implementation of NMT Master-plans and local NMT plans. (Master-plans should guide the development of local NMT plans should it be absent, but should also take cognisance of and be informed by local NMT Plans where they do exist).
-
- Surface design appropriate for the intended mix of personal mobility devices, and geometric designs that allows for the operational characteristics of these devices.
-
- Road signage and surface markings that warn and indicate the presence of NMT users. (Uniformity and legality have to be ensured through the application of the Road Traffic Signs Manual 19).
-
- Route continuity (Is an important element of NMT planning, because continuous routes between popular destinations and attractions improve the ease and convenience of NMT usage).

The approach will consist of the following steps:

1. Identify the profile target user group needs in terms of requirements and constraints
2. Understand the area in terms of demographics, spatial and geographical layout, origins and destinations, weather conditions, etc.
3. Develop a desired NMT network linking the information identified above.
4. Develop a sustainable network by optimally fusing the desired and existing network.

3.3.3 Needs and Constraints

Transportation infrastructure is an essential component in providing rural residents improved access to opportunities outside the local community. This is especially important in the Amajuba District Area as a lot of the communities do not offer sustainable employment. It is important to not only implement the necessary public transport to address this specific problem but, also to make sure the necessary NMT strategies are set in place so that pedestrians have clear and safe access to these new transport facilities.

A problem that is starting to be addressed is the fact that pedestrian safety has been overshadowed by policies that over- emphasize the need to adhere to safe driving, to the extent that the issue of pedestrians is are not seen as a priority, because pedestrians are at fault for being on roads. In other words, roads are still considered to be the preserve for motorists only.

Most of the public generally considers pedestrian facilities to be limited to sidewalks; however, they encompass a much broader scope of services and facilities. Pedestrian facilities include, but are not limited to, traffic control devices, curb ramps, grade separations (overpasses and underpasses), crosswalks, and design features intended to encourage pedestrian travel (such as traffic calming devices including speed bumps or centre refuge islands). In general, these facilities are found parallel to the roadway system and are provided as part of the public right-of-way.

The lives of rural people are characterised by isolation, exclusion, hardship, unreliable access to even the most basic economic opportunities and social services. For the majority of their transport needs, they rely on non-motorised means of transport and on rugged paths, tracks, and roads, which are typically in poor condition.
Rural households, and particularly women, spend much time and effort on transport activities to fulfil their basic needs. Safety in South Africa constitutes one of the barriers to NMT use. Others are related to geographic conditions, e.g. major streams, steep slopes, climatic conditions, land use developments restricting users' movement, high volume roads, freeways and rail lines, particularly those with limited points of safe crossing.

Within the municipality, the roads are not very conducive to non-motorised transport users. In the rural areas of the municipality, were there are sidewalks available they are below standard and not user friendly. There are often conflict occurrences between hawkers and pedestrians. Throughout the municipality there are a lot of informal taxi ranks and stops. This leads to an unsafe environment for pedestrians. There are also shortages in loading and unloading bays, parking spaces in the towns, shelters and ablution facilities especially at public transport terminals. The main problem lies in the absence of a major transport interchange for any of the transportation modes. Implementing the upgrades to the transport system will be complemented by an accompanied NMT system, improving safety, security and mobility.

Non-motorized transport infrastructure is very crucial, in particular intermediated transport to support farming and non-farming activities. Off road infrastructure that caters for a wide range of NMT / IMT e.g. tractor–tracks, pedestrian infrastructure, bicycle and animal drawn carts are necessary. Rural travel patterns are often characterised by a low density of demand, a high proportion of non-work trips (including emergency trips, "special need" trips, and freight transport trips), and poor road conditions.
The diagram in Figure 30 shows where NMT systems fit into the rural transports functional areas.

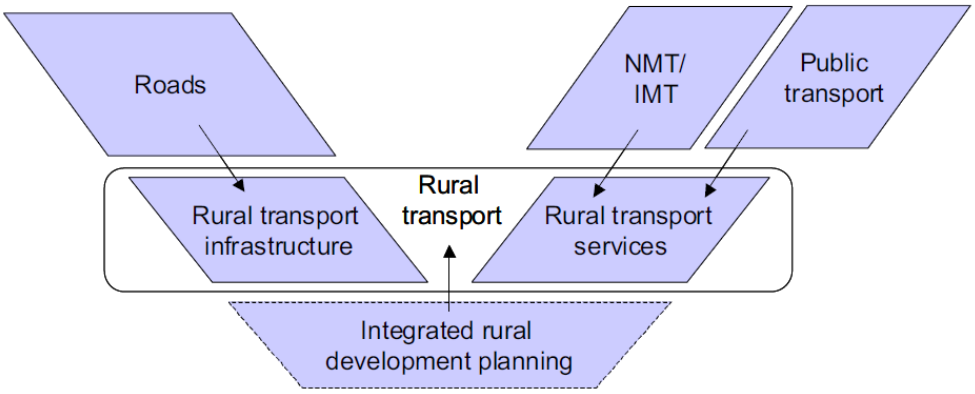


Figure 30: Linkage between rural transport and other functional areas

Poverty and geographical isolation has perpetuated the level of marginalisation of many communities living in rural areas. This spatial fragmentation comes at a high transport cost that also limits the movement of people and goods. The main transportation focus of Amajuba is in the central and southern parts of the municipality, with the main emphasis in the centre.

It is important to integrate NMT, mainly at the start and end destination of the routes as this is where the majority of pedestrian activity will occur. The image below shows the public transport facilities that are proposed to be upgraded. Extensive NMT infrastructure will therefore be required at these locations. In fact the new multi-modal ranks will also be designed as hubs of extensive walkway networks.

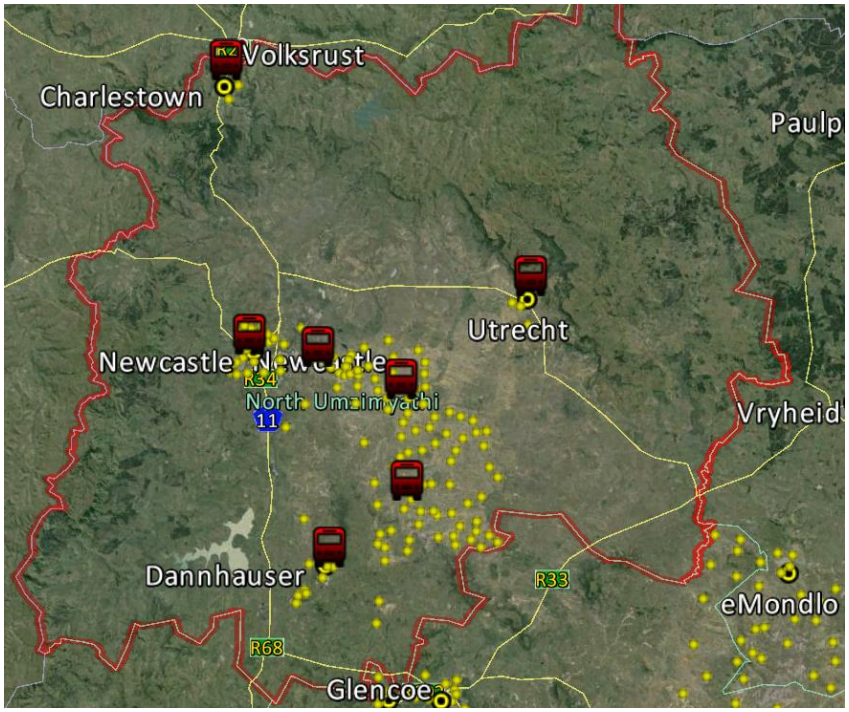


Figure 31: Proposed public transport facilities to be upgraded

3.3.4 Desired NMT Network

The overall objective of NMT is to increase mobility and access to opportunities, and in so doing, to improve the quality of life in a sustainable manner. In an effort to redress past imbalances, there is a strong focus particularly on communities that rely more heavily on NMT as a primary mode and for access to public transport, but it is important to acknowledge that NMT can be, and should be, important for all sectors of society. With the strategic transport model available, it is possible to concentrate on those specific areas where NMT is very important.

In all areas, mobility cannot be enhanced unless it is affordable and appropriate with regard to local conditions. Questions of suitability can relate to safety among users of the transport system. For example cyclists on off-road paths may clash with pedestrians. Solutions will have to be a combination of measures, including regulation, enforcement, education and design.

All recommendations should take cognisance of safety and security, as well as the need to empower people, to foster sustainable job creation and to improve the quality of life for all.

There are many benefits in providing a safe environment for pedestrians. Some of these benefits include:

- Investing in the poor, elderly and young citizens as they are given the opportunity to travel in a safer environment with relatively no capital expenditure.
- Health benefits for the individual user, which in the long run is beneficial to the economy.
- A very flexible transportation mode as they are not bound by traffic or the availability of parking facilities.
- Fewer short vehicle trips mean fewer accidents.
- A reduction in greenhouse emissions and noise pollution

The most dangerous places for pedestrians are anywhere where they are vulnerable to any other mode of transport. This is typically at intersections or mid-block crossings. The provision of the pedestrian/cycle priority zone will considerably enhance the safety of pedestrians. In terms of the new upgrades to the Amajuba transport system, vulnerabilities will occur especially at the newly upgraded ranks as there will be an increase in pedestrians.

The primary objectives of the NMT policy are, among others, to increase the role of NMT as one of the key transport modes, integrate NMT as an essential element of public transport, and provide a safe NMT infrastructure and allocate adequate and sustainable funding for the development and promotion of NMT. (This is exactly what is being done with the Amajuba District Municipality Operational Plan).

3.3.5 Fusing the Desired Networks

To sufficiently integrate the NMT with the proposed infrastructure upgrades it is necessary to highlight the required areas where NMT infrastructure will have to be implemented.

The main requirements for pedestrian areas are:

- Attractiveness: The infrastructure is designed and fits into the surroundings in such a way that walking is appealing.
- Safety, traffic: The pedestrian infrastructure protects the safety of the pedestrian and other users.
- Security: the pedestrian infrastructure protects the safety of the pedestrian and other users
- Comfort: Delays and nuisances caused by barriers and bottlenecks or additional physical effort caused by unnecessary grade differences are to be minimised

Although road safety problems occur in informal settlements, as well as formalised townships, the more serious safety problems are experienced in informal settlements due to the lack of infrastructure and particularly pedestrian facilities. Such settlements often develop adjacent to major roads in order to gain access to transport, and in some cases, informal housing encroaches onto road reserves. It is therefore necessary to incorporate the necessary traffic calming measures at the proposed ranks, especially at pedestrian crossing areas.

Traffic calming is defined as follows:

“The objective with the introduction of traffic calming measures is to moderate traffic behaviour, through physical and legislative measures, with the aim to reduce vehicle speeds, (and/or) traffic volumes (and/or) travel patterns, thereby improving traffic safety, and quality of life in the urban environment, but with due regard to mobility and accessibility.”

Some of the traffic calming that can be enforced are:

- Improvement of road signs and markings at the proposed ranks.
- Vertical Shifts in the Carriageway i.e. raised pedestrian crossings
- Speed Humps

Yield controlled crossings at all the public transport facilities should be considered. Warning signs can also be set up before ranks to warn motorists to slow down because of an increase in pedestrian activity.

Another safety issue regarded especially on the walkways are street lighting. Street lights invite more people to walk because they feel safer. Street lights should be implemented at all formal ranks that are not already implemented. Lighting can also be considered on any major walkway leading to and from the rank. Pedestrians feel safer if they know they can be seen by others who can help in the event of difficulties and insecurity.

A typical problem found in many urban areas and rural communities throughout South Africa is that the necessary signage and facilities have either not been provided, or are not properly maintained in accordance with the guidelines contained in the SA and SADC Road Traffic Sign Manual (RTSM)(SADC 1997).

In many townships pedestrian facilities are completely lacking in a number of pedestrian facilities, this includes:

- Raised pedestrian crossings;
- Pedestrian walkways;
- Improved road markings and street lighting;
- Vertical kerbs at intersections to prevent minibus taxis from cutting corners; and
- Paving for pedestrians at intersections.

Various common problems, which have a negative impact on road safety, are experienced in informal settlements and townships (DoT 2003b), including:

- Hawkers in the road reserves which block pedestrian sidewalks.
- Small businesses which operate on the sidewalk, such as car maintenance, telephone booths, etc.
- Shacks/houses built up to the edge of the road.

- Minibus taxis which use the sidewalk as stops, ranking areas and even repair and washing bays.
- Boulders placed on the walkway to protect properties against traffic.
- Lack of drainage, or poorly maintained drainage systems, force pedestrians onto the roadway during the rainy season. Regular maintenance of such drainage systems would improve the plight of pedestrians walking alongside roads especially during inclement weather conditions.
- Non-existent or poorly maintained street lighting, which is a very important amenity for pedestrians who often leave early in the mornings or arrive home late in the evenings. A major proportion of pedestrian casualties in South Africa are recorded during the hours of darkness.

The following recommendations will ensure better safety:

- Vehicle speeds to be reduced by introducing calming measures at schools and busy intersections;
- Law enforcement to be improved with increased visibility of enforcement during peak hours;
- Road safety campaigns to be targeted to provide a co-ordinated multidisciplinary approach to road safety;
- Vegetation to be maintained and cleared, especially on sidewalks;
- A longer barrier to be erected to prevent pedestrians crossing at grade instead of over the bridge provided; and
- Signage to be improved and updated.

3.3.6 Guidelines

For implementing walkways the following walkway width is prescribed by the Public Rights-of-way Access Advisory Committee as seen in the table below:

Table 9: Prescribed walkway width

Description	Width
Absolute minimum width	1.5m
Desirable width	2.0m
Shared cycle track/walkway	3.0m

It is important to design walkways so that they are universally accessible to all people, especially those with disabilities or special needs. By implementing ramps on to the walkways, people in wheelchairs will also have access to the walkways. The ramp detail is seen below in the figure.

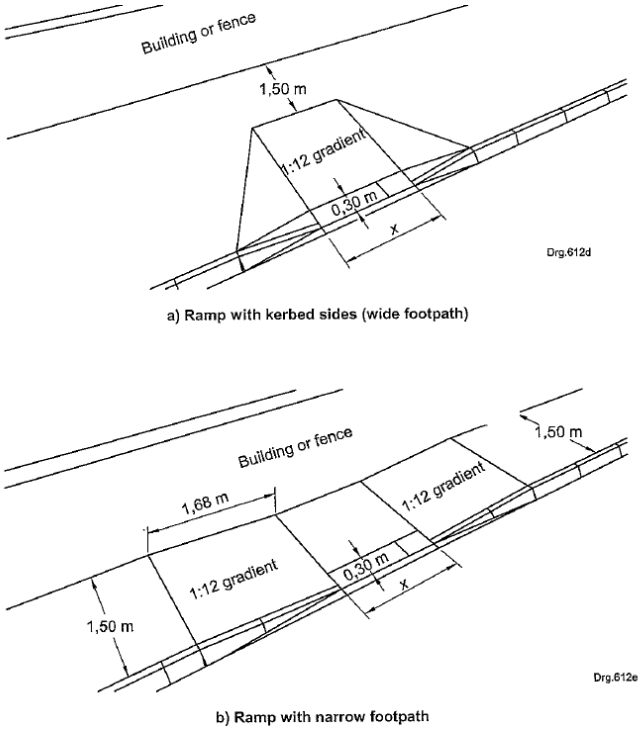


Figure 32: Ramp guidelines

Ramps are also required at intersections. An example of the implementation of ramps at an intersection is depicted below in Figure 33.

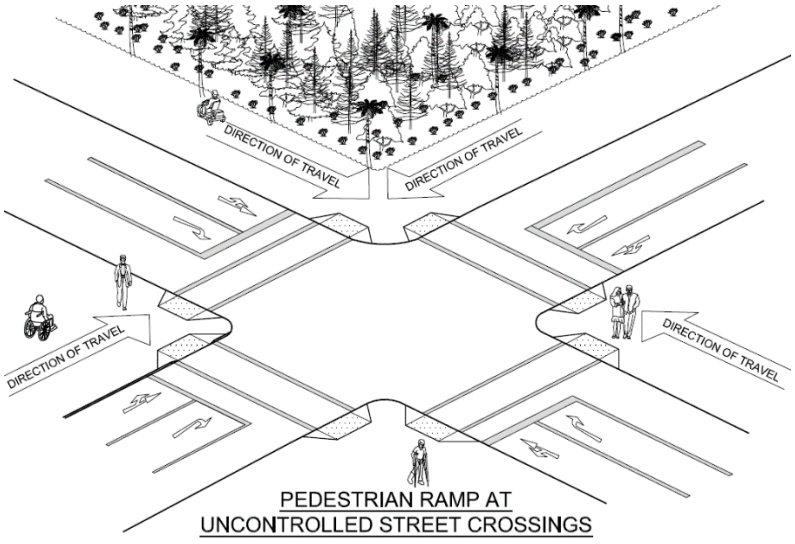


Figure 33: Pedestrian ramps at an uncontrolled street crossing

Walkways should be designed with a buffer between the walkway and the roadway. In residential areas a continuous landscaped or planted strip known as the green zone 'Green Zone' is advised. The Green Zone buffers pedestrians from motor vehicles and accommodates driveway access without having to slope the walkway. Even in constrained situations, a narrow Green Zone must be included. Ideally the Green Zone should be a minimum of 1.5-1.8m for healthy tree growth.

If a Green Zone cannot be provided due to space limitations, and the walkway must be attached to the kerb, an additional 400-600mm width can be added as an added buffer. Implementing a walkway into the road reserve is shown below for a residential street, residential collector and local distributor.

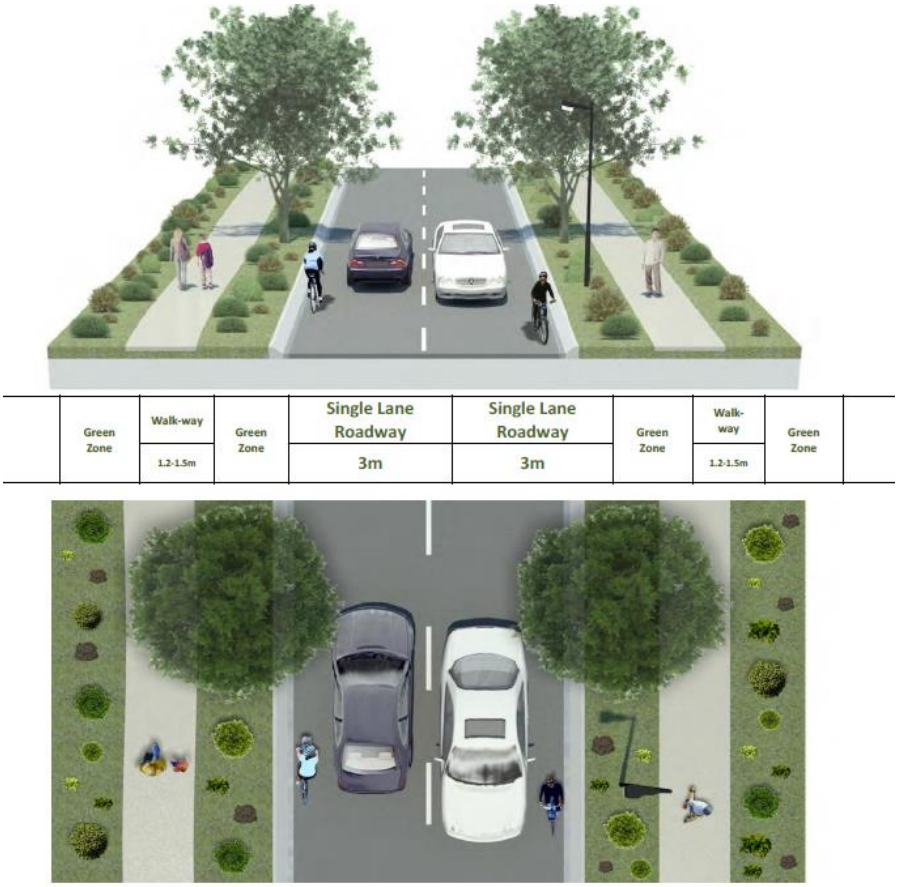
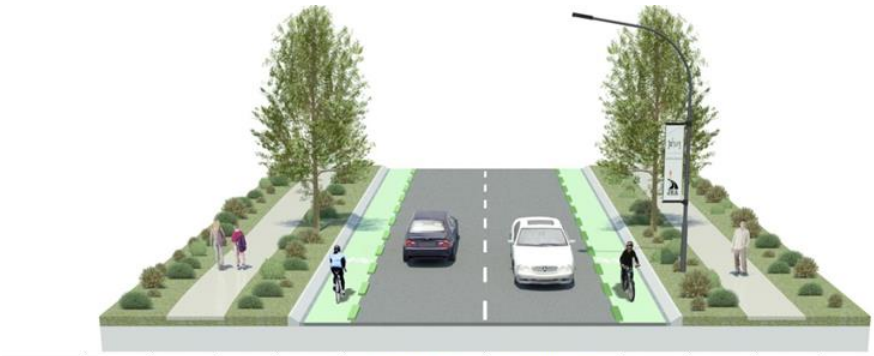


Figure 34: Implementation of walkways (residential street)



Green Zone	Walk-way 1.5-1.8m	Green Zone	1.5-1.8m Cycle Lane	Single Lane Roadway 3.5m	Single Lane Roadway 3.5m	1.5-1.8m Cycle Lane	Green Zone	Walk-way 1.5-1.8m	Green Zone

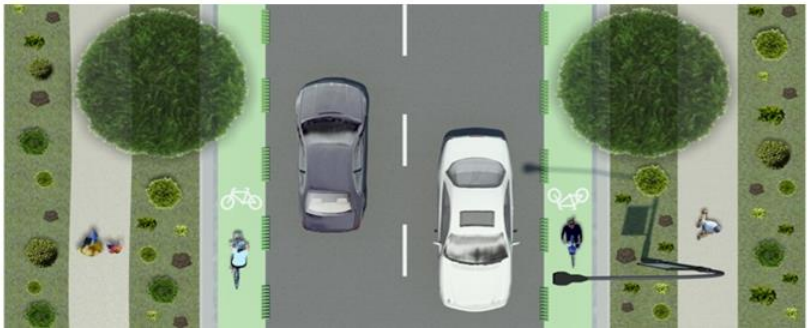
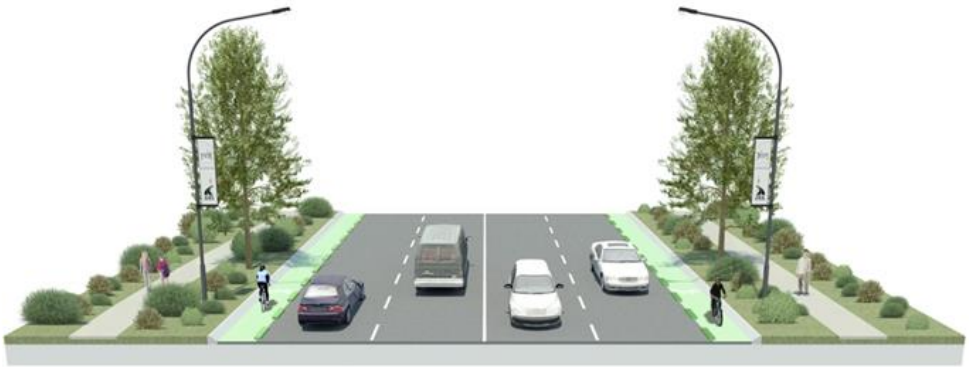
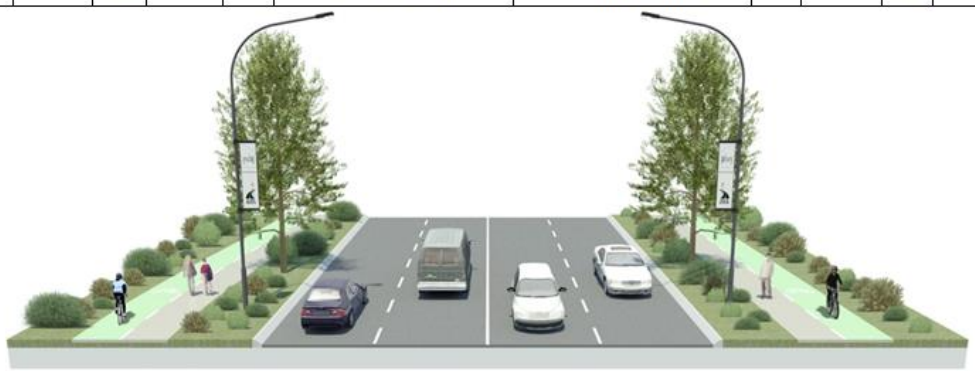


