A STUDY OF THE DECENTRALISED BUSINESS NODES OF THE POST-APARTHEID CITY OF DURBAN.

Toward a New Business District as Part of the Greater Durban Business System.

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ABSTRACT

This dissertation revolves around the topic of office decentralisation. The literature review chapter first discusses a systems approach to planning, and how it is the relationships between the objects within a system that makes the system as a whole useful. This chapter also discusses theories relating to city planning with reference to Kevin Lynch in terms of city elements as well as city planning typologies. Edmund Bacon's theory of how movement systems of cities become powerful forces in terms of how the city is used and viewed is also discussed.

Ebenezer Howard's Garden City concept is discussed due to its intentional decentralisation but also for the manner in which nodes are linked. New Urbanism is touched on because many sprawling cities are turning this type of development in attempt to reduce the outward push of low density developments. Seeing that Apartheid city planning was informed by Modernist city planning, both of these concepts are looked at critically in relation to one another. This is to form the background on what impact office decentralisation has had on South African cities, and whether the locations of such decentralised office nodes have been in the correct locations in order to provide access to jobs to those who were marginalised during the years of Apartheid.

With this background, office decentralisation is discussed in general, touching on office building typologies, the effect transportation technologies had on city planning, what causes office decentralisation, and the issue of office decentralisation in South African cities. Examples of how office decentralisation has been used as urban renewal projects have been discussed because it is of the opinion of the author that this needs to occur more often, especially in South Africa.

Precedent studies of three cities which have undergone office decentralisation have been discussed in the next chapter. One is a South African city; one is another African city; and one an international city. This chapter discusses briefly their past, and the issues decentralisation is causing for the cities, as well as their solutions to the issues.

Durban is used as a case study in the next chapter where decentralised office nodes have been identified and analysed. The challenges this decentralisation brings to the city are then discussed and possible solutions drawn from the abovementioned precedent studies have been suggested.

These solutions were tested in a questionnaire which was sent to a selected group of working people. The results of which are discussed and analysed in chapters 5.

DECLARATION

It is hereby stated that the work contained in this dissertation is original by the author, unless explicitly indicated otherwise. The opinions herein are not those of the author's sponsor. This dissertation has not been submitted previously in any form to any other tertiary education institution.

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SIGNED: Jeffrey Timm

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DATE

DEDICATION

The author dedicates this dissertation to all communities within South Africa who are still disadvantaged due to historical Apartheid planning.

ACKNOWLEDGEMENTS

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CHAPTER 1   **INTRODUCTION**

1.1. INTRODUCTION

1.1.1. Background of the Study

This document serves to investigate the trend of office decentralisation in the post-Apartheid cities in South Africa, and whether the new locations of office development are appropriate to benefit all members of the public.

According to the Oxford Dictionary, decentralisation involves the movement of an activity which is under a centralised authority to an area under a local authority. In urban spatial terms, decentralisation is the movement of an activity from a centralised location to another location, whether it is a centralised location or not.

During the Apartheid regime, cities were planned according to race and class, and members in different groups were definitively separated by urban obstacles. Wealthy white suburbs were located very near job opportunities whilst poor black townships were located on the periphery of cities. This design gave preference to the white population in terms of economic and social ascent, whilst hindering the much poorer black population's economic and social ascent because they were located very far from these opportunities (Boraine, 2004: 112).

During Apartheid, the economic, or business, nodes were centralised in Central Business Districts (CBDs), but the 1970s saw the beginning of office flight from these centralised locations for more attractive, decentralised locations.

The question arises about the appropriateness of these decentralised locations as traditionally economic opportunities should be nearest the poorest members of society in order to minimise their transportation costs, as well as time spent travelling between their place of residence and their place of work.

The city of Durban (eThekwini Metropolitan Municipality) is situated on the east coast of South Africa in the province of kwaZulu-Natal. According to the South African Cities Network, the eThekwini Municipality has the second largest population (3 161 844 persons) of the other municipalities in South Africa.

Durban had a delayed reaction to office decentralisation when compared to other major South African cities, such as Johannesburg. Therefore the trend is still relatively new and the Durban city planners are able to learn from the mistakes made by other cities (Gounden, 1999: 55).

This poses a unique opportunity to investigate the appropriateness of the location of decentralised office nodes in the eThekwini Municipality. Therefore Durban/eThekwini will be used as a case study in this dissertation.

1.1.2. Motivation/Justification of Study

Some city councils roll out controlled policies of employment decentralisation in attempt to solve problems in the city which involve tampering with existing urban spatial planning and social problems within the city, and in some cases it is used in order to slow the rate of urban sprawl. In other cities, decentralisation occurs spontaneously and in an uncontrolled manner, which results in a host of spin-off pitfalls. Both of these scenarios can occur in cities located in the same country due to differing management control over municipal spatial planning, therefore each decentralisation occurrence comes with a unique set of issues and agendas.

Although the concept of decentralisation comes from changes in environmental, social and economic conditions, decentralising core business nodes in itself causes significant shifts in environmental, social and economic spheres. After all, a shift in location means a shift in emphasis, which involves interfering with existing naturally occurring market forces (Townroe, 1979: 117). This study will examine these shifts incurred by actively decentralising important nodes of a city in the South African context, since each country has a unique set of environmental, social, economic and spatial planning conditions.

Previous research has shown that decentralisation of business nodes has indeed occurred, whilst other research has shown a link between transportation technology and urban planning. The South African context is unique in that the Apartheid planners used this technology to segregate the population and impose poverty on the majority by limiting their access to employment opportunities in the business nodes. Whilst there has been extensive research on Apartheid planning (David Dewar is a renowned author), the link between Apartheid planning and the active decentralisation

of business nodes which occurred toward the end of the regime, and after it, is a largely untapped subject.

This link is important because it could potentially show what is being done to counter the urban spatial problems which the Apartheid regime has left us with, and whether the post-Apartheid urban spatial planning initiatives are appropriate in improving access to economic opportunities for the poor.

1.2. PROBLEM STATEMENT

The South African spatial context is unique due to rigorous Apartheid planning. Apartheid cities were designed to "impede movement" within the metropolitan areas in order to segregate races and classes (Boraine, 2004: 112). This makes for extremely inefficient use of resources and infrastructure as cities are fragmented by design.

City planners in the late 1970s began encouraging office decentralisation from the central business districts (CBDs) by means of taxes and rates incentives because they were concerned by the "over-concentration of key business and financial institutions" (Boraine, 2004: 113). This paved the way of the mass office exodus from CBDs to decentralised locations in the 1980s and by the mid-1990s these decentralised office nodes began to "spatially fragment a number of key South African cities" (Boraine, 2004: 113).

Cities handled this trend differently, though, based on the integrity of the spatial planning management department in each. For example it can be observed that Johannesburg's spatial planning management has been irresponsible in acceptance of rezoning applications in the northern residential suburbs of the city (Reilly, 2003: 25) which do not have the infrastructure in place in order to cope with the rigorous demand of low density offices. Roads become clogged by excessive use of the private car due to the decentralised office nodes' lack of existing public transport infrastructure (Buchanan, 1995: 75), whilst implementing public transport becomes inefficient due to the vast distances it would be required to cover as a pitfall of the low density development. Office decentralisation in Johannesburg appears to have occurred without a direct plan from the city's spatial planning department, which has left an uncontrolled sprawl of low density office parks in inconvenient locations which suited only the developer.

It can be observed that other South African cities have had a more controlled approach to office decentralisation (as in the case of Durban), whilst others have resisted it (as in the case of Cape Town). There is light on the horizon for Johannesburg though. It is predicted that the decentralisation process has ended, (Reilly, 2003: 24) and the city can now devise ways of making these nodes function efficiently by implementing correct infrastructure.

There are some dangers in the creation of decentralised nodes. New nodes may be located in an area which would benefit few people and businesses whilst disadvantaging many more. There is a danger that decentralising important nodes would move physical and managerial resources, as well as political attention away from pressing issues within the city centre. Other dangers include the possibility of jeopardising the economic stability of the original city centre (Townroe, 1979: 117).

The urban spatial and hierarchical structure of a city or country is stubbornly resistant to a change in emphasis on location. Grand gestures are difficult to implement politically whilst possibly causing severe social distress and being extremely inefficient in the use of resources. A policy of employment decentralisation involves tampering with the existing pattern of market forces operating in existing and new locations of economic activity (Townroe, 1979: 117).

To conclude, it can be seen in this section that more attention needs to be paid to the logistics regarding town and city planning, infrastructure implementation, but most of all to the location of decentralised economic nodes in South Africa due to the urban scarring left by Apartheid.

1.3. AIM

To study the unifying of Durban's decentralised business nodes for the benefit of city dwellers.

1.4. OBJECTIVES

- To study the design of cities in the South African and international context.
- To study the motivation for office decentralisation.
- To study the advantages of office decentralisation.
- To study the disadvantages of office decentralisation.

1.5. KEY QUESTIONS

- Why decentralise offices?
- What systems are in place to deal with office decentralisation?
- What effect has office decentralisation had on the South African public?
- How are office nodes accessed by workers?
- How can the concept of office decentralisation be used to counter the strict planning rules set on cities during Apartheid?

1.6. DELIMITATION

The research will focus on office employment decentralisation. Residential decentralisation will be touched on in order to understand how decentralisation became attractive. Industrial employment decentralisation will not be included in this dissertation because it involves a different type of workforce to commercial offices. It is also a vast topic on its own because it involves regional planning due to the efficiency and cost-effectiveness of processes involved in industrial node planning, as well as the proximity to a labour force.

1.7. THEORIES RELATED TO THE TOPIC

1.7.1. A Systems Approach to Planning

"A system is a set of objects together with relationships between the objects and between their attributes" where "objects are the parts or components of a system, which are unlimited in variety "," attributes, are properties of objects" and "relationships are those that 'tie the system together'" (Chadwick, 1978: 36).

1.7.2. Kevin Lynch's Theories of City Form and its Elements

Kevin Lynch discusses districts and nodes in his book *The Image of the City*. He says that districts are medium-to-large sections of a city into which the observer enters. These are recognisable parts of a city which have a common, identifiable character and are often used for references on the exterior. For example, tall office towers of the central business district (Lynch, 1960: 47).

According to Lynch, nodes are "strategic spots in a city into which an observer can enter, and which are the intensive foci to and from which he is travelling." Nodes could be junctions in paths, a break in transportation, a shift from one structure to another, or they could be "concentrations which gain their importance from being the condensation of some use or physical character" (Lynch, 1960: 47).

1.7.3. Decentralisation of Employment

According to Daniels, decentralisation is "a process or procedure that results in the withdrawal or redistribution of something from a place or centre in which it has previously been concentrated". As density and congestion increases in the Central Business District (CBD), the functions which least need to be there move out (Daniels, 1975: 160).

There are numerous reasons for businesses choosing to leave the CBD. Generally speaking these are congestion, crime and high land values in the centre and low land values on the periphery.

City Councils may introduce policies to encourage businesses to move to new decentralised areas in an effort to solve social, environmental and economic problems in the city as a whole.

1.7.4. South African Spatial Structure

The structure of South African cities is unique to most others due to Apartheid planning which was based on Modernist city planning which separated uses to ensure each use functioned at their maximum efficiency. Apartheid city planning extended this separation to that of racial and class groups. "South Africa occupies a position between developed and developing countries" (Marais, 1978: 23) because there was a distinct difference in the level of attention paid to the urban areas in which white people, and those in which black people, lived.

1.8. RESEARCH METHODOLOGY

1.8.1. Method

1.8.1.1. Primary Research

According to the Oxford Dictionary, research is the "systematic investigation of materials, sources, etc. to establish facts." Primary research will be in the form of the following:

- Case studies which the author will use to illustrate the topic, and the theories pertaining to the topic;
- Semi-structured interviews will be conducted with relevant sources;
- Questionnaires will be conducted to gain information from large groups of people

1.8.1.2. Secondary Research

This research will take the form of literature review and key precedent

studies, which involve the sourcing of information via means of literature which has already been written. Secondary research will be in the form of the following:

- Libraries: books, journals, newspaper articles;
- Electronic Media: internet

1.8.2. Methodology

Methodologies outline what the researcher needs to achieve. Relating to this topic, the methodology is to achieve an understanding of international trends in office decentralisation with a theoretical understanding of fragmented urban form with relation to South African cities. Qualitative analyses will be carried out on South African cities, as well as international cities, in order to reach this understanding.

1.9. RÉSUMÉ OF THE DISSERTATION STRUCTURE

Chapter Two will be the literature review of the dissertation and will discuss theories pertaining to the topic. These theories will include those touched on in section 1.6.

Chapter 3 will contain three key precedent studies. These will be of three cities which have experienced office decentralisation. Of the three cities chosen, one will be South African (not including Durban), another will be from another African country, and one will be from either Europe or the United States of America.

Chapter Four will be the case study of the dissertation. This case study will investigate the trends in office decentralisation in Durban in general, and one decentralised office node located in Durban in specific.

1.10. SUMMARY

The occurrence of decentralising a city's employment nodes is a common one throughout the world. Being a unique blend of developed and developing country, South Africa's largest cities possess the same issues any other large metropolis does, together with social problems which are left behind by Apartheid. Apartheid added a new dimension to the urban framework of South African cities, whereby cities were fragmented by racial and income group, disadvantaging most by placing them in far out locations with very limited resources and employment opportunities.

This research document will investigate the issues in surrounding employment distribution and the population they are intended to serve. This document will also

look at the social, environmental and economic issues which are unique to South Africa in general, and then in the case study, Durban's in specific.

A city is a system. The integrity of a system relies on the relationship between its objects. It is hoped that this research will aid in undoing the segregation of employment opportunities of the past, and propose an appropriate means of bringing employment opportunities to those who need them most in South Africa.

CHAPTER 2.   LITERATURE REVIEW

2.1.   A SYSTEMS APPROACH TO PLANNING

Professor George Chadwick writes toward a theory of the urban and regional planning process in his book *A Systems View of Planning*. He speaks of numerous theories involving complicated mathematical sequences, but also of basic fundamentals involving the issue of planning in general.

