PUBLIC TRANSPORT AS A CATALYST FOR DEVELOPMENT OPPORTUNITIES ALONG THE NORTHERN GROWTH CORRIDOR, CAPE TOWN.

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PUBLIC TRANSPORT AS A CATALYST FOR DEVELOPMENT OPPORTUNITIES ALONG THE NORTHERN GROWTH CORRIDOR, CAPE TOWN.

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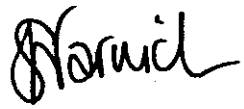
DECLARATION

I, Sonja Warnich, hereby declare that the contents of this thesis represent my own work, and that it has not previously been submitted for academic examination towards any qualification at any tertiary institution. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.



Sonja Warnich

ABSTRACT

This research study explores corridor development and the various impacts on its surrounding urban environment. These impacts include socio-economic influences, land-use changes, movement and transport needs and a critical look at development control, with specific emphasis on densities.

The functioning of activity corridors differs depending on the specific contexts. For this reason it is useful to investigate theory, as well as local and international case studies to have a clear understanding of what a corridor is and how it can be beneficial.
This research not only explores corridor development in the context of the Developing World, but includes the Developed World context in the investigation phase of the study. This study is significant in that it is not only relevant to the Developing World or Developed World countries, but can be applied to both.

This study focuses on the role of public transport in corridor development.
Public transport can be seen as the catalyst for development that is needed along the NGC. At present the public transport system in the sub-region does not comply with envisioned demands and needs. This is a major concern for the City of Cape Town as it is generally accepted that public transport must play an important role in the economic and social integration and upliftment all along the NGC, as far north as the town of Atlantis.

It is contended that the value of this research project will lie in providing a clear understanding of the term corridor development and its relevance to the Northern Growth Corridor, and possibly to most others.

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DEFINITIONS AND CONCEPTS

Access:

"A Way or means of approach to provide vehicular or pedestrian entrance or exit to a property" (Center for Urban Transportation Research, 1996: 57).

Built environment

"...that part of the physical surroundings which are man-made or man-organised, such as buildings and other major structures, roads, bridges, and the like, down to lesser objects such as traffic control signals and telephone boxes. They are the things used and seen in everyday life" (Reekie, 1972).

Bus Rapid Transit System (BRT):

"City and Provincial Government believe that the Bus Rapid Transit (BRT) System is the cheapest mass transport systems to build and run" (City of Cape Town. Directorate of Transport, Roads and Stormwater, 2004: 8).

Density:

"The intensity of development and human activity within a certain spatial area, as a function of the size of the area" (Cape Metropolitan Council, 1999a: 17).

Development:

Development can be referred to as the activities (through the socio-economic and man-made environment) of various individuals, communities or government where they strive to improve the quality of life. This concept should be seen from a physical point of view (growth or expansion of city) with the social, cultural,

economic and political impacts. A typical example of development would include the following: "construction of housing, the provision of infrastructure such as roads and sewers, the setting up of businesses, and the establishment of community facilities such as schools and hospitals" (Cape Metropolitan Council, 1999).

Economic development:

"A process of economic change whereby production, per capita income, education and productivity levels increase" (Cape Metropolitan Council, 1998: 41).

Efficiency:

"The most economical and viable means of achieving a desired result. In spatial terms it can be seen as the use of resources such as urban land, energy an finance in order to increase the level of productivity within the area concerned and achieve the greatest level of public benefit" (Cape Metropolitan Council, 1999a: 17).

Environment:

"Our surroundings, including living and non-living elements, e.g. land, soil, plants, animals, air, water and humans. The environment also refers to our social and economic surroundings, and our effect on our surroundings" (City of Cape Town, Cape Metropolitan Council, 1998: 42).

Equity:

The fair distribution of, and provision of access to, urban and recreational opportunities, enabling people to take advantage of them (taking into account

any disadvantages they may experience)" (Cape Metropolitan Council, 1999a: 17).

Integrated:

"Mixing or combining all useful information and factors into a joint or unified whole" (Cape Metropolitan Council, 1998: 42).

Land Use:

"The actual or permitted activities on a defined piece of land, such as residential, commercial, industrial or a combination of these" (Cape Metropolitan Council, 1999a: 17).

Metropolitan nodes:

"Metropolitan nodes are nodes that are of such significance in terms of scale, location, impact, diversity and agglomeration of function (facilities, services and economic activities), that they impact on the metropolitan region as a whole (Cape Metropolitan Council, 2000: 16). For example, in the Cape Town context the Cape Town CBD is a metropolitan node.

Mixed-use development:

"The horizontal and vertical integration of suitable and compatible residential and non-residential land uses within the same area or on the same parcel of land. It is aimed at facilitating a wide range of residential types within close proximity to employment, educational, asocial and recreational opportunities" (Cape Metropolitan Council, 1999a: 17).

Natural environment:

"Our surroundings, including living and non-living elements, e.g. land, soil, plants, animals, air, water and humans. The environment also refers to our social and economic surroundings, and our effect on our surroundings" (Cape Metropolitan Council, 1998: 42).

Nodal development:

"Describes the spatial pattern of human settlement and infrastructure that is concentrated around a single point" (Blaauwberg Municipality 1999: vi).

Public transport:

Public Transport is any form of passenger transportation that is available to the general public at a basic prescribed fare on a local, metropolitan or regional scale. This form of transportation excludes walking, cycling and includes more than one mode, namely, train, bus minibus-taxi and metered taxi. Also referred to as public transit or public transportation.

Social environment:

The environment that relates to the social condition of the community and its modes of organisation.

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ACRONYMS AND ABBREVIATIONS

BRT:	Bus Rapid Transit
BSDP:	Blaauwberg Spatial Development Plan
CBD:	Central Business District
CCT:	City of Cape Town
CMA:	Cape Metropolitan Area
CMC:	Cape Metropolitan Council
CWCBR:	Cape West Coast Biosphere Reserve
KNPS:	Koeberg Nuclear Power Station
MRT:	Mass Rapid Transit
MSDF:	Metropolitan Spatial Development Framework
Muni-SDF:	Municipal Spatial Development Framework
NGC:	Northern Growth Corridor
NMT:	Non-Motorised Transport
RISC:	Research Information Support Centre

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CHAPTER ONE
THE RESEARCH PROBLEM AND ITS SETTING

1.1 Statement of the Research Problem

This study seeks to investigate the role of public transport as a catalyst for the development of activity corridors with specific emphasis on the Northern Growth Corridor in the Cape Metropolitan Area.

Development in the City of Cape Town (CCT) is focused along the two mature corridors namely Voortrekker Road and Main Road (City of Cape Town. Planning and Development Directorate, 1999). These two corridors have, it is generally believed, and on the basis of discussions with planners involved in the City of Cape Town, for all practical purposes reached their full capacity. This fact, combined with the growth limitations placed on the city by the urban edge has resulted in alternative expansion options having to be identified. On account of the geographical location of Cape Town (the mountain and the oceans as boundaries on two sides, refer to Figure 1.1), the northern sub-region in which the Northern Growth Corridor is envisaged, appears to be the only extensive area available for large-scale city expansion.

Figure 1.1: Cape Town: Table Mountain, Lion's Head and Signal Hill *Source: Cape Town Travel Pictures, 1997: s.p.).*

The City of Cape Town recognises public transport as a vehicle to alleviate numerous socio-economic problems such as unemployment, lack of access to health care, educational and social opportunities (Cape Metropolitan Council, 2001). In view of the fact that public transport services are, at the time of writing, very limited in the northern sub region, this study is seen as opportune to examine the potential of public transport to stimulate socio-economic growth and whether this can occur in the form of an activity corridor.

1.2 Background to the Research Problem

Tentative observations on the part of the researcher, prior to this research, seemed to raise the possibility that important connections exist between vibrant corridor development and a sound public transport system. It is this particular theme, and questions surrounding the causative relationship between the two, that this thesis is about. Therefore the following is submitted:

1.2.1 Why is Corridor Development a Popular Concept?

In August 2001 the urban edge of the City of Cape Town was demarcated (adopted as a City of Cape Town policy) and for the next 20 years expansion beyond it was not to be allowed. The function of the edge is to address one of the three main concerns of the City of Cape Town, namely urban sprawl. It seems clear amongst planners and in the documentation produced, and indeed in much theoretical literature which is discussed later, that corridor development could address and assist with this very important problem and possibly place less pressure on the urban edge as a policy measure. This implies that the city would be placed in a better position in managing much higher densities than is the case at present.

Corridors are thus seen as structural devices to counteract urban sprawl and amorphous low-density development (Cape Metropolitan Council, 2000) by virtue of providing the preconditions for concentrated development according to clearly identified spines of activity and development. This notion, as has been mentioned, is well supported in the literature, and is discussed in Chapter Three.

1.2.2 Public Transport and Corridor Development

Public transport is also generally accepted as playing an important role in the development of cities, as emphasised in the following extract:
"A review of historic developments will show how long-distance transportation had a major role in determining the locations of cities; how their *size* has been influenced by both long distance as well as local, intra-urban transportation; and how the latter has effected the *urban form* (shape of urban area and its basic transportation network) and *urban structure* (distribution of land uses and population densities)" (Vuchic, 1981: 1).

This is supported by Louw on transportation in his paper: "Integrated Transport Planning: A Queensland Experience", where it is stated that: "It brings people together and connects people with goods, services and information" (Louw, 2003: 2). Allopi (1998: iii) stated that the South African Government had recognised transport as one of five main priority areas for socio-economic development. This also suggests the importance of transport as an elementary factor in the life of the city dweller.

As matters stand, the current public transport service in Cape Town is unsustainable. Clark and Crous (2002: 77) mention that it is "unsustainable in terms of increasing subsidy requirements", but even more so, by not effectively meeting user needs. Clark and Crous also mention that since the end of apartheid, a range of trends is intensifying problems and threatening the *status quo*. Some of the problems mentioned are the following:

- "Commercial and industrial development is moving out of established centres and creating a widely dispersed distribution of employment areas, which are difficult to serve by public transport.

- More choice users are switching to private cars for their daily transport needs" (Clark and Crous, 2002: 78).

"It is believed that the predominance of car movement has negatively affected the sustainability of corridors because it is reliant on a single mode of transport" (Jordaan, 2003: 3). This statement, taken from many in planning literature, highlights an important connection between public transport and the development of corridors.

The functioning of activity corridors differs, depending on the specific contexts. For this reason it is useful to investigate international case studies to develop a clear understanding of the nature of a corridor, and this is therefore explored in

later chapters. As mentioned in the opening paragraph, however, this study investigates the possible causative relationship between public transport and corridor development, over and above the nature of corridors per se.

1.2.3 The Study Area

Cape Town is clearly running out of expansion options. The sub-region in which the envisaged Northern Growth Corridor is located, seems to suggest the only solution, other than massive densification, to the city's growth challenges in that this area offers extensive unused land and some basic infrastructure to support future development.

In a meeting with transport professionals in the Department of Transport: City of Cape Town, this concern was pointed out to the researcher. The importance of the Northern Growth Corridor (henceforth referred to as the NGC) is in fact emphasised in the Blaauwberg Spatial Development Plan where it states that the NGC and Atlantis are "highlighted as challenges to the provision of integrated economic infrastructure" (City of Cape Town. Planning and Environment Directorate, 2002: 7).

The northern sub-region in question extends from the Cape Town CBD northwards towards the urban edge and includes the towns of Atlantis, Mamre, Melkbosstrand and Table View (see Figure 1.2). Atlantis, which is well known for it's politically motivated establishment remains questionable on economically sustainable grounds at the time of writing. The development of Atlantis was initiated by the government's decentralisation policy, and the failure of this political ideology of the time, is clearly visible. Forced removals as a policy as well as the housing shortage that the coloured community of the Cape experienced, were additional factors.

Public transport along the envisioned NGC, which is still very much in its infancy, is currently undeveloped and inefficient, except for the position in the southern most sector where at least a basically functional bus and taxi service operates. The existing public transport system clearly does not comply with envisioned demands and needs. This is a major concern for the City of Cape Town, which generally accepts that public transport must play an important role in the economic and social integration and upliftment all along the NGC, and especially in connecting the town of Atlantis with greater Cape Town.

The importance of this specific sub-region to the City of Cape Town is therefore frequently mentioned in various planning documents, such as "Moving Ahead" (Cape Metropolitan Council, 1998).

Having regard to the complexity of the sub- region in which the NGC is situated, a proper understanding of it's numerous opportunities and constraints is needed for the City of Cape Town to successfully pursue its sustainable growth policy.

In this regard, it is contended that the value of this research project will lie in providing a clearer understanding of the term "corridor development" and its relevance to the NGC.

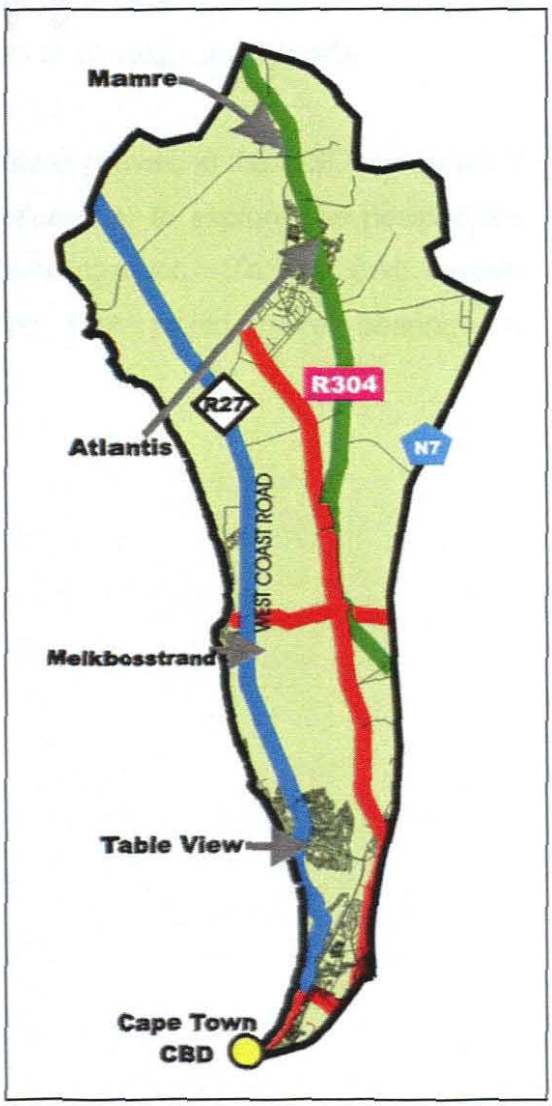

Figure 1.2: Extent of the study area.

1.3 Research Questions

1.3.1 What is the relationship between a public transport system and corridor development? This question explores the nature of public transport, it's connection with land-use patterns and its relevance specifically to activity corridor development.

1.3.2 What is the nature of corridor development, in particular "activity" corridor development? The findings should indicate what preconditions should be in place for successful activity corridors to develop and operate.

1.3.3 What is the nature of, and what conditions prevail, in the NGC sub-region? This information would enable the researcher to explore the possibilities for development into a mature activity corridor. To this end, certain structuring elements were identified that would have bearing on development opportunities in general:

- Economic Base
- Movement System
- Coastal Environment
- Conservation Areas
- Tourism
- Atlantis
- Nuclear Facility
- Proposed Airport

1.4 Research Objectives

This study seeks to

1.4.1 investigate the connection between public transport, land-use patterns and activity corridors.

1.4.2 develop a clear understanding of the term "corridor" and more specifically "activity corridor".

1.4.3 evaluate the prospects for the Northern Growth Corridor.

Though these objectives are stated in this order, it will be noted that the sequence of chapters though deviating from this, indicates the path followed in order to achieve these objectives.

1.5 Delineation of the Study

This research focuses on corridor development both in the Developing and Developed World contexts in their application to the chosen study area.

It was initially unclear whether particular planning interventions for the NGC could emanate from this study. As will be seen in the final chapter, however, it is concluded that the grounds for this, other than making general predictions, cannot be adequately defined.

1.6 Significance of the Study

Urban Sprawl has been passively accepted for the last thirty years (CSIR: Division of Roads and Transport Technology, 1990) and is now seen as one of the main problems that Cape Town is facing. The way in which this issue is to be

addressed has become a most urgent matter for investigation and is crucial for the development of Cape Town and probably other cities in South Africa.

As mentioned earlier, properly developed corridors are generally believed in theoretical and specific planning literature, to be a powerful device in addressing urban sprawl. The issue of public transportation in this regard, has however yet to be investigated. This study can therefore assist town planning and transport engineering professionals, who would directly employ such a device.

1.7 Structure of the Document

The table of contents presents an extension to the six main themes highlighted in Figure 1.3:

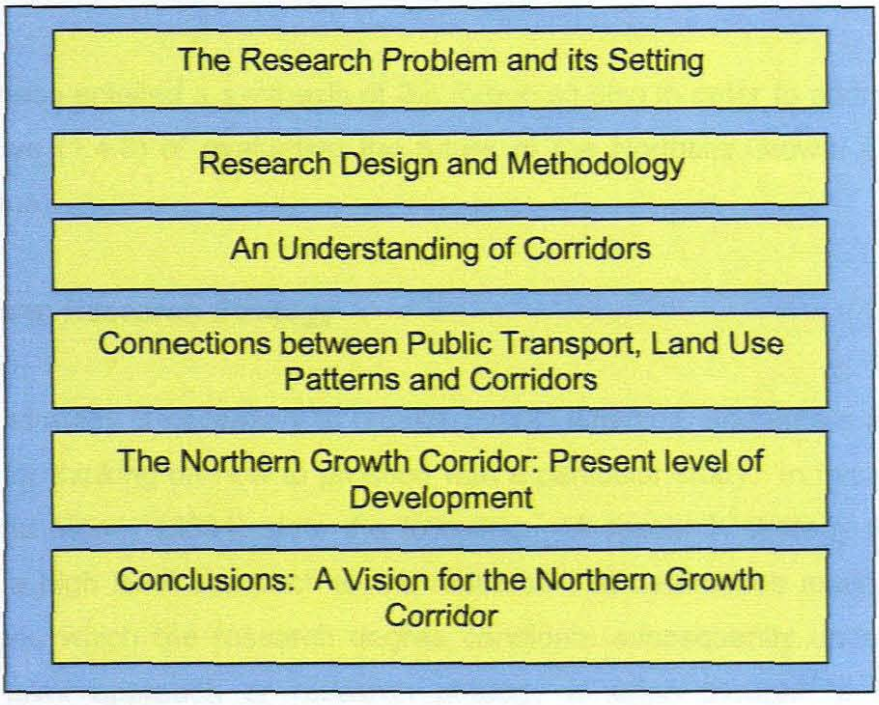

Figure 1.3: The main themes addressed in this thesis.

The study was undertaken in four phases. Firstly, existing corridors were examined for the purposes of objective 1.4.2 (the meaning of corridors), by way

of a few examples selected from literature sources (Chapter Three). Actual on-site investigations though desirable, were not realistically possible in view of the distances to be travelled, as far as the overseas examples are concerned.

This was followed by an investigation, for the purposes of objective 1.4.1 (*causative relationships between public transport, land use patterns and activity corridors*), of urban and transportation theory and planning principles in the literature, and also by way of consultations with informed professionals in the private and public sectors (Chapters Three, Five, Six and Seven).

The third phase involved, with a view to objective 1.4.3 in part, (evaluation of the prospects for the NGC), an examination of the background to and conditions prevailing in the Northern Growth Corridor area, *based mainly on planning and related documents and consultations* (Chapter Eight)

The final phase entailed a synthesis of the foregoing also in order to address the final objective (1.4.3) of evaluating the future of the Northern Growth Corridor (Chapter Nine).

1.8 Chosen Research Strategy

A research strategy is necessary to provide overall direction, and entails a broad framework for thinking on how to proceed with a particular study. In this regard, Remenyi and Money (2004) state the following: "A research strategy may be defined as a high level approach to the research that determines much of the detailed work, which the research degree candidate subsequently undertakes. This high level approach or research strategy is often thought to be the researcher's basic philosophical beliefs and understanding of the nature of the research that will be undertaken" (2004: 58). According to the aforementioned authors, the available strategies can be illustrated as in Figure 1.4:

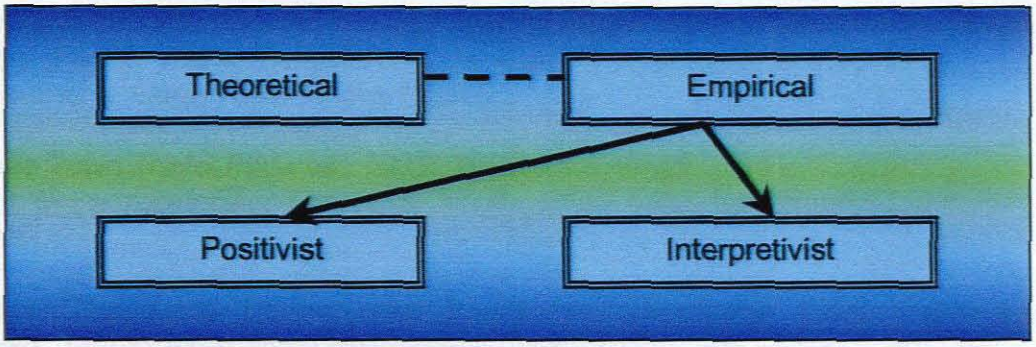

Figure 1.4: "Research Degree Strategies" *(Source: Remenyi and Money, 2004: 58).*

In this thesis, the researcher regards the empirical strategy as appropriate, generally defined as drawing on experience and observation of evidence in order to advance in understanding of the phenomenon being studied. Empirical studies may include both quantitative and qualitative data, though on account of the subject matter dealt with in this study; the evidence is exclusively qualitative in nature. Moreover, the approach should also be seen as interpretivist, which essentially infers that "the researcher is not objective and cannot be", and that "analysis is generally open to emergent concepts and ideas" (Remenyi and Money, 2004: 62).

Strategy should be seen as distinct from methodology, and the details regarding the latter are described in Chapter Two. It is mentioned there what the sources of information were.

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CHAPTER TWO
RESEARCH DESIGN AND METHODOLOGY

2.1 Introduction

As with most research projects, the methods used in this thesis were determined by the objectives of the study, type of information sought and its availability. This resulted in five methods being used. These are all well-known and acceptable methods for the town and regional planning field.

It should be noted that the emphasis and nature of the topic did not warrant large-scale surveys, which could generally generate vast empirical data unlike the present context, which is more relevant to studies where public opinion ought to be solicited. Primary information was instead gathered through a focused, small-scale questionnaire survey and personal observations, as will be discussed in further detail.

Figure 2.1 indicates the sequence of research activities and methods used in this study:

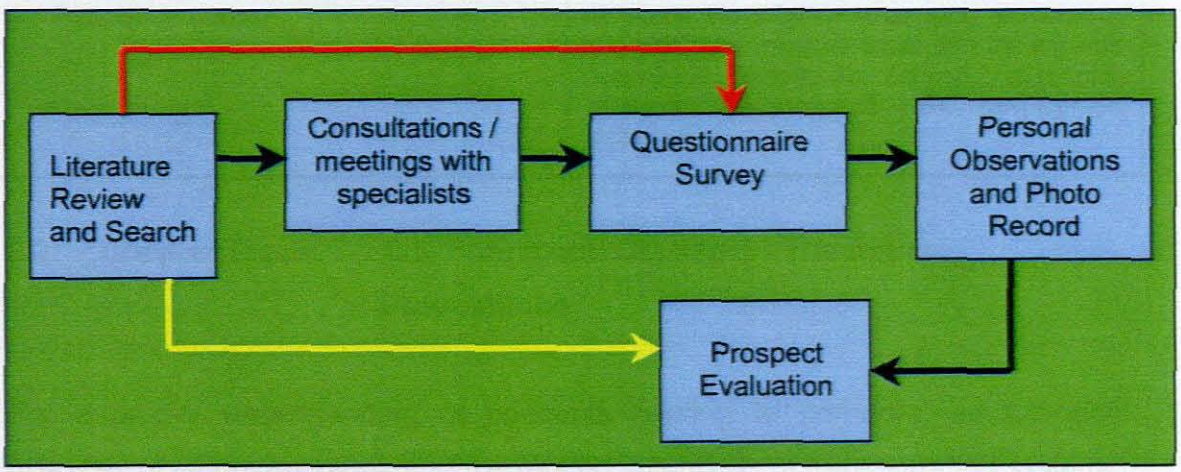

Figure 2.1: The research activities and methods.

The following table illustrates the objectives of each of these research methods / activities whilst the remainder of this chapter describes the methods employed on a chapter-by-chapter basis.

Table 2.1: Research activities and their objectives.

Research method and / or Activity	Objective in Research Study
1. Literature Review and Search.	To develop an understanding of the nature and scope of corridors, the relationship and importance of public transport and its role in corridors and ascertain the current level of development of the NGC and its sub-region.
2. *Consultations / meetings.*	*Same as the literature review.* It was seen as imperative to gain the opinions and inputs from role-players with regard to the three main themes of this thesis, namely: • the role of public transport in corridors, • an understanding of corridors, • and the NGC, existing and planned
3. Questionnaire.	To determine the varying perceptions with regards to corridors.
4. Personal observations and photo record *through site visits to the NGC.*	To inform researcher of the NGC potential *regarding corridor elements as highlighted in* Chapter Eight.
5. Prospect evaluation.	Evaluate the existing structuring elements of the NGC and integrate these with the aspects. identified in Chapter Six, Table 6.2, to critically evaluate the proposed NGC development initiatives.

2.2 Chapter Three: City Forms and Corridors - Theoretical Propositions

For a proper understanding of concepts relating to corridors, an historical overview of city morphology and the related influences of transportation systems, as well as urban land use models was undertaken. This took the form of a

comprehensive desktop search concerning the various town planning models as well as the origins and development of cities over time. In this search, the literature sources included online national and international library sources, internet websites, and course notes from both national and international institutions.

Similarly, a literature review in the form of a desktop search on corridors, especially activity corridors, was also undertaken for the purpose of developing a theoretical understanding of corridors, the terminology and its origins. Definitions of corridors proved to be inconsistent and somewhat contradictory. A number of specialists were consulted with regard to definitions and the nature of corridors.

A questionnaire was compiled and forwarded to specialists to determine the varying perceptions with regard to corridors. The specialists were identified by the researcher on the basis of their interest in the topic or having been suggested by other specialists. A total number of 7 key specialists (including transport planners, engineers and town planners) were approached and a list of questions (see Appendix 1) were forwarded to them via e-mail. A reminder e-mail was subsequently forwarded and 5 specialists responded.

The responses and comments received from the questionnaire highlighted the confusion of the terms and definitions of corridors and activity corridors, and this warranted further investigation. In response, numerous official websites and literature sources were thus further consulted, and personal interviews conducted. An extensive online search was undertaken using relevant subject area repositories. Online national and international library sources, including catalogues and databases, and institutional repositories and ETD (electronic thesis and dissertations) portals were used. Subject-specific virtual gateways, "gray literature" and other "deep internet" resources were also examined.

2.3 Chapter Four: Corridors –Legislative and Policy Contexts

Numerous documents were identified by the researcher, some of them at the suggestion of interviewed role-players. This also mainly included a desktop search approach. In order to compare the numerous legislative and policy documents, a table was constructed to determine which documents address the same issues (see Appendix 3).

The legislative review focused on two topics, namely corridor development and public transport in South Africa, and specifically Cape Town. Though considerable reference is made to public transportation, almost no mention is in fact made of corridors in legislation. The researcher was nonetheless able to identify related issues and areas of concern that could well be relevant.

Shortcomings and omissions in certain documents were also identified and therefore the need for certain issues to be addressed in specific policy and legal provisions could thus be discussed, especially with regard to activity corridor development and transportation. These findings were ultimately tabulated.

2.4 Chapter Five: Existing and Planned International Corridor Developments

The case studies examined were identified through a process of interviews with a number of town and regional planning practitioners and transport professionals, and others were discovered in the literature.

A checklist (see Appendix 2) was compiled to ensure that the same and comparable information for all the case studies was gathered.

The main method used to gather relevant data concerning international case studies, was an extensive online search and e-mail communication with specific

international collaborators (see Table 2.2). Online national and international library sources, including catalogues and databases, and institutional repositories and ETD (electronic thesis and dissertations) portals were used. The researcher was assisted in this regard by the Research Information Support Centre (RISC) of the Cape Peninsula University of Technology. These findings were also tabulated. Though general information on countries was relatively easily available on tourism and transport department websites, specific information regarding activity corridors proved to be difficult to find.

Table 2.2: List of international professionals consulted for case-study information.

Professional / Specialist	Affiliation and Institution / Company / Department	Contact details (e-mail address)	Country
Chhabra, Raj. P.	Indian Institute of Technology Kanpur	chhabra@iitk.ac.in	India
Dahlstrom, Dave	Project Manager, South Florida Regional Planning Council	davidd@sfrpc.com	United States of America
Louw, Johan	Regional Manager Transport Planning Central, Queensland Transport	Johan.z.louw@transport.qld.gov.au	Australia
Markovich, Martin	Office of Systems Planning, Florida Department of Transportation	Martin.Markovich@dot.state.fl.us	United States of America
Smith, Trey	City Planner, City of Roanoke Rapids	treys@roanokerapidsnc.com	United States of America
Terry, Kevin	Cork City Council	Kevin_terry@corkcity.ie	United States of America
Williams, Kristine	Program Director, Planning & Corridor Management, Centre for Urban Transportation Research	kwilliams@cutr.usf.edu	United States of America
Hussin, Rajimah Ms	Urban Redevelopment Authority, Singapore	Rajimah_hussin@ura.gov.sg	Singapore
Information Desk	Transport dept Hong Kong	tdenq@td.gov.hk	China

2.5 Chapter Six: Planned Corridor Developments in South Africa

As in the case of the international case-studies, these instances were identified through a process of interviews with a number of town and regional planning

practitioners and transport professionals, and some were suggested in the literature. As has been mentioned, case-studies provide a most useful source for empirical research.

A checklist (see Appendix 2) was compiled to ensure that the same comparable information for all the case studies was gathered.

General information was relatively easily available on national and local authority transport department websites and the official websites of planned corridor developments. However, more specific documentation such as working documents were obtained from the professionals contacted and these proved to be very useful. Here again, the researcher was assisted by the Research Information Support Centre (RISC) of the Cape Peninsula University of Technology.

Site visits were conducted in the Northern Growth Corridor, Cape Town in order to establish the state of development and discussions were held the city planner Charles Rudman (2005) concerning growth trends and official planning intentions.

2.6 Chapter Seven: Public Transport

A comprehensive literature review in the form of a desktop search of the connection between pubic transport and corridors formed the foundation for this chapter.

The literature review entailed an investigation into key issues such as:

- the influence of public transport on the development of spatial forms,
- the influence of land-use patterns and activities on public transport,

- the mutually reinforcing influence of public transport and land-use patterns, and

- the implications of the foregoing three perspectives on activity corridors.

Consultative meetings with key public transport professionals (see Table 2.3) were found to be one of the most useful techniques for determining the latest trends and strategies specific to the public transport – activity corridor relationship. This was an ongoing process that took the form of one-on-one meetings or if not possible, communication via e-mail.

2.7 Chapter Eight: The Northern Growth Corridor Sub-Region

A literature review and search was conducted with specific reference to the Northern Growth Corridor sub-region.

2.8 Chapter Nine: Conclusions: A Vision for the Northern Growth Corridor

Various specialists responsible for proposed corridor strategies had been consulted previously (see Tables 2.2 and 2.3) to inform the researcher of the NGC potential regarding corridor elements as highlighted in Chapter Three.

The existing structuring elements of the NGC were accordingly evaluated in terms of this, and the aspects identified all previous chapters.

The prospects of the Northern Growth Corridor could thus be evaluated, as a synthesis of the principles contained in these foregoing chapters.

Table 2.3: Professionals in the transportation and town planning fields that were consulted at different stages of the research project.

Professional	Company	Contact details
Dr Duff-Riddell, Wayne	University of Stellenbosch	Phone: 021 808 4647/4905 Fax: 021 808 4361 E-mail: driddell@sun.ac.za
Mr Robertson, Robby	Ninham Shand	Phone: 021 481 2400 Fax: 021 424 5588 E-mail: trans@shands.co.za
Ms Mazaza, Maddie	Department of Transport, City Cape Town	Phone: 021 406 7379 Fax: 021 419 5249 E-mail: maddie.mazaza@capetown.gov.za
Prof Del Mistro, Romano	University of Cape Town	Phone: 021 650 2605 Fax: 021 689 7471 E-mail: rdelmist@ebe.uct.ac.za
Mr Kingma, Ron	Department of Transport, City Cape Town	Phone: 021 418 6830 / 406 7343 Fax: 021 419 5249 E-mail: ronald.kingma@capetown.gov.za
Prof Chhabra, Raj	Indian Institute of Technology, Kanpur	E-mail: chhabra@iitk.ac.in
Mr Petersen, Yunus	Department of Transport, City Cape Town	Phone: 021 487 2200 Cell: 084 900 0913 Fax: 021 419 5349 E-mail: yunus.petersen@capetown.gov.za
Mr Muthien, Ignatius	Golden Arrow Bus Services (Pty)Ltd	Phone: 021 937 8800 Fax: 021 934 4885 E-mail: ignatiusmuthien@gabs.co.za
Mr Rudman, Charles	City of Cape Town: Kraaifontein Administration	Phone: 021 980 6182 Fax: 021 980 6179 E-mail: charles.rudman@capetown.gov.za
Mr Cupido, Donald	Department of Transport, City of Cape Town	Phone: 021 021 418 6830 Fax: 021 021 419 5249 E-mail: donald.cupido@capetown.gov.za

CHAPTER THREE
CITY FORMS AND CORRIDORS – THEORETICAL PROPOSITIONS

3.1 Introduction

Corridors, as defined in this thesis, appear to be a comparatively recently evolved component of urban settlements, and in particular of larger cities. A proper theoretical examination thus requires at least a brief overview of city morphology in relation to transportation, for the purpose of an informed background to corridors as a city form.

3.2 A Brief history of City Morphology

The earliest urban settlements developed out of "settled agriculture" as some of the population could be freed from food production and enabled to live in larger settlements than before (Johnson, 1967). In the first millennium BC, cities around the Mediterranean grew in relative size and number with the developments in crafts, industries and commerce. By the fifth century BC Athens is estimated to have had a population between 100 000 to 150 000, though this was the exception for its time. The population of Rome in the second century AD is estimated to have been 200 000 persons (Johnson, 1967).

In later centuries Medieval Europe was more notable for the rise in the numbers of towns than their growth in size, and even London, despite its excellent location for transport and trade, only reached about 40 000 in the fourteenth century AD (Johnson, 1967).

The rise of capital cities in Classical antiquity, and in Renaissance Europe, was similarly based on surplus agricultural production in particular, and later the development of commerce and trade. The rate of urbanization and sizes of cities experienced profound and exponential changes with the advent of the Industrial Revolution (Johnson, 1967), in regard to complexity not only in technical and economic terms, but also to the structure of these cities.

Though the origins of formal planning are for the most part lost in obscurity, historical evidence shows that this did occur since ancient times, as a response to different contexts involving different issues and operating at different scales, and usually at far lesser scales than in modern times. Formal planning gradually gained more prominence as a response to the sheer scale of cities, technological changes including transportation, and to concerns for public intervention. Evolutionary and organic development with minimal planning intervention could no longer produce proper functioning urban places.

Approaches in planning in the western world such as in Britain, were influenced by fashionable "construct-based" notions from the end of the nineteenth century. At about the same time, the "city beautiful" movement gained momentum in the United States, often going beyond urban design objectives to include totally designed systems for cities such as main circulation arteries. Plans were produced for many cities including approaches such as zoning controls on the one hand, and social reform on the other.

Over time different shifts also originated in layout planning, and the concepts of neighbourhood units, superblocks, clustering, separation of modes of transport, low densities and separation of land uses were explored and developed. Familiar examples of these were Ebenhezer Howard's "Garden Cities" concept, Clarens Steyn's "Radburn Superblock" concept, and Clarence Perry's "Neighbourhood Unit" concept (Behrens and Watson, 1996).

The underlying objectives of these planning constructs and proposed urban forms were *inter alia* to overcome crowded and polluted housing conditions, and included various notions such as balancing town and country living, avoidance of through traffic, separation of pedestrians and cars, and community cohesiveness (Behrens and Watson, 1996).