Figure 35: Implementation of walkways (residential collector)



Green Zone	Walk-way 1.5-1.8m	Green Zone	1.5-1.8m Cycle Lane	2 Lane Roadway 3.5m x 2= 7m	2 Lane Roadway 3.5m x 2= 7m	1.5-1.8m Cycle Lane	Green Zone	Walk-way 1.5-1.8m	Green Zone



Green Zone	Shared Use Path 3m	Green Zone	2 Lane Roadway 3.5m x 2= 7m	2 Lane Roadway 3.5m x 2= 7m	Green Zone	Shared Use Path 3m	Green Zone

Figure 36: Implementation of walkways (local distributor)

The following are the sidewalk principles embedded in the Complete Streets Guide for the street palette:

- Separated sidewalks should be a minimum 1.5m wide (all classifications).
- Sidewalks should be provided on both sides of all street classifications (including most residential and industrial areas)
- Wider (≥2.0m) sidewalks should be provided along public transport routes and connections to public transport hubs.
- Wider (≥2.0m) sidewalks should be provided for connections to schools, within activity centres and near major pedestrian generators (e.g. stadiums).
- Sidewalks should be wider (>2.0m) to provide separation from traffic when
    - truck volumes are > 10% of total volume
    - design speed is >60 km/h
    - traffic volume is >20,000 vehicles per day. (Note: does not apply to industrial streets)
- Sidewalk width should be chosen based on surrounding land uses (higher density requires wider sidewalk).
- For sidewalks constructed at the base of the retaining wall (between the wall and the street), be sure to include additional sidewalk width (space to remove the discomfort of having to walk immediately next to the wall or curb). The additional sidewalk width required might need to vary by the height of the wall, with higher walls requiring more space and very low walls requiring less. However, this distance should typically be at least 0.3m from the wall and, if the sidewalk must be back-of-curb due to space constraints. Generally a sidewalk next to a retaining wall should be at least 2.3m wide on avenues, boulevards, and parkways, not including the curb measurement.
- For sidewalks constructed near the top of retaining walls, provide the same additional sidewalk width as described above, and (depending on the height of the wall) include a handrail at the top of the retaining wall
- Pedestrian-scaled lighting should be incorporated appropriate to the use of the street
- Handrails and landings should be provided along steep grades

There are various manuals published by or with the DoT including the PBFGM, the South African Road Safety Manual (SARSM) (DoT 1999) and the SA and SADC RTSM (SADC 1997) contain standards and guidelines for improving the road environment for pedestrians and cyclists. These can also be addressed as extra reference. All of the above are included in the Amajuba proposals.

3.3.7 Amajuba District Municipality Non-Motorised Transport proposals

The following NMT proposals are recommended to be developed within the Amajuba District Municipality:

NMT provision for upgraded/new public transport facilities

Six public transport facilities within Amajuba DM requires to be upgraded. Part of these upgrades includes a complete re-design of pedestrian flows to and within the facility. (See plan DN0004-AM-501 to DN0004-AM-505 in Part B: Amajuba DM Conceptual IPTN Map Book.)

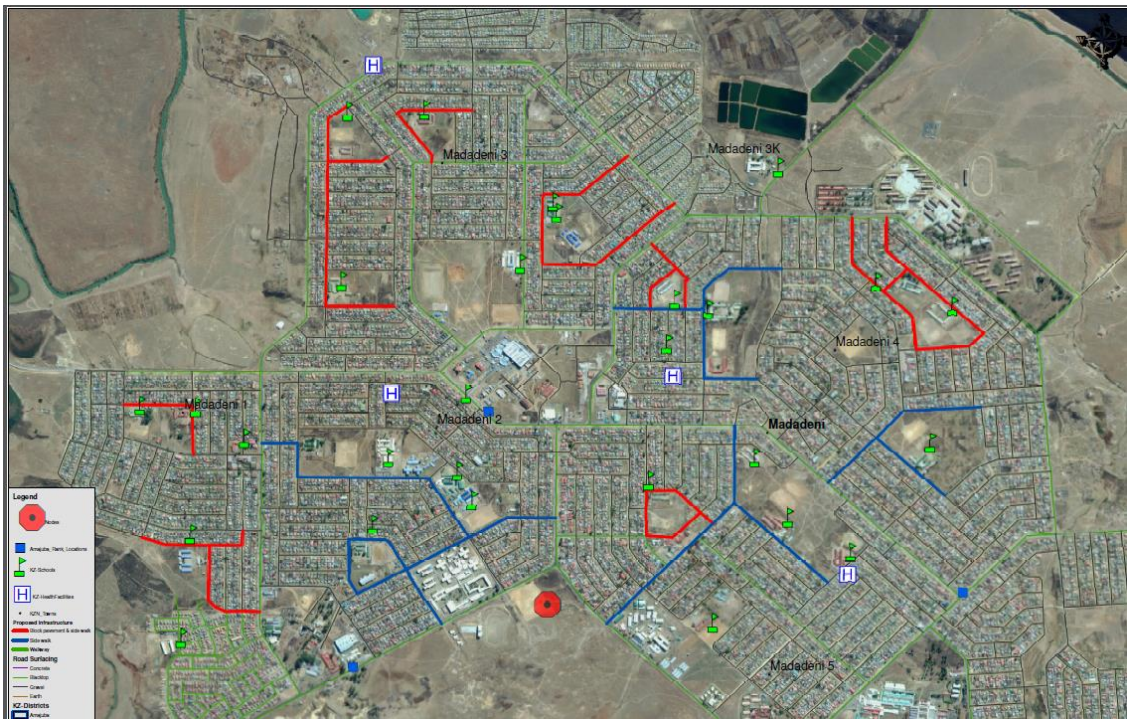


Figure 37: NMT proposals at facilities

Public transport shelters are another very important aspect of the integrated public transport network. These design and location of these facilities are discussed in the infrastructure provision chapter.

Walkways of at least 2m wide should be constructed adjacent to these shelters, providing a safer environment for pedestrians and cyclists.

NMT provision for connecting to the main public transport network

One cannot possibly connect to each and every one with a formal motorised vehicle. Economically it is just not feasible. One way of opening up the system to more rural residents is to allow for public transport commuters, wishing to travel by means of cycles a way of integrating with the system. This will fully encapsulate what the whole Integrated Public transport system stands for.

A typical commuting cyclist does not want to travel too far to get to his/her final destination. They are therefore restricted to only a few travelling possibilities closer to home. For a typical morning commuting trip, the following typical stages applies:

- Stage 1: Travelling from home to the relevant public transport stop/station
- Stage 2: The actual trip
- Stage 3: Travelling from the alighting station/stop to the final destination.

Stages 1 and 3 are mostly done by means of walking. If a means of travelling with a cycle on stage 2 of this fictitious trip was available, the number of cyclist using the network should increase.

One way of aiding cyclists would be to have a cycle trailer on most of the minibus-taxis. This will enable cyclists to commute over vast distances whilst the start and end stages of their trip can be completed with their cycle. Examples of such trailers are shown in the images below:

Figure 38: Examples of bicycle trailers

3.4 Public Transport Operational Design Proposal

In this section proposals will be defined to develop an IPTN for the Amajuba DM. To keep it practical and realistic, corridor based analyses will be executed as detailed in the sections below.

The public transport passenger volumes in Amajuba DM are not high enough to implement dedicated bus way systems. There are however sufficient passenger volumes to consider higher order bus trunk services with minibus-taxi feeder services.

With the design of these services the following key aspects were considered:

- The vehicles considered were minibus-taxis, minibuses, single buses and articulated buses; and
- The database for operating licences is outdated and no attempt will be made to price the buy-out of operating licences on the routes that is to be changed to high-intensity bus services. It is assumed that negotiations will be conducted where the provincial transport department and the taxi industry will address such challenged.

3.4.1 Public Transport Routes

Public transport routes that fall within the Amajuba DM are presented in Figure 39 and Figure 40 for bus and minibus-taxi routes respectively.

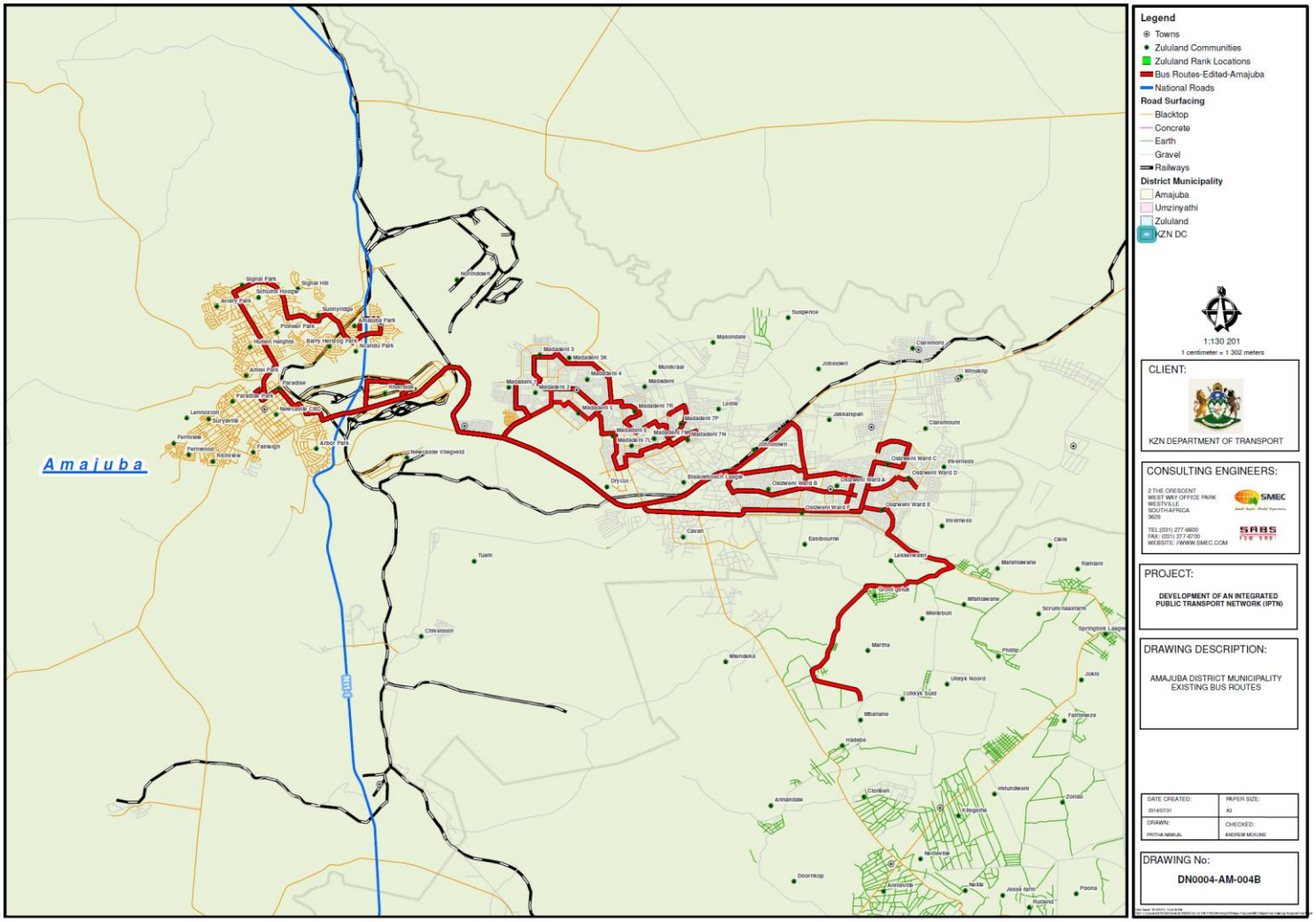


Figure 39: Existing public transport bus routes

(See plan DN0004-AM-0004B in Part B: Amajuba DM Conceptual IPTN Map Book).

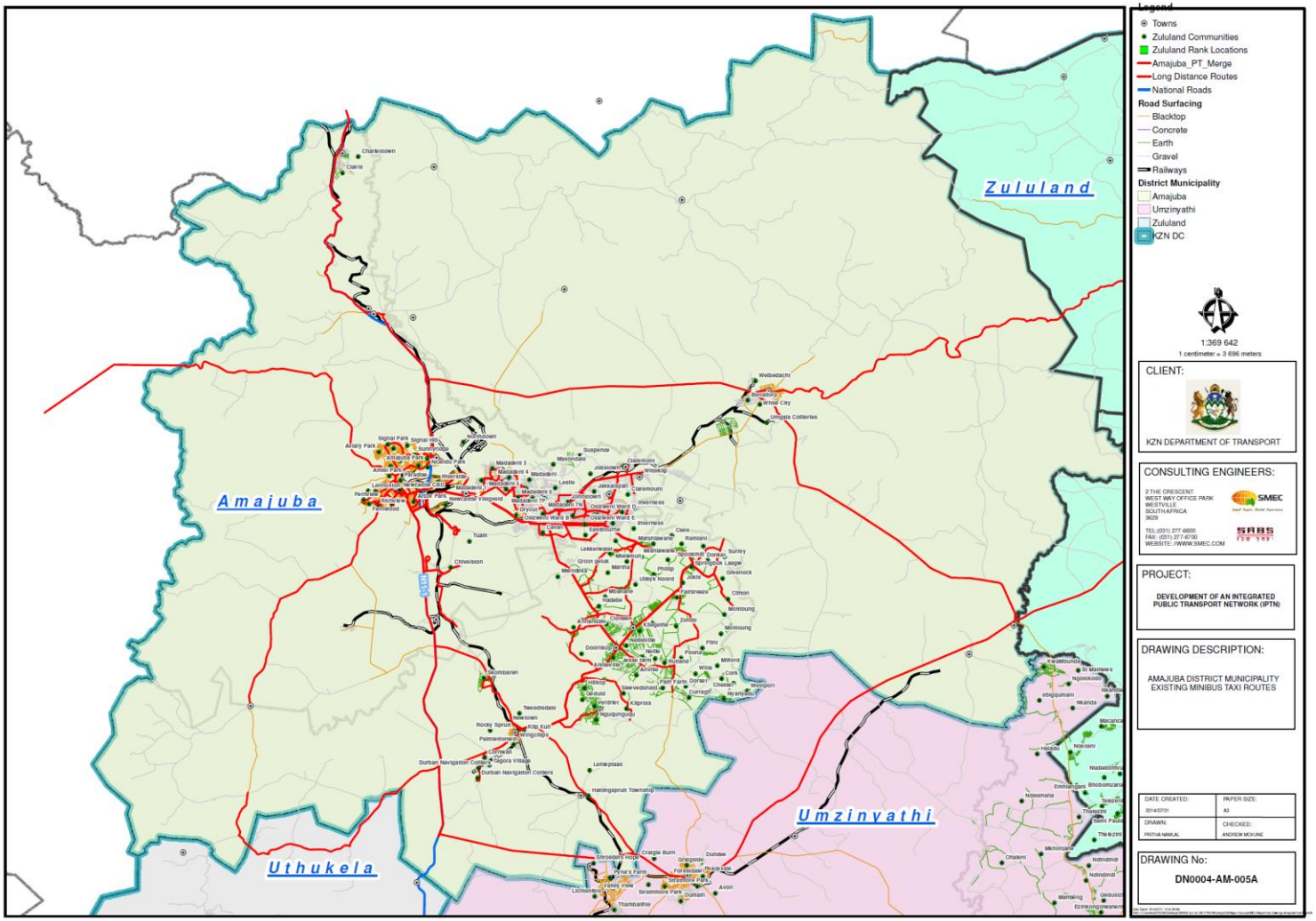


Figure 40: Existing minibus-taxi routes

(See plan DN0004-AM-0004B in Part B: Amajuba DM Conceptual IPTN Map Book).

No pavement management system (PMS) information could be obtained for the roads that fall within the Amajuba DM. It is recommended that a PMS be implemented to aid in the infrastructure phasing.

In order to classify the public transport routes in terms of road type and approximate passenger volumes, the following rationale, as indicated in Table 10 was be considered.

Table 10: Classification of public transport network

Class	Road Type	Approximate Passenger Numbers
Trunk corridors	Identified major public transport routes	
Main Routes	Feeders to the trunk corridors and major public transport facilities	>2000 daily passengers
Secondary Routes	Links towns and communities; acts as a link to the main network	<2000 daily passengers
CUL de SACS	Public transport roads ending within a town.	N/A

Infrastructure proposals will therefore be subject to the hierarchy of the specific public transport route. The demand profile for daily trips provides the basis for designing the IPTN systems. Understanding the size of passenger demand along the corridors and the geographic location of origins and destinations permits planners to closely match the system characteristics to customer needs. IPTN should be fully integrated with land use policies in order to ensure the growth of transit-orientated development around stations. The location of stops, services and residences within walking distance of stations can ensure that as there is growth within the Districts, the IPTN systems will serve the mobility needs of residents.

Major passenger movements within the Amajuba DM occur between Newcastle and Osizweni, and to a lesser extent further south to/from Dundee (the latter is a link with the uMzinyahti District Municipality). The images below are summarised accumulated passenger volumes, presented in line diagrams.