2.1.1.   PLANNING

Chadwick describes a plan as "any hierarchical process in an organism that can control the order in which a sequence of operations is to be performed" (Chadwick, 1972: 22), and that planning is a process of human thought and action which is brought on by that thought which makes the planning process one which considers the future and because of this, planning is optimistic in that it allows the planner to determine the future of a society. Chadwick says that "planning is a human activity, squarely based on human attributes." He goes on to say that a systems view of planning is intended to make the most of human abilities (Chadwick, 1972: 25).

City and regional planning "involve the arrangement of spatial patterns over time," but the spatial patterns are not planning, they are the objects of a process which can be seen independently of them (Chadwick, 1972: 24). In other words, spatial patterns are objects in a system.

2.1.2.   SYSTEMS

Chadwick quotes Hall and Fagen (1956): a system is a set of objects together with relationships between the objects and between their attributes.

2.1.2.1. Objects

As seen in figure 1, objects are the components of the system which are numerous and unlimited in variety. Objects are regarded as the parameters of the system. These parameters include "input, process, output, feedback control, and a restriction" (Chadwick, 1972: 36-7).
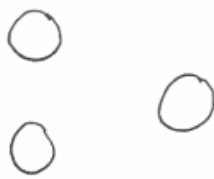
Figure 1: Objects in a system.

2.1.2.2. Attributes

These are the properties of objects and their parameters (figure 2). Such a property is an external expression "of the way in which the object is known, observed, or introduced in a process." In other words, "attributes characterise the parameters of the system," and these can be changed as a result of system operation (Chadwick, 1972: 36-7).

Figure 2: The attributes give objects their unique identifiable character.

2.1.2.3. Relationships
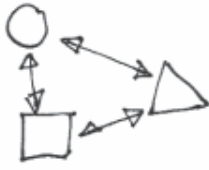
Figure 3: It is the relationship between the objects which make them useful.

These are what tie the whole system together (figure 3). They are seen as the factor which joins the objects and attributes in the system process. Relationships are found in "all system elements, among systems and sub-systems, and between two or more sub-systems" (Chadwick, 1972: 36-7).

A system has wholeness from the sum of its parts, but it is the relationship between these parts which actually make the system useful. This makes the relationship between the parts of the system crucial to the effective functioning of the system. That being said, Chadwick says that the structure of the wholes cannot be described in terms of relationships. He also indicates that the parts of a system are *arranged*, as opposed to being *added*, (Chadwick, 1972: 36) which indicates that the parts of systems are planned and placed in strategic positions so as to benefit the system as a whole.

Systems can be defined as complexes of elements which stand in interaction, and these elements stand in a structural conformity or "logical homology of laws in different realms."

Generally, principles of systems include wholeness, centralisation, leading parts, hierarchical order, individuality and finality (Chadwick, 1972: 38).

Systems operate by a process of input and output. Between these two actions is a flow through the system, which could be information, energy or matter. This flow can be described as an input-output relationship, and this relationship can be extended to sub-systems (Chadwick, 1972: 38-9) which can be translated back into the spatial structure of a city whereby the output of one centre could be the input of another.

Chadwick refers to the hierarchy of systems suggested by Kenneth Boulding (1956) who says there are eight hierarchical levels of complexity within systems. These eight levels, Chadwick says, are a framework on which to base all systems.

Level 1

Static Structure, which is the basic framework on which the system is based.

Level 2

"Clockworks," which is the simple dynamic system with predetermined, necessary motions.

Level 3

Cybernetic systems, whereby "the transmission and interpretation of information is an essential part of the system."

Level 4

The open system at cell level, which has a self-maintaining structure.

Level 5

"Genetic-societal level of the plant."

Level 6

The animal, with increased mobility and self-awareness.

Level 7

The human being as an individual system, "with self-awareness, and possessed with the image and ability to produce, absorb, and interpret symbols."

Level 8

Social organisation, human society (Chadwick, 1972: 41).

Chadwick comments on the work of Ross Ashby who speaks on the topic of cybernetics. Ashby notes that separate sub-systems begin to partition a larger system when the threshold level rises. When this happens, the "degree of wholeness" of the system changes. This means that scope of the system varies by the subject into which we are looking. Ashby says that "we define a system in accordance with our interests, and we can always lower or raise the resolution to define a "bigger" system or a "smaller" one" (Chadwick, 1972: 42).

The "scale" of a system also depends on the scope of the subject into which we are looking. Chadwick lists the following relative scales:

1. The *Environment* of the system. He says that this is the set of all systems other than the one we are interested in, and that we are not usually interested in the elements of the environment because we would then need to include them in our defined system.

2. The *System* itself, which is defined at a resolution level.
3. The *Subsystems* of the system. These are parts of the whole which show the quality of intercommunication within the system and distinguishes them from the other parts of the system as a whole, but are clearly part of the "larger" system.
4. *Elements* of the system. These are the components, the "smallest" parts of the system. We become interested in their behaviour, but not in their structure. Chadwick refers to these elements as "black boxes" because we know nothing of the structure of the element, but we know that it is relevant to the operation of the "larger" system. We know of its inputs and outputs, but not of the processes involved within the element. Chadwick says that this is valuable to the town planner in that, to them, buildings are seen as black boxes. They know of the inputs and outputs of the building, but know nothing of the processes within it. The knowledge of these inputs and outputs gives town planners what they need to conduct their business (Chadwick, 1972: 43).

Inherent in all systems is the idea of process, and this is evident at all levels. "A system exists in relation to its environment, and the system may be "open" or "closed in relation to its environment." When Chadwick refers to an "open" system (figure 4), he means that the system is not isolated from its environment, and its materials, energies and information are shared within its environment. A "closed" system (figure 5) functions without this sharing of information, energy and materials (Chadwick, 1972: 45).
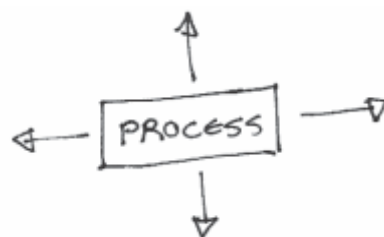
Figure 4: The open system communicates with its surrounding environment.
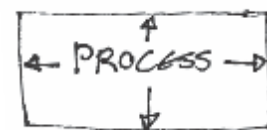
Figure 5: The closed system does not communicate with its surrounding environment.

Systems have a structure of morphology, which undergo internal changes over time, and in the case of open systems, undergo irreversible external changes over time (Chadwick, 1972: 46).

Chadwick says that a town cannot be a system when only its artefacts – its buildings – are taken into account. To be a system, the buildings need to be occupied by people and their activities, movement paths and energies, information and communication. This has to occur over a long period of time in order for a town to be useful as a system. "All systems are flow systems, for flows of information and/or energy and/or matter make up the relationships which are the heart of any system" (Chadwick, 1972: 48). This reiterates the important role the relationships play in the system which was stated earlier in the chapter.

On the subject of "size" of the system, Chadwick says this is a matter of the level of complexity of the system, as opposed to physical scale. When measuring the level of complexity in systems, Chadwick uses "variety" to determine the number of identifiable elements in a set. The more identifiable elements in a set, the more complex and hence the larger the system.

It is important to realise that is it physically impossible to study every single element in a given system because it will take far too long due to the many different varieties of subsystems, and subsystems of subsystems involved within the single "larger" system (Chadwick, 1972: 51-2). It is thus important to define the limits to which one is studying a given system.

Chadwick continues by saying that systems maintain themselves by "exchanging materials, energy, information with the environment and in continuous building up and breaking down of the components in the system" (Chadwick, 1972: 59). In terms of towns and cities, this relates to cycles of urban degradation and regeneration, whereby some areas in a city are degrading whilst others are regenerating.

2.1.3. SUMMARY AND CONCLUSIONS

Professor George Chadwick discusses systems and planning in general, but this can clearly be related to urban and regional planning. In terms of decentralisation of city centres, each centre can be seen as a subsystem of the "larger" system which is the city as a whole. The systems principle of "wholeness" will be formed by the differing centres' ability to function together as a single entity, and the principle of hierarchy would be seen as the level of importance placed on each centre, which is a naturally occurring phenomenon in any case.

In terms of the "size" and "scale" of the system, the "larger" system would be the metropolitan region, and the elements or *objects* would be the different centres within the city. Each centre would be a subsystem, and each would have subsystems within them which drive the market forces which would inevitably uphold the integrity of each centre. The most important feature of any system, and which makes the system useful, is the *relationship* between the *objects* which make up the system. The *relationships* between the centres of a city are the means by which they are connected, for example road or rail, and by what each centre specialises in, for example manufacturing, commerce, residential, etc.

As discussed previously, parts of systems break down whilst others build up, and this can be related to the degeneration and regeneration of parts of cities.

It can be seen that cities are systems containing many components and subsystems which work together to form a whole to achieve a single goal. This goal will ultimately be what the city specialises in, for example finance, industry or services.

2.2. THEORIES OF CITY FORM AND ELEMENTS

Kevin Lynch is a well respected author on the makings of successful urban form. In his book *The Image of the City* he speaks of the various elements which work together to form the structure of cities, and later writings in Banerjee's book *City Sense and City Design* he speaks of urban form typologies, as well as the character of urban centres. It is interesting to note that he refers to urban forms as "systems," which relates to the subject of the previous chapter.

Lynch states that a town is mainly characterised by the look of its centres, its major roads, predominant open spaces and the quality of its residential districts. He also states that the visual quality of the activity centres is possibly the most important feature of the city because they are used by the largest numbers of people, thereby "standing for" the city as a whole (Banerjee, 1990: 303).

He states in the same book that centres are places which people identify with, "sharing reflected glory or shame, depending on their quality. People are proud of cities whose unique centres present a clear image to themselves and to visitors. In other cities, they say there is nothing to see, nowhere in particular to go" (Banerjee, 1990: 741).

2.2.1. URBAN ELEMENTS

Lynch says that there is a public image of any given city. This image is a juxtaposition of many images experienced by the observer, and these images take on many different forms, each with its symbolic meaning. The following are what Lynch considers elements:

2.2.1.1. Paths

Figure 6: The city is experienced mostly from paths.

Paths are possibly the most important element because they are the lines which allow the relationships between sectors of the city to occur, in turn tying the city together. Paths are the movement channels within the city. They can take the form of streets, walkways, transit lines, canals or railroads. Paths depict how the city is arranged and organised, and for most people, it is the way in which they observe the city, as well as orient themselves to it (Lynch, 1960: 47-62).
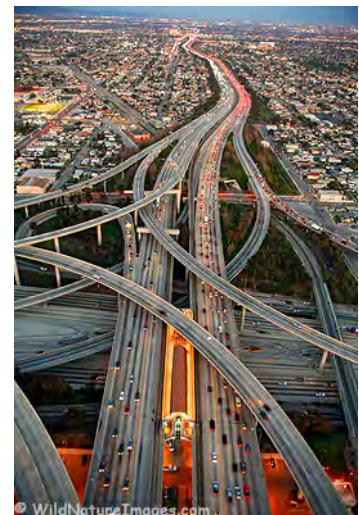
Plate 1: This freeway interchange in Los Angeles illustrates that paths are the lifeblood of cities. (www.my-photo-blog.com)

2.2.1.2. Edges

Figure 7: An edge can take the form of many things. This illustration shows a beach promenade forming the edge of a high density residential district.

Edges are linear elements which are not considered as paths, although they could be. Edges form the boundaries between two kinds of areas. The strongest edges are not only visually prominent, are also continuous in form and do not allow for movement to flow through them. Edges act as lateral references, with the example of a coastline (Lynch, 1960: 47-66).

Lynch describes a freeway as "a snake lying over the city image. Held down at ends and at one or two internal points, it elsewhere writhed and twisted from one position to the next" (Lynch, 1960: 63). He says that edges, whether they are railroads, freeways, topography or district boundaries, are a typical feature which tends to fragment the city environment. He also says that "the disruptive power of an edge must be reckoned with "because it may cause isolation of communities, although he found, whilst interviewing respondents, that the most unpleasant edges "seemed to have been mentally erased" (Lynch, 1960: 64). For example refer to figure 8. Whilst the

Figure 8: This aerial photograph is of an area in Durban. The edge in this case takes the form of a railway shunting yard. It is evident that it prevents similar development from taking place either side of it. One is completely unaware of the shunting yard when one crosses the arterial bridge and thus this unpleasant urban edge is hidden from view at street level so that it does not tarnish the perception one has of the urban fabric.
(Google Earth 2010)

visual continuity is an important feature of the edge, it does not necessarily mean that the edge is impenetrable as many edges function as seams which join two major areas together, rather than barriers which keep them apart.

Edges can be paths. Lynch discovered from his respondents that where edges were paths, they read the element as a path, not an edge.

Edges also have directional qualities (Lynch, 1960: 47-66).

2.2.1.3. Districts

Figure 9: Districts are defined as such by their unique characters. Although the above diagram is simple, it shows that districts are identifiable from the outside, and the viewer is able to enter into them.

"A city district in its simplest sense is an area of homogeneous character, recognised by clues which are continuous throughout the district and discontinuous elsewhere" (Lynch, 1960: 103).

Districts are relatively large areas of a city which the observer can enter, and each district has a distinctive character. They can be recognised internally, and sometimes from the outside. Lynch found that some of his respondents said that "districts were the basic elements of the city image," (Lynch, 1960: 67) and that districts were still an important part of the experience of living in a city.

A district is defined as an area which has a common character (see figure 9 and plate 2). To add to this character could be a large variety of variables, such as: texture, space, form, detail, symbol, building type, use, activity, degree of maintenance or topography, to name a few. There needs to be a certain "reinforcement of clues" to give a district a strong identity.

Lynch says that social connotations also play a role in the defining districts in cities. There are "class overtones that many people associate with different districts" (Lynch, 1960: 68).

Names are given to districts in order to reinforce their identity even when they do not contrast greatly with the rest of the city.

Districts have various types of boundaries; some are hard, with the example of a river or coastline; some are soft or uncertain, such as the end of an inner city shopping district and the beginning of an

office district. There are other regions which do not have any boundaries.

Edges appear to play a secondary role though. They may set limits and enhance the identity of a district, but they have less to do with constructing it. Edges may increase the tendency of districts to fragment the city in a disorganised fashion.