The foregoing layout approaches stood in strong contrast to the gridiron plan, which originated from the early European settlements and were adopted in most planned developments throughout the western world in the later nineteenth century. The simple geometry of the grid layout presented numerous advantages such as ease of land subdivision, whilst its open-road system offered maximization of access points and choice of routes. Significantly, from the point of view of this thesis, these layouts generally did not include a deliberately defined hierarchy of through-routes. In most towns, however, main roads did in fact develop though in an evolutionary manner, as fore-runners to corridor development.

Modern writers and those in the planning profession have been critical of some of the negative results of these prototypes, and have described many cities as suffering form fragmentation, disjointedness, mono-functionality, non-viability, isolation and inhumanity. In the South African context, this scenario was aggravated by the political ideologies of the recent past. Problematic city forms are, according to the critics, seen as the consequence of simplistic and easy-to-manage planning constructs, and their plea therefore is that such adversely structured cities be addressed so as to achieve the positive opposites: integration, complexity, complementarily, continuity, multi-functionality, viability and urbanity.

It is in the light of these critical evaluations in planning history, read as evidence of malfunctioning cities, that the researcher has undertaken an examination of the functioning of the corridor as a positive urban form, and also as a powerful

planning device, whilst including the role of public transport in this. As was mentioned, it is clearly observable that the notion of corridor development has occurred only in recent times in planning approaches to city planning. One explanation of the total disregard of corridors in earlier planning is seemingly related to smaller scale and lower density scenarios prior to the industrial revolution, accompanied by lower intensities of transportation.

3.3 The Historical Influence of Transportation Systems

Fundamental to urban growth was the development of improved means of transportation, including the construction of roads, railway lines and canals. With improved internal transport as well, places of work and places of residence were increasingly being separated. These changes were in fact typical of cities throughout the Western world toward the end of the nineteenth century, including the United States.

Another aspect of transport-induced urban morphology were changing trends in urban density patterns. Prior to public transport within cities becoming well developed, strong centripetal forces resulted from economies of compactness on the one hand and difficulties of movement on the other. Both railway-lines and roads reversed these processes of compaction of cities and transport along roads was often much more important than transport by rail. "Morphologically, the effect of train and omnibus services was to concentrate urban expansion along the main traffic arteries..." (Johnson, 1967: 38). These trends were enhanced by the introduction of motor buses, though these operated mainly on fixed routes which were usually main routes. In the view of the researcher, this reported influence of public transport on developments alongside these routes since recent historic times, already provides strong empirical evidence of public (and of course private) transport activity providing a powerful precondition for corridor development.

The introduction of the private motor-car has brought about profound morphological changes of its own to cities throughout the world, in particular lower densities overall and urban sprawl, as well as urban infilling between the main traffic arteries. The results of the motor-car have been greatest in those cities, particularly in the United States which have experienced all their growth in the twentieth century. This would of course also apply to those parts of a city, including those in South Africa, which expanded outwards at this time.

The private-car has, in fact, presented most difficult challenges for planning to accommodate space and route requirements under serious conditions of congestion. Costly freeway construction has only alleviated cross-city movement in older cities such as Cape Town. This is strongly suggestive of the merits of major routes accommodating efficient and viable public transport, and planned corridors have now become a contemporary response to this.

3.4 Historical Overview of Descriptive City Models

Theoretical models of city structure were also investigated by the author for the purposes of detecting further historical clues as to corridor development. "Urban growth theories explain the internal demographic, spatial and economic growth of cities" (Author unknown, *s.a.: s.p.*). These three features of a city cannot be seen as separate entities because they are interdependent and grow and develop in tandem with each other.

Cities, at least the larger urban conurbations, started with a nodal structure, as suggested by the concentric zone model. This model depicts a set of concentric rings with a single land-use type allocated to each ring, with the CBD (Central Business District) in the center, based on observations made by Burgess of Chicago during the 1920's.

The significance of the concentric zone model is its simplicity and the fact that other models became alternatives of this particular model (Author unknown, *s.a*: *s.p.*).

In the investigation of land-use and transportation relationships, this model also analysed the location of social classes in the city though it was ultimately concluded that transportation and mobility played an important role in the spatial structure of the city (Rodrigue, 2005: *s.p.*).

In 1939 Hoyt proposed the sector model where he observed the following spatial characteristics of typical cities:

- Low-income households along railway lines, and
- Commercial facilities along major business main roads.

In order to accommodate these phenomena, he in fact introduced transportation routes into the original concentric zone model, modifying the latter. This model thus took the form of different growth sectors rather than concentric zones, with land-use sectors forming radiating arms with economic and commercial activities aligned with major transport axes. These, it will be noticed later, coincide with the general characteristics of activity corridors.

In 1945 Harris and Ullman suggested the multiple nuclei theory in regard to city structure. They argued that as city size increases, the larger suburban areas develop smaller business districts within them. These business districts perform the functions of satellite nodes even though the CBD is still to be seen as the centre of commercial activity. "At the centre of their model is the CBD, with light manufacturing and wholesaling located along transport routes. Heavy industry was thought to locate near the outer edge of the city" (Verster, *s.a.*: 12). On the

basis of this model, the linear development of each potential corridor, in the view of the researcher, acted as the "string" to connect the different nodes, or the "beads" from which the string-of-beads notion (Cape Metropolitan Council, 1996) can be derived, as depicted in Figure 3.1.

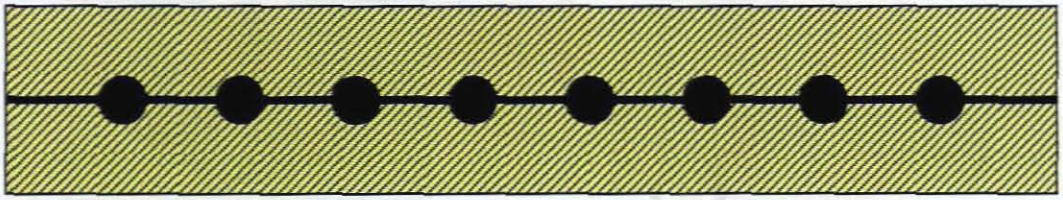

Figure 3.1: String-of-beads concept *(Source: National Department of Transport, 2001: 2-69).*

The related concept of the linear city can be described as an "urban plan for an elongated urban formation" (Wikipedia Encyclopedia, 2005: *s.p.*). The notion of the linear city was first developed in the 1900's by Arturo Soria y Mata. He proposed isolated zones for railway lines, a zone for production and commercial activities, an agricultural zone, a park zone and a residential zone (Wikipedia Encyclopedia, 2005). It will emerge later in this chapter, that the structure of this model corresponds strongly with that of an activity corridor, with the main movement route forming the backbone in each case.

The urban land use models in Figure 3.2 illustrate that there has been a clear shift from the concentric and nuclei-based cities to the linear-based cities where public transport plays an important structural role. The earlier models have been modified to accommodate contemporary realities, and one of these is corridor development.

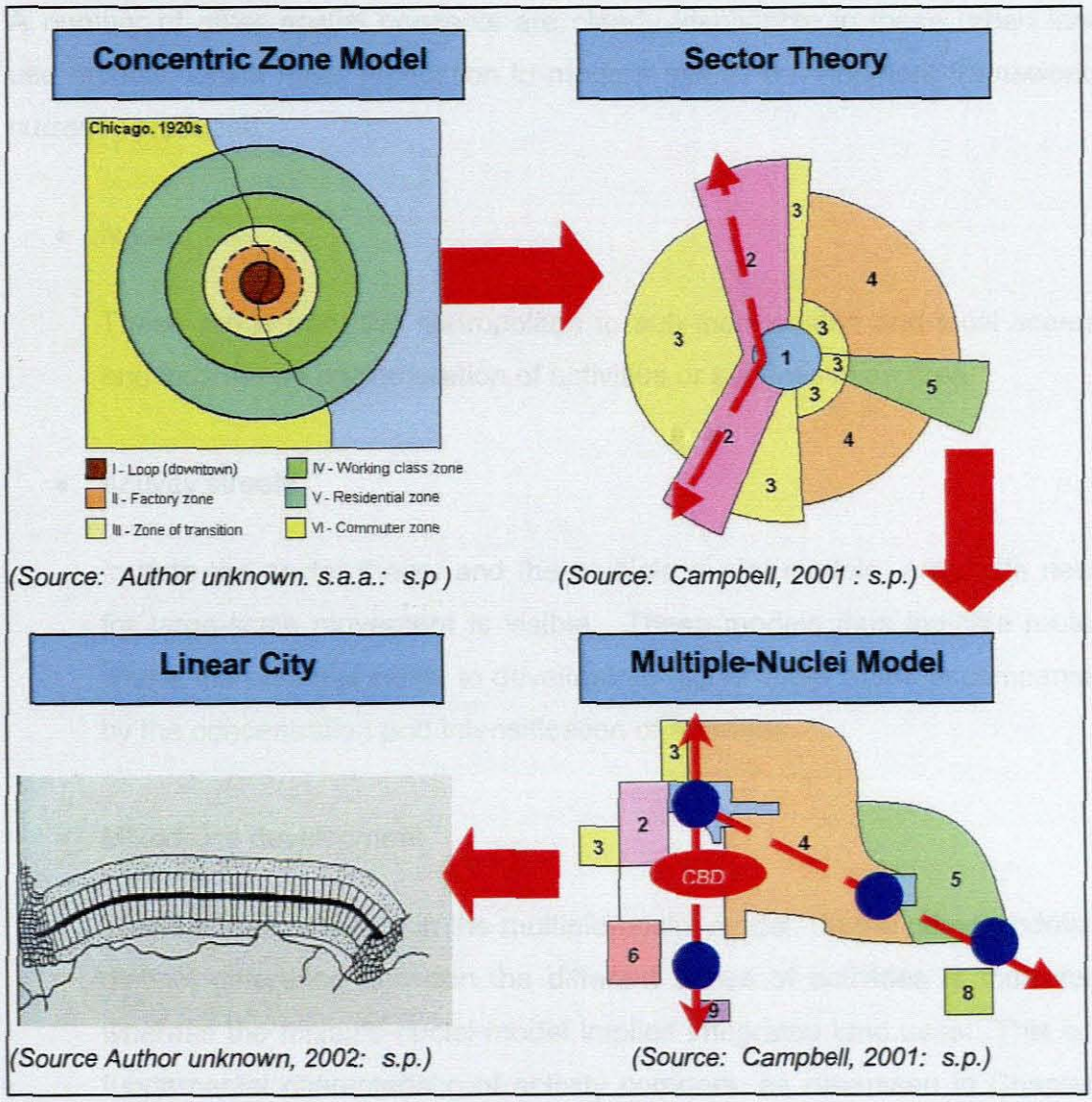

Figure 3.2: The changing form of the city

The concept of linear configuration (not corridors per se) in the development of western cities seems to be relatively old. With the advent of the densely populated concentric European industrial city about a century ago, city models in a linear shape were in fact presented as an alternative (Priemus & Zonneveld, 2003: 3). This can be seen as analogous in concept to the modern corridor in urban areas.

A number of other spatial concepts are clearly identifiable in these urban land use models, which have application to modern spatial development frameworks currently produced:

- Nodes

  These range from the metropolitan to sub-metropolitan and local scales, and indicate an agglomeration of activities or services in an area.

- Activity streets

  In both the sector theory and the multiple nuclei models, a definite need for large-scale movement is visible. These models thus indicate routes where the potential exists to develop into higher order roads accompanied by the concentration and intensification of activities.

- Mixed-use development

  This element is visible in the multiple-nuclei model. In the other models a distinct difference between the different zones of activities is indicated, whereas the multiple-nuclei model implies integrated land uses. This is a fundamental characteristic of activity corridors, as discussed in Chapters Five and Six.

3.5 The Phenomenon of Corridors in the City

It was mentioned earlier that various and differing opinions and definitions as to what a corridor is, appear not only in the literature but have been suggested in communication with relevant professionals. As a general introduction, the following is given here: The most basic and important element of a corridor is the continuous linking of nodes in the metropolitan area, and the corridor thus provides a focus for public transport services (Cape Metropolitan Council, 2000).

Many other elements are, however, incorporated in the following discussion of definitions.

3.5.1 Metropolitan Corridors

There appears to be reasonable consensus that the following can be described as characteristics of metropolitan corridors:

- longitudinal distance at a metropolitan scale

  This physical distance (in terms of kilometers) should be sufficiently of metropolitan importance for it to:

- link various nodes in the metropolitan area

  The corridor links major nodes that operate as such at a metropolitan scale. An example would be Voortrekker Road Corridor that links the Cape Town CBD and Bellville CBD, both seen as major metropolitan nodes.

- low intensity development on average, along their length.

  The typical metropolitan corridor has a lower intensity of land uses on average, such as residential densities, than is the case of activity corridors which cover shorter distances.

3.5.2 Activity Corridors

The functioning of an activity corridor depends on the specific context, and the scale at which it operates as well as its location will clearly influence its function. For this reason it is necessary to investigate this phenomenon from both general

and specific perspectives to arrive at a clear understanding as to the true nature of an activity corridor. The related issue of how a specific activity corridor with its unique nature and type of development and operations could benefit the structure and function of a city, could thus be given more clarity.

An activity corridor is defined in the Blaauwberg Spatial Development Plan as follows:

"Activity corridors and streets provide a structure along which high density mixed use development can be promoted" (City of Cape Town. Planning and Environment Directorate, 2002: 72). The activity corridor can according to this view be seen as a strong prerequisite for the development of public institutions and economic activities at an extensive scale.

Figure 3.3 illustrates the different structuring elements that an activity corridor consists of, according to the Metropolitan Spatial Development Framework Guidelines (Cape Metropolitan Council, 2000).

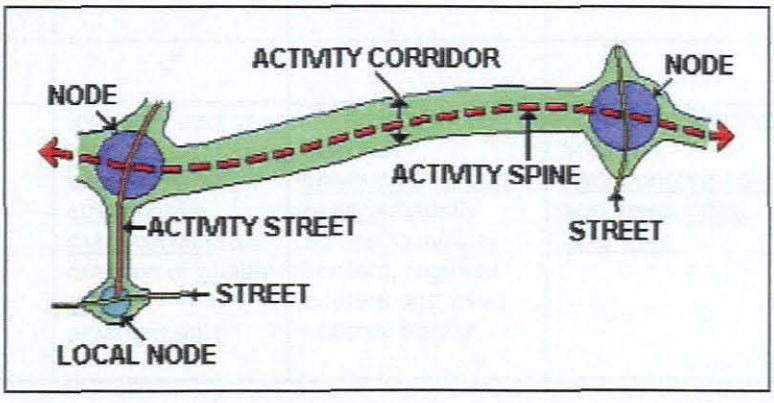

Figure 3.3: Some structuring elements of an activity corridor *(Adapted from Cape Metropolitan Council, 2000: 13).*

A further and related definition is offered by Bishop (1989) who states that it "... can include nearly anything that can be seen from, or has an impact on, the roadway" (Bishop, 1989: 3). This is unfortunately somewhat vague and hardly

suggests what the elements are that are referred to. Although the researcher acknowledges that different activity corridors will be made up of different elements or land uses, the following table highlights components that should be present for an activity corridor to function efficiently, according to the sources mentioned.

Table 3.1: Comparisons between corridor definitions.

Elements	CMC/MSDF (2000)	Priemus & Zonneveld (2003)	Author unknown. (s.a.)	CSIR (1990)
Transport Route	✓	✓	✓	✓
Public Transport	✓		✓	✓
Linked nodes	✓	✓	✓	✓
Activities & Services	✓		✓	✓
Densities (i.e. residential)	✓	✓		✓
Integration, Intensification, Urban Sprawl	✓	✓		✓
Public Investment	✓			
Other	Indirectly part of strategy to ensure sustainable management & creation of quality urban environments.	Corridor situated between polynuclear urban regions usually across municipal borders, regional borders and even national border.	Strong relationship between transportation route and surrounding land uses	Integration also allows maximising of choice

From the table it is evident that the main feature of an activity corridor is a transport route that links various nodes. A number of other features are also suggested that should be present for an activity corridor to function optimally, and include:

- a major transport route;
- public transport modes;

- linkages between nodes and sub-nodes;
- intense human interaction;
- availability of services;
- intensification of development, and
- public investment at least in the immediate vicinity of the activity corridor.

The following are examples of corridors in Greater Cape Town, having the above-mentioned characteristics or elements and demonstrating different scales and contexts:

- Main Road Cape Town – Muizenburg
- Main Road Cape Town – Camps Bay
- Voortrekker Road Cape Town – Northern Suburbs

The presence of all these elements, the author would argue, ensure a more integrated city form as opposed to urban sprawl.

Further, but minor, characteristics relating to the operation and functioning of an activity corridor are identifiable. These include characteristics determined only at a very local scale and the particular operations related to that. For instance, high density residential areas are in some places occupied by at least middle-income residents, thus generating certain levels of service and demand. Furthermore, smaller scale economic and commercial enterprises are likely to occur in the form of single shops as opposed to extensive shopping or industrial areas. A further scenario could be one in which a variety and mix of land-uses occur sometimes scattered, such as residential and commercial operations, which generate movement patterns of their own.

The foregoing shows reasonable consensus between authors and sources of information regarding the importance of public transport as a catalyst for activity corridor development. There also seems to be an indication that activity

corridors could play an important role in promoting economic development and integration of the city.

In this regard, Lotz (1995) states in the context of South Africa that the "...development of activity corridors can create a strong well-defined city structure which will address the current urban deficiencies experienced in metropolitan areas. Activity corridors offer a means to integrate those parts of the metropolitan area with no coherent and integrated structure into the larger urban environment" (1995: *s.p.*). The poor or undeveloped economic and social activities are thus here identified as "urban deficiencies", especially where there is a lack of these activities and facilities in the lower-income areas (Lotz, 1995).

Lotz (1995) argues that the activity corridor has the capacity to address these deficiencies in the following ways:

- increased densities,
- high concentrations of land-uses,
- and the generation of through - traffic.

The first function, namely increased densities, is of the utmost importance as it can create the demand thresholds for viable service provision, including public transport, to sustain a vibrant society.

Naude in Newman (1993: 28) summarises the expected benefits of activity corridors as follows:

- Accommodating urban population growth and social mobility pressures
- Establishing a greater variety of housing options
- Containing urban sprawl and the haphazard location of major traffic generations
- Containing and channelling vehicular traffic, and promoting public transport

- Creating a complementarity between different transport modes
- Creating complementarity of business development in potentially competing locations

It is noted that though this author does not specifically refer to the notion of integration, this certainly seems to be implied. There is a positive correlation between urban densities and integration of land-uses and related activities. Hence, it is argued that activity corridors serve a primary purpose of facilitating this integration, which implies higher levels of accessibility, and this is key to quality urban living in the developing world with disparities in income levels and mobility by private means. The integration of such land uses are indicated in Figure 3.4.

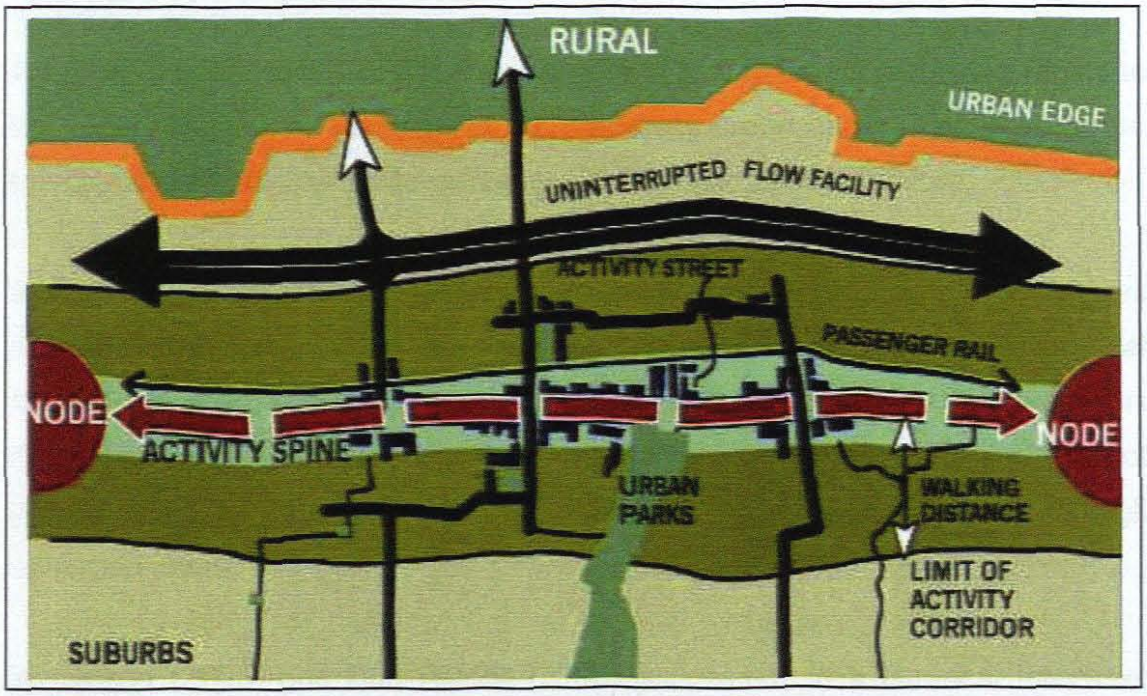

Figure 3.4: The various different elements of a conceptual activity corridor *(Cape Metropolitan Council, 1996: 42).*

3.5.3 Growth Corridors

At the time of writing, reference is loosely made to the concept of Growth corridors by the planning and related professions, in reports and discussions.

A growth corridor is generally accepted as having extensive growth expectations and potential on a metropolitan scale, with clear scope for the full range of urban land uses including residential, commercial and industrial uses. This type of corridor could thus also be characterised by unique features such as a regional shopping centre by virtue of sheer scale of activity levels.
Though the basic elements of a growth corridor correspond with those of an activity corridor, the difference lies in:

- geographical extent (growth corridor encompasses a larger area, with higher potential for development)
- scale of activities (growth corridors accommodate larger shopping centres).

A further implication is that the development of growth corridors, having regard to the scale referred to, would most likely address urban sprawl having regard to their potential to facilitated densification and an optimal city structure.

In the view of the researcher there are no examples of Growth Corridors as defined in the foregoing, in the Republic of South Africa. The major national routes crossing the country and linking towns and cities do not fall under this definition, having regard to the fact that they are mono-functional and are not accompanied by urban development of any kind, except as they pass through cities and towns.

Robertson (2005) and Duff-Riddell (2005) suggested, in a personal interview, that the term growth corridor refers to a growth stage in the lifecycle of an activity corridor. According to this view, before a corridor reaches a mature state, it goes through a growth phase, and sometimes the growth phase re-occurs, possibly every decade. It can be argued though that the term "growth corridor" does not always refer to this stage in the corridor's lifecycle. There are exceptions where certain corridors cannot be characterised as "activity corridors" because they

have different attributes relating to growth corridors, such as the sheer scale of the latter. Then it can be said that the corridor concerned is a growth corridor and not necessarily an activity corridor in its growth stage.

An example of a growth corridor in a foreign country occurs in the Roanoke Rapids City Council area, North Carolina, United States of America. The Southern Growth Corridor (SGC) is approximately 5.12km² in linear extent and mostly rural in nature (Roanoke Rapids City Council, *s.a.*: *s.p.*). The Roanoke City Council believes that growth in the SGC will occur quickly in the near future (Smith, 2005) and can thus be seen as an expansion area for the metropole or town. The Council is therefore desirous that the growth in this area will proceed in a pre-planned and organised manner. This will "protect the health, safety and general welfare of the general public" (Smith, 2005: *s.p.*). This vision is based on the premise that if growth of the area is planned in advance, then the management thereof is likely to be more efficient. This will in turn ensure that the general welfare of the public is protected and that a safe environment is created for the residents in that area.

3.5.4 Development Corridors

Kleynhans (2001) investigated the term and defined it as follows:
"This description of what a development corridor is, emphasises the focus on economic development and links it to the dimension of a specific geographical area, where such unique economic development activities and/or opportunities are to be found. Another aspect of the definition expresses the role of policy issues focused on economic growth" (Kleynhans, 2001: 12). In terms of this definition, it can therefore be said that a development corridor is an extensive linear area with a major road and transport route running along its centre, with a high economic potential, whether this has been realised as yet or not. It therefore offers significant insight to the definition and could include both activity and growth corridors.

3.5.5 Other Corridors

Further investigation reveals other corridor types, which, though not directly relevant to this study, are included here for the sake of comprehensiveness. These are scenic corridors, green corridors, environmental corridors and mega/euro corridors, and are briefly discussed here.

Green Corridor: In the literature, the term "green corridor" commonly refers to an agricultural strip of land. It can also refer to a landscape in elongated form, which is created when large areas of natural habitat, forest or places of environmental interest are aligned as in Figure 3.5.

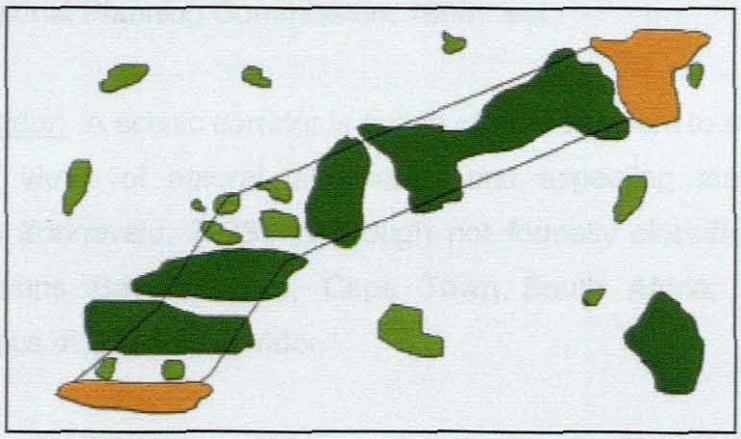

Figure 3.5: A concentration of environmental areas in a linear form *(Source: Fondation Les oiseleurs du Québec inc, 2003).*

An example of such a corridor would be the W Growth Corridor in the Philippines. "It is a strategic approach in promoting Central Luzon as an investment destination. It comprises the Central Luzon key investment area for tourism, industry and agriculture. These areas represent the growth municipalities of the region, which when plotted on a map form the shape of a "W" (Central Luzon, 2004). A total area of 635,345 hectares in Central Luzon is dedicated to agricultural production and stretches over two provinces in the northern Philippines (Central Luzon, 2004).

Environmental Corridor: This term specifically refers to environmentally sensitive urban areas aligned in a longitudinal configuration, including natural and sometimes cultural features (Murrell, *s.a.*).

"Environmental corridors are continuous systems of open space in urban and urbanising areas. These corridors include environmentally sensitive lands and naturally sensitive lands and natural resources requiring protection from disturbances and development, and lands needed for open space and recreational uses. They are based mainly on drainage-ways and stream channels, floodplains, wetlands, steep slopes, and other resource features, and are part of a countywide system of continuous open space corridors" (Dane County Regional Planning Commission, 1996: s.*p.*).

Scenic Corridor: A scenic corridor is a strip of land adjacent to a road that has exceptional views of natural landscapes and appealing man-made features (Priemus & Zonneveld, 2003). Although not formally classified as such, Hout Bay to Camps Bay / Clifton, Cape Town South Africa, would have the characteristics of a scenic corridor.

Megacorridor: Priemus and Zonneveld (2003) refer to the Megacorridor as the modern version of the corridor concept. They define it as "a combination of one or more important infrastructure axes with heavy flow of cross border traffic" (2003: *s.p.*). These infrastructure axes might include road, rail and telecommunication lines. De Vries and Priemus state that the megacorridor " is employed to draw attention to spatial developments in areas between large urban areas in north-west Europe and the challenges that these developments pose" (De Vries & Priemus, 2003: 1).

Stated otherwise, such corridors can be seen in the context of providing European citizens with a high quality of life. This understanding of the term

"megacorridor" has led to the concept 'eurocorridors' (Albrechts & Coppens, 2003).

3.6 Conclusion

What is clear is that corridor planning has become a well accepted strategy for restructuring cities, promoting economic growth in a focused way whilst controlling urban sprawl. Some of the best city transportation systems are generally viewed as corridor-related strategies. The causative relationship where public transport may possibly be a predeterminant for vibrant corridor development, is investigated in Chapter Seven. A further hypothesis therefore is that corridor and public transport development are mutually supportive, each one going through phases of their own, and thus will also be explored.

The table below, compiled by the author, comprises a summary of the nature of corridor developments throughout the world, as suggested in documented theory and the sources are cited in the references.

Table 3.2: The Nature of Corridors: Typical Features

Aspects	Features
Densification	• Concentration of people • High density development • Intensification of activity
Economic Environment	• Provision of social and economic facilities • Initiation of economic growth points • Commercial facilities along major business main roads • Public institutions and economic activities • Private investment • Public investment
Public Transport	• Major transport route • Public transport services • Variety of public transport facilities
Social environment	• Social facilities • Intense human interaction
Spatial arrangements	• Continuous linkage of metropoltian nodes • Creation of a network throughout a city • Restructuring of spatial inequity of city • Mixed land-uses • Specific land-use patterns • High density mixed-use development • Integration • Creation of strong well-defined city structure
Urban Qualities	• Quality urban environment • Maximisation of choices
Other	• Implementation happens over a period of time

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CHAPTER FOUR
CORRIDORS – LEGISLATIVE AND POLICY CONTEXTS

4.1 Introduction

This chapter seeks to highlight the role of legislation and policy documents in corridor development. This review therefore attempts to examine enabling provisions for:

- corridor development, and
- public transport in South Africa, and specifically Cape Town.

If legislation did not specifically address activity corridors or corridor development, the researcher focussed on public transportation.

The responsible levels of government are discussed in a later section

4.2 National Legislation

Urban Transport Act No. 78 of 1977 (South Africa, 1977)

The vision of this Act is *"to promote the planning and provision of adequate urban* transport facilities..." (Verster, 2004: 82)

This Act does not make specific reference to activity corridor development. However, it mentions various institutional bodies that should be in place and should be able to address issues concerning activity corridor development.

Development Facilitation Act, No. 67 of 1995 (South Africa, 1995)

As stated in the Development of an Integrated Urban Corridor assessment and Strategy Development Process for Transport Authorities and provinces (2001), this Act promotes corridor development and "provides a set of normative guidelines that have to be adhered to in the process and prescribes the formulation of land development objectives in which corridors have to be included" (National Department of Transport, 2001: 4-77). These include the promotion of efficient and integrated land development, housing and job opportunities close to one another, sustainable development and the maximisation of resources and discouraging of urban sprawl (National Department of Transport, 2001).

The White Paper on National Transport Policy (South Africa, Department of Transport, 1996)

Corridor development is promoted in the White Paper and a certain degree of detail is given with regard to "the objectives that have to be pursued in their development and the format that they must take" (National Department of Transport, 2001: 4-72).

National Land Transport Transition Act, No. 22 of 2000 (South Africa, 2000a)

The Goal of this Act is "Creating appropriate institutional bodies, planning, regulated competition and the restructuring of modes, sustainable funding, and effective transport law enforcement" (South Africa, 2000a: 11).

This Act clearly states that public transport should be preferred over private transport in order to succeed with land transport planning and providing land transport infrastructure and facilities. Activity corridors can provide attractive

public transport services along the corridor, which can be a cost effective feeder system of modes.

The benchmarks for public transport mentioned in this Act include: safety, security, punctuality, frequency, reliability, quality, speed / travel time, affordability, meeting special needs passengers, modal integration, and reducing environmental impact. All of these can be achieved by having an activity corridor in place. It can therefore be said that the NLTTA promotes corridor development and provides "frameworks in which they have to be developed" (National Department of Transport, 2001: 4-76).

This Act appears to be the leading legislation document which addresses corridor development in South Africa, at present, and the importance attached to public transport at least as a supportive factor is clear.

4.3 Provincial Legislation

Western Cape Provincial Transport White Paper, 1997 (Western Cape Department of Transport and Public Works, 1997)

A "Public Transport" First policy is enunciated which includes the objective of preference being given to public transport. This could be achieved with activity corridors and it could therefore be said that public transport should be regarded as essential in the development and implementation of activity corridors.
This document thus supports the notion of corridor development as a planning concept.
According to this White Paper, the fundamental principle put forward on urban restructuring is:
"the reorientation of growth away from the periphery of the urban area towards the middle, concentrating growth at certain strategic sites and along certain corridors" (City of Cape Town. City Planners Department, *s.a.*: 12).

The notion of activity corridor development clearly supports areas with higher intensities of land-uses in close proximity to the corridors. It can therefore be said that the White Paper encourages activity corridor development by directing growth away from the periphery of the city.

4.4 Local Government Legislation

Local Government: Municipal Systems Act No. 32 of 2000 (South Africa, 2000)

This legislation has a direct impact on activity corridor development in that provision can easily be made for certain community needs in close proximity to an activity corridor, if it is not already in place. Activity corridor development appears to be fairly easily adaptable, which results in manageable growth and development in an area. According to Verster (2004) this Act "...provides the core principles, mechanisms and processes that are necessary to enable municipalities to move towards social and economic upliftment of local communities" (Verster, 2004: 84). It is important to note that activity corridors can be seen as a tool to assist municipalities in addressing social and economic upliftment, which is one of the possible functions of activity corridors.

4.5 Policy documents

Moving South Africa: Towards a Transport Strategy for South Africa for the year 2020 (South Africa. Department of Transport, 1997)

This document focuses on the vital strategic issues that are faced by transport in South Africa. This strategy "aims to provide all passengers with access to safe and reliable transport options, depending on their specific needs" (National Department of Transport, 1998: *s.p.*). The movement role of an activity corridor is most relevant and effective to attain this objective as set out by the MSA.

Moving Ahead: Cape Metropolitan Transport Plan (Cape Metropolitan Council 1998)

This document's provisions form part of the transport planning process, Moving Ahead, of the Cape Metropolitan council. It formulates a vision and goals, the metropolitan growth scenarios and transport trends for the Cape Metropolitan Area and provides an overarching policy framework. The vision and goals coincide with those mentioned in other legislation and policy documents referred to in this chapter.

The Moving Ahead policy framework projects the growth and demand patterns in the city for future years, and thus indicates the potential areas for activity corridor development.

MSDF Handbook: Guidelines for the Local Interpretation and Application of the MSDF Principles and Spatial Concepts (Cape Metropolitan Council, 2000)

Activity corridors are one of the key MSDF concepts. "Proposed activity corridors refer to movement corridors which:

- Connect public transport routes to either proposed or exiting metropolitan nodes

- Display a few of the characteristics of activity corridors

- Are perceived to have potential for development that will benefit the metropolitan region as a whole" (Cape Metropolitan Council, 2000: 13-14).

This document also highlights a number of criteria for the implementation of an activity corridor at the local level:

- Timing

  Activity corridors need to develop at different times (not all simultaneously), and different portions at a time and not all the portions should have priority at the same time (Cape Metropolitan Council, 2000).

- Nature of development

  This should be in context with the history of the area if it excludes the preferred mixed-use development and higher densities that are usually associated with corridor development (Cape Metropolitan Council, 2000).

- Location of development

  The walking distance prescribed by the MSDF, timing, and the densities, bulk and use rights need to be appropriate to the local needs of the area (Cape Metropolitan Council, 2000).

- Changing roles and nature of corridor

  Depending on the local needs and circumstances, the nature of the corridor will change, especially with regard to the land-uses. Therefore the local authority needs to assess the role of the corridor in the local area.

This document, however, does not succeed in addressing the operational and managerial issues on the ground. These issues include the implementation of strategies, enforcing management structures / policies, ensuring that processes

are followed through, and in general ensuring that what should happen at ground level, takes place as intended.

Mobility Strategy (City of Cape Town. Directorate of Transport, Roads and Stormwater, 2004)

The foremost message of this document is to

- *put people first,*
- *have low-cost, smooth and safe public transport*
- *have safe places for walking and riding bicycles*
- *sustainable transport, and*
- *investment in low-cost mobility* (City of Cape Town. Directorate of Transport, Roads and Stormwater, 2004: 4).

Figure 4.1 illustrates how the Mobility Strategy aims to achieve the above-mentioned.

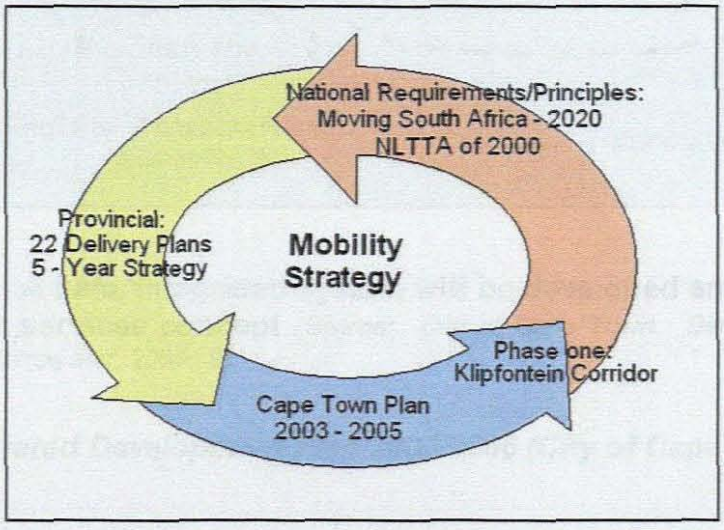

Figure 4.1: The Mobility Strategy: Implementation Vehicle of the Provincial Vision as well as the "Growing the Cape" Strategy *(Source: City of Cape Town. Directorate of Transport, Roads and Stormwater, 2004: 4).*

Klipfontein corridor was identified as phase one of the Mobility Strategy. Different strategies of the mobility strategy will help to support the implementation

of a Bus Rapid Transit system (see case study section for a detailed discussion on the Klipfontein Road Corridor). The remaining phases have not as yet been established

The Mobility Strategy envisions a safe and integrated transport system. Figure 4.2 illustrates how this will be achieved by using the corridor and feeder services concept. It is thus evident that activity corridors are to play a pivotal role in ensuring the success of the Mobility Strategy, and thus the successful implementation of an efficient transport system.

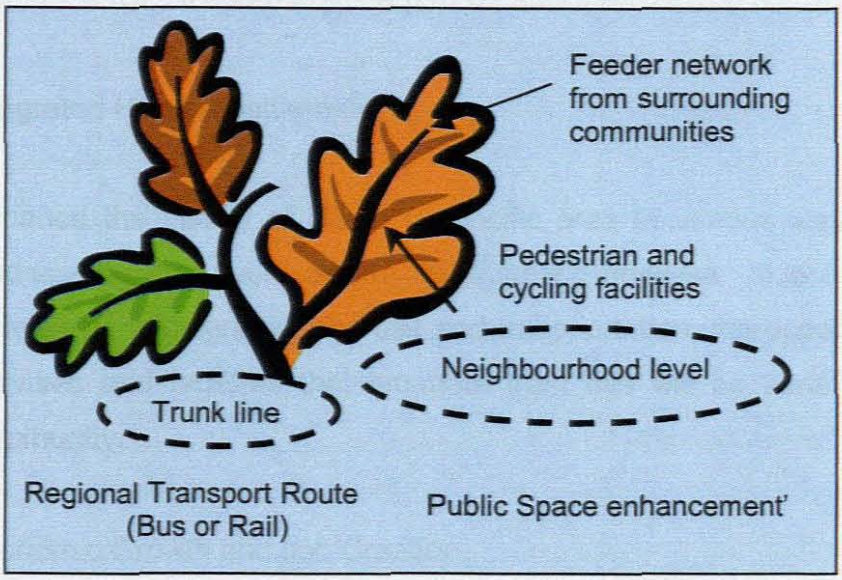

Figure 4.2: A safe, integrated system will be developed around the corridor and feeder services concept *(Source: City of Cape Town. Directorate of Transport, Roads and Stormwater, 2004: 9).*

Draft Integrated Development Plan 2005/2006 (City of Cape Town, 2005)

According to this document, current investment in transport, especially public transport, does not meet the increase of demand. It can therefore be said that if we can overcome the lack of coordination between the various public transportation modes, public transport challenges of Cape Town could be addressed to ensure enhanced progress in the system.

The then Executive Mayor of Cape Town, Nomaindia Mfeketo, stated that the focus of the IDP is on "... the actions we must take to reduce poverty in our City" (City of Cape Town, 2005: *s.p.*). The researcher argues, however, that in addition to all the plans and projects and programmes, the focus of the IDP for the City of Cape Town should not emphasise the poverty concern in the city, but rather what to do to decrease the number of unemployed residents.

The IDP proposes five strategic themes to support the vision and goals of Council. With the implementation of activity corridor development pertinently referred to in the IDP, these themes are to be addressed in the following ways:

- Integrated Human Settlement

  Enhance the quality of life in a specific area in various ways, including landscaping that could add to its aesthetic qualities. If activity corridor development integrates land-use and transportation, the opportunities and activities and facilities that emanate from this will be beneficial for the community.

- Economic Growth and Job Creation

  The economic opportunities that will be created or enhanced by activity corridor developments could have a direct influence on the community. Jobs could become available to the residents and this could boost the local economy in the area.

- Access and Mobility

  It would seem to the researcher that activity corridors could provide a city form in terms of which universal access to a large number of opportunities,

to facilities and destinations, and the making use of various transportation modes, would result.

- Building Strong Communities

  Activity corridors can link different residential communities and help to build strong communities by integrating the communities and having them share facilities that are available along the activity corridor.

- Equitable and Effective Service Delivery

  Activity corridors can assist in providing services in the development area that are equitable and effective.

It is clear therefore that activity corridor developments can directly contribute to the strategic themes of the IDP, which in turn support the vision and goals of the City of Cape Town.

"Poor access and mobility has serious impacts on the city's economy, with areas of job opportunities, economic development and housing developments located outside the established radial transport corridors (both rail and road based corridors)" (City of Cape Town, 2005: 26). In order to address this issue, it is thus important to have an integrated network that will link activities and people.

The key strategies for improving access and mobility goals applicable to activity corridors are:

- Improved Public Transport

  According to the IDP priority is given to the process of transformation and restructuring of public transport (City of Cape Town, 2005). If the

transportation system, especially public transport, is improved and made more appealing to users, more people will avail themselves of this instead of using their private vehicles. It can furthermore be envisaged that if the public transport system is improved, this could have a positive influence on the growth and development of an activity corridor. This possibility is explored in some detail in Chapter Seven.

- Integration of Land-Use and Transport through Integrated Transport Corridors

  The optimal potential of urban elements (such as land-use) can be reached when they are integrated with other elements (such as transportation) and work together. Activity corridors can thus be seen as an effective planning device to integrate land-use and transportation.

- Improved Transport Network and Infrastructure

  If the transport network and infrastructure are improved, this will have a positive effect on promoting economic development, housing and social upliftment and enhance access between places of work and home. This will result in people making use of the facilities offered in an activity corridor, and thus provide the necessary demand thresholds to sustain such a corridor.

- Non-motorised Transport and Investment in Low-Cost Forms of Mobility

  Universal Access and walking and cycling need to be promoted through the implementation of activity corridors. This will encourage people to leave their private vehicles at home and make use of the facilities of activity corridors. It can therefore be said that the Draft Integrated

Development Plan is aligned with national legislation, in that it proposes the development of corridors to integrate land transport functions.

4.6 Institutional Bodies / Parties

Transport Authority for Cape Town

According to the *Interchange* (Golden Arrow Bus Services, 2005: 3), Ms Maddie Mazaza states that there has to be "integration of the transport sector with land-use development objectives, and this process will require political will" (Golden Arrow Bus Services, 2005: 3). This could, in the view of the researcher, be achieved with the implementation of activity corridors, seeing as corridors have the potential to integrate transportation and the various land-uses.

In order to achieve such integration, management structures need to be in place. Therefore the establishment of a transport authority is a key component for integrated transport management: The IDP clearly states "greater progress in addressing Cape Town's public transport challenges is however hampered by a lack of coordination between the various entities responsible for the bus, rail and minibus-taxi component" (City of Cape Town, 2005: 9). This clearly emphasises the dire need for a governing body for all the public transportation modes.

Transport authorities (TA) are established in terms of Parts 5 and 14 of the National Land Transport Transition Act with the aim of improving the service delivery within the local area, by means of "grouping transport functions into a single well-managed and focused institutional structure " (Golden Arrow Bus Services, 2005a: 6).

Despite the challenges, the concept proves to be "not a bad idea and if established well may surely solve most of the transport challenges" (Golden Arrow Bus Services, 2005a: 6).

4.7 Guidelines Specific to Corridors

A Preliminary Investigation of Activity Corridors as an Urban Strategy (CSIR: Division of Roads and Transport Technology, 1990)

"This document argues for the management and planning of the Cape Metropolitan area in a single integrated and comprehensive framework – in other words, as ONE CITY" (CSIR: Division of Roads and Transport Technology, 1990: 3).

The document states that the goals for the implementation of activity corridors should be:

- "To create equitable access to recreational, social, cultural, environmental, retail, residential and most importantly, employment opportunities for all city dwellers, and particularly the urban poor.

- To form the basis of an urban planning and transportation strategy aimed at the integration of the city" (CSIR: Division of Roads and Transport Technology, 1990: 8).

It further explores the concept of activity corridors as an urban strategy. The advantages of the activity corridor concept are highlighted as:

- Linearity
- Historical and contemporary precedent
- Economical soundness
- Ability to accommodate growth

The document also suggests certain preconditions that need to be in place for the development of an activity corridor:

- Scale
- Corridor width
- Density
- Location of significant land-uses
- Connection of metropolitan nodes
- Existence of multi-modal transport systems
- High street characteristics
- Continuity and direction
- Definition of edges (CSIR: Division of Roads and Transport Technology, 1990: 11).

The concept has subsequently been applied to the south-east of Cape Town. This document sees the concept of activity corridors to be a "vehicle for restructuring inefficient urban areas" and highlighted areas for further research (CSIR: Division of Roads and Transport Technology, 1990: 38).

Development of an Integrated Urban Corridor Assessment and Strategy Development process for Transport Authorities and Provinces (National Department of Transport, 2001)

This document explores the context of the corridor, investigates legislation relevant to corridor development and a number of case studies, corridor typologies and types and provides a list of objectives under the following main headings:

- Economic and Financial
- Transport

- Social
- Physical / Urban From
- Institutional
- Environmental (see appendix 4 for table of objectives and performance measures) (National Department of Transport, 2001).

According to this study, one cannot formulate one set of objectives that will be applicable to all corridors. This document "produced a resource document and electronic model that can produce quantitative values of performance measures of any corridor alternative being proposed" (National Department of Transport, 2001: ii).

After investigating corridor development and applicable legislation, this document produced an electronic model (Excel) to assist transport authorities and provinces to "facilitate the calculation of performance measures" (National Department of Transport, 2001: xiii).

For the purposes of summarising what has been described in this chapter, Table 4.1 is provided, with the second column listing the stated goals of the legislators and policy-makers. This therefore provides an extension to Table 3.2 (page 42), and highlights a close correlation between established features of corridors on the one hand, and related legislative and policy goals of government on the other.

Table 4.1: The nature of corridors: Typical characteristics (Theoretical and Legislative)

Aspects	Features	Legislative and Policy Goals
Densification	• Concentration of people • High density development • Intensification of activity	• High densities
Economic environment	• Provision of social and economic facilities • Initiation of economic growth points • Commercial facilities along major business main roads • Development of public institutions and economic activities • Private investment • Public investment	• Economic upliftment • Economic growth and job creation
Public Transport	• Major Transport route • Public transport services • Variety of public transport facilities	• Public transport • Modal integration • Movement role
Social environment	• Social facilities • Intense human interaction	• Provision for community needs • Social upliftment
Spatial arrangements	• Continuous linkage of metropoltian nodes • Creation of a network throughout a city • Restructuring of spatial inequity of city • Mixed land uses • Specific land use patterns • High density mixed use development • Integration • Creation of strong well-defined city structure	• Integration of land use and transport • Concentrated growth away from periphery and along certain corridors • High intensity of land uses • Connection between public transport nodes • Mixed use development
Urban Qualities	• Quality urban environment • Maximisation of choices	• Enhance quality of life • Access and Mobility
Other	• Implementation happens over a period of time	

4.8 Conclusion

What is clear is that corridor planning has become a well accepted strategy for restructuring cities, promoting economic growth in a focused way whilst controlling urban sprawl. Some of the best city transportation systems are described as part of corridor-related strategies, though the researcher intends to investigate whether and to what extent public transport can be a predeterminant for vibrant corridor development.

From discussions with planners in both transportation and urban management contexts, the inference can be made that questions remain concerning the comprehensivity, the specificity and the degree of integration relating to laws and policies. This could well be the subject of a separate thesis. It has been noted with interest that the National Land Transport Transition Act (South Africa, 2000a) is popularly cited as a useful and instructive document, and the researcher having perused all others mentioned in this chapter, feels strongly inclined to concur. The inference seems to be that the other legal provisions and policies are not as useful to planners and officials. A serious shortcoming is that responsible roleplayers are not properly identified for the implementation of these provisions.

Literature concerning public administration and administrative law advances reasons why the mere existence of legislation does not necessarily guarantee that the objectives of the legislators will be achieved. Three problem areas are listed here:

- The degree to which it is humanly possible to effectively apply all relevant legislation on any particular matter involving a large number of acts administered by different state departments at different levels.

- A lack of clear understanding on the part of either the officials or private sector planners in interpreting and executing the intentions of the law.

- A lack of political will. This is compounded by conflicts between national and provincial levels of government (Theunissen, 2005).

The inclusivity, integration and ultimate implementaiton of government policies offer challenges of their own, whether they address the spatial or procedural realms.

Some policies ar emore explicitly entrenched in laws and regulations than others, and this seems evident in certain of the legislation outlined above. Unclear policy raises a host of problems such as difficulties in interpretation on the one hand, and questionable credibility on the other, in terms of whether community values are adequately reflected.

At least two other challenges have to be met in the policies briefly referred to in this chapter, viz. Implementability in terms of available professional expertise in both the private and public sectors, and also in terms of budgetary constraints and financial viability (Theunissen, 2006).

For the most part the existing laws and policies are fairly recent and whether implementation will pick up momentum will depend on the extent to which the difficulties mentioned can be overcome in the not too distant future. The extent to which legislation and policies enable and facilitate corridor develoment are difficult to determine and certainly merit detailed study.

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CHAPTER FIVE
EXISTING AND PLANNED INTERNATIONAL CORRIDOR DEVELOPMENTS

5.1 Introduction

The identification of the international case studies was mainly based on the suggestion of experienced planners. With a view to sheer logistical difficulties, international cases could not be explored in depth.

The purpose of this chapter is to examine a few overseas examples as to the nature and operation of existing public transport systems and corridors, and the co-existence of the two. This, and the next chapter, referring to the South African context, provide empirical evidence which together with theory (addressed in Chapters Three and Seven) serve as a basis for ultimately proposing a future scenario for the Northern Growth Corridor.

5.2 International Corridor Developments as Case Studies

The "activity corridor" seems to be the most comprehensive of all the different definitions investigated in Chapter 3, and therefore the focus in regard to the case studies has been on activity corridors.

The following criteria were borne in mind with the selection of the case studies:

- The ready availability of sufficient information
- Instances that were highlighted by planning professionals as important.
- Examples that conformed to the definition of an activity corridor as discussed in Chapter 3.

The selected international case studies described here therefore include the following:

- Bogotá, Columbia, South America
- Curitiba, Brazil, South America
- Sembawang Activity Corridor, Singapore

5.2.1 Troncal Caracas, Bogotá ,South America

The position can be described as follows, and the point of these statistics is to provide the reader with an insight concerning the scale of the city and transport operations occurring within it, especially if comparisons are drawn with metropolitan Cape Town which *inter alia* differs dramatically in terms of its lower population densities and level of infrastructural development (details provided in Figure 6.2.1, Chapter Six):

Facts	
City Population	6 400 000 [1]
Average population densities	±230 people per ha [3]
Population reliant on public transport	80 % [1]
Average number of passengers per weekday	885 000 [1]
Public transport vehicle fleet	2 100 [1]
Buses in operation	344 [2]
Stations in operation	56 [2]
Ridership (passengers/hour/direction)	33 000 [2]

Source:

[1]Pienaar, P.S., Krynauw, M.N & Perold, A.D. 2005. Public Transport: Lessons to be learnt form Curitiba and Bogotá. *Proceedings of the 24th South African Transport Conference (SATC 2005)*, Pretoria, 11 – 14 July 2005. Pretoria: Documents Transformation Technologies.

[2]Wright, L.& Fjellstrom, K.(ed). 2002. *Module 3a: Mass Transit Option. GTZ. Transport and Mobility Group.* Sustainable Transport: A sourcebook for Developing Cities. *[s.l.:s.n].*

[3]Targa, F. 2003. Examining Accessibility and Proximity-Related Effects of Bogotá's Bus Rapid System using spatial hedonic price models. Unpublished dissertation towards the degree of Masters of Regional Planning. Chapel Hill: University of North Carolina.

Bogotá in general

Bogotá is well known for its successful high quality and cost-effective public transport system.

Transportation in Bogotá

A decision was taken in 1998 to create a transport entity, known as the Transmilenio, with the aim of drastically changing the public transport form in order to improve mobility in the urban areas. With the implementation of the bus rapid transport (BRT) system, the company aimed "to improve the quality of life of citizens of Bogotá, and to improve the productivity of the city" (Pienaar *et al*, 2005: 370).

Characteristics of the Transmilenio system include:

- buses are of all shapes, sizes (typically 20-25 seater) and ages,
- no formal planned routes and no time schedule, and
- no allocated operators (Pienaar *et al*, 2005).

In the larger areas not covered by the Transmilenio system, the public transport services consist of privately owned and operated buses.

Troncol Caracas (Caracas Busway)

This is one of the most important corridors in Bogotá, constructed and developed between 1988 and 1992 (Targa, 2003). It consists of a busway of 16 km "which acts as a high capacity collector fed by routes needing to cross the city rapidly"

(Targa, 2003: 30). After a time of lack of maintenance of the Busway, it stagnated and resulted in an unattractive and undesirable movement system. The Transmilenio (Figure 5.1) began to operate in December 2000. This system has proven to be successful and "carries more travellers than entire mass transit systems in many other cities around the world" (Targa, 2003: 32). The importance of corridors in the city would therefore seem to indicate that this particular city form is an important factor in the success of a public transport system.

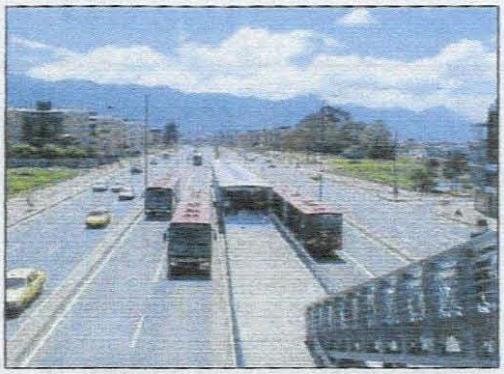


Figure 5.1: TransMilenio bus system, Bogotá: A Typical station *(Targa, 2003: 24).*

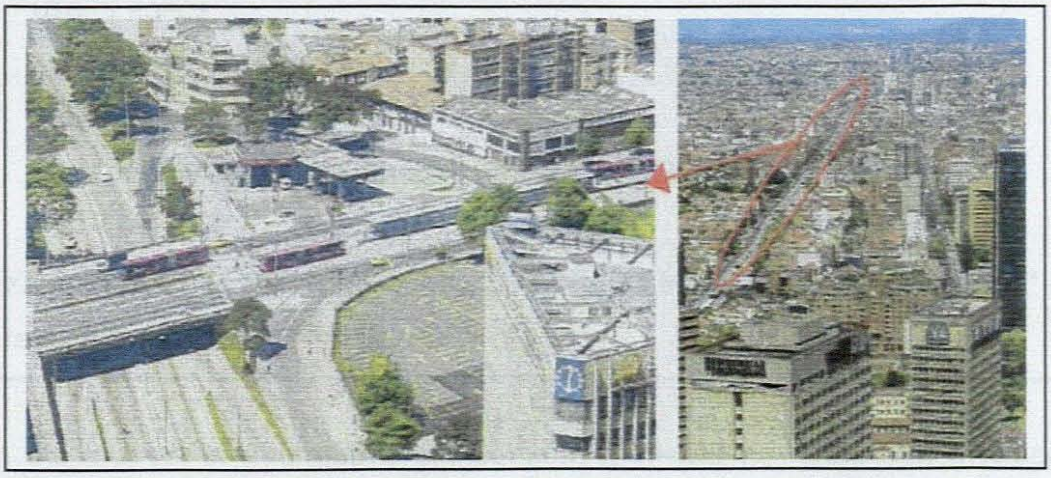


Figure 5.2: TransMilenio bus system components *(Targa, 2003: 24).*

- ***Business / economic opportunities***

The presence of the Mass Rapid Transit stations along the corridors in Bogotá "help catalyse new economic and employment opportunities" (GTZ Transport and

Mobility Group, 2002: 26). This is due to the fact that these MRT stations act as development nodes and generators of further economic activity.

Bogotá experienced a rise in the land values "in the vicinity of TransMilenio stations and strong demand from land-owners and business for the construction of stations in their local areas. The city implemented an innovative value-capture scheme in which the windfall benefits to landowners in the form of rising land values was partially diverted to help fund the construction of stations" (GTZ Transport and Mobility Group, 2002: 26).

Box 1

What is MRT?

MRT (Mass Rapid Transit) is also referred to as public transit. It is a passenger transportation service, which is usually offered on a local basis. "It is designed to move large numbers of people at one time. Features that define the MRT include the following:

- use of space
- speed and passenger capacity
- integration, and
- level of service (GTZ Transport and Mobility Group, 2002: 4).

Examples include Bus Rapid Transit, heavy rail transit, and light rail transit" (GTZ Transport and Mobility Group, 2002: 2).

In the interest of informative comparison, it should be noted that metropolitan Cape Town does not as yet have any form of Mass Rapid Transport, though a Bus Rapid Transport system has until recently been a planning project in one of its areas, namely Klipfontein Road. The basic reason for this position is that the city of Cape Town is as yet in an underdeveloped stage with a somewhat diffuse, low-density structure.

- ***Densities***

The population of Bogotá is increasing at almost 5% per year as a consequence of urbanization, and demands are accordingly put on planning strategies to accommodate these in terms of densification (Wikipedia Encyclopedia, 2005: *s.p.*). This immediately suggests viable demand thresholds that have given rise to the provision of the transportation infrastructure now in existence. The existence of corridors may well imply further that this densification can be and is accommodated in this city form. The following figure indicate the location of residential properties in the vicinity of Caracas Corridor in Bogotá (Figure 5.3).

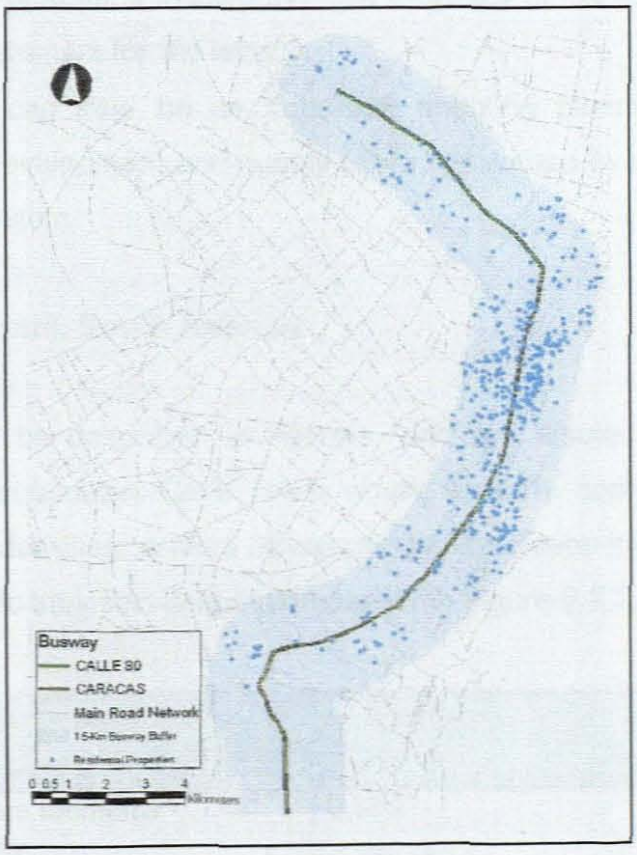


Figure 5.3: Residential properties located in the vicinity of Caracas Corridor in Bogotá *(Targa, 2003: 58).*

What can be learnt from Bogotá

The following can be learnt form the Bogotá experience:

- The political will should be there to take conscious decisions to address the transport system in the city. As has been mentioned in an earlier chapter, lack of political will could in fact lead to failure even if laws and policies are in place.
- Business and economic opportunities improved along corridors due to the MRT stations along them.
- Residential properties located in close proximity of Caracas corridor are a supportive element for the latter.
- A corridor can thus be an important enabling planning construct for economic development and quality of life, reinforced by an efficient public transport system.

5.2.2 Curitiba, Brazil, South America

The position can be described as follows, and the issues raised earlier in comparison to metropolitan Cape Town would similarly apply here, *inter alia* higher population densities, a more developed transportation infrastructure and a higher rate of public transport usage (compare with Figure 6.2.1, Chapter Six):

Facts	
Population per square kilometre	2,800 [2]
Metropolitan Population	2,700,000 [2]
Land Area	432 km² [4]
Bus system passengers per day	1.3 million [5]
Use bus system daily	Nearly 70% of population [3]
Public Transport trips / day	2.1 million (75% of all trips) [1]

Sources:

[1] Cayford, J. 2002. Impressions form Curitiba – Brazil. [*s.l:s.n*].

[2] Cox, W. 2003. Curitiba: World class public transport. Available online: www.demographia.com/rac-ix.htm [15 April 2005].

[3] European Partners for the Environment. *s.a.* Curitiba: A integrated network of surface transport. Available online: http://www.epe.be/workbooks/tcui/example4.html [7 April 2005]

[4] ICLEI. Local Governments for Sustainability. 2002. Orienting Urban Planning to Sustainability in Curitiba, Brazil. Available online: http://www.3iclei.org/localstrategies/summary/curitiba2.html [13 April 2005].

[5] World Resources Institute. s.*a.* Urban priorities for action: Box 5.4 integrated transportation and land use planning channel Curitiba's growth. Available online: http://pubs.wri.org/pus_content_text.cfm?ContentID=963 [7 April 2005].

Curitiba in general

Curitiba, capital city of the State of Paraná, is seen as one of Brazil's wealthiest cities (Youth Exchange, 2004) and is renowned for its "success stories" of urban design, planning and management. Like many other cities across Brazil, it experienced rapid growth when migration escalated due to agricultural mechanisation in the 1950's – 1980's (Horizon Solutions Site, 2002).

City structure / Infrastructure

Instead of the city center expanding outwards in a compact form, a linear form along transport corridors extending outwards in a radial form was suggested by city planners. This change in the development structure of Curitiba led to the development and growth of what are today known as "structural corridors" (or radial centres) rather than perpetuating growth nodes in future expansion (Cayford, 2002: *s.p.*).

The following figure indicates the difference between the typical dispersed city (disorganised) as opposed to the radial (organised) growth of the city of Curitiba. Disorganised growth refers to uncontrolled, organic growth of the city in all

directions. Organised growth (as the case is in Curitiba) refers to growth that is directed along consciously planned routes or corridors.

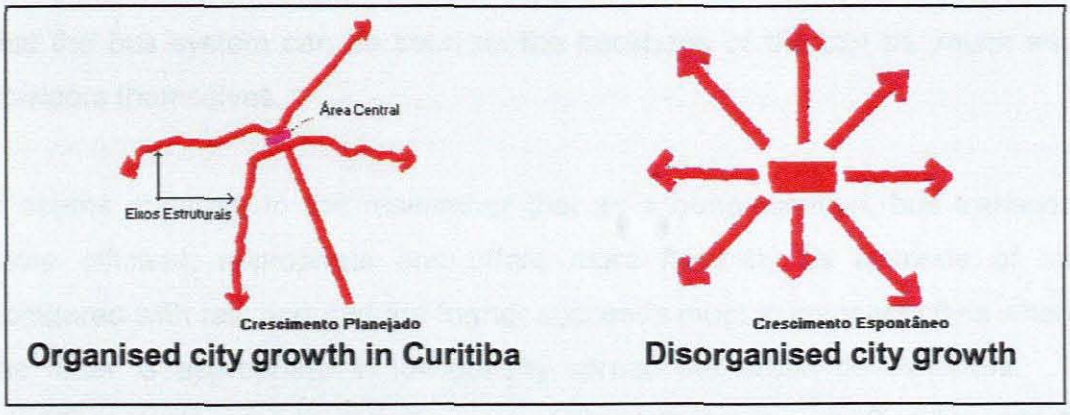


Figure 5.4: Organised and disorganised city growth *(Source: Horizon Solutions Site, 2002: 4).*

Organised city growth is thus managed and controlled to some extent along definite routes, planned as such, in contrast to disorganised expansion where the city grows in a non-planned manner in all directions with relatively little control, not unlike some of Cape Town's historic urban sprawl.

Transportation in Curitiba

"Curitiba's infrastructure effectively creates demand for bus use in the same way that the infrastructure of traditional cities creates demand for automobile travel. Whilst Curitiba's population has quadrupled in size, from 500,000 to 2,000,000, in the past three decades, its automobile travel has decreased by 30 percent" (Youth Exchange, 2004). The success of Curitiba's transport system was dependent on choosing the appropriate mode to ensure that it was the most suitable mode for the specific needs of the city.

"The city's visionary policies integrate an innovative transit system with land-use development to ensure that one supports the other; in Curitiba, mobility is linked with development, thereby reducing dependency on cars" (Youth Exchange,

2004: *s.p.*). The result of this uniquely designed rapid transit system of Curitiba is that it has become evident to a "high income world public transport industry" (Cox, 2003: *s.p.*). Public transport supports corridor development in Curitiba in that the bus system can be seen as the backbone of the city as ,much as the corridors themselves.

It seems apparent to the researcher that as a generalisation, bus transport is more efficient, appropriate and offers more flexibility as a mode of travel compared with rail, and that the former succeeds most in compact cities whereas the latter is appropriate in low-density spread out urban development. This would seem to explain the success of the bus system in Curitiba, which is enhanced by the presence of corridors, though the reverse seems also to be apparent.

Structural Corridors

Curitiba's five radiating corridors, referred to as structural corridors, cover distances between five and fifteen kilometres.

"The key concept was to channel the city's physical expansion away from the central city and along five linear corridors or axes" (World Resources Institute, *s.a.: s.p.*).

These axes have a central road acting as an activity spine. This road has lanes that are exclusive for certain modes of transport; for example, the express buses, a lane for local traffic and a lane specifically allocated to high-speed car traffic that flows both in and out of the city. These roadways and adjacent development are collectively known as structural corridors and are flanked by high-density commercial development. The land further away from the corridor is zoned for lower density activities. As a result of this, the noise and traffic

congestion in the city centre has been reduced to a great extent which led to the pedestrians returning to the city (World Resources Institute, *s.a.*).

As has been mentioned, integration between public transport planning and land-use planning occurs, with a strong emphasis on mixed-use development. This results in the city being pedestrian-friendly and having high passenger densities, resulting in an economically viable public transport system (Pienaar *et al*, 2005: 376).

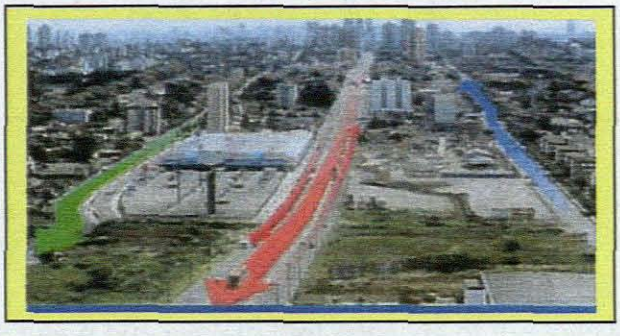


Figure 5.5: Cross-section and busway: structural corridor, Curitiba *(Source: Pienaar et al, 2005: 365).*

As can be seen from the figure above, the typical corridor consists of three lanes that run parallel (green, red and blue lines). The inner road (red) has two exclusive bus lanes and two lanes for slow traffic, while the outer roads (green and blue) host three to four one-way lanes for fast traffic running in opposite directions (National Department of Transport, 2001: 2-41). A typical cross-section is illustrated in Figure 5.6.

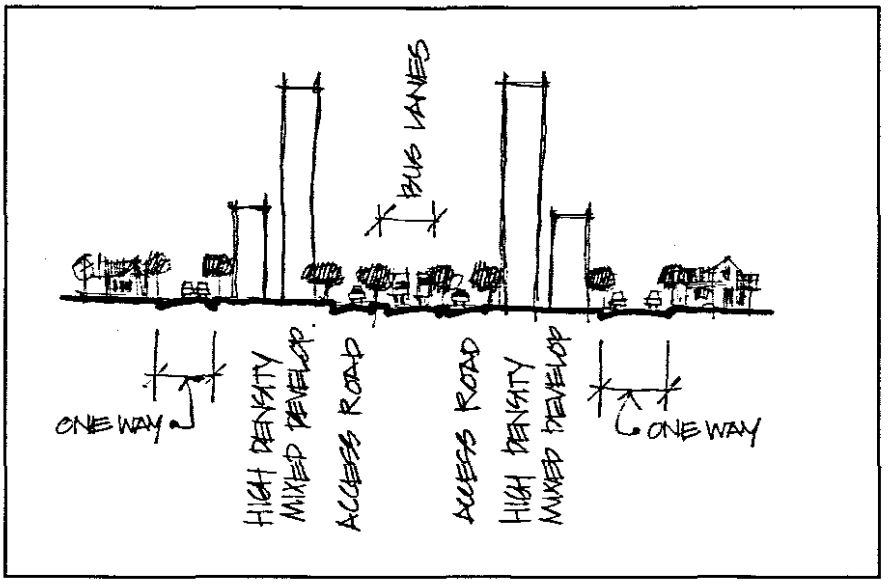


Figure 5.6: Cross section of a structural corridor *(Source: National Department of Transport, 2001: 2-44).*

The city of Curitiba has a bus system that consists of the following:

- green articulated and padron buses [connect transfer terminals to different districts and do not pass through the city centre]
- silver buses [direct speedy routes and use the tube stations along routes that link the main district and surrounding municipalities with Curitiba](Horizon Solutions Site, 2002).
- Red express buses [run along the corridors]
- Yellow buses [feeder system "that circulate through outlying areas and that take passengers to transfer stations in the corridor" (National Department of Transport, 2001: 2-41)].

As can be seen from Figure 5.7, the colours of the buses indicate the clear distinction between them as each bus has a specific role in the service provided. This colour scheme is intended as a user-friendly device in order that passengers are left in no doubt as to whether the route of a particular service coincides with the corridor or whether a minor route is being followed.

Figure 5.7: Green and silver buses in Curitiba *(Source: Horizon Solutions Site, 2002: 6).*

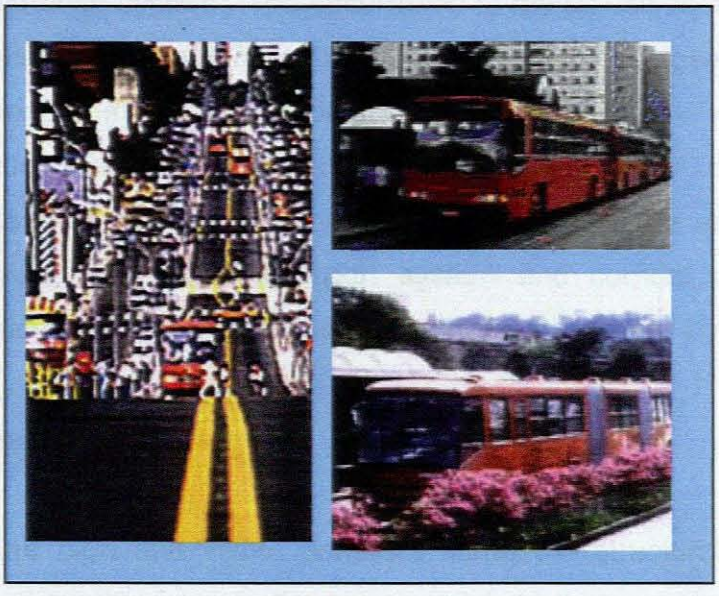
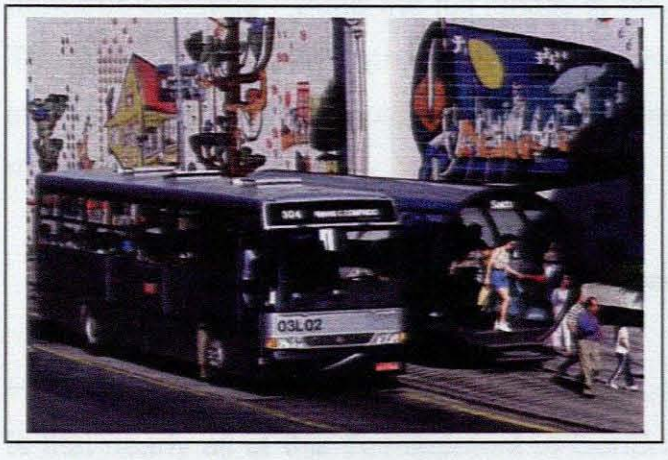


Figure 5.8: Roads reserved for bus use: Curitiba *(Source: Horizon Solutions Site, 2002: 4 & 6).*



Reserved roadways are allocated for double articulated buses, which are served by "tube stations". To be able to enter these stations, users first have to purchase a token. This reduces the boarding time and thus stopping time for buses (Cox, 2003: *s.p.*).

Figure 5.9: Tubular stations in Curitiba
(Source: ICLEI. Local Governments for Sustainability, 2002: s.a.).

- ***Business / economic opportunities***

The City Council of Curitiba, as most would, sees economic development as a most important activity, and the economic growth in Curitiba is closely related to the public transportation system. The occurrence of mixed-use zoning in the city provides for self-sufficient communities in having development close to the transit stations. This results in the bus-stops functioning as nodes where shopping activities, recreation and businesses are concentrated (Cox, 2003: *s.p.*). The important thing to take from the Curitiba scenario is the positive and supportive relationship between the public transport system and corridor development. Another observation is that financial resources can be substituted by creativity.

- ***Development densities***

In order to ensure high and viable densities along the structural corridors of Curitiba with lower density areas further away, strict regulations are applied. The high densities are accomplished by offering incentives to developers by granting them additional rights (National Department of Transport, 2001). The higher densities continue "along the full length of the corridor" (National Department of Transport, 2001: 2-42), and it can reasonable be supposed that this planning intervention strongly reinforces density patterns that are already induced by the market forces.

- ***Residential-to-corridor spatial juxtaposition***

High-rise residential development is not unusual for Brazil, but what is noticeable is that nearly all of this development in Curitiba is "within one block of the rapid transit lines" (Cox, 2003: *s.p.*). Four of the structural corridors are visible from a considerable distance because of the high-rise apartment developments that have been built along them. These perform the additional function of legibility for the city in terms of "paths" and "edges" (Lynch, 1990).

This development along Curitiba's corridors is characterised by 20 – 30 storey buildings containing offices, shops as well as residential flats along the efficient and affordable public transport routes (Pienaar *et al*, 2005.).

Figure 5.10: Typical high-rise development along structural corridor *(Source: Pienaar et al, 2005: 365).*

What can be learnt from Curitiba

The public transport system in Curitiba is generally seen as one of the most efficient and effective ones in the world. The use of structural corridors has proven to be successful due to the fact that they accommodate high population densities and transportation demands. This has resulted in a public transport network that is not only accessible, but also economically viable and even environmentally sustainable at the same time.
Transport routes in Curitiba are used to their full capacity and land-use and transport planning are linked. (Author unknown, *s.a.*d:*s.p.*).

The lessons learnt from the Curitiba experience include the following:

- Political will and enforcement are among the pre-requisites for the implementation of major planning projects

- The merits of a fully co-ordinated transport system in having one company responsible

- The advantages of expanding a city (in a linear form) by means of radial axes

- The proper integration between transportation and land-use can lead to an efficient and affordable public transport system. Conversely, an efficient public transport system appears to sustain an effectively operating corridor, which is central to the author's hypothesis.

- The importance of providing the most appropriate public transport system for a given context. In the case of Curitiba, bus-travel as the predominant mode proved to be more cost-effective than rail. This is presumably the result of stop-start and break-of-journey patterns. The matter of transportation economics falls beyond the ambit of the present study, though such details could be researched further by those in that particular field.

5.2.3 Sembawang Activity Corridor, Singapore, Malaysia

The position can be described as follows and this once again represents an instance of a city at a higher level of development than the city of Cape Town (see Figure 6.2.1, Chapter Six):

Facts	
City Population (thousands)	2930 [3]
City Population density (people/1 square km)	4553 (1991) [3]
Singapore residents ('000)	3,437 [1]
Land Area (Singapore):	697.1 km² [1]
Public Transport trips / day	5 million [2]

Sources:

[1]Land Transport Authority. 2004. *Singapore Land Transport Statistics in brief.* [Brochure].

[2]Land Transport Authority. 2005a. LTA: Development Control. Available online: http://www.lta.gov.sg/public_transrpot/pt_overview.htm [16 August 2005].

[3]National Stats Singapore. s.a. Available online: http://parallel.park.org/Japan/TokyoNet/aip/COUNTRY/SINGAPORE/STATS/ [16 August 2005].

Singapore in general

The urban area of Singapore is concentrated towards the southern part of the island and the rest of it is designated as rain forest or agricultural land (Wikipedia Encyclopedia, 2005).

City structure

The town of Sembawang is located on the northern coastline of Singapore. It is fairly new and certain areas are still under development (Urban Redevelopment Authority, 2003). The goal of using land to its full potential in proposed development is incorporated in the formulation of the Master Plan which has the aim of: "Making the north a more attractive region" (Urban Redevelopment Authority, 2003: *s.p.*).

Transportation in Singapore

Singapore has been quoted as one of the best public transport systems in the world because it is so extensive and efficient. A variety of public transportation alternatives are available; these alternatives (Mass Rapid Transit System, Light Rail Transit System, buses and taxi's) provide services that cover the whole island and at reasonable fares (Land Transport Authority, 2005a).

The following table indicates the predominance of bus transport compared with other modes:

Table 5.1: Average Daily Ridership in Singapore, 2003 *(Source: Land Transport Authority, 2004: s.p.).*

Public Transport Mode	'000 passenger-trips
MRT	1,219
LRT	53
Bus	2,972
Taxi	827

The MRT is the most utilised of the rail public transport modes and serves 51 stations in its network (Singapore Tourism Board, 2003). It has proven to be quick, efficient, reliable and information on the system and a copy of "A Quick Guide to MRT Travel" can be obtained form the Station Control Rooms at all MRT stations (Singapore Tourism Board, 2003: *s.p.*).

Figure 5.11 shows a Mass Rapid Transit Train in Singapore.

Figure 5.11: A C651 train of the Mass Rapid Transit (MRT) system: Singapore *(Source: Wikipedia Encyclopedia, 2005: s.p.).*

The three main modes of public transport are trains (Mass Rapid Transit) buses and taxi's with the Mass Rapid Transit (MRT) being the fastest. In order to avoid congestion on the roads, the ERP (Electronic Road Pricing) system is employed (Real Destination, 2005: s.p.).

Box 2

What is ERP?

"Electronic Road Pricing (ERP) is an electronic system of road pricing based on a pay-as-you-use principle (Land Transport Authority, 2005: *s.p.*). This system is designed to be fair and is only charged during peak hours (Land Transport Authority, 2005). This system makes use of ERP gantries instead of toll booths (Real Destination, 2005: *s.p.*). The gantries deduct money automatically from a prepaid card, saving time and preventing a bottleneck.

According to Singapore's Land Transport Authority: "ERP has been effective in maintaining an optimal speed range of 45 to 65 km/h for expressways and 20 to 30 km/h for arterial roads" (Land Transport Authority, 2005: *s.p.*).

Proposed Sembawang Activity Corridor

The proposed Sembawang activity corridor envisages development from the Sembawang Town centre, in the middle of Sembawang, to the Jalan Legundi area, and the plans include an integrated bus interchange (see new White Site on map below).

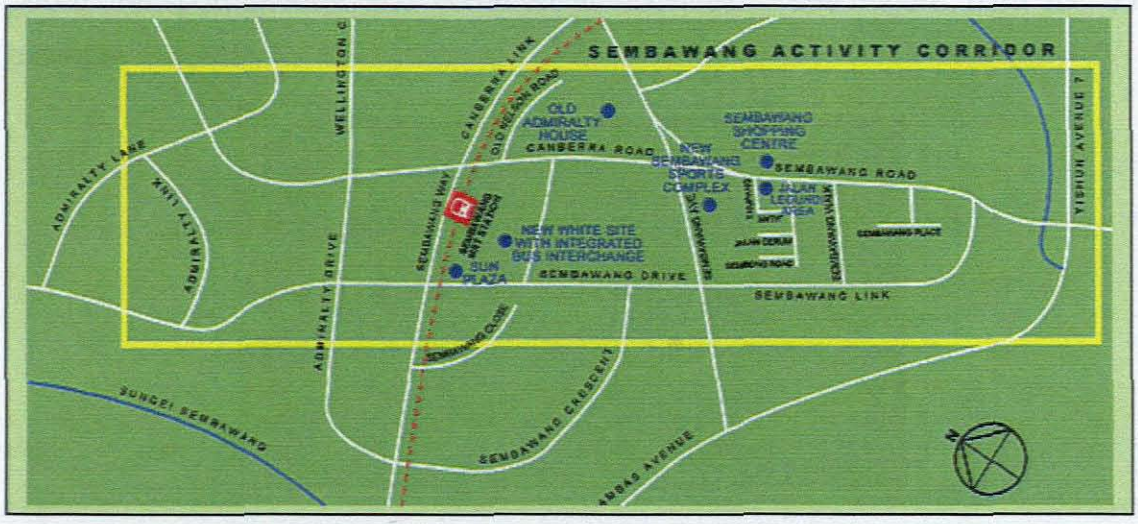


Figure 5.12: Sembawang Activity Corridor *(Source: Urban Redevelopment Authority, 2003: s.p.).*

- ***Streets and nodes***

The major node on this activity corridor is Sembawang Shopping Centre. Zoning along the activity corridor provides for commercial activities at street level with residential uses occupying upper levels. The result of this zoning type is that people are to live within the corridor, close to amenities and facilities.

- ***Transport modes***

"Public transport remains the most important mode of transport to work in Singapore. In 2000, one in two resident workers commuted to work by public transport (public bus, MRT or taxi)" (Statistics Singapore, *s.a.:* 1).

The proposed bus interchange at the new White site Sembawang Town Centre will provide a seamless travel experience to the commuter (Urban Redevelopment Authority, 2003: *s.p.*). The White site will be directly linked to the Sembawang MRT station, resulting in improved access between the various

public transport modes and commercial activities. See Figure 5.13 for an example.

Figure 5.13: Atrium@Orchard above Dhoby Ghaut MRT station *(Source: Land Transport Authority, 2004: s.p.).*

- ***Business / economic opportunities***

The White site area in the Sembawang activity corridor includes a plaza that would "serve as a gathering and activity point for residents" (Urban Redevelopment Authority, 2003: *s.p.*). Business opportunities are planned for the Sembawang Shopping centre as well as the Town centre and surrounds.

- ***Cultural***

Recreational facilities will be available to the community when the proposed Sembawang Sports Complex is completed (see Figure 3.16).

- ***Residential to corridor spatial juxtaposition***

As mentioned earlier, along Jalan Legundi and Jalan Tampang, commercial activities occur on the first floor of the buildings and the higher storeys are occupied by residential uses. These mixed land-uses promote the integration of the various elements in the activity corridor. This results in the efficient utilisation of land.

What can be learnt from the planned Sembawang Corridor?

The following can be learnt from the Sembawang experience:

- An affordable, efficient and extensive public transport system can result from the corridor-orientated structure and densities of the surrounding city.

- A proposed bus interchange in the vicinity of the Sembawang MRT station, is expected to create an area of high concentration of activities and facilities (node).

- Mixed land uses along a corridor could result in residential uses close to amenities and facilities.

5.3 Conclusion

The conclusions of this chapter are presented in tabular form (Table 6.2, Chapter Six) which provides a synthesis of case study findings both international and local. In general, a functional interrelationship between public transport and corridors seems to exist.

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CHAPTER SIX
PLANNED CORRIDOR DEVELOPMENTS IN SOUTH AFRICA

6.1 Introduction: Historical Background

Corridor developments as defined earlier feature as a relatively recent form of intervention in city planning in the country, one of the underlying reasons possibly being that only the larger cities are characterized by scales of intensity in activity and development to warrant city forms of this nature. Corridors have been adopted as a planning device only as recent as 1990 (CSIR: Division of Roads and Transport Technology, 1990).

Though deliberate planning is as recent as this, the prior existence of so-called incipient corridors in the larger cities must be acknowledged. Examples of these would be "the corridors running along Koeberg Road, Old Paarl Road, Durban Road (Durbanville), Van Riebeeck Road (Kuilsriver to Faure) and roads through Somerset West and Strand" (Cape Metropolitan Council. Department of Urban Planning, 1996: 45). The cities have otherwise largely structured partially in a planned and partially in an unplanned way without any particular focus on corridor development per se. Some of the connections or causative relationships between corridors, land use patterns and public transport, and how corridors operate, have been discussed in Chapter Three and are examined again in Chapter Seven.

6.2 Planned Corridor Developments in South Africa as Case Studies

The following criteria were born in mind in identifying cases in this country:

- Those case studies that were highlighted by planning professionals as important.

- The case study should conform to, the definition of an activity corridor as previously explained.

The selected national case studies described here, include the following:

- Klipfontein Road Corridor, Cape Town, South Africa
- Mabopane-Centurion Development Corridor, Pretoria, South Africa

6.2.1 Klipfontein Road Corridor, Cape Town, South Africa

The position in the city of Cape Town is as follows:

Facts	
Population (Cape Town)	2 893 247 [4]
Average growth rate (1999 – 2005)	2.5% [1]
Public Transport vehicle fleet (Cape Town)	10 770 [3]
Rail passenger trips (Metrorail) per day	601 940 [2]
Minibus taxi passenger trips per day	332 407 [2]
Bus passenger trips per day	197 444 [2]

Sources:

[1]City of Cape Town. 2005. *Draft Integrated Development Plan 2005/2006.* Cape Town: *s.n.*

[2]City of Cape Town. 2005a. *Public Transport in Cape Town 2003/2004.* Cape Town: *s.n.*

[3]Pienaar, P.S., Krynauw, M.N & Perold, A.D. 2005. Public Transport: Lessons to be learnt form Curitiba and Bogotá. *Proceedings of the 24th[d] South African Transport Conference (SATC 2005)*, Pretoria, 11 – 14 July 2005. Pretoria: Documents Transformation Technologies.

[4]Statistics SA. 2005. Telephonic communication with Mostert, V. [28 November 2005].

Cape Town in general

Cape Town is sometimes popularly described as the gateway to Africa. As the oldest city in the country, its history of growth and development is characterised by physical structure both planned and non-planned.

The spatial structure of Cape Town was heavily influenced in recent times by the "apartheid orientated" government. A consequence is a city with an unequal distribution of resources and facilities resulting in people, many of whom are in the low-income groups, needing to travel long distances between work and residence and therefore heavily reliant on public transport.

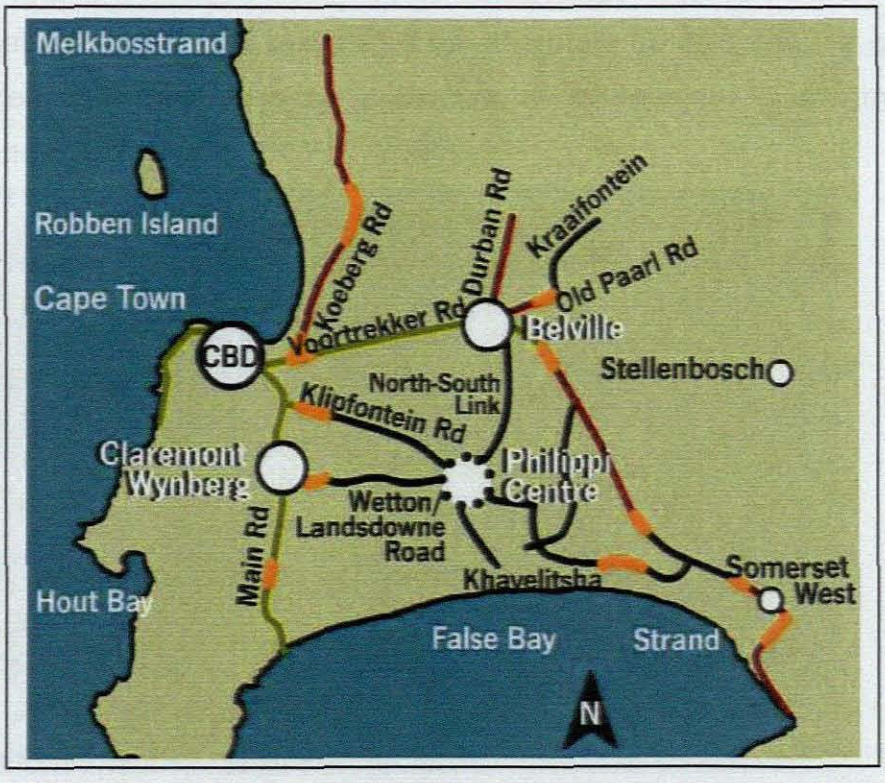

Figure 6.1: Klipfontein road corridor in spatial relation to other major movement routes in the Cape Metropolitan Area *(Source: Cape Metropolitan Council. Department of Urban Planning, 1996: 81).*

Though certain areas of Cape Town are predominantly private vehicle-orientated, the urban poor mostly located further away from main urban job opportunities

and services such as retailing do not have any means of transport other than public transport. The quality of the public transport system is also deterring users because of its unattractiveness, inefficiency and being unsafe. The modes of transport that are in operation at the time of writing are described in a later section.

Klipfontein Road Corridor Project

"The Klipfontein Corridor is more than the construction of an improved transport system; it is the reconstruction of people's lives" (Author unknown, *s.a.a*: *s.p*). Klipfontein Road is seen as the main corridor in a system which has smaller corridors that intersect in the system. It can therefore be said that the concept acknowledges that it is seen as a mixture of movement (Department of Transport and Public Works. PGWC, 2004).

Figure 6.2: Klipfontein Road (Source: *City of Cape Town. Directorate of Transport, Roads and Stormwater, 2004: 8 and Institute for Transportation and Development Policy, 2003: 10).*

The Mobility Strategy ,which aims to put people first, envisages Klipfontein Road Corridor (Figures 6.2 and 6.3) as a safe and efficient environment which could provide 24 hour access for its users, but also as a destination where people will

utilize the area for recreation and relaxation (City of Cape Town. Directorate of Transport, Roads and Stormwater, 2004).

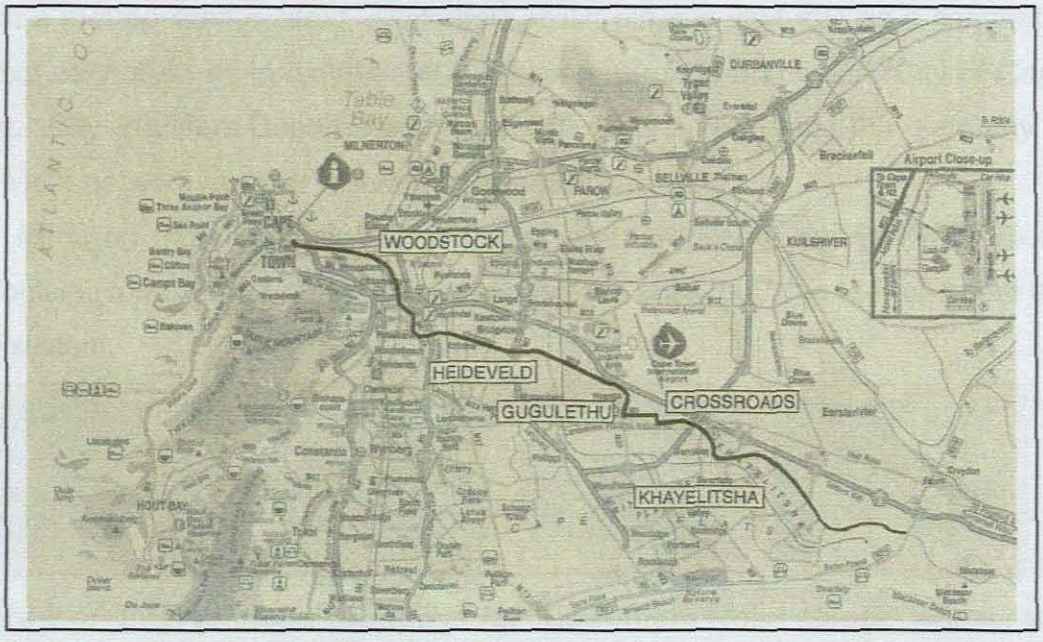

Figure 6.3: Klipfontein Road Corridor *(Source: Author unknown, s.a.a: s.p.).*

The Klipfontein Road Corridor Project revolves around the future provision of the following:

- a Bus Rapid Transit system;
- a Non-Motorised Transport programme,
- a Dignified Urban Spaces programme, and
- a Security Enforcement Strategy (Author unknown, *s.a.a*: *s.p.*).

The aim of the project is to "transform and integrate the public transport system in the City of Cape Town with a comprehensive project structure and implementation plan" (Author unknown, *s.a.a*: *s.p.*).

- ***Streets and nodes***

"From a metropolitan context, Klipfontein Road plays a vital role as a commuter link but cannot do so in isolation of the adjacent roads and links" (City of Cape Town. City Planners Department, *s.a.*: 13). This emphasises the hierarchy of roads in a network in order to increase accessibility.

The following figure illustrates some of the proposed interventions along Klipfontein Road viz not only to pedestrianise the area, but also to implement the BRT system.

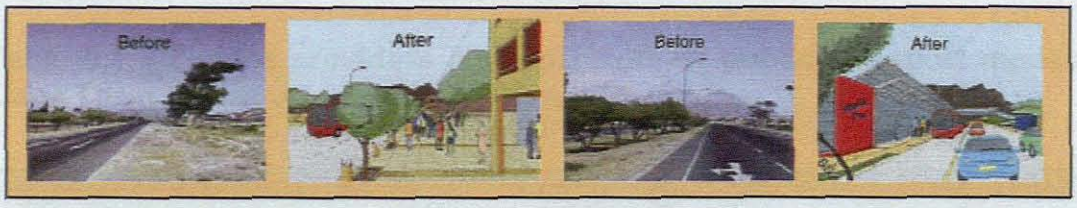

Figure 6.4: Interventions proposed for Klipfontein Road *(Source: Adapted from City of Cape Town. Directorate of Transport, Roads and Stormwater, 2004: 8).*

Box 3

What is Bus Rapid Transit (BRT)?

"BRT is not just a dedicated bus lane, though that is an important element. The best systems have enclosed, metro-like bus stations. " (Institute for Transportation and Development Policy, 2003: 5).

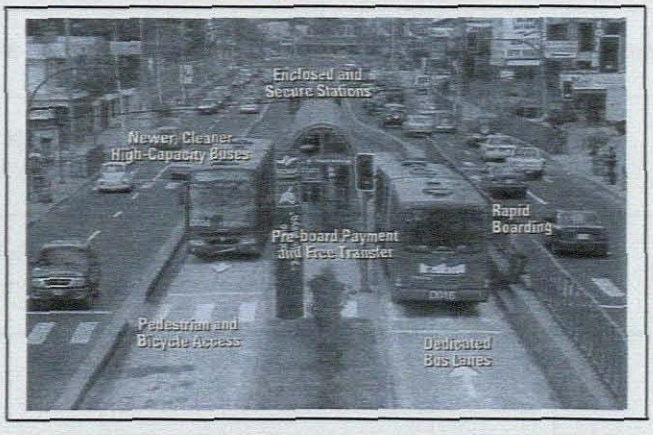

Figure 6.5: A BRT station in Bogotá *(Source: Institute for Transportation and Development Policy, 2003: 5).*

"...hundreds of passengers can get on and off all at once, the delay is much less than for a normal bus, and comparable to metro stems" (Institute for Transportation and Development Policy, 2003: 5).

- ***Transport modes***

"The responsibility for the provision of rail, bus, and minibus taxi transport services in Cape Town is vested in separate independently functioning organisations" (City of Cape Town, 2005a: 7). The BRT system is proposed along Klipfontein Road to run along a dedicated lane and is seen as "phase one for seamless journeys and public transport integration with a better quality of life for all" (City of Cape Town. Directorate of Transport, Roads and Stormwater, 2004: 8).

Table 6.1: Service providers and operators of public transport modes in Cape Town *(Source: Adapted from City of Cape Town, 2005a: 7).*

Transport Service	Service provided by (Owned)	Responsible Organisation (operated)
Rail Passenger Service	South African Rail Commuter Corporation (SARCC) "owns and finances all passenger coaches, rail lines and stations, approves rail fares and timetables" (City of Cape Town, 2005a: 7).	Metrorail operate trains and rail stations
Bus Service	Golden Arrow Bus Services (GABS)	Golden Arrow Bus Services (GABS) and Sibanye
Minibus-Taxi Services	Private operators (who obtain licences from Operating Licensing Board to operate)	Private operators
Metered Taxi Service	Private operators (who obtain licences from Operating Licensing Board to operate)	Private operators

"The passenger rail network in the City of Cape Town area has 260km of rail track, 14 rail service routes and 97 stations" (City of Cape Town, 2005a: 11).

Figure 6.6: Passenger rail in Cape Town *(Source: National Department of Transport, s.a.: s.p.).*

The bus service provided in Cape Town is a "scheduled line-haul with a small number of feeder and distribution services. (City of Cape Town, 2005a: 21).

Figure 6.7: Bus service in Cape Town *(Source: Cape Metropolitan Council, 1999: 42).*

"Services include feeder or distribution services, mainly to and from railway stations, and line-haul services from residential areas to employment areas. Minibus taxis do not operate according to timetables and most vehicles depart only when they are full" (City of Cape Town, 2005a: 21).

Figure 6.8: Minibus taxi Terminus in Cape Town *(Source: National Department of Transport, s.a.: s.p.).*

A Non-Motorised Transport (NMT) network is also proposed for Klipfontein corridor. It suggests upgrading the conditions for pedestrians and cyclists (Department of Transport and Public Works. PGWC, 2004: 29).

Whatever the intentions regarding the modes of transport, and therefore the exact composition of rail, bus service and minibus-taxi's, or the extent of non-motorised transport in the envisaged Klipfontein Road Corridor project, the detailed planning of this has not at the time of writing reached a point of finality. One certainly cannot project the position though from the brief description given above of the present situation of modes of travel in the Cape Metropolitan Area.

- ***Business / economic opportunities***

The unemployment rate of the communities residing along the Klipfontein Road Corridor is 40% (Author unknown, *s.a.c*: s.p.). According to the Klipfontein Corridor Brochure (*s.a.a)*, Klipfontein Road Corridor will be the backbone of economic development in the area and noticeably change everyday life (Author unknown, *s.a.c*: *s.p.*). An important role in economic development is thus envisaged in the project.

The Mobility Strategy states that this corridor will deliver "all-day business and commuter traffic" if the current infrastructure is improved (City of Cape Town. Directorate of Transport, Roads and Stormwater, 2004: 9). This will result in re-investment in the area and an increase in property values. The employment opportunities available will expand along the Klipfontein Road Corridor as well as urban renewal and regeneration (City of Cape Town. Directorate of Transport, Roads and Stormwater, 2004). The mobility strategy intends to link communities that are currently separated to:

- "decrease travel time,
- create fresh opportunities for quiet reflection,
- meeting places for old friends, and
- restore dignity to historic communities torn apart by Apartheid social engineering" (City of Cape Town. Directorate of Transport, Roads and Stormwater, 2004: 9).

What can be learnt from Klipfontein Road Corridor

The following can be learnt from the Klipfontein Road proposal:

- An improved transport system is seen by planners to reinforce the future development of the Klipfontein Road Corridor, and this is noted as a general principle.

- The corridor is also seen by planners as a major initiator and catalyst for the entire network of routes planned for the CMA.

These two policy objectives of the City of Cape Town provide further evidence of the general belief in the principle of mutually supporting interaction between public transport systems and corridors. *

** It is noted that the author is aware of the criticism of Klipfontein Road Corridor. According to the Cape Argus (Essop & Du Plessis, 2006), the project: "...had been mooted as a long-term solution to the city's transport problems, has been dramatically scaled down, with the original plan criticised as too expensive and impractical". The principal emerges, as has been stated throughout this thesis, that a threshold level of development and movement is necessary for corridors to properly come into being and to justify related investments. The issues, intentions and principals discussed in this section, aside from now being regarded as premature, should though remain in place for future purposes.*

6.2.2 Mabopane-Centurion Development Corridor, Pretoria, South Africa

The position is as follows:

Facts	
Population (Johannesburg)	2.8 million [1]
Population (Gauteng)	7 million [2]
Daily commuters (between Garankuwa, Mabopane and Soshanguve to Pretoria)	±94 000 [3]
Public Transport vehicle fleet (Johannesburg)	13 450 [1]

Sources:
[1]Pienaar, P.S., Krynauw, M.N & Perold, A.D. 2005. Public Transport: Lessons to be learnt from Curitiba and Bogotá. *Proceedings of the 24th[d] South African Transport Conference (SATC 2005)*, Pretoria, 11 – 14 July 2005. Pretoria: Documents Transformation Technologies.

[2]Mabopane Centurion development Corridor. *s.a.* Official website. Available online: http://www.mcdc.co.za/index2.htm [15 June 2005]

[3]Author unknown. s.a.c. The Mabopane-Centurion Development Corridor. Available: http://www.bk.tudelft.nl/users/carmona/internet/d4module/modulebook98_copy(11).htm [31 October 2005].

Pretoria in general

The city is referred to as the administrative capital of South Africa. "Pretoria is situated in the transitional area between the Highveld and the Bushveld, approximately 50 km north of Johannesburg in the north-east of South Africa" (Wikipedia Encyclopedia, 2005c: *s.p.).*

The development of Pretoria has occurred at a slower pace than Johannesburg, "and the town planners had the foresight to include an abundance of open spaces" (South Africa Explored, s.*a:* *s.p.*). At a metropolitan level, the major roads are orientated roughly in a grid fashion as depicted in Figure 6.9.

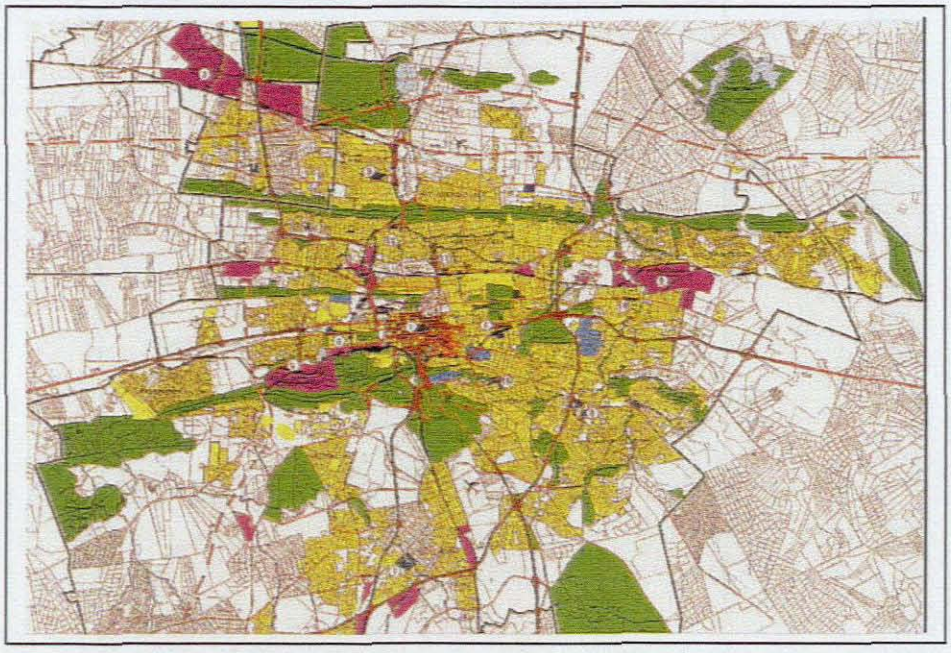

Figure 6.9: Spatial structure of Pretoria *(Source: Vela VKE, s.a.: s.p.).*

Access and mobility is provided with existing and potential land transport infrastructure. This infrastructure can be seen as "one of the cornerstones of corridor development" (Author unknown, *s.a.*b: s.p.).

It can therefore be said that the following are important facilities in the western parts:

- Soshanguve station and rail line
- PWV – 9 (existing and planned route)
- K46 (P39 – 1) and K71 (66 – 1)

"The above facilities form an integral part of the existing and planned land use pattern and are included in the MCDC" (Author unknown, *s.a.*b: s.p.).

Figure 6.10 indicates strategic public transport corridors and nodes by showing existing as well as proposed movement routes in the area.

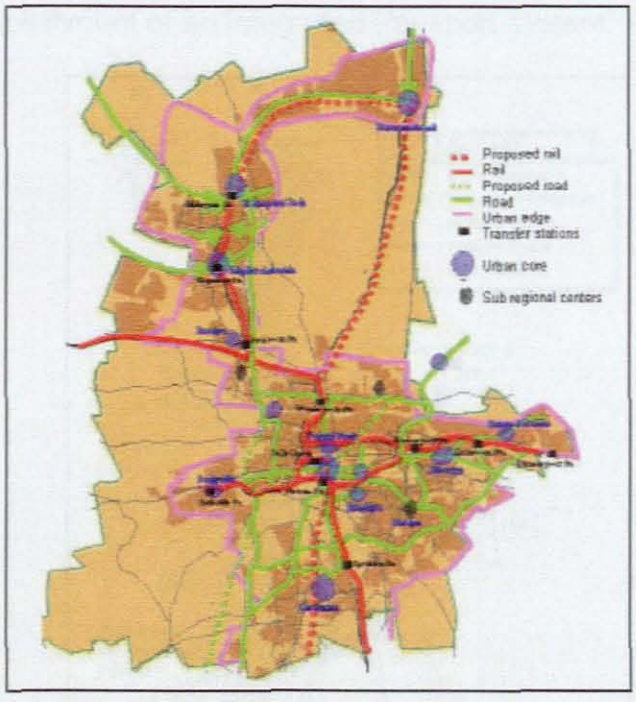

Figure 6.10: CTMM Strategic Public Transport Corridors and Nodes *(Source: City of Tshwane, 2004: 7-9).*

Mabopane-Centurion Development Corridor (MCDC)

This proposed corridor is in line with the Metropolitan Spatial Development Framework which focuses is on urban reconstruction and socio-economic development (National Department of Transport, 2001). This corridor is 10km in width and 70km in length and its aims are to stimulate growth in the area. Refer to Figure 6.11 for the scope of the corridor, and Figure 6.12 for an oblique aerial view of it. It is "driven by the principles of sustainable economic development, mobilisation of investment and equal opportunities, the MCDC is aimed at unlocking the inherent and under – utilised economic and social development potential of the western parts of the greater Tshwane area" (City of Tshwane, 2005: *s.p.*).