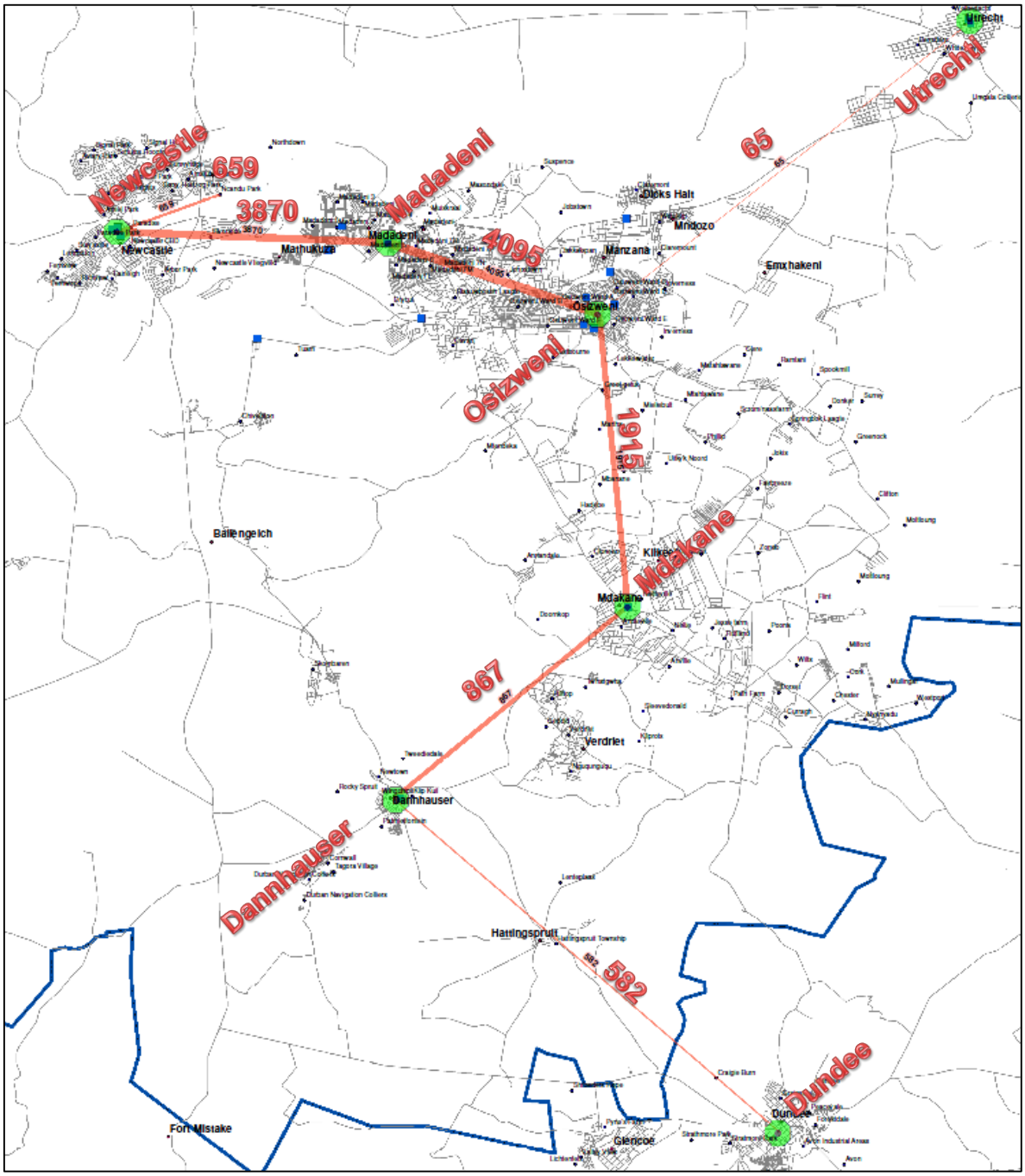


Figure 41: Daily bus two-way passenger volumes

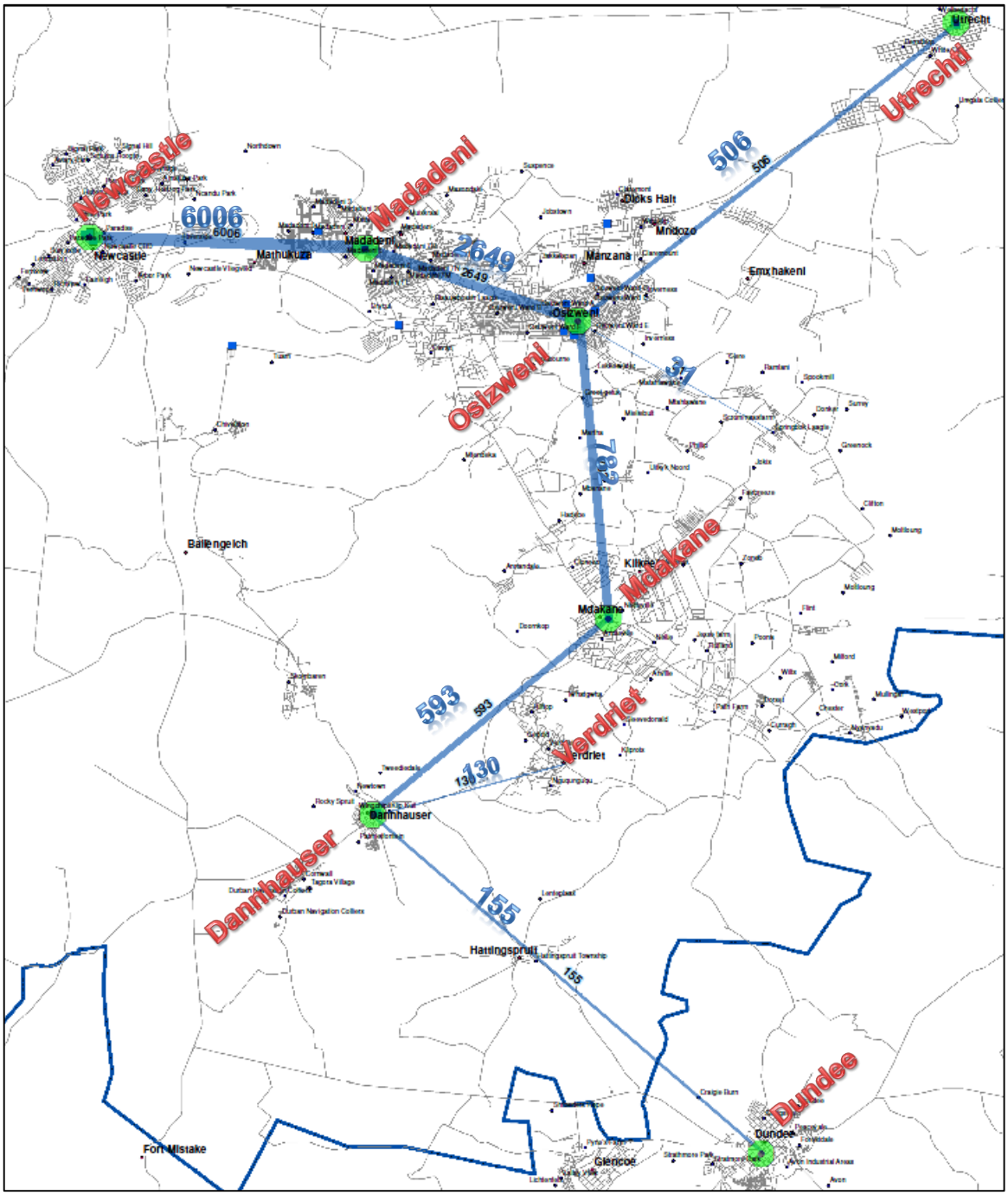


Figure 42: Daily minibus-taxi two-way passenger volumes

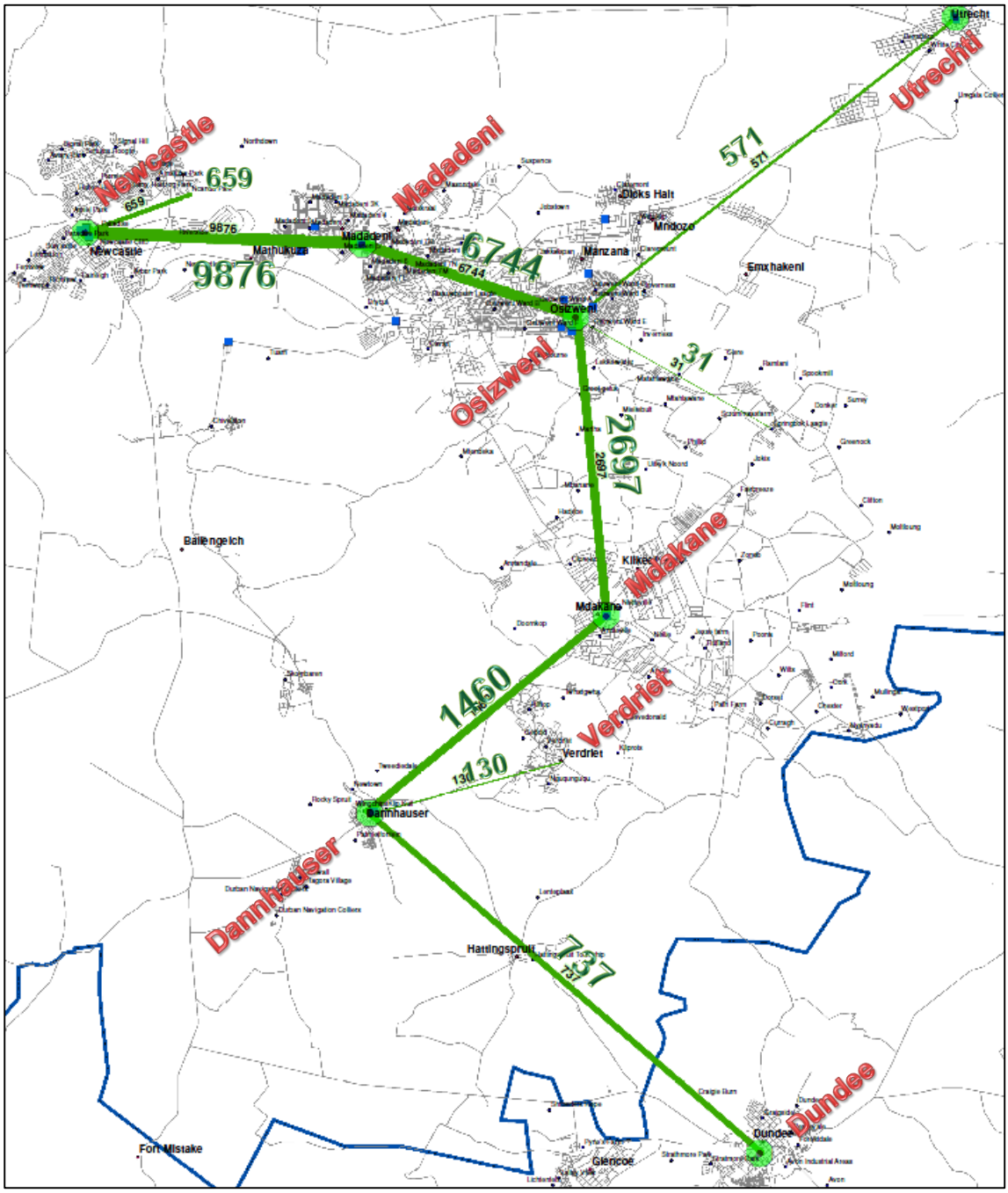


Figure 43: Combined two-way daily passenger volumes

From the image above the following can be ascertained:

- The section between Newcastle, Madadeni and Osizweni can be classified as a trunk corridor;
- The section between Osizweni and Mdakane can be classified a main route; and
- The remainder of the road sections, that are not cul-de-sacs in terms of public transport routes, can be classified as secondary routes.

Public transport Service Requirements

The preferred quality of Level of Service (LOS) will be different per scale of network. Quality LOS is determined by average operational speed (determined by the number of stops versus an Express service), and by the frequency. These factors depend on the trip length. For shorter local trips a passenger would require more stops (to reduce walking time) and a higher frequency (to avoid too long waiting time, compared to the total trip time). For longer district trips a passenger would allow for longer waiting time (relative to the total trip time) and a higher average speed is required (with less stops). A reasonably good quality LOS for the three trip categories is presented in Table 11.

Table 11: Public Transport Service and Sop Frequency

	Peak Hour	Off-Peak	Stop Frequency
Local trips (3 to 10 km)	8 trips/hr	4 trips/hr	stops every 500m
Municipal trips (10 to 30 km)	4 trips/hr	2 trips/hr	stops every 1 500m
District trips (30 to 100 km)	2 trips/hr	1 trips/hr	stops every 5km

It should be noted that the above numbers should be seen as a guideline and can be applied differently in individual situations.

The required quality LOS and the passenger numbers, together with the capacity of vehicles, will determine the type of vehicles most suitable:

- High passenger volumes would require a bus: more efficient operations, but still a good quality LOS;
- Smaller passenger volumes could better be catered for by minibus-taxi to still have a sufficient quality; and
- Very small passenger volumes would require a minibus-taxi, but would be too expensive to operate on a high quality LOS, and therefore stick to ‘traditional’ demand-driven operations.

Table 12 indicate the rounded figures in order to provide an indication of the required thresholds for Main Route operations.

Table 12: Service Mode and Frequency vs Passenger Volumes

	Service Frequency	Daily Passenger Volumes
Local	>8 bus in peak = 400 pass/hr/dir	= >4000 pass/day in 2 directions
Local	>8 taxi in peak = 120 pass/hr/dir	= >1200 pass/day in 2 directions
Municipal	>4 bus in peak = 200 pass/hr/dir	= >2000 pass/day in 2 directions
Municipal	>4 taxi in peak = 60 pass/hr/dir	= >500 pass/day in 2 directions
District	>2 bus in peak = 100 pass/hr/dir	= >1000 pass/day in 2 directions
District	>2 taxi in peak = 30 pass/hr/dir	= >300 pass/day in 2 directions

Below these thresholds operation would either be too expensive to run in a scheduled formal way, or would have insufficient quality LOS (too low frequencies). Therefore a more ‘traditional’ demand-driven operations would be more applicable.
A Conceptual IPTN is developed between and around the main nodes in a district. A main route should connect:

- Local services:
  - Residential areas – Working areas – CBD nodes – PT nodes – and Working areas beyond (with stops every 500m);
- Municipal:
  - Residential areas – smaller communities on the way – Working areas – CBD/PT node – and Working areas beyond (with stops in the main nodes every 500-1000m, between the nodes roughly every 5km, depending on the intermediate communities); and
- District services
  - CBD/PT node – smaller towns and communities on the way – CBD/PT node, with some residential and working areas on the way, or even beyond (with stops roughly every 5km, depending on the intermediate towns and communities).

Therefore transversal routes are recommended, to connect residential areas on both sides of a node and avoid a change-over for through passengers. From an operation point of view radial routes with roughly the same number of trips are connected to transversal routes. These routes would then run partly empty in contra-peak direction, but it would mean more operational efficiency. Implementation might be difficult, but easier if these route-parts are run by the same company / association.

Trunk corridor / route infrastructure requirements

As the road section between Newcastle, Madadeni and Osizweni can be classified as a trunk corridor, it should be treated as such. The image below shows the approximate 27km route between these urban centres.

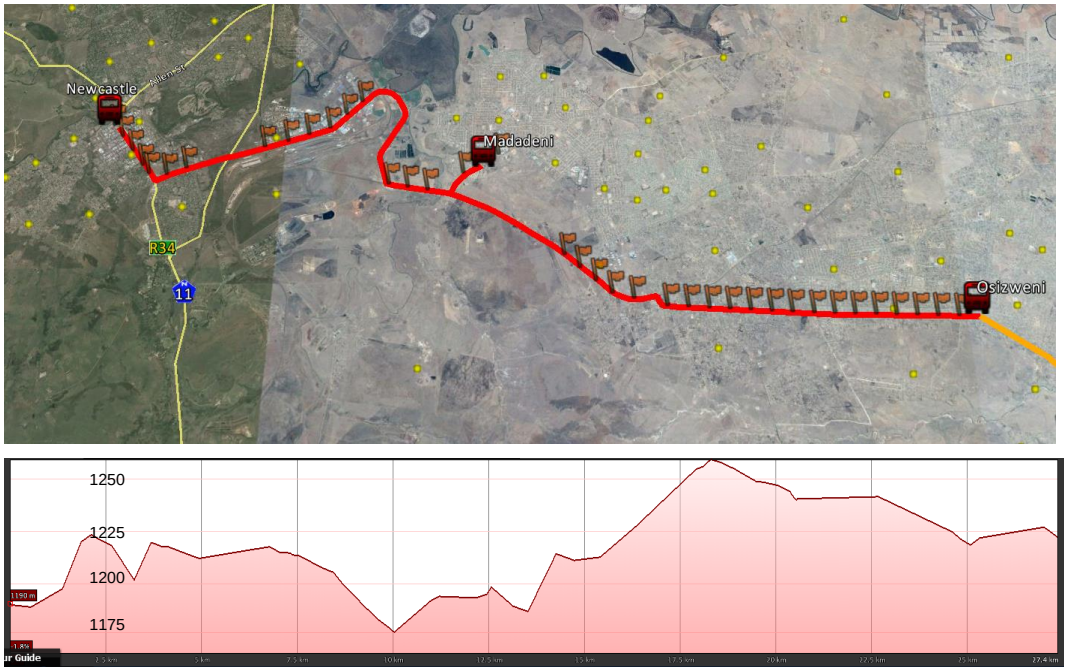


Figure 44: Trunk route to be upgraded (Long section)

The corridor operational information is presented in Table 13. The number of provisional number of buses required along the corridor during the Peak Hour was calculated. It should be noted that the

number of buses required for the proposed service is dependent on the schedule to be implemented. Thus the information provided in Table 13 is a provisional estimation until bus schedules are in place.

Table 13: Main Corridor Operational Information

Origin	Service Areas	Pax	km	Total Buses	AM Peak Hour
Newcastle, Madadeni and Osizweni Corridor	Newcastle, Madadeni, Osizweni, Blauwbosch	9876	27 km	61	3950

Although public transport vehicle volumes on this section of road do not validate the implementation of segregated public transport lanes, peripheral implementation measures should be considered. These measures include:

- Dual lane implementation of this road section;
- Public transport shelters, including lay-bys and lighting, with a spacing of at least 500m apart;
- Walkways with a width of at least 2m;
- Cycle ways can be incorporated with the walkways when the minimum width is 3m;
- Street lighting along the whole length of road;
- Formal storm water drainage; and
- Geometric improvements such as right turn lanes.

Figure 45: Existing cross section of the road between Newcastle and Madadeni

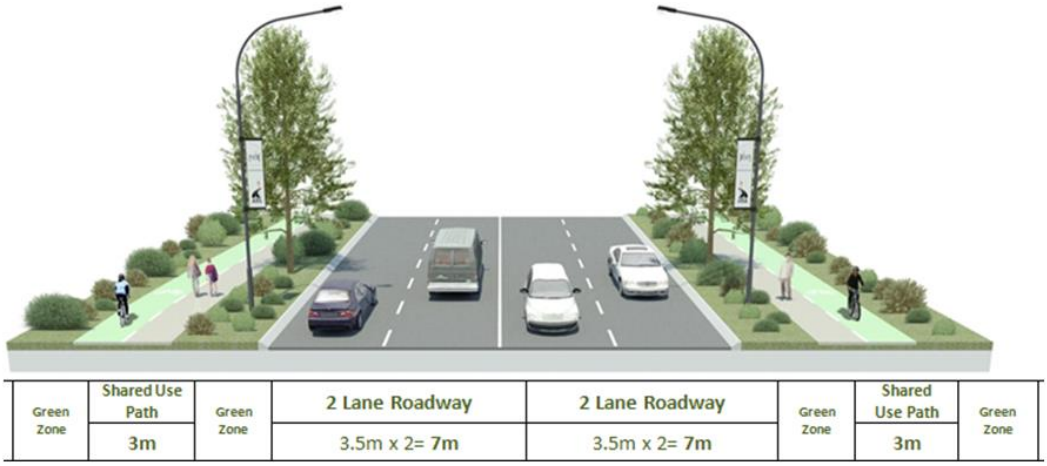


Figure 46: Proposed cross section between Newcastle and Osizweni

It should thus be a long term goal to upgrade the corridor in terms of roads infrastructure for the standard as described above.

Main routes

The 25km route between Osizweni and Mdakane can be classified as a main route due to the volume of daily passengers traversing the route as well as the route acting as a significant link to the trunk route running between Newcastle and Madadeni.

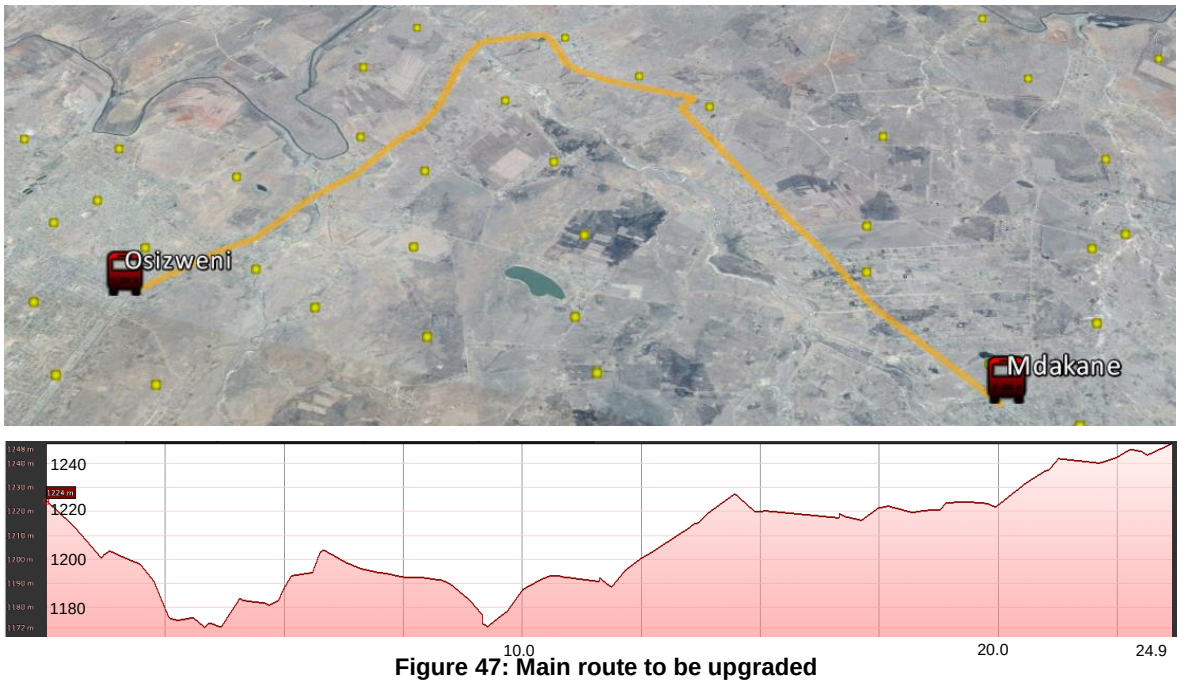


Figure 47: Main route to be upgraded

Table 14: Main Route Operation Information

Origin	Service Areas	Pax	km	Total Minibus-Taxis	AM Peak Hour

Osizweni to Mdakane Route	Osizweni, Mdakane	2697	25 km	144	2158

As a main public transport route section, it is proposed to upgrade this section of road in order to enhance the safety of all vehicles travelling on this section of road. These measures include:

- Walkways with a width of at least 2m;
- Cycle ways can be incorporated with the walkways when the minimum width is 3m;
- Street lighting along the whole length of road;
- Formal storm water drainage; and
- Geometric improvements such as right turn lanes etc.

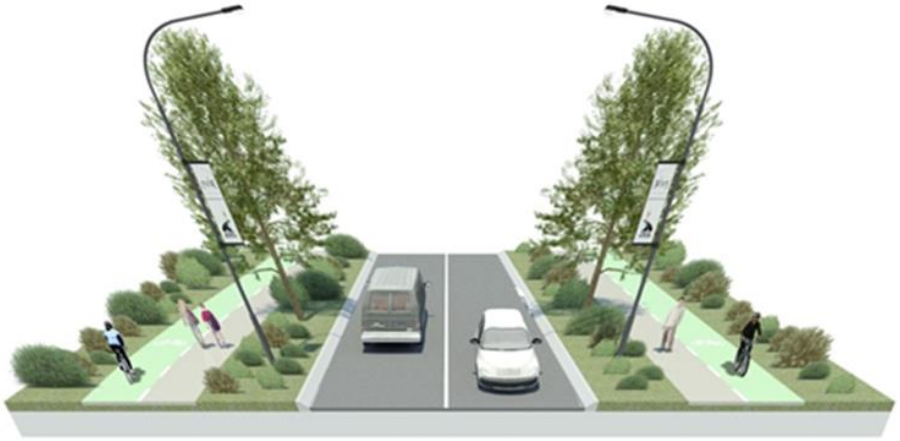


Figure 48: Proposed cross section for the route between Osizweni and Mdakane

Secondary routes and cul-de-sacs

In order for the public transport network to be accessible to the majority of the public, a proposal is put forward to implement public transport shelters at strategic locations throughout the District Municipal area. In places where no surfaced roads exist to these settlements, it is proposed to upgrade these roads by means of labour intensive construction methods. The map below shows the extent of these proposed road upgrades (shown in yellow).

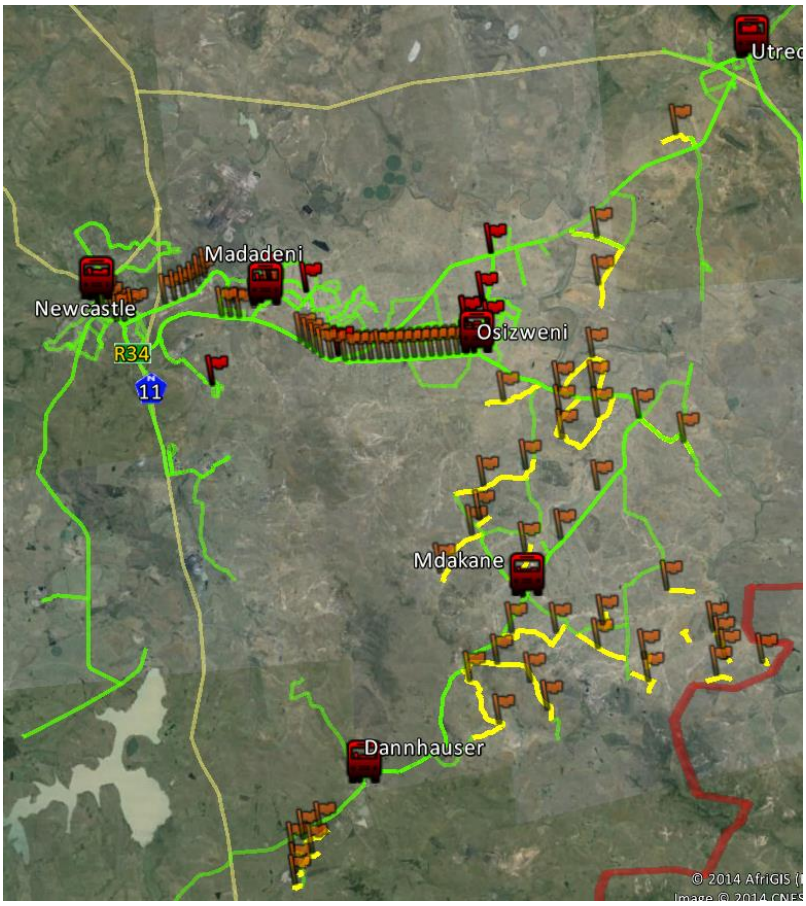


Figure 49: Extent of proposed labour intensive road upgrades

Chapter 13 expands on the opportunities and procedures to follow for labour intensive road construction projects.

These routes are recommended for the unsubsidised minibus-taxi industry by approving new operating licences for these routes.

3.4.2 Operational recommendations

- That the Newcastle – Ozisweni route be with a mixture of single and articulated buses;
- That the current operating licences of the minibus-taxis on this route be changed to feeders for the trunk route system; and
- That the bus contract of TRANSNAT be re-negotiated with that company to reflect the new service as detailed above and with the approximate cost as detailed.

4 OPERATIONAL PLAN

4.1 Key Aspects of the National Land Transport Act

It is stated in article 50 of the National Land Transport Act of 2009 that “no person may operate a road-based public transport service, unless he or she is the holder of an operating license or a permit.”

In article 55, it also states that an operating license may not be granted, unless it is proved by the planning authority in its Integrated Transport Plan that there is a need for such a service.

The defining guidelines for the Amajuba DM Operational Plan are therefore as follows:

- Ultimately all vehicles that perform a public transport service in the study area must have an Operating License for that specific service and vehicle;
- The number of operating licenses issued for any specific input must balance the demand for such a service with the supply of vehicles operating on the route in question; and
- There must be a process defined whereby operators can prove that the operating environment has changed and that there is a specific need for a new operating license.

It is very important that all stakeholders take cognizance of the following articles of the NLTA that deals with key aspects related to the process of the issuing of Operating Licenses and the management thereof:

- 47: Rationalisation of existing services: general
- 49: Rationalisation of minibus-taxi type services
- 50: Regulation of road based public transport
- 51: Entities that must issue operating licenses
- 52: Maximum validity period of operating licenses
- 53: Exemptions
- 54: Application for new operating license
- 55: Operating licenses for public transport services provided for in transport plans
- 57: Disposing of applications with regards to operating licenses for non-contracted services.
- 58: Renewal, amendment or transfer of operating license or permit.
- 59: Publication of decisions
- 62: Issue and contents of operating license
- 63: Authority conveyed by operating license
- 64: Persons who may hold operating licenses
- 65: Long-distance services
- 71: Adapted light delivery vehicles
- 72: Transporting of scholars, students, teachers and lecturers
- 73: Amendment of operating license to replace specified vehicle
- 74: Temporary replacement of vehicle
- 76: Duties of holder of operating licence or permit
- 77: No session, alienation or hiring out of operating licence or permit

- 78: Cancellation of operating licences and permits not in use
- 79: Withdrawal, suspension or amendment of operating licence or permit
- 92: Appeals to Transport Appeal Tribunal

4.2 Amajuba Integrated Public Transport Network

The Amajuba district Integrated Public Transport Network, has been identified with the following attraction points in the District i.e. Newcastle, Dannhauser, Utrecht and Dundee in Umzinyathi District. The IPTN was designed to integrate the public transport services along those corridors, based on the current subsidised services and taxi operations within the district as well as the latent passenger demand surveys. Other aspects that were considered are:

- The location of the key residential and employment nodes
- The need to improve access and provide public transport to areas presently poorly served by public transport
- The potential to reduce present journey times.

The approach for the design was to include the quality issues in the public transport strategy and the action plan. The main objectives of this report are as follows:

- Development of Integrated Public Transport Networks (IPTNs) for the *Amajuba District Municipality*
    i. Reducing travelling times for all and by all public transport modes
    ii. Provide proper network coverage, including all remote areas –resulting in walking distances to nearest PT facility of less than 1km by 2020
    iii. Improvement of service frequencies to all areas in the whole network
    iv. Provision of a system that will result in extended hours of operation
    v. Providing high quality vehicles and facilities
    vi. Achievement of multi-modal integration
    vii. Provision of access for special need users
    viii. Network image improvement
    ix. Improve needs for non-motorised transport networks

4.2.1 Approach and Methodology

Public Transport corridors clearly depict the issue of accessibility by relating transport infrastructure and transport demand with other socio-economic aspects. Poor access to transport constrains economic and social development and contributes to poverty.

Improving people's access to essential services requires better mobility through transport infrastructure and services as well as the location, price, and quality of facilities. This can be achieved by having an integrated network structure which caters for all modes of transport.

The accepted standard method for the development of service designs entails the following:-

- Collection of passenger survey data on all public transport services;
- Determine origins and destinations;
- Determine directional flows of public transport vehicles;
- Measure public transport routes and operating kilometres;
- Develop timetables;
- Determine fleet requirements;

From the analysis of the current subsidised services, a service based on trunk routes and complementary services was designed. Also the current passenger demand was determined, the fleet requirements were considered. This was based on modal efficiencies for the trunk routes as well as the complementary services.

The next step was the identification of certain stopping points, junctions, transfer points and stops along the highlighted IPTN on the area maps. The transfer points were identified to serve as starting points for the line haul service. For each transfer point and stop, villages were identified that will be served by the complementary service. The approach in the service design was with the aim of increasing mobility by assigning trips to the identified transfer point at a high frequency during the peak hours. In some instances, the starting time as per the current service was altered by assigning trips at more convenient times with an understanding that passengers currently use an earlier service because of longer travel times and lack of suitable alternative departure times.

4.2.2 Public Transport Infrastructure Components

The National Transport Master Plan divides the public transport facilities into transfer facilities, bus termini, taxi ranks and public transport halts and lay-byes. This classification is not conducive to the intended integration of the modes into a single integrated public transport system as it is still based on separately designed infrastructure. Integrated transport infrastructure should cater for the combination of all the modes at any particular location, depending on the demand.

The main infrastructure components considered in this report generally consist of depots, intermodal facilities, and stops. Depots are classified into two groups, namely, main depots and sub-depots. The intermodal facilities have been classified according to their potential variable sizes. These facilities are each described in the following sections.

Types of Infrastructure

Depots

Depots consist of main and sub-depots, and are generally located at major service centres in the Province. These will serve all modes of transport, namely, buses, taxis as well as non-motorised public transport. Main depots would normally include facilities for the operation and maintenance of the fleet, such as service stations, fuel storage, etc.

Minor depots or “sleep-over facilities” are located at destinations away from the main depots. The minor depots will function as an overnight storage for the public transport and will cater for all modes. This

increases the efficiency of the public transport towards the major service stations. The minor depots consist of storage for the public transport, accommodation, security, etc.

Intermodal Public Transport Facilities

Intermodal public transport facilities have been classified into five categories, namely:

- Primary intermodal public transport facility;
- Secondary intermodal public transport facility;
- Tertiary intermodal public transport facility;
- Main stopping facility; and
- Basic/Minor stopping facility.

The main characteristic and distinguishing features of the intermodal facilities will be their sizes, composition of the modes as well as the services that will be required as the basic support, in order to ensure that the facility functions at its best. The main determining factor for the above classification is the passenger volumes on the corridors converging at that location. Thus it is critical to first look at the existing passenger volumes in each district, in order to determine the key infrastructure locations.

Classifying, Sizing and Location of Intermodal Facilities

The size of an intermodal facility mainly depends on the number of passengers to be handled during peak hour periods. The estimation and classification of the facilities in this report will be based on the existing facilities that are similar in nature in South Africa, as a method of getting an indication for Limpopo.

The following facilities were visited to observe their main characteristics such as size of land occupied, general layout of facilities, available facilities, types of modes, retail services provided, informal trading facilities, as well as passenger volumes handled during peak hour periods. Table 4.4.1 shows the summary of analyses in order to classify facilities in Amajuba District.

Table 15: Some characteristics of existing intermodal PT facilities in Gauteng

Name of Facility	Estimated Size and Passengers Volumes			Facilities Provided (Yes or No)		
	Estimated Area (ha)	***Approximate Peak-hour volume***	***Implied density (passengers/ ha)***	***Management offices***	***Retail services***	***Park & ride***
Johannesburg Park Station	15	151 000 – 180 000	7000 - 10000	Yes	Yes	Yes
Mabopane Station	25	80 000	3 200	Yes	No	Yes
Pretoria Station	20			Yes	No	Yes

The Park Station in Johannesburg can be considered a model interchange, with a much more compact design. It has modern facilities such as management or administrative offices, retail services such as banks, restaurants, retail shops, medical shops, etc. It has well designed circulation and parking facilities, including park-and-ride with good security services. It even boasts a SAPS station within the precinct.

Pretoria station can be considered secondary to the Park station, with fewer retail facilities and shops. Banking facilities found within the precinct consist of ATMs only. Security seems to be adequate, with an SAPS station within the precinct.

Although the Mabopane station has a huge area with adequate circulation and parking facilities, it still lacks the other services found in the Pretoria and Park station. There are also a huge number of informal trading that lacks proper facilities. The park-and-ride areas are generally too far from the train station. There also seems to be unused space that could be redesign for use by other modes such as bus and non-motorised transport, as well as the provision of retail facilities. Another striking feature of this facility is that it is rather out-of-the-way in its location, while the other two are located on transport corridors, and therefore form better interchanges.

A conclusion that could be drawn from the above analysis is that the location of these facilities should be at intersection of main public transport corridors, within cities or major service centre, and should integrate all public transport modes. Specifically, the following could be deduced:

- The Johannesburg Park station would be an appropriate model to adopt with respect to its office and retail facilities design, which takes advantage of multi-story buildings where space is not in abundance;
- The Pretoria station provides insights as far as typical appropriate services such the use of banking facilities like ATMs instead of banking offices;
- In terms of land requirements, the Mabopane station could be used as a model as it is more rural in nature and thus closer to the nature of most of the towns in Limpopo Province;
- The location should take into account the ultimate land requirements, even though the facility may not be developed to its full capacity initially. Land use planning should take priority at all cases. The location of a public transport facility should ideally be determined by the following aspects:
    - Change of trip direction;
    - Change of mode;
    - Modal trip end;
    - Number of passengers converging at that point;
    - Proximity to other facilities;
    - Land availability; and
    - Existing facility that can be upgraded.

The following criteria, shown in Table below are proposed for the classification, sizing and location of the main intermodal facilities in the Amajuba District.

Table 16: Criteria used for locating and classifying public transport facilities

Classification	General Criteria	Public transport traffic volume rating	Passenger volume range in peak hour
Depots	At major service centres; Journey ends; Operator's choice		N / A
Primary public transport facility	Intersection of two primary routes; Major service centre	Very high public transport traffic volume	Larger than 60 000
Secondary public transport facility	Intersection of primary and secondary routes	High to intermediate public transport traffic volume	Between 40 000 and 60 000
Tertiary public transport facility	Intersection of secondary and tertiary routes	Moderate to low public transport traffic volume	Between 20 000 and 40 000
Major/Main public transport stop	Intersection of two tertiary routes; Every 5km along route	Very low public transport traffic volume	Less than 20 000
Basic/Minor public transport stop	Intersection of two tertiary routes; Every km in built-up areas	Very low public transport traffic volume	Less than 20 000

4.2.3 Priorities at corridor intersections

In order to function effectively, the intermodal public transport facilities will need to have certain basic infrastructure. Priorities at these intersections are based on the following criteria, which are determined on the basis of the services offered at each of the four types. The actual project level needs will be determined at project implementation stages when accurate project definitions would be done during individual project feasibility study. A general indication of needs at corridor intersections is shown in table below.

Table 17: Priorities and needs at corridor intersections

Type of Facility	Needs and services to be provided										
	Offices	***Waiting area/Rest rooms***	***Ablution facility***	***Pit latrines***	***Wash bays***	***Shops; Convenience stores***	***Informal Business trading***	***Shelters for buses, taxis and NMT***	***Open informal trading area***	***Park-and-Ride facilities***	***Bicycle storage***
Depots	Yes	No	Yes	No	Yes	No	No	Yes	No	No	No
Primary Public Transport Facility	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Secondary Public Transport Facility	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tertiary Public Transport Facility	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Major Stopping Facility	No	No	No	Yes	No	No	No	No	Yes	No	No
Minor Stopping Facility	No	No	No	No	No	No	No	No	Yes	No	No

4.2.4 Priorities along each corridor

Priorities along public transport corridors are defined as those interventions that would result in enhancing travel by public transport along the routes, to an extent that people would leave their private vehicles and travel by public transport. In terms of infrastructure, these would include the provision of the following:

- Additional dedicated lanes on public transport routes, particularly in cities and built-up areas;
- Provision of climbing lanes at strategic sections along public transport routes;
- Widening of existing narrow surfaced shoulders;
- Provision of adequate surfaced shoulders at strategic sections;
- Surfacing of collector gravel roads: secondary and tertiary, which are justifiable;
- Regravelling of poor gravel roads;
- Provision of adequate drainage structures to ensure all-weather travel and connectivity – even to isolated villages;
- Provision of non-motorised transport facilities at strategic locations on the network; and
- Effective road maintenance programmes, e.g., implementation of road management systems in all districts and the Province.

The approach to the above strategies is discussed in the following paragraphs:

The current AM peak period passenger numbers along the public transport corridors were used to calculate the peak period traffic volume. The assumption was made that the current AM peak period passenger numbers were based on a three (3) hour period. The peak hour traffic was then calculated based on the assumption above. The peak hour traffic was then converted to the Average Annual Daily Traffic (AADT) and compared with the capacity recommendations as published in the "Highway Capacity Manual 2000". Table 4.6.1 below shows the comparison between the AM peak period passenger numbers and the AADT.

Table 18: Comparison between morning peak passenger numbers and AADT

Guideline	AADT			
	250	**500**	**700**	**1000**
Passenger No (Peak Period)	670	1350	1900	2700

Notes: 1.The modal split between the captive transport and the choice transport were obtained from analysis conducted on the actual site observations and records.

2. The sub-modal split between the busses, midi busses, taxi's and non-motorised transport (NMT) were obtained from analysis conducted on the actual site observations and records.

Additional dedicated lanes

One of the most common strategies in major cities is the provision of dedicated public transport ways at highly congested sections of their networks. Sometimes these dedicated ways could be opened up for private transport during off-peak periods. Additional lanes are normally essential in urban areas where there are traffic congestions. According to the "Highway Capacity Manual 2000" the construction of additional lanes are recommended when the AADT is higher than 2550 vehicles per day. The corridors that require additional dedicated lanes were identified using the recommended AADT from the "Highway Capacity Manual 2000", Table 4.6.1 above and site observations.

Climbing Lanes

Major delays occur where public transport vehicles have to follow slow moving trucks in steep mountainous sections of the road network. These conditions do occur at some sections of the roads in the Province, and result in travel delays for public transport. The provision of climbing lanes, especially on long steep routes would ease the flow of traffic on the road network. These widened sections could be marked as dedicated lanes to favour the use by public transport vehicles.

The future climbing lanes were identified by the use of the guidelines in the "Highway Capacity Manual 2000". Where the AADT per lane is higher than 300, construction of a climbing lane would be warranted.

Widening of existing narrow surfaced shoulders

The majority of the roads in the Provincial network do not have adequately constructed shoulders. The situation may be worsened by worn-out edges and shoulders that are in dire need for re-gravelling. Adequate surfaced shoulders have a huge potential to increase the capacity of a road, and thus result in rapid public transport in the system. These will need to be wide enough to enable slow moving vehicles such as trucks, to drive on them and allow public transport to pass. A total shoulder width of 2.5m would be adequate. Adequate signage will have to be placed to regulate the traffic. The widening of surfaced shoulders was determined by field observations and analysis of the field data.

Provision of adequate surfaced shoulders

The majority of the surfaced roads in the Province have no surfaced shoulders, even though they may have wide enough gravel shoulders. As stated in 4.5.3 above, the capacity of these roads could be enhanced by surfacing the shoulders. A total shoulder width of 2.5m would be adequate. The need for surfaced shoulders was determined by field observations and analysis of the field data.

Surfacing of Gravel Roads

Poor gravel roads have a huge negative contribution towards delays on public transport and movement of passengers. Travel times could be reduced tremendously when gravel roads are surfaced. The gravel roads were identified by using the recommendation from the "Highway Capacity Manual 2000". The manual recommends that a gravel road must be upgraded to a surfaced road when the AADT is higher than 500 vehicles per day. The recommended surfacing of roads was also based on the access to the following public or community facilities:

- Clinics and Hospitals;
- Shopping centres;
- Schools; and
- New and future developments.

Regravelling of roads

Those gravel roads that cannot be justified for surfacing both economically and socially, should at least be regravelled in order to improve their riding quality. This would result in the reduction of travel times on the network. The gravel roads to be regravelled were identified by using again the recommendation from the "Highway Capacity Manual 2000". For the purposes of this investigations the following criteria were used to determine which gravel roads should be regravelled:

- Passenger volume exceeding 300 passengers peak hour period; and
- Roads in a poor state and inaccessible

Provision of adequate drainage structures

The provision of adequate drainage structures will open up access for remote communities. This strategy could be one simultaneously with the regravelling of the road in the network. The following criteria were used to determine the drainage structures along the corridors.

- Rainfall in the corridor area;
- The terrain (Flat, Rolling or Mountainous); and
- New drainage structures along the new proposed surfaced road.

The results for the upgrading of the road network in order to enhance PT are shown in the table below, Table 4.6.2.

Non-motorised transport facilities

Non-motorised transport facilities comprise the following aspects that should be integrated into the whole public transport infrastructure implementation strategies in the Provincial network.

- Walkways;
- Cycle-ways;
- Bicycle storage facilities; and
- Animal-drawn vehicle-ways.

The approach to the priorities along public transport routes is summarised in Table 19.

Table 19: Approach to determine priorities and strategies along PT routes

Road category	Strategic actions						
	Dedicated lanes	***Climbing lanes***	***Surfacing of gravel shoulders***	***Surfacing gravel roads***	***Re-gravel poor gravel roads***	***NMT***	
						Walk/ Cycle-ways	***Animal drawn Vehicle ways***
Primary	Yes	Yes	Yes	n/a	n/a	Yes	Yes
Secondary	Yes	Yes	Yes	n/a	n/a	Yes	Yes
Tertiary	n/a	Yes	Yes	Yes	Yes	Yes	Yes
Minor/ Gravel roads	n/a	n/a	n/a	Yes or No	Yes	n/a	n/a

4.2.5 Current public transport demand on each of the major corridor segments

To identify and propose key corridors and major routes, it was required to determine the present demand i.e. where people were travelling from and to (Origin - Destination patterns) and which modes of transport they were using to do so.

4.2.6 Proposed key corridors and major routes

The public transport passenger demand was depicted, it was then necessary to identify a Strategic Public Transport Network for the District. This was divided into four classes of public transport network roads, identified as:

Class	Road Type	Passenger Numbers (Peak period)
Trunk	National routes and other major identified public transport routes	
Secondary	Feeders to the Primary Network	>1000 passengers in peak period
Tertiary	Links towns and villages; acts as a link to the secondary network	<1000 passengers in peak period
CUL de SACS	Public transport roads ending within a town	

4.2.7 Classification of public transport road network

The identified Primary and Secondary routes are summarised in the table which follows:

Route No	From	To	Length (km)	Public Transport passengers (Daily passenger volume)
1	Madadeni	Newcastle	12.6	9876
2	Osizweni	Newcastle	26.3	6744
3	Mdakane	Newcastle	37.1	2697
4	Dannhauser	Newcastle	34.6	1460
5	Utrecht	Newcastle	50.4	571

4.2.8 Proposed feeder and distribution routes

In the more rural areas of the District, some people are isolated from the major nodes and have to travel great distances to access these. The Districts had a greater majority of the people who did not live within a 5km radius of a public transport route as compared to the more urban areas. Some of the roads with a major passenger demand were rural unpaved roads.

Network maps were created linking the public transport data using GIS, maps were created for the district.

The highest traffic volumes in Amajuba travel along the N11 in a north-south direction. There are also high traffic volumes travelling along the main provincial road P483 between Newcastle, Madadeni and Osizweni.

The current passenger demand is based on mixed fleet i.e. buses and minibus taxis. The IPTN approach will also consider a mixed fleet in order to accommodate all current operators.

Madadeni and Osizweni to Newcastle

Based on passenger demand the route between Newcastle and Osizweni to Madadeni has been identified as the trunk route for the IPTN. Table 1 identifies the villages which will serve as feeders to the proposed stops on the IPTN.

Utrecht to Newcastle

The service from Utrecht to Newcastle can be divided into two services on the identified IPTN network identified as a feeder to the IPTN which will via the trunk route in Madadeni to Newcastle (51.8km) or complementary route which go directly to Newcastle on R34 route (54km) which will provide services in Ncadu Park.

A transfer point has been identified as stop 1

Dundee to Newcastle

The service from Dundee to Newcastle can be serviced through the IPTN along the Mdakane areas or as a complementary service which should be comprised of feeder services from Durnacol and Dannhauser, the trip will be serviced between R68 the N11 corridor (71.8). The current subsidised services currently operate trips from Dundee to Annieville, such trips should be serviced as feeder services to the network.