Plate 2: Durban's Central Business District (CBD) is characterised by its tall buildings. Localised areas within the CBD are characterised by use such as shopping, office or residential.
(Author, 2008)

It is common for districts to have a solid core, around which is a decreasing gradient of activity. Sometimes a strong nodal point can define a district by means of homogeneity. These nodes are primarily reference points and are useful organising mediums.

Some districts are introvert, which make little reference to the city around them, whilst others are extrovert and consciously make ties with the surrounding city. There may be a single district in a city, or there may be many which are linked together (Lynch, 1960: 47-72).

Districts are areas of the city which have an identifiable character. People identify parts of the city by what the part is used for, for example the Central Business District. But districts are also defined by land use intensity. Perhaps the implementation of the separation of land uses by methods of zoning enhanced the idea of identifiable districts within a city.

2.2.1.4. Nodes
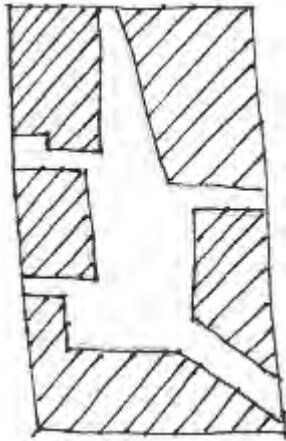
Figure 10: Nodes are strategic points in a city. This figure illustrates a public square amongst dense buildings.

"Nodes are the conceptual anchor points in our cities " (Lynch, 1960: 102).

Nodes are strategic points of focus in a city which a viewer can enter. They are typically junctions in paths or a concentration of a similar characteristic. Conceptually they are small points in a city, but they may also be large squares (as in figure 10), linear shapes or even whole central districts when the city is considered at a large enough level.

A junction, or a point of break in transportation, has a very important place in the eyes of the city observer. This is a point at which decisions must be made and people's senses are naturally heightened at these places, which makes them notice elements in these vicinities much more readily than in other situations. Elements in at these points may be assumed to develop a special prominence from their location.

Lynch suggests that the "transition from one transportation channel to another seems to mark the transition between major structural units." He also mentions that subway stations are linked along invisible path systems, but are located at strategic junction nodes on the surface and that some of his respondents would organise the rest of the city around these points (Lynch, 1960: 74), see plate 3.

Plate 3: An entrance to the Paris Metro Subway forms a strategic node at ground level.
(www.travelblog.org)

Theoretically, a crossing of ordinary streets could form a node, but the sheer number of these occurrences in a vast city becomes far too many to contemplate each to be of any form defining importance. On a city scale, nodes of importance may be the economic centres, but within those centres will be nodes of specialised activity, for example a city square around which the district is arranged.

Nodes become memorable when the space around them has form, although for the node to function as such, form is not crucial when there is a high concentration of specialised activity around it.

Nodes, like districts, can be introvert or extrovert, but the most successful ones "seem to be unique in some way and at the same time to intensify some surrounding characteristic" (Lynch, 1960: 77).

2.2.1.5. Landmarks

Landmarks are physical reference points within a city, as seen in figure 11 and plate 4. They may be man-made or topographical. They may be large scale, as in the case of an obelisk, or small scale, as in the case of a unique door. They may be near or they may be distant. The purpose of a landmark is to be a contrast to its background in order to be instantly recognisable to be used as an orienting device. It must be simple in form so that it is easily memorised in its context.

Locating a landmark at a junction reinforces its importance because it is a point of many decisions. Historical or other deeper meanings are powerful reinforcements for landmarks.

Landmarks can be spatially prominent. To do this one can either make the element visible from many locations, or one can set up a local contrast with nearby elements, for example a variation in set back or height (Lynch, 1960: 47-83).

Landmarks can be used in order to visually link dissociated centres in cities in order to establish direction and distance between them.

Figure 11 & Plate 4: The viewer uses landmarks as a means of finding their way through the city, man-made or topographical. Image: Durban harbour control tower (Author, 2006).

The elements discussed above are the "raw materials" of the environmental image at the city scale and should be used together to produce a satisfying form. Used

effectively they can enhance each other's power, but used ineffectively they can destroy themselves and the urban landscape.

In Lynch's research, it seemed that there were sets of overlapping images, rather than a single image, in a given city. These were typically arranged in a series of levels, roughly by the scale of areas involved. These levels went from street, to neighbourhood, to city, to metropolitan region. The arrangement by levels is crucial in a large and complex environment, although it does add the extra burden of organisation on the observer, especially if there was little relation between levels (Lynch, 1960: 86).

"We are continuously engaged in the attempt to organise our surroundings, to structure and identify them. Various environments are more or less amenable to such treatment. When reshaping cities it should be possible to give them a form which facilitates these organising efforts rather than frustrates them" (Lynch, 1960: 90).

2.2.2.   URBAN FORM TYPOLOGIES

2.2.2.1. The Linear Form
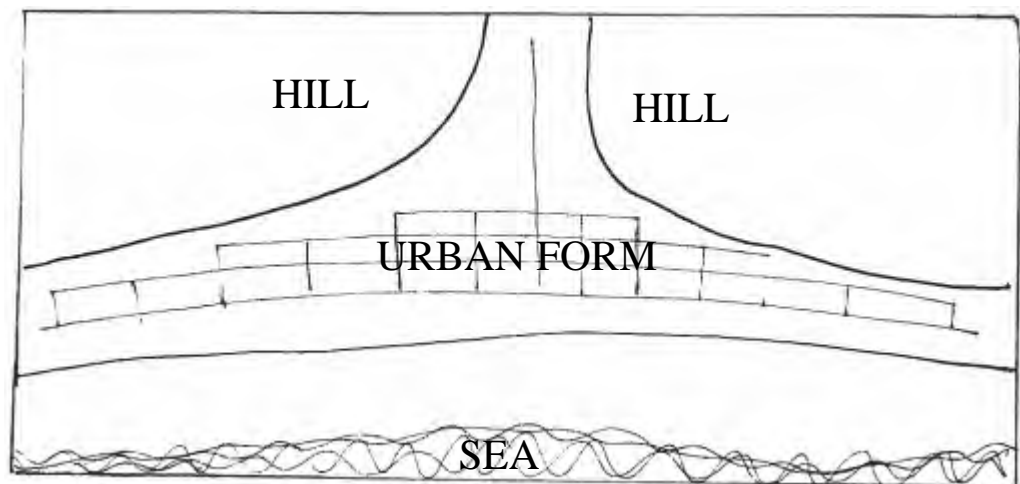
Figure 12: A linear form is typically seen in narrow coastal belts between the sea and steep terrain.

This form is organised by a set of dominant, relatively parallel paths which are dictated by a hard, usually naturally occurring, edge – for example the edge of an ocean or lake. The urban form takes on a linear character whilst development occurs along these parallel paths. Points of interest, generally activity centres, occur along the line which creates a rhythm for the observer. Lynch says that some hierarchical ranking occurs along the line as there may be one main centre and several smaller ones. This form can grow indefinitely in either longitudinal direction, but has a limited ability of lateral growth. Such growth would weaken the system; therefore this urban

form is best suited to a narrow coastal belt where this lateral growth is restricted (Banerjee, 1990: 76-7).

2.2.2.2. The Linkage System
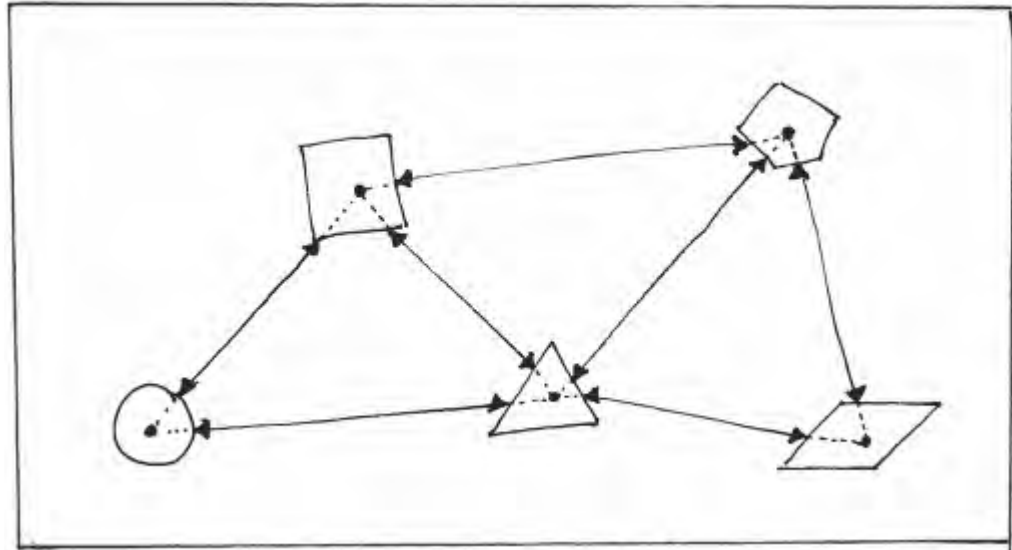
Figure 13: The linkage system involves many separate centres within city limits which are identifiable from their differing characteristics. These centres are linked by transportation routes.

This urban form is derived from various focal points which are distributed within the limits of the city, but are interlinked by paths to form an irregular network. The character of each focal point is different to the next and contrasts greatly to the land immediately around them. Lynch says that hierarchical order does occur in this urban form, albeit not as prominently as in other forms. The most important centres tend to cluster near the geographical centre of the region. The sequence of links which lead from one major centre to another would pass through a number of minor centres; this would be referred to as a major link. To describe this form simply would be to say that it consists of "a few major centres and their connections" (Banerjee, 1990: 78).

Linking paths terminate at a major centre at each end which gives rise to an important node in each, together with the possibility of landmarks and other important urban elements.

Lynch says that special districts are also an important feature of this urban form, for example a Central Business District, together with small to medium sized open space within the centres.

Land use intensities in these centres are high, resulting in multi-storey solutions, but there is a requirement of a local movement system which is not connected to the inter-centre movement because of the land-use intensity in the centre itself. Densities diminish as the distance from the nodes increases. Centres located on the periphery may be satellite communities who are connected by their links into the city but are surrounded by open space.

Due to the generalised linkage throughout a region of this form, a certain degree of clearance, disorganisation and waste can occur without disrupting the system as these activities can be bypassed. This form is "well suited to in-filling and gradual change, as long as the loci of the centres are preserved," and the region may grow toward its edges. Lynch says, too, that it may be possible to invert the system and allocate new centres which have their links in the old open spaces. These new links would then "plow under" the old linkage system which would cause some adaptability shifts to occur, but the main flows must remain primarily on the centre.

A major issue with the Linkage Form is having a sufficient degree of differentialisation in character between the different nodes without straining the observer's ability to retain the image of the whole whilst making it possible to remember the interconnections of these nodes. The Form gives a certain degree of choice regarding the organisation of the observer's life in terms of centres, special districts, landmarks and sequences.

An inherent issue this Form possesses is that it is "an invitation to congestion" due to the multi-directional traffic flows due to the choices available to the viewer (Banerjee, 1990: 78-9).

2.2.2.3. The Radial System

In this urban form there is a single dominant focus which is centrally placed in the region with a series of major paths of circulation which lead into it. These paths are ribbons of development and between these are large wedges of open space. These paths are connected by a circumferential path, and at the point of connection a smaller centre, or node, is formed. As part of a hierarchical structure, these centres

are less important than the major centre toward which all paths run in this form.
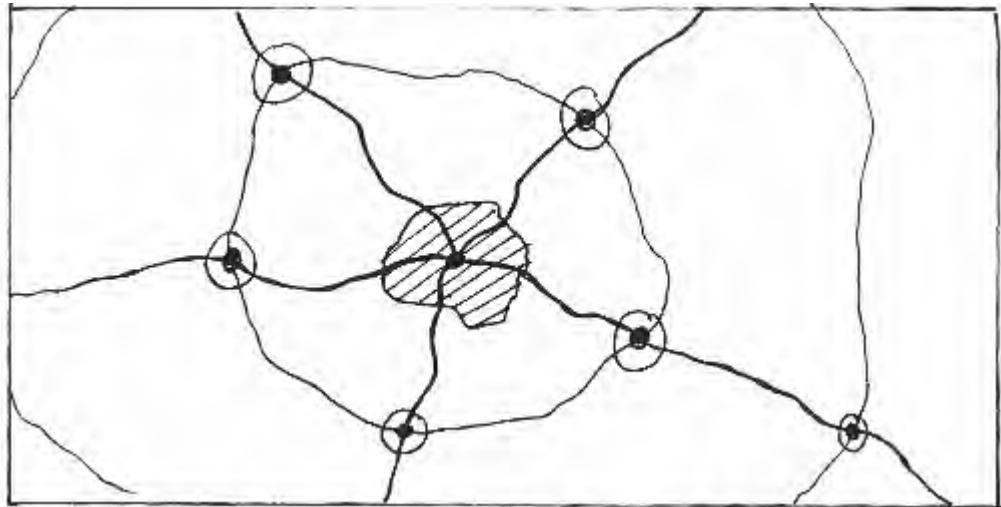
Figure 14: The radial system involves a single major centre. Minor centres occur at intersections of the major routes which lead into the major centre, and the minor routes which encircle the major centre.

The radial paths are linear sequences which all end in the major centre but the distance covered is scaled by the rhythm of passing through the minor centres on the circumferential path. The radial pathways pushing outward eventually lose momentum and the opportunity for satellite communities exist at the ends of these.

This type of urban form can take the shape of a star, and it generally grows outward along its rays of radial paths, although as the observer moves further from the major centre, development is linear in form and becomes isolated from the other radial paths. Lynch says that the major centre, or other important centres, can grow together by "rolling" along the path which connects them.

There are several problems relating to the Radial Form. One is that it becomes difficult to maintain a sense of direction on the circumferential paths due to its endlessly curving nature. There is also the problem of a lack of ability to adapt due to the large focus of energy on the major centre. Problems in accessibility arise from the inherent principle of convergence, although this feature allows mass transit systems to operate very efficiently due to the high density of people living and working close to the radial paths (Banerjee, 1990: 79-80).