"The key objectives of the corridor include the following:

- "local, metropolitan and regional economic growth through focused investment in the corridor;

- the establishment of an integrated transport system"

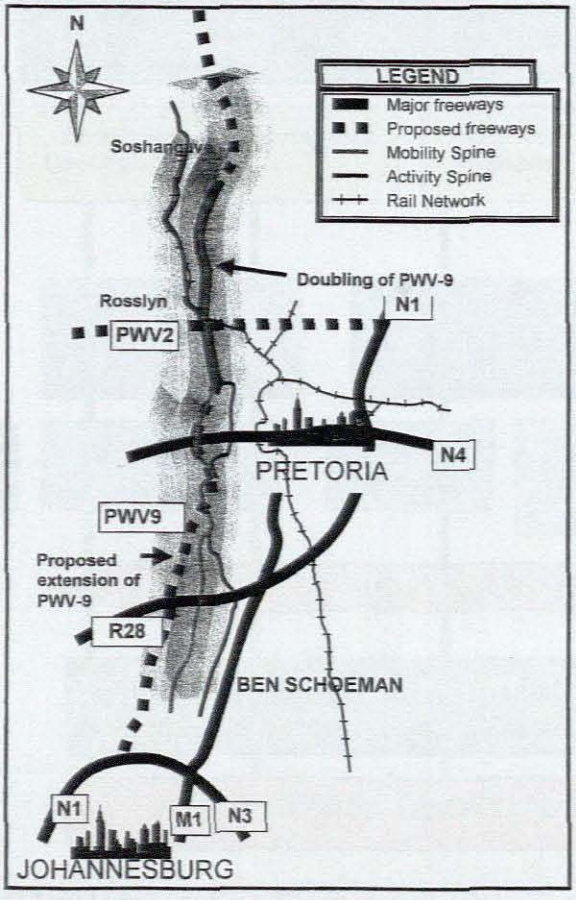

Figure 6.11: Mabopane Centurion Development Corridor *(Source: Kleynhans, 2001: 150).*

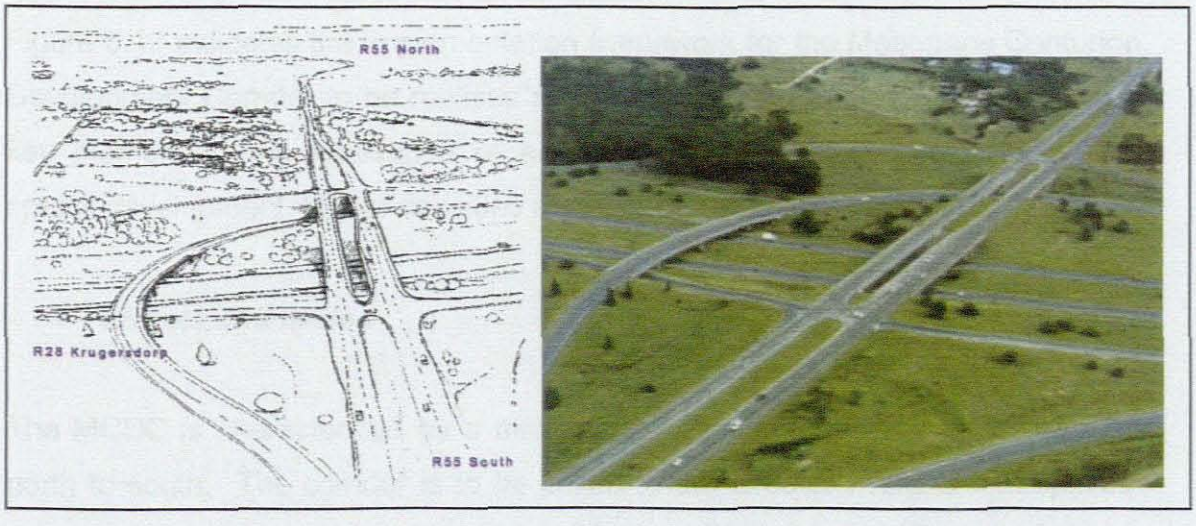

Figure 6.12: Mabopane Centurion Development Corridor: Oblique Aerial View *(Source:* Mabopane Centurion development Corridor, *s.a.*: s.p.).

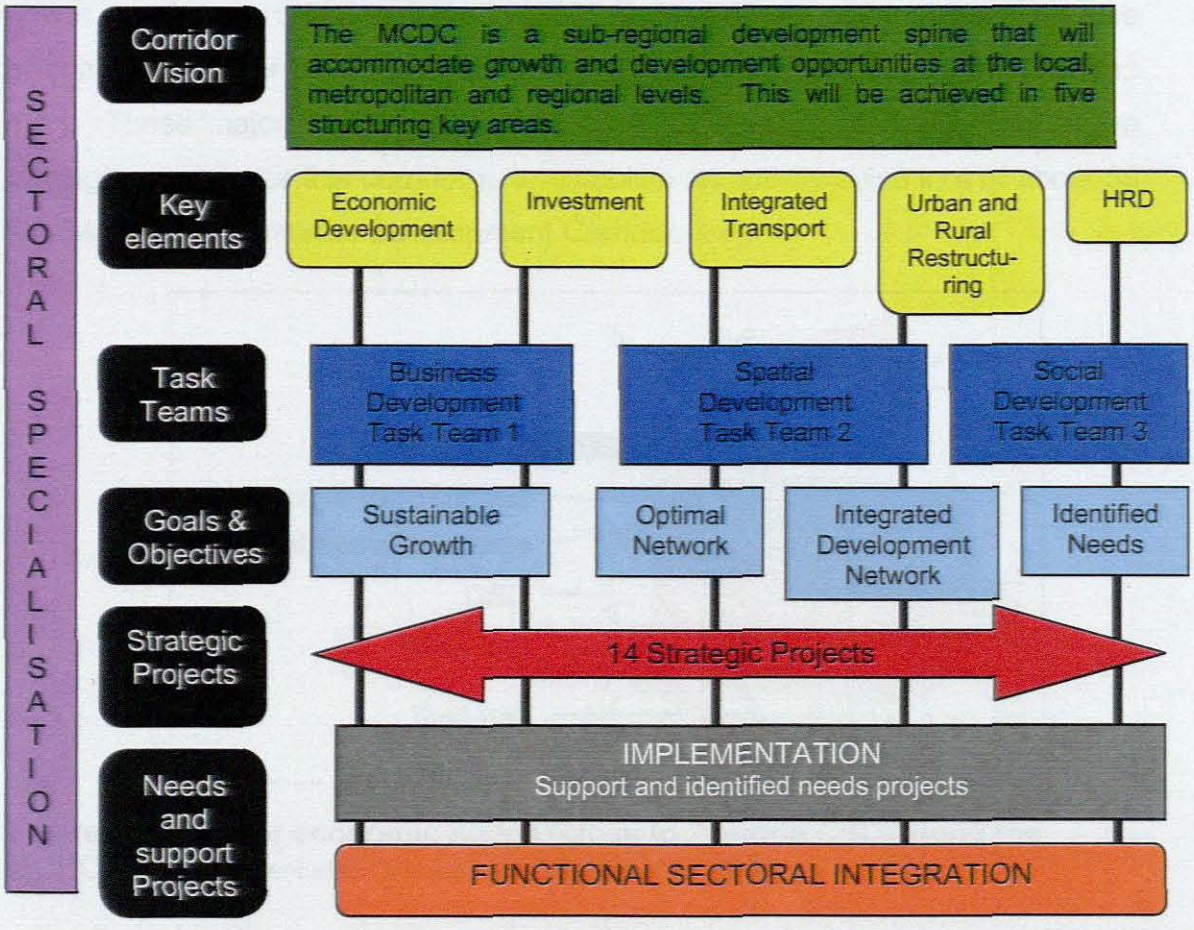

Figure 6.13: MCDC Implementation Framework *(Source:* Mabopane Centurion Development Corridor, *s.a.*: s.p.).

Figure 6.13 indicates the implementation framework for the Mabopane Centurion Development Corridor to be realised successfully. Integrated transport is thus a key element in the realisation of a development corridor accompanied with spatial development, higher densities and economic development.

- ***Streets and nodes***

The MCDC is characterized by a mobility spine of about 60kms that runs form north to south. The corridor is to be linked to the Greater Pretoria Metropolitan Area by a number of east – west routes (National Department of Transport, 2001: B-6). The MCDC development concept is characterised by intermodal transfer

nodes that "will be linked to the economic nodes and will promote the better use of public passenger transport" (Mabopane Centurion Development Corridor, *s.a.*: *s.p.*). These major economic nodes are depicted in Figure 6.14. One of the strategic projects for this corridor is to establish an activity spine in it of about 50 km (Mabopane Centurion Development Corridor, *s.a*).

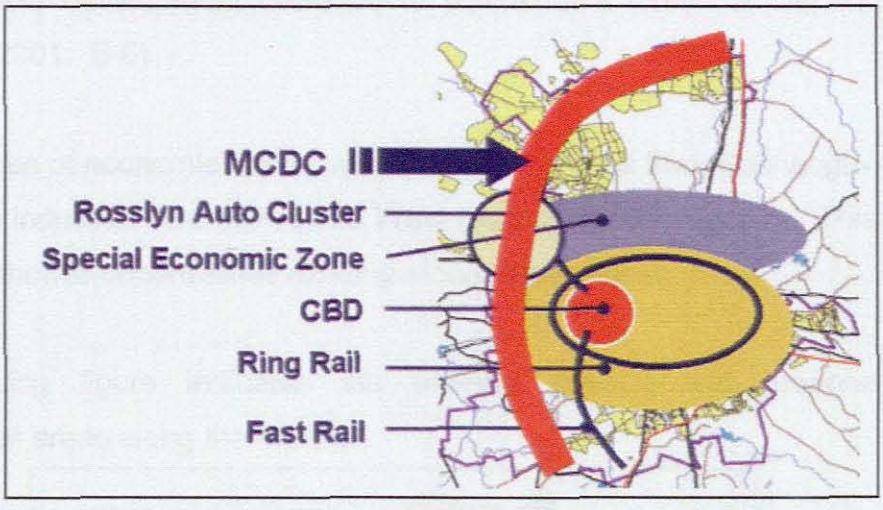

Figure 6.14: Major economic nodes (close to Pretoria CBD) along the MCDC (Mabopane Centurion Development Corridor, *s.a.*: *s.p.*).

- ***Transport modes***

According to the National Department of Transport (2001), competition exists between the various public transport modes which creates difficulties for the development of an integrated public transport system along the corridor. "Given that the PWV-9 is to be the main transport route in the corridor it will be road-based modes of public transport, i.e. buses and taxis. On the existing rail link between Soshanguwe and Pretoria it will of course be train" (National Department of Transport, 2001: 2-70).

- ***Business / economic opportunities***

One of the key objectives identified for this corridor is "urban and rural restructuring by facilitating the development of a more compact city, integrating

dormitory towns with the rest of the metropolitan area and ensuring economic growth in these towns" (National Department of Transport, 2001: B-6). In order to do so, specific economic development areas have been identified of which the international airport is one to attract investors to the corridor. Getting people to invest in the corridor seems unsuccessful thus far, and the fact that there is a lack of visible development could be to blame for it (National Department of Transport, 2001: B-6).

A high degree of economic interaction occurs in the area from Soshanguve in the north to the industrial area of Pretoria West (Author unknown, *s.a.*b). This results in more economic opportunities existing along these areas.

The following figure indicates the already existing and proposed new development areas along the MCDC.

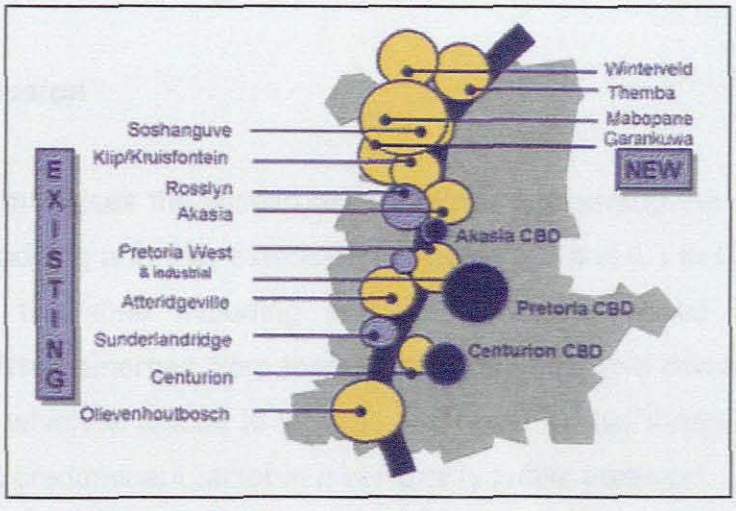

Figure 6.15: Development areas along the MCDC *(Source: Mabopane Centurion Development Corridor, s.a.: s.p.).*

- ***Densities***

The areas where the main concentrations of population occur are the following settlements: Soshanguve / Mabopane (north), Akasia, Atteridgeville. Another project is to develop "mixed land-use and higher density housing in the activity housing in the activity spine and pre-identified urban nodes" (Mabopane

Centurion Development Corridor, *s.a: s.p.*). "A strong focus on employment creation in the industrial sector should see this land use becoming very dominant in the corridor. In additional to this the focus is on high-density residential land use" (National Department of Transport, 2001: 2-70).

What can be learnt from the intended Mabopane-Centurion Development Corridor

The following can be learnt form the Mabopane – Centurion Developent Corridor:

- The importance of an integrated public transport system as integral part of a corridor.
- Link intermodal transfer nodes with economic nodes to improve the use of passenger transport.

6.3 Conclusion

Table 6.2 summarises the researcher's findings concerning the aspects relating to corridors, adding a further extension to Tables 3.2 and 4.1 in Chapters 3 and 4 respectively, this time including empirical evidence based on case study literature. What emerges from theory, relevant legislative documents and case studies, and which is crucial to what is examined in this thesis, is that the one common and predominant factor in a corridor is public transport.

This significant finding thus provides strong affirmation of the initial premise based purely on historical accounts that the author set out with in this thesis. Correlations though do not in themselves explain cause and effect between public transport and corridors. The purpose of Chapter 7 is therefore to explore the matter of causation, mutual or otherwise, between public transport and corridors.

Table 6.2: The nature of corridors: Typical characteristics (Theoretical, Legislative and Empirical)

Aspects	Features	Legislative Goals	Case Study Findings
Densification	• Concentration of people • High densities • Intensification of activity	• High densities	• High passenger densities • High densities continue along full length of corridor • Focus on high density residential land use
Economic environment	• Provision of social and economic facilities • Initiation of economic growth points • Commercial facilities along major business main roads • Development of public institutions and economic activities • Private investment • Public investment	• Economic upliftment • Economic growth and job creation	• High density commercial development • Economically viable public transport system • Economic growth closely related to public transport • Economic development seen as one of the most important activities • Zoning along activity corridor for commercial activities. • Employment opportunities • Stimulation of economic growth • Instrument of regional economic growth • High degree of economic interaction
Public Transport	• Transport route • Public transport services • Variety of public transport facilities	• Public transport • Modal integration • Movement role	• Public transport services • Appropriate mode for the specific city • Transit system and land use developments that support one another • Effective transport systems • Variety of public transport alternatives / modes • Public transport is most important mode of transport • Integrated transport system
Social environment	• Social facilities • Intense human interaction	• Provision for community needs • Social upliftment	• People living in corridor – close to amenities and facilities • Socio-economic development

Spatial arrangements	• Continuous linkage of metropoltian nodes • Creation of a network throughout a city • Restructuring of spatial inequity of city • Mixed land uses • Specific land use patterns • High density mixed use development • Integration • Creation of strong well-defined city structure	• Integration of land use and transport • Concentrated growth away from periphery and along certain corridors • High intensity of land uses • Connection between public transport nodes • Mixed use development	• Integration between public transport planning and land use • Mixed use development • Mixed use zoning • Access between various public transport modes and commercial activities • Mixed land uses and integration between the various elements in activity corridor • Urban reconstruction • Urban and rural restructuring
Urban Qualities	• Quality urban environment • Maximisation of choices	• Enhance quality of life • Access and Mobility	• Accessible transport network • Access and mobility
Other	• Implementation happens over a period of time		• Strong land use legislation

Public transport can therefore, it seems, be linked with the rest of the characteristics of a corridor in the following ways:

- Densities

  Higher densities in city development can be achieved if higher levels of accessibility are available. This can be provided with public transport. Densities can also be seen as a precondition for public transport in that the former provides the thresholds for higher ridership, resulting in a viable service being provided.

- Economic Environment

  Public transport can contribute to a vibrant economic environment by providing the exposure and opportunities for business to establish along its routes. Public transport can also provide the thresholds to sustain economic activity, depending on the scale of passenger movement.

  The following quote supports the above
  "...new public transportation system have substantial economic benefits, attracting development and increasing real estate values. Well planned, fixed guideway systems, such as rail, seem to have more impact, apparently because they imply a long term commitment to providing transportation to specific locations" (Wikipedia, 2005d: *s.p.*).

- Social Environment

  Public transport enhances the social environment in a corridor in that it provides access to opportunities, amenities and facilities for communities, thus contributing to social upliftment generally.

- Spatial Arrangements

  Public transport planning contributes to a positive spatial arrangement in a metropolitan area in that structural inequity is addressed and mixed-use development is promoted.

- Urban Qualities

  Public transport contributes to the quality of an urban environment in maximizing choices and enhancing access and mobility in a metropolitan area.

Public transport is thus clearly a main characteristic of a corridor, and integral to the existence of the latter because of the implications of its movement function, and can therefore not be disaggregated from the operation of corridors. The causative connections between public transport and corridors merit rigorous investigation, and these are dealt with in the next chapter.

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CHAPTER SEVEN
PUBLIC TRANSPORT

7.1 Introduction

This chapter follows on the discussion regarding the nature of corridors as set out in Chapters Three, Four, Five and Six and now examines the fundamental interrelationship including causes and effects, between the three basic elements investigated in this thesis namely, public transport, urban development and activity corridors.

"For most people transport is a basic need – it affects economic well-being and stability, links to people and places, the safety and quality of the environment and access to economic, social, educational, recreational and cultural activities. When transportation fails to meet our needs, it becomes a source of great personal hardship and economic loss" (Cape Metropolitan Council, 1998: 4). This emphasizes the immense role that transportation plays in the everyday life of an urban resident. This argument is further supported by the fact that cities with poor transport systems are characterised by "poor economic performance, environmental degradation and declining standard of living" which therefore indicates the importance of a sound public transport system (Cape Metropolitan Council, 1998: 4).

For the purposes of logical discussion this chapter approaches the topic in six sections, with a brief historical introduction:

- The modal nature of public transport
- The influence of public transport on the structure of the city of Cape Town.
- The influence of public transport on the quality of life of the city.

- The influence of land use patterns and activities on public transport; this is in effect the reverse perspective of the second section above.
- The mutually reinforcing influences of public transport and land use patterns.
- The implications of the foregoing perspectives on activity corridors i.e. an activity corridor as an integrating structure.

7.2 Brief Historical Overview of Public Transport

During the sixteenth century, in Europe, "several organized forms of interurban public transportation" came into being. The modes (horses and horse-drawn post chaises) were hired and used to travel along major routes between posting points (Vuchic, 1981: 11). A fact that lead to the popularity of public transport, is that the limitation on the size of the city was removed and pressure for new passenger transport modes inside the city evolved (Vuchic, 1981). The role of public transport in the development of cities is evident; especially with rapid urbanisation, a transportation system was crucial.

The need for public transport dates back to the first manned ferries. "...the earliest public transport was water transport, for on land people walked or rode an animal" (Wikipedia, 2005a: *s.p.*).

"Some historic forms of public transport are the stagecoach, traveling an appointed route from inn to inn, and the horse-drawn boat carrying paying passengers, which was a feature of canal systems from their 17th-century origins" (Wikipedia, 2005a: *s.p.*).

"The omnibus, the first organised public transit system within a city, appears to have originated in Nantes, France, in 1826" (Wikipedia, 2005a: *s.p.*). An example of the "early trolley car" can be seen in Figure 7.1, as opposed to the different forms of modern public transport in Figure 7.2.

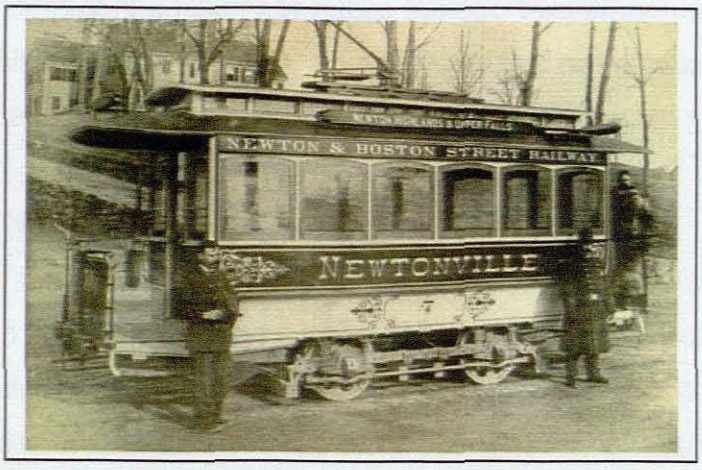

Figure 7.1: "Early trolley car in Newton, Massachusetts" *(Source: Wikipedia, 2005a: s.p.).*

Figure 7.2: Different forms of modern public transport *(Source: Wikipedia, 2005a: s.p.).*

Further details concerning the history of public transport would not be relevant for this study, and this chapter therefore focuses on the ramifications of public transport on some aspects of city structure, and activity corridors in particular.

7.3 The Modal Nature of Public Transport

Public transport in a city has many dimensions, referring to components or categories into which it may fall, of what it is constituted, how it operates, its influences on the city, and extraneous factors that impact on it in turn. Figure 7.3 makes this point graphically. These components are all briefly referred to in this chapter, though this section focuses on the modal aspect.

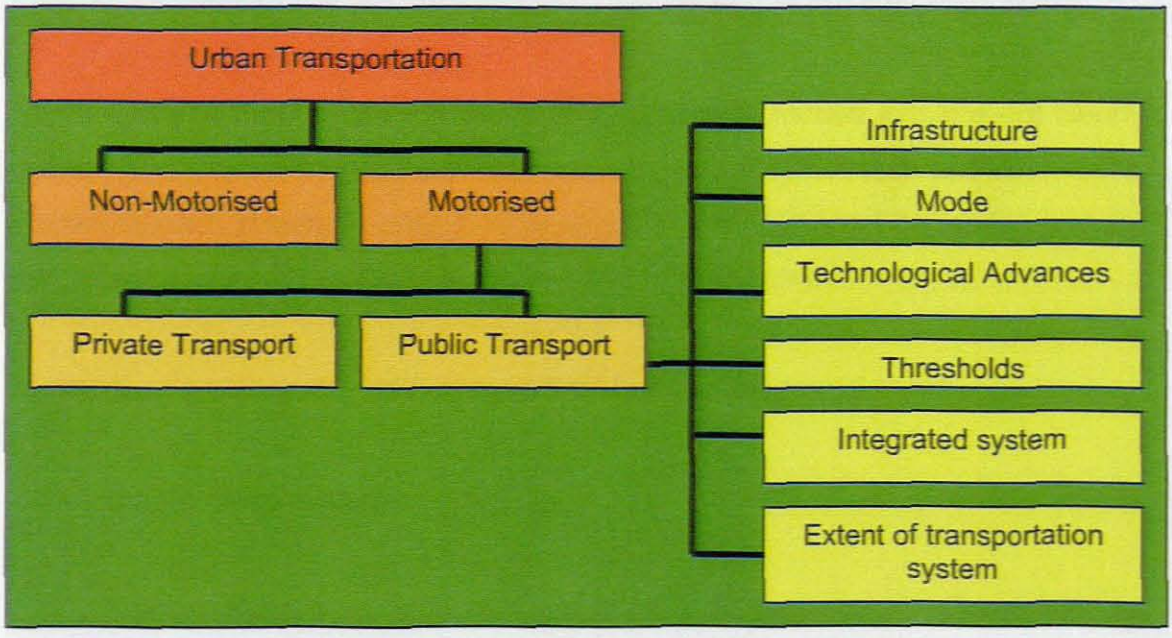

Figure 7.3: The components of urban transportation.

A public transport system can be described as the arrangement concerning the movement of people, where passengers do not travel with their own vehicles, from one place to another at a minimal charge (Wikipedia, 2005). Public transport can also be referred to as mass transit: "While it is generally taken to include rail and bus services, a wider definition would include scheduled airline

services, ferries, taxicab service etc. – any system that transports members of the general public" (Wikipedia, 2005a: *s.p.*).

It is important to note that a 'public transport system' operates in different contexts. This alludes to the fact that public transportation systems in cities are not alike. One of the most obvious differences is their composition. A related aspect is the sum total of the particular demands and needs of communities in a city, which determine the unique nature of that system. These community needs will in accordance with free-market principles determine the appropriate mode that will operate in a part of the city and therefore the public transport system that works best there. For example, in the CBD a shorter distance would be a typical need as opposed to the line-haul needs by commuters in the suburban areas.

Some systems though can comprise of a number of modes that are not clearly defined and there may not be a clear connection with the routes and customers. Therefore each system is unique regarding the composition of its modes and the role, predominant or not, that the mode plays in the system.

A simplified typology of public transport systems is suggested here:

- Single mode system

  This comprises of only one mode of public transport. There are no supporting, alternative modes that have different roles or functions, and this limits the choice of the user. The public transport mode for such a system could be specifically applicable to a town or city. Curitiba for instance, has a single mode public transport system. It is referred to as Bus Rapid Transit (BRT) and consists of the Transmilenio bus service as its only public transport mode.

A major element of any public transport system is its supportive infrastructure, which is mostly determined by the mode and its requirements. The mode would thus determine whether infrastructure is road-based for instance, requiring facilities along the road, or if it is rail-based, requiring a railway line.

- Multi-modal system

This is one that offers the choice of different modes. The type of modes and routes differ depending on the demand, though each mode plays a vital role within the system. The ideal would be for all modes to have their own function in the system, but in many instances modes compete for infrastructure and passengers.

Similarly, the bus and minibus-taxi services compete for passengers over shorter distances and in some cases for infrastructure as well, seeing as both of these are road-based. The Mobility Strategy (2004) for Cape Town suggests a feeder system where certain modes feed others. In Cape Town; bus and rail compete for passengers to and from the suburbs in that both offer a line-haul service to commuters even though they do not make use of the same infrastructure.

The public transport system in Sydney, Australia by comparison, comprises of the following modes:

Monorail: an above-ground rail system that operates through the heart of the city (see Figure 7.4),

Metro Light Rail: "modern tram line that runs along the harbour to the western part of the center" (Urban Transport Technology, 2005: *s.p.*).

City Rail: underground train service for the suburban areas in Sydney,

Rapid Bus Transitway: for low-population densities (see Figure 7.5).

Multi-modal systems such as these offer the benefit of choice, especially if the modes are linked through proper integration. This integration is not always in place throughout the CMA.

Figure 7.4: "Monorail in Sydney" *(Source: Urban Transport Technology, 2005: s.p.).*

Figure 7.5: "Mercedes Benz custom coach low floor bus: Sydney" *(Source: Urban Transport Technology, 2005: s.p.).*

The point of this brief discussion on travel modes is that, as will be alluded to in the next section, though the influence of public transport on a city and its spatial patterns cannot be stated in general terms, these influences are determined by the unique modal composition that is operative in the city concerned.

7.4 The Influence of Public Transport on the Structure of the City of Cape Town

"The dynamic growth and changes in cities and metropolitan areas require that their transportation systems be further developed and modified. The types of transportation systems, in turn, influence the growth, characteristics, and environment of the cities and metropolitan areas" (Vuchic, 1999: 23).
This statement provides evidence that public transport can play an integral role in the growth and development of cities. This is further supported by the statement of Verster (2005), "Transport systems go beyond providing opportunities of mobility in that their design and performance also directly influence patterns of growth and economic activities. The quality of a given transport system thus influences not only its primary function of transporting people and goods in an urban area, but also its capacity to initiate and sustain growth centres in the city" (2005: 1). It is therefore clear that transport, especially public transport systems, do not only play a movement role in a city. Verster highlights the following four realms in which public transport can play an important role in the city:

- Economic – the economy of a city benefits from efficient traffic flows.
- Social – public transport provides access to employment opportunities, crucial for the urban poor.
- Development – this can be an identified need in a part of the city once it is completely accessible.
- Environment – an environmentally friendly public transport system is likely, because of its popularity, to minimise congestion. (Verster, 2005).

The importance of public transport as seen by Vuchic is that it is a "solution to urban transport problems rather than a contributor" (Verster, 2005: 2). This "solution" can be realised if an efficient system is present in a city.

According to Mazaza (2002), transportation forms have had impacts on the density, forms as well as the spatial character of the metropolitan area of Cape Town. Table 7.1 indicates the tensions that exist between land use and transportation planning in the city.

Table 7.1: Conflicting Orientations of Land Use vs Transportation Planning
(Source: Mazaza, 2002: 4).

	Land Use	Transportation
Scale of Concern	Small – micro compatibility among land uses	Large scale – functioning of the network
Objectives	Complex often internally contradictory	Simple, more straight forward
Planning Horizon	Short term – difficult to plan for land development alone as it depends on social and economic issues	Longer term – has been possible to plan for long term horizon assuming travel demand will achieve the assumption
Techniques for Analysis	Ad hoc	Standardised
Levels of Government involved	Local government is responsible for land use	Involves local, provincial and national levels
Prospects for Implementation	Low	High and more direct
Units of Implementation	Small single parcel of land and incremental	Large units, often each decision focuses on fixing the transportation network
Levels of Budget	Small – as implementation is mostly controlled by private actions	Large – a stronger government function and entails larger public expenditure

"Transport, as an important part to the overall city planning needs to be considered in the closest possible relationship to land use planning and other activities in the cities" (Hall & Pfeifer 2000 as cited in Mazaza, 2002: 9).

Mazaza also states that transport can be seen as "the maker and breaker of cities because it exists in symbiotic relationship with urban form" This is clear with the development of a city that influences the choices available and where the system affects future development of the city (Hall & Pfeifer 2000 as cited in Mazaza, 2002: 9).

As has been stated in the Municipal Spatial Development Framework (City of Cape Town. Planning and Development Directorate, 1999), the infrastructure of a transportation system has an impact on the spatial patterns of accessibility, which in turn influences the economic and social opportunities in an area. This is consistent with the aforementioned phrase referring to (public) transport as the "maker and breaker" of cities.

The actual effect of a public transport system depends on certain aspects of its very nature, such as the choice of modes that are offered or whether viable and affordable; the effect could in other words be positive or negative. According to the Wikipedia Encyclopedia, "modes are combinations of networks, vehicles, and operations, and include walking, the road transport system, rail transport, ship transport and modern aviation" (2005: *s.p.*). Modes differ in technical, operational and economic characteristics; for instance, ownership and charging for services (Vuchic, 1981).

The relationship between public transport modes and land use can thus be varied and complex, as trips made by transport modes are not all the same. They differ in direction, length and the mode used. Certain trips would be best performed by walking, but are influenced by the availability of a public transport service to reduce the time spent on walking and be more comfortable. This results in a service that needs to be provided frequently (Vuchic, 1981: 613), and suggests that certain land use patterns could be negatively influenced where the available modes of travel are not fully appropriate.

At the level of general principle, the issue of equity arises. "The concept of broadly equitable access is central to making a spatially more equitable and integrated city" (City of Cape Town. Planning and Development Directorate, 1999: 20). Equity does not necessarily mean that there should be a monotonous structure in a city, but rather having convenient access for all people to a range of opportunities and facilities in the urban environment.

According to the City of Cape Town, Planning and Development Directorate, (1999), movement systems based on public transportation can be seen as equitable systems when they provide alternative modes that users can choose from at any stage of the journey. It is thus evident that not only should a number of modes be available to users, but also a choice in routes to enhance accessibility and mobility, which can additionally be provided for by a public transport system.

As far as the influences on land use are concerned, this includes both formal and informal activities. Public transport routes provide a 'stage' for informal traders to sell their goods because of the demand thresholds of concentrated human traffic.

A number of scenarios can be envisaged regarding the resultant spatial patterns of a city. In a simplified model, where an efficient and well distributed public transport system were to precede land development generally, it is reasonable to expect that evenly spread though mixed land uses will occur, with highest densities and mainly commercial activities closest to the main axes of movement, as an expression of greatest accessibility and opportunities offered along these axes, particularly if they take the form of roadways. Railway lines on their own will not give the same result, though they could generate nodal development along the axes.

7.5 The Influence of Public Transport on the "Quality of Life" of the City

The role that public transport can play in making enjoyable urban places, takes one into the realm where the importance in providing high-quality public places and spaces to enhance the quality of life in a city, must be recognised. "Urban public spaces are the primary meeting places of people in urban settlements. Functionally, they act as 'urban living rooms' and as seams of connectivity and

should be viewed as the primary form of social infrastructure in settlements" (City of Cape Town. Planning and Development Directorate, 1999: 51).

According to the Muni-SDF "Public spaces should always be associated with patterns of movement" (City of Cape Town. Planning and Development Directorate, 1999: 52). The reason for this is the fact that these spaces should be in areas that are highly accessible. Public places and spaces should therefore be created in conjunction with movement systems and indicate areas which are relatively high in accessibility (City of Cape Town. Planning and Development Directorate, 1999). Figure 7.6 illustrates the network that should exist between streets and public places and squares, as suggested in the MSDF.

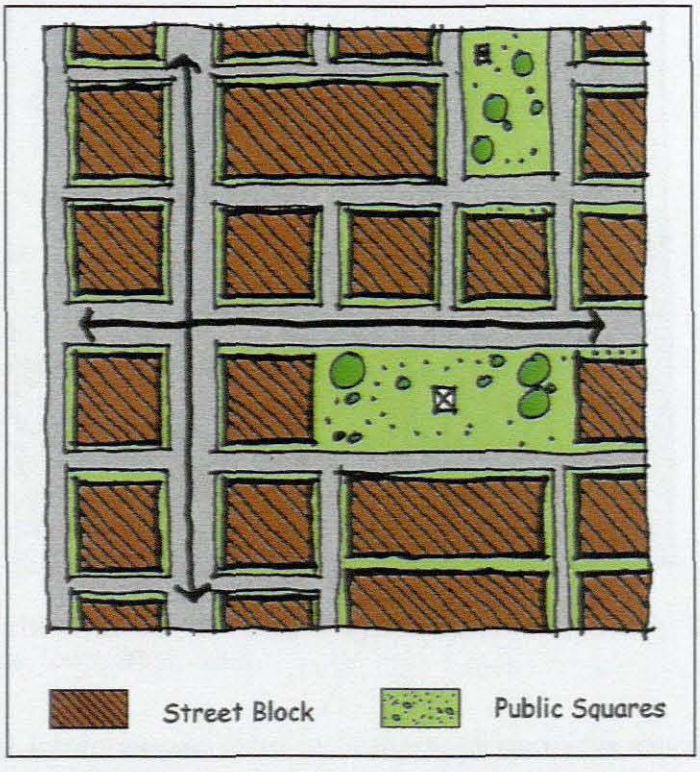

Figure 7.6: "Networks of streets and public squares" *(Source: Cape Metropolitan Council. City of Cape Town, 2002: s.p.).*

Quality public places could also include places such as shopping malls and public transport interchanges. Seeing as high residential densities are likely to occur along an activity corridor, the provision of public spaces would be a reasonable planning intervention.

Parks and open spaces are thus important elements of an urban area to create relief from congested areas, especially in areas with higher densities. The Cape Metropolitan Administration (2002) suggests that such areas should be linked in a well-defined network. "These should be integrated into the urban fabric providing opportunities for diverse recreational activities, social interaction and pedestrian convenience" (Cape Metropolitan Administration. City of Cape Town, 2002: *s.p.*). Figure 7.7 suggests how parks and open spaces should be integrated in the network.

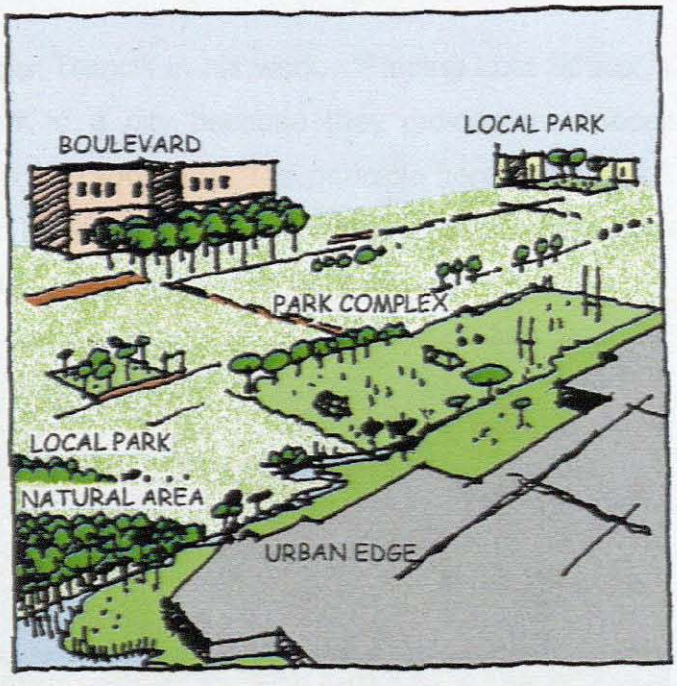

Figure 7.7: "Networks of parks and open spaces" *(Source: Cape Metropolitan Council. City of Cape Town, 2002: s.p.).*

"Public Transport Interchanges form an integrated part of a city's transportation network (Nagurney, 2000). It follows therefore that their performance (or lack thereof) can have a direct influence on the quality or livability of a city, particularly if their functioning goes beyond mere transportation efficiency" (Verster, 2005: 12). Verster (2005) argues further that a public transport interchange could host economic, commercial and social activities. Refer to Figure 7.8 for a graphic presentation of how this could be achieved in an interchange.

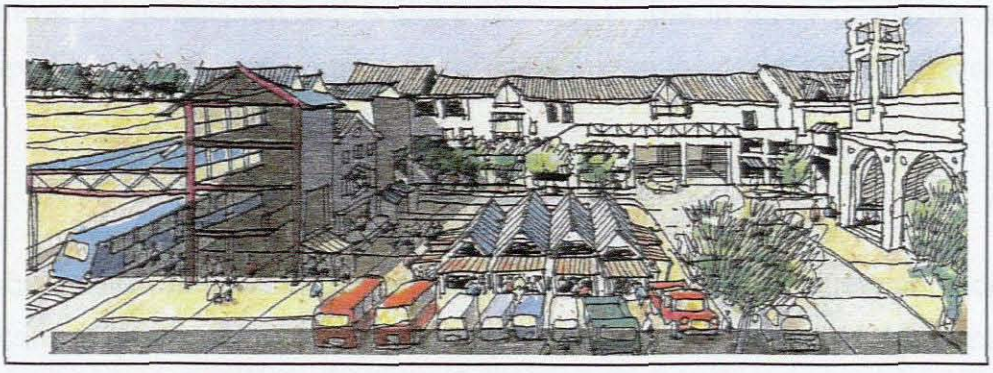

Figure 7.8: A Multi-modal public transport interchange functioning as a public space *(Source: City of Cape Town. s.a.: 14).*

According to Roger Trancik in his work: "Finding Lost Space", open spaces are deemed important in a city because they provide the "necessary relief from congestion" (Trancik, 1986: 66). The principle here is that open space provision could and should be integral to the planning of public transport systems. Figure 7.9 is an illustration of how this could be achieved.

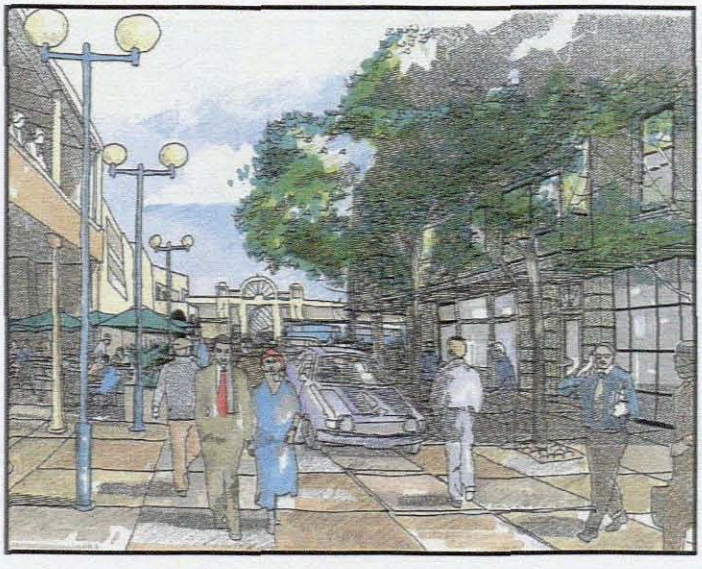

Figure 7.9: An example of what a public space could be *(Source: City of Cape Town, s.a.: 16).*

The point made again, in this section on urban quality of life, is that public transport systems cannot be divorced from city spatial planning, as in the

instances of recreational and social spaces, and that in many cases the public transport service is an important precondition for the location of these spaces.

7.6 The Influence of Land Use Patterns on Public Transport

A viable public transport system requires demand thresholds for its operation and this can come about through high trip-generating land uses and high densities. As an example, figure 7.10 illustrates two different development scenarios with different densities even though they have the same population size for a bus service of 400m (CPRE / Friends of the Earth, 2000). Scenario A provides a shorter route length, journey time and lower operating costs and therefore lower fares. These are determinants of the choices made by users and therefore a densified area will result in strong preferences for public transport and sustain the different modes. See the Figure below.

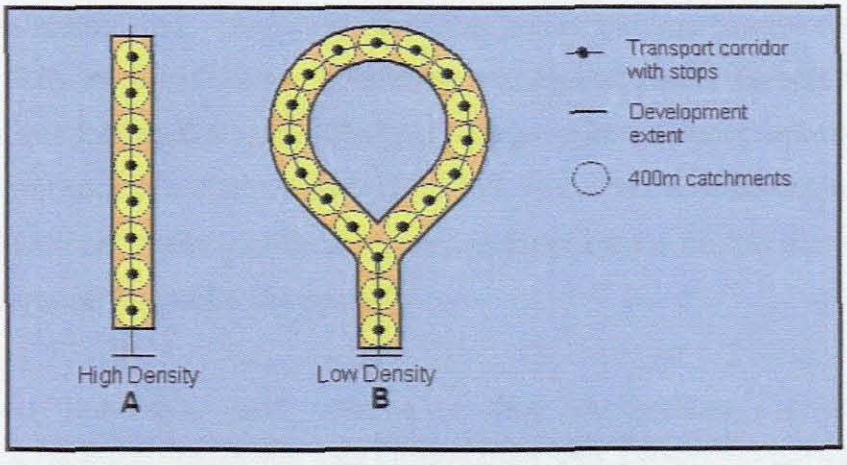

Figure 7.10: Higher densities along an activity corridor *(Source: CPRE / Friends of the Earth, 2000: 6).*

"There is a well-known relationship between the density of development, and types of transportation" (Wikipedia Encyclopedia, 2005: *s.p.*). In the first place, higher densities can result from particular groupings of land uses. By having complimentary land uses in close proximity to one another, for instance, they will attract each others' clientele and could thus promote higher densities of

development on account of their functional interaction, than might occur where different land uses are situated in juxtaposition to each other.

Another aspect regarding the type of integration or interrelationship that occurs between land uses, is that, by having a mixed land use pattern, numerous needs can be met within a relatively small radius. This could potentially eliminate additional trips and save money and time. According to the City of Cape Town (*s.a.*), "Integration requires developing a city in which different parts and elements are coordinated, in the sense that they support and reinforce each other" (City of Cape Town, *s.a.*: 5). The consequence of all this could be reduced number of trips, demand for transport and putting less pressure on an existing or envisaged public transport system. The integration of land uses could thus lead to integrating different areas and ensure easier movement between such areas and the sharing of facilities (National Department of Transport, 2001).

It has been stated that: "Activities requiring public transport require accessible locations" (City of Cape Town. Planning and Development Directorate, 1999: 20). From this follows the notion that public transport connects activities with an accessible network in a city. Stated otherwise, land uses with particular transport needs and with particular locations also have an influence on the magnitude and nature of demand for public transport.

Users need numerous and various access to facilities, amenities and opportunities in the city and this can be provided with either private transport, the sum total of which could be disadvantageous to the city, or a sound public transport system, which incorporates a wide range of modes. Certain modes function better on feeder routes compared to other modes, hence the type of modal composition transport system that comes about could well be determined by patterns of development that generate particular demands.

7.7 The Mutual Reinforcement of Land Use and Public Transport in Cities Generally

In the foregoing sections cause and effect between land use and public transport were discussed as simplified "one-way" models, first the one, and then the reverse. This section intends to highlight a third model or paradigm, arguing for mutually reinforcing activities and forces underlying the relationship between land use patterns and development on the one hand, and public transport on the other.

It was stated in the foregoing that land use patterns clearly determine the type and magnitude of traffic flows whereas on the other hand transport infrastructure could in turn change land use patterns. As parts of cities go through phases of development, the author envisages that these interactions would in fact alternate over time in an incremental fashion.

The relationships and influences between land use and public transport do not in other words occur instantaneously but occur over a period of time. Figures 7.11 and 7.12 illustrate the process that occurs in a cyclical fashion. Whereas figure 7.11 presents the situation in a neutral fashion, figure 7.12 is an alternative model highlighting the need for upgrading public transport services over time, as land use changes occur.

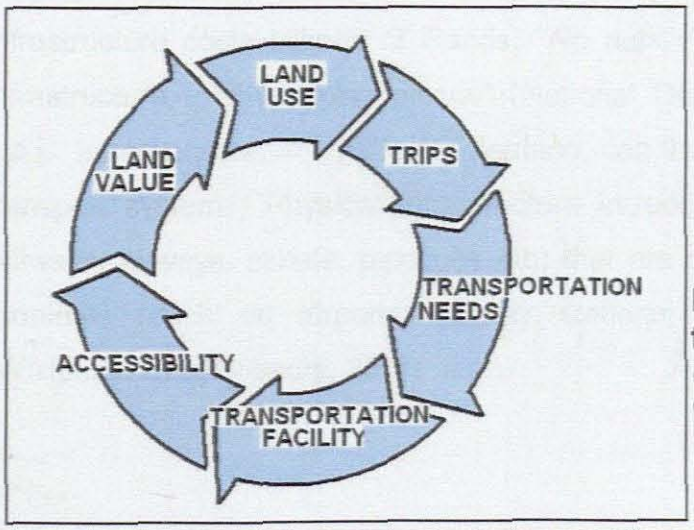

Figure 7.11: "Cycle of functional obsolescence"
(Source: Highway Research Board (as cited in Bishop, 1989: 16).

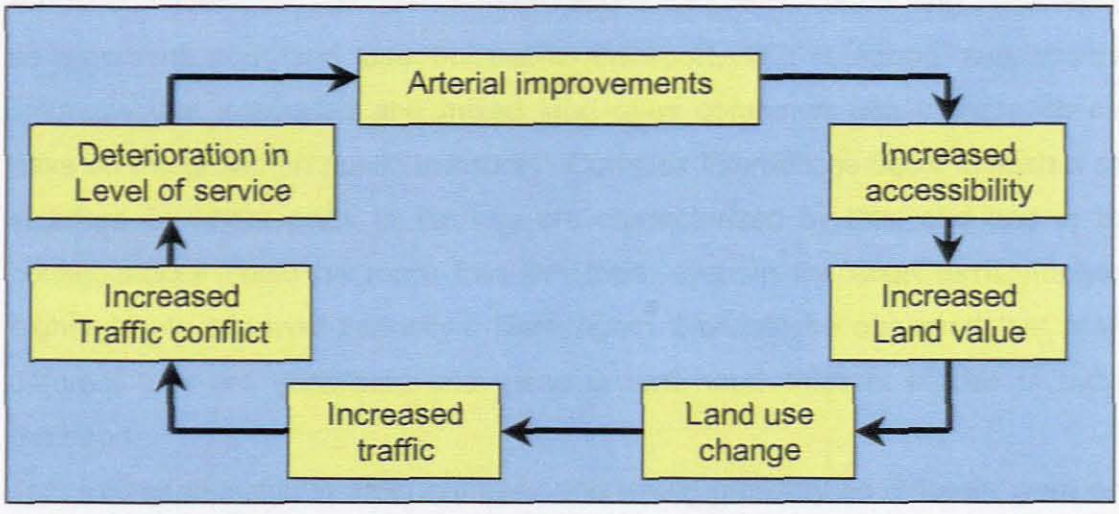

Figure 7.12: The transportation – land use cycle *(Source:* Stover and Koepke, 1988 (as cited in *Center for Urban Transportation Research, 1996: 5).*

Figures 7.11 and 7.12 provide simple illustrations of the fact that infrastructure relies on land use to provide the necessary demand thresholds to sustain those activities provided by the infrastructure. For instance, if traffic-generating land uses such as a shopping centers are located close to station areas, traffic is likely to be generated also at the station, though the modal choices may well be different.

The foregoing bears mentioning because transport systems imply that particular forms of physical infrastructure are in place. "Transport systems rely on infrastructure, be it in the form of roads, railway lines, ports and airports. Such infrastructure costs billions of Rands. No nation can afford the risk of putting infrastructure in the wrong places" (National Department of Transport, 1998: *s.p.).* Infrastructure, in addition to demand, can thus be seen as the basis of any transport system. Physical infrastructure includes "transport networks (roads, railways, airways, canals, pipelines etc) that are used, as well as the nodes or terminals (such as airports, railway stations, bus stations and seaports" (Wikipedia Encyclopedia, 2005: *s.p.*).

A final consideration, also shown in the above diagrams, concerning the effect of development and land use on public transport, is the strong and positive influence that integrated and mixed land uses combined with city growth can have on the growth in public transport. Complex interactions occur in such a city structure or where parts of the city are characterized by this, and one of the consequences could be more frequent trips, even in the short term, implying higher levels of travel intensity. Here again it should be observed that many different trips are generated and these in turn need different modes of public transport.

This interrelationship is most complex and would probably be different were one to make historical or case-by-case comparisons between cities. As has been emphasized in previous sections, access is a very important component of a transport system. This operates at two levels or in two senses: namely access to the system itself and on the other hand, the access that the system provides to opportunities, employment facilities and amenities. This concept is described in the next paragraph.

In figure 7.13, access is described as "a function of land use configuration (proximity), transport network and services (connectivity), and system performance or quality of movement (mobility)" (Cape Metropolitan Council, 1998: 14). Thus, for instance, in an urban situation where proximity or connectivity or both are sub-optimal, general accessibility will be sub-optimal. It can therefore be said that "access to access" or to opportunities is dependent on the strength of these three factors when seen in the broader context (Cape Metropolitan Council, 1998).

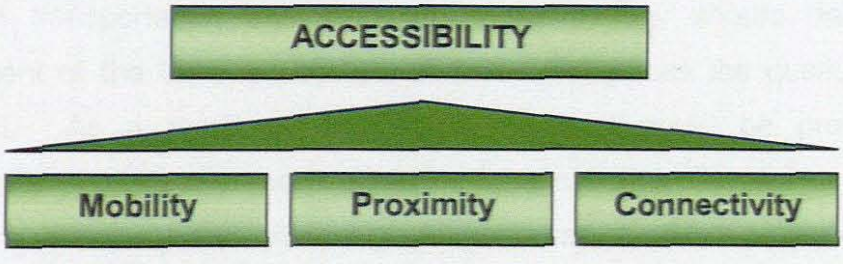

Figure 7.13: "Accessibility as a function of mobility, proximity and connectivity" *(Cape Metropolitan Council, 1998: 14).*

Entire communities, particularly of the lower income group, benefit from improvements in public transport. If better services are provided and access improved, the system will also be more attractive to non-users which will lead to a reduction in congestion if they switch from private modes to public transport. Public transport also has a positive implication for communities in terms of relative affordability. Public transport is low in cost where both the operator and the user benefit, lowering average and marginal costs due to the fact that people travel collectively with public transport. Private transport on the other hand is high in cost for the individual and society and low in value, which means that public transport would be the preferred mode among the lower income groups in particular. Were the latter mode to be dominant in fact, and there could be meaningful relationships between public transport routes and destinations, as well as (income group) residential spatial patterns.

Stated otherwise, whereas public transport provides accessibility to broader sections of the community, this ability is on the other hand enhanced by particular land use patterns. It can also be said that land use determines traffic flows (especially with regard to commuter transport) and conversely that transport infrastructure could change land use patterns (Wegner & Feurst, 2005.). The latter could be a result of the infrastructure providing opportunities such as exposure and demand thresholds, for certain viable land uses and their operations.

There is also a technological dimension regarding the interacting relationship between transportation and land use. Technology should be seen as a component of the transport system in that it influences the quality of services provided. As a result of technology, services could be provided faster, infrastructure may seem more attractive to users and ultimately systems could run more effectively and efficiently. The relevance of this to activity corridors, which are discussed in the next section, would be evident through the advances in public transport technology. As a public transport route forms the backbone of

a corridor, it can safely be said that technological advances would attract more users to the system and by doing so expose more people to the opportunities of an activity corridor.

Figure 7.14 indicates the features of the new StreetCar, a cross between a bus and tram that was officially launched by FirstGroup in the UK. "The objective of *ftr* is to take 10% of car journeys off the roads on the corridor it serves within five to six years. That would increase public transport usage on those same corridors by 30%" (Krause, 2005: 5).

Figure 7.14: The StreetCar *(Source: Golden Arrow Bus Services, 2005: 4)*

Planning has often been described as an activity in a world where "action and reaction " occurs, and this arguably applies to land use and transport, where definite sequences are indeterminate. As has been alluded to before, relationships between the growth of urban development and the growth of transport cannot in fact be described in a "one-way" fashion. "It has already been pointed out that the relationships between urban form and transport is not one-way though" (Van Eeden, 2002: 21). The effect on land use is evident and should be seen in conjunction with transport relationships and therefore "An increase in the accessibility of an area relative to other, theoretically should make

that location more attractive to households and firms seeking to minimize transport costs and maximize exposure" (Van Eeden, 2002: 21).

This observation has one strong implication, namely that insofar as land use and transportation are interdependent, it follows that urban planning and transportation planning should accordingly be pursued in an interdependent way. This of course holds a further implication, namely the need for a multidisciplinary approach in planning, particularly if the prioritization of public transport is to be implemented. "Transportation and land use problems are interdependent and require coordinated solutions" (Center for Urban Transportation Research, 1996: 5).

An alleged example of non-integrated urban and transport planning quoted by the critics of the freeway system introduced in the city of Cape Town in the sixties, was the priority given to private transport and to movement efficiency, in disregard of the of the structure and performance of the city as an urban place, as well of the consequent situation of social and economic inequity.

7.8 An Activity Corridor as an Integrating Structure

All of the foregoing should now be brought into context with activity corridor development. In the first place, such corridors are typically characterized by integrated mixed land uses, relatively high development densities including residential densities, as well as high levels of movement of at least private transport, including pedestrianisation, where public transport may not as yet have become fully developed.

Underlying these visible aspects, forces may have been at work over a long period of time and still come into play. In the previous paragraphs the interactions of transport and land-use patterns have been described. In the same way it is reasonable to conclude that corridors are a specific form or spatial

structure that is evidence of, or generates, various growth forces. So for instance activity corridors can lead to higher development densities whilst the reverse would also obtain.

It seems to emerge from the discussion of the "mutual reinforcement" phenomenon in section 7.7, that particular land use patterns can sustain corridor growth and corridors can sustain development growth. This implies that the presence of land uses or activities which are particularly reliant on access, are also highly dependent on activity corridors and on how they operate, particularly with a well-developed public transport system.

It has been mentioned in Chapter Three that activity corridor development can result in high residential densities in close proximity to the corridor. This is mainly due to the fact that numerous facilities and amenities are accessible either within the pedestrian range or via pubic transport.

"Activities which are dependent on public support (for example, retailing and commercial development, small-scale manufacturing, warehouses and community facilities) as well as higher-density housing, should be allowed along all continuous routes which are not limited-access routes. In addition, certain routes should be downgraded to allow for closer connection between the route and the activities which flank them" (City of Cape Town. Planning and Development Directorate, 1999: 47). This is possible along an activity corridor, which provides access on different levels and has high densities with supporting thresholds. Having the above-mentioned activities in an activity corridor (close to the activity spine) will also ensure mixed land uses close to public transport facilities.

Figure 7.15 illustrates the areas with higher densities along activity corridors in relation to walking distances. This increases the accessibility of the activity corridor and the thresholds, not only to sustain the activities and facilities of the

activity corridor but also public transport services. Certain areas, where thresholds of nodes overlap, have higher intensities that could result in the attraction of specific land uses and which create a rich urban environment.

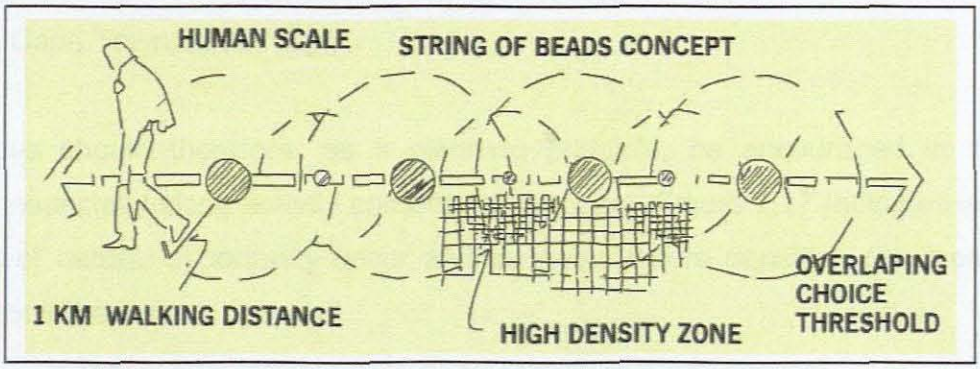

Figure 7.15: Human scale and accessibility of activity corridors *(Cape Metropolitan Council, Regional Planning, 1996: 45).*

With the provision of public transport services, the existing infrastructure provides areas with enhanced opportunities. Figure 7.16 illustrates the relative densities that are required to sustain a specific public transport mode.

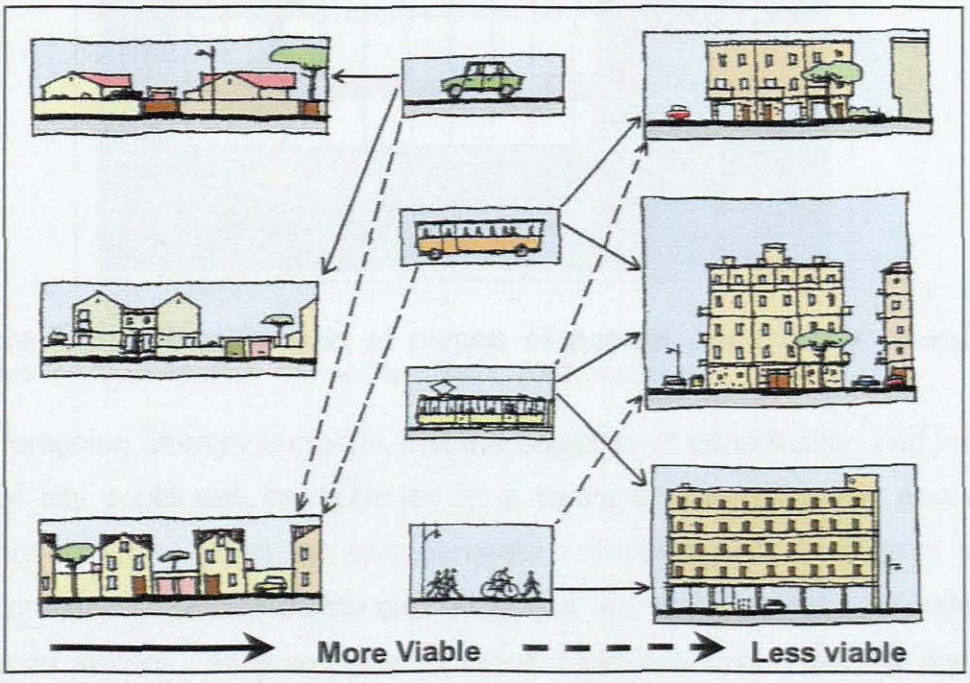

Figure 7.16: Gross density thresholds for public transport viability *(Source: Cape Metropolitan Administration. City of Cape Town, 2002: s.p.).*

activity corridor but also public transport services. Certain areas, where thresholds of nodes overlap, have higher intensities that could result in the attraction of specific land uses and which create a rich urban environment.

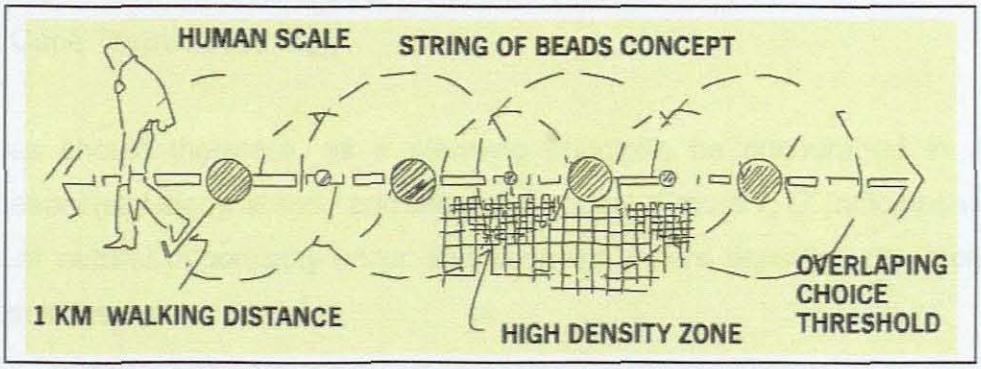

Figure 7.15: Human scale and accessibility of activity corridors *(Cape Metropolitan Council, Regional Planning, 1996: 45).*

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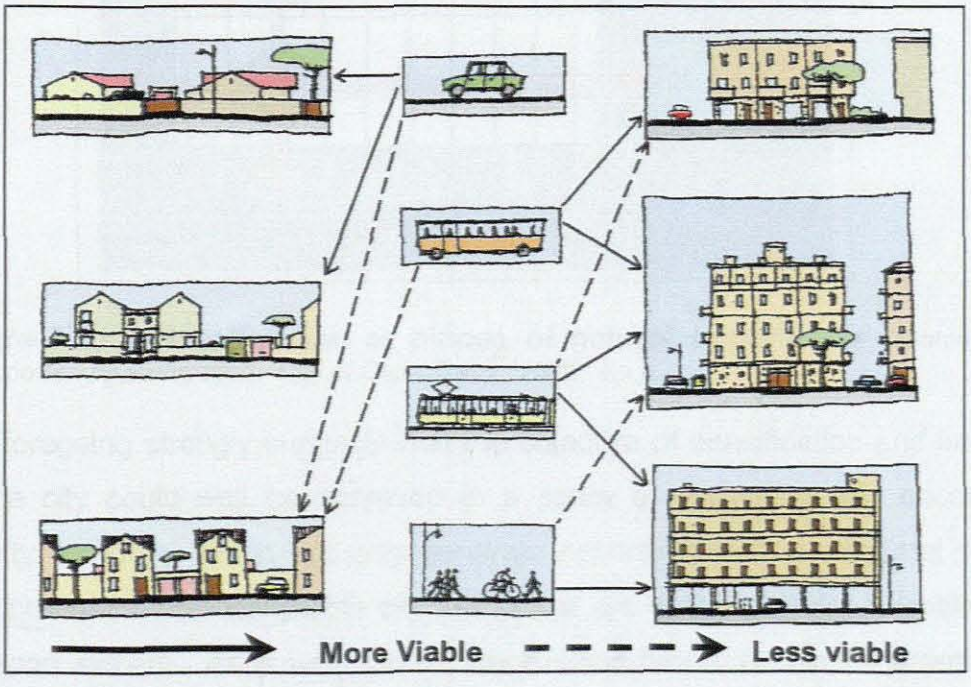

Figure 7.16: Gross density thresholds for public transport viability *(Source: Cape Metropolitan Administration. City of Cape Town, 2002: s.p.).*

The Cape Metropolitan Administration (2000) states that places where opportunity occurs naturally in an urban area, include "stations, modal interchanges and nodes, along main roads and major intersections, near places of employment and along transport routes" (Cape Metropolitan Administration. City of Cape Town, 2000: *s.p.).*

Densities should therefore, as a planning principle, be encouraged in these areas, especially along activity corridors and nodes. Figure 7.17 Indicates where places of natural opportunity occur and suggests where densities can increase as a result thereof.

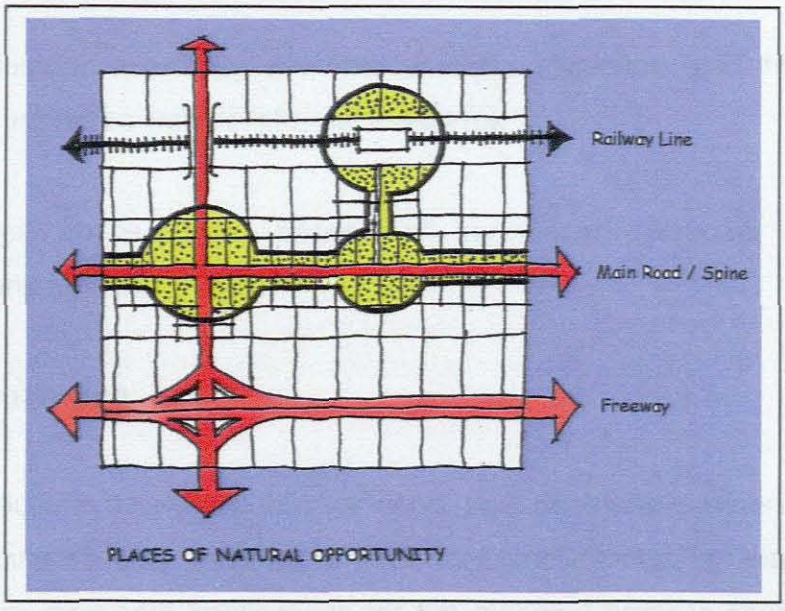

Figure 7.17: Densification at places of natural opportunity *(Source: Cape Metropolitan Administration. City of Cape Town, 2002: s.p.)*

The foregoing strongly suggests that the objective of densification and implosion of the city could well be achieved in a policy of promoting and encouraging activity corridors, which not only generate opportunities in an optimal way but also produce more acceptable city forms that are sustainable for a viable public transport system. As is well known, Cape Town has to confront the problem of low densities underlying a serious undeveloped public transport system. In the

final analysis, this challenge can be met in properly integrated land use and transportation planning which employs the activity corridor as a structural device. It seems to be generally accepted that virtually any land use activity relates to public transport and corridors in one way or another. The following are mentioned by the National Department of Transport (2001), in this regard:

- "Social facilities, such as education and health as well as the concept of clustering of community facilities

- Commercial activities, including informal trade

- Industrial activities, with the focus on service and high technology industries as well as informal industries

- Open space, green space and recreation" (National Department of Transport, 2001: 3-2).

7.9 Conclusion

The connections between public transport, land uses and corridors that have now been discussed thus hold most important implications for planning. These connections also hold implications for the planning process itself, which clearly has to be multi-disciplinary, requiring coordinated solutions.

This chapter provides confirmation that public transport potentially serves as a catalyst for corridor development at the very least, though, it transpires that the reverse is a force of no smaller magnitude. Hence: "The challenge of managing corridor development lies in the dynamic interaction between transportation and land use" (Center for Urban Transportation Research, 1996: 5).

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CHAPTER EIGHT
THE NORTHERN GROWTH CORRIDOR SUB-REGION

8.1 Introduction

This chapter presents an examination of the existing conditions in, and current policy planning objectives for, the sub-region for the purposes of ultimately developing a vision for the future of the study area in terms of public transport, land use and spatial structure, and concomitantly, the evolution of corridor development itself.
This vision will be proposed in the next and final chapter, in order to address the third objective of this thesis, stated in Chapter One, section 1.4.3.

8.2 Historical Overview: The Development of the Geophysical Configuration of the Cape Metropolitan Area

The development and expansion of Cape Town have over the years been restricted by its geographical location in terms of the Table Mountain range and the Atlantic coastline, ultimately resulting in the development of "four arms of development":

- To the north (Route to Saldanha)
- To the south (Simons Town)
- To the west (Seapoint), and
- To the east (Paarl) (Dewar *et al*, *s.a.*: 17).

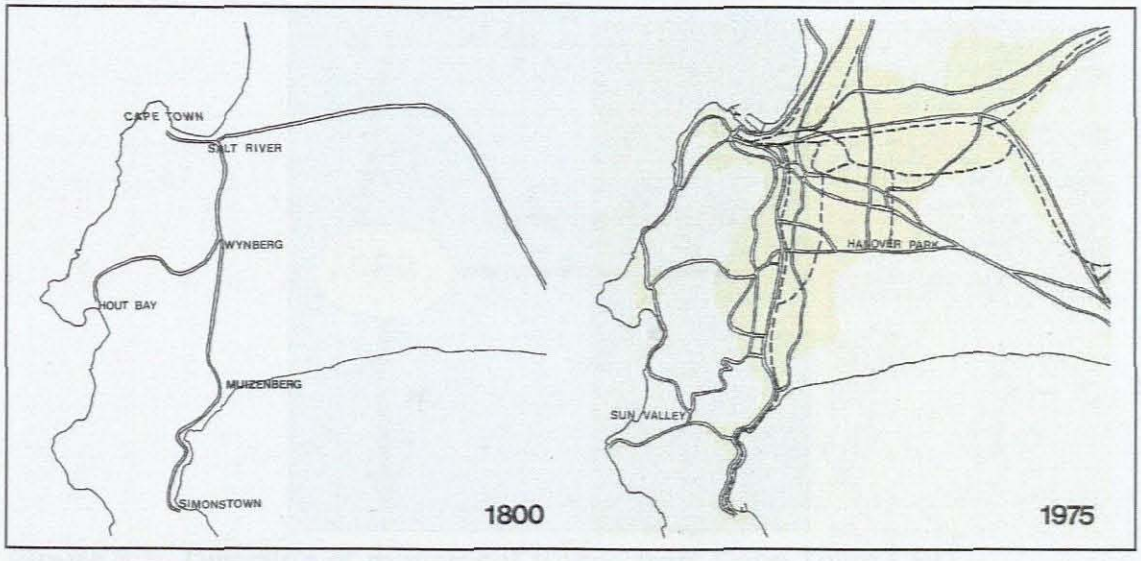

Figure 8.1: Historical development of Metropolitan Cape Town *(Source: Dewar et al, s.a.: 16-17).*

This evolving structure of the city of Cape Town was also strongly influenced by policies of the previous government. This lead *inter alia* to dispersed city growth resulting in a skewed pattern of investment and a lack of transport facilities and other opportunities in the more outlying areas (See Figures 8.1 and 8.2).

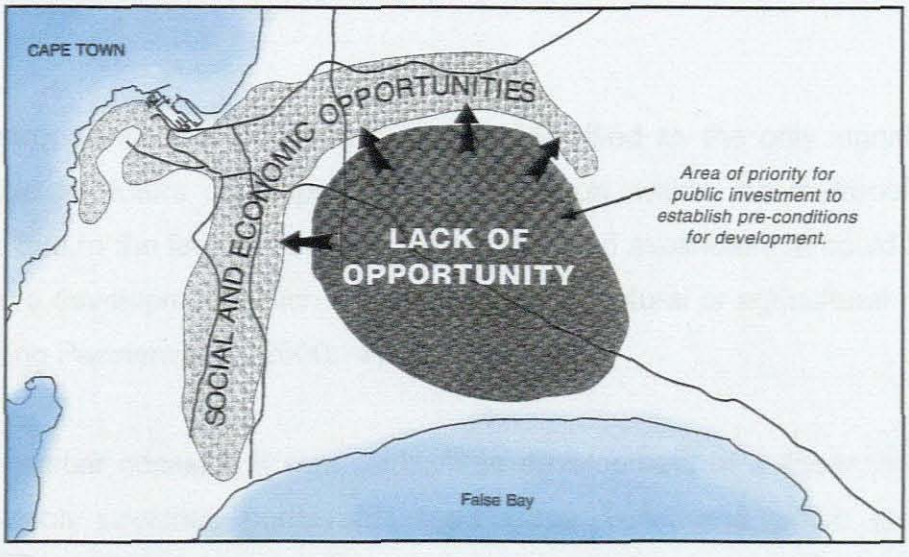

Figure 8.2: "Area of Development Priority " *(Source: Adapted from Cape Metropolitan Council, 1996: 21).*

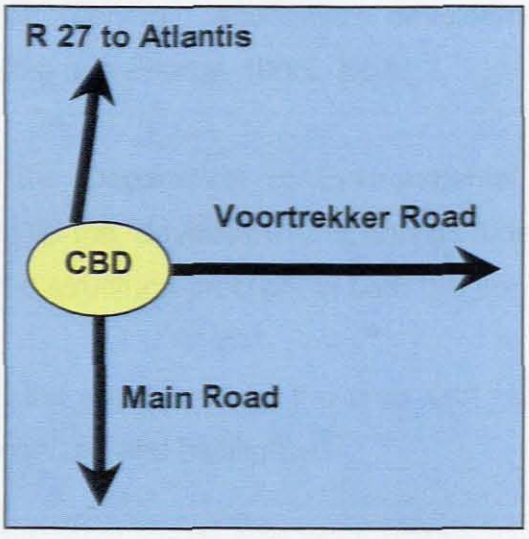

Figure 8.3: Direction of movement routes from Cape Town CBD

The position has been reached where options for future metropolitan expansion are now mainly confined in a northerly direction. As a consequence, the authorities were led to develop policy approaches such as the Blaauwberg Urban Development Strategy in order to address the demands for rapid urban expansion, which are a major concern (Planning Partners *et al*, 2001). Figure 8.3 illustrates the three main directions in of movement routes from Cape Town CBD.

"At metropolitan level the area has been identified as the only significant area available for future development and expansion, within the metropolitan area. This is due to the fact that there is substantial land available that could be utilized for future development which is not restricted by natural or agricultural resources" (Planning Partners *et al*, 2000: 1).

On an earlier occasion it was said: "The development of a linear development axis which stretches northwards from Cape Town and which provides for housing, job opportunities and recreation facilities, with adequate possibilities for expansion, is a logical line of action to overcome this problem and should at the

same time benefit general economic development" (Department of Environmental Planning and Energy, 1980: *s.p.*).

During the 1980's the Department of Environmental Planning and Energy concurred in stating that the "development of an axis along the West Coast is an effort to overcome the structural problem in both the peninsula and the Western Cape" (1980: 10).
At that time already the importance of the area with regard to the structure of Cape Town was recognized and highlighted.

This formed the southern part of an envisaged major axis linking Cape Town with Saldanha, with Atlantis intended to provide a growth point to further sustain the axis. Refer to Figure 8.4.

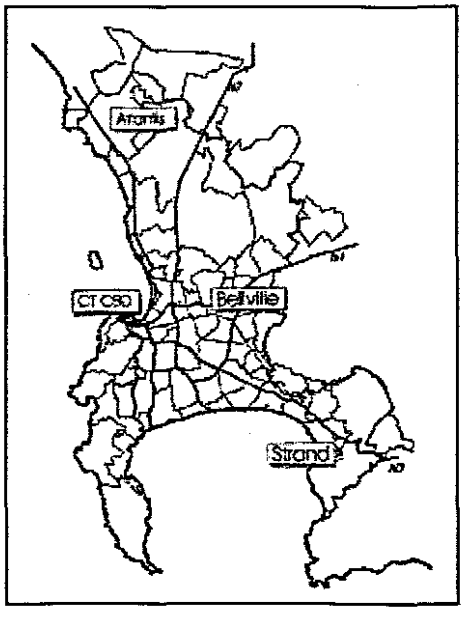

Figure 8.4: Map of CMA with Spatial Areas *(Source: City of Cape Town, 2001a: 6).*

The foregoing notions concerning the form that northwards expansion should take, emanate from earlier metropolitan spatial policies. The corridor development concept was adopted by South African cities with the intention to address the transport / land use connection (Mazaza, 2002: 7).

The Moving Ahead policy document (2001) proposes the following "contract areas" to address the above mentioned for the City of Cape Town, refer to Figure 8.5.

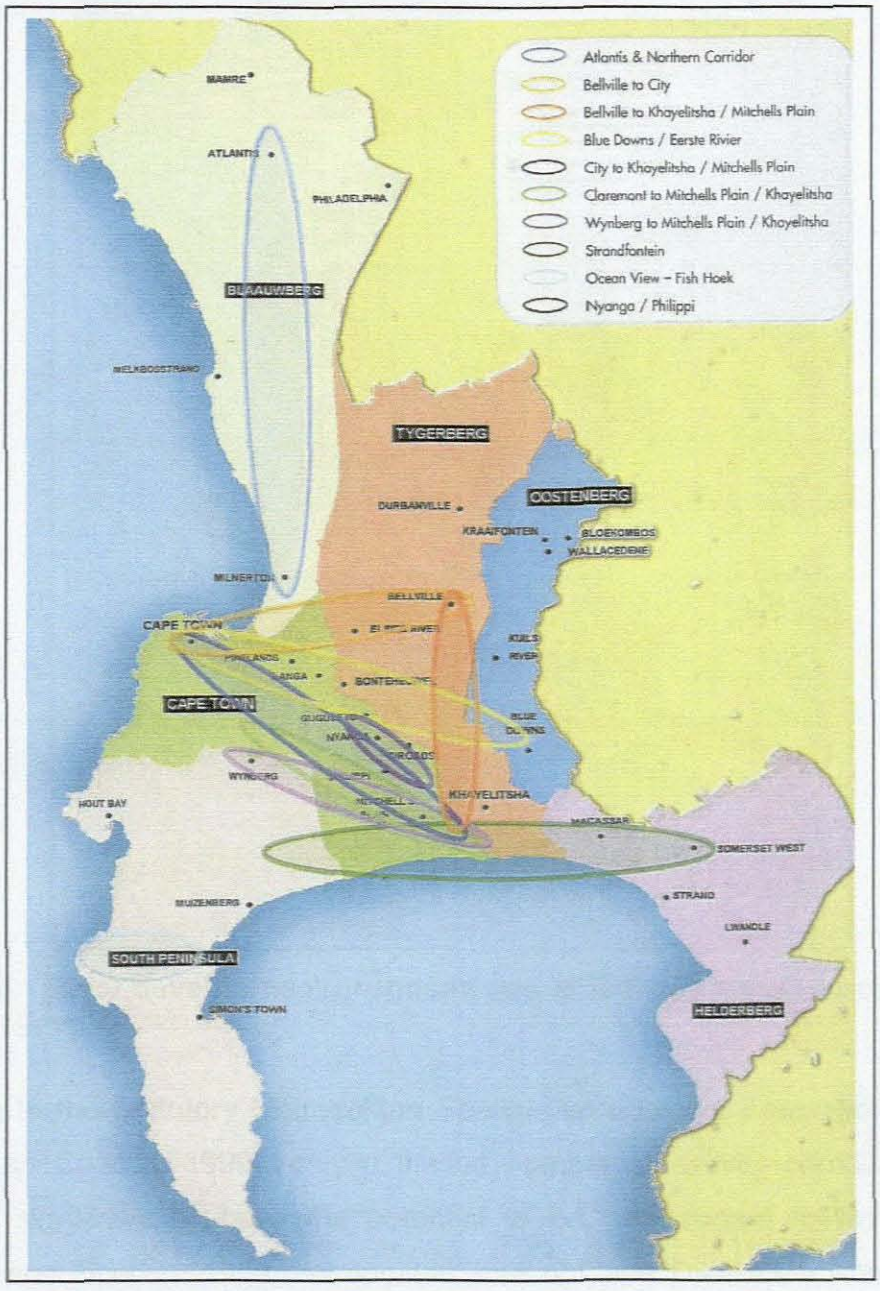

Figure 8.5: "Proposed contract areas" *(Source: City of Cape Town. 2001: 44).*

The corridors and areas that are proposed for service contracts according to the Moving Ahead document (City of Cape Town. 2001: 45) are those in terms of

which agreements are to be undertaken between the City of Cape Town and transport entrepreneurs.

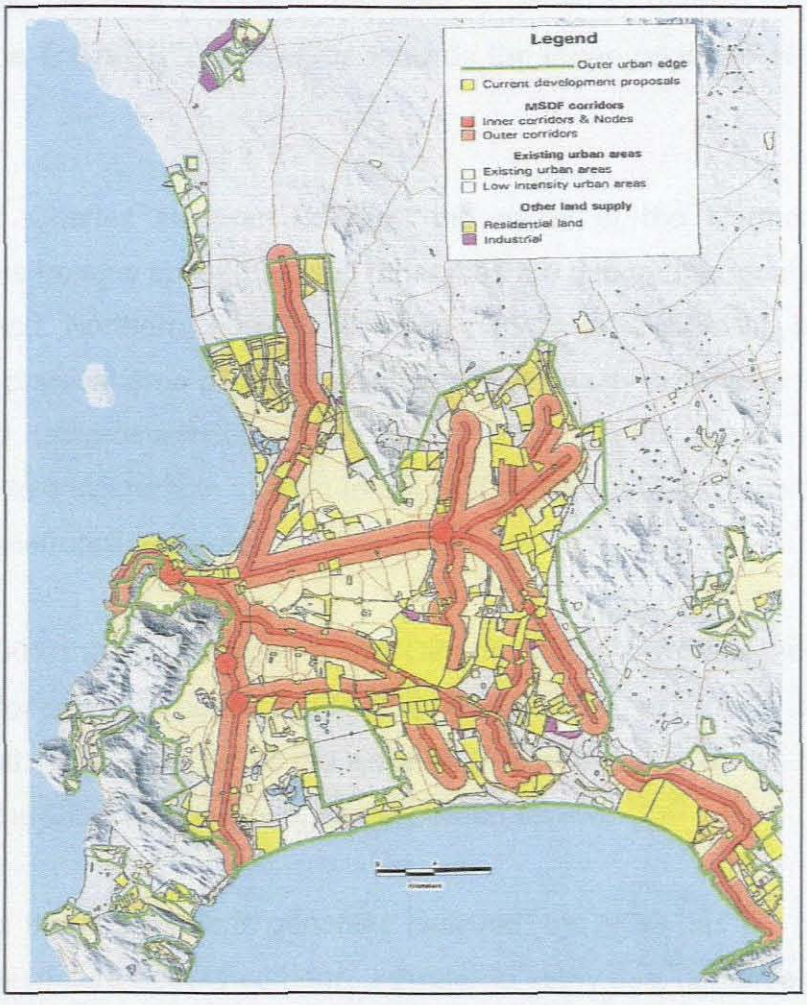

Figure 8.6: Major development proposed and MSDF corridors *(Source: Cape Metropolitan Council, 1998: 36).*

According to the Statutory Metropolitan Spatial Development Framework (Cape Metropolitan Council, 1999), only a limited number of activity corridors exist. They are significant or have the potential to be, with regard to their scale, character and location in the metropolitan area of Cape Town as a whole. The proposed corridors include: Main Road to Muizenberg, Voortrekker Road to the northern suburbs and Klipfontein Road (see Figure 8.6).

8.3 The Northern Growth Corridor Sub-Region

For policy and planning purposes, the area is generally defined as extending from the Cape Town CBD northwards towards the urban edge. (Refer to figure 8.7)

According to Charles Rudman (2005a), the name of the Northern Growth Corridor stems from no specific reason other than the geographic location.
The envisaged Northern Growth Corridor (NGC) is significant because it represents a physical area presenting opportunities for city expansion that has so far remained underdeveloped. The demarcation of the urban edge has, however, led to considerable interest in the NGC because of the growth potential offered on a metropolitan scale.

In August 2001 the urban edge of the City of Cape Town was adopted and demarcated for policy purposes and for the next 20 years, expansion beyond this is not allowed. The purpose of the edge is to address one of the three main concerns of the City of Cape Town, namely urban sprawl.

In the view of the author, as is generally believed, the NGC has the potential to develop into a mature activity corridor. In order to verify this, certain elements in the study area were accordingly examined as critical components to enhance development opportunities, primarily on the basis of the Blaauwberg Spatial Development Plan (First Draft 2002) and Blaauwberg Urban Development Strategy (Report 1 Analysis, 2000). The following structuring elements were thus identified as contributing to the significance of the area and presenting opportunities for development, and these are given some elaboration in section 8.3.2 of this chapter:

- Economic Base
- Movement System

- Coastal Environment
- Nature Conservation
- Tourism
- Atlantis
- Nuclear Facility
- Proposed Airport

8.3.1 Description of the Study Area

Figure 8.7: The extent of the study area with major movement routes.

The Northern Growth Corridor sub-region is a physical area that extends from the Cape Town CBD northwards towards the urban edge and includes the towns of Atlantis, Mamre, Melkbosstrand and Table View. This area, especially Atlantis, is well known for it's politically motivated origins. The towns of Melkbosstrand and Table View are northern suburbs of Cape Town and are considered to be dormitory suburbs of Cape Town. The towns of Atlantis and Mamre are situated further away from Cape Town and were historically seen as "separate" establishments and in fact still are so. Refer to Figure 8.7.

The establishment of Atlantis arose out of the government's decentralisation policy as well as the housing shortage that the coloured community of the Cape experienced at that time, and the consequences of this political ideology are clearly visible.

Under present circumstances, the study area is not evenly developed, the general situation being that urban expansion is rapidly occurring northwards, from the southern through the central to the northern sector.

The northern sector of the NGC sub-region includes (refer to Appendix 6): rural-village type settlements, large tracts of agricultural land, the southern core of the Cape West Coast Biosphere Reserve and pockets of urban development (City of Cape Town. Planning and Environment Directorate, 2002).

The central sector (refer to Appendix 6) is located between Blaauwberg Road and the northern metropolitan edge (N-S), and the coast and the N7 (E-W). "It is currently experiencing the greatest new growth and will accommodate Blaauwberg growth for the next 20 years" (City of Cape Town. Planning and Environment Directorate, 2002: 28).

The southern sector of the NGC (refer to Appendix 6), includes, from Paarden Island to Milnerton, a mix of older established residential areas etc. are rapidly expanding (City of Cape Town. Planning and Environment Directorate, 2002).

8.3.2 Structuring Elements of the Northern Growth Corridor

As has been mentioned, it is generally believed that the NGC has the potential to develop into a mature activity corridor, though at present the levels of intensity of transport and development are such that it can be described as still being in its infancy. The researcher has, however, identified a number of elements that are necessary, though some of which are as yet quite undeveloped, based on the BSDP (First Draft 2002) and Blaauwberg Urban Development Strategy (2002).

8.3.2.1 Economic Base

The study area does not constitute an independently functioning economy with its own basic industries or any other fully developed sector. As a part of the metropolitan area it functions instead as a northward extension of the latter and operates for the most part as a dormitory sub-region stretching as far as Atlantis, served by a sub-optimal, undeveloped and virtually non-integrated transport system.

It can reasonably be anticipated that the study area's future lies in the rapid expansion of the suburban function, though accompanied with corresponding degree of commercial and industrial development. There is extensive land for this. The existing major road, namely the R27, will potentially contribute to economic growth. Other elements underlying the general movement system are described further on.

Industrial development is flourishing with small industries in the southern area of Blaauwberg, and with industrial parks in Marconi Beam, Montague Gardens and Century City (Planning Partners *et al*, 2000). "The Koeberg Corridor and the Northern Corridor are intended to accommodate a range of activities including industrial land uses, as this will be a means to providing economic opportunities along the primary public transport route" (City of Cape Town. Planning and Environment Directorate, 2002: 79). The provision of industrial uses in the area could thus provide employment opportunities *inter alia* for residents in the area.

The following photograph (Figure 8.8) indicates potential economic development.

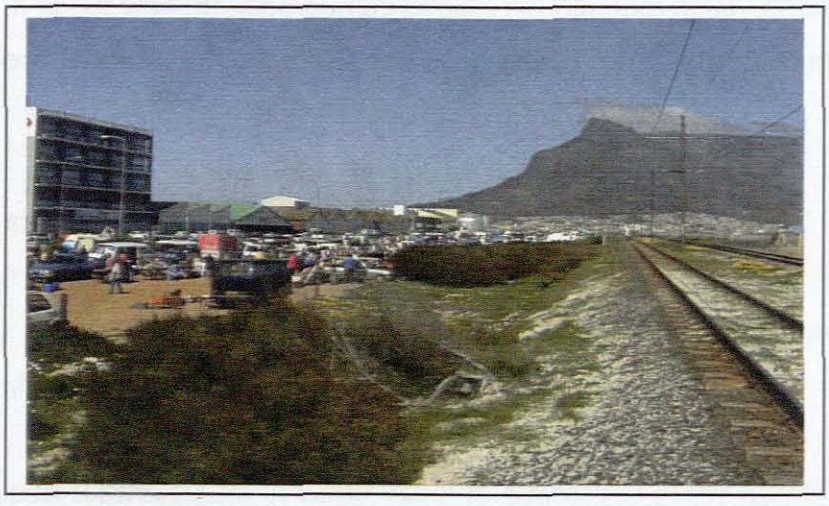

Figure 8.8: Rail-line running northwards alongside Marine Drive: A corridor in the making.

In the medium to long term, as demand thresholds grow, various retail activities will be added to the Bayside shopping centre and others, which have expanded rapidly over the last few years (Blaauwberg Municipality, 1999). The proximity of Century City implies that this will also operate as a retailing and entertainment center to the sub-region.

8.3.2.2 Movement System

Transportation is very important in the development of cities as stated by Vuchic in his book, Urban Public Transportation: Systems and Technology. (Vuchic 1981: 1) Dr Louw further stresses transport as elementary in our daily lives. He said: "It brings people together and connects people with goods, services and information" (Louw, 2003: 2).

The movement system *inter alia* comprises the transportation situation in metropolitan Cape Town. The public transport system of the latter has been a response to land use patterns and travel characteristics, resulting in it evolving over time to the system known today (Williams & Kingma, 2002). Even though the movement system is extensive, it is generally acknowledged to be poorly

structured. It is not well focused either, to achieve national policy objectives or to provide a good level of service to the traveling public" (Williams & Kingma, 2002: 1).

It can be said that the strongest feature of the public transport system in metropolitan Cape Town is the extensive rail network, because it provides accessibility and mobility throughout the CMA and "penetrates the main activity corridors and nodes of the city." (CSIR Transportek, 2001: 2-3).

Public transport for the future in Cape Town is addressed in the Mobility Strategy (2004), in that its ultimate goal is to "transform and restructure public transport in the Cape Metropolitan Area (CMA) with a focus on:

- Placing public transport, people and quality of life first
- Integrating of all modes of public transport - rail, bus, mini-bus taxis, non-motorised transport (NMT) and not excluding cars, freight and business
- Pursuing sustainable transport through investment in low cost forms of mobility" (Frieslaar *et al*, 2005: 1).

These can only be seen as longer-term goals in the study area. With a vision of "people and quality of life first", it is important to have an accessible city. Frieslaar *et al* (2005) states that this would require a network of public transport corridors. The mobility strategy proposed a number of integrated corridors to address this issue. See figure 8.12 for major development and MSDF corridors proposed.

Road infrastructure: The road structure in the sub-region consists of an established hierarchy providing mobility and access for the various needs in the area (City of Cape Town, Planning and Environment Directorate, 2002), the main routes the main being the R27, the N7, the R304 and Koeberg Road.

Insofar as the Northern Growth Corridor sub-region is concerned, the southern sector is more developed than the other two sectors regarding a road network, and the northern sector thus has a much coarser road network (City of Cape Town. Planning and Environment Directorate, 2002: 43).

As indicated in Figures 8.7, as read with Figure 8.9, a number of different movement channels exist. However, public transport is not the main modal choice, and the bulk of movement is by means of private vehicles.

During peak times private vehicles move from primarily dormitory areas towards the CBD for employment reasons. The yellow arrow indicates the movement for employment opportunities via public transport towards the northern Milnerton area, which occurs to a far lesser extent than the southward magnitudes of travel. Commuting further northwards towards Atlantis is practically negligible.

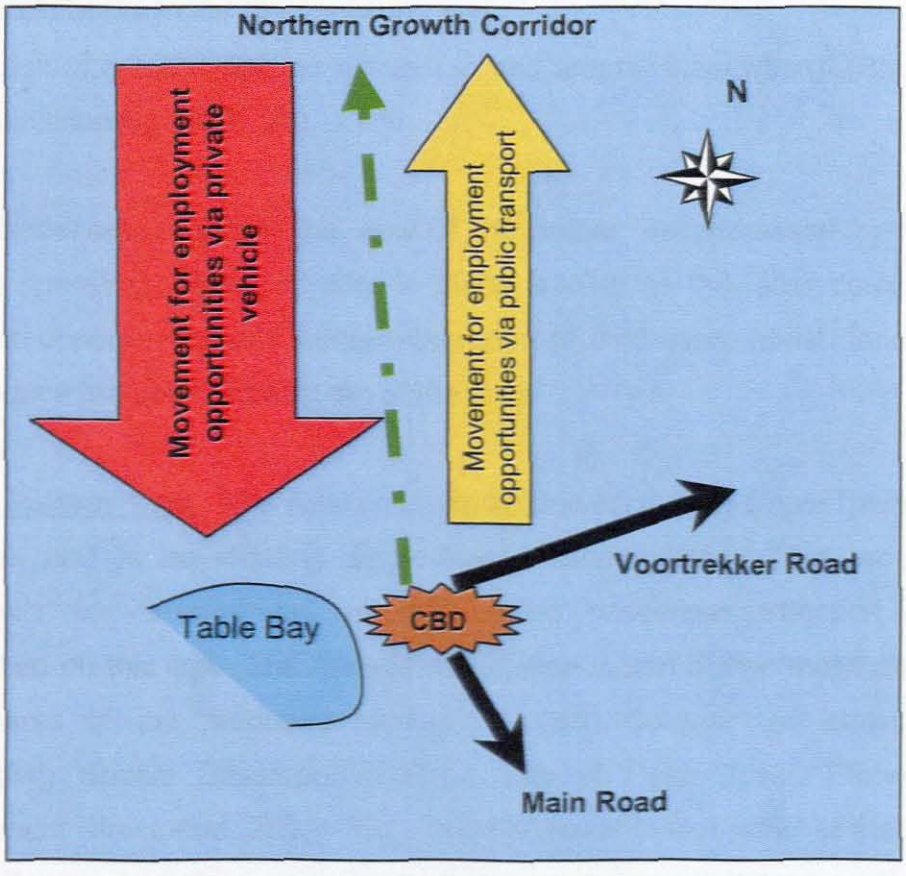

Figure 8.9: Nature of major movements in the Northern Growth Corridor

The southern sector has two well-established road transport routes, namely: Koeberg Road and Blaauwberg Road. Koeberg Road is a very important public transport movement route because it links with numerous important transport interchanges such as Koeberg, Maitland and Ysterplaat railway stations. At these stations passengers are able to reach local destinations through "transport interchange at Koeberg, Maitland and Ysterplaat railway stations where passengers transfer to taxis and are then routed along Koeberg Road" (City of Cape Town. Planning and Environment Directorate, 2002: 47).

"Current transport bottlenecks in the south of Blaauwberg are a consequence of:

- The lack of nearby employment opportunities for residents in the Blaauwberg municipal area;
- Bottlenecks in the road network; and
- Lack of a commuter rail network in and around Blaauwberg" (Blaauwberg Municipality, 1999: 24).

These bottlenecks could in the view of the author, be addressed by having a properly operating activity corridor in place, seeing as the latter could provide economic opportunities and better integration of land uses, whilst densification, could reduce the need to travel out of the area.

Atlantis Railway Line: The Atlantis Railway Line runs from Cape Town CBD to Saldanha and is an existing single-freight service line. This provides an opportunity for development in that public passenger transport can be established on this line. The Atlantis railway line is part of the "major structuring components of the proposed Northern Growth Corridor" as stated in the Blaauwberg Spatial Development Plan (City of Cape Town, Planning and Environment Directorate, 2002: 89). This document in fact refers to the potential that the line presents for a passenger service, and states that it will be dependent on a link between Atlantis and Metro South East because of strong demand for

movement between the northern and southern parts of the city (City of Cape Town, Planning and Environment Directorate, 2002).

Road Network:

The following is the road system (Figure 8.10) proposed by the City of Cape Town, Planning and Development Directorate (2002):

Class 1 Roads:

West Coast Road (R27)

M12

N7

East-West arterial

R300

Class 2 Roads:

Dassenberg Drive (R307)

Koeberg Road extension

M12 extension

Blaauwberg Road

Melkbosstrand Road (M19)

R304

Class 3 Roads:

Ottu Du Plessis Drive

Parklands Main Road

Extention of Sandown Road

East West Activity Street

Klein Dassenberg Road

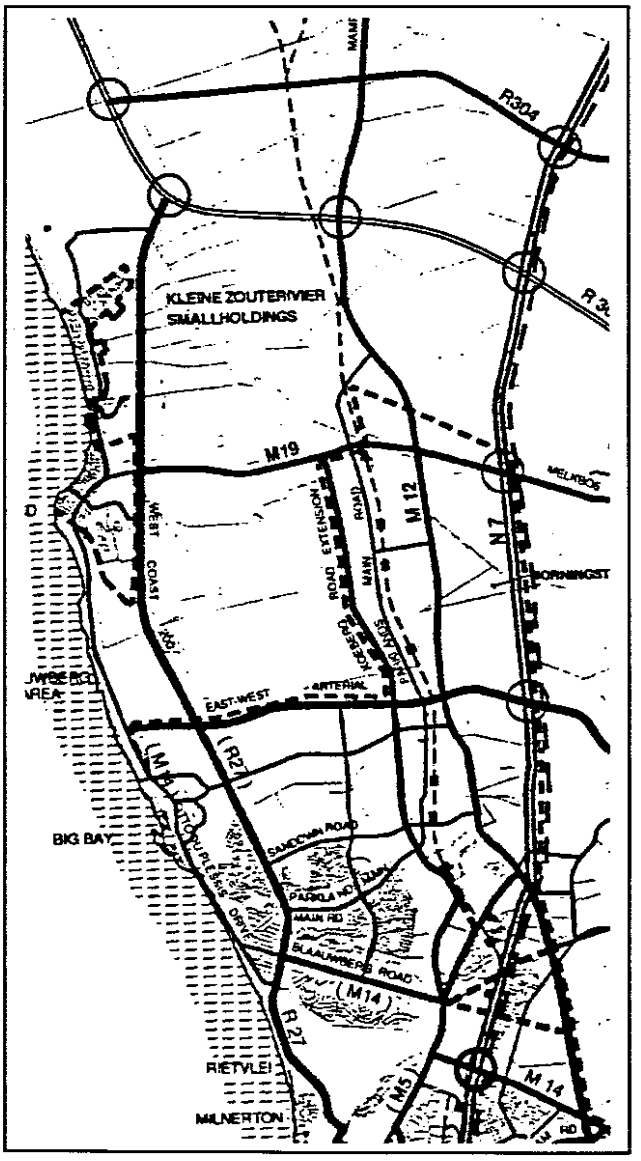

Figure 8.10 Proposed Road Transportation Network *(City of Cape Town. Planning and Environment Directorate, 2002: 86).*

Public transportation modes: The two main public transportation modes that exist are bus and minibus-taxi. There is no existing passenger rail-line service

along the Northern Growth Corridor. "The proposal to upgrade the Atlantis railway line has been proposed in numerous urban planning and transportation studies. The implementation thereof is a critical element in the development of this area" (City of Cape Town. Planning and Environment Directorate, 2002: 47). However, it seems that the railway-line could be a commuter line only in the short to medium term seeing as the area does not yet have the densities to sustain this. The proposed passenger rail-line will nonetheless ultimately become a very important element along the NGC. This could be an additional and economically viable mode of transport for commuters. It can also be utilised as a tourist attraction/facility over weekends and holidays and offer train trips along the picturesque West Coast to various tour destinations.

Golden Arrow Bus Services are the bus operators that function in the area on scheduled major routes. The Minibus - taxi's operate on demand along designated or minor routes. Corridor movement is in fact evident mainly in the case of scheduled routes of the larger bus operators.

8.3.2.3 Coastal Environment

The coastal environment of the study area constitutes an asset of enormous value in aesthetic, recreational and economic terms. These environments generally offer complex landforms, ecosystems, microclimates, aesthetic qualities and views resulting in a range of economic and recreational or tourism activities.

Though the coast line here is generally straight and with low lying land profiles, the presence of the Atlantic Ocean remains a significant factor in the quality of the Northern Growth Corridor Sub-Region. This quality has in the first place given rise to considerable coastal, urban and resort developments and at the time of writing these are expanding at a rapid rate, placing heavy demands on the existing road network. A number of popular day-visit resorts have also been

developed on the beaches and include Blaauwbergstrand, Melkbosstrand, and picnic spots between the two.

A number of erstwhile structure plans, including the Sub-regional Coastal Structure Plan for the coastline of metropolitan Cape Town were prepared in the course of the 80's and 90's by the then Provincial Administration of the Cape and coastal local authorities, providing for extensions to coastal urban developments and to day-visit resorts. Population growth since that time, resulting from, inter alia, extensions to urban areas has resulted in the intensive use of facilities. New developments have already been planned such as the Groote Springfontein area south of Silwerstroomstrand resort.

It is clear that the coastal area, what it offers and what it generates, will continue to have a considerable impact on growth in the sub-region, whatever spatial form such growth may take. Tourism is discussed in a separate section, though it should be mentioned here that a growing tourism activity offered by scenic drives, beauty spots and related facilities is already putting serious pressure on the existing infrastructure.

8.3.2.4 Nature Conservation

Natural vegetation: The study area is located in the semi-arid segment of the South-West Cape mediterranean region and is home to many ecosystems, offering a variety of unique natural vegetation (see Figure 8.11). It forms part of the fynbos biome which is indigenous to the country, and constitutes one of the six plant kingdoms in the world. It may be the smallest of the six, but it is the richest in species and diversity (West Coast District Council, *s.a.*).

Figure 8.11: Unique coastal vegetation *(Source: Blaauwberg, s.a.: s.p.).*

Cape West Coast Biosphere Reserve:

In order to promote the area along the NGC study area with land and marine ecosystems, the Cape West Coast Biosphere Reserve (Figure 8.12) was proclaimed in 2000 "to recognise the community's sustainable approach to life and living" (Author unknown 2003). There had been a tremendous loss of coastal vegetation from 1652 until 1982 (West Coast District Council, *s.a.*) mainly as a result of cultivation, which emphasises the serious merits of a conservation strategy.

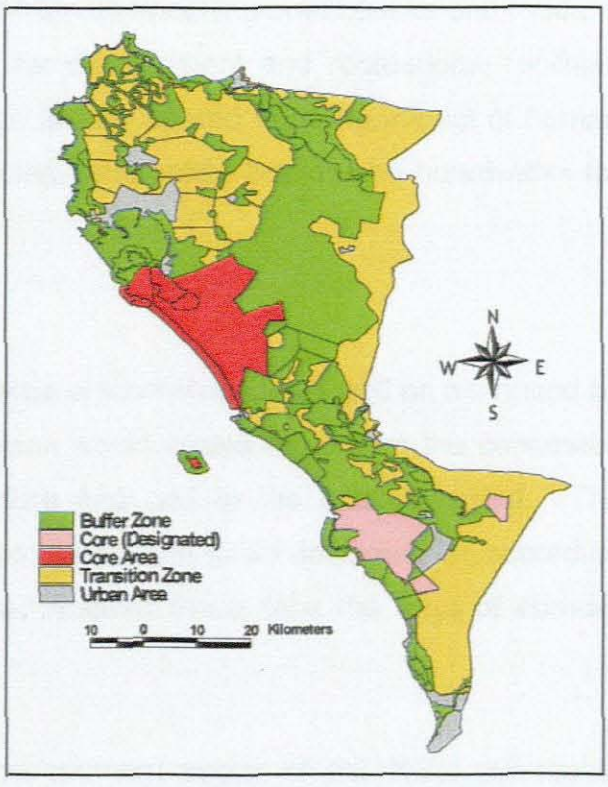

Figure 8.12: Cape West Coast Biosphere Reserve, North of Cape Town *(Source: Cape West Coast Biosphere, s.a.: s.p.)*

The primary function of a biosphere reserve includes conservation, development and support. Cape West Coast Biosphere Reserve is not a fenced-in reserve and is internationally acknowledged.

Koeberg Nature Reserve: The Koeberg Nature Reserve is a private nature reserve that was opened on 18 October 2001. The reserve contains two major veld types, namely Dune veld and West Coast Strandveld. The Reserve plays an important conservation role in that only 0.74% of West Coast Strandveld is being preserved at present (Blaauwberg, *s.a.*), and it also hosts a number of animal species.

Dune Management Project: The Dune Management Project at Table View was established to control the wind-blown sand. This is a multi-functional project and seeing as it aims to prevent the sand from encroaching onto houses and roads, it represents a demonstration project for development and recreational facilities elsewhere along the coast. Protection is also offered from the impact of human traffic and vehicles by means of fencing, information boards and boardwalks for pedestrian access.

General:

Development initiatives in the study area are constrained as well as enhanced by these natural components. Such areas would create relief from the congested urban areas that might arise in future and add to the quality thereof. The conservation - worthy areas could thus restrict and direct development, according to environmentally friendly principles, whether these take the form of corridor development or otherwise.

This is already demonstrated in the southern sector of the NGC sub-region where urban expansion is directed by the nature reserve on the western side and the movement routes on the eastern side, resulting in constricted linear growth.

8.3.2.5 Tourism

Tourism is one of the fastest growing economic sectors in the South-Western Cape and could strengthen the sub-region's economic base. There are quite a number of places of historical and cultural interest that attract tourists and add to the unique character of the study area, over and above the coastal environments that are discussed in a separate section. These are listed here:

Mamre Moravian Mission: The Mamre Moravian Mission was declared a National Monument in 1967. The buildings date back to the 1800's and express a rich cultural and historical heritage.

Old Wooden Bridge at Milnerton: The Old Wooden Bridge at Milnerton served as a military access road across to Lagoon Island and was built during the Anglo-Boer war in 1899. This is still used as a footbridge today.

Post Office Stone: The Post Office Stone in Table View is the oldest relic of Portugese origin known in South Africa. The original is in the South African Museum and a replica is displayed at the Blaauwberg Tourism Office.

Paarlberg Stone: The Paarlberg Stone in Milnerton was unveiled on 14 August 1975 in honour of the Afrikaanse Taal Monument and can be viewed at the municipal offices in Pienaar Road, Milnerton.

Milnerton Lighthouse: The Milnerton Lighthouse is situated at Milnerton Beach and was established in 1960 and its function was to serve as a beacon for ships entering the Cape Town harbour.

Regional Main Road 27: The Regional Main Road 27, better known as the R 27, is a tourist attraction in itself by providing a major viewing axis. Numerous tourism publications refer to the R27 as the "West Coast experience". People

flock to the West Coast to participate in flowershows, wine-tasting at the various cellars in the district, or just to view the scenery.

Scenic Drives: There are a number of scenic drives along the Northern Growth Corridor, especially in the Blaauwberg area. These include the following:

- Otto du Plessis/Marine Drive (R27/R14,)
- Table View beachfront,
- Tree Lane (R14 & R304),
- The N7, and
- Old Darling Road (R304) (which was renamed as the Evita Bezuidenhout Boulevard).

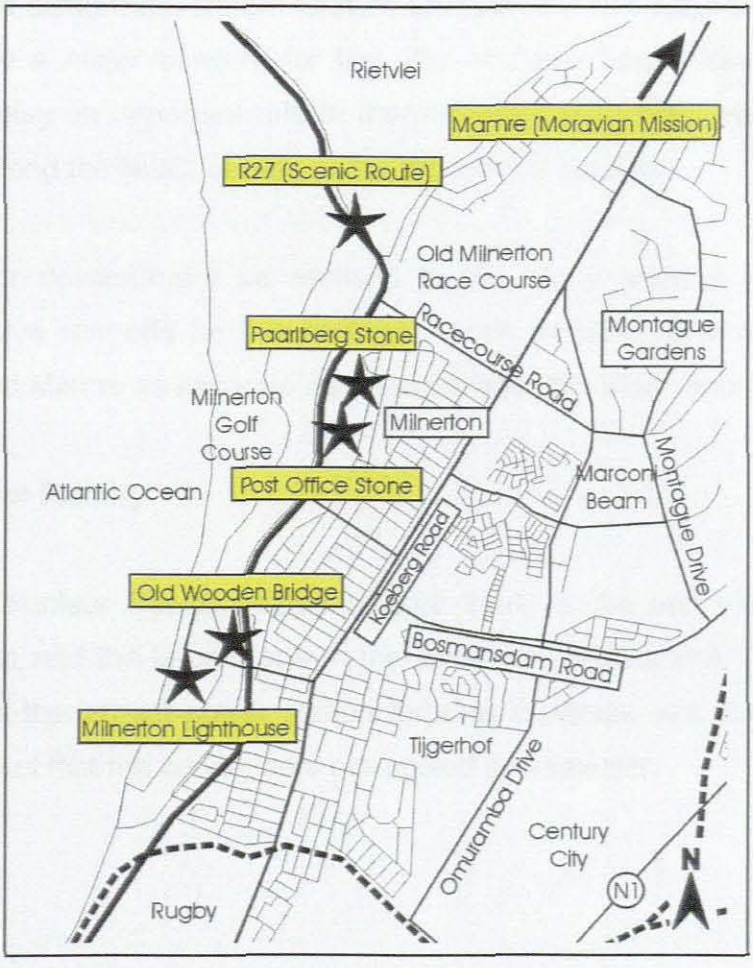

Figure 8.13: Locality map of tourist attractions: Milnerton.

The aforementioned tourist attractions are of course not main attractions in the Cape Metropolitan Area. Should the study area develop; whether in the form of a corridor or otherwise, this should give the tourism industry in the area an economic injection with the influx of visitors.

8.3.2.6 Atlantis

The town has not developed a vibrant and self-sustaining growth in its economy as was originally envisaged and remains to a large extent a distant dormitory town in regard to metropolitan Cape Town, with considerable commuting taking place. The low-income levels in Atlantis are a reflection of this.

Public transport along the Northern Growth Corridor is inefficient and inadequate. This should be a major concern for the City of Cape Town seeing as public transport can play an important role in the economic and social integration and upliftment all along the NGC, as well as for the town of Atlantis.

Should corridor development be realised in the study area, it will have an immense positive spin-offs for this northern sector as well. One will no longer see Atlantis and Mamre as separate settlements from the Blaauwberg region.

8.3.2.7 Nuclear Facility

The Koeberg Nuclear Power Station (Figure 8.14) is the only nuclear power station in Africa and the largest one in the Southern Hemisphere. (Blaauwberg, *s.a.*) It boasts the largest power station turbines in Africa, and another unique feature is the fact that the condensers are cooled by seawater.

Figure 8.14: Koeberg Nuclear Power Station

The biggest constraint that the Koeberg Nuclear Power Station poses for future development is the population restriction within a 20km radius as a safety measure. This means that the design of future development needs to accommodate emergency evacuations should these become necessary.

Though the close proximity of a nuclear facility does not preclude development, nuclear safety provisions need to be incorporated in forward planning. According to Charles Rudman (2005) no development is allowed within a radius of 5 kilometers, whilst for development within a radius of 16 kilometer, the residents should be able to evacuate the area in 16 hours if necessary. This poses strict development guidelines with regard to densities and movement routes, which could directly influence the development of an activity corridor in the sub-region. It is foreseen that the nuclear power station will remain a factor that sustains activity but not add any in a major way, irrespective of an extension such as a modular pebble-bed reactor.

8.3.2.8 Proposed Airport

The proposed airport site was identified, as mentioned in the Blaauwberg Spatial Development Plan, during an investigation for possible airport sites and is

situated to the south east of Atlantis. Initially, two sites were identified, though, one was found unsuitable as it is located within the Cape West Coast Biosphere Reserve (CWCBR). According to Bettesworth (2003), there are no "serious discussions at this point and it remains more of a conceptual idea". The development of an airport could generate a number of possibilities. From a transport perspective, it can attract more traffic and related activity in this direction. From an economic perspective, it could become an activity hub, creating more employment opportunities. It would certainly change movement patterns along the NGC study area as residents from the Atlantis and Mamre areas could work at the airport site instead of the CBD, resulting in less traffic and congestion during peak times towards the inner-city.

8.4 Development Initiatives Proposed for the Northern Growth Corridor

At a general level, according to the City of Cape Town, the provincial authorities promote a bioregional approach "which acknowledges biodiversity conservation and the maintenance of environmental integrity" (City of Cape Town. Planning and Environment Directorate, 2002: 9). Their vision for the West Coast accordingly constitutes a "growth axis" in order not only to control urban sprawl, but to achieve the hierarchies of development and conservation according to the bioregional planning.

As a planning strategy, the first priority that has been identified from which all later development initiatives should follow, is an improved road infrastructure, and a number of projects have been identified in this regard.

Firstly, the City of Cape Town has identified Parklands Main Road as an important route in the future to link with stations along the envisaged Northern Growth Corridor.

"There are a number of existing major road proposals for the Blaauwberg area. The proposals are intended to improve the capacity of the existing north-south arterial routes and to improve the discontinuous east-west routes. (Refer to figure 8.10).

The following are also intended for the envisaged sub-region by the BSDF in a north-south direction:

- The extension of Koeberg Road and Parklands Main Road

  The BSDP (2002), proposes these two roads to be extended northwards in order to "form the core of the proposed north-south metropolitan activity corridor" (City of Cape Town. Planning and Environment Directorate, 2002: 78). Koeberg Road is proposed to extend to the M19.

- Construction of the M12

  The M12 arterial extension is proposed to "form the eastern boundary of the north-south activity corridor" (City of Cape Town. Planning and Environment Directorate, 2002: 78).

According to the City of Cape Town, Planning and Environment Directorate (2002), it is of importance to focus on east-west routes in the corridor in "distributing traffic across the study area" (City of Cape Town. Planning and Environment Directorate, 2002: 79). The Blaauwberg Spatial Development Plan proposes the following:

- Extension of Sandown Road

  "which will cross the railway line and intersect with the N7, thereby providing access to the Northern Corridor from the western side of the

study area. This road will help to facilitate development to the west of the railway line" (City of Cape Town. Planning and Environment Directorate, 2002: 79).

- East-West activity street

  The aim of this would be to link the Big Bay coastal node to the M12 and the NGC (City of Cape Town. Planning and Environment Directorate, 2002).

- East-west arterial

  "It will intersect with the M12 and the N7, thus providing access to the Northern Corridor" (City of Cape Town. Planning and Environment Directorate, 2002: 79).

- The R300

  "although the alignment is not fixed at this time, will provide regional access and form an interchange with the R27, thus providing an important east-west route to the West Coast and to the greater metropolitan area" (City of Cape Town. Planning and Environment Directorate, 2002: 79).

The observation to be made here is that this network once implemented will achieve many of the objectives for the sub-region such as integrated development, satisfactory public transport, opportunities and positive preconditions for subsequent economic development as a response by the private sector. In regard to the relevance of these to corridor development, the reader is referred to Table 6.2, Chapter Six.

8.5 Conclusion: Challenges Facing the Northern Growth Corridor Sub-region

"In 1997 it was estimated that 3500 Atlantis employees or 21% of those with work commute to jobs at various places in the Cape Metropolitan Area" (City of Cape Town, 2001a: 43). This indicates the need for efficient, reliable and cost–effective commuter transport in the area and more employment opportunities in the area.

"The majority of the new residents in Blaauwberg are likely to be dependent on public transport for movement beyond their immediate neighbourhood. Thus the provision of and access to public transport and the design of urban form to accommodate public transport, is going to be significant measure of performance" (Planning Partners *et al*, 2000: 25).

"The Council needs to explore the potential for improved rail access to Blaauwberg's high-density areas and the introduction of a regular service (goods and passenger) to Atlantis" (Blaauwberg Municipality, 1999: 24).

Having regard to the above, the following observations are worthy of note:

- "The main challenge is to integrate the various parts. Atlantis is stagnating economically and in order to assist it to attract significant economic development in the short to medium term, it is important that the town is given the opportunity to be integrated and connected into the region, by whatever mean available." (City of Cape Town. Planning and Environment Directorate, 2002: 29).

- Large numbers of residents make use of private vehicles and not public transport.

According to the City of Cape Town (2002), the latter is a result of the number of white-collar residents that work outside of the area where they live. As a consequence, there are increased numbers of commuters by car to employment opportunities in central locations of the City of Cape Town (City of Cape Town. Planning and Environment Directorate, 2002).

Research has shown the reasons why users prefer the modes that they make use of. The most common reasons include costs, efficiency and crime.

The following table illustrates why public transport modes are not preferred.

Table 8.1: Reasons for choice of mode (CSIR Transportek, 2001: 5-2).

Main Mode	Reasons passenger gave for not selecting alternatives			
	1	2	3	4
Rail	Taxi too expensive	No bus at right time		
Bus	Taxi too expensive	Too far to walk to catch a train	Too much crime on trains	
Taxi	Too far to walk to catch a bus or train	Wait too long for buses and trains	Too much crime on trains	Trains too crowded

High levels of congestion on the road network could of course be addressed if these commuters would make use of public transport. This however, proves to be problematical in that these commuters can afford the luxury and convenience of a private vehicle. A change in this mindset could occur if highly efficient public transport modes are introduced. The projected hovercraft scheme may provide an interesting experiment in this regard.

- "One of Blaauwberg's challenges is to find a compromise between the uneven spatial development patterns that have occurred within the study area"(City of Cape Town. Planning and Environment Directorate, 2002: 29).

These aspects of disfunctionality are partially a result of the previous government policies, where there are portions in the northern part of the NGC sub-region that are isolated from the "main stream development" and opportunities and facilities

closer to the CBD of Cape Town. The challenge is therefore to link them. This could be addressed by the facilitation and implementation of an activity corridor, seeing as it could integrate various parts of a city and also integrate various land uses.

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CHAPTER NINE
CONCLUSIONS: A VISION FOR THE NORTHERN GROWTH CORRIDOR

9.1 Introduction

This final chapter addresses the third objective of the thesis, and the reader is referred to sub paragraph 1.4.3 in Chapter one: "evaluate the prospects for the Northern Growth Corridor".

The chapter is structured in two parts:

- A summary of the findings that emanate from the previous chapters which investigated the nature of corridors and public transport and the factors and processes involving their mutual interaction and development.
- A translation of these findings in combination with the overview of the study area described in Chapter Eight, into a vision for the ultimate realisation of the proposed Northern Growth Corridor.

9.2 Findings concerning Corridor Development

In the first place, various types of corridors are referred to and defined in the literature. Reference is for instance made to metropolitan corridors, characterized by low intensity development over extended areas, as opposed to activity corridors characterized by high intensity development and mixed uses. In general, certain typical features of activity corridors emerge from the literature and these include the following:

- Intense development and human interaction
- High density development

- A major transport route, linking nodes
- A range of public transport modes
- High public investment
- Provision of accessible community services

In addition, the literature mentions that corridors not only initiate growth in the city, but also provide a means of restructuring spatial patterns so as to address inequity in terms of access. Moreover, corridors do not come into being instantaneously but develop over time.

Another popular term is "growth corridor", particularly relevant to this thesis by virtue of reference to the Northern Growth Corridor; referring to one that has not yet reached a state of maturity though some potential is evident. Growth corridors are also characterised by their relatively large geographical extent so as to include at least a sub-region.

Based further on an examination of the case studies that could be identified by the researcher over and above the theoretical propositions, the elements listed above, in terms of the generally accepted definitions seem to be verified, namely the association of corridors with high density development and intense activities, linkage of metropolitan nodes, prominence of public transport, mixed uses, economic viability and congenial urban environments.

9.2.1 The Effects of Public Transport on Land Use Patterns

As discussed in Chapter Seven, a symbiotic relationship exists in that land use patterns result from the unique characteristics of the given public transport system and it was stated in general that development densities and mixed land uses could be amongst such consequences. Public transport and its infrastructure affects the formal as well as the informal sectors of the economy, particularly retailing. Different transport modes differ in terms of technical,

operational and economical characteristics and these aspects also have direct bearing on land use patterns. It was observed that some modes such as buses or taxis, are more appropriate for particular land use patterns and that the available choice of modes and the range of these choices could promote equity in space, particularly if modal operations are properly integrated. To these generalizations should be added that these relationships are necessary, unique, and indeed complex, depending on the part of the city.

9.2.2 The Effects of Public Transport on Urban Performance

Here it was established that a properly functioning public transport system with all its infrastructure provides important preconditions for well performing urban places and for positive urban qualities. Defined networks which could well include corridors, enable linkages between for instance high density residential development and quality public spaces. Moreover, a well developed public transport system plays an important role in viable, sustainable and vibrant commercial activity, which often includes social activity nodes. As an instance, public transport interchanges have the potential of generating and hosting economic commercial and social activities, both formal and informal.

9.2.3 The Effects of Land Use Patterns on the Public Transport System

This aspect poses the reverse of the approach in the previous two subsections, and was also explored in Chapter Seven for analytic purposes. It was observed that particular groupings of land use giving rise for instance to complimentarity in their operation, can generate higher densities, and higher densities in turn generate demand thresholds of viability and sustainability of a public transport system. On the other hand it is also true that other groupings involving certain mixed and closely located land uses can result in saving trips, thus putting less pressure on the transport system. These opposing forces are indeterminate and the circumstances change over time.

Land use patterns and the particular locations involved influence the magnitude and nature of demand for public transport, and certain patterns of development demand particular modes. Moreover, particular demands on public transport influence the type of infrastructure that is then required. Finally, there is the aspect of growth in development: as the city expands in a particular geographic area, this will necessarily lead to growth in demand for movement. Some of this would take the form of private transport depending on the degree of affluency in a given area whilst it could also take the form of public transport, particularly in lower income areas.

9.2.4 Mutual interactions between Land Use Patterns and the Public Transport System

It has emerged in this study that in reality the relationship between land use patterns and public transport is not a simple one-way, cause-and-effect process; these two components in fact operate in a mutually reinforcing manner through phases and over time (Cupido, 2005).

This interaction occurs at a number of levels including access required and access given, in terms of exposure given and thresholds generated. Such interactions also occur in terms of income-group residential spatial patterns, where public transport routes and destinations are planned timeously in response to the needs of such communities. The public transport system often responds in terms of either formal or informal modes where the particular supply and demand are not properly matched.

Finally, there are technological dimensions that play a part in this "action and reaction" scenario. Improvements to the public transport system can raise the levels of preference and demands for a given service whereas on the other hand demand factors themselves could generate improved designs and technology.

9.2.5 Corridors as Integrators

In the previous sections a brief overview has been given concerning the nature and processes in the interactions between land use and public transport systems.

However, when one reviews the intricate relationships discussed and having regard to the fact that corridors as defined and understood, then it is clear that as a physical device in the urban landscape, a corridor is directly concerned with and subject to these identified iterative relationships between land use and public transport. Thus, why corridors originated in the first place, and what they generate in the second place, becomes clear when one considers the cause and effect relationships outlined in earlier sections. These will therefore not be repeated here, though it seems reasonable to argue then that land use and the public transport system are in fact related in "activity corridors" in an important way.

It is for the reasons discussed above that a corridor, and in particular an activity corridor, should rightly be seen by urban and transportation planners as a powerful structural device in addressing optimal spatial patterns in the city on the one hand, and in achieving an efficient and appropriate public transport system properly integrated with these spatial patterns, on the other.

9.3 A Vision for the Northern Growth Corridor

In this second part of the chapter, where the prospects for the Northern Growth Corridor are to be evaluated, the researcher considers it appropriate to relate this to certain preconditions already in place regarding the study area. These preconditions fall mainly under three categories; firstly planning proposals already made for the study area, secondly, economic conditions in the sub-

region, and thirdly, regional economic forces in the context of the metropolitan area.

9.3.1 Planning Policies

It has been ascertained that as far as the metropolitan level of planning is concerned, the Mobility Strategy (2004) explicitly indicates the Northern Growth Corridor as one of the nine proposed corridors planned for the structuring of the metropolitan area. As far as the jurisdictional area of the Blaauwberg Administration is concerned, the particularly pertinent forward planning document is the Draft Blaauwberg Spatial Development Plan (2002), which synthesizes all other developmental proposals in the area.

The aforementioned Spatial Development Plan, though not spelling out precise projections and details of planning, has identified a northern, central and southern sector (as indicated in Chapter Eight) and it is envisaged that development will in fact occur in phases from south to north as far as Atlantis. As far as the road and rail structure are concerned, which are incorporated in the plan, the details of this were also described in Chapter Eight.

With reference to the definition of a "metropolitan corridor" given earlier, this clearly seems to be the case with regard to this study area in that its development is showing signs of growth in intensity in the southern sector whilst the two sectors to the north are as yet relatively undeveloped or in fact totally undeveloped. Public investment at this stage occurs mainly in the form of extensions and upgrades of the road infrastructure, which include the provision of east-west links to establish a proper network. A commuter rail-line with its particular infrastructure such as stations is envisaged as far as Atlantis, to augment the purely goods transportation function at the moment. The time scale attaching to the objective of a full-blown corridor development along its entire length is open to conjecture.

At the time of writing the notion of a new airport serving the Cape Metropolitan Area in Atlantis has been mooted in the press. Were this to occur, this would certainly provide economic impetus to the town especially in the construction stages, whilst the traffic generated with the CMA would obviously be a potential growth factor along the corridor.

9.3.2 Economic Conditions in the Sub-Region

Based on the analysis of the study area which has been outlined in Chapter Eight, it would appear that in general, economic growth, whatever the pace or extent that eventually transpires, will be based almost entirely on the northern expansion of the metropolitan area by virtue of the availability of land that occurs nowhere else as abundantly as far as the Cape Metropolitan Area is concerned. It would therefore seem that this growth will occur mainly in the form of residential development and related development such as commerce and retailing and to a small extent industrial activity, rather than in terms of growth of some or other economic base such as industry, mining or agriculture.

One of the elements of a metropolitan corridor could be a major retailing center, but until such time as residential developments occur and depending on their densities, this cannot be projected at the time of writing. Though industrial activity in the established south has shown considerable growth, future projections in the Northern Growth Corridor cannot at this stage be given with confidence, as this will also depend on development in the entire metropolitan area and the degree to which its policy of densification, and therefore demands, will be realized.

The sub-region is poorly endowed with agricultural potential, and this sector of any economy generally cannot in any event be expected to dramatically change the local "domestic product", especially if the agricultural practices are low-yielding, land-extensive operations. It is conceivable though that agricultural

practices can be intensified in terms of new food producing technologies, especially if the metropolitan area generates the demands for this.

Tourism has been recognized as the fastest growing economic sector in recent times in the South West Cape, and reference has been made in Chapter Eight to the tourism infrastructure in the Northern Growth Corridor sub-region. In this context, the growing traffic on the West Coast Road (R27) to Vredenburg / Saldanha is showing strong growth. As in the instances of the industrial and agricultural sectors though, long-term predictions cannot with confidence be made regarding the growth of tourism. As far as conservation is concerned, though this has value from a tourism perspective, the existing statutory conservation areas present a constraint on development and growth in some areas.

9.3.3 Regional Economic Forces

It has already been said that the "economic base" of this sub-region cannot with confidence be predicted in terms of its nature nor in terms of dramatic growth. This sub-region is unique, as indeed is any other, but the particular economic circumstances here seem to suggest a relatively conservative scenario for growth, in the view of the researcher. The economic growth and expansion of the Cape Metropolitan Area itself in future will have to demonstrate the correctness or not of this supposition.

Even if one could envisage dramatic residential development, one would expect "leakages" in terms of income spent depending on the degree to which the "dormitory town" situation obtains. It must be remembered that planning cannot by itself directly ensure economic activity, employment opportunities and growth, though it plays a very important role in providing the preconditions for these, as for instance suitable infrastructure that offers efficient levels of access, to which the private sector can then respond.

It is in this regard that the realization of the Northern Growth Corridor could, if it in fact occurs, well generate economic growth where a number of elements fall into place such as agglomeration factors underlying industrial growth, generated by thresholds of demand, with linkages and complimentarity between them, and there could even be scope for footloose industries once development reaches a threshold level which could benefit from "take-off" phases, that might or might not occur.

The foregoing is of course the field in which long-term scenario planning takes place, and though admittedly speculative, at least attempts to offer prospects and projections based on certain premises. The researcher has, as can be seen, offered cautious premises regarding the future of the Northern Growth Corridor. Presenting arguments for such premises falls beyond the scope of what the researcher attempts in this project.

There are in any event considerable difficulties facing land use planning apart from the issue of predictability. It has been mentioned, that planners cannot go beyond providing suitable preconditions to which the private sector and the free market must respond. As is well-known, this response is subject to a number of imponderable factors such as the sentiments of investors or entrepreneurs in terms of risk-taking, and indeed the state of the economy in terms of available finances at a given point in time.

9.4 Corridor Prospects

As a final concluding comment, it is suggested that the prospects for the realisation of full-blown activity corridor development in this sub-region depend on two major factors. Firstly there is the political will expressed in the planning policy documents relating to development being focused here, among other identified corridor projects. The importance of this lies in the willingness to invest

public funds in various ways such as public transport or demonstration projects to which the private sector can then positively respond.

The second major factor is the growing momentum of demand for northerly expansion of the city into the geographical area defined as the Northern Growth Corridor, by virtue of the availability of land.

In previous chapters the issues surrounding the nature of corridors, as well as of public transport and how they develop in relation to the structure of the city and the present conditions in the study area, were examined. The researcher is inclined to comment that, based on this entire study, all the processes identified in corridor growth will quite likely occur at least in the southern and central sectors referred to earlier, though this may take a decade or more.

Reasonable understanding has now been developed as to what underlies the development of a growth corridor and what corridors contribute to the city. In the initial stages of this investigation, the researcher approached the subject on the basis of the implicit hypothesis that public transport is a catalyst for corridor development, and this in fact was adopted as the title of the thesis, in effect dismissing the reverse possibility. It has been shown however, after the process of this research that this hypothesis is a simplification of reality in terms of cause and effect.

The researcher has in conclusion developed reasonable confidence to suggest what might be termed the "mutual catalytic theory" where in the context of corridor development the precise extent and order in which one factor serves as a catalyst for another, is indeterminate. A corridor can also in some ways provide conditions that act as a catalyst for new and additional elements in the public transport system, and indeed in land use patterns.

It has been mentioned that a sub-region has its own unique factors, and what precisely will occur will partially be what time will tell. It is reasonable to expect though, that as time passes, the planners can review the situation and devise new, appropriate interventions with the benefit of hindsight.

The promotion of activity corridor development is a strategy that takes between the medium to long term to be realized, and the indicated time frame of development is approximately 20 years (Carelse, 1997: 55). It is important thus to be clear that the implementation of activity corridors happens over an extended period of time and in a number of phases. Nonetheless, on the basis of the foregoing observations and arguments, they should collectively be seen as a powerful planning device to integrate land use and transport planning.

As it has been learnt that the Blaauwberg Spatial Development Plan reflects the approach of the authorities that a blueprint determining developments for the next decade or beyond cannot with confidence be given, the researcher likewise cannot propose interventions nor go beyond the general vision based on the premises stated in this chapter.

9.5 References Cited

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City of Cape Town, Planning and Environment Directorate. 2002. *Blaauwberg Spatial Development Plan Final Draft.* [*s.l.*: *s.n.*].

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APPENDIX 1:

Questionnaire

Questionnaire

Name: _____ Date: _____

1. Do you have a definition for activity corridor and/or growth corridor?

2. What is your understanding of an activity corridor and a growth corridor?

   Might the difference be that growth corridor initiates urban growth in a specific direction, what will happen if over time the development in the area has taken place? Will it still be known as a growth corridor, especially after the main characteristic will not be present anymore? Is the growth corridor then nothing more than a stage in the life cycle of a corridor?

3. What case studies can you refer me to? Especially in Developing Countries.

4. Do you know of activity corridors in Durban and Johannesburg that I could use as case studies?

5. **Are there specific policy documents or legislation that I should consult?**

_____

_____

_____

6. **Are there any other specialists that you could refer me to?**

_____

_____

_____

APPENDIX 2:

Case Study Checklist

CHECKLIST FOR AVAILABILITY OF CASE STUDY INFORMATION

Case Study: _____

Country: _____

Yes	No	Information
		Full name of corridor
		Description of corridor (area, extent, location)
		Locality map
		Map of corridor (what roads are included or excluded)
		Jurisdiction/Authority
		History (brief, how long ago established)
		Significant characteristics
		Activity corridor elements present?
		Traffic/Movement info (transportation and modes)
		Infrastructure
		Legislation

APPENDIX 3:

Legislation and Policy Table

Legislation and Policy Documents											
	DFA (South Africa 1995)	NLTTA (South Africa 2000a)	Urban Transport Act (South Africa 1977)	White Paper on National Transport Policy (South African, DoT 1996)	WC Provincial Transport White Paper (Western Cape Department of Transport and Public Works 1997)	Municipal Systems Act (South Africa 2000)	Moving South Africa (South African Department of Transport 1997)	MSDF Handbook (CMC 2000)	Moving Ahead (CMC 1998)	IDP 2005/2006 (City of Cape Town 2005)	Mobility Strategy (City of Cape Town 2004)
Densification	✓				✓			✓			
Economic Environment	✓					✓				✓	
Public Transport		✓			✓		✓	✓	✓	✓	✓
Social Environment		✓				✓				✓	
Spatial Arrangements	✓	✓			✓	✓		✓			
Urban Qualities					✓			✓		✓	

APPENDIX 4:

Objectives and Performance Measures

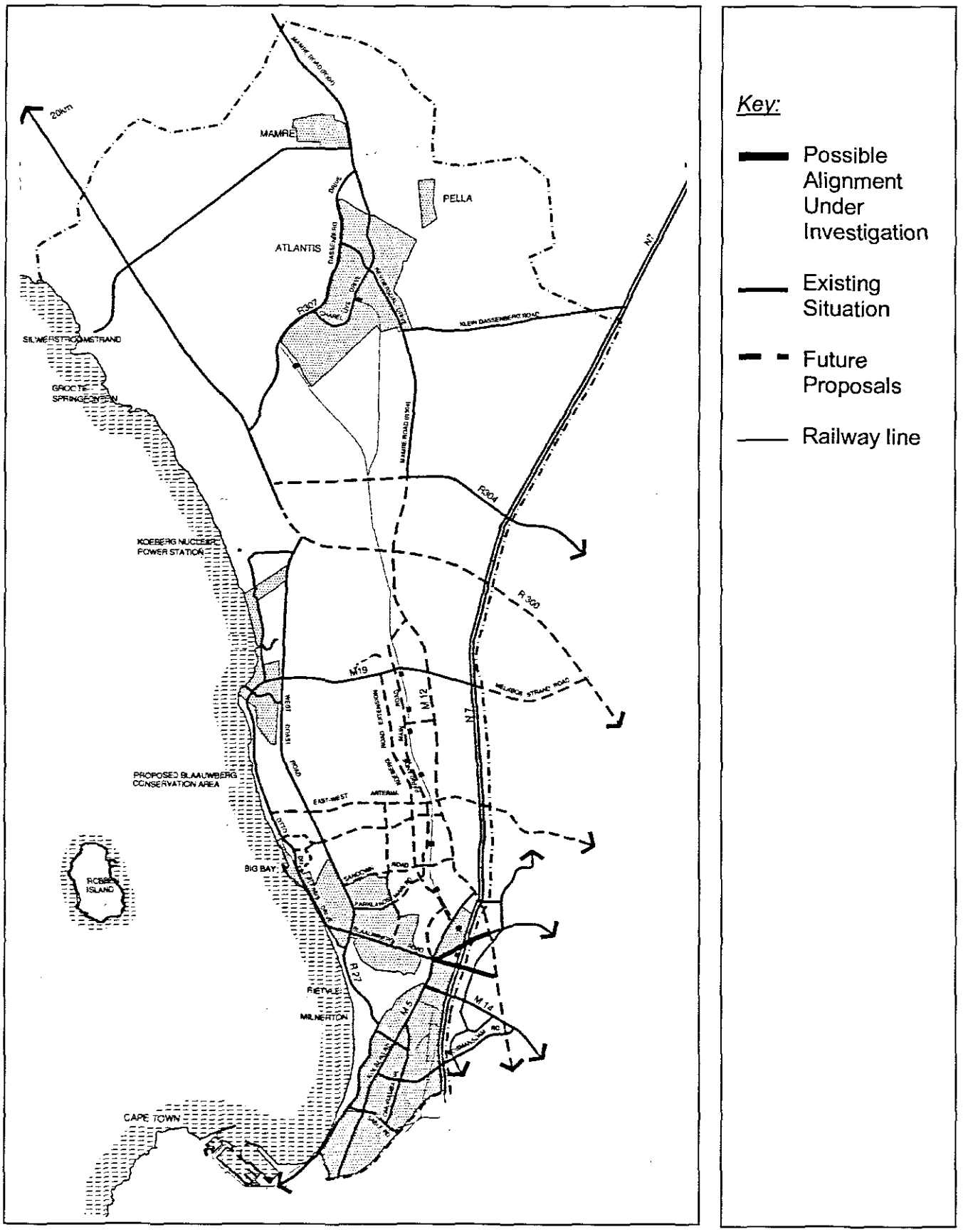
OBJECTIVE	POSSIBLE PERFORMANCE MEASURES
ECONOMIC AND FINANCIAL	
Reduce transport subsidies	Subsidy / year to region
	Subsidy / person in region/ year
Reduce overall expenditure on transport and use non-renewable resources	Capital cost / passenger
	Capital cost / passenger km
Reduce transport costs for the poor	Cost / public transport passenger
Attract new investment to a metropolitan area	Spin–off investment
Increase economic opportunities	Number of jobs (excluding relocations) in corridor
	Number of SMMEs in corridor
Improve the efficiency of infrastructure	Infrastructure operating cost / person in corridor
	Infrastructure operating cost / person in region
Linking to global economy	Number of plants, regional head offices, etc of multi-nationals in corridor
	Value of exports form corridor
TRANSPORT	
Integrate land use and transport	Average motorized travel distance / person in the region / day
Increase the use, efficiency and quality Of public transport	Modal split in corridor
	Modal split in the region
Increase / Maximise accessibility	Average travel time in corridor
	Average travel time in region
Increase / Maximise mobility	Average travel speed in region
Increase modal choice	Percentage of population with choice of public transport modes
Increase modal integration	Number of interchanges / trip in and to and from corridor
Shorter, fewer and safer trips	Number of non-motorised trips /day
Achieve peak travel times equal to off-peak travel times	Ratio of average peak hour / average off-peak hour travel times in corridor
	Ratio of average peak hour / average off-peak hour travel times in region
SOCIAL	
Alleviate poverty and reduce inequality and Social exclusion	Number of jobs in corridor for designated groups
	Average travel costs for designated group in corridor
Provide for the transport needs of special groups, such as the disabled and the elderly	
Improve security	
Improve the quality of life	Education indicators of designated group in corridor
Improve access to social services	Average travel time for designated group to specified basket of social services
	Average travel costs for designated groups to specific basket of social services

PHYSICAL / URBAN FORM	
Restructure the Apartheid landscape through spatial integration	Area of non-residential land within 1 hour travel distance for designated group
	Number of jobs for designated group within 1 hour travel distance
Redevelop blighted areas	Vacancy ratio in corridor
	Private spend / ha in corridor
Steer urban development	Ratio of development in corridor to region
Create "Urbanity"	Residential density in corridor
	Ratio of residential / non-residential land use in corridor
Improve legibility and the aesthetic quality of the urban landscape	
INSTITUTIONAL	
Improve inter-governmental co-operation	Spheres in stakeholder group in corridor initiative
Build partnerships	Number of participating stakeholders in corridor initiative
ENVIRONMENTAL	
Reduce the need for motorized transport and ensure more sustainable urban environment	Veh-km traveled / person in corridor
	Veh-km traveled / person in region
Reduce pollution	Quantity of particulates, SO_2, NOx, etc
Contain urban development / sprawl	Ratio of residential density in corridor to region
	Area of non-urban land converted to urban uses

(Source: National Department of Transport, 2001: 2-11)

APPENDIX 5:

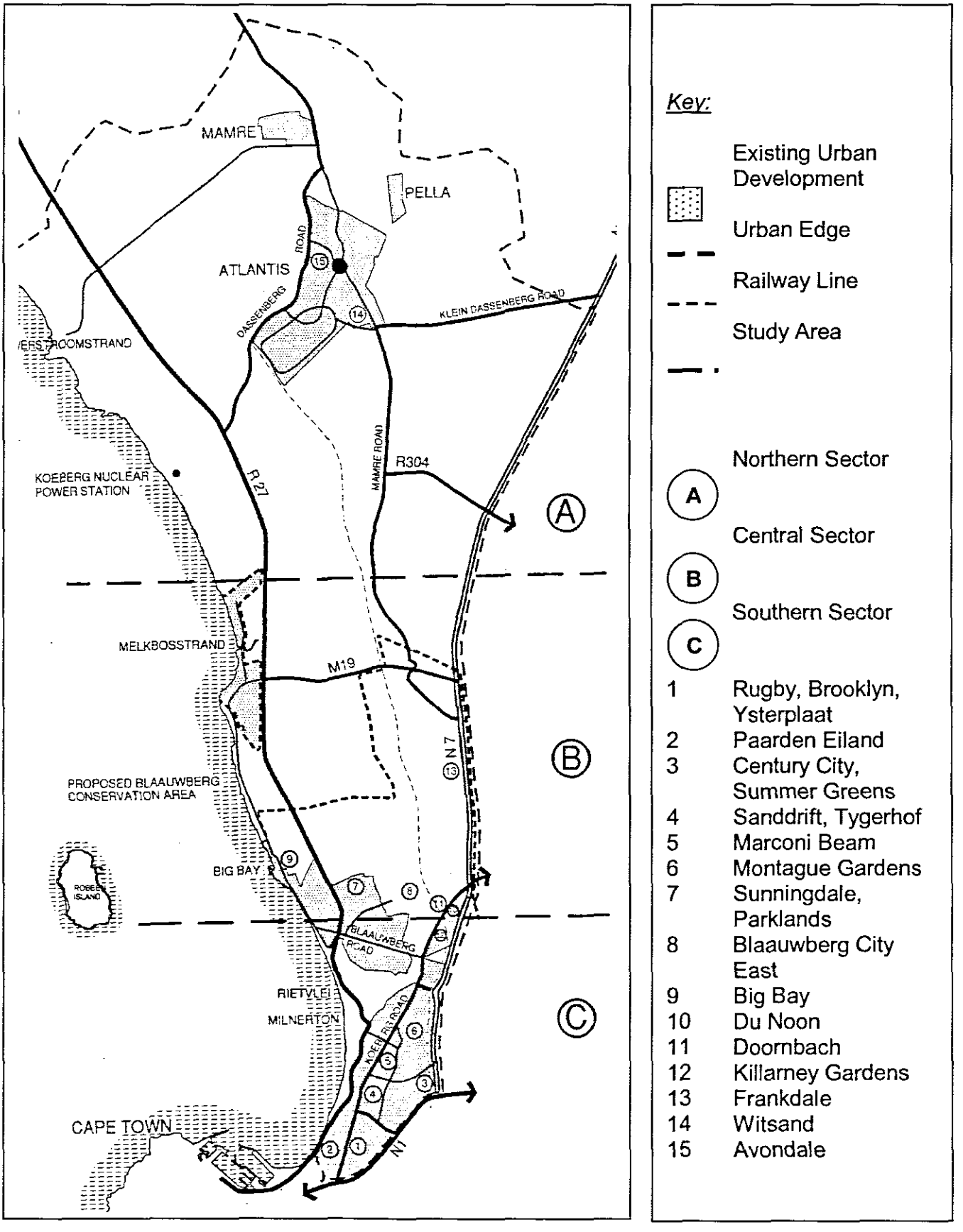
Map of the Northern Growth Corridor



(Source: City of Cape Town. Planning and Environment Directorate, 2002: 48)

APPENDIX 6:

Map of the Northern Growth Corridor regions



(Source: City of Cape Town. Planning and Environment Directorate, 2002: 3)

APPENDIX 7:

Research Outcomes and Outputs

	OUTCOMES	OUTPUTS	TIME FRAME
	2003		
1	Attended the 22nd Annual South African Transport Conference, CSIR Conference Centre, Pretoria, South Africa.	Good platform to debate corridor development with relevant specialists attending the conference.	14 – 16 July 2003
2	Attended the Southern Transportation Centre of Development's (STCD) annual Symposium, Engineering Building Stellenbosch University.	Networking and possible funding opportunities.	7 October 2003
3	Delivered a paper at the Eleventh Annual Technology Conference, Civil Engineering, Cape Technikon. Topic of paper: Potential of the Northern Growth Corridor (NGC)	To showcase the research in the Department to all students and lecturing staff.	16 October 2003
4	Designed a Poster for the Research Expo, Faculty Built Environment and Design, Cape Technikon. Topic of poster: Growth Potential of the Northern Growth Corridor.	To exhibit the progress being made with the research projects in the Department.	10 – 14 November 2003
	2004		
5	Delivered a paper at the 23rd Annual South African Transport Conference, CSIR Conference Centre, Pretoria, South Africa. Paper title: Potential of the Northern Growth Corridor.	Networking and showcasing the advances made in the research from the previous conference.	12 - 15 July 2004
6	Designed a Poster for the Research Expo, Research Department Cape Technikon.	To exhibit the progress being made with the research projects in the Department.	March 2004
7	Delivered a Paper at the 12th Annual Technological Conference, Civil Engineering, Cape Technikon. Potential of the Northern Growth Corridor.	To showcase the research the Department to all students and lecturing staff	14 October 2004
	2005		
8	Delivered paper at the 24th South African Transport Conference, CSIR Conference Centre, Pretoria, South Africa. Paper title: The answer is: Corridor Development, but what is the question?	Networking and showcasing the advances made in the research from the previous conference.	11 – 13 July 2005
9	Delivered a paper at the 2nd Africa Technology Transfer Conference, Pietermaritzburg South Africa. Paper title: Investigating attributes of a thriving activity corridor.	Networking and showcasing the advances made in the research from the previous conference.	21 – 24 September 2005

2006			
10	Thesis submission		May 2006
11	Journal article with research findings and conclusions to be written and published		2006