Table 20: Amajuba IPTN Service

Origin	Destination	Service Areas	Length (km)	Daily Pax	Peak Period Pax	Fleet
Trunk 1: Osizweni to Newcastle						
Section 1: Osizweni	Blaauwbosch	Osizweni ward A – F, Blaaubosch	22 km	3372	211 trips	70 Minibus taxi
Start 3 : Madadeni junction Trunk route	Newcastle	Claremont, Dicks Halt, Mnodozo, Witteklip, Jobstown, Jakkalspan, Claremount , Manzana, Inverness, Lekkerwater, Mieliebult , Groot Geluk, Martha, Mbanane, Uitkyk Noord, Phillip, Mfahlawane, Mafahlawane, Clere, Ramlani, Scrum/naasfarm, Spookmill, Surrey, Springbok, Laagte, Jokis, Fairbreeze, Greenock, Clifton, Moltloung, Emxhakeni	22 km	6744 (total) 3372 1170 455 = 1625	5:30-8:30 18 trips 10 min 8:30-10:00 7 trips	10
Start 4 : 2nd Junction Madadeni trunk route	Newcastle	Leslie, Masondale, Muiskraal, Mathukuza, Madadeni A - Madadeni P	15 km	9876 4938 780	5:30-8:30 12 trips 15 min	6
			15km		308 Trips	103 Minibus Taxi (16 seats)
Start 1 : Utrecht Trunk Route	Via Madadeni to Newcastle	N11 route	30 km 54km	571 (Total) 286 (am peak) 325 (estimate)	5 trips 50/55 min	2 Buses
			54 km	286 pax	16 trips	18 Minibus Taxis (16 seats)
Dundee **Mdakane trunk route**	Newcastle	Zondo, Kilegethe, Kilkeel, Nellieville, Flint, Poona, Jesse farm, Annieville, Nellie, Blaauwbosch, Laagte, Rutland, Milford, Mullingar, Westport, Nyanyadu, Curragh, Chester, Cork, Wilts, Path Farm, Anville, Doornkop, Annandale, Cloneen, Mdakane, Hadebe	81.9 km	2728 1364 1170 455 = 1625	5:30-8:30 18 trips 10 min 8:30-10:00 6 trips	10
Dundee **Danhauser service Complementary route**	Newcastle	Twhatgwha, Sleevedonald, Hilltop, Kliprots, Verdriet, Nguqunguqu, Geduld,	71.8 km	2327 1164 (1170)	05h30 – 08h30 18 trips 10 minutes interval	15 buses
		Dannhauser, Tweediedale, Newtown, WingchipsKlip, Kuil, Palmietfontein, Rocky, Spruit				
		Hattingspruit, Hattingspruit Township Durban navigation colliers				
		Ncandu Park, Amiel Park, Amajuba Park,				
Newcastle	Ncandu Park, Amiel Park, Amajuba Park,	Internal		635		3

Table 21: Amajuba Timetables

AMAJUBA DISTRICT																				
UTRECHT TO NEWCASTLE																				
Start	Utrecht	05:40	06:30	07:20	08:10	09:00														
Transfer	Stop 1 Trunk route	06:20	07:10	08:00	08:50	09:40														
Complementary Route																				
Start	Utrecht	05:50	06:50	07:50	08:50															
Destination	Newcastle	07:00	08:00	09:00	10:00															
MADADENI AND OSIZWENI SERVICE TO NEWCASTLE																				
Start	Stop 1 Trunk route Osizweni services	05:30	05:40	05:50	06:00	06:10	06:20	06:30	06:40	06:50	07:00	07:10	07:20	07:30	07:40	07:50	08:00	08:10	08:20	08:30
Stop	Stop 2 Trunk route Madadeni services	05:45	05:55	06:05	06:15	06:25	06:35	06:45	06:50	07:05	07:15	07:25	07:35	07:45	07:55	08:05	08:15	08:25	08:35	08:45
Destination	Newcastle	06:05	06:15	06:25	06:35	06:45	06:55	07:05	07:15	07:25	07:35	07:45	07:55	08:05	08:15	08:25	08:35	08:45	08:55	09:05
Start	Stop 1 Trunk route Osizweni services	08:45	09:00	09:15	09:30	09:45	10:00													
Stop	Stop 2 Trunk route Madadeni services	09:00	09:15	09:30	09:45	10:00	10:15													
Destination	Newcastle	09:20	09:35	09:50	10:05	10:20	10:35													
DUNDEE TO NEWCASTLE SERVICE																				
Start	Dundee	05:30	05:40	05:50	06:00	06:10	06:20	06:30	06:40	06:50	07:00	07:10	07:20	07:30	07:40	07:50	08:00	08:10	08:20	08:30
Stop	Mdakane	06:15	06:25	06:35	06:45	06:55	07:05	07:15	07:25	07:35	07:45	07:55	08:05	08:15	08:25	08:35	08:45	08:55	09:05	09:15
Destination	Newcastle	07:00	07:10	07:20	07:30	07:40	07:50	08:00	08:10	08:20	08:30	08:40	08:50	09:00	09:10	09:20	09:30	09:40	09:50	10:00
Start	Dundee	08:45	09:00	09:15	09:30	09:45	10:00													
Stop	Mdakane	09:30	09:45	10:00	10:15	10:30	10:45													
Destination	Newcastle	10:15	10:30	10:45	11:00	11:15	11:30													
Complementary Route																				
DUNDEE TO NEWCASTLE SERVICE																				
Start	Dundee	05:30	05:40	05:50	06:00	06:10	06:20	06:30	06:40	06:50	07:00	07:10	07:20	07:30	07:40	07:50	08:00	08:10	08:20	08:30
Stop	R68 and R621 (Hattingspruit service)	05:50	06:00	06:10	06:20	06:30	06:40	06:50	07:00	07:10	07:20	07:30	07:40	07:50	08:00	08:10	08:20	08:30	08:40	08:50
Stop	N11 Durnacol Junction (Dannhauseer transfer)	06:10	06:20	06:30	06:40	06:50	07:00	07:10	07:20	07:30	07:40	07:50	08:00	08:10	08:20	08:30	08:40	08:50	09:00	09:10
Destination	Newcastle	06:35	06:45	06:55	07:05	07:15	07:25	07:35	07:45	07:55	08:05	08:15	08:25	08:35	08:45	08:55	09:05	09:15	09:25	09:35
Start	Dundee	08:45	09:00	09:15	09:30	09:45	10:00													
Stop	R68 and R621 (Hattingspruit service)	09:05	09:20	09:35	09:50	10:05	10:20													
Stop	N11 Durnacol Junction (Dannhauser transfer)	09:25	09:40	09:55	10:10	10:25	10:50													
Destination	Newcastle	09:50	10:05	10:20	10:35	10:50	11:05													

4.3 Law Enforcement

The need for law enforcement in terms of the National Land Transport Act can hardly be over emphasized. This Operating Licence strategy will only be successfully implemented, if it is backed by a vigorous and dedicated law enforcement process. In the NLTA the law enforcement process is regulated by the following articles:

- 85: Land transport law enforcement
- 86: Appointment of inspectors
- 87: Impoundment of vehicles
- 88: Presumptions and proof of certain facts
- 89: Powers of authorised officers
- 90: Offences and penalties

In the last article (90) as many as thirteen classes of offences have been identified, which is a clear indication that the tasks of a public transport inspector is both specialised and of a complicated nature.

As is noted above, the list of offences that the law enforcement officers are expected to pursue is long. It is not only necessary that they must ensure that these offences are pursued for vehicles registered in the district, they are also required to deal fully with all vehicles passing through on the N11. Given the volume of traffic, the lack of identifying marks on those current permit holders, this is a major undertaking and requires that the necessary manpower, equipment, vehicles and facilities are provided to pursue this task. This aspect must be pursued on provincial government level, for all the districts combined.

4.3.1 Commuter Routes

The following criteria are applicable to the evaluation of commuter or peak hour operations in order to determine the need for further operating licences:

- Waiting time of passengers in a queue for a specific route during peak operations – if the waiting times in queues are longer than 10 minutes, this indicates that the route is under-supplied and that additional capacity is required; and
- Waiting time of passengers in a vehicle for a specific route during peak operations – if passengers wait in vehicles for shorter than 10 minutes, this is an indication that the route is over-supplied and that no additional capacity is required.

As no passenger waiting queues were observed as part of the CPTR process, or by the surveyors of the project team for this study on any commuter route, the following strategy for the approval of new operating licenses on commuter routes can be formulated:

- No new operating licences on any commuter route in the Amajuba DM area should be approved, in the time that the Amajuba Operational Plan remains valid, unless:
- An operator applying for such a license can prove with new survey data (which are checked as valid by the OLB), that conditions have changed in such a way that

passenger waiting times of longer than 10 minutes now do occur on the route that the application is submitted for.

(Changed conditions can occur, for example as the result of vigorous law enforcement actions, which remove illegal operations in specific areas.)

4.3.2 Long Distance Routes

Again, if the 10 min waiting rules are applied to the long distance routes which originate in the Amajuba DM, no observations have indicated passenger waiting queues of 10 minutes and longer before a vehicle becomes available. The application strategies for commuter routes will therefore also apply to long distance routes as well as the following additional one:

- If an existing licenced operator applies for an additional long distance route, on which no other transport services are offered at present, it should be approved by the OLB.

(This will improve the mobility of affected communities, enhance the economic viability of existing operators, without affecting the viability of other operators.)

4.3.3 Dealing with other applications

The following procedures are proposed to the OLB for dealing with procedures other than the applications of new licences as was detailed above:

Table 22: Other considerations by the OLB

Application	Action
1. License Transfer Application (to deceased holder's husband, wife, son and daughter)	**No impact on supply – treat as application for renewal of licence.**
2. License Transfer Application (to another person)	**Treat as new application.**
3. Additional vehicles	**Impact on supply – treat as application for new licence.**
4. Application for educational service	**Impact on supply – treat as application for new licence.**
5. Change of particulars	**Not related to supply – treat as administrative action.**
6. Organised parties	**Operator to apply for a temporary license from OLB. (These applications should be viewed with circumspect.)**
7. Application for tourism service	**Treat as application for new long distance service.**

4.3.4 License Criteria

The following policy relates to conditions that will need to be met for a license to be approved. All regulations within the Road Traffic Act (1996) will need to be complied with and are not repeated in the OLS.

Passenger Liability Insurance

The applicant of a bus or minibus taxi license must show proof of, or the ability to secure, passenger liability insurance from a recognised insurer. Thus an operating license can only be awarded upon presentation of passenger liability cover.

The operating license will become invalid if at any stage passenger liability cover is terminated. It is also the responsibility of the operator to immediately notify the OLB of such a termination of cover.

Route Membership

It is a requirement that any person applying for a new minibus taxi operating license on an existing route, must belong to the same association(s) as the operators currently providing services on that route.

Vehicle Standards and Equipment

The following requirements relate to vehicle and equipment standards as a condition before approval of an operating license can be considered:

All vehicles must comply with SABS or SANS standards and specifications.

Where the holder of an operating license wishes to replace the vehicle that is specified in the operating license with another vehicle with the same passenger capacity, the holder must apply to the OLB for approval on the basis that the replacing vehicle meets all requirements in the original license and the quality of service is not affected.

Special equipment (e.g. special needs access) attached to approval of a license must be installed and operational before commencement of a service.

Access to Ranking

The granting of an operating license is dependent upon the necessary ranking permits being obtained and annually renewed. Should the rank permit not be renewed the operator must cease to operate on that route.

The operating permit will state which authorised ranks, or terminals, are to be used for the specific route and any other points of pick up and disembarkation will only be at points designated for such purposes by the Amajuba DM.

Where the need for public transport services is justified in terms of user demand, but insufficient capacity exists at the pick-up and drop-off points, support of the application will be subject to there being available funding for rationalization or upgrading of the required facilities.

4.4 Safety and Security

4.4.1 Introduction

Safety and security are distinct; measurable attributes of a transit system that impact service attractiveness to customers, operating costs, and overall performance. They reflect different attributes that contribute to a transit patron's comfort with riding a public transport system.

Safety is the level of freedom from hazards experienced by passengers, employees, pedestrians, other vehicle occupants, and other who interact with the transit system. **Security**, meanwhile, is the level of the freedom from crime or other intentional danger experienced by transit employees, system users, and property.

The implementation of the IPTN has the potential to yield improvements over conventional bus operations, such as:

- Improved perception of safety and security – resulting from changes to physical design attributes and service characteristics – potentially inducing additional ridership.
- Reduced transit vehicle collisions with autos, objects, and pedestrians by minimising interactions and potential conflicts within the travelling -way of other motor vehicles.
- More predictable and manageable risks, which can reduce insurance claims, legal fees, and accident investigations.
- Reduced harm to passengers either from hazards or crime.

The provision of a safe and secure environment for IPTN customers requires careful consideration of the primary safety and security risks, and the best means to address those risks, within three key system environments: inside the vehicle, on the right-of-way, and at stations and stops. Public transport stations and stops are of particular concern, as they are likely to be unattended and open during extended hours of operation. The sections below consider how investment in the IPTN can be expected to impact these risks.

Table 23: Safety issues to be addressed

Running Way – Markings
Running way markings can help decrease the likelihood of non-public transport vehicles entering an exclusive running way by visually differentiating the PT running way form mixed-traffic streets. The public transport volumes experienced in this DM does not however necessitate the construction of segregated public transport running ways.
Stations – Kerb Design
Raised kerbs or level platforms reduce the possibility of tripping and facilitate wheelchair and disabled person access.
Vehicles – Vehicle Configuration
The use of vehicle configurations with partial or complete low floors may potentially reduce tripping hazards for boarding BRT vehicles. Studies performed so far, however, cannot yet point to statistically-valid comparisons of passenger safety for low-floor buses versus high-floor buses. In implementing low-floor buses, hand-holds may be necessary between the entrance and the first row of seats since, in many cases, the wheel well takes up the space immediately beyond the entrance (King 1998).
ITS – Transit Vehicle Prioritization
Station and lane access control can improve security of transit facilities by providing access only to approved vehicles. Jurisdictions that implement signal priority should ensure that any bus-only signals are clearly marked and understood by other drivers.
ITS – Intelligent Vehicle Systems
Lane-keeping assistance systems, collision warning systems, object detection systems, and precision docking can contribute to the safety of an IPTN system through smoother operation as it is operating at high speeds, in mixed traffic, or entering/exiting traffic flows. In addition, guidance technologies allow vehicles to follow a specified path along the running way and in approach to stations, thereby helping operators to avoid collisions while maintaining close tolerances.

4.4.2 System Safety and Security Measures

This section describes security measures which are applicable to public transit. Crimes related to bus transit can occur in three separate environments: (1) while traveling on the bus, (2) while waiting at a bus stop, and (3) while walking to or from the bus stop (Hoel).

Security on Buses/Minibus-Taxis

The problem of robbery of bus/train drivers has largely been eliminated by smart card payment systems used by most public transportation authorities. The threat of an assault always exists, however, as does the possibility of vandalism and rowdy behaviour (Hoel).

There are three strategies to reduce assaults against bus/train drivers and passengers:

- Create an environment in which a crime will not be attempted (deterrence);
- Furnish devices to enable the driver to summon help (thwarting); and
- Improve the means for capturing the criminal suspect subsequent to the crime (apprehension).

Methods for reducing robberies and assaults on buses are shown below:

Deterrence

- Reduce overcrowding
- Eliminate or reduce cash availability
- Isolate driver in separate booth
- Furnish extra personnel on buses
- Furnish police or security guards
- Publicise security measures

Thwarting

- Furnish means to isolate the criminal
- Furnish alarms on buses
- Furnish protective clothing for drivers

Apprehension

- Furnish two-way radios on buses
- Furnish covert alarms on buses
- Use closed-circuit television
- Photograph bus patrons

Security for Bus Stops

Research has indicated that most crime incidents occurred at public transport stops. The two most evident reasons for crime incidents at public transport stops were pedestrian crowding and dangerous rural stop location. Some general guidelines in ensuring a safe PT stop design are highlighted below:

- Ensure that bus stops are placed in areas where passengers have safe and direct access to sidewalks, telephones and nearby developments (Federal Ministry for Economic Cooperation and Development, 2004).

- Waiting areas should be well-lit and open. Adequate lighting is important from a safety standpoint and as a deterrent to criminal activity.
- Maximize visibility by designing doors and windows to look into public areas, such as parking lots, roadways or sidewalks (APTA Transit Infrastructure Security Work Group, 2010).
- Ensure adequate illumination of public areas. Street illumination is an important element to consider (APTA Transit Infrastructure Security Work Group, 2010).
- Organized surveillance strategies include use of police and guard patrols. It is directed at keeping intruders under observation.
- Lighting and CCTV are mechanical strategies for surveillance, and natural strategies include widows, low landscaping and raised entrances (APTA Transit Infrastructure Security Work Group, 2010).
- Design features that can dramatically degrade both access and security are sound walls or other similar structures which can isolate waiting passengers from the neighbourhood. In general, there is no reason to locate transit stops adjacent to sound walls or fences, as these preclude direct access from neighbourhoods. Should this situation arise, the structure's design should consider breaks that allow for pedestrian access.
- Use landscape structures and architectural designs to discourage access to private areas (APTA Transit Infrastructure Security Work Group, 2010).
- Street furnishings, trees, and bushes should be designed to provide an open area near the bus stop.

Security when Walking

Countermeasures for crimes that occur while walking to or from a bus stop are also related to the environment in which the crimes occur. Elderly or transit-dependent riders are most likely to be assaulted because they ride most often and are perceived as vulnerable. People feel most safe in daylight hours and many are fearful to ride transit during the evening. This problem can be addressed by a neighbourhood effort to provide more lighting, escort services, police, and sidewalks. A "business watch" similar to neighbourhood watches, using private security personnel with local police coordination, would create a safer sidewalk environment (Hoel).

Crime Counter-measures

Transit security can be improved by incorporating various policies, procedures, design features, and technologies into a rapid transit system. These crime countermeasures are typically divided into the following categories:

- hardware/device related;
- station/vehicle design related;
- personnel/operations related;
- judicial policy related; and
- land-use related.

The basic elements of each of these categories are shown in Table 24:

Table 24: Basic crime counter-measures

Hardware/Device Related	**Station/Vehicle Design Related**
• Closed-circuit TV • Passenger-activated alarms • Pre-screened riders • Public address systems • Telephone (radio) communication between passengers and security	• Adaptive space • Attractive, clean transit property • Barriers and fences • Elevated guideways • Elimination of station restrooms • Good lighting • Non-breakable windows • Open design • Single exits • Vandal proof surfaces
Personnel/Operations Related	**Judicial/Policy Related**
• Curfews • K-9 (police dog) patrols • Plainclothes detectives • Police decoys • Presence of transit personnel • Saturation patrols/random patrols • Reduction of operating hours • Visible, uniformed security force	• Differential penalties • Mandatory sentencing • Rapid processing
	Land-Use Related
	• Landscaping • Site selection • Station/use integration

*Source: Hoel, n.d.

4.4.3 Concluding Remarks

Personal security is an important factor in the decision by many people to use public transportation. While individuals are not attracted to transit simply because it promises a risk-free journey, they are deterred if the system is seen as unsafe, regardless of other positive attributes that the system may possess. People avoid transit at night and during off-peak hours if they perceive themselves as vulnerable.

Security measures for bus transit should recognize that crimes can occur while traveling on the bus, while waiting at a stop, or while walking to or from a stop. Each situation requires a separate strategy and consequently must be dealt with on a case-by-case basis.

4.5 Summary

The legitimacy of operating mini-bus taxis has been examined. A total of 14 minibus-taxi ranks within the Amajuba DM have been surveyed in order to determine the number of vehicles operating without a valid operating license. During the survey, 1673 mini-bus taxis were observed, 390 were legitimate and the rest can be considered as illegally operating in the public transport system.

It is also obvious that a sensible operating licence strategy simply cannot be devised on the above data. The only recommendations that can be defined are thus the following.

- A detailed administration process must be launched by the Operating licensing Board to compile an up-to-date and relevant record of valid operating licences issued that is decidedly route based;
- The generic rules for the issuing of new operating licences must be applied on the routes of the Amajuba District Municipality; and
- Once an updated list of valid operating licences has been compiled a rigorous law enforcement campaign must be launched for the network of illegals.

5 FINANCIAL IMPLICATIONS AND PHASING PLAN

The financial implications and financial plan is informed by the Public Transport Network Analysis and Design (Chapter 3) and the Operational Plan (Chapter 4). This chapter presents an overview of the likely financial implications of the proposed public transport network and services. This chapter is pitched at the conceptual level and more detailed financial analyses and phasing plans will have to be formulated during the detailed design phase of the project. The phasing plan is addressed in more detailed in Section 5.2 and the financial implications are described in Section 5.3.

5.1 Phasing Plan

Table 5.1 below provides a summary of the changes from the existing services to the proposed service in terms of the applicable phasing considerations.

Table 5.1: Phasing Considerations of New Proposed Services

Route	Current service	Proposed Service	Phasing Considerations
Newcastle – Madadeni – Osizweni Corridor	Minibus-taxi and bus services	Bus Service	• Negotiations on transition with existing taxi operators; • Design of new bus service (contract specifications) • Tender procedures and processes
Osizweni - Mdakane	Minibus-taxi	Minibus-taxi	None, no changes to existing services

There are one corridor route in the Amajuba DM area that will be affected by a new proposed service, namely the Newcastle-Madadeni-Osizweni Corridor. In order to avoid duplication of services the transition needs to be on a stop-start basis. This means that the minibus-taxi services should be terminated at the end of the evening peak period on the last day of the month preceding the start of the new contracted bus service. The new bus service will then start operating on the first day of the new month.

Although the new service as such do not need any phased introduction there are certain tasks that will take time to complete before the service can commence. These time-related tasks are the following:

- Negotiations with the existing minibus-taxi operators to stop their operations. It is anticipated that there will be financial implications for the DM in this regard. Such negotiations could be protracted as operators will not want to give up their livelihoods easily;
- The new bus service will have to be designed and contract documents compiled.
- The tender process will also have certain associated time periods, such as the tender period itself, tender evaluation and appointment, and site establishment.

5.2 Financial Implications

In determining the likely financial implications of the Amajuba IPTN the following components need to be taken into account:

- Road infrastructure costs;
- Capital and Operational Costs associated with the introduction of any new contract services;
- Public transport facility costs; and
- Non-motorised transport related costs.

5.2.1 Road Infrastructure Costs

As there is no active Pavement Management System in place in the DM area, no cost estimates related to road infrastructure could be made.

5.2.2 Capital and Operational Costs of New Services

Typically, a transport service has two main cost elements, namely capital and operational costs. Capital costs are related to the cost of acquiring vehicles (passenger carrying vehicles such as buses, minibuses, articulated buses and in larger services vehicles used by the operator in running the service such as repair and inspection vehicles). Operating costs are the costs associated with actually running the service on a daily basis.

In order to provide any cost estimate, even a high-level one, a great deal of information is required on the service itself. This information includes elements such as vehicle type (even the mix of larger and smaller vehicles if the service requires it), number of daily trips (peak and off-peak) by vehicle type and head-office type costs such as those related to depots and sleeping grounds. In effect it means that the service should actually be scheduled in order to get the fleet requirement, headways and daily trips.

This section does not contain a detailed cost estimate of the proposed service due to the requirements of calculating vehicle trips. However, the process of costing the service is explained in some detail in this section.

In order to obtain the number of vehicles required for the proposed service as well as the kilometres they have to travel on a daily basis, the following methodology needs to be employed.

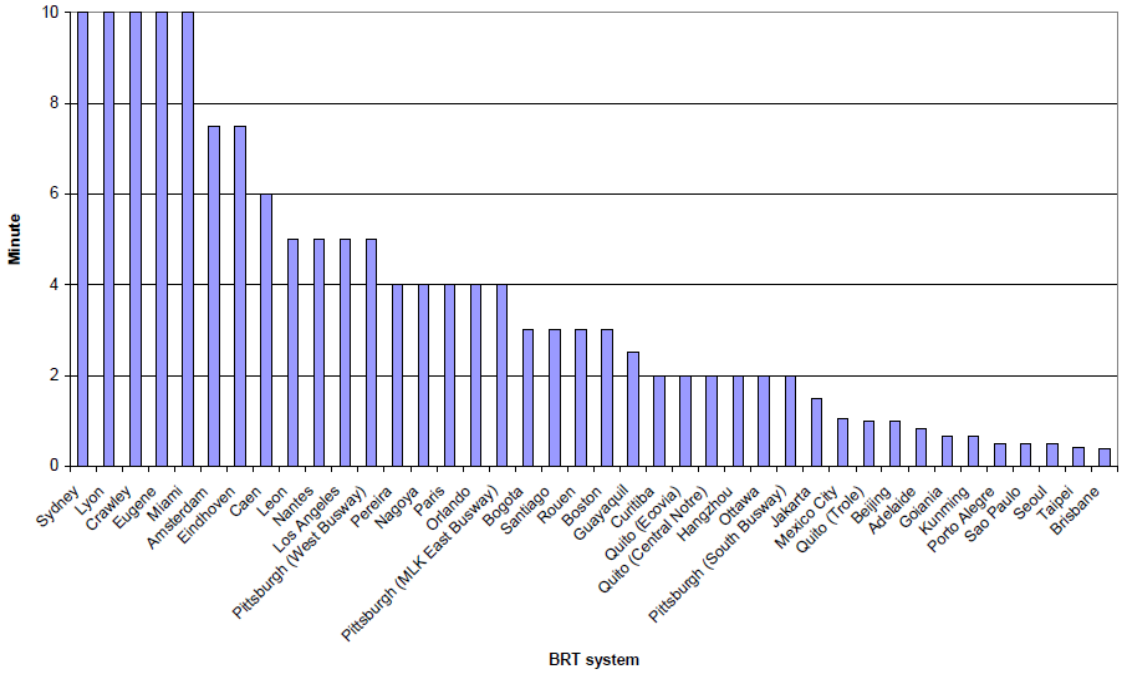
Transit line Scheduling Methodology

The method for transit line scheduling, has been developed by Vuchic (Vuchic, 1981) and (Vuchic, 2003). The following transit operations and scheduling definitions and symbols were sourced from the two sources above:

Headway (h)

"*Headway is the time interval in minutes between two successive transit vehicles on a line. Transit users are interested in having service with short headways to minimise waiting time. However, since for any given volume of passengers per hour it is cheaper to operate a smaller number of large vehicles than a greater number of small vehicles, the operator is interested in operating with larger vehicles at longer headways*."

The figure below shows a comparison of all the average headways for various systems around the world.



FigureNN: Average peak headways

*Source: (Hensher & Golob, 2008)

Policy headway (h_p)

In order to ensure that the end user of the public transport system does not wait too long for a transit unit to pass, due to operational cost limitations, a policy headway should be implemented for the service. This will ensure that amount of time that passengers would wait for a vehicle to pass would have a set maximum. Due to the different demand patterns for peak and off-peak movements, two different policy headways are usually given.

South African policy headways for peak hours are currently 15 minutes with off-peak headways being 30 minutes.

Frequency of service (f)

"*Frequency of service is the number of transit trips passing a point on the line during one hour (or any given period of time). Thus, short headways mean high frequency, long headways represent low frequency."*

Vehicle Capacity (C_V)

"Vehicle capacity is the total number of passenger spaces on the vehicle. It is calculated by adding the number of seats plus the standing capacity."

Maximum line capacity (C_{MAX})

"*The maximum line capacity is the maximum number of passengers per hour a line can carry with minimum operationally feasible headways."*

Operating time (T_o)

"*Operating time is the scheduled time interval between departure of a vehicle from one terminal (end-of-line stop or station) and its arrival at another terminal on a route, T_o is usually expressed in minutes."*

Operating speed (V_o)

"*Operating speed is the average speed of a transit vehicle, including stopping time at stations or stops and expected delays for traffic reasons. It is computed as the one-way line length (L) in kilometres divided by the operating time in minutes*.

Terminal Time (t_t)

"*Terminal time is the time a vehicle spends at a terminal or end-of-line stop in excess of the interval required for the boarding and alighting of passengers. Its purpose is to allow time for vehicle turning or change of drivers, rest of the driver (or crew), and adjustment in schedule (e.g. to maintain uniform headway, or to recover delays incurred in travel)."*

Cycle Time (T)

"*Cycle time is the total round trip time for a vehicle. i.e., the time interval between two consecutive times the same vehicle passes a fixed point travelling in the same direction."*

Commercial Speed (V_C)

"*Commercial speed is the average speed of a transit vehicle for a complete round trip. Commercial speed is the most important type of speed for the operator since it directly determines (along with headway) the required fleet size and cost of operation."*

Fleet Size (N_f)

"Fleet size is the total number of vehicles which a transport operator owns. The fleet size consists of the vehicles required for regular peak hour service on all lines (N), vehicles in reserve (N_r), plus vehicles which are in maintenance and repair (N_m)."

Load Factor (α)

"Load factor is the ratio of the number of passengers in a vehicle to the vehicle capacity. A higher value of α means that a vehicle is crowded and that it is more likely that some vehicles will not have sufficient capacity to collect all waiting passengers."

Transit unit (TU)

A transit unit is a single unit, and could be made up of a number of vehicles, e.g. an articulated bus consists of one TU, but two vehicles (n).

Maximum volume of passengers (P_{max})

The maximum volume of passengers on any section along the line is measured in passengers per hour.

In the Public Transport Systems course notes (Vuchic, 2003), the following transit line scheduling equations are provided:

Based on the passenger volume, frequency and headway is calculated:

$$h = \frac{60}{f}$$

Equation 1

Where:

h = headway (minutes)

f = frequency (TU/hour)

$$f = \frac{P_{max}}{\alpha * n * C_v}$$

Equation 2

Where:

f = frequency	(transit units/hour)
n = number of vehicles per transit unit	(veh/transit unit)
α = desired maximum utilisation coefficient	(passengers /space)
C_v = vehicle capacity	(spaces/transit unit)
P_{max} = maximum volume of passengers along any section along the line	(persons/hour)

The headway should be rounded down and devisable into 60, for ease of scheduling as well as to ensure that the schedule repeats itself over the next hour. The smallest number between h and h_p is adopted. A first estimate of cycle time T' is computed as:

$$T' = 2T_o + t_{tl} + t_{t2}$$

Equation 3

Where:

T' = first estimated cycle time	(minutes)
To = operating time	(minutes)
t_{t1}, t_{t2} = terminal times	(minuets)

The number of transit units (TU's) operating for the computed schedule is computed as:

$$N = \left[\frac{T}{h}\right]$$

Equation 4

Where:

N = number of transit units	(TU)
T' = first estimated cycle time	(minutes)
h = headway	(minutes)

Note that N should be rounded up to the next integer value. Final cycle time is then calculated as:

$$T = N * h$$

Equation 5

Where:

T = cycle time	(minutes)
N = number of transit units	(TU)
h = headway	(minutes)

Cycle speed is then calculated as follows:

$$Vc = \frac{120 * L}{T}$$

Equation 6

Where:

Vc = cycle speed	(km/hour)
L = length of the transit line	(km)
T = cycle time	(minutes)

Once the above scheduling exercise has been completed the cost estimate can then be compiled. There are generally three main cost elements, namely running costs (variable costs that vary with the number of kilometres operated per day), fixed operational costs and overhead costs.

Running Costs

Running costs include cost items such as fuel, tyres, lubricants, and maintenance costs associated with kilometres travelled.

Fixed Operational Costs

Fixed operational costs (i.e. those costs that the operator incurs irrespective of the level of operations) typically consist of the following items:

- Bus instalments and insurance costs (normally the average lifetime of a bus is 12 years);
- Branding expenses;
- Bus driver salaries;
- Maintenance personnel salaries;
- Other personnel salaries;
- Depot rent; and
- Office rent.

Branding costs are normally fixed per bus and depends on the number of times branding will be allowed during the lifetime of the bus. Bus drivers salaries are directly linked to the number of buses required in the peak hours of operation. The maintenance personnel complement depends on the policy of the operator in terms of maintenance and repairs, i.e. whether vehicles are maintained by the operator itself or if they were acquired on a full maintenance lease. Other personnel salaries include operations staff such as scheduler(s), despatchers, clerks, human resource staff, financial and accounting staff and management. Depot and office rent also form part of fixed operational costs as these are payable on a monthly basis, irrespective of the level of operations.

Overhead costs

Overhead expenditure is the last of the three operational cost elements and consists of the following items:

- Telephone and internet usage;
- Maintenance equipment;
- Water and electricity bills;
- Public relations expenses;
- Security contract;
- Computer equipment;
- Salaries of management and admin staff;
- Advertising; and
- Service vehicle instalments.

All three operational elements are added up to get to a total monthly operating cost.

The next step is to calculate the fare box recovery as this figure dictates the subsidy required from the contracting authority.

Fare box Recovery

Fare box recovery is based on two types of fare revenue. The first is passengers paying with cash, whilst the alternative is to buy a monthly journey pass. An incentive to have a lower rate per kilometre for the monthly pass is usually implemented, which will ensure revenue for the whole month.

Subsidy Requirements

The subsidy requirement is calculated by deducting the fare box recovery from the operational costs.

5.2.3 Public Transport Facility Costs

Table CCC on the next page contains a custom-developed infrastructure calculator that can be used in determining likely infrastructure costs for new facilities or upgrading existing facilities. The table shows the various cost items, the respective elements that attract costs as well as unit costs. The quantity of each cost element (reflected in the green column in the table) is filled in and the cost automatically calculated. The calculator also contains a recommended value or requirement for each cost element. Depending on the specific case in point, the suggested recommended value can either be accepted or overridden.

Table 25: Infrastructure Cost Calculator

Item	Sub-item	Requirement/Recommended	Unit	Quantity	Rate	Total	Comments
PT Vehicles	Drop-off area (used by buses)	One drop off for every 10 buses	No	0	R 48 000	R 0	
	Drop-off area (for minibus-taxis)	One drop off for every 10 minibus-taxis	No	0	R 9 000	R 0	
	Ranking area (used by buses)	1:2 ratio for peak vehicles	No	0	R 56 000	R 0	
	Ranking area (for minibus-taxis)	1:2 ratio for peak vehicles	No	0	R 10 500	R 0	
	Shelter (used by buses)	drop off plus 75% of ranking area	No	0	R 48 600	R 0	
	Shelter (canopies for minibus-taxis)	drop off plus 50% of ranking area	No	0	R 9 000	R 0	
NMT	Walkways (including kerbing)	1.5 - 2 m wide	m^2	0	R 600	R 0	
	But-rests/seating	At least for the front three ranking berths	No	0	R 1 500	R 0	
	Shelter (canopies)	Major NMT movement on the exposed level	m^2	0	R 900	R 0	
	Handrails	Everywhere for heights more than 1.5m	m	0	R 650	R 0	
	Pedestrian ramps	Max 1:15 slope with transition half way	m^2	0	R 1 500	R 0	
	Cycle storage	5% of ranking area	m^2	0	R 1 000	R 0	
Bulk Services	Access roads (used by buses)		m^2	0	R 1 000	R 0	
	Access roads (not used by buses)		m^2	0	R 800	R 0	
	Lay-by (used by buses)	At least one per direction of travel	No	0	R 80 000	R 0	
	Parking bays	If required	No	0	R 15 000	R 0	
	Bulk Earthworks (soft material)	Assume cut and fill of 0.5m on the whole site	m^3	0	R 190	R 0	

Item	Sub-item	Requirement/Recommended	Unit	Quantity	Rate	Total	Comments
Internal services	Water	At least the longest length of the site	m	**0**	R 1 500	R 0	
	Sanitation	At least the longest length of the site	m	**0**	R 0	R 0	
	Electricity	5% of construction, minimum R35k for shelters	LS	**0**	R 35 000	R 0	
	Storm water	At least the longest length of the site	m	**0**	R 2 500	R 0	
	Telecommunication	Assumption	LS	**0**	R 10 000	R 0	
	Wash bays	One wash bay for every 100 vehicles	No	**0**	R 75 000	R 0	
	Road markings and signage	Approximately 1.5% of contract value	LS	**0**	R 0	R 0	
	Internal roads (used by buses)	Proficient bus turning radii	m^2	**0**	R 800	R 0	
	Internal roads (not used by buses)	Proficient minibus-taxi turning radii	m^2	**0**	R 600	R 0	
Retail	Hawker stalls	One hawker for every 250 peak hour passengers	No	**0**	R 8 000	R 0	
Structures	Offices	Approximately 36m^2 per association	m^2	**0**	R 7 500	R 0	
	Stores	Approximately 12m^2 per association	m^2	**0**	R 4 500	R 0	
	Ablution facilities	8 WC per 1000 passengers plus 2 disabled WC	m^2	**0**	R 12 000	R 0	
	Floor slab (for multi-level structure)	340mm slab	m^2	**0**	R 1 500	R 0	
	Columns (for multi-level structure)	600x 900 columns	m^2	**0**	R 260	R 0	
	Piling (for multi-level structure)	At least two piles per column	m^2	**0**	R 700	R 0	
	Ramp (to and from multi levels)	Max 1:10 for vehicles	m^2	**0**	R 1 500	R 0	
	Rail platform	Only link with a platform to existing rail infrastructure	m^2	**0**	R 1 800	R 0	
	Typical shelter (at lay-by)		No	**0**	R 45 000	R 0	

Item	Sub-item	Requirement/Recommended	Unit	Quantity	Rate	Total	Comments
Safety and Security	CCTV monitoring system	Highly recommended	LS	**0**	R 20 000	R 0	
	Fire protection (sprinklers, hydrants and reels)	Required at all sites	m²	**0**	R 150	R 0	
	Fencing	Around the site perimeter	m	**0**	R 500	R 0	
Site establishment	Establishment, P's & G's	20% of contract value	LS	**0**	R 0	R 0	
				0			
Items not included	*Bulk water*		*LS*	*N/A*	*N/A*	*N/A*	*Assumed to be available*
	Bulk sanitation		*LS*	*N/A*	*N/A*	*N/A*	*Assumed to be available*
	Bulk electricity		*LS*	*N/A*	*N/A*	*N/A*	*Assumed to be available*
	Bulk storm water		*LS*	*N/A*	*N/A*	*N/A*	*Assumed to be available*
	Demolition		*LS*	*N/A*	*N/A*	*N/A*	*Assumed not to be required*
	Mass retail		*m²*	*N/A*	*N/A*	*N/A*	*Business model to pay for construction*
	Railway line		*LS*	*N/A*	*N/A*	*N/A*	*Assumed to be available*
	Holding area		*m²*	*N/A*	*N/A*	*N/A*	*Formal holding areas not included*

5.2.4 Non-motorised Transport Costs

Non-motorised costs are dependent on the actual design of the facilities/infrastructure and typically includes the area to be paved, sidewalks to be constructed, and other facilities such as provision for bicycle storage.

6 FINANCIAL MODEL

The financial model has taken into account the existing operations, together with those that are proposed for the new system and contained in the operational plan. The objective of the financial model was as follows:

- Provide an indication of the potential cost of the operations;
- Determine the financial viability and financial implications of the operations;
- To determine the total project costs, both of capital and operational nature over the duration of the contract; and
- To determine the total revenue from Fares and to establish the level of Government's financial assistance/subsidy that will be required to establish and to sustain the operations.

The financial model allows for changes in input values to match different scenarios so as to easily see how these changes affect the outputs. This allows for adjustments to be made as the relevant factors are confirmed during the detailed design phase. The financial model will ultimately be composed of the following elements for the contract period:

- Income statement;
- Balance sheet;
- Cash flow statement; and
- Operations rate per kilometre.

When compiling the financial model, the following factors were considered:

- Analysis of staff costs;
- Fleet running cots / unit; and
- General operating costs / unit.

The model is provided in the form of the following tables:

- Projected income statement;
- Detailed breakdown of other operating costs;
- 12 Year Projected Cash Flow Statement;
- Summary of Key Performance Indicators;
- Balance Sheet; and
- Analysis of passengers, trips and kilometres

The key assumptions are listed in Table 26. The financial model provides the opportunity to test different operating scenarios and guide decision making in the negotiations process and to assist in determining the level of subsidy that may be required. There is however a need to understand that a process of testing the model will need to be undertaken to identify any gaps. The process of identifying the gaps

in the financial model may lead to picking up anomalies in the operational plans. The model cannot be viewed as a static tool but the dynamism ensures versatility and continuous improvement. While this process is in the conceptual the financial model and the operational plan will require further refinement as is standard industry practice.

Table 26: Financial Model Assumptions

FINANCIAL MODEL ASSUMPTIONS	
Factor	**Assumption**
Average passenger fare	R 8.00
Income tax rate	28%
Secondary Tax on Companies	10%
Annual Inflation	6.50%
Useful life - Bus	13
Useful life - Taxi (Minibus)	5
Useful life - repair vehicle	5
Useful life - ETM and Tracking system	5
Useful life - Workshop electronic equipment	3
Useful life - Workshop tools and other non electronic ec	5
Useful life - Furniture and Fittings	5
Useful life - Computer equipment, Printer, fax, copier, s	3
Residual value - Bus	-10.00%
Residual value - Taxi	-5.00%
Residual value - Repair vehicle	-10.00%
Residual value - ETM and Tracking system	0.00%
Residual value -Workshop electronic equipment	0.00%
Residual value - Workshop tools and other non electron	0.00%
Residual value - Furniture and Fittings	-10.00%
Residual value - Computer equipment, Printer, fax, copi	-10.00%
Number of buses purchased	50.00
Number of buses in operation	50.00
Ratio of driver to vehicle	1.50
No of operating hours	12.00
Number of repair vehicles purchased	2.00
Number of repair vehicles in operation	2.00
Number of Depos	2.00
Asset finance deposit	10%
Term of finance (years)- (Bus)	12.00
Term of finance (years)- (Bus, Serv vehicle, Furniture, V	5.00
Term of finance (years)- Taxi, computer, Workshop elec	3.00
Interest rate (Financing)- 1st finance cycle	9.00%
Interest rate (Financing)- 2nd cycle onwards	9.00%
Total distance travelled per year - Bus (km)	3 360 654.00
Total distance travelled per year - Repair vehicle (km) (A	30 000.00
Purchase price - Bus (Incl VAT)	1 943 023.69
Purchase price - Repair vehicle (Incl VAT)	150 000.00
Debtors days	30.00
Creditors days	30.00
Inventory days- Scen 1	15.00
Inventory days- Scen 2	22.00
Dividend pay out policy	80%
Equity	10%
Debt	90%

Table 27: projected Income Statement for the Bus Operations Company over a 12 year Contract Period

INCOME STATEMENT												
Year	1	2	3	4	5	6	7	8	9	10	11	12
	R	R	R	R	R	R	R	R	R	R	R	R
Buses	37 664 880	40 113 097	42 720 449	45 497 278	48 454 601	51 604 150	54 958 420	58 530 717	62 335 213	66 387 002	70 702 157	75 297 798
Total Fare Revenue	**37 664 880**	**40 113 097**	**42 720 449**	**45 497 278**	**48 454 601**	**51 604 150**	**54 958 420**	**58 530 717**	**62 335 213**	**66 387 002**	**70 702 157**	**75 297 798**
Subsidy	**16 878 667**	**17 975 781**	**19 144 207**	**20 388 580**	**21 713 838**	**23 125 237**	**24 628 378**	**26 229 222**	**27 934 122**	**29 749 840**	**31 683 579**	**33 743 012**
Total revenue	**54 543 547**	**58 088 878**	**61 864 655**	**65 885 858**	**70 168 438**	**74 729 387**	**79 586 797**	**84 759 939**	**90 269 335**	**96 136 842**	**102 385 736**	**109 040 809**
Revenue growth %	10.50%	10.50%	10.50%	10.50%	10.50%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Operating expenses												
Fleet Running costs												
Fuel	17 465 782	19 474 347	21 713 897	24 210 996	26 995 260	30 099 715	33 410 684	37 085 859	41 165 303	45 693 487	50 719 770	56 298 945
Spares and units	2 691 523	2 866 472	3 052 793	3 251 224	3 462 554	3 670 307	3 890 526	4 123 957	4 371 395	4 633 678	4 911 699	5 206 401
Repairs and maintenance	1 051 403	1 119 744	1 192 527	1 270 042	1 352 594	1 433 750	1 519 775	1 610 961	1 707 619	1 810 076	1 918 681	2 033 802
Tyres	1 182 829	1 259 713	1 341 594	1 428 798	1 521 670	1 620 578	1 717 813	1 820 882	1 930 134	2 045 943	2 168 699	2 298 821
Fleet Running costs	**4 925 755**	**5 245 929**	**5 586 914**	**5 950 064**	**6 336 818**	**6 724 635**	**7 128 113**	**7 555 800**	**8 009 148**	**8 489 697**	**8 999 079**	**9 539 024**
Staff Costs												
Salaries - Vehicle related	5 296 512	5 640 785	6 007 436	6 397 920	6 813 784	7 222 612	7 655 968	8 115 326	8 602 246	9 118 381	9 665 483	10 245 412
Salaries - Depot	1 148 160	1 222 790	1 302 272	1 386 919	1 477 069	1 565 693	1 659 635	1 759 213	1 864 766	1 976 652	2 095 251	2 220 966
Salaries - Operations	848 640	903 802	962 549	1 025 114	1 091 747	1 157 252	1 226 687	1 300 288	1 378 305	1 461 003	1 548 664	1 641 584
Salaries - Administrative and Fin	3 953 040	4 209 988	4 483 637	4 775 073	5 085 453	5 390 580	5 714 015	6 056 856	6 420 267	6 805 483	7 213 812	7 646 641
Staff Costs	**11 246 352**	**11 977 365**	**12 755 894**	**13 585 027**	**14 468 053**	**15 336 137**	**16 256 305**	**17 231 683**	**18 265 584**	**19 361 519**	**20 523 210**	**21 754 603**
Other Operating Expenses *												
Other operating expenses total	2 891 977	3 009 343	3 136 773	3 274 922	3 426 063	3 584 540	3 754 104	3 961 509	4 152 348	4 357 169	4 577 875	4 813 976
Depreciation	7 493 754	7 493 754	7 493 754	7 261 734	7 310 004	6 525 662	7 670 128	7 621 859	7 680 166	7 680 166	7 680 166	6 477 392
Total Costs	**44 023 620**	**47 200 738**	**50 687 232**	**54 282 742**	**58 536 198**	**62 270 689**	**68 219 334**	**73 456 710**	**79 272 549**	**85 582 038**	**92 500 101**	**98 883 940**
Expected EBIT	10 519 927	10 888 140	11 177 423	11 603 116	11 632 240	12 458 698	11 367 463	11 303 229	10 996 786	10 554 804	9 885 636	10 156 869
Interest expense	8 292 618	7 825 924	7 317 226	6 755 786	6 188 267	5 545 635	5 421 387	4 683 357	3 900 803	3 026 390	2 073 280	1 023 454
EBT	2 227 309	3 062 216	3 860 197	4 847 330	5 443 973	6 913 063	5 946 076	6 619 872	7 095 983	7 528 414	7 812 356	9 133 416
Tax	(623 646)	(857 421)	(1 080 855)	(1 357 253)	(1 524 313)	(1 935 658)	(1 664 901)	(1 853 564)	(1 986 875)	(2 107 956)	(2 187 460)	(2 557 356)
Earnings After Tax (EAT)	1 603 662	2 204 796	2 779 342	3 490 078	3 919 661	4 977 405	4 281 175	4 766 308	5 109 108	5 420 458	5 624 896	6 576 059
Dividends	(1 282 930)	(1 763 837)	(2 223 473)	(2 792 062)	(3 135 729)	(3 981 924)	(3 424 940)	(3 813 046)	(4 087 286)	(4 336 366)	(4 499 917)	(5 260 848)
Retained earnings	**320 732**	**440 959**	**555 868**	**698 016**	**783 932**	**995 481**	**856 235**	**953 262**	**1 021 822**	**1 084 092**	**1 124 979**	**1 315 212**

Table 28: Detailed Breakdown of other Operating Costs

OTHER OPERATING COSTS												
Year	1	2	3	4	5	6	7	8	9	10	11	12
	R	R	R	R	R	R	R	R	R	R	R	R
Other Operating Expenses *												
Compliance Cost - Audit and legisl	60 000	63 900	68 054	72 477	77 188	82 205	87 549	93 239	99 300	105 754	112 628	119 949
Bank Fee	15 000	15 975	17 013	18 119	19 297	20 551	21 887	23 310	24 825	26 439	28 157	29 987
Depot lease	150 000	159 750	170 134	181 192	192 970	205 513	218 871	233 098	248 249	264 386	281 571	299 873
Electricity	36 000	38 340	40 832	43 486	46 313	49 323	52 529	55 944	59 580	63 453	67 577	71 969
Water	15 000	15 975	17 013	18 119	19 297	20 551	21 887	23 310	24 825	26 439	28 157	29 987
Driver waybills and time sheets	36 000	38 340	40 832	43 486	46 313	49 323	52 529	55 944	59 580	63 453	67 577	71 969
Bus cleaning equipment	60 000	63 900	68 054	72 477	77 188	82 205	87 549	93 239	99 300	105 754	112 628	119 949
Fire extinguishers	11 400	12 141	12 930	13 771	14 666	15 619	16 634	17 715	18 867	20 093	21 399	22 790
Workshop Equipment - Small tools	231 000	246 015	262 006	279 036	297 174	316 490	337 062	358 971	382 304	407 154	433 619	461 804
Legal costs	360 000	383 400	408 321	434 862	463 128	493 231	525 291	559 435	595 798	634 525	675 769	719 695
Computer and other stationery	90 720	96 617	102 897	109 585	116 708	124 294	132 373	140 978	150 141	159 900	170 294	181 363
General Insurance	90 720	96 617	102 897	109 585	116 708	123 711	131 133	139 001	147 341	156 182	165 553	175 486
Cell phone - Management and oth	622 944	663 435	706 559	752 485	801 396	853 487	904 697	958 978	1 016 517	1 077 508	1 142 158	1 210 688
Telephone - Office	46 872	49 919	53 163	56 619	60 299	64 219	68 072	72 156	76 486	81 075	85 939	91 095
Staff canteen	42 336	45 088	48 019	51 140	54 464	57 732	61 196	64 867	68 759	72 885	77 258	81 893
Uniform -Traffic staff	120 960	128 822	137 196	146 114	155 611	164 948	174 844	185 335	196 455	208 243	220 737	233 981
Uniform -Workshop	120 960	128 822	137 196	146 114	155 611	164 948	174 844	185 335	196 455	208 243	220 737	233 981
Staff training - Traffic staff	136 080	144 925	154 345	164 378	175 062	185 566	196 700	208 502	221 012	234 273	248 329	263 229
Staff training - Workshop	136 080	144 925	154 345	164 378	175 062	185 566	196 700	208 502	221 012	234 273	248 329	263 229
Vehicle Insurance	509 905	472 436	434 967	397 499	361 608	325 058	291 756	283 650	245 540	207 140	169 457	131 056
Other operating expenses total	2 891 977	3 009 343	3 136 773	3 274 922	3 426 063	3 584 540	3 754 104	3 961 509	4 152 348	4 357 169	4 577 875	4 813 976

Table 29: 12 Year Projected Cash Flow Statement

CASH FLOW STATEMENT	1 R	2 R	3 R	4 R	5 R	6 R	7 R	8 R	9 R	10 R	11 R	12 R
Retained earnings	320 732	440 959	555 868	698 016	783 932	995 481	856 235	953 262	1 021 822	1 084 092	1 124 979	1 315 212
Add back non cash items	7 493 754	7 493 754	7 493 754	7 261 734	7 310 004	6 525 662	7 670 128	7 621 859	7 680 166	7 680 166	7 680 166	6 477 392
Depreciation - Bus	6 477 392	6 477 392	6 477 392	6 477 392	6 477 392	6 477 392	6 477 392	6 477 392	6 477 392	6 477 392	6 477 392	6 477 392
Depreciation - Service vehicle	54 000	54 000	54 000	54 000	54 000	-	78 794	78 794	78 794	78 794	78 794	-
Depreciation - ETM and Tracking	651 941	651 941	651 941	651 941	651 941	-	951 274	951 274	951 274	951 274	951 274	-
Depreciation - Workshop equipn	6 473	6 473	6 473	6 473	6 473	-	9 445	9 445	9 445	9 445	9 445	-
Depreciation - Furniture and Fitti	71 928	71 928	71 928	71 928	71 928	-	104 953	104 953	104 953	104 953	104 953	-
Depreciation - Computer equipm	232 020	232 020	232 020	-	48 270	48 270	48 270	-	58 307	58 307	58 307	-
Working capital	(1 093 526)	698	8 998	18 786	30 269	41 700	44 014	58 955	76 205	96 060	118 855	144 961
Subsidy Debtors	(1 387 288)	(90 174)	(96 035)	(102 277)	(108 925)	(116 005)	(123 546)	(131 576)	(140 129)	(149 237)	(158 937)	(169 268)
Inventory (Tyres, Spares and Fu	(1 547 872)	(100 612)	(107 151)	(114 116)	(121 534)	(129 434)	(137 847)	(146 807)	(156 349)	(166 512)	(177 335)	(188 862)
Creditors	1 841 633	191 483	212 184	235 180	260 728	287 139	305 407	337 338	372 683	411 809	455 127	503 092
Capital repayments on ass	(5 185 498)	(5 652 192)	(6 238 230)	(6 489 839)	(7 143 884)	(6 727 463)	(8 185 019)	(8 921 670)	(9 744 056)	(10 594 903)	(11 650 526)	(11 461 972)
Bus	(4 331 611)	(4 721 456)	(5 146 387)	(5 609 562)	(6 114 422)	(6 664 720)	(7 264 545)	(7 918 354)	(8 631 006)	(9 407 797)	(10 254 499)	(11 371 706)
Service vehicle	(42 609)	(46 443)	(50 623)	(55 179)	(90 145)	-	(58 515)	(63 781)	(69 521)	(75 778)	(126 373)	-
ETM and Tracking	(534 368)	(582 461)	(634 882)	(692 022)	(754 303)	-	(715 278)	(779 653)	(849 822)	(926 306)	(1 009 674)	-
Workshop	(15 684)	(17 095)	(18 634)	(20 311)	(22 139)	-	(21 307)	(23 224)	(25 314)	(27 593)	(30 076)	-
Furniture and Fittings	(56 755)	(61 863)	(67 430)	(73 499)	(120 074)	-	(77 942)	(84 956)	(92 603)	(100 937)	(168 328)	-
Computer equipment	(204 472)	(222 875)	(320 273)	(39 266)	(42 800)	(62 742)	(47 432)	(51 701)	(75 790)	(56 492)	(61 576)	(90 267)
Cash on sale of assets				77 340		134 693	64 360			87 781	-	196 536
Deposit on purchase of assets				(16 090)		-	(611 323)			(23 148)		
Total Net cash flows	**1 535 462**	**2 283 219**	**1 820 390**	**1 549 947**	**980 321**	**970 073**	**(161 604)**	**(287 595)**	**(965 864)**	**(1 669 953)**	**(2 726 526)**	**(3 327 871)**

Table 30: Summary of Key Performance Indicators

KEY PERFORMANCE INDICATORS												
Year	1	2	3	4	5	6	7	8	9	10	11	12
EBIT Margins	*19.29%*	*18.74%*	*18.07%*	*17.61%*	*16.58%*	*16.67%*	*14.28%*	*13.34%*	*12.18%*	*10.98%*	*9.66%*	*9.31%*
Total costs to Total revenue	*80.71%*	*81.26%*	*81.93%*	*82.39%*	*83.42%*	*83.33%*	*85.72%*	*86.66%*	*87.82%*	*89.02%*	*90.34%*	*90.69%*
Subsidy as a % of FARE	*44.81%*	*44.81%*	*44.81%*	*44.81%*	*44.81%*	*44.81%*	*44.81%*	*44.81%*	*44.81%*	*44.81%*	*44.81%*	*44.81%*
Fare per Pax	8.00	8.52	9.07	9.66	10.29	10.96	11.67	12.43	13.24	14.10	15.02	15.99
Subsidy per vehicle- Per annum	753 298	802 262	854 409	909 946	969 092	1 032 083	1 099 168	1 170 614	1 246 704	1 327 740	1 414 043	1 505 956
Subsidy per Pax-Per annum	3.59	3.82	4.07	4.33	4.61	4.91	5.23	5.57	5.93	6.32	6.73	7.17
Subsidy per vehicle- Per month	62 774.80	66 855	71 201	75 829	80 758	86 007	91 597	97 551	103 892	110 645	117 837	125 496

Table 31: Balance Sheet

BALANCE SHEET/ STATEMENT OF ASSETS AND LIABILITIES													
	Year 0	1	2	3	4	5	6	7	8	9	10	11	12
	R	R	R	R	R	R	R	R	R	R	R	R	R
Assets													
Non current assets- Book	94 487 233	86 993 479	79 499 725	72 321 550	65 011 547	58 351 192	56 729 931	49 108 072	41 427 907	33 891 443	26 211 277	19 537 349	
Bus	90 673 792	84 196 400	77 719 008	71 241 616	64 764 224	58 286 832	51 809 440	45 332 048	38 854 656	32 377 264	25 899 872	19 422 480	
Service vehicle	246 000	192 000	138 000	84 000	30 000	-	358 949	280 155	201 362	122 568	43 774	-	
ETM and Tracking	2 607 763	1 955 822	1 303 881	651 941	-	-	3 805 097	2 853 823	1 902 548	951 274	-	-	
Workshop	90 626	84 153	77 680	71 206	64 733	-	132 237	122 791	113 346	103 900	94 455	-	
Furniture and Fittings	327 672	255 744	183 816	111 888	39 960	-	478 120	373 167	268 214	163 261	58 307	-	
Computer equipment	541 380	309 360	77 340	160 899	112 629	64 360	146 088	146 088	87 781	173 176	114 869	114 869	
Current assets	4 470 622	6 944 626	8 968 203	10 734 543	11 945 323	13 160 835	13 260 623	13 251 412	12 582 026	11 227 822	8 837 569	5 867 828	
Inventory (Tyres, Spares, Fuel)	1 547 872	1 648 483	1 755 635	1 869 751	1 991 285	2 120 718	2 258 565	2 405 372	2 561 721	2 728 233	2 905 568	3 094 430	
Subsidy Debtors	1 387 288	1 477 461	1 573 496	1 675 774	1 784 699	1 900 704	2 024 250	2 155 826	2 295 955	2 445 192	2 604 130	2 773 398	
Cash & cash equivalents	1 535 462	3 818 681	5 639 071	7 189 018	8 169 339	9 139 412	8 977 808	8 690 213	7 724 349	6 054 397	3 327 871	0	
Total assets	**98 957 855**	**93 938 105**	**88 467 928**	**83 056 093**	**76 956 870**	**71 512 027**	**69 990 554**	**62 359 484**	**54 009 932**	**45 119 265**	**35 048 846**	**25 405 177**	
Equity and liabilities													
Capital and reserves	10 518 831	10 959 790	11 515 659	12 213 674	12 997 606	13 993 087	14 849 322	15 802 584	16 824 405	17 908 497	19 033 476	20 348 688	
Issued capital	10 198 099	10 198 099	10 198 099	10 198 099	10 198 099	10 198 099	10 198 099	10 198 099	10 198 099	10 198 099	10 198 099	10 198 099	
Reserves	320 732	761 692	1 317 560	2 015 576	2 799 508	3 794 989	4 651 224	5 604 485	6 626 307	7 710 398	8 835 378	10 150 589	
Non current liabilities	86 954 707	81 302 514	75 064 284	68 719 254	61 575 370	54 847 907	52 164 793	43 243 122	33 499 066	23 112 498	11 461 972	-	
Bus	83 104 455	78 382 999	73 236 612	67 627 050	61 512 628	54 847 907	47 583 362	39 665 007	31 034 001	21 626 204	11 371 706	-	
Service vehicle	242 391	195 948	145 325	90 145	-	-	335 454	271 672	202 151	126 373	-	-	
ETM and Tracking	2 663 668	2 081 207	1 446 325	754 303	-	-	3 565 456	2 785 802	1 935 980	1 009 674	-	-	
Workshop	78 179	61 084	42 450	22 139	0	-	106 207	82 983	57 669	30 076	-	-	
Furniture and Fittings	322 865	261 003	193 573	120 074	-	-	446 824	361 868	269 265	168 328	-	-	
Computer equipment	543 148	320 273	-	105 543	62 742	-	127 490	75 790	-	151 843	90 267	-	
Current liabilities	1 841 633	2 033 117	2 245 301	2 480 480	2 741 209	3 028 348	3 333 755	3 671 093	4 043 776	4 455 585	4 910 713	5 413 805	
Total equity and liabilities	**99 315 171**	**94 295 421**	**88 825 244**	**83 413 409**	**77 314 185**	**71 869 343**	**70 347 870**	**62 716 800**	**54 367 248**	**45 476 581**	**35 406 161**	**25 762 493**	

Table 32: Analysis of Passengers, Trips and Kilometeres

PAX AND KILOS ANALYSIS SUMMARY

ROUTES	ROUTE NAME		Total Buses	KM	No of Trips AM	No of Trips OFF PEAK	No of Trips PM	PAX AM	PAX OFF PEAK	PAX PM	TOTAL TRIPS	TOTAL KILOS	TOTAL PAX
Route 1	Utrecht Trunk		2	54	5	3	5	325	162.5	325	12.5	675	813
Route 2	Utrecht		3	51.8	5	3	5	325	162.5	325	12.5	647.5	813
Route 3	Mandadeni Junction		10	22	25	13	25	1625	812.5	1625	62.5	1375	4063
Route 4	Mandadeni Junction 2		6	15	12	6	12	780	390	780	30	450	1950
Route 5	Dundee-Mdakane		10	81.9	24	12	24	1625	812.5	1625	60	4914	4063
Route 6	Dundee-Danhauser		15	71.8	18	9	18	1170	585	1170	45	3231	2925
Route 7	Newcastle-Internal		3	14	8	4	8	635	317.5	635	20	280	1588
TOTALS/DAY			**49**	**311**	**97**	**49**	**97**	**6 485**	**3 243**	**6 485**	**243**	**11 573**	**16 213**
PER WEEKDAY				311	97	49	97	6 485	3 243	6 485	243	11 573	16 213
SATURDAY		50%		155	49	24	49	3 243	1 621	3 243	121	5 786	8 106
SUNDAY		30%		93	29	15	29	1 946	973	1 946	73	3 472	4 864
PER MONTH				**7 514**	**2 347**	**1 174**	**2 347**	**156 937**	**78 469**	**156 937**	**5 869**	**280 055**	**392 343**
PER YEAR				**90 169**	**28 169**	**14 084**	**28 169**	**1 883 244**	**941 622**	**1 883 244**	**70 422**	**3 360 654**	**4 708 110**

Table 33: Analysis of Staff Costs

STAFF COSTS					
	Monthly cost	Overhead (30%)	Total Cost to Company	No of employees	Annual Cost
Buses					
Mechanic - General artisan	4 800.00	1 440.00	**6 240.00**	4	**299 520**
Mechanic - Manager	16 000.00	4 800.00	**20 800.00**	-	**-**
Driver	4 160.00	1 248.00	**5 408.00**	75	**4 867 200**
Total bus related staff costs	24 960.00	7 488.00	**32 448.00**	79	**5 166 720**
			-		
Service vehicle			**-**		
Driver	4 160.00	1 248.00	**5 408.00**	2	**129 792**
			-		
Depot's Costs			**-**		
Depot clerk/dispatcher	4 000.00	1 200.00	**5 200.00**	2	**124 800**
Depot - Manager	12 000.00	3 600.00	**15 600.00**	2	**374 400**
Ticket sales - Clerk	3 200.00	960.00	**4 160.00**	2	**99 840**
Cleaners (Fleet &W/shop)	2 400.00	720.00	**3 120.00**	10	**374 400**
Security	2 800.00	840.00	**3 640.00**	4	**174 720**
Total depot related costs	24 400.00	7 320.00	**31 720.00**	20	**1 148 160**
			-		
Operations			**-**		
Traffic planner	12 000.00	3 600.00	**15 600.00**	2	**374 400**
Stores - Clerk	3 200.00	960.00	**4 160.00**	2	**99 840**
Stores - Manager	12 000.00	3 600.00	**15 600.00**	2	**374 400**
Training staff	8 000.00	2 400.00	**10 400.00**	-	**-**
Total operations related costs	35 200.00	10 560.00	**45 760.00**	6	**848 640**
			-		
Office Administration			**-**		
Administration - Clerk	5 200.00	1 560.00	**6 760.00**	12	**973 440**
Administration - Assi-Manager	15 000.00	4 500.00	**19 500.00**	3	**702 000**
Administration - Manager	32 000.00	9 600.00	**41 600.00**	1	**499 200**
Human Resources	4 000.00	1 200.00	**5 200.00**	3	**187 200**
Total adminstration related costs	56 200.00	16 860.00	**73 060.00**	19	**2 361 840**
Finance			**-**		
CFO	40 000.00	12 000.00	**52 000.00**	1	**624 000**
Finance manager	20 000.00	6 000.00	**26 000.00**	1	**312 000**
Accountant	15 000.00	4 500.00	**19 500.00**	2	**468 000**
Finance clercks	6 000.00	1 800.00	**7 800.00**	2	**187 200**
Total adminstration related costs	81 000.00	24 300.00	**105 300.0**	6	**1 591 200**
Total payroll costs	**169 880**	**50 964**	**220 844**	**126**	**11 246 352**

Table 34: Fleet Running Costs per Kilo

Fleet running expenses				
	Bus (Standard)		Repair vehicle	
Fuel consumption (cents per km)	517.20		140.80	
Tyres per kilometer (cents per km)	35.00	*	11.00	
Spares per kilometre (cents per km)	80.00	*	5.00	
Repairs and maintenance (cents per km)	31.00		16.00	
	663.20		**172.80**	
Rands/ Kilo	**R 6.63**		**R 1.73**	

Table 35: General Operating Costs/Unit

GENERAL COST MATRIX		
	Bus Cost pm	Annual Cost
Compliance Cost - Audit and legislative	R 100.00	R 1 200.00
Bank Fee	R 25.00	R 300.00
Depot lease	R 250.00	R 3 000.00
Electricity	R 60.00	R 720.00
Water	R 25.00	R 300.00
Driver waybills and time sheets	R 60.00	R 720.00
Bus cleaning equipment	R 100.00	R 1 200.00
Fire extinguishers	R 19.00	R 228.00
Legal costs	R 600.00	R 7 200.00
	Employee Cost pm	Employee ANNUAL Cost
Computer and other stationery	R 60.00	R 720.00
General Insurance	R 60.00	R 720.00
Cell phone - Management and other staff	R 412.00	R 4 944.00
Telephone - Office	R 31.00	R 372.00
Staff canteen	R 28.00	R 336.00
Uniform -Traffic staff	R 80.00	R 960.00
Uniform -Workshop	R 80.00	R 960.00
Staff training - Traffic staff	R 90.00	R 1 080.00
Staff training - Workshop	R 90.00	R 1 080.00

7 CONTRACT AGREEMENTS

The planning and delivery of public transport particularly in the rural and peri-urban environment is based on the Public Transport Strategy which promotes the identification of the Integrated Public Transport Network (IPTN). The IPTN trunk routes and feeders have been identified and the services designs to provide a service that meets the demand for transport as well as promoting access and mobility for the communities. The aim is to make sure that the quality aspect of the strategy which includes, amongst others, the following:

- 85% of all residents within 2 km access to the IPTN trunk route or feeder
- Upgraded modal fleet, facilities and stops
- Extended hours of operations and off-peak services
- Universal access over and period of time.

The intention of the KZN DoT is to improve mobility and accessible by the providing services that, as far as possible meet the quality criteria mentioned above. The design of the public transport services based on the identified IPTN and supporting feeder services begins to address the quality as well as the need of the communities serviced. These designs are contained in the operational plan. This plan should not be seen as fixed but will need to be improved and fine-tuned based patronage as well as funding availability.

The current position in terms of funding for the public transport services, specifically IPTN services is that the fare-box must at least cover the operational cost. However this may not be feasible in the operations of rural public transport services due to the nature of the services and low levels of current demand. The level of the subsidy which is based on a rate per kilometre operated will have to be determined by the financial model and subject to negotiations with operators.

Whilst the intention of the Public Transport Strategy is to ensure that current public transport operators provide the services and that the authority (municipality) manage such services based on determining the service levels, monitoring as well collecting the fares, this is not feasible in this instance due to the capacity and institutional arrangements of the district municipality (DM). Thus gross based contracts cannot be considered for the DM at this stage. Attached as Annexure E are the model contracts documents for tendered or negotiated contracts as well gross based or net based contracts.

The considering the current imperatives of government in respect of the Public Transport Strategy as well the BBBEE empowerment initiatives of government it is felt that the most appropriate contract model that should be adopted for subsidised service contracts is the net based negotiated contract. The reason for this conclusion is that:

- Although current subsidised service contracts exist a fair amount of the services in the DM are undertaken by the taxi industry without being subsidised.
- The notion in the Public Transport Strategy that the service must be provide by current operators so that job losses are minimised.

- The current public transport operators such as the taxi as well as small bus industry that are outside of the formal subsidised services would require t be capacitated into an organised an formal service delivery model.

The net based negotiated model negotiated contract document will need to adapted to meet the specific need for empowerment of public transport operators that firstly current providing services in the DM and secondly the services were provided outside of the formal subsidised service contract regime. Thus a draft empowerment model was developed and presented to the KZN DoT. The empowerment model will need further discussion with the affected public transport operators before any decision is made. The draft empowerment model is attached as Annexure F.

In the light of the above it is recommended that:

- The KZN DoT adopt the net based negotiated contract model;
- The contract document be adapted to incorporate the final empowerment model of current public transport operators
- The KZN DoT embark on a process of identifying all current affected operators in the DM that are not subject to subsidised services contracts and commence with a negotiation process to conclude a negotiated contract.

8 CONCLUSION

The preceding chapters have presented and reasoned a strong case for the introduction of an IPTN into a largely rural environment such as Amajuba DM. This is in keeping with the letter and spirit of the Public Transport Strategy and Action Plan 2007, in particular Phase 2, where it was envisioned that the transformation of the public transport system would go beyond the initial 12 Cities.

The IPTN proposed for Amajuba DM is in line with the principles of the PTSAP in that it:

- A phased implementation of a SINGLE, user-responsive, publicly planned and controlled system that integrates routes into a multi-modal public transport network, and provides maximum accessibility and coverage in the district for ALL citizens, both in the CBD and in the outlying communities that range from urbanised townships to sparsely populated rural townships;
- This integrated network will provide extended hours of operation and will strive for maximum accessibility for users with special needs. The economic development opportunities that will be created by extended hours of operation must be fully recognised and taken advantage of by other sectors such as business. More importantly meeting the needs of all shift workers in the retail, entertainment, health, education, construction, security and hospitality sectors through the provision of extended hours of service, public transport will have unprecedented improvements on workers conditions and unlock economic growth potential including job creation;
- Further, this integrated network will ensure maximum empowerment of public transport workers and operators through the network development and economic development opportunities this will present.

However, it cannot be ignored that the rural setting for this IPTN brings it's own challenges, which require unique approaches. These have been outlined in preceding chapters and have been dealt with in more detail in dedicated volumes that form part of this plan/study. Among these challenges are:

- The relatively smaller rates base in rural areas
    - The approaches in terms of operational frequency, infrastructure provision, management structure and funding have been developed to speak to this situation;
- The prevalence of non-standard public transport vehicles in existing operations
    - This would affect the industry transition process, hence approaches to suit have been proposed that would be taken forward into the compensation model;
- The prevalence of unsurfaced roads on public transport routes
    - This affects the type and quantity of road infrastructure improvements. Clearly, it would be untenable to implement a very high standard public transport infrastructure on a poor basic road network, hence an approach that finds a middle ground has been proposed
- Communities residing on land that is under traditional authorities

- This presents an additional stakeholder who needs to be involved in the process from the outset in order to have a positive outcome. A large emphasis was hence placed on Stakeholder Consultation and walking hand-in-hand with the Traditional Leadership in developing the network.

The takeaway from the analysis and recommendations for this IPTN is that both the National and Provincial Departments of Transport will have to be open to new approaches in implementing IPTN in a rural area, than has been par for the course in the 12 Cities. This would entail detailed engagements on a few key matters in order to move forward from the planning stage into the implementation stage.

ANNEXURE A – PUBLIC TRANSPORT FACILITY DESCRIPTIONS

NO.	FACILITY NAME	STATUS		TYPE OF FACILITY			ON/OFF STREET		PAVING		CODE
		F	I	T	R	H	ON	OFF	Y	N	
1	Makhanya Informal Taxi Tank	F			R			√	Y		AM_F_001
2	Khuzani / Manzana Intersection Taxi Rank (Osizweni)		I		R		√			N	AM_I_002
3	Bob Shopping Centre Informal Taxi Rank (Osizweni)		I		R		√			N	AM_I_003
4	Top Rank to KwaMdakane Informal (Osizweni)		I		R		√			N	AM_I_004
5	Top Rank to Newcastle Informal (Osizweni)		I		R		√			N	AM_I_005
6	Osizweni Formal Taxi Rank	F			R			√	Y		AM_F_006
7	Dicks & Manzana & Mdozo (Dicks)	F			R			√	Y		AM_F_007
8	Emadlangeni Minibus Taxi Rank (Utrecht)	F			R			√	Y		AM_F_008
9	Spar Centre Informal Bakkie Rank (Utrecht)		I		R			√		N	AM_I_009
10	9 Mile Informal Taxi Rank		I		R			√		N	AM_I_010
11	Ingogo Informal Minibus-Taxi Rank		I		R			√		N	AM_I_011
12	Clevis Taxi Rank (Required by Taxi Association) At Charlestown Clinic Gate		I		R		√			N	AM_I_012
13	Charlestown Informal Minibus-Taxi Rank (Now called Phembindlela Taxi Rank)		I		R		√			N	AM_I_013
14	Newcastle Formal Taxi Rank	F			R	H		√	Y		AM_F_014
15	Spar Parking Informal Taxi Rank		I		R		√		Y		AM_I_015

16	Central Car Park 4 plus 1 Taxi Rank (Murchason Street)	F			R		√		Y		AM_I_016
17	Karbochem Taxi Rank (at Vezubuhle)		I		R		√			N	AM_I_017
18	Madadeni Court Informal Taxi Rank		I		R			√	Y		AM_I_018
19	Madadeni Shoprite Checkers Informal Taxi rank		I		R		√			N	AM_I_019
20	Madadeni Sec 4 & 5 Informal Taxi Rank		I		R		√			N	AM_F_020
21	Mdakane Cross Roads Taxi Rank	F			R			√	Y		AM_F_021
22	Dannhauser Taxi Rank	F			R			√	Y		AM_F_022
23	Newcastle Bus Rank	F		T				√	Y		AM_F_023

Note:
F – Formal rank
I – Informal rank
T – Terminus for buses
R – Rank for minibus-taxis
H – Holding area
Y – Yes
N – No

ANNEXURE B – LEGITAMICY OF PUBLIC TRANSPORT VEHICLES

Legitimacy of vehicles at Bob Shopping Centre Informal Taxi Rank

Registration Number	Legitimacy	Registration Number	Legitimacy
NN 26078	☑	NN 44374	☐
NN 26867	☑	NN 48285	☐
NN 30601	☑	NN 48367	☐
NN 31917	☑	NN 51555	☐
NN 33651	☑	NN 52682	☐
NN 34289	☑	NN 54558	☐
NN 39388	☑	NN 55426	☐
NN 41461	☑	NN 566581	☐
NN 51604	☑	NN 57486	☐
NN 51939	☑	NN 58680	☐
NN 53352	☑	NN 58819	☐
NN 53997	☑	NN 59222	☐
NN 55157	☑	NN 60356	☐
NN 59871	☑	NN 61608	☐
NN 62012	☑	NN 62950	☐
NN 71358	☑	NN 63674	☐
NN 9219	☑	NN 65551	☐
NN 1064	☐	NN 66116	☐
NN 11285	☐	NN 66814	☐
NN 13461	☐	NN 67181	☐
NN 16688	☐	NN 67808	☐
NN 1995	☐	NN 70450	☐
NN 2240	☐	NN 7071	☐
NN 23082	☐	NN 71152	☐
NN 26621	☐	NN 71336	☐
NN 28023	☐	NN 7192	☐
NN 33227	☐	NN 72048	☐
NN 33237	☐	NN 73774	☐
NN 3449	☐	NN 77057	☐
NN 34505	☐	NN 77334	☐
NN 34941	☐	NN 77526	☐
NN 37044	☐	NN 79024	☐
		NN 80339	☐

Legitimacy of vehicles at Charlestown Informal Taxi Rank

Registration Number	Legitimacy
BM 652B GP	☐
DNC 062 MP	☐
FDC 564 MP	☐
FHH 018 MP	☐
FKP 624 MP	☐
FNC 502 MP	☐
FSK 202 MP	☐
FTR 844 MP	☐
MVC 999 GP	☐
NN 22455	☐
NN 69866	☐
NN 73370	☐

Legitimacy of vehicles at Dannhauser Taxi Rank

Registration Number	Legitimacy	Registration Number	Legitimacy
NDH 1837	☑	NDH 2417	☐
NDH 2204	☑	NDH 2427	☐
NDH 2902	☑	NDH 2643	☐
NDH 2903	☑	NDH 2693	☐
NDH 3008	☑	NDH 2953	☐
NDH 3016	☑	NDH 2979	☐
NDH 3023	☑	NDH 30	☐
NDH 3112	☑	NDH 3032	☐
NDH 3408	☑	NDH 3118	☐
NDH 3455	☑	NDH 3122	☐
NDH 4289	☑	NDH 3220	☐
NN 18473	☑	NDH 3406	☐
NN 44246	☑	NDH 3426	☐
NDE 15259	☐	NDH 3633	☐
NDE 15401	☐	NDH 3878	☐
NDE 18725	☐	NDH 4406	☐
NDH 1185	☐	NDH 4426	☐
NDH 1276	☐	NDH 4482	☐
NDH 1536	☐	NDH 4597	☐
NDH 1570	☐	NDH 4663	☐
NDH 177	☐	NDH 902	☐
NDH 1794	☐	NN 1970	☐
NDH 1930	☐	NN 27737	☐
NDH 1970	☐	NN 28614	☐
NDH 2032	☐	NN 31102	☐
NDH 2049	☐	NN 3426	☐
NDH 2081	☐	NN 38391	☐
NDH 2113	☐	NN 40668	☐
NDH 2162	☐	NN 49481	☐
NDH 2389	☐	NN 67873	☐

Legitimacy of vehicles at Emadlangeni Mini-Bus Taxi Rank

Registration Number	Legitimacy
NN 17736	☑
NN 18744	☑
NN 18911	☑
NN 20211	☑
NN 29912	☑
NN 31074	☑
NN 64519	☑
NN 67829	☑
NUT 22	☑
NUT 2778	☑
NUT 3024	☑
NUT 708	☑
NN 16755	☐
NN 18734	☐
NN 21838	☐
NN 248	☐
NN 27970	☐
NN 28200	☐
NN 53426	☐
NN 66438	☐
NN 6729	☐
NN 73248	☐
NUT 2298	☐
NUT 2647	☐
NUT 2715	☐
NUT 2816	☐
NUT 64483	☐

Legitimacy of vehicles at Khuzani Manzana Intersection Rank

Registration Number	Legitimacy
NN 19952	☑
NN 21708	☑
NN 28641	☑
NN 37286	☑
NN 37962	☑
NN 51604	☑
NN 52479	☑
NN 63313	☑
NN 13461	☐
NN 13644	☐
NN 16675	☐
NN 16680	☐
NN 22982	☐
NN 35604	☐
NN 35987	☐
NN 40441	☐
NN 43371	☐
NN 55426	☐
NN 57487	☐
NN 58820	☐
NN 59025	☐
NN 60233	☐
NN 60927	☐
NN 64532	☐
NN 65089	☐
NN 66814	☐
NN 69011	☐
NN 7071	☐
NN 72048	☐
NN 72882	☐
NN 79024	☐

Legitimacy of vehicles at Madadeni Court Informal Taxi Rank

Registration Number	Legitimacy	Registration Number	Legitimacy
NDH 3659	☑	NN 56078	☐
NN 10100	☑	NN 57483	☐
NN 2087	☑	NN 57977	☐
NN 22998	☑	NN 58255	☐
NN 26149	☑	NN 58869	☐
NN 26716	☑	NN 59126	☐
NN 28574	☑	NN 59975	☐
NN 68822	☑	NN 60069	☐
NN 10608	☐	NN 60758	☐
NN 13109	☐	NN 61454	☐
NN 21151	☐	NN 64611	☐
NN 21945	☐	NN 65594	☐
NN 22688	☐	NN 66628	☐
NN 2435	☐	NN 66732	☐
NN 24390	☐	NN 66862	☐
NN 25930	☐	NN 66866	☐
NN 26671	☐	NN 67077	☐
NN 29191	☐	NN 67094	☐
NN 30752	☐	NN 67130	☐
NN 3196	☐	NN 67735	☐
NN 32149	☐	NN 69956	☐
NN 33171	☐	NN 70348	☐
NN 34220	☐	NN 71229	☐
NN 34672	☐	NN 72312	☐
NN 34947	☐	NN 74268	☐
NN 40861	☐	NN 74326	☐
NN 42518	☐	NN 74839	☐
NN 44323	☐	NN 74840	☐
NN 46175	☐	NN 76323	☐
NN 46671	☐	NN 77142	☐
NN 53604	☐	NN 7727	☐
NN 54952	☐	NN 77955	☐
NN 55440	☐	NN 78580	☐

Legitimacy of vehicles at Makhanya Informa Taxi Rank

Registration Number	Legitimacy
NN 20133	☑
NN 22955	☑
NN 24712	☑
NN 34289	☑
NN 43207	☑
NN 16183	☐
NDH 2710	☐
NDH 3998	☐
NDH 4278	☐
NN 1675	☐
NN 28083	☐
NN 28755	☐
NN 32967	☐
NN 34449	☐
NN 42784	☐
NN 4284	☐
NN 51041	☐
NN 52988	☐
NN 55581	☐
NN 56070	☐
NN 63506	☐
NN 66438	☐
NN 66814	☐
NN 67692	☐
NN 68034	☐
NN 73594	☐
NN 74778	☐
NN 79024	☐
NN 80339	☐

Legitimacy of vehicles at Mdakane Cross Road

Registration Number	Legitimacy
NDH 137	☑
NDH 1918	☑
NDH 2420	☑
NDH 2902	☑
NDH 3016	☑
NDH 3594	☑
NDH 3659	☑
NDH 4195	☑
NDH 1973	☑
NDH 1193	☐
NDH 1529	☐
NDH 1890	☐
NDH 2340	☐
NDH 3274	☐
NDH 4367	☐
NDH 4582	☐
NDH 4592	☐
NDH 4597	☐

Legitimacy of vehicles at Newcastle Bus Rank

Registration Number	Legitimacy	Registration Number	Legitimacy
NDH 4328	☑	NDH 3183	☐
747 GP	☐	NDH 3346	☐
CGY 465 MP	☐	NDH 3433	☐
DFZ 468 MP	☐	NDH 3445	☐
DKB 391 MP	☐	NDH 3499	☐
EAGLE 312 N	☐	NDH 3501	☐
MADELA ZN	☐	NDH 3520	☐
NDA 4715	☐	NDH 3650	☐
NDH 1192	☐	NDH 3813	☐
NDH 1235	☐	NDH 3814	☐
NDH 1275	☐	NDH 3815	☐
NDH 1277	☐	NDH 3939	☐
NDH 1279	☐	NDH 3975	☐
NDH 1280	☐	NDH 3987	☐
NDH 1313	☐	NDH 3997	☐
NDH 1351	☐	NDH 4002	☐
NDH 1411	☐	NDH 4003	☐
NDH 1437	☐	NDH 4032	☐
NDH 1477	☐	NDH 4165	☐
NDH 1687	☐	NDH 4269	☐
NDH 175	☐	NDH 4277	☐
NDH 2060	☐	NDH 4284	☐
NDH 2199	☐	NDH 4286	☐
NDH 2258	☐	NDH 4360	☐
NDH 2396	☐	NDH 4375	☐
NDH 2473	☐	NDH 4384	☐
NDH 2495	☐	NDH 4467	☐
NDH 256	☐	NDH 4468	☐
NDH 2627	☐	NDH 4472	☐
NDH 2709	☐	NDH 4474	☐
NDH 2712	☐	NDH 4486	☐
NDH 2714	☐	NDH 4606	☐
NDH 2716	☐	NDH 4632	☐
NDH 2813	☐	NDH 4715	☐
NDH 2932	☐	NDH 4724	☐
NDH 2940	☐	NDH 58889	☐
NDH 2948	☐	NDH 76849	☐
NDH 2973	☐	NDH 784	☐
NDH 3026	☐	NN	☐
NDH 3037	☐	NPP 2060	☐
NDH 3056	☐	NRB 5889	☐
NDH 3063	☐	NV 20283	☐
NDH 3164	☐	TES 726 GP	☐

Legitimacy of vehicles at Newcastle Spar Taxi Rank

Registration Number	Legitimacy	Registration Number	Legitimacy
NDH 1973	☑	NN 22785	☐
NDH 3016	☑	NN 24767	☐
NN 15909	☑	NN 25850	☐
NN 17969	☑	NN 27630	☐
NN 18473	☑	NN 27817	☐
NN 19424	☑	NN 29418	☐
NN 19952	☑	NN 31102	☐
NN 21708	☑	NN 35181	☐
NN 25928	☑	NN 35981	☐
NN 30309	☑	NN 37455	☐
NN 33363	☑	NN 37604	☐
NN 38033	☑	NN 38083	☐
NN 41254	☑	NN 39757	☐
NN 41986	☑	NN 40531	☐
NN 44246	☑	NN 40668	☐
NN 47428	☑	NN 40763	☐
NN 47626	☑	NN 41858	☐
NN 49097	☑	NN 42847	☐
NN 51682	☑	NN 44250	☐
NN 51705	☑	NN 44520	☐
NN 54685	☑	NN 44671	☐
NN 56416	☑	NN 44789	☐
NN 5644	☑	NN 49481	☐
NN 57343	☑	NN 49482	☐
NN 60711	☑	NN 53311	☐
NN 62916	☑	NN 55386	☐
NN 67205	☑	NN 55434	☐
NN 67591	☑	NN 55789	☐
NN 67611	☑	NN 58168	☐
NN 76526	☑	NN 61386	☐
DMM 039 FS	☐	NN 61657	☐
NDH 1193	☐	NN 61897	☐
NDH 1606	☐	NN 66079	☐
NDH 1890	☐	NN 66248	☐
NDH 3274	☐	NN 66954	☐
NDH 3418	☐	NN 67009	☐
NDH 4367	☐	NN 67712	☐
NDH 4582	☐	NN 68758	☐
NN 10069	☐	NN 68922	☐
NN 1010	☐	NN 68978	☐
NN 11285	☐	NN 70334	☐
NN 13117	☐	NN 72884	☐
NN 1397	☐	NN 75323	☐
NN 17161	☐	NN 77167	☐
NN 17696	☐	NN 77647	☐
NN 22553	☐	NPP 3985	☐
NN 22556	☐	PTH 143 GP	☐

Legitimacy of vehicles at Osizweni Formal Taxi Rank

Registration Number	Legitimacy	Registration Number	Legitimacy
NN 10664	☑	NN 44920	☐
NN 11840	☑	NN 45648	☐
NN 21978	☑	NN 49559	☐
NN 24712	☑	NN 49886	☐
NN 26078	☑	NN 49901	☐
NN 26904	☑	NN 50319	☐
NN 28641	☑	NN 51422	☐
NN 33651	☑	NN 52953	☐
NN 34289	☑	NN 53431	☐
NN 39388	☑	NN 53552	☐
NN 4989	☑	NN 539967	☐
NN 52289	☑	NN 55486	☐
NN 53136	☑	NN 57486	☐
NN 58826	☑	NN 59222	☐
NN 60706	☑	NN 59648	☐
NN 63313	☑	NN 59689	☐
NN 71131	☑	NN 60084	☐
NN 72454	☑	NN 60171	☐
NN 10642	☐	NN 60355	☐
NN 13461	☐	NN 61601	☐
NN 16675	☐	NN 61608	☐
NN 16680	☐	NN 63707	☐
NN 21470	☐	NN 64256	☐
NN 2240	☐	NN 64532	☐
NN 22762	☐	NN 65474	☐
NN 22982	☐	NN 66814	☐
NN 28083	☐	NN 67628	☐
NN 28755	☐	NN 67736	☐
NN 34449	☐	NN 67803	☐
NN 34505	☐	NN 69613	☐
NN 34941	☐	NN 70567	☐
NN 35987	☐	NN 70880	☐
NN 36329	☐	NN 71159	☐
NN 37044	☐	NN 73674	☐
NN 40719	☐	NN 74931	☐
NN 42179	☐	NN 76603	☐
NN 42988	☐	NN 78822	☐
NN 44196	☐	NN 79036	☐

Legitimacy of vehicles at Top Rank to Mdakane

Registration Number	Legitimacy	Registration Number	Legitimacy
NN 30601	☑	NN 48678	☐
NN 54772	☑	NN 50105	☐
NN 59624	☑	NN 51824	☐
NN 70066	☑	NN 52371	☐
NN 10041	☐	NN 54972	☐
NN 10760	☐	NN 55334	☐
NN 11742	☐	NN 55621	☐
NN 12157	☐	NN 58137	☐
NN 13607	☐	NN 61253	☐
NN 17823	☐	NN 61311	☐
NN 22916	☐	NN 63128	☐
NN 25033	☐	NN 63911	☑
NN 26410	☐	NN 64351	☐
NN 27578	☐	NN 65632	☐
NN 27991	☐	NN 6611	☐
NN 33439	☐	NN 68132	☐
NN 35295	☐	NN 70441	☐
NN 36883	☐	NN 70721	☐
NN 37854	☐	NN 72820	☐
NN 39098	☐	NN 74255	☐
NN 40126	☐	NN 75021	☐
NN 44196	☐	NN 78295	☐
NN 47004	☐	NN 88102	☐
		NN 91641	☐

Legitimacy of vehicles at Top Rank to Newcastle

Registration Number	Legitimacy	Registration Number	Legitimacy
NN 10664	☑	NN 39757	☐
NN 22621	☑	NN 40668	☐
NN 26867	☑	NN 42733	☐
NN 26904	☑	NN 44196	☐
NN 30601	☑	NN 44374	☐
NN 31917	☑	NN 44901	☐
NN 33651	☑	NN 49686	☐
NN 34482	☑	NN 49819	☐
NN 37286	☑	NN 51920	☐
NN 41461	☑	NN 52160	☐
NN 54258	☑	NN 54558	☐
NN 56851	☑	NN 55386	☐
NN 58630	☑	NN 55426	☐
NN 58826	☑	NN 55486	☐
NN 60706	☑	NN 60233	☐
NN 62902	☑	NN 60355	☐
NN 65420	☑	NN 65089	☐
NN 69316	☑	NN 65738	☐
NN 69479	☑	NN 67181	☐
NN 71358	☑	NN 67628	☐
NN 72454	☑	NN 68978	☐
NN 1010	☐	NN 69536	☐
NN 13208	☐	NN 70450	☐
NN 14687	☐	NN 7071	☐
NN 16642	☐	NN 71152	☐
NN 16792	☐	NN 71336	☐
NN 17794	☐	NN 71517	☐
NN 26926	☐	NN 72649	☐
NN 29586	☐	NN 76603	☐
NN 30291	☐	NN 77334	☐
NN 30691	☐	NN 77526	☐
NN 33168	☐	NN 78295	☐
NN 35235	☐	NN 79024	☐
NN 35604	☐	NN 79036	☐
NN 36363	☐	NN 80339	☐

ANNEXURE C – DEMAND SURVEY QUESTIONNAIRE

PUBLIC TRANSPORT QUESTIONNAIRE

(Please mark with an X)

DM: .....
LM: .....
Community: .....

1. Is public transport (bus or taxi) available to your community?	YES		NO		
2. If public transport is available and you do not use it, what is the reason?	OWN VEHICLE	WALK	USE NON-MOTORISED	TOO EXPENSIVE	TOO FAR
	NOT SAFE	LIFT	BICYCLE	WRONG DESTINATION	
3. If yes, how frequent or efficient is the public transport?	FREQUENT & EFFICIENT		INFREQUENT & INEFFICIENT		
4. What do you use public transport for?	SCHOOL	WORK	GENERAL	OTHER	
5. How often do you make use of public transport?	DAILY	WEEKLY	MONTHLY	YEARLY	
6. How much time do you spend waiting for public transport?	Less than 30 mins	30 – 60 mins	60 – 90 mins	More than 90 mins	
7. How much time do you spend travelling to your destination, using public transport?	Less than 30 mins	30 – 60 mins	60 – 90 mins	More than 90 mins	
8. Most common mode of public transport that you use:	TAXI	BUS	NON-MOTORISED TRANSPORT	OTHER	
9. What percentage of your income is spent on public transport?	0 - 30%	30 - 50%	50 - 70%	70 - 90%	

10. Please evaluate, public transport in your area	Very bad	Bad	Average	Good	Very good
Safety of services	1	2	3	4	5
Vehicle appearance	1	2	3	4	5
Comfort of vehicles	1	2	3	4	5
Security at rank	1	2	3	4	5
Appearance of rank	1	2	3	4	5
Facilities (toilets) at rank	1	2	3	4	5

11. Is there public transport available to a shopping centers/market places?	YES	NO
12. Is there public transport available to a clinic or hospital?	YES	NO
13. Is there public transport available to school or work place?	YES	NO
14. Do you have a disability, difficulty or challenge?	YES	NO
15. If yes, does the available public transport accommodate your disability, difficulty or challenge?	YES	NO
16. Do you have problems with the transport of freight?	YES	NO
17. Name a Public Transport Destination that you would like a service to:		

ANNEXURE D – PUBLIC TRANSPORT FACILITY UTILISATION

PT Facility	No. of bays provided	Max. No. of vehicles surveyed	Comment
Makhanya Informal Taxi Tank	None	29	Upgraded Facility Required
Khuzani / Manzana Intersection Taxi Rank (Osizweni)	None	0	Formal Lay-by Required
Bob Shopping Centre Informal Taxi Rank (Osizweni)	None	0	Formal Lay-by Required
Top Rank to KwaMdakane Informal (Osizweni)	None	30	Formal Facility Required
Top Rank to Newcastle Informal (Osizweni)	None	70	Formal Facility Required
Osizweni Formal Taxi Rank	5	75	Upgraded Facility Required
Dicks & Manzana & Mdozo (Dicks)	5	0	Not utilized
Emadlangeni Minibus Taxi Rank (Utrecht)	5	26	Upgraded Facility Required
Spar Centre Informal Bakkie Rank (Utrecht)	None	0	Formal Lay-by Required
9 Mile Informal Taxi Rank (Blaubosch Intersection)	None	0	Formal Lay-by Required
Ingogo Informal Minibus-Taxi Rank	None	0	Formal Lay-by Required
Clevis Taxi Rank (Required by Taxi Association) At Charlestown Clinic Gate	None	0	Formal Lay-by Required
Charlestown Informal Minibus-Taxi Rank (Now called Phembindlela Taxi Rank)	None	12	Formal Facility Required
Newcastle Formal Taxi Rank	30	905	Upgraded Facility Required
Emadlangeni Minibus Taxi Rank (Utrecht)	5	26	Upgraded Facility Required
Spar Centre Informal Bakkie Rank (Utrecht)	None	0	Formal Lay-by Required
Spar Parking Informal Taxi Rank	None	78	Formal Facility Required

Central Car Park 4+1 Taxi Rank (Murchason Street)	6	0	0%
Karbochem Taxi Rank (at Vezubuhle)	None	0	Formal Lay-by Required
Madadeni Court Informal Taxi Rank	None	66	Formal Facility Required
Madadeni Shoprite Checkers Informal Taxi rank	None	0	Formal Lay-by Required
Madadeni Sec 4 & 5 Informal Taxi Rank	None	0	Formal Lay-by Required
Mdakane Cross Roads Taxi Rank	6	18	Upgraded Facility Required
Dannhauser Taxi Rank	None	35	Formal Facility Required
Newcastle Bus Terminus	3	86	Upgraded Facility Required

ANNEXURE E – DOT MODEL CONTRACT DOCUMENTS

ANNEXURE F – EMPOWERMENT MODEL REPORT