



BUFFALO CITY MUNICIPALITY

ARTERIAL ROAD NETWORK

DEVELOPMENT PLAN

DRAFT

2006 – 2023

Prepared by



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EXECUTIVE SUMMARY

The Arterial Road Network Development Plan (ARNDP) for Buffalo City has been prepared as an essential input to the City's Integrated Transport Plan (ITP), which in turn is a requirement of the National Land Transport Transition Act (NLTTA). The ITP, in turn, provides input to the City's Integrated Development Plan (IDP).

The Plan has considered in the following chapters background issues that have a direct bearing on the need for the arterial road system and its future growth.

CHAPTER 1: INTRODUCTION

This chapter sets out the objective of the Plan and briefly describes the modeling procedure using VISUM 8.14 and later versions. These assist with the development of the Plan by testing various demand and network scenarios.

CHAPTER 2: REGIONAL PERSPECTIVES AND POLICIES

National and Provincial Land Transport Policies are referred to in this chapter. The metropolitan road system is shown in the context of the regional network, extending to King William's Town.

CHAPTER 3: LAND USE DEVELOPMENT

As transport demand is a direct result of the density and location of land use development, this is an important chapter where existing and future trends and plans are considered.

CHAPTER 4: METROPOLITAN MOVEMENT PATTERNS

Trip making patterns are investigated at source in this chapter, which deals with the origin and destination of trips in the commuter peaks, the modes of travel and the major corridors of movement.

CHAPTER 5: ROAD HIERARCHY FOR ARTERIAL NETWORK

This chapter makes proposals on a classification system of arterial roads in the metropolitan area, and suggests a policy towards the management and control of access on such arterials.

CHAPTER 6: ARTERIAL ROAD NETWORK DEVELOPMENT PLAN

This chapter sets out the implementation plan for arterial road projects for the period 2006 -2023.

Implementation Programme: 2006-2010

	<i>Ref</i>	<i>Project</i>	<i>Cost 2006 R million</i>
1	RP GN 03	Widening of Gonubie Main Road Phase 1&2	40
2	RP GN 01	Beacon Bay - Gonubie New Arterial Road	60
3	TSM EL 07 & 08	NEX / Thorburn Terrace Upgrade	20
4	RP EL 14	NWX Frederick Street to Amalinda Main Rd	8
5	TSM EL 13	Oxford Street Mall (pedestrianisation)*	15
6	TSM EL 34.1	Mdantsane Access Road (MAR) Improvements	10
7	TSM EL 32.9	Bonza Bay Road Traffic Circles	2
8	RP MD 01	Qumza Highway Upgrade	40
9	RP EL 27	Fitzpatrick Road alignment & Sleeper Site roads	60
10	RP EL 33	IDZ: Completion of Breezyvale Link Road first carriageway	3
Total Cost for 2006 – 2010			258

* See comments in the report on the timing of this project.

Implementation Programme: 2010-2015

	<i>Ref</i>	<i>Project</i>	<i>Cost 2006 R million</i>
11	RP GN 04	Gonubie Main Road / N2 interchange on-ramp	6
12	RP BB 08	Bonza Bay Road / N2 interchange on-ramp	12
13	TSM EL 30	NEX / N2 interchange off-ramp	10
14	RP EL 11	Batting Bridge and approaches NEX on-ramp	40
15	RP DV 01	Sunnyside Road extension to Douglas Smit	6
16	RP EL 16	NWX : Amalinda Main Road to Summerpride	60
17	RP EL 21	Buffalo Crossing : R72 to MAR	180
18	TSM KWT 01	Zwelitsha Road pedestrian facility	2
19	PROP 01	MAR : Main Entrance to Woolwash Road	51
20	RP EL 34	IDZ: Eastward extension of the Harbour Arterial Road (HAR) Phase 1 to Potters Pass, 1 carriageway, incl. link to Prince George Drive	24
21	RP EL 35	IDZ: Remainder of the Eastward extension of HAR to Military Road / West Bank, 1 carriageway	35
22	RP EL 36	IDZ: Second carriageway to existing HAR between traffic circles	15
23	RP EL 38	IDZ: Second carriageway to Breezyvale LinkRd	12
Total Cost for 2010-2015			453

Implementation Programme: 2015-2023

	<i>Ref</i>	<i>Project</i>	<i>Cost 2006 R million</i>
24	RP EL 08	Park Arterial : NEX to Settlers Way	90
25	RP EL 05	Lower Croydon Road	8
26	RP EL 17	Windermere Road Upgrade	20
27	PROP 03	MAR : Woolwash to Douglas Smit	30
28	RP MD 08	Billie Road / N2 Interchange	30
29	RP MD 07	Mdantsane / N2 Interchange	20
30	PROP 04	Mdantsane Perimeter Road	50
31	RP KWT 01	King Williams Town By-Pass	80
32	RP EL 25	Buffalo River Crossing N2 - Ziphunzana	120
33	RP EL 28	Western Ave / N2 Interchange	30
34	RP EL 29	Kings Way Rail underpass	15
35	RP MD 09	MAR R102 link over rail	15
36	RP EL 30	Voortrekker Road upgrade	30
37	RP EL 31	Amalinda Main Road N2 Interchange	15
38	RP EL 37	IDZ: Westward extension of HAR to Cove Rock / R72, First carriageway	35
39	RP EL 39	IDZ: Completion of Eastward Extension of HAR, second carriageway on both phases	50
40	RP MD 10	Billie Road upgrade	20
Total Cost for 2015 - 2023			658

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

It is concluded that:

- (i) The Plan is a global evaluation of the need for arterial road improvement projects throughout the Buffalo City municipal area, which provides a set of priorities taking into account various planning initiatives and their impact on transport.
- (ii) Assuming a discount rate of 10% the rate of return of the projects identified in this report could yield a cost benefit ratio as high as 2,7;
- (iii) The economic evaluation gives an indication that the Arterial Road Development Plan, if carried out according to the programme, will provide essential and major benefits to the economy of the Buffalo City region.
- (iv) The Plan provides guidance in the decision-making process with regard to future priorities for the arterial roads system;
- (v) The Plan can be used with a high degree of confidence up to the period 2010, after which future events and policies may influence the priorities;
- (vi) The setting of priorities cannot be based on traffic demand alone, but must be weighted towards those corridors carrying public transport.

It is recommended that:

- (i) This Plan be adopted as the official policy for Buffalo City to guide the development and expenditure on the arterial road system;
- (ii) The Plan be used as a basis for setting of priorities for the implementation of projects up to year 2010, and for guidance and planning purposes for the period 2011 – 2023;

- (iii) A policy for the hierarchal structure and the access control and management of the arterial system be further developed;
- (iv) The Plan be reviewed soon after 2010 to take into account new proposed industrial, business and land use developments in the Buffalo City area;
- (v) A regular program of transportation monitoring be implemented in order to stay informed with regard to travel trends.
- (vi) The VISUM model be updated and kept current in order that major changes in land use planning and in the road network can be tested at any time.

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LIST OF ABBREVIATIONS

BCM	Buffalo City Municipality
CBD	Central Business District
ELIDZ	East London Industrial Development Zone
HAR	Harbour Arterial Road
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
KWT	King William's Town
LSDF	Local spatial development framework
MAR	Mdantsane Access Road (also links to Ziphunzana Bypass)
MELD	Mdantsane East London Development
NEX	North-East Expressway
NLTTA	National Land Transport Transition Act
NWX	North-West Expressway
SDF	Spatial Development Framework
TLC	Transitional local council
VPH	Vehicles per hour
V/C	Volume over capacity (Ratio indicating degree of saturation)
IC	Interchange (Freeways)
SWECO	Swedish Consult (Consulting Engineers from Sweden)
EB	East bound
WB	West bound
NB	North bound
SB	South bound

CHAPTER 1 : INTRODUCTION

1.1 Background

In terms of Section 27 of the National Land Transport Transition Act (Act No.22 of 2002), Buffalo City is required to prepare an Integrated Transport Plan that complies with Subsection (2) of Section 27 of the Act. The proposals for the arterial road network therefore form part of the input to the ITP.

Consequently, this report presents a Plan to manage and develop the major arterial road network in the Buffalo City Municipal Area.

The Arterial Road Network Development Plan recognizes activity corridors, and provides land use and transport planning. The priorities in these corridors are the transformation and restructuring of South Africa's land transport system, with the emphasis on public transport. To this end BCM have produced the Public Transport Framework Plan (PTFP) which aims at the formalization and regulation of public transport services in Buffalo City.

This Plan looks at the infrastructural requirements for the road-based public and private transport system. In addition, the need and desirability of providing a major new road link crossing the Buffalo River is discussed.

The Plan further recognizes the importance of a policy to plan for appropriate major and minor arterial road access standards and to control access to developments abutting these major arterials. This applies to both existing and planned facilities.

Transport planning is a dynamic process, as forecasting future needs is dependent upon current priorities, planning and development. This Plan can be used to assist in the formulation of an implementation programme for the next five years, and as a guide for planning in years beyond.

1.2 Objective of the Plan

The Plan forms a vital part of the Integrated Transport Plan for Buffalo City Municipality, as it provides a well-considered guide for the prioritization of road improvement projects beyond the immediate short term and gives an indication of the needs to the year 2020. It thus aids Buffalo City in selecting the projects, placing these on the Interim Transport Plan and budgeting for their implementation.

The development of this plan relied on a significant amount of existing and forecast population, employment and other data, that is a useful reference source. For this reason, important reference data has been included in this report.

1.3 Study Philosophy and Methodology

The technical planning work carried out on which this Plan is based, was essentially an analysis of the demand for existing and forecast arterial road capacity, resulting from the growth in the use of passenger cars and road-based public transport vehicles using the network during commuter peak hours.

The network of existing and planned arterial roads in Buffalo City (including such future routes such as the North-West Expressway and the Buffalo River crossing linking the N2 with the R72) has largely been determined. The Plan provides guidance on when existing parts of the network should be upgraded and when planned roads should be implemented. The study has concluded that few other new roads need to be built within the existing developed urban area during the planning horizon. The emphasis has been rather to identify existing routes that should be given higher priority in the development programme.

The priority currently being given toward managing the development of the city has shifted from expanding outwards geographically to containing urban development within the confines of the City's current boundary.

In an area such as Buffalo City, the privately owned automobile plays an important role in the provision of movement and access between parts of the

urban area due to the limited public transport system. With the planned improvements to the system through the Public Transport Framework Plan (PTFP), it is expected that in time public transport will be more attractive to all income groups and reduce the current trend of increased private car usage.

Currently, the dispersed nature of residential areas in Buffalo City requires a sustained high standard arterial road system to allow for access to all commuters. The road-based public transport system will also rely on a high standard arterial road system for its efficient operation as it will cater for over 80% of public transport movement.

1.3.1 The Land Use Transport Simulation Model

A new land-use transport simulation model was set up with VISUM software. The new VISUM model was developed and used for testing both public and private transport planning scenarios. There are differences in the way the public transport and private transport are handled by the VISUM model but in essence both follow the basic four-step modeling process:

- Generate a base year (2005) vehicle trip (PCU) matrix from travel survey data (2001 population statistics used).
- Calibrate the base year PCU matrix using traffic counts undertaken at strategic locations throughout the City.
- Project the base PCU vehicle matrix to 2010, 2015, 2020 time horizons using future spatial planning information in order to produce vehicle trip matrices (PCU's) for each horizon.
- Assign the matrices to the network for each horizon to obtain saturation flows and volume/capacity ratios for road links in the network in order to identify future infrastructure requirements at each time horizon such as new road links and the upgrading of existing roads.

1.3.2 Analysis Procedure and Outputs

The analysis procedure was aimed at identifying the projects required to provide sufficient capacity on the road network to accommodate predicted traffic flows for the morning commuter peak periods in the years 2010, 2015 and 2020 at acceptable volume over capacity ratios (V/C ratios had to be <0.9). The modus operandi was as follows:

- The base model was checked and problem links identified.
- 2010 demand tested against the base year (2005) network to identify projects required by the year 2010.
- 2015 demand tested against the assumed 2010 network to identify projects needed by the year 2015, and
- 2020 demand tested against the assumed 2015 network to identify projects needed by the year 2020 and beyond.

CHAPTER 2 : REGIONAL PERSPECTIVES AND POLICIES

2.1 Transport Policy

The new governmental policies developed since the introduction of the Constitution of the Republic of South Africa have led to certain fundamental changes in the planning and provision of transport compared with procedures followed in the previous dispensation.

Most notable is the policy toward public transport in both the National White Paper of September 1996 and the Provincial Green Paper published in October 1997, which put public transport ahead of private transport on the priority list. This led to the formulation of the NLTTA Act 22 of 2000.

The “public transport first “ policy is closely linked with land-use developmental objectives, which aim to bring homes closer to work places, thus shortening the length and time of home to work journeys. This is being actively pursued through such initiatives as the Mdantsane – East London Development Corridor (MELD) which aims to concentrate houses and employment in a densely developed corridor, or to develop closely spaced development nodes. The MELD Study played a key role in the preparation of the BCM Spatial Development Framework Plan (SDF) which was completed in October 2003 as well as the preparation of the Public Transport Plan (PTP) and assigns Public Transport as the essential ingredient to mobility within this corridor.

The policy emphasis in the context of the arterial road network is twofold :

- Firstly, priority should given to routes that support public transport when improvements are made to the road network; and
- Secondly, the capacity of the arterial road system should be optimized by removing bottlenecks in the system, thus enabling the investment in existing infrastructure to be maximized.

New routes should be provided only where they can be justified in terms of both high economic benefits and social benefits to the community.

The Arterial Road Network Development Plan has been structured to meet the major policy direction set by government, while also satisfying private vehicle mobility needs.

2.2 Regional Context

The context of the Buffalo City metropolitan area within the greater region is illustrated in Figure 2. This clearly shows the importance of regional routes within Buffalo City, namely the N2, N6, R72 and the future R72 - N2 link across the Buffalo River.

The regional routes are particularly important as carriers of both local and through-traffic across the Buffalo City municipal area. Special consideration should be given to standards of road cross-section and access which should be appropriate to such routes.

CHAPTER 3 : LAND-USE DEVELOPMENT

3.1 Introduction

Transport and land-use are closely linked, as transport infrastructure must be planned for and provided hand in hand with the development of land-use and vice versa. The need to provide for commuter movement between home and work usually dictates the basic alignment of the transport routes in a city. The capacity requirements of these routes are generally determined by the number of commuters and the types of vehicle they use.

3.2 Spatial Development Initiatives

The nature, location and pace of urban development influence the demand for travel in any area, and thus the provision of transport infrastructure to meet that demand.

The spatial development of Buffalo City has been guided by several land-use planning studies, and these are listed below:

3.2.1 Buffalo City Spatial Development Initiatives

The Spatial Development Framework (SDF) plan for Buffalo City was compiled to support the development vision, objectives and strategies identified in Buffalo City's Integrated Development Plan. The SDF has been approved by the Municipal Council, and now has the status of a statutory plan, serving to *guide and inform all decisions on spatial development and land use management* in the area.

Other local SDF's have been produced or are in the process of being compiled and take a micro view of development in smaller areas of Buffalo City.

These include:

The West Bank LSDF
The Vincent Berea LSDF
The Quinera LSDF
The Dimbaza/Mount Coke LSDF
The King William's Town Comprehensive Urban Plan

The West Bank LSDF, dated October 2004, studies the area west of the Buffalo River to the Keiskamma River and up to the R346, but excludes the area east of Chester Road. The objectives of the plan are to identify development projects, infrastructure requirements, appropriate land-use proposals and to compile a detailed phased implementation programme.

Part of this area includes the ***East London Industrial Development Zone (IDZ)***. A report published in 1997 on the ELIDZ covered the development of an industrial and residential zone on the West Bank. The report on transportation entitled "East London IDZ Road Infrastructure Planning" sets out a network of arterial roads serving this sizeable land area and their linkage to the existing network. These roads include a major arterial through the West Bank, running parallel to the coast, linking the harbour with future residential development in the Cove Rock area, and several north-south links between this arterial and the R72.

The IDZ is currently under development and some of the planned road infrastructure is already in place, and further expansion of the system is covered later in this report

The West Bank LSDF identifies other transport routes (mobility) linking various parts of the district, where mixed land uses, agriculture, tourism and industries are located. These include the existing R72 coastal route and the R346 Mount Coke Road. Proposed transport routes include the N2 bypass (linking the N2 and R72), an Mdantsane access to the Mount Coke Road and a link between Mdantsane and Needs Camp. These routes are focused on transportation of people, goods and services between the nodes.

The Vincent Berea LSDF (2004) was prepared to provide a guide plan on the rezoning of residential land use to business land use within the study area. The

study investigated the impact of business zoning in terms of traffic and available capacity. The study further addressed developer contributions toward network improvements required as a result of impact on available capacity. A development contribution formulae was proposed that could be used as a standard or guide for the calculation of monetary contribution towards addressing the development impact on the commuter traffic environment.

The Quinera LSDF plan was completed mid 2005 and gives guidance to the development of the area between Gonubie and Beacon Bay and also the area north of Gonubie Main Road. Improvements to the arterial road infrastructure include the widening of Gonubie Main Road and a link between Gulls Way and Beacon Bay. Some of the identified projects are already being implemented.

The Dimbaza/Mount Coke LSDF is still in the course of preparation and is not yet available.

Other land use reports that have been published which impact on the Arterial Road Network include:

KWT Comprehensive Urban Plan December 2001 :

This Plan outlines in broad terms the strategies for sustainable development and use of social, environmental/physical and economic resources in a long-term planning and development process. It covers the area within the former KWT TLC, which includes areas that fall outside the boundaries of Buffalo City.

The settlement pattern of the KWT area is characterized by the urbanized areas between KWT and Berlin which include the urbanized areas of Zwelitsha, Phakamisa and Ilitha complemented by Ndevana regarded as a rural structure but showing a tendency to become more urbanized.

The remaining urbanized area in the KWT area is Dimbaza, 20 km west of KWT, which functions as a local node.

The rural areas to the northeast are mostly of the extensive commercial farming type. The rural areas to the north, west and southwest of KWT are scattered with

small villages and rural settlements with a wide range of populations. They all consider KWT as the primary node for urban work opportunities and as the basic service provider. A hampering factor in the development of the rural areas is the poor road conditions and transportation facilities.

3.2.2 The East London / Mdantsane Corridor SDI (MELD),

The Meld Corridor was the subject of a detailed planning exercise in 1998/1999, which resulted in the Mdantsane – East London Corridor Development Framework (November 1999).

That document set out the conceptual approach towards planning within the Meld Corridor and identified a number of major and minor nodes. The conceptual approach to planning and key proposals have been re-evaluated and endorsed in the course of formulating the Buffalo City Spatial Development Framework

Included, as a major node is the Mount Ruth Station Nodal Precinct, for which a concept development plan was completed. The proposed project will upgrade the railway stations, taxi ranks and access routes, which will better integrate Mdantsane with the surrounding areas as well as with Buffalo City as a whole.

Additional to Mount Ruth is the proposed major node at Arnoldton Station. A status quo and public consultation process is underway and a concept development plan is being prepared. The final plan is expected to be similar to that of Mount Ruth with the overall objective of providing an “integrated and productive socio-economic hub”

The upgrading of the Highway Centre as a major node will enhance quality of life for the users of the transport interchange by improving access and safety.

3.2.3 The Mdantsane Urban Renewal Programme

The underlying objective of the Urban Renewal Programme is to ensure that the programmes of the South African government on poverty alleviation, economic

growth and environmental sustainability are implemented in an integrated manner.

Buffalo City Municipality has incorporated the MURP into their Integrated Development Plan (IDP), vowing that the people of the township will be lifted from poverty and that the area will have become an “integrated and productive socio-economic hub” of the city by 2020.

Specific areas of focus include:

- The upgrade or rehabilitation of existing but degraded infrastructure
- The redevelopment of key access and circulation roads
- The development of social facilities at strategic locations
- The development of public transport feeder routes to railway stations

3.2.4 East London CBD Development

A traffic study was carried out in August 1999 on the planned development of the “Sleeper Site”, a site east of the CBD that will significantly increase the size of the CBD. A system of new roads and the extension and upgrading of existing roads was recommended. These recommendations were to be phased in over a period of 15 years. As yet no final decision on the full Site has been made and only recently planning of the development of two sites within the eastern limits of the site has started.

One scenario of the 1999 study was to evaluate the effects of closing or partially closing Oxford Street and accommodating traffic on alternative arterials. The study suggests that if this scenario was implemented without the additional infrastructure proposed for the “Sleeper Site”, there could be serious traffic impacts on the network during peak periods. This is not necessarily the case, although additional roads running parallel to Oxford Street would obviously assist in accommodating peak-hour traffic.

The comments and recommendations of the 1999 Sleeper Site Traffic Study are still valid. The development of the Northern section of this site is currently being planned and Traffic Impact Studies are to be done to assess impact for peak hour operations for the planned development and with that the first phase of network changes. In this initial phase the R72 alignment is to be improved by linking across the site from the north end of Curry Street to the Fitzpatrick Road / Commercial Road intersection. This will greatly improve the geometrics at the Tutton Terrace / Fitzpatrick intersection and through traffic will be routed via Curry Street.

The development of the Buffalo River Bridge and R72 to N2 road link on the West Bank would ease congestion on the routes parallel to Oxford Street in the event of its closure by diverting heavy industrial away from the CBD.

3.3 Metropolitan Population and Settlement Areas

Buffalo City has experienced a number of influences that have shaped the development of its land usage over the past century. In its early years, East London operated mainly as a port with residential development clustered close to the town center and the harbour. As rail links to the hinterland were established, suburbs were built along the railway line, clustered near stations. By the early 1960's, increasing ownership of the private motor vehicle allowed residential development to take place in areas not served by public transport, and this led to the growth of suburbs away from the commercial centers. .

Early in the 1970's the growing demand for housing for the low income group wanting to access jobs in urban areas resulted in the establishment of Mdantsane and Zwelitsha.

The pattern of dispersed residential development persisted until the early 1990's when the political changes in this country redirected planning energies towards the development and formalization of informal low-income residential settlements closer to work opportunities, so reducing commuting distances and improving living conditions. Thus the expansion of Mdantsane has been replaced by developments such as Scenary Park (John Dube Village), Haven Hills,

Mzamomhle, Ndevana, Ilitha, Nompumelelo, Ducats and plans for low cost housing projects such as Sweetwaters and Reeston phases 1 - 3.

3.4 Employment and Employment Nodes

The development of employment nodes has been closely linked to residential settlement, and the availability of land.

From an historical perspective, towns initially centred all economic activities in the vicinity of the CBD within close walking distance to residential areas. Later, when the passenger rail transport service enabled housing to establish further away, employment remained at the core. The establishment of industrial areas away from the towns was only made possible after the 1950's when road based transport was made accessible to commuters.

The development of the Berlin industrial area in the 1980's was an attempt to provide employment opportunities for residents of Mdantsane and planned settlements between Mdantsane and Bhisho. However, industrialists were slow to establish factories in favour of sites closer to East London, and Berlin remains largely under-developed to this day.

Dimbaza was established in the late sixties and early seventies when the previous government offered incentives for industrial development as part of the Decentralised Industrial Development Point Strategy. With the rescission of these incentives, Dimbaza's and Fort Jackson's industrial operations have shrunk.

Responding to the preferences of industry to locate near to existing established factory areas, planning and construction of infrastructure for large-scale industrial development on the West Bank will better satisfy needs and will have the best chance of attracting investors, thereby creating more jobs. The fact that the major employment growth is planned to take place on the West Bank over the next ten years makes the need to create better links to this area from residential areas north of the Buffalo River. Further discussion on the need for an arterial road crossing of the Buffalo River is dealt with later in this report.

3.5 Growth Patterns

The projections of growth within the study area suggest that the population will grow by between 4% and 5% per annum. On that basis the population will increase from approximately 700044 (see reference 2) in the base year (2005) to 1276500 people in the year 2020. The table below gives a breakdown of the population increase by area during the analysis period.

Table 1: Population 2005 – 2020

Area	Population			
	2005	2010	2015	2020
Berlin	3460	5973	8487	11000
Bhisho	9770	11347	12923	14500
Briedbach	10622	11581	12541	13500
Dimbaza	28074	37049	46025	55000
Duncan Village	85639	107093	128546	150000
East London Central	5196	7464	9732	12000
East London North East	26787	29858	32929	36000
East London North West	37649	45433	53216	61000
Ginsberg	7760	14173	20587	27000
Ilitha	5733	8822	11911	15000
KWT/Sweetwaters	11922	19948	27974	36000
Mdantsane/Potsdam	182225	232150	282075	332000
Mt Coke/Needs Camp	8600	13400	18200	23000
Ndevana	14831	14221	13610	13000
Phakmisa	10904	14269	17635	21000
Quenera	30448	36965	43483	50000
Reeston	41462	53641	65821	78000
Rural North	65225	48483	31742	15000
Rural South	56362	67575	78787	90000
Tyutyu	2230	3987	5743	7500
West Bank	26196	23631	21065	18500
Zwelitsha	28949	38466	47983	57500
Rail Corridor	10486	53657	96829	140000
Total	700044	892196	1084348	1276500

Estimates of future employment opportunities have been based on the premise that the ratio of population to employment will remain constant over the analysis period except for the ELIDZ site which is expected to generate some 21000 jobs once the site has been completed and businesses start operations. It is also necessary to review spatial planning when distributing the increase in

employment opportunities as some areas that currently do not offer any employment will in the future have these opportunities. Likewise there is potential for opportunities in some areas to decrease as development take place in new areas.

Base year (2005) employment in the formal sector has been given as (125800) but this figure is understated as it does not include employment in the informal sector. Employment categorized as 'undetermined' in the census of 2001 is considered to be informal. The number of people employed in this sector is approximately 14000.

On the basis of the existing opportunities given for the formal sector in the base year, the number of employment opportunities in the formal sector is expected to increase by the year 2020. The exact growth and areas of growth are difficult to predict as the City develops however, some assumptions have been made on the implementation programmes from the various Spatial Planning documents.

3.6 Development Corridors

The notion of development corridors both as structuring elements to guide spatial planning as well as special development areas with specific types of development potential has been well established internationally.

Typically, development corridors have been identified as roads or other transport routes along which existing and/or potential land developments at higher than average intensity and density are allowed to occur.

While the overall aim of the process is to improve living conditions for residents of the corridor through job creation, it is recognized that transportation links are essential to success. This section suggests a broader plan for activity corridors in the Buffalo City area.

3.6.1 Components of Activity Corridors

The corridor concept has developed out of the principal of a continuous section of urban development, approximately 3km in width, in which residential places and work opportunities are either continuous or in relatively close proximity. A corridor is characterized by an activity spine along its centre around which the development is at its most dense.

Activity corridors have as their primary transport element a road-based transit system or a rail commuter service, or both, along the spine of the corridor. In addition, it is essential that within or adjacent to the corridor a “mobility route” consisting of a primary arterial should be present so that public transport and the economic opportunities in the corridor are also accessible by car.

A linear corridor will in practice consist of activity nodes with intense activity (commercial, residential, service industries) as opposed to a homogenous mix of continuous linear development. These nodes will be linked by the public transit system situated centrally along the spine.

3.6.2 Application of Activity Corridor Model to BCM Area

The application of the corridor model to the BCM area is shown in **Figure 3**. Three corridors are shown for East London which terminate in East London’s CBD. KWT similarly has three corridors terminating in the CBD. Major public transport movements will pass through or terminate in the CBD thus allowing the development of efficient interchanges and distribution of trips from one corridor to another.

The focus of each corridor is the CBD where opportunities will be made for strengthening the economic base of the CBD in terms of work opportunities and retail outlets. At the same time access to other major nodes within the corridors will be improved through the public transport systems that are established along the spine routes.

The nature of the corridors could be as follows:-

(a) **Mdantsane / East London Development Corridor (MELD)**

This corridor has been the subject of a major planning exercise and is undoubtedly the corridor with the most need and potential for development.

The Mdantsane Access Road/ Ziphunzana routes acts as a spine road for the corridor while the N2 and the proposed Buffalo River Bridge and Arterial Road link between N2 and R72 can effectively serve as the mobility route.

The link across the Buffalo River will allow a direct link from the corridor into West Bank without the need for trips to pass through the CBD. This applies to both public transport and private vehicle trips.

(b) **West bank – East London CDB Corridor**

The East London Industrial Development Zone (IDZ) will extend development along R72 in the form of a corridor. It is important that, if the corridor concept is to be established here, a spine road be identified separately from the R72.

(c) **Gonubie / Beacon Bay – East London CBD Corridor**

Of the three corridors in the East London area, the Gonubie – East London CBD Corridor is likely to be the least dense due to it traversing predominately high-income areas. Should the concept of this corridor advance, the appropriate spine road, as a public transport route, must be investigated. One possibility is Oxford Street and Devereux Avenue / Old Transkei Road / Batting Road / Beaconhurst Drive through to Gonubie.

The corridor will link four major nodes. These are the CBD, Vincent Centre, Beacon Bay town centre and Gonubie town centre. The mobility routes serving the corridor would be the North-East Expressway and N2.

(d) **Bhisho – KWT CBD Corridor**

This corridor operates primarily as a connection between the residential areas of KWT and the employment node of Bhisho. Maitland Road is the spine road of this corridor and in future could be used as a public transport corridor.

(e) **Zwelitsha – KWT CBD Corridor**

Currently there is no spatial planning done for this corridor. This corridor therefore only operates as a mobility route between KWT/Bhisho and Zwelitsha. In the future there is the possibility for this corridor to become a major public transport corridor.

(f) **Dimbaza – KWT CBD Corridor**

The Dimbaza node initially started as an industrial zone with employees traveling from KWT and as far a field as East London on a daily basis. This trend has changed due to the loss of employment opportunities after the incorporation of the former Ciskei into South Africa and the lost tax incentives to set up factories here. There is still a large population that resides in the area and therefore the main focus of this corridor is to travel to KWT for employment. Again this corridor in the future could be used as a public transport corridor.

CHAPTER 4 MAJOR MOVEMENT PATTERNS

4.1 Introduction

This section deals with the findings of the travel survey conducted in 2002 which provided confirmation of the current transportation planning done by the City. The survey captured a 1% sample of all household's person movement over a 24 hour period. Details of the findings of this survey can be found in the report "BCM 2002 Travel Survey, July 2002

Trips within the Buffalo City area are made by private vehicle, minibus taxi, commuter rail and non-motorized travel (walking). The concentration of movement occurs during weekday commuter peaks. During the morning peak hour most trips are generated in the residential areas and attracted to places where employment and education opportunities are situated.

The peak hours for private transport and public transport occur at slightly different times for the morning peak hour. The peak hour for public transport observed at the trip end side (employment side) starts before that of private transport. In many areas there is an overlap where the peak operational hours partially overlap.

The principle of determining the arterial network needs, based on commuter travel demand, is the basis of this Plan.

4.2 Commuter Movements

A travel survey of the BCM area (except KWT) was carried out in March 2002 and the supplementary surveys in March 2003. Travel data for KWT was collected in 2000 and integrated with the 2002/3 data to provide an overall presentation of travel patterns in the whole Buffalo City Area for a typical 24 hour period.

From the survey it is estimated that there are 1.3 million trips made per day in the functional transport BCM area, of which 48% are made by motorized road-based modes. Minibus taxis cater for 56% of motorized trips, private transport 39% and scheduled bus services 5%. It is assumed that no significant changes have taken place in land development or travel mode in the past 3 years to suggest that using this information would be incorrect.

The travel patterns for these trips are concentrated along the corridor between Mdantsane and East London and to a lesser degree between KWT - Zwelitsha and the other corridors.

The travel survey database, Muuli and VISUM software were used to establish current travel patterns and develop the current base year morning peak hour travel matrix. The base matrix reflect person trips during the AM peak hour as this is considered the busiest time on the network. Table 3 below indicates estimated work bound person trips for some of the main residential areas observed during the busiest hour of the morning peak period. Quoted figures exclude intra-zonal trips.

Table 3: Commuter Movements

<i>Residential area</i>	<i>Private Person movements in morning commuter peak hour (external) by PCU</i>
Beacon Bay and Gonubie	8300
East London suburbs	33200
Mdantsane	11600
KWT suburbs	8200
Zwelitsha and surroundings	5000
Gompo & Parkside	11200
Total	77500

Trips originating primarily in the East London and Mdantsane areas have destinations mainly to the East London CBD, West Bank or Wilsonia industrial area as these are the current major employment nodes.

KWT is the employment, retail and transport hub for the surrounding rural areas and therefore is the main destination for trips in the area. Dimbaza currently has

limited attraction as an employment node and most trips are to KWT from the surrounding area.

4.3 Mode Choice and Trip Length

The current travel modes available for commuters to choose are limited and constrained by available services, income and vehicle ownership.

Minibus taxis cater for the highest number of road based motorized one-way person trips traveling to work in the metropolitan area followed by passenger car, then bus. The balance of the 48% mentioned in 4.2 above is covered by rail and pedestrians. It is expected that these figures will change for the different modes of travel during the analysis period as the usage of an integrated and regulated public transport system is increased.

The average travel times currently for the different modes of transport are shown in Table 4 below. The travel survey indicates a mean travel time of 21 minutes with longer travel times for public transport and shorter times for private transport.

Table 4: Average trip travel time per mode

Mode	Average travel time (minutes)
Car	17
Walk	19
Minibus taxi	26
Bus	27
Train	32
Average	21.5

As BCM rolls out its PTP, and public transport systems are implemented, travel times on road based public transport and rail are expected to decrease.

4.4 Public Transport System and Market Share

The existing minibus taxi industry is referred to as the public transport system in Buffalo City. This is not strictly true as the industry does not cater for the needs of the commuter but is supply driven and controlled by the numerous operators. Buffalo City's vision for the future is a transport system that satisfies the mobility needs of the whole community and supports the economic development of Buffalo City.

To this end, work on the Public Transport Plan is being completed, with the introduction of the first phase expected in mid 2008.

Currently the minibus taxi industry carries approximately 350 000 of the estimated 624 000 motorized road based daily commuter trips in the Buffalo City area.

By far the largest corridor of public transport movement is along the Mdantsane / East London Development Corridor (MELD) and constitutes some 34% of the total public transport movement in the metropolitan area.

This volume confirms the need to provide an efficient and upgraded public transport system along the corridor. This will be implemented through the formalization of the minibus taxi industry, the introduction of a structured bus service, upgrading of infrastructure (including arterial roads) and the promotion and upgrading of the rail service as the transport backbone of the corridor.

4.5 Major Travel Corridors

With the amalgamation of ELMET and KWT TLC, the number of travel corridors has increased to include KWT/Bhisho and surrounding areas. Travel patterns for Buffalo City are illustrated in **figure 4**.

East London has a pattern of arterial routes radiating from the East London CBD supplemented by cross-town feeder routes running at right angles to the radial routes.

Seven corridors are identified for East London and are illustrated in **Figure 4**. These are:

- **Mdantsane Corridor**, incorporating Mdantsane
- **North-West Corridor**, incorporating Amalinda and Cambridge
- **South-West Corridor**, incorporating the West Bank
- **North-East Corridor**, extending from Gonubie to the CBD
- **Zwelthwa Corridor**, incorporating Phamkamisa
- **Dimbaza Corridor**, incorporating Dimbaza
- **Bhisho Corridor**, incorporating Bhisho

CHAPTER 5 ROAD HIERARCHY FOR ARTERIAL NETWORK

5.1 Introduction

This chapter provides an introduction to the concepts of road management and control of access. These guidelines are essential for the development of a structured hierarchy of arterials and for the ongoing management by the system Roads Authority.

These guidelines are important when decisions need to be made on the standard of a proposed arterial upgrading, and the connections of other arterials, roads and access via intersections with the routes.

5.2 Road Hierarchical Definition

The concept of identifying arterials in a hierarchical format stems from the need to balance mobility against access needs.

The following arterial road definitions are presented below:

Table 4: Arterial Road Definitions

Road Hierarchy	Description
Freeway	An expressway with special design features including median, grade separation at all crossing roads, ramps and interchanges
Expressway	A primary distributor on which preference is given to through traffic by providing access connection with selected public streets only
Primary Distributor	A primary road giving preference to through traffic while providing access to high traffic generating developments
District Distributor	A secondary road where increased opportunity is provided for direct property access. Roads in this category are occasionally referred to as "activity spines: where the interaction between the road and roadside developments at the pedestrian scale is important. These roads serve as important public transport routes
Local Distributor	These provide increased opportunity for direct property access. They also serve as important public transport feeders.

5.3 Network Structure

It must be emphasized that the geophysical nature of Buffalo City in some instances makes it extremely difficult to apply norms used elsewhere. Normally spacing between freeways varies between 8km and 11km apart. Expressways and primary arterials are 2km to 4km apart, with the district distributors some 1km to 1,5km apart. An analysis of the arterial spacing suggests that the network which has historically developed in Buffalo City conforms to some extent to the above norms.

5.4 Access Control and Road Management

Access control standards provide the roads authority with a valuable tool to:

- Determine the appropriate spacing of accesses along the arterial when planning a new facility, and
- Make decisions on the nature and location of accesses along existing arterials in response to development applications.

The control of access should be linked to two basic characteristics of the road or road section under consideration:

- (i) The hierarchy of the road, as defined in 5.1; and
- (ii) The development density and environment adjacent to the section of road.

For a specific hierarchy of road the spacing of intersections or accesses to the road should vary according to the density of development through which the road section passes. Where an arterial passes through a CBD area, access spacing can be at more frequent intervals than normally permitted in a suburban environment. This approach allows for the lower travel speeds appropriate to densely developed environments than for sparsely populated areas.

It is proposed that a road access policy be developed for the Buffalo City area which provides guidelines for the appropriate spacing of accesses, which take into account the road hierarchy, and development environment.

5.5 Suggested Road Hierarchy and Development Environment

Using the principles outlined in Section 5.2 and taking the categories of road hierarchy described in Section 5.1, it is proposed that a road hierarchy for the Buffalo City area be considered as follows:-

Table 5: Road Hierarchy

Road Hierarchy	Roads in Buffalo City
Freeway	N2 Freeway
Expressway	North East Expressway N6 Proposed North West Expressway Proposed Buffalo River Crossing and arterial link between N2 and R72 Settlers Way west of Buffalo Crossing
Primary Distributor	Woolwash Road / Amalinda Main Road / Lukin Road Proposed Park Arterial / Settlers Way R63 to Dimbaza R63 to Bhisho
District Distributor	Mdantsane Access Road / Ziphunzana Bypass / Buffalo Street Windermere Road / Devereux Avenue Croydon Road R346 to Stutterheim Buffalo Street Wodehouse Road to Ginsberg Western Avenue / Oxford Street Old Transkei Road / Batting Road / Bonza Bay Road / Gonubie Main Road Beaconhurst Drive Qumza Highway

The suggested road hierarchy given in **Figures 5 and 6** is a preliminary view of the possible development environments based on the density of urban development.

The concepts outlined in this chapter are provided as an introduction to a potentially powerful set of guidelines and standards which will require further detail before adoption.

5.6 Routes of Metropolitan Significance

Metropolitan roads may be defined as arterial routes which have an important function in providing mobility within the Buffalo City area.. The routes are mainly classified as either freeways or major arterial streets. Certain minor arterial routes such as public transport routes are included as being significant. The routes are shown in **Figure 7**.

CHAPTER 6 ARTERIAL ROAD DEVELOPMENT

6.1 Introduction

The main component of the Arterial Road Development Plan is a schedule of future road projects and this is presented in **Chapter 6**. The plan is based on the findings of a process of analysis, combining practical considerations of the optimal hierarchical structure of the arterial road system with future traffic demand predictions yielded from the VISUM modeling analysis.

The Plan has been structured to provide a strategy for the implementation of road improvement schemes to be completed by:

- Years 2005 – 2010 short term
- Years 2010 – 2015 medium term
- Years 2015 – 2020 long term

6.2 Economic Evaluation

An arterial road network with sufficient capacity is an essential part of the infrastructure of the metropolitan area without which the economy could not function efficiently. Inadequate provision of the network, either through a lack of capacity on critical road links or indirect routes causing longer journeys, results in higher costs for the road user.

The Arterial Road Network Development Plan has been tested for the period 2005 to 2020 using outputs from the VISUM simulation model to establish the benefits that would accrue to the metropolitan community, assuming the plan is implemented.

The methodology followed was to start with the 2005 base scenario. This network was then loaded with 2010 demand to determine network constraints under future load conditions. The projects proposed for the 2006 – 2010 period were then inserted into the model and the 2010 demand reassigned. In a similar fashion all the planning horizons up to 2020 were modelled. A list of the modelled scenarios is as follows:

- 2005 Base scenario
- 2005 Network with 2010 demand
- 2010 Network with 2010 demand
- 2010 Network with 2015 demand
- 2015 Network with 2015 demand
- 2015 Network with 2020 demand
- 2020 Network with 2020 demand

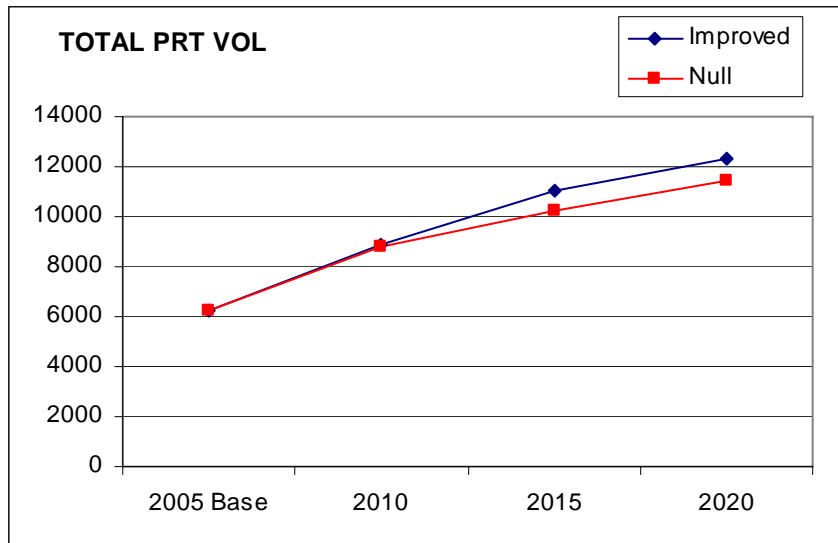


Figure 6.2.1

From Figure 6.2.1 above it is evident that traffic flows become constrained as more traffic is loaded onto road network without expanding the network to accommodate it. This results in comparatively lower over all traffic volumes travelling through the network. The difference between vehicle trip volumes for improved vs do nothing scenarios appears to increase as the demand on the network is increased suggesting that there is a reduction in available capacity to the point that the network is over saturated with resultant delays and longer vehicle operating time, see also figure 6.2.2 below.

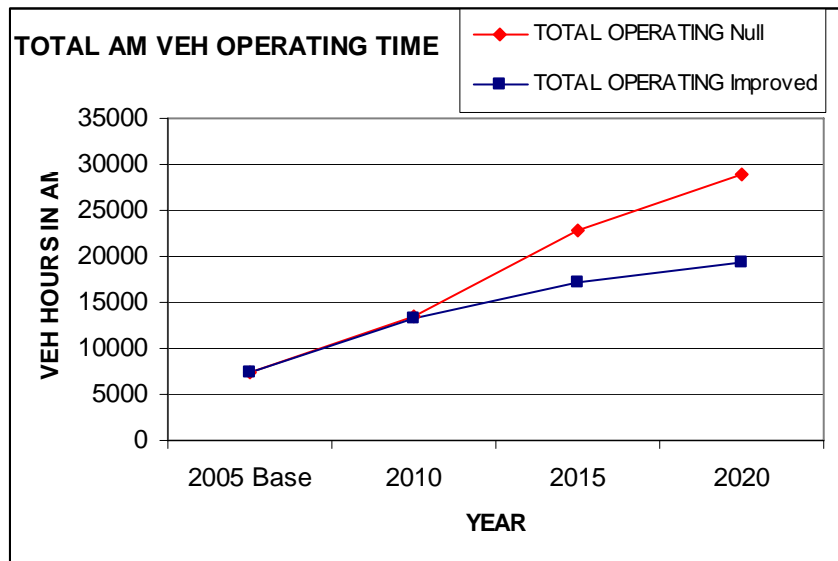


Figure 6.2.2

The sum of vehicle hours and total delay was extracted from the VISUM assignment results for each scenario and compared to determine the benefit in terms of total travel time and operating time on the network. Vehicle delay time and operating time was combined to determine total operating time. The total operating time from the base year assignment results was subtracted before carrying out Rate of return calculations.

A unit cost of R100/h was then applied to determine the total cost as a result of delay on a constrained network for the sum of the various do nothing scenarios.

By applying the unit cost of R100/h to the difference between the total operating cost of the improved and do nothing scenarios for the commuter peak hour traffic only (AM and PM combined), it is estimated that an annual saving of R 478 M can be achieved if the identified projects to a cost of R 1 369M (2007 Rands) are implemented over the 16 year planning period.

Assuming a discount rate of 10% per annum, the net present value of the resulting benefits, taking into account the cost of projects implemented in terms of the Plan over the next 16 years, will be approximately R 3 742,5M. This equates to a benefit cost ratio of 2,73.

It should be noted that this calculation is based only on the cost of total vehicle operating time and does not include the vehicle operating costs which would be higher if no arterial road infrastructure improvements are provided. It could also be argued that a reduction in total vehicle operating time and resultant reduction in vehicle operating costs could also result in a reduction in vehicle emissions and air pollution levels although this is not quantified as part of this report.

The economic evaluation gives an indication that the Arterial Road Development Plan, if carried out according to programme, will provide essential and major benefits to the economy of the Buffalo City region.

6.3 Implementation Projects for 2006 - 2010

To be able to identify project proposals to be completed by year 2010, a brief summary of the deficiencies within the network corridors are given. Deficiencies within the network are generally based on the lack of capacity however, some deficiencies will arise resulting from spatial layout changes in BCM over the study period. The known spatial changes as revealed in the SDF have been taken into account in the various scenarios tested.

6.3.1 Beacon Bay and Gonubie Corridor

(a) Existing Situation

Virtually all commuters living in Beacon Bay and Gonubie travel to work by car, using east-west arterial to reach work destinations in the west, in East London's CBD and the West Bank.

Gonubie residents have no option with only one arterial link (Gonubie Main Road) for the start of their journey. The link volume in the morning peak hour towards East London (exit direction) is approximately 1600 vph for the base year and is nearing a volume-capacity ratio (v/c) of 1,0. Plans have been prepared to increase the capacity of Gonubie Main Road towards East London by initially providing another lane in that direction and maintaining one lane in the direction of Gonubie. The affects of this increase generate a volume-capacity ratio (v/c) of 0,45 for the base year. Work on the widening is expected to be completed by June 2008 and should provide sufficient capacity beyond 2015.

Plans are also being produced for the widening of the entire carriageway of Gonubie Main Road to two lanes in either direction with a central median and cycle/pedestrian facilities on either side. The latter are already under construction. This will also entail the upgrading of the Gonubie / N2 interchange on-ramp as well as the NEX / N2 interchange ramps. This was a recommendation from the previous version of this report. This widening is to run concurrently with the provision of service roads off the main road servicing a

mixed land use node. The widening and provision of additional roads is expected to increase traffic on Gonubie Main Road.

Beacon Bay motorists have the option of only two routes to reach work destinations in the west, as follows:

- via Batting Road and the bridge over the Nahoon River, and
- via Bonza Bay Road and the N2.

The upgraded section of road linking the Batting Bridge with the Northern-East Expressway (the Batting “link”), carries a volume of over 1800 vph inbound in the morning peak hour. This volume is equal to the present capacity of the Batting Bridge crossing.

As a result of the capacity restraint of the two-lane, two-way Batting Bridge, traffic over and above the 1200 vph catered for by the bridge uses the Bonza Bay Road route. The current volume of traffic using this route is approximately 1000 vph, most of which continues its onward journey in the morning peak inbound along the N2, gaining access via the on-ramp of the Bonza Bay / N2 interchange.

The section of Old Transkei Road extending from the Gonubie Interchange and running parallel to the N2 acts as a further escape route for traffic from Gonubie heading for work destinations in the west and carries approximately 400 vph inbound in the morning peak hour.

Additional to these access schemes, BCM is reviewing and finalizing the location of a link between Gonubie and Beacon Bay. This project, Edge Road - Quinera Road, is a planned urban arterial to be constructed parallel to the coastline, approximately midway between the coastline and the N2 freeway - Gonubie Main Road (see **Figure 8**). The function of the road will be to link the communities of Gonubie, Quinera and Beacon Bay by means of a road of high order that obviates the need to travel between the above suburbs by using the longer N2 route for relatively short distance journeys.

Accepting the limitation of Beaconhurst Drive to function as a metropolitan route, an alignment allowing traffic to access to the N2 freeway, should be considered by utilizing Edge Road for the route and linking Beaconhurst Drive west of the Quinera River with Bonza Bay Road South of the N2 / Bonza Bay interchange.

(b) Discussion

From the information above it can be said that most capacity problems on the arterial road network in this corridor are being dealt with to the year 2010. The only deficiency in capacity is Batting Bridge and the road links to its approaches.

By simply widening the Batting bridge not much would improve and the benefit of the widening could only be realized by also improving the capacity across the bridge and onto the NEX. This can be achieved by providing an additional lane on the onramp and improving the Old Transkei, Batting Road intersection.

It is proposed that BCM continue with the implementation of the widening schemes proposed for

Gonubie Main Road (RP GN03)

for completion before 2010.

It is proposed that the new

Beacon Bay - Gonubie arterial road scheme (RP GN 01)

be implemented before 2010

In regard to the Bonza Bay Road route, it is proposed that the capacity of the

Bonza Bay Road traffic circles (TSM EL 32.9)

be improved by adding a second circulating lane at the Batting Road and Beaconhurst Drive intersections.

6.3.2 NEX / Valley Road to CBD Corridor

This section of the route epitomizes the state of the NEX corridor leading from the N2 inbound including the arterial feeders carrying traffic from its termination into and through the CBD.

The NEX is currently operating at an inbound volume of 2400 vph in the morning peak, which is below its capacity with a V/C ratio of 0,57 . The downstream Valley Road section, completed in 1996, carries 2200 vph at a v/c of 0,61. Commercial Road is almost fully loaded carrying 1500 vph at a v/c ratio of 0,83.

As traffic growth on this corridor continues, further strain will be placed on the lower reaches of the corridor, which will require that additional capacity be built to provide for adequate access to the city centre and destinations beyond.

In 2010 the NEX itself will still have sufficient capacity to accommodate the demand from the N2 to its termination at Valley Road. The inbound morning peak hour volume could be as much as 4000 vph and the v/c ratio approaching 0.9 on the expressway link immediately north of the Gleneagles interchange. This indicates a near capacity condition at this stage, but the expressway should function without undue congestion. While the expressway itself will cope with 2010 demand, however, the feeder system downstream of the termination point and on-ramps may be overloaded, and this will result in queuing taking place on NEX upstream of the bottleneck. The elements of the downstream arterial system constituting these bottlenecks are the following:

- **Thorburn Terrace**

Traffic traveling inbound on NEX and turning right into Thorburn Terrace will generate a demand of 1100 vph against a capacity of less than 500 vph under the current yield conditions at the intersection at this point (v/c ratio 2.2). Removal of the speed humps along Thorburn Terrace should be investigated.

- **Commercial Road**

Traffic demand on Commercial Road traveling inbound towards the upper end of the CBD will reach about 1900 vph, which corresponds to a v/c ratio of 0,9.

The lower end of the NEX delivery system will clearly be under considerable strain in accommodating the traffic demand by 2010 and, in some instances, earlier than 2010.

- **Fitzpatrick / Fleet Street**

Traffic heading for the West Bank and using the Fitzpatrick / Fleet Street route is limited to a maximum inbound flow of approximately 1200 vph due to substandard elements along the route. Improvements to the Park Avenue / Thorburn Terrace route are not likely to satisfy the demand for travel to the CBD, nor does this route provide for traffic going to the West Bank.

It is noted that preliminary planning of the development of the East London Sleeper Site, carried out in mid-1998 could lead to changes to the arterial road systems east of the current CBD. While these plans are still to be taken to a further stage of detail, the sleeper site will contribute to the traffic drawn to the vicinity of the CBD.

With the development of the site the following road links are proposed that would provide more alternative routes to and from the CBD: A link across the rail lines opposite Union Street, a link between Recreation and Signal Street and the Fitzpatric Road re-; between Bowls Road and Tutton Terrace

This section of Fitzpatrick Road Leading into the City from the east will operate at capacity with a v/c ratio of 1,1.

It is proposed that in order to increase the available capacity of this corridor,

the following projects be implemented in the period 2005-2010, as follows:

Thorburn Terrace NEX Upgrade (RP EL 08)

This will provide more capacity for NEX traffic on the route leading to the upper end of the CBD via Thorburn Terrace.

Fitzpatrick Road alignment & Sleeper Site Roads (RP EL 27)

Traffic heading for the lower end of the CBD and for West Bank will benefit from the realignment.

6.3.3 Oxford Street : Amalinda Main Road / CBD Corridor

This route carries approximately 1200 vph inbound in the morning peak along the section north of Amalinda Main Road and operates at an acceptable v/c ratio of 0,7. South of Amalinda Main Road the flow is at a similar level, also within acceptable limits with a v/c ratio of 0.6.

With the exception of a short section of the route associated with the staggered intersection of Amalinda Main Road / Lukin Road with Oxford Street, where a level of congestion occurs due to the inefficient operation of this arrangement, the route has adequate capacity to accommodate current traffic demand.

The growth in the Cambridge and Amalinda areas, coupled with additional traffic originating from the N2, will increase traffic volumes traveling inbound on this route in weekday morning peak hour. By 2010, traffic on the Western Avenue / Oxford Street route will be operating very close to the capacity; the Western Avenue section will carry 1500 vph at v/c of 0,9 while the sections of Oxford Street upstream of St Peters Road will carry 1700 vph at a v/c of 0,9

The lower portion of Amalinda Main Road near the Frere Hospital carries approximately 1400 vph inbound in the morning peak hour, and this traffic flows freely up to this point at a v/c of 0,6.

The limited capacity of the Amalinda Main Road / Oxford Street intersection, however, results in a large number of vehicles diverting from Amalinda Main Road to use the Lennox Road route in preference to the Oxford Street route. Inbound peak traffic volumes on Lennox Road upstream of St Peter's Road are, in fact, of the same order as those on Oxford Street, at 1100 vph.

Amalinda Main Road will be heavily loaded by 2010 with traffic demand reaching a flow of 2400 vph on the approach to Frere Hospital. At this point traffic will be operating at capacity (v/c ratio of 1,0) and it is likely that significant congestion will occur. This will result in a degree of distribution of traffic to other routes in order for them to reach their destination more quickly, and routes such as Ziphunzana Bypass via Fitchett Road will carry some of this traffic.

The capacity restraint at the Amalinda Main Road / Oxford Street intersection will continue to cause traffic to divert to Lennox Road, with an estimated 1500 vph attempting to use this route at a v/c ratio of 1.2.

The undesirably high loading of traffic on Lennox Road, a low-order collector road, suggests the need for a higher capacity corridor running parallel to Lennox Road.

This can be achieved with the extension of the North-West Expressway from Frederick Street to Amalinda Main Road.

Once the North-West Expressway (NWX) route has been constructed, it will be necessary to improve the secondary arterial routes delivering traffic from the adjacent areas to the NWX.

Croydon Road is a further incomplete route that will link Amalinda Main Road with the Cambridge area and will also connect with the Windermere Road route. The road should be implemented during the period 2006 – 2010.

The development of these other links into the city centre will facilitate the closure, or partial closure, of Oxford Street for pedestrianisation between North and Fleet Streets, which has been planned for 2006 – 2010. However, it may be prudent to

delay this project until the new Buffalo River Bridge and road link is open. The latter should absorb much of the heavy vehicle traffic that uses Oxford Street for access to and from the N2.

It is proposed that in order to accommodate the increasing flows on Amalinda Main Road, and to divert traffic using Lennox and Oxford Streets, the second section of

North West Expressway (NWX) (RP EL 14)

be constructed from its current termination at Frederick Street to Amalinda Main Road.

Croydon Road (RP EL 05)

linking Amalinda Main Road with the Cambridge area.

6.3.4 Mdantsane Access Road / Ziphunzana Corridor

The route has spare capacity on each of its subsections and therefore does not need immediate upgrading for reasons of congestion and delays. Significant problems exist, however, due to the operational needs and behaviour of road users.

(i) Mdantsane Access Road

This section will increasingly act as a spine arterial route through a growing residential area. The high levels of pedestrian traffic in the vicinity of the road are in conflict with high travel speeds of traffic encouraged by the geometric rural character of the road. The Mdantsane Access Road Safety Study (see reference 5) identified several projects that will be implemented in terms of Project TSM EL 34.1.

(ii) Ziphunzana Bypass

A similar situation pertains to the dual-lane undivided section of the route adjacent to Duncan Village. The pedestrian activity here is significantly increased through dropping-off and picking-up of passengers by bus and minibus taxis at frequent stopping points on the route. Pedestrian bridges, concrete footpaths and the installation of Armco barrier have improved the safety of these pedestrians.

(iii) Buffalo Street

Within the East London CBD, Buffalo Street is under pressure due to high volumes of minibus taxis plying the route, onstreet parking demand and turning movements at the crossing streets. Further traffic management measures to accommodate these needs are required.

In order to manage the safety of the users of Mdantsane Access Road, it is considered that the project

Mdantsane Access Road Safety Improvements (TSM EL 34.1)

be continued.

6.3.5 Mdantsane Access

For the relatively large population that resides in Mdantsane, traffic demand generated by the township as a whole is low in relation to the high-income areas of East London. This is due to the fact that the majority of the workers commuting to destinations in East London do so by road-based public transport and rail. In addition, the high unemployment rate prevailing in Mdantsane further suppresses the travel demand.

Even so, Qumza Highway North of the R102 link carries a traffic volume inbound towards East London in the morning peak hour of 1000 vph at a v/c of 0,55 on the approach to the Main Entrance. On the section between Billie Road and the Saule Road intersection, traffic flows at a volume of approximately 600 vph at a v/c ratio of 0,4.

While public transport must be enhanced to encourage the economically upwardly mobile community to continue using it, it is probable that car usage will also increase in future.

The arterial road system serving Mdantsane will probably be able to cater for demand with improvements defined through this study to 2015, assuming a small-expected modal shift to private car. It is evident that with few accesses into Mdantsane from the external arterial system, the delivery system could very easily become congested as car ownership and usage increases in the future.

Qumza Highway Upgrade (RP MD 01)

The section between Billie Road and Golden Highway should be upgraded to a similar standard as the section between Billie Road and the Main Entrance before 2010.

Table 6: Implementation Programme for 2006-2010
(see also **Figure 8**)

	<i>Ref</i>	<i>Project</i>	<i>Cost 2006 R million</i>
1	RP GN 03	Widening of Gonubie Main Road Phase 1&2	40
2	RP GN 01	Beacon Bay - Gonubie New Arterial Road	60
3	TSM EL 07 & 08	NEX / Thorburn Terrace Upgrade	20
4	RP EL 14	NWX Frederick Street to Amalinda Main Rd	8
5	TSM EL 13	Oxford Street Mall (pedestrianisation)*	15
6	TSM EL 34.1	Mdantsane Access Road (MAR) Improvements	10
7	TSM EL 32.9	Bonza Bay Road Traffic Circles	2
8	RP MD 01	Qumza Highway Upgrade	40
9	RP EL 27	Fitzpatrick Road alignment & Sleeper Site roads	60
10	RP EL 33	IDZ: Completion of Breezyvale Link Road first carriageway	3
Total Cost for 2006 – 2010			258

* Possibility that that this project should not commence until new Buffalo crossing is open to traffic.

6.4 Implementation Projects for 2010-2015

Following the implementation of the projects for the period 2006 - 2010 dealt with in **Section 6.3** and assuming that most of these projects are completed, it is proposed that the following list of projects be implemented to supplement preceding projects or, in other cases, be new projects aimed at improving mobility in the Buffalo City area.

6.4.1 Beacon bay and Gonubie Access

(i) Gonubie Access

In addition to upgrading Gonubie Main Road, the access ramp at the Gonubie / N2 interchange linking Gonubie Main Road with the N2 freeway, which has a current capacity for 1300 vph, may be required to carry in excess of 2000 vph westbound at a v/c ratio of 1,3 in the morning peak period by 2015. The balance of the westbound vehicles not entering the freeway (1300 vph) would either continue along the Old Transkei Road or alternatively travel via the new Quinera Road to Beacon Bay. The upgrading of the south-bound on-ramp, particularly its intersection with Gonubie Main Road, will be essential to absorb the increased demand for this route.

(ii) Beacon bay Access

By 2015 the two access routes leading out of Beacon Bay will be severely under strain, with both routes either beyond or close to capacity. Traffic using the Batting "link" would experience severe congestion as the demand is anticipated to increase to over 2500 vph in the morning peak hour in the westbound direction, equivalent to a v/c ratio of 1,3. The Bonza Bay Road route, carrying traffic westwards towards East London via the N2 or Old Transkei Road, will carry about 1800 vph at a v/c ratio of 0,98.

The capacity constraints on the Gonubie / Beacon Bay sub-regional road network will influence travel patterns in several ways.

- Traffic from Bonza Bay Road turning into the NEX via the Bonza Bay / N2 interchange southbound ramp will operate at a volume of about 1800 vph in the morning peak period in the inbound direction, corresponding to a v/c ratio of over 0,9.
- As a result of this near capacity condition, a significant volume would continue onwards over the freeway to join the N6 route into town.
- The section of Old Transkei Road from the junction of Bonza Bay Road to the NEX / N2 interchange will operate at a v/c ratio of nearly 1,0 in the morning peak hour in the southbound direction,

The situation as analyzed requires the upgrading of the Batting “link” to provide needed capacity.

(iii) **Constraints along the N2 Freeway**

The N2 freeway effectively functions as a urban primary arterial between the Gonubie interchange and the Western Avenue interchange, collecting significant volumes of traffic from Gonubie and Beacon Bay and discharging them into the arterial street system via the N2 / NEX and N2 / Western Avenue interchanges. The traffic volumes in the morning peak period in the inbound direction on the three mid-block sections of the freeway (Gonubie – Bonza Bay; Bonza bay - NEX; NEX – Western Avenue) will be below the freeway capacity in the year 2015. (v/c ratios 0,4, 0,6 and 0,4 respectively in the inbound direction).,

The access ramps at the three interchanges, however, (Gonubie, Beacon Bay and NEX), will have insufficient capacity to provide for the demand for access to and from the N2 at these points by the year 2015.

- At the Gonubie interchange the flow demand of 2000 vph in the morning peak hour in the westbound direction attempting to use the

ramp to enter the freeway will result in a latent v/c ratio of 1,3 and this will result in a deviation, as mentioned in (i).

- At the Beacon Bay interchange, approximately 1800 vph will access the freeway via the ramp in the morning peak hour in the inbound direction, experiencing a near capacity v/c of 0,9 as mentioned in (ii) above.
- At the NEX / N2 interchange approximately 2000 vph will exit the freeway in the morning peak period in the inbound direction to continue their journeys to CBD along NEX. The single lane ramp serving this movement will have insufficient capacity and traffic will operate in congested conditions at a v/c of 1,3. This would result in many vehicles taking the longer routes toward the Western Avenue interchange to exit the freeway.

In order to satisfy capacity demand in the period 2010-2015 for traffic originating in the Beacon Bay and Gonubie areas, the following projects should be implemented:

Gonubie Main Road - N2 interchange on-ramp (RP GN 04)

be upgraded to provide a minimum capacity of 3200 v/h;

The on-ramp between Bonza Bay Road and the N2 (RP BB 08)

be increased in capacity to a minimum of 3200 v/h;

The off-ramp from the N2 to the North East Expressway (TSM EL 30)

be increased in capacity to allow a left turn capacity of minimum 3200 v/h;

The Batting “link” Project (RP EL 11)

Increase capacity on the section between NEX and Batting Road to a minimum 3200 v/h

6.4.2 West Bank Access - New Buffalo River Crossing

The separation of the West Bank from areas to the north of the Buffalo River has had a significant effect on the form of development north and south of the Buffalo River, but also on access to the West Bank.

The fact that crossings of the river can only be made at the existing Settlers / Pontoon bridges and 7,5 km upstream at the Buffalo Pass bridge results in longer journeys to reach workplaces on the West Bank for residents north of the Buffalo River than could be achieved with a more direct route. The limited number of crossings has also resulted in concentrations of traffic flowing through the CBD and a growing level of congestion on the Settlers Way route.

Fleet Street immediately to the west of Buffalo Street carries a flow of 2000 vph towards West Bank in the morning peak, which is joined by 400 vph from the Settlers Way underpass, resulting in a v/c ratio of 0,6 on the approach to the Pontoon Road intersection. Traffic splits at the Pontoon intersection, with 1800 vph flowing onwards and over the Settlers Way Bridge, while 600 vph use the Pontoon Bridge in the same direction. The two bridges have sufficient capacity to carry the demand at v/c ratios 0,8 and 0,6 respectively. Although these traffic volumes are not yet critical the current development of the IDZ and imminent increase in traffic as a result thereof may cause severe capacity failures along this route.

The feasibility study entitled “Buffalo River Bridge and Arterial Road Link between the N2 and R72: Part C – Transport Planning Report” (see reference 4) provides a detailed analysis of the need for the new Buffalo crossing.

The study provided greater clarity on the alignment and geometric configuration of the route of the arterial linking the bridge with the N2. While further detail is still required before the conceptual planning can be completed, and the route reserved and proclaimed, it is clear that the construction of the bridge and the phase 1 road link (initially proposed to be constructed in the period 1998-2002) should be implemented in the 2010 – 2015 period and should be followed by the link to the N2 in the period 2015 – 2020. In practical terms, 2010 – 2015 is later

than would suit the closure of Oxford Street for pedestrianisation, suggesting that this closure should be postponed until the bridge and road link are in place. The bridge should be constructed with sufficient width to accommodate four traffic lanes, pedestrians and cyclists.

Provision should be made for upgrading the section of Mdantsane Access Road from the Main Entrance at Mdantsane to Woolwash Road to accommodate the role that this road will play within the MELD corridor. This road will serve increasing volumes of traffic while at the same time require attention to give priority to road-based public transport vehicles that will form a major component of the corridor linking the IDZ with the residential suburbs situated north of the Buffalo River.

It is proposed that in order to meet the needs of commuters working on the West Bank and in the Industrial Development Zone, the

**Buffalo River Crossing: Mdantsane Access Road to the
Airport Bypass (RP EL 21)**

be implemented before 2015.

With the above project the improvement of the

Mdantsane Access Road (PROP 01)

from Main Entrance at Mdantsane to Woolwash Road.

6.4.3 Duncan Village Access

The previous Arterial Roads Plan made recommendations that access to Duncan Village, both for vehicles and pedestrians, be improved by linking Douglas Smit Highway to Ziphunzana Bypass. Over the last number of years various projects have been carried out to achieve this. The only one of the planned links still to be provided is the extension of Sunnyside Road from the MAR to Douglas Smit Highway. The need for this link should be re-considered as it will have to pass through already developed township.

It is recommended that the road projects that formed part of the programme and have not been completed be done so by 2015 (subject to review) :

Duncan Village Link Road (RP DV 01)

This will link the Douglas Smith Highway with Ziphunzana Bypass opposite Sunnyside Road

6.4.4 Oxford Street / Amalinda Main Road to CBD Corridor

Traffic demand modeling suggests that attention should be given to providing more capacity in the north-west corridor to relieve Amalinda Main Road of growing traffic congestion. The construction of North-West Expressway (NWX) will provide this relief to Amalinda Main Road and allow it to service local traffic associated with intensive business developments along this route.

The road reserve of NWX has been acquired and is reserved for the future 6-lane dual carriageway. Further studies are required to establish:

- The staging of construction of the road;

- Feasibility of incorporating public transport priority lanes with the road corridor; and
- The nature and optimal standard of intersections / interchanges with crossing roads along the route.

This project will provide an important arterial essential to providing a direct route for the traffic demand from the North west to the upper CBD.

North-West Expressway (RP EL 16)

from Amalinda Main Road to Summerpride

6.4.5 King Williams Town Corridors

KWT is the employment, retail and transport hub for the surrounding rural areas with three clearly identified travel corridors spreading out from the CBD area.

i) **Bhisho Corridor**

This corridor primarily services the employment node of Bhisho and is accessed via Maitland Road from KWT or via the MR0688 from Zwelitsha. Maitland Road is a dual carriageway with two lanes for traffic in either direction. The flow along Maitland Road in the am peak is 380 vph towards Bhisho at a v/c ratio of 0,1. The volume of traffic towards Bhisho from Zwelitsha along in the am peak is 150 vph at a v/c ratio of 0,08. Both of these routes are expected to continue to operate adequately to the year 2015.

ii) **Zwelitsha Corridor**

Traffic in this corridor flows towards KWT in the morning peak via Buffalo Road (R346). This route services the entire area to the south west of KWT including Phakamisa, Ndevana, Zwelitsha and other minor settlements. As private car ownership in these areas is relatively low, the majority mode of motorized transport is the minibus taxi. The seating

capacity of these vehicles contributes to the lower traffic volume on this stretch of the route, which is less than the actual capacity of the route. The v/c ratio is 0,06. It is expected that this route will continue to operate at an acceptable level to 2015.

iii) **Dimbaza Corridor**

Most trips in this corridor are towards KWT in the morning peak primarily by minibus taxi using the R63. The peak flow is 217 vph at a v/c ratio of 0,12. As Dimbaza has limited attraction as an employment node it is expected that the R63 will operate adequately up to and beyond 2015.

Due to the low ownership of private vehicles in these corridors, a large percentage of trips are made on foot. The R63, Dimbaza to King Williams Town has recently been improved in terms of public transport stops.

The Zwelitsha corridor could benefit from improving pedestrian safety and public transport stops along the route in a similar fashion as provided along the Mdantsane Access Road.

Construction of non motorized facility in the form of

cycle and pedestrian path along Zwelitsha Road (TSM KWT 01)

Table 7: Implementation Programme for 2010-2015 (Section 6.4)
(see also **Figure 8**)

	<i>Ref</i>	<i>Project</i>	<i>Cost 2006 R million</i>
11	RP GN 04	Gonubie Main Road / N2 interchange on-ramp	6
12	RP BB 08	Bonza Bay Road / N2 interchange on-ramp	12
13	TSM EL 30	NEX / N2 interchange off-ramp	10
14	RP EL 11	Batting Bridge and approaches NEX on-ramp	40
15	RP DV 01	Sunnyside Road extension to Douglas Smit	6
16	RP EL 16	NWX : Amalinda Main Road to Summerpride	60
17	RP EL 21	Buffalo Crossing : R72 to MAR	180
18	TSM KWT 01	Zwelitsha Road pedestrian facility	2
19	PROP 01	MAR : Main Entrance to Woolwash Road	51
20	RP EL 34	IDZ: Eastward extension of the Harbour Arterial Road (HAR) Phase 1 to Potters Pass, 1 carriageway, incl. link to Prince George Drive	24
21	RP EL 35	IDZ: Remainder of the Eastward extension of HAR to Military Road / West Bank, 1 carriageway	35
22	RP EL 36	IDZ: Second carriageway to existing HAR between traffic circles	15
23	RP EL 38	IDZ: Second carriageway to Breezyvale LinkRd	12
Total Cost for 2010-2015			453

6.5 Implementation Projects for 2015 - 2023

In this section suggestions are put forward for road projects that would be required between 2015 and 2023. As this period is more than a decade from now and the outcome of development and extent of eventual growth is uncertain it will be necessary to verify the implementation time of these projects as time progresses.

6.5.1 NEX / Valley Road to CBD Corridor

High-income residential development will continue to grow in the Beacon Bay / Gonubie areas resulting in the demand for private car travel on this corridor. Many of these vehicles have destinations beyond the CBD, in the West Bank.

Two requirements must be fulfilled in the longer term along this corridor that would not be adequately addressed by the Thorburn Terrace upgrade (TSM EL 07 & 08) proposed in the 2005 - 2010 period.

- Greater capacity will be needed between the NEX and the CBD; and
- Provision of a route leading traffic past the CBD to destinations on the West Bank.

It is proposed that in order to satisfy the above, the Park Arterial be implemented during this period. This route, as defined in the report "Investigation into Alternatives for the Northern CBD Cross Town Link" (see reference 6), is planned as a multi-lane arterial road with uniform standard linking NEX to Settlers Way.

The route as planned has some significant impacts on developed properties, and/or Settlers Way. Because of the high expropriation costs, the changes to road access and the impact on public places, planning for the route must be carried out in consultation with affected and interested parties, particularly owners of properties on or adjacent to the route. In the course of this process, options can be considered investigating alternative routes and standards so as to investigate negative impacts while meeting the needs of traffic demand.

It is proposed that in order to accommodate traffic in the NEX/Valley Road to CBD Corridor and to provide for traffic bypassing the CBD, the

Park Arterial (RP EL 08)

be implemented.

6.5.2 Amalinda Area Access Routes

Once the North-West Expressway (NWX) route has been constructed, it will be necessary to improve the secondary arterial routes delivering traffic from the adjacent areas to the NWX.

Windermere Road is an existing east-west distributor that intersects with the NWX, and links the NWX with the Cambridge area in the east and the Woolwash residential area in the west. If the road is to perform its function as an access to the NWX then it should be upgraded to a 4-lane arterial linking the NWX with Western Avenue. Consideration must be given to the most appropriate alignment of the route through the Cambridge area; likewise, the linkage between the NWX and Woolwash Road must be considered in the planning process.

Thus, the upgrading of access routes in the Amalinda Area will require the upgrading of:

Windermere Road (RP EL 17)

functioning as an arterial distributing traffic from NWX; and

6.5.3 Mdantsane Access Road / Ziphunzana Corridor

The upgrading of Mdantsane Access Road between Woolwash Road and Douglas Smith Highway should be undertaken in this period. This will provide for a continuity of route standard in the section from Mdantsane to Braeside Road, as is required for the needs of the MELD corridor. The nature of the cross-section to accommodate higher access related traffic and also road-based public transport must be determined through a conceptual planning study of the corridor.

The terminating section of the above route extends from the Douglas Smith Highway east intersection with Braeside Road to Fleet Street and includes a portion of Buffalo Street. Improvements and modifications to this section to provide for the volume and mix of traffic will be required by 2020. These

improvements will consider the role of the route as a major carrier of public transport vehicles, which will terminate in the CBD hub.

Projects that will be required in this period are improvements to:

Mdantsane Access Road (PROP 03)

from Woolwash Road to the Western intersection of Douglas Smit Highway; and

Braeside Road (PROP 02)

from the eastern intersection of Douglas Smit Highway and Ziphunzana bypass to Fleet Street.

6.5.4 Mdantsane Access

While public transport must be enhanced to attract more users as the economy improves the higher income groups in the community is likely to use private transport and therefore car usage will increase in the future. Measures to maximize the usage of public transport include:

- The development of priority to road-based public transport in the Qumza / Mdantsane Access route within the MELD corridor;
- Efficient and attractive interchange points for public transport; and
- The upgrading of the rail commuter transport system by providing improved access to the railway stations.

(i) ***Northern Perimeter Road***

In order to satisfy these requirements, it is proposed that a northern perimeter arterial distributor be established, linking Billie Road with Qumza Highway by the development of a continuous route located parallel to and south of the railway line. This route should connect the railway stations and

include additional linkages as appropriate to other collector roads in Mdantsane. This road will enable bus services to feed the railway stations much more efficiently than occurs at present.

(ii) ***N2 Freeway Linkages(R102 Nahoon IC) & Mont Ruth IC***

Another objective should be to supplement the current limited capacity of Qumza Highway to accommodate traffic volumes entering and leaving Mdantsane. It is considered that the following projects should be programmed for closer examination with a view to implementation after 2015 to be in line with planning as detailed in the SDF.

- The extension of Billie Road over the N2 to connect with the Newlands Road, and the construction of ramps to the N2 to form an interchange off Billie Road with the N2. This will provide direct access from the centre of Mdantsane to the freeway.
- The proposed northern perimeter road be linked to the N2 freeway by means of an overhead road bridge crossing the trunk road and rail lines to link the Nahoon Dam Road, which currently has an interchange with the N2. This will further provide access from the eastern end of Mdantsane with the N2.

Mdantsane will require the following projects between 2015 and 2020 to attend to both private vehicle access and the enhancement of public transport systems.

A northern perimeter road (PROP 04)

between Billie Road and Qumza Highway linking to the commuter rail stations, Mouth Ruth, Mdantsane and Mtsotso.

Billie Road / N2 Interchange (RP MD 08)

with N2 and the realignment of Billie Road with Qumza Highway (RP MD 08).

A link over rail from the northern perimeter road to the
N2 / Mdantsane interchange (RP MD 07).

6.5.5 King Williams Town Bypass

The current bypass route for the N2 through King Williams Town is still aligned through the town and through traffic impact on Alexandra, Maitland and Buffalo Streets.

The SDF identified the need for a N2 bypass around King Williams Town and the VISUM analysis confirm that a bypass to the west of King Williams Town may become a requirement by 2020 and should be implemented in the period 2015 - 2020.

In terms of the SDF the

King Williams Town Bypass (RP KWT 01)

should be implemented between 2020 and 2025

6.5.6 West Bank Access - New Buffalo River Crossing also refer to 6.4.2

The feasibility study entitled “Buffalo River Bridge and Arterial Road Link between the N2 and R72: Part C – Transport Planning Report” (see reference 4) provides a detailed analysis of the need for the new Buffalo crossing to link the N2 and R72.

The study provided greater clarity on the alignment and geometric configuration of the route of the arterial linking the bridge with the N2. While further detail is still required before the conceptual planning can be completed, and the route

declared, it is reasonably clear that the construction of the bridge in the 2010 - 2015 period should be followed by the link from Ziphunzana bypass to the N2 (RP EL 25) in the period 2015-2020.

It is proposed that in order to meet the needs of commuters working on the West Bank and in the Industrial Development Zone, the Buffalo River Crossing :

Mdantsane Access Road to the Airport Bypass (RP EL 21)

be implemented before 2020.

6.5.7 Western Avenue over N2 dual lanes

When the network is tested under normal traffic growth conditions this link is over capacity for the 2020 scenario. A large area is open for development to the north of the N2 and east of the goods shed on the hills overlooking Nahoon Valley. This area can only be accessed from the south via the Western Avenue link over the N2 or from the north via Two Rivers Drive. Current development pressure may lead to further growth and development in this area that would over saturate the available network capacity and impact heavily on the northern limits of the M1 (Western Avenue).

The widening of the interchange to accommodate four lanes plus a dedicated turn lane is proposed in the 2020 - 2025 planning period.

To accommodate traffic at an acceptable V/C ratio it is proposed to widen the

Western Avenue bridge over the N2 (RP EL 28)

by 2025.

6.5.8 Kingsway rail underpass dual lanes

Under present traffic load conditions this link along the M5 (Kingsway / Devereux Avenue) is showing capacity problems. The proposed NWX (2010 - 2015) and Croyden Road (2015 - 2020) projects may to a certain extent bring some relief.

However the proposed Windermere Road project (RP EL 17) to be implemented in the preceding period would draw traffic toward the Devereux Ave / Kingsway underpass and would further compound the capacity problems. It is strongly recommended that should the Windermere project be implemented in the latter part of the 2015 - 2020 period, then the Kings Way underpass widening should be timed to happen immediately after as one project. In this way the severe bottle neck can best be resolved.

To relieve the bottle neck at the M1 / M5 intersection is proposed to widen the

Kings Way Rail underpass (RP EL 29)

to accommodate 4 lanes by 2025.

6.5.9 Qumza Highway R102 link dual lanes over rail

Should the Mdantsane interchange link (RP MD 07) proposed in the preceding period (2015 - 2020) not be implemented then the widening of the R102 MAR link over rail would most certainly be required.

With the current development of the area west of this link and further planned development in terms of the SDF in the area situated between Arnoldton and Mdantsane capacity problems are expected on this short link between the R102

and the M3 (Mdantsane Access Road). It is proposed that the rail overpass be widened to accommodate four lanes.

In order to improve the predicted V/C ratio on the R102 / MAR link, it is proposed to :

Widen the road over rail bridge (RP MD 09)

6.5.10 Voortrekker Road and Amalinda N2 interchange upgrade

In terms of the SDF with the planned development of the Arnoldton node, the capacity of Voortrekker road will be insufficient to provide for traffic demand in the year 2020. The road would require additional lanes to the west of the Amalinda /N2 interchange.

It is proposed that Voortrekker Road be upgraded to a four lane facility between Amalinda Main Road and Bert Kipling Street.

It is further proposed that the east bound on ramp of the Amalinda N2 interchange be widened to provide for two lanes onto the freeway.

To accommodate traffic demand at acceptable V/C ratio

Voortrekker Road upgrade (RP EL 30)

East-bound on-ramp widening at Amalinda N2 interchange (RP EL 31)

is proposed before 2025.

6.5.11 Billie Road requires additional lanes

In the previous planning period 2015 - 2020 it is proposed to implement the Billie Road / N2 Interchange. The interchange will greatly improve the accessibility for both Mdantsane and the Newlands area.

It is evident that the demand on Billie Road will increase with these network developments and in order to maintain an acceptable V/C ratio along Billie Road it is proposed that the road be widened to four lanes between the N2 and Qumza High Way.

To provide capacity for 2020 demand it is proposed to

widen Billie Road from Qumza to the N2 (RP MD 10)

to accommodate four lanes.

**Table 8: Implementation Programme for 2015 2023- (Section 6.5)
(see also Figure 8)**

	<i>Ref</i>	<i>Project</i>	<i>Cost 2006 R million</i>
24	RP EL 08	Park Arterial : NEX to Settlers Way	90
25	RP EL 05	Lower Croydon Road	8
26	RP EL 17	Windermere Road Upgrade	20
27	PROP 03	MAR : Woolwash to Douglas Smit	30
28	RP MD 08	Billie Road / N2 Interchange	30
29	RP MD 07	Mdantsane / N2 Interchange	20
30	PROP 04	Mdantsane Perimeter Road	50
31	RP KWT 01	King Williams Town By-Pass	80
32	RP EL 25	Buffalo River Crossing N2 - Ziphunzana	120
33	RP EL 28	Western Ave / N2 Interchange	30
34	RP EL 29	Kings Way Rail underpass	15
35	RP MD 09	MAR R102 link over rail	15
36	RP EL 30	Voortrekker Road upgrade	30
37	RP EL 31	Amalinda Main Road N2 Interchange	15
38	RP EL 37	IDZ: Westward extension of HAR to Cove Rock / R72, First carriageway	35
39	RP EL 39	IDZ: Completion of Eastward Extension of HAR, second carriageway on both phases	50
40	RP MD 10	Billie Road upgrade	20
Total Cost for 2015 - 2023			658

6.6 Development of the ELIDZ and adjacent areas on the West Bank

Sub-section 3.2.1 of this report alluded to the development of the ELIDZ on the West Bank and the possible growth of residential areas in the vicinity.

The ELIDZ became reality in 2002, and planning for the road infrastructure in that area had begun several years prior to the IDZ's promulgation. The eventual IDZ is expected to cover five Zones, stretching from the airport to West Bank adjacent to the Harbour.

The initial road requirements for Zone 1, which occupies most of the area bounded by Chester Road in the east and Breezyvale Road in the west, the coastline in the south and the R72 / Settlers Way in the north, included :

- the re-alignment of the Chester Road intersection with Settlers Way, and the upgrading of Chester Road (M19) to divided four-lane standard, with provision for dedicated bus lanes to be added later;
- the construction of one carriageway of the Harbour Arterial Road (HAR) (M20), linking Chester Road at a traffic circle to another traffic circle at the western end of Zone 1A. This arterial is intended ultimately to be a four-lane divided facility, linking through to the Harbour in the east and Cove Rock and the R72 in the west. Provision has been made on this arterial for bus bays;
- a link from the second traffic circle to Breezyvale Road, giving access to Zone 1B of the IDZ. Provision has been made on this road for busses;
- the closure of the southern portion of Chester Road that linked it to Prince George Drive (incorporated into the Customs Controlled Area of Zone 1A).

Construction of these elements was completed in 2005.

In the interim, preliminary planning for the eastward extension of the Harbour Arterial Road has been undertaken but never finalised. A proposal for the construction of stage 1 of the extension, from the Chester Road Circle to link with Potters Pass was never approved by BCM or the ELIDZ for construction. This link would presuppose the upgrading of Potters Pass to Settlers Way to overcome the current load restriction on the former. The gradients on Potters Pass make it questionable as a route for heavily loaded industrial traffic. However, off this proposed link would come the new link to Prince George Drive along the coastline, separating the Grand Prix Circuit from the municipal road network.

The Breezyvale Link Road (M18), passing the entrance to Zone 1B, is surfaced as the final four-lane divided arterial for about 200m beyond the entrance. The remainder of the link to Breezyvale Road (outside the IDZ area) is gravelled, and has been aligned to fit the possibility of a grade-separated interchange with the R72, and provide a new entrance into the airport. This road will serve the

planned Nordev (Land Restitution) township north of Zone 1B and the Airport Residential Township Phase II already established in the same area. The future intersection with the R72 has taken into account the likely final alignment of the Buffalo River Crossing from the N2, linking with the R72 / Settlers Way.

The ELIDZ also acquired the Airport Industrial Township, now Zone 1D, accessed from Settlers Way via Millard Road. Securing of this area cut off direct access to the eastern end of the Airport Residential Township, which now has a temporary access through Siyakha and a rough gravel track south of the Breezyvale Reservoir.

More recent developments in the IDZ include the partial occupation of Zone 1F off Military Road, and the establishment of an automotive supplier park for Daimler Chrysler in Zone 1A. The latter will increase the heavy vehicle flow between Zone 1A and the DCSA plant off Military Road. Portion of Military Road and its intersection with Settlers Way are due to be upgraded during 2007.

The long-term access to Zone 1F, and the remainder of Zone 4 that abuts it, is proposed along Jonker Crescent West, with a possibility that this could eventually extend south to link with the Harbour Arterial eastward extension. These proposals are all dependent on the acquisition of land from Prisons and the West Bank Golf Club.

6.6.1 Projects for implementation : 2006 – 2023

The timing of the various projects proposed here is very dependent on the pace of development in the ELIDZ and surrounding areas, including the establishment of the proposed Nordev residential township. However, the completion of the first carriageway of Breezyvale Link Road to surfaced standard should be a priority if the existing basic roadworks are to be protected from degradation.

This project could be linked to the south-west extension of the link road from the traffic circle to Prince George Circuit near Eagles Rest, providing a replacement for the closed Chester Road connection to the coast. This would be a medium-term project.

The eastward extension of the Harbour Arterial could become a critical link for the IDZ to the possible Portnet container depot on the West Bank. The decision on the future container depot is expected within a year or two. It is anticipated that the eastward extension of the HAR would be needed before 2015.

The above project should coincide with the construction of the second carriageway of the HAR between the two traffic circles.

The westward extension of the HAR is dependent on future residential expansion towards Cove Rock and the full proposed development of Nordev. It is not anticipated that this extension will be needed before 2015.

The completion of the second carriageway on the Breezyvale Link Road is dependent on the final link of the Buffalo Crossing directly to the R72, and the establishment of Zone 2 of the IDZ adjacent to and west of the airport.

No other major road planning has been undertaken at the time of compiling this report.

Tables 9, 10 and 11 are given as an initial guide to implementation of the above proposals.

Table 9: Implementation Programme for 2006 – 2010 (Section 6.6)
(see also **Figure 9**)

	<i>Ref</i>	<i>Project</i>	<i>Cost 2006 R million</i>
10	RP EL 33	IDZ: Completion of Breezyvale Link Road first carriageway	3
Total Cost for 2006 - 2010			3

Table 10 : Implementation Programme for 2010 – 2015 (Section 6.6)
(see also Figure 9)

	<i>Ref</i>	<i>Project</i>	<i>Cost 2006 R million</i>
20	RP EL 34	IDZ: Eastward extension of the Harbour Arterial Road (HAR) Phase 1 to Potters Pass, 1 carriageway, incl. link to Prince George Dve	24
21	RP EL 35	IDZ: Remainder of the Eastward extension of HAR to Military Road / West Bank, 1 carriageway	35
22	RP EL 36	IDZ: Second carriageway to existing HAR between traffic circles	15
23	RP EL 38	IDZ: Second carriageway to Breezyvale LinkRd	12
Total Cost for 2010 - 2015			84

Table 11: Implementation Programme for 2015 – 2020 (Section 6.6)
(see also Figure 9)

	<i>Ref</i>	<i>Project</i>	<i>Cost 2006 R million</i>
38	RP EL 37	Westward extension of HAR to Cove Rock / R72, First carriageway	35
39	RP EL 39	Completion of Eastward Extension of HAR, second carriageway on both phases	50
Total Cost for 2015 - 2020			85

CHAPTER 7 CONCLUSION AND RECOMMENDATIONS

It is concluded that:

- (vii) The Plan is a global evaluation of the need for arterial road improvement projects throughout the metropolitan area, which provides a balanced set of priorities taking into account various planning initiatives and their impact on transport.
- (viii) The Plan provides guidance in the decision-making process with regard to future priorities in the transport plan;
- (ix) The Plan can be used with a high degree of confidence up to the period 2010, after which future events and policies may influence the priorities;
- (x) The setting of priorities cannot be based on traffic demand alone, but must be heavily weighted towards those corridors carrying high occupancy vehicles and public transport.

It is recommended that:

- (vii) This Plan be adopted as the official policy for Buffalo City to guide the development and expenditure on the arterial road system;
- (viii) The Plan be used as a basis for setting of priorities for the implementation of projects up to year 2010, and for guidance and planning purposes for the period 2006 – 2020;
- (ix) Projects proposed in the Public Transport Plan be related to the proposals of this document to ensure compatibility
- (x) A policy for the hierarchial structure and the access control and management of the arterial system be further developed;
- (xi) The Plan be reviewed in the year 2010 to take into account the then proposed industrial, business and land use developments in the Metropolitan area;
- (xii) A regular program of transportation monitoring be maintained in order to stay informed with regard to travel trends in the metropolitan area.
- (xiii) The VISUM model be updated and kept current in order that major changes in land use planning and in the network can be tested as and when required on demand.

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