2.2.2.4. The Grid System
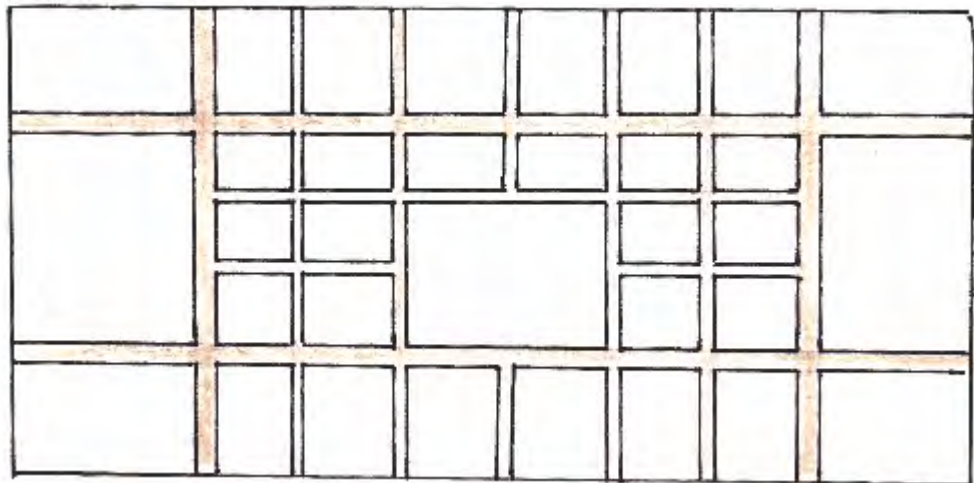
Figure 15: The grid system functions on logic and efficiency of space.

This system is based on the general rectangular grid of major paths and performs best in terms of efficiency and of sensing direction. The spacing within the grid may vary, but the principle is that paths run parallel and perpendicular to one another and these two sets of paths are distinguishable from each other. There can be hierarchical ranking to a certain degree among the paths, with the dominant path being the most important.

There is a recurrent rhythmic sequence which occurs along these paths by those which are perpendicular to the direction the observer is travelling which gives a sense of scale.

The Grid System is a very basic form which has clarity and indefinite coverage whilst being able to organise a complex and large environment, together with being able to adapt to changes in function and circulation very well. The centres in the system can be varied in their relation to the grid; they have diverse characters and functions whilst they are not isolated from one another.

Foci are found at the intersections of paths, but do not straddle them. The location and hierarchical rank of the foci depend on the crossing of major paths. There is a difficult relationship between the foci and gridlines because the centres have to lie beside the lines so as to not to interrupt the path flow. Major circulation works more efficiently if access to the major centres occurs between the major intersections, rather than at them. This causes a sense of isolation between the grid

and the rest of the spatial structure. As with the radial form, densities decrease as the distance from the foci increases.

The grid system has its positives and negatives surrounding it. The major positives are that it relates well to growth and change, functionality is very flexible, flow changes can be accommodated, and the form allows for very efficient use of land. The negative is that "it is an endless, repetitive form, rather than centrally oriented" (Banerjee, 1990: 81-2).

Many cities are made up of a composition of two or more of the above urban forms, but Lynch proposes how best to utilise each form to impact positively on any existing city – not considering the costs involved. The following are a few of his proposals (see figure 16):

a)   A rectangular grid of limited-access freeways. These would pass near, but not through, existing centres. It would be important to maintain visual contact of the centres and open spaces from the freeway. Transit lines would run on the same grid at the freeways, and these would loop off the grid to pass through the centres.

b)   Arterial streets in the existing city would be gradually relocated and improved. These streets would run from centre to centre and along them would be a concentration of special non-central uses.

c)   Dispersion of central functions would be encouraged, but only to other central locations. Where necessary, new multi-purpose centres would be supported, and would be aligned to the arterial street network. It would be important, however, to maintain the integrity of the original centre because its degree of specialisation would be desirable. All centres in the regional system would maintain their concentration, mixed use would be encouraged, and each centre would have its own local movement system. Each centre would have its own recognisable identity complete with landmarks, entrances and focal points.

d)   Densities are recommended to be kept relatively low, but not uniform, with an increase along the arterial streets and particularly near the centres. Central functions would be encouraged to remain in

clusters and access-oriented functions would be located on arterials, whilst other uses would be allowed to be placed freely. Diversity and individual action would be most encouraged (Banerjee, 1990: 83-85).

The above proposals show that Lynch encourages cities to possess multiple centres of great diversity, but it also shows that he is not afraid of the highway and the freedom of movement of the motor car. Although his system does involve centre-to-centre movement of mass transit, this network would run side-by-side with highways which is noble, but the superior travel times of the private car to mass transit may have the upper hand in an apparent competition.

── FREEWAY GRID
─ ─ ─ RAILWAY GRID
── ARTERIAL GRID
LOCAL GRID
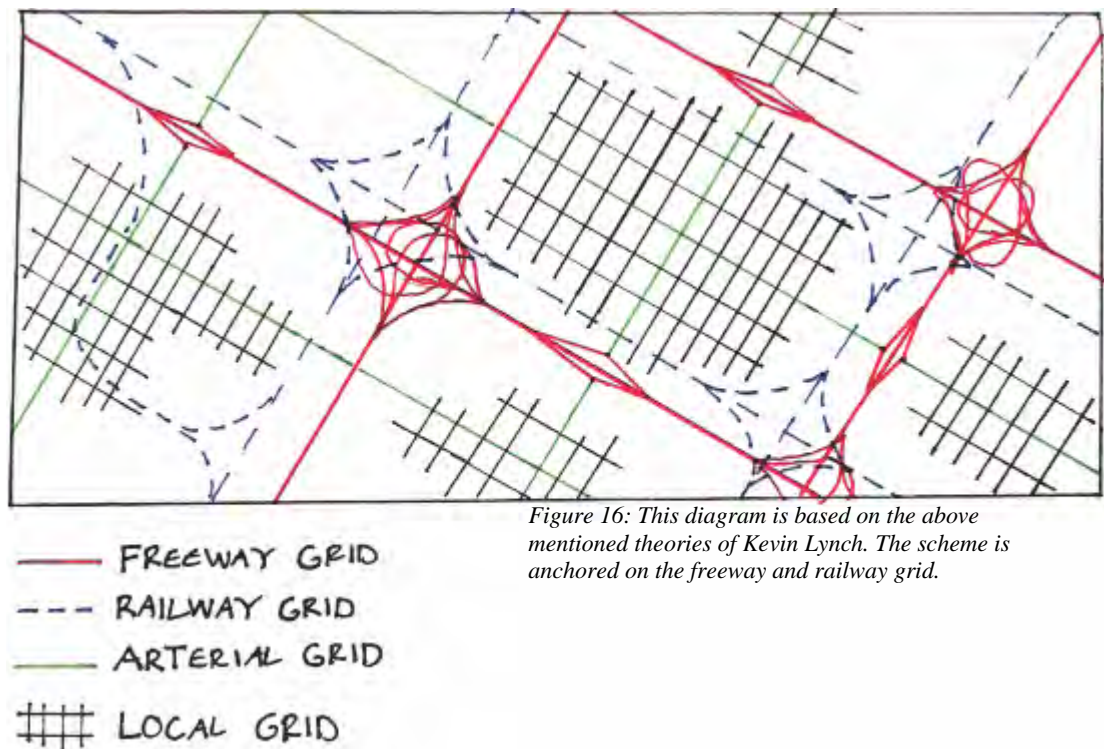
Figure 16: This diagram is based on the above mentioned theories of Kevin Lynch. The scheme is anchored on the freeway and railway grid.

Lewis Mumford agrees with Lynch's embracement of the highway, although he says that they must be designed correctly and sympathetically toward the existing urban fabric. It is clear from his writings that he feels that the highway is destroying the urban landscape, however he does make some interesting points. He says that the "motorway has taken the most valuable recreation space the city possesses," not only by using land which could be used for other things, but also by cutting off urban features (Mumford, 1964: 183).

Mumford draws a comparison between train and private vehicle traffic crossing London Bridge. He says that the railroad could carry 50 000 people across the bridge in one hour, whereas the best freeways can allow 4 000 to 6 000 cars to pass a single point per hour. Freeways take up a much larger space than a railway does, but cannot compete with the rate at which the railway can carry passengers (Mumford, 1964: 186).

Mumford draws another comparison, this time between pedestrians and cars. He says that moving 100 000 pedestrians could be moved from point A to point B in half an hour, but it is unknown how long it would take to move the same number of people travelling in cars between the same points (Mumford, 1964: 186).

It is clear from these comparisons how the issue of congestion in city centres arises.

2.2.3. MOVEMENT SYSTEMS AND PERCEPTION OF SPACE

The following sections will discuss Edmund Bacon's theories of simultaneous movement systems and the viewer's perception of space.

2.2.3.1. Simultaneous Movement Systems

Bacon says that in order to understand this theory we must first consider the relationship of mass and space, the continuity of experience, and simultaneous continuities. These describe the paths along which city dwellers move through cities (Bacon, 1980: 34).

2.2.3.1.1. Relationship of Mass and Space

Space is seen as the dominant force and needs to be responded to as a basic element in order to produce designs abstractly within it. Bacon says that scientific thought has made us realise that space and movement are dominant and that matter is really the product of movement in space (Bacon, 1980: 34).

2.2.3.1.2. Continuity of Experiences

Bacon says that the role of the design of a city should be to create a "harmonious environment for each individual who resides in it from the moment he rises in the morning until he retires at night." When one moves through space, "a continuity of experiences occurs which is derived from the nature and form of the spaces through which the

movement occurs" (Bacon, 1980: 34). From this Bacon derives that the concept of a movement system is a dominant organising force in city and architectural design. It is the design of structures along these movement systems which create continuous experiences for the user.

2.2.3.1.3. Simultaneous Continuities

Bacon says that we must see the continuity of space experiences "in terms of a series of movement systems based on different rates of speed and different modes of movement, each of these interrelated with the others and each contributing its part to the total living experience in the city" (Bacon, 1980: 34).

2.2.3.1. 4. Simultaneous Movement Systems and City Design

The strength of the plan of a city lies in the ability to influence growth, not in authority. As movement systems of a city are used over time, they establish themselves deeply in the psychology of the community (Bacon, 1980: 35).

Bacon suggests that introducing a movement system to a city should be in an organic manner, and should be allowed to grow over time because the pattern of growth is ever changing. Movement systems must relate to natural and man-made topography. They have the ability to emphasise elements which are important to the community (Bacon, 1980: 35).

Movement systems must also relate to the tempo of the type of movement system one is designing for. For example a freeway needs long, free flowing forms to take account of fast moving traffic, whilst pedestrians need interest, variety and impressions of rapid change (Bacon, 1980: 35). To create these impressions one can use focal points, landmarks and regularly changing building facades.

The concept of movement systems provides a basic design structure for the designer to build his work from. It is essential that continuity at the city scale is kept in mind when designing.

"A clearly expressed movement system is a powerful influence." It becomes a political force in that it can show communities that city

rebuilding and restructuring is occurring with the ruling government's ideals in mind (Bacon, 1980: 36).

2.2.3.2. **Perception of Space**

The ways in which people perceive space forms the basis of the mindset with which city dwellers will ultimately view their city, as well as the different parts within their city. Edmund Bacon illustrates the following four perceptions people can gather about a space or city.

2.2.3.2.1. Inward Looking
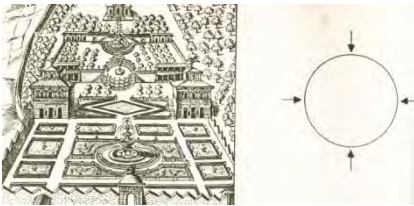
Figure 17: Inward looking design. (Bacon, 1980: 44)

This is when buildings or urban areas focus their attention inward into themselves in order to preserve the perfectness which exists within their boundaries but which they believe does not exist outside of their boundaries. These structures exclude those who are left on the outside of these boundaries and create a hostile environment for both parties.

2.2.3.2.2. Outreach

Figure 18: Outreach planning. (Bacon, 1980: 44)

These plans involve entire cities. Thrusts and counterthrusts of movement systems are extended over vast distances but always reach out and terminate at definite objects such as a gateway, church or square. These can be used to tie a city together.

2.2.3.2.3. Outgoing
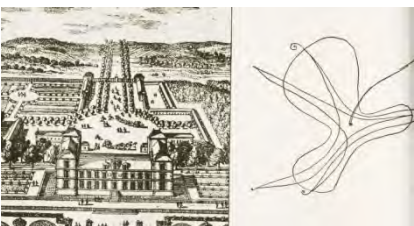
Figure 19: Outgoing planning. (Bacon, 1980: 44)

This type of city plan creates movement system thrusts similar to the Outreach type, but they do not have any definite termination point. They "penetrated the boundaries of the inner space, that extended outward indefinitely, over the horizon and seemingly to infinity." This plan is intended to "establish the idea of a design structure capable of indefinite extension over time" (Bacon, 1980: 45).

2.2.3.2.4. Involvement

Figure 20: Involvement planning. (Bacon, 1980: 44)

This type of plan is a combination of the Outreach and Outgoing types. It involves the outward thrust of movement systems from a source, but also the inward thrust from other sources. This sets up relationships between different parts of a city.

2.2.4. SUMMARY AND CONCLUSIONS

In this section, Kevin Lynch's theories of city elements and form have been discussed. Elements include paths, edges, districts, nodes and landmarks. These help define a city's character, as well as different areas within cities. They are useful when one is designing a new urban node, or even upgrading parts of cities. They can also be used as a means to analyse an urban area.

The city forms which have been discussed in this section include the linear form, the linkage system, the radial system and the grid system. These are also useful as a means of analysing cities in that each form speaks of differing sets of variables which occurred at the planning phase. For example the radial system came about by the invention of the commuter railway and the streetcar, which will be discussed in the next section. These forms also speak of the sets of principles upon which cities were designed. For example, the grid system is rational and efficient, whilst the linkage system is about maintaining the characters of the individual centres whilst being connected in order to trade with each other.

Edmund Bacon's theories of simultaneous movement systems and perception of space were discussed. Movement systems involve the continuity of experiences throughout the city by city dwellers. The movement system provides a starting point from which the city designer may begin designing. There are different scales of movement systems which need to be designed accordingly. Perception of space is important to understand in order to design the most appropriate city for the public for whom the designer is designing.

This brings the discussion to the next section, which will discuss the topic of Ebenezer Howard's Garden City concept which involves the controlled decentralisation of the 'old' cities in order to improve the quality of life in these old cities, but also the countryside and in the new towns.

2.3. EBENEZER HOWARD'S GARDEN CITY

In 1898 Ebenezer Howard, a stenographer and shorthand writer, published a book called *To-Morrow: A Peaceful Path to Real Reform.* This book introduced Howard's concept of The Garden City and social and political reform to the world. His theories are among the most influential in the history or modern town planning (Ward, 1992: 2; 28).

2.3.1. BACKGROUND

Ebenezer Howard was born in London in 1850 but spent five years of his early working life in Chicago (Ward, 1992: 3). His proposal in 1898 was based on London and came to be from two important factors: rapid rural-to-urban migration and industrial pollution (Ward, 1992: 29).

The rapid rural-to-urban migration experienced in London caused large overcrowded and insanitary slum-like living conditions which resulted in the decline of both urban and rural life (Ward, 1992: 29).

With regard to pollution, Howard says that "the sunlight is being more and more shut out, while the air is so vitiated that the fine public buildings, like the sparrows, rapidly become covered with soot" (Howard, 1966:47).

Howard's Garden City proposed returning the population to the countryside, whilst providing infrastructure that is available in cities but at a lower density. He illustrated this idea in a diagram he calls "The Three Magnets."

2.3.2. THE THREE MAGNETS

The diagram of The Three Magnets is a representation of Howard's reformist ideas. It outlines the ills of the Town and Country, but also the advantages of merging the best qualities of both development typologies.
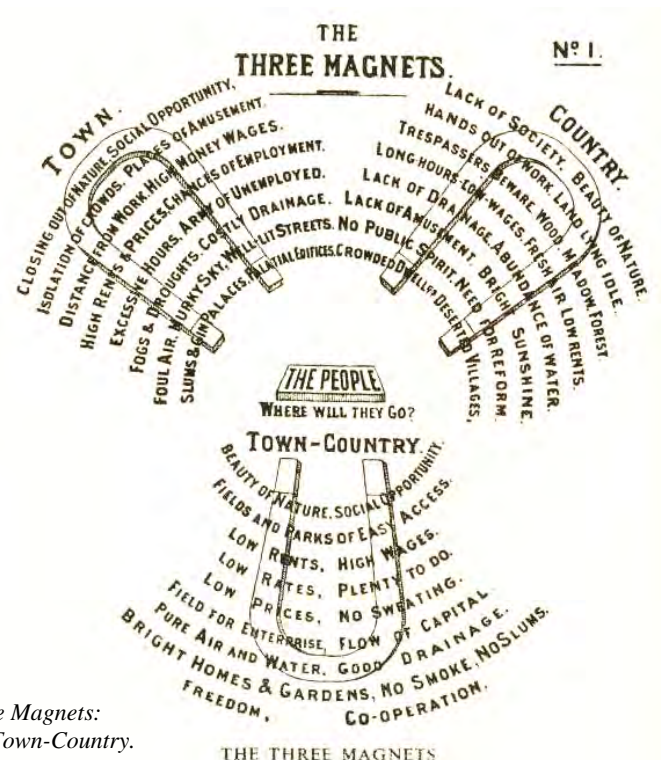
Figure 21: The Three Magnets: Town, Country and Town-Country. (Howard, 1966: 46)

2.3.2.1. The Town Magnet

Howard said that the town is the symbol of society (Howard, 1966: 48). He portrayed it as an overcrowded, polluted place which is full of economic, social and amusement opportunities. Although earnings are higher in the town, rents and prices of goods are also much higher than in the country. He also said that there is a large proportion of the population which is unemployed and that even though the streets are lit with electrical lighting, environmental conditions are foggy and water and sanitary services are very poor, sometimes non-existent. He said, too, that both the distance to work and working hours in the town are excessive (Howard, 1966: 47).

Howard said that the town is the place of mutual help between humans. It is the place of science, art, culture and religion (Howard, 1966: 48). He argues, however, that the negatives of living in the town outweigh its positives (Howard, 1966: 47).

2.3.2.2. The Country Magnet

Howard said that the country is the "source of all beauty and wealth" (Howard, 1966: 47), although it is very dull due to a lack of society and money. The country possesses clean air, rolling hills and wonderful views, but even though rents are low, it is due to the lack of money or interest. The industry which dominates the country is agriculture, which takes advantage of the rainfall, but there is no means of storing water for times of drought. Parts of the country are almost devoid of people

Howard said that the country is "the symbol of God's love and care for man." It is the source of health and wealth, but due to the "unnatural separation" of man from the country, there is so much for man to learn from nature (Howard, 1966: 48).

Howard therefore proposes the Town and Country should become one, whereby the best qualities of each be joined in harmony.

2.3.2.3. The Town-Country Magnet

Howard proposed that the town-country marriage would – according to his theory – lead to social opportunities which are similar to those

found in the town whilst accommodating nature throughout the development. He said that higher wages would be coupled with lower rents and rates, and that there would be employment opportunities for all. He also said that capital would be attracted and would create wealth and that sanitary conditions would be remarkable. He said too that everyone would have a beautiful home, gardens would be seen from everywhere and that freedom would be widened to make for happy residents (Howard, 1966: 49).

Howard's proposal takes the social advantages of the town and places them in a location in the country.

2.3.3. THE GARDEN CITY CONCEPT

Ebenezer Howard's ideas for the Garden City were not new – they were adopted from three sources – but it was the combination of the three ideas which gave the Garden City concept its substance. In his writing, Howard fully acknowledged sources of his ideas in industrial and population migration, land reform and model communities (Ward, 1992: 2).

Figure 22: Ebenezer Howard's diagram of a group of satellite Garden Cities. Notice the central town has a larger population than the outer ones. (Ward, 1992: 4)

The fundamental idea behind Howard's vision is "the movement from a high-cost, unstable big-city economy to a low-cost, stable decentralised economy concentrated in self-contained communities" (Ward, 1992: 148).

Garden cities were intended to be small, well planned towns where each would be surrounded by 5 000 acres of rural land and interconnected by a rapid transit system of electric railways. The actual town would occupy 1 000 acres and would house a population of up to 32 000. Although this population is small, each garden city would be economically and socially balanced whereby all income groups would be accommodated and all levels of employment would be available (Ward, 1992: 29-30).

In terms of regional planning, Howard envisaged regional systems of garden cities whereby the smaller cities with populations of 32 000 would surround a single larger city of 58 000 people. Green belts around each city would keep them separate and each would have its own identity. "These polycentric 'social cities' indeed anticipate the modern concept of a multi-centred city region divided by green belts and served by integrated traffic systems" (Ward, 1992: 30).

Howard's physical plans of Garden City show it in a circular formation with a

Figure 23: A more detailed plan of the conceptual layout of the Garden City. Notice Howard placed industry/employment zones on the outskirts of the settlement. This would give preference to the residential zones within,but also maximise the amount of employment opportunities in each ward due to the large circumference of the circular form of the town (Ward, 1992: 5).

clear zoning system within it. Public buildings and service activities are located at the centre of the circle which is surrounded by a belt of residential development. Encircling this are the railway and factories. Public parks and gardens, and tree-lined avenues are important features of the garden city concept. Six large boulevards radiate from the centre of the city outwards. These boulevards divide the city into six equal neighbourhoods which are self-sufficient. The rural land surrounding the city is

used for agriculture, forestry, recreation and institutions such as hospitals (Ward, 1992: 30).

Howard's drawings were very diagrammatical, which allowed real-life developments to take on their own form to suit sites and developer preferences. Howard intended this to occur, along with free will on the style of buildings built in the cities. He did however stress that all sanitary arrangements would be strictly enforced, and that all sewerage and refuse be utilised on the agricultural areas surrounding the city (Ward, 1992: 30).

Howard also stressed that the land on which the city sat must belong to the community. The reason for this was that it would ensure the social control of the physical planning of the garden city, and that all increases in land value brought about by development would be put to public use (Ward, 1992: 30).

Howard believed that quality of housing, work and leisure conditions would be greatly improved in garden cities. He intended a city of freedom, whereby only land uses would be controlled. It would be a place where both rural and town life would be enriched: the attractions of the countryside would be available to the city's residents whereas the economic advantages of the city would be easily available to rural residents (Ward, 1992: 31).

The Garden City, in essence, is controlled decentralisation of the older, more congested city. It was Howard's intention to undermine the old city by the creation of "satellite" garden cities located outside of the old city (Ward, 1992: 10). These satellite towns were intended to attract rural-to-urban migrants before they reached the big city, and to attract big city residents who wanted a better way of life away from the congestion, pollution and failing sanitary and sewage systems.
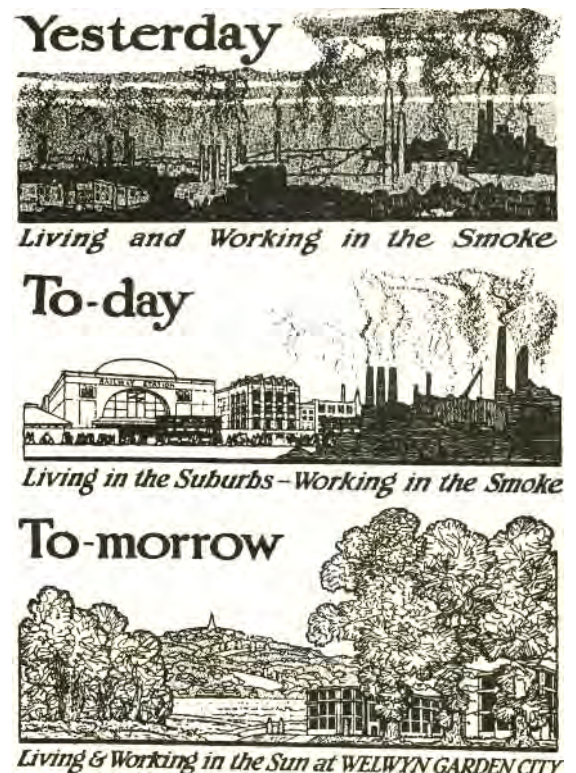
Figure 24: Propaganda for an experimental Garden City in 1920. It clearly shows that Howard's garden city idea was a reaction to the era of coal, steam and the railway (Ward, 1992: 147).

2.3.4. IMPLEMENTATION OF THE GARDEN CITY CONCEPT

Ebenezer Howard's Garden City concept was never fully implemented, but it did make waves around the world. It influenced planners and reformers in many countries around the world, even though they implemented the concept partially. Peter Hall labelled Howard as "the most important figure in the international history of town planning" (Ward, 1992: 24). Hybrids of the garden city concept can be found in many cities around the world.

2.3.5. SUMMARY AND CONCLUSIONS

The basis of Ebenezer Howard's Garden City concept was to deconcentrate the 'old' city by a means of controlled decentralisation. His reason for this was overcrowding, pollution and unsanitary conditions in the 'old' city, whilst the countryside was lacking in the social and economic opportunities available in the city. His proposal was to take the positive qualities of both the city and countryside and create a decentralised, self-contained community with a balance of classes and economic opportunities on all income and skills levels.

These decentralised, or satellite, towns would have strict land use zoning laws, but also would allow the residents the freedom of designing their own space. The density of these satellite towns would be much lower than that of the 'old' city, and the quality of living would be of utmost importance.

The satellite towns would be surrounded by rural agricultural land which separates the towns from each other, but also allows the residents easy access to nature. The satellite towns would be placed around a larger town, which strongly speaks of decentralisation of city functions.

The Garden City concept, as noted before, was probably the most important introduction to the history of town planning. Concepts it used can be seen in Modernist city planning, for example zoning, the creation of wards or neighbourhoods and keeping a close connection to nature by means of separating nodes by means of unspoilt land.

Howard's Garden City concept is arguably the first actively decentralised community.

2.4. MODERNIST PLANNING AND THE SOUTH AFRICAN SPATIAL STRUCTURE

The structure of South African cities is unique to most others due to Apartheid planning, which separated the population into racial and class groups. "South Africa occupies a position between developed and developing countries" (Marais, 1978: 23) because there was a distinct difference in the level of attention paid to the urban areas in which white people and those in which black people lived.

2.4.1. MODERNIST PLANNING

The Apartheid city was developed around Modernist planning. It is therefore valuable to discuss the principles of this method of planning in order to understand the way in which the Apartheid city was structured.

Modernist planning was derived by the Congres Internationaux d'Architecture Moderne (CIAM) as a means of dispersing the functions of cities which had become congested by the Industrial Revolution. They believed that the Revolution created chaos in European cities by 1900 which had destroyed the cities' social fabric. The CIAM solution "proclaimed a new machine era in which the potential benefits of the Industrial Revolution would be extended to all classes (of people) and in which the city would be as orderly as an industrial assemblage" (Holston, 1989: 41). Modernist cities were intended to be both functional and efficient, as in the efficiency of such an industrial assemblage.

The ideal modernist city would be neither socially nor spatially divided into wealth classes (Holston, 1989: 46). Modernist planners saw the capitalist city as one which was organised, both socially and architecturally, by discriminations between public and private, as well as by wealth which, in their view, had to be changed. In order to achieve this, the state took control of the four functions of urban order, namely housing, work, recreation and traffic (Holston, 1989: 55). Planners refer to the arrangement of these functions or "objects" as zoning. Modernist planning proposes that cities
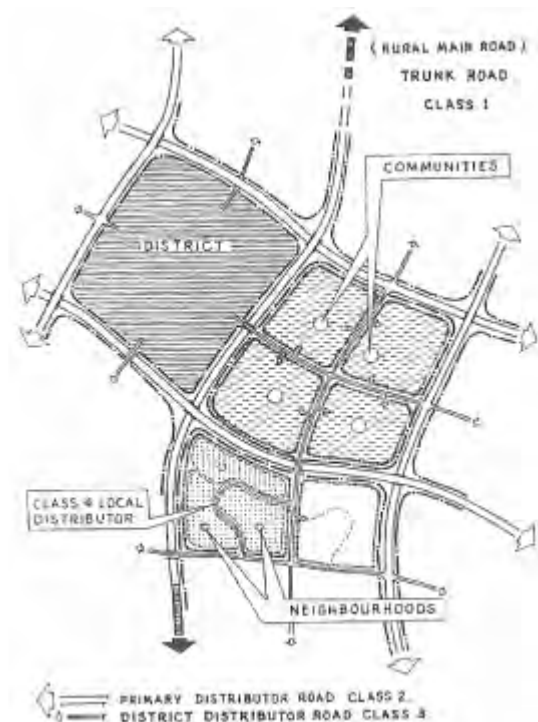
Figure 25: A diagram showing the essence of Modernist planning. The stages of the plan are indicated by the level of detail shown in the blocks. Districts are planned, then these districts are divided into communities. These communities are then divided into neighbourhoods. (Dewar, 2004: 12)

be "organised as mutually exclusive sectors. Together with circulation, this organisation determines both the mutual order and the overall shape of the city" (Holston, 1989: 32).

Modernist planners had an "overriding concern with separation." The four functions, or zones, mentioned above were "consciously separated into mono-functional areas." This idea of separation was to "reduce conflict between activities and to maximise the functional operation of each activity" (Dewar, 2004: 11). From this was derived the concept of the neighbourhood unit (see figure 25). This concept involved the grouping of units into 'neighbourhoods' or 'cells' whereby each had community and commercial facilities at their geographic centres, and the development around these centres was oriented inward toward them. Movement routes were designed to discourage through-traffic. The system of centres in these 'cells' was often hierarchical in that many smaller centres in an area would relate to a larger centre in the area, which in turn would relate to City Centre (or Central Business District). At a larger city scale, development took the form of a "system of discrete developments, separated by buffers of open space and linked only by high speed, limited access movement routes" (Dewar, 2004: 11). These "buffers" were seen as positive pieces of open land which the public could use to access nature.

Modernist planners relied on state authority to achieve total planning of their cities. They intended to fuse art, politics and daily life, and the development of building typologies and planning conventions were used as a means to achieve social change (Holston, 1989: 43).

Decontextualisation, James Holston says, is fundamental to the modernist planners who were designing new environments of social concentrations, and which, due to the totality of the master plan, allowed "no escape from what is essentially a forced conduction to radical changes in social relations" (Holston, 1989: 53). This conduction relied on shock and defamiliarisation. The latter is a "means of breaking through the deadening and mechanical habits of daily routines in order to desacralise unquestioned values" (Holston, 1989: 53-54). Techniques of shock were developed to raise critical consciousness. Methods to achieve this include inversion, arbitrary juxtaposition, montage, decomposition and deconstruction (Holston, 1989: 55).

Modernist planners designed master plans for cities. "The purpose of a master plan is...to achieve a rationally structured homology between social-functional and architectural-formal organisations. The zone is a basic unit of such a structure and is conceived as a single correlation of function and form." As mentioned before,

modernist city's functions are separated in the form of zones, and "it is this uncompromising rationality in the planning of its parts that gives the modernist city the quality of total and totalising order" (Holston, 1989: 138).

2.4.2. SPATIAL PLANNING AND THE APARTHEID CITY

"The spatial precepts of Apartheid accorded neatly with those of modernism" (Dewar, 2004: 13). The Apartheid planners distorted the following principles of modernist planning:

- "Desirable use separation was extended to include race." This meant that different racial groups were allocated exclusive pieces of land on which to live (see figure 26). There was (and still is) a direct link between class and race in South Africa, and, as it happened, the poorest were the black people who were moved to the periphery of cities. These peripheral locations were/are known as townships and were very far from economic and social opportunities (Dewar, 2004: 13). This is contrary to American cities in which the poor live very close to the economic centres because this cuts their transportation and time costs.

- "The neighbourhood unit." The open space around these units was seen as negative space. These open spaces were used as buffers which were intended to reinforce the separation of the population (Dewar, 2004: 13). "Apartheid planning has left South Africa cities scarred by buffer strips" (Cox, 2009: 21). These buffer strips also took the form of major infrastructures such as freeways and railway lines which could not be crossed easily (Boraine, 2004: 25). Economic opportunities were prevented from establishing themselves in these neighbourhoods which had very limited numbers of access and exit points in order to control the occupants.

- The next distorted Modernist concept was that of movement. "The entire system of Apartheid depended on high-speed routes linking the fragmented parts of the city" (Dewar, 2004: 13). The most common form of these links are freeways and railways. These were seen as "urban umbilical cords" due to the exaggerated distances seen in South African cities due to their spatial fragmentation. These routes were seen as "space bridges: their sole purpose was to move large numbers of people and goods over considerable distances from one destination to another as rapidly as possible. The emphasis was almost entirely on promoting mobility rather than increasing access" (Dewar, 2004: 13).
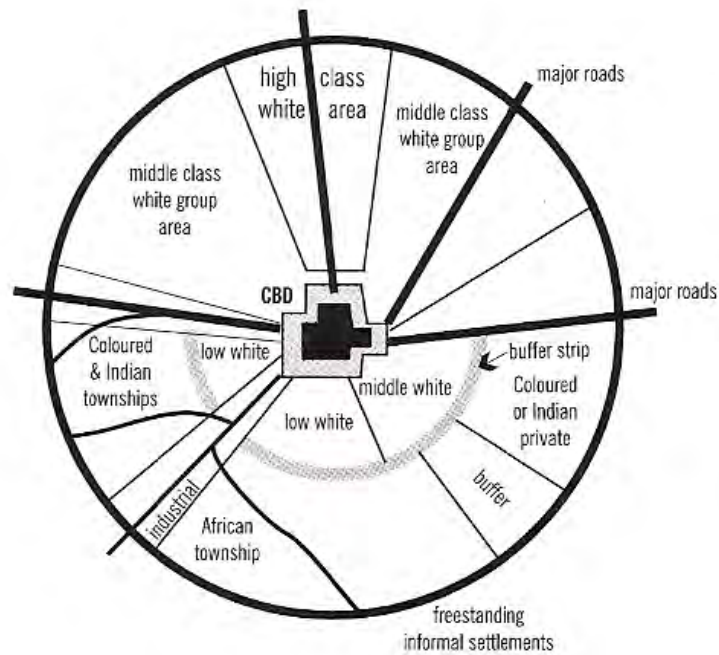
Figure 26: A diagram showing the basic structure of the Apartheid city. One can see the extent the planners went to in order to separate races and to favour white only areas (Boraine, 2004: 24).

The two overriding features of South African cities are "racially based planning, and a political economy that meant development for some at the expense of the majority" (Boraine, 2004: 24)

Richard Tomlinson describes the South African city as a "doughnut" (see figure 27) due to the highest density of the population being located on the periphery of the city (Tomlinson, 1994: 17). As discussed earlier, these peripheral areas were allocated to the poorest, largest, portion of the public, and these people were forced to live in these areas by the Group Areas Act of 1950. These areas were "sprawling, squalid dormitory townships of

Figure 27: Diagram showing the relative population densities and distribution in Apartheid cities. Red is high and green is low. There were far more poor, black members of society than wealthy, white members, yet the latter received a much larger portion of land on which to live. (image altered from: Boraine, 2004: 24)

undifferentiated 'matchbox' houses." They were poorly serviced by infrastructure and were "devoid of employment or shopping and entertainment facilities" (Boraine, 2004: 25). These poorest members of society, predominantly black, were seen as a source of cheap labour and were exploited as such.

The white suburbs sprawled too, but much more care went into planning them. They were located much closer to the economic centre of the city, thus closer to economic and social opportunities than the poorest members of society (Boraine, 2004: 25).

2.4.3. MOVEMENT AND THE APARTHEID CITY

It is ironic that Apartheid cities were designed to impede movement, (Boraine, 2004: 112), but their urban structure generates considerable movement and access problems.

There are three aspects which characterise the spatial outcomes of the Apartheid city:

- Sprawl
- Fragmentation
- Separation (Dewar, 2004: 20)
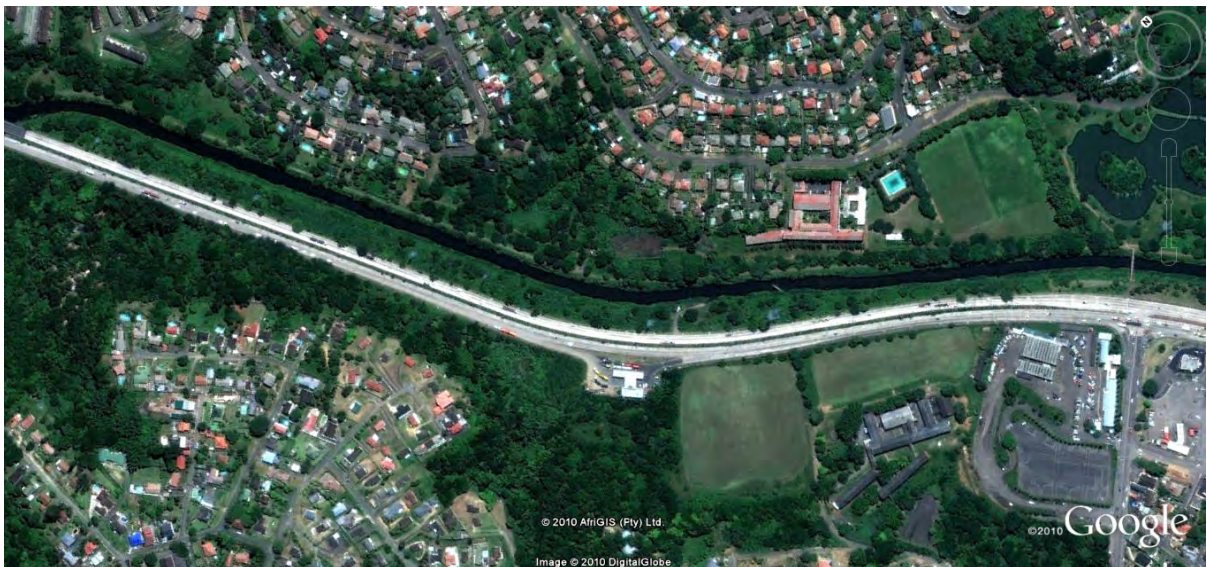
Figure 28: This aerial photograph of Edwin Swales Drive in Durban illustrates well the system at work in the Apartheid urban structure. It is clear that the high speed movement path is the main road which follows the river, and there are no roads which cross over the river to join the two sprawling suburbs on either side of the main road. Another feature of the Apartheid city can be seen in this photograph: buffer zones. The road, together with the vegetation either side of it, prevents any pedestrian crossing between the two suburbs. It can be seen from this photograph the sprawl, fragmentation and separation inherent in Apartheid city planning. (Google Earth, 2010)

Each of these aspects generate a large amount of movement on their own, but when put together they create a major urban movement problem.

He says that "the system generates an enormous amount of movement and the sprawling patterns militate against the provision of efficient public transport" (Dewar, 2004: 21).

Plate 5: A peripheralised government housing development in Durban. Notice the sprawling nature of the development. (www.kzn-media.photoshelter.com)

Dewar says the system discourages pedestrian movement because it is road-focused. There are large amounts of one-way traffic at peak hours, with a large fall-off in the off-peak hours. This, together with the low-density sprawl, makes larger capacity, fixed-line public transport unviable in most cases. This lack of high capacity public transport forces people to own cars. Together with this, the minibus taxi industry directly competes with the available bus and train services, which adds more vehicles to the roads (Dewar, 2004: 21).

As noted previously, the urban poor are forced to live in peripheral locations, far from economic opportunities (see plate 5). Also, when a person makes a trip, the value of the activity their destination offers is sufficient to warrant the trip in the first place. (Don't understand previous sentence. There are two sets of costs involved in travel: time and money. "The time spent travelling is time not spent doing other things" (Giuliano, 2004: 51). This is the essence of the locational disadvantage inherent in all Apartheid cities, where time is taken from the poor in the form of transport. This time could be better spent on further studying, with family, or even a second job. These things are elements which help lift a poor society out of its predicament and into a better life.

Another movement generator in South Africa, and cities around the world, has been office decentralisation.

2.4.4. NEW URBANISM

The has been a reaction to the sprawling nature of South African cities in the form of a relatively new concept of urban planning called New Urbanism.

2.4.4.1. Introduction

The concept of New Urbanism was born when a congress convened in Alexandria, Virginia, United States of America, in October of 1993. The 170 people who attended voiced their concerns regarding the manner in which modern cities and society functioned (Leccese, 2000: 1). Note their concerns were of American issues, but similar issues have arisen in many cities around the world. They were concerned about the placelessness of residential suburbs, the decline of central cities, the widening separation of communities through race and income, the social impacts of raising children in an economy which requires both parents to work to maintain a good lifestyle, and the environmental damage which is a direct result of development which requires the use of a private car for daily activities (Leccese, 2000: 1).

2.4.4.2. The Charter of New Urbanism

Together the Congress, mentioned in sub-chapter 2.4.4.2, put forward The Charter of New Urbanism which has three main chapters:

- The Region: Metropolis, City and Town
- Neighbourhood, District, and Corridor
- Block, Street, and Building

The following sub-chapters will run through the points discussed in the Charter.

2.4.4.2.1. The Region: Metropolis, City and Town

The Charter states that the metropolitan region is an essential part of the modern world and that "government cooperation, public policy, physical planning and economic strategies must reflect this new reality" (Leccese, 2000: 15). "Metropolitan regions are finite places with geographical boundaries" and they are made up of multiple centres in the form of cities, towns and villages, each with their own centre and edges (Leccese, 2000: 23). "Farmland and nature are as important to the metropolis as the garden is to the house" (Leccese, 2000: 29).

The Charter suggests that development patterns should not blur or destroy the edges of the metropolis and that infill development within the existing built environment would conserve the environment, economic investment and social fabric whilst re-using and rejuvenating abandoned areas within the metropolis (Leccese, 2000: 35).

In cases of urban infill, the new development should be organised as neighbourhoods and districts whilst being fully integrated with the existing urban pattern. Where new development is not in infill areas, it should be organised as a town with their own urban edges and should cater for both residential and job opportunities. (Leccese, 2000: 43). Also, development should "respect historical patterns, precedents and boundaries" (Leccese, 2000: 49).

The Charter states that cities should provide a wide variety of public and private uses to support a regional economy which benefits all income groups, and that affordable housing should be evenly distributed throughout the region to match job opportunities in order to avoid concentrations of poverty (Leccese, 2000: 53).

"The physical organisation of the region should be supported by" many modes of transport available in the region, for example public transit, pedestrian and bicycle, in order to reduce the reliance on the private car (Leccese, 2000: 59).

Tax revenues should be shared amongst municipalities in order to avoid destructive competition between cities and towns whilst promoting "coordination of transportation, recreation, public services, housing and community institutions" (Leccese, 2000: 65).

2.4.4.2.2. Neighbourhood, District and Corridor

The Charter states that the neighbourhood, district and corridor are fundamental elements of both development and redevelopment because they "form identifiable areas that encourage citizens to take responsibility for their maintenance and evolution" (Leccese, 2000: 73). The Charter also suggests that neighbourhoods should be compact, mixed-use and pedestrian-friendly whilst districts specialise in a single use but should be treated in a similar fashion to neighbourhoods. Corridors form the connections between neighbourhoods and districts in the form of road, rail, or even river (Leccese, 2000: 79). Streets should be designed to encourage

Figure 29: This is a diagram of a proposal to expand San Diego's successful light rail line throughout the city whilst demonstrating how the nodes of "transit orientated development" can be dispersed along the network (Katz, 1994: xxxiii)

pedestrian activity over private vehicle use (Leccese, 2000: 83).

When transit corridors are planned properly they can aid in organising the structure of the metropolis as well as revitalising urban centres – see figure 29 - (Leccese, 2000: 97), and "appropriate building densities should be within walking distance of transit stops, permitting public transit to become a viable alternative" to the private car (Leccese, 2000: 101).

The Charter suggests that within neighbourhoods there should be a wide range of housing types which are aimed at all income groups of all ages and races in order to strengthen the "personal and civic bonds essential to an authentic community" (Leccese, 2000: 89).

There should be "concentrations of civic, institutional and commercial activity" within the neighbourhoods and districts as opposed to in isolated, single-use complexes such as suburban malls. Schools should be in a location suitable enough for children to either walk or cycle to them (Leccese, 2000: 105).

Graphical urban codes can improve "economic health and harmonious evolution of neighbourhoods and districts" (Leccese, 2000: 109), and parks should be distributed within neighbourhoods, whilst "conservation areas and open lands should be used to define and connect different neighbourhoods and districts" (Leccese, 2000: 113).

2.4.4.2.3. Block, Street and Building

The Charter states that streets and public spaces are places of shared use which are defined by all urban architecture and landscape design (Leccese, 2000: 123), and all architectural projects should be "seamlessly linked to their surroundings" (Leccese, 2000: 127).

"The design of streets and buildings should reinforce safe environments," whilst maintaining accessibility and openness, because safety and security are crucial to revitalisation (Leccese, 2000: 133). Streets and squares should be comfortable to the pedestrian and when "properly configured, they encourage walking and enable neighbours to know each other and protect their community" (Leccese, 2000: 147).

Although 2.4.4.2.2 stressed that pedestrian-friendliness is crucial to New Urbanism, there is no getting away from the private car. These need to be

incorporated into the scheme, but the manner in which they are treated must respect the pedestrian and the form of public space (Leccese, 2000: 141).

Both architecture and landscape design should be derived from the local context and "should provide their inhabitants with a clear sense of location, weather and time" (Leccese, 2000: 155 and 169).

Civic buildings and spaces need to be placed in important locations in order to reinforce community identity. They also require distinctive form because their role in the neighbourhood is unique (Leccese, 2000: 161).

Figure 30: This drawing shows hierarchy a New Urbanist scheme should have. Public space in the form of streets and squares have driven the design whilst buildings are kept to a human scale. According to Katz, the building code of this development required the buildings to hold a consistent street line and provide arcades over the pedestrian walkways. The resultant of this was a clearly defined public realm whilst maintaining diversity in architectural expression (Katz, 1994: 98)

It is vital to preserve and renew historical buildings, districts and landscapes because they "affirm the community and evolution of urban society" (Leccese, 2000: 173).

2.4.4.2.4. Summary

The Charter of New Urbanism is a guideline of how urban designers and developers should go about providing space in which to live and work within metropolitan areas. It is intended to counter the outward thrust of single-use, low-density suburban sprawl by promoting mixed-use, higher density urban development to occur in the existing metropolis. It is preferred that the technique used is infill (development of land between existing development) or revitalisation of abandoned parts of the metropolis.

New Urbanism aims to reinstate the importance of pedestrians by prioritising their experience in the neighbourhood and district over that of the private car.

The creation of community identity is also important. This may be enhanced by architectural, urban and landscape design codes but also by placing civic buildings and spaces in important locations and by providing them with a distinctive design because they are unique buildings meant for a unique community.

New Urbanism promotes the notion that all racial and income groups should live in the same place, as opposed to wealthy people living in one part of town whilst the poor live in another part of town. This is to avoid inequality in terms of access to services and also concentrations of poverty.

The following sub-chapter will discuss attempts at incorporating New Urbanism into South African cities.

2.4.4.3. New Urbanism in South Africa

In 2003, Cara Reily published an article in the Planning journal on New Urbanism in South Africa. Although the Charter of New Urbanism was first tabled in 1993, South Africa caught onto the term around the year 2000. Reily says that "New Urbanism is a very modern and trendy concept that has been employed to create what could be seen as exclusive areas" (Reily, August 2003: 13). She compares new developments of conscious thought, such as Melrose Arch, to nodes in Johannesburg which are already developed - in a less conscious manner - as mixed-use in nature and which function well with many people from differing demographical backgrounds using the facilities.

Figure 31: This aerial photograph of Melrose Arch in Johannesburg. Notice how the road intersections are treated differently by brick paving to facilitate pedestrian movement. Also notice the private and public courtyards (Google Maps, 2011)

Reily says that there is a willingness by South Africans to interact, but "they loath to mix too much. People are more comfortable to stick to people their own age, race and economic groups. This therefore hinders the development of open, fully mixed

nodes" (Reily, August 2003: 14). The idea of a fully mixed node is one of the primary objectives of New Urbanism. It is thus questionable whether South Africans are ready for integrative urban design.

Other drawbacks for New Urbanism in South Africa are the security and transport issues in the country. "As soon as crime occurs the reaction is to put up a fence, which stops the integration between the street and the structure" (Reily, August 2003: 14) which is another vital element of New Urbanism. In the South African context it is easier to develop areas outside the city structure to start from scratch, as opposed to using the infill and rejuvenation methods within the existing city structure as discussed in the previous sub-chapter.

Plate 6: This is an image from within Melrose Arch. Notice the unique character of the buildings shown. Also the pedestrian friendliness of the road (Author, 2008)

Reily speaks specifically about Melrose Arch in Johannesburg - which was already in use at the time the article was published- and Umhlanga New Town which was still in planning and construction stages. She says that when Melrose Arch is completed it will be bigger than the suburb of Rosebank and that the emphasis of the development is on the public realm. Melrose Arch is seen as about "making the space

Figure 32: This is an aerial image of a portion of the Umhlanga New Town Centre. One can see clearly from this view the spatial hierarchy between public space – Palm Boulevard and the Park, then the semi-private squares between buildings, and finally private square which are for the exclusive use of residents of buildings (Google Maps 2011)

in which we live worth living in" and its design incorporates "shopping, working and living in an up-market, publically oriented environment." Reily says that although the

concept of Melrose Arch is good, the development exists within a gated complex which has a minimal positive effect on surrounding areas. (Reily, August 2003: 14).

Reily says that the Umhlanga New Town Centre is a mixed-use urban development which is built around a series of squares, parks and boulevards that surround Gateway Theatre of Shopping. She says that the architects and urban designers intended to "transcend suburban meritocracy by capturing the timeless qualities of cities that have been lost in suburban sprawl" (Reily, August 2003: 15). The Umhlanga New Town Centre "is to become a showpiece development subscribing to the principles of the New Urbanism Charter" (Wood, September/October 2008: 51). The

Plate 7: An image from a semi-private courtyard in Umhlanga New Town Centre. Notice how the space is activated by balconies looking into it. The water features form vents from the basement parking below the courtyard (Author, 2010)

Plate 8: Buildings looking onto Palm Boulevard, across the road from Gateway Theatre of Shopping. (Author, 2010)

development ethic of the project is to be: accessible to all, safe and convenient for pedestrians, the car is to take on a subservient role, quality landscaping and lighting which are well managed and maintained, and that it "defines the complexity of a vibrant, mixed-use node with a legibility and place-making that gives the area a distinct identity" (Wood, September/October 2008: 51). In effect the principles of New Urbanism are being used by the creation of quality public space and the preference of pedestrian activity over the private car. Umhlanga New Town Centre will be discussed further in Chapter 4.

2.4.4.4. Summary of New Urbanism in South Africa

In a country which is divided physically, socially and economically like South Africa is, it would make sense that an urban concept such as New Urbanism would be helpful in solving these historical issues. However it appears that there is still the social divide between groups of people, and distances are too vast to bring together dissociated communities. The inherent problem of crime in South Africa is another

big hindrance of New Urbanism because people are fearful so they dissociate themselves from the public realm by creating office parks and residential estates which are gated and fenced off so that they do not relate to the public realm. This is the primary issue with Melrose Arch because it intends to be an example of New Urbanism, but it is exclusive to the upper classes due to a boom gate.

2.4.5.   SUMMARY AND CONCLUSIONS

It can be seen from this section that South African cities were designed using Modernist planning principles whereby the separation of uses and the neighbourhood ward were elements. These elements were enhanced during the Apartheid regime to include the separation of racial groups into defined "neighbourhoods" or townships and suburbs.

Due to this enhancement, South African cities disallowed movement between residential areas. Natural features such as rivers and difficult terrain, as well as man-made features such as freeways and railways, were used to physically separate racial groups. Tracts of land between parts of the Modernist City were intended as positive spaces, but in the Apartheid city they were negative spaces. The poorest members of society were placed on the outskirts which resulted in vast distances to be travelled by those who had the least, thereby robbing them of their time with which they could do other things in order to better their lives. This is the physical and economical legacy Apartheid has left the citizens of South Africa.

Due to the fragmented, low density urban form, South African cities generate a large amount of movement due to their inherent design principles of separation of use. Vast distances need to be travelled to reach any destination, and the concept of this movement system is to get the user from point A to point B in the quickest time possible by using low access high speed routes, such as freeways or railways.

With the onset of decentralised offices in many South African cities, the issue of the fragmentation of urban form has worsened.

The concept of New Urbanism has been introduced in South Africa in several cities. This concept aims to mix social and income groups in a precinct which is mixed-use in nature that favours pedestrian and public transport over the private car. However South Africans are still unwilling to mix with people who are outside their comfort zone: age, race and/or income group. This is the inherent social disorder that the people of this country have been left with by the Apartheid government, and it will take much more than an urban precinct to change that.

New Urbanism is a form of office decentralisation. The following section will discuss office decentralisation in general, then the case in specific to South Africa.

2.5. DECENTRALISATION OF OFFICE EMPLOYMENT

According to Daniels, decentralisation is "a process or procedure that results in the withdrawal or redistribution of something from a place or centre in which it has previously been concentrated". As density and congestion increases in the Central Business District (CBD), the functions which least need to be there move out (Daniels, 1975: 160). In order to understand the concept of decentralisation, we first need to examine the structures which were put in place before it occurred which enticed the action to commence.

2.5.1. WHAT IS MEANT BY OFFICE EMPLOYMENT?

2.5.1.1. Definition of 'office'

Daniels describes the function of an office as to "direct or coordinate the activities of an enterprise" (Daniels, 1975: 4). He also says that the office functions can be categorised into the following:

- Receiving information
- Recording information
- Arranging information
- Giving information

Office work needs to assist an organisation to reach its goals as efficiently as possible. "The office is responsible for initiating the various business elements necessary to the successful functioning of the organisation" and due to the competition in the office field, it is imperative that the office keeps strong communication ties to the outside world (Daniels, 1975: 4).

2.5.1.2. Office typologies

2.5.1.2.1. High-Rise Buildings

These are multi-storeyed office buildings which are designed specifically to cater for office functions. They are generally found in city centres, or areas which are the most accessible and where the concentration of land use is traditionally high. These skyscrapers are generally multi-tenanted.
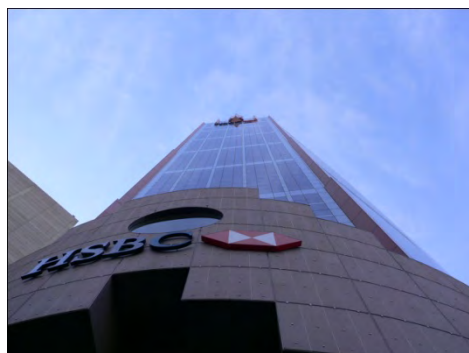
Plate 9: A high rise office building in Sydney, Australia. (Author, 2004)

2.5.1.2.2. Shared-Use Buildings

There are generally office components attached to manufacturing buildings, but are seen on smaller scale than the high-rise. They are generally single-tenanted because the office functions relate directly to the processes in the manufacturing section of the building. These types tend to be located in industrial or manufacturing areas. See plate 10.

Plate 10: The Fagus Factory office component, by Walter Gropius. (en.structurae.de)

Other shared-use building types are mixed-use office, residential and retail buildings. These types are popular in "compact city" developments whereby one can live, work and play in one precinct. These types are sometimes used in inner city renewal projects, but also at edge city locations.

Plate 11: A mixed use office/residential building in the Umhlanga New Town Centre precinct in Durban. (Author: 2010)

2.5.1.2.3. Suburban Offices

These can be high- or low-rise developments located amidst low-density residential suburbia. These types will be discussed later in this chapter.

2.5.1.2.4. Office Parks

Although these can also be seen as 'suburban offices' (which in most cases they are), they are a typology of office which takes the form of a low-rise, low density office complex which is traditionally set on large pieces of land which are landscaped. The occupants of these offices move to these locations in order to escape the congestion and pollution of the city centre. They do, however, strongly rely on private vehicle use because their sporadic, sprawling nature does not allow for efficient public transportation. These types of offices have sprung up in most cities around the world (Daniels, 1975: 200).

Plate 12: La Lucia Ridge Office Estate whilst the precinct was still under construction in 1999. Notice the low density of the buildings, and how they are spaced far apart. Also notice the reliance on roads as opposed to rail, and notice too how far this area is from the rest of the city of Durban. (Gounden, 1999)

2.5.2. A HISTORY OF TRANSPORTATION TECHNOLOGY

Lewis Mumford said that "the purpose of transportation is to bring people or goods to places where they are needed, and to concentrate the greatest variety of goods and people within a limited area, in order to widen the possibility of choice without making it necessary to travel" (Mumford, 1964: 178).

Guiliano said that "travel is a fundamental human activity," and it is "necessary to engage in spatially dispersed activities." There are two sets of costs involved in travel: time and money. "The time spent travelling is time not spent doing other things, hence those who value their time highly will be willing to spend more money in order to save time by using a faster mode" of transport. (Giuliano, 2004: 51).

Transportation technology has had profound effects on the spatial structure of metropolitan areas throughout history. Below will be discussed modes of transportation which changed the way in which cities were pieced together.

2.5.2.1. The Railway

The invention of the commuter railway in the United States began to set the scene for satellite suburban villages around major cities in the late nineteenth and early twentieth centuries. In order for the railway to be cost efficient, stations were spaced relatively far apart and the suburbs were all planned around these stations.

Plate 13: South Africa's commuter rail network, Metrorail. (www.prasa.com)

New York and Chicago were already too large by this stage for reliance on the streetcar, thus New York opened its first segment of subway in 1904 (Hall, 1995: 58).
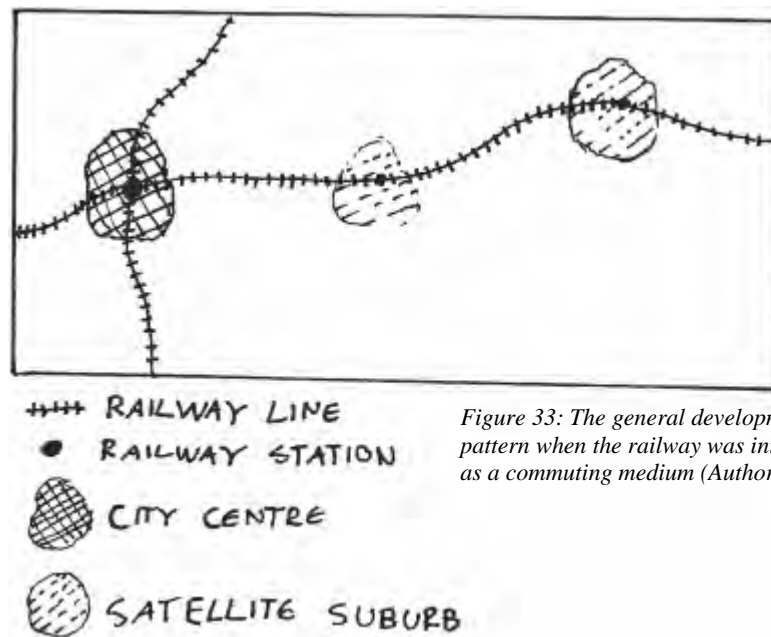
Figure 33: The general development pattern when the railway was introduced as a commuting medium (Author, 2010).

2.5.2.2. The Streetcar

Before the invention of the streetcar in 1888, most of the population lived in close proximity to their places of work and industrial factories. These were generally located near harbours and railway nodes (Giuliano, 2004: 77). Railways were more commonly used for inter-city haulage of goods than passengers, but this did occur.

Plate 14: A modern streetcar in the streets of Melbourne, Australia. (Author: 2010)

In the United States, the streetcar invention saw the arrival of the "streetcar suburb" which supported the development of wealthy low-density residential areas that were removed from the polluted, congested inner city centre. This removal of the necessity to live close to one's work resulted in commercial activities replacing those of residential, thereby increasing the notion of separation of land uses, which in turn lead to the specialisation of regions in metropolitan areas (Fowler, 1993: 30-31).

The streetcar induced a "star shaped" city form (figure 34), with the original centre remaining as the hub of commercial and social activity, with residential development

occurring along the streetcar paths which generally radiated outward from this centre (Giuliano, 2004: 77).
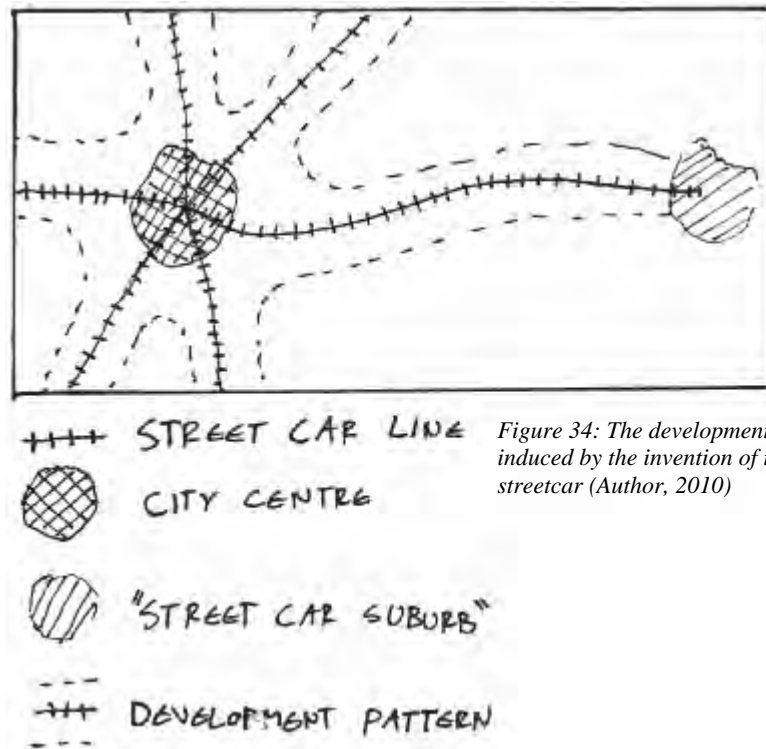
Figure 34: The development pattern induced by the invention of the streetcar (Author, 2010)

2.5.2.3. The Private Automobile

Shortly after the widespread implementation of the streetcar was the invention of the private automobile. The first models were only affordable to the very wealthy and it was not until the 1920s that Henry Ford developed the first car which was affordable to the working class (Giuliano, 2004: 77).

Plate 15: The Ford Model T was the first mass produced car, which made cars much more affordable to the working class.
(www.independent.co.uk)

The early years of the era of the private automobile resulted in the start of dispersed development because there was no longer a need to remain near a transit line (Giuliano, 2004: 77). It is interesting to note that, in the 1930s, although the majority of the population of New York did not own a car, those who did usually worked in Manhattan; an area to which commuting by car was almost impossible. "Suburbanisation must await the outward movement of jobs to places where the car was more convenient than the subway" which only occurred in the 1950s (Hall, 1995: 291).
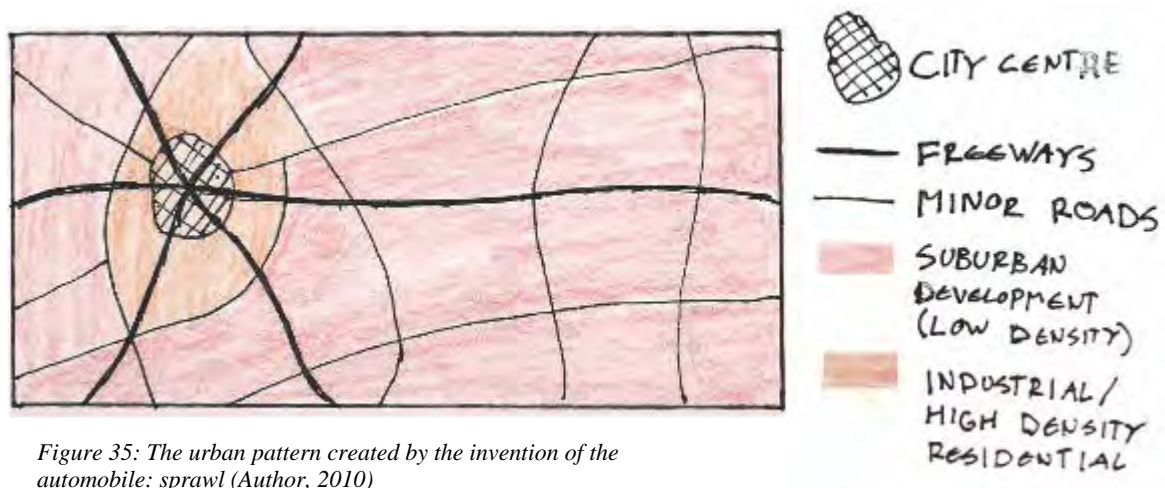
Figure 35: The urban pattern created by the invention of the automobile: sprawl (Author, 2010)

Spatial change was slow in the early years of the auto era due to the Depression and World War II (Giuliano, 2004: 77), but in 1941, US president Franklin D. Roosevelt appointed known supporters of "planned decentralisation of people and jobs" to an Inter-Regional Highways Committee which in 1944 called for a 32 000 mile Interstate highway system. It was believed that roads could be used to "cure urban blight", and that "new roads were not only vital for national defence in an era of Cold War, but could also generate an economic boom." This belief was set in motion and freeways became defining elements of urban form, together with the arrival of long term mortgages with low interest rates, these created the American Dream of a single family dwelling surrounded by a large patch of private ground – the suburban house (Hall, 1995: 291-2).

Mumford argues that the highway system would eventually strip the Americans of the freedom that the private car promised them. He says that the sense of freedom and power lies in the low-density suburbs and the countryside, areas which the private car gave easy access to. He says that "using the car to flee from the metropolis the motorist finds that he has merely transferred congestion to the highway" thereby doubling the congestion experienced in the city (Mumford, 1964: 177).

Mumford says that because cars are replacing the function of all other means of transportation, it is causing over-concentration of cities and highways. He says that this phenomenon is rapidly destroying our cities (Mumford, 1964: 177).

2.5.2.4. The Issue of Transportation in Developing Countries

The issues discussed above relate predominantly to the urban structure of developed countries. Developing countries have greater issues regarding urban transport and urban spatial planning due to countless years of underdevelopment; therefore they have not risen with technology.

The difference between developed and developing countries in terms of urban spatial arrangement is the following: when the present day more developed cities and countries were building their transportation infrastructure, their populations were much smaller than compared to those of developing countries of today. As discussed in the previous chapter, major cities in less developed countries are very large, and are growing at alarming rates. Adding to developing countries' woes is that the automobiles today are much more affordable than when present day more developed countries and cities were building their transportation infrastructure. (Giuliano, 2004: 89)

Most of the present day developed countries and cities started off with relatively small transportation investments. Due to the very large size of the major cities of developing countries, enormous capital input needs to occur to handle soaring passenger and freight traffic. In most cities there is no time for small-scale testing which means there is greater risk in large investments (Giuliano, 2004: 89).

Plate 16: A minibus taxi rank in Soweto, Johannesburg. (www.cmt4austin.org)

It appears that the challenges faced by developing countries involve the timing of the initiation of transportation infrastructure developments, and authorities appear to be forced to 'play catch-up' with the demand, as opposed to planning for the future as in the case of presently developed cities.

Plate 17: The recent implementation of the Gautrain in Gauteng was highly necessary, but extremely expensive public transport infrastructure initiative. (www.rail-news.com)

A positive of developing countries implementing new transportation systems is a vast range of available tried and tested technologies. The urban spatial character would not be limited by a lack of technology; they would be limited more by a lack of skilled manpower to implement such systems.

2.5.3. THE ROAD TO EMPLOYMENT DECENTRALISATION

There are many complex forces which lead to employment decentralisation, and these need to be discussed in order to understand the phenomenon.

2.5.3.1. Residential Decentralisation: The Suburb

To understand decentralisation and the deconcentration and segregation of land use, we must begin at the development of the residential suburb.

As discussed in section 2.3, the Garden City concept aimed at deconcentrating cities, and diverting rural-to-urban migrants to decentralised, low-density towns where people could live, work, play and be close to nature. Although this concept is not strictly speaking a suburb because it was intended to be a self-sufficient entity in terms of economic and social opportunities, it can be argued that Garden Cities enticed the concept of low-density housing outside the 'old' cities, and showed how it could alleviate social and congestion issues in these areas.

The United States used the suburban dwelling as part of a mechanism to promote economic growth in the early twentieth century. As part of a growth agreement, the economy would be used "to provide single-family homes for as many people as possible, mainly in the suburbs." The idea was that suburban homes would be seen as objects for consumption which in turn would drive the economy. As it happened, by the 1970s over half of the US gross national product was in some way related to the suburbs (Fowler, 1993: 140).

The post-war building boom created many large property development companies, and these companies employed many people. They were highly profitable during the boom, and even after these years these companies wanted to continue to produce housing. The speculative market created a trend called "leap frog" development, whereby large tracts of land on the periphery of a city were bought by these developers. These pieces of land were cheap because they were a fair distance from the core of the city centre, but reasonably accessible to anyone who owned a private car (Fowler, 1993: 144). The major problem inferred by this "leap frog" development of low density housing is that mass public transit became increasingly inefficient and unsustainable (see figure 36).

Although the American suburbs were a highly profitable business, the members of the public who bought into them had to have been driving the demand for them.

The reasons people bought into the suburbs are numerous, but to name a one would be individualism. The individualism in North American culture relates to self-sufficiency, and this is characteristically related to one's purchases. The two major

purchases would be the home and the car which are both symbols of self-sufficiency (Fowler, 1993: 162).

Figure 36: An example of "leap frog" development in Fourways, Johannesburg. Notice tracts of land between residential developments, as well as the regional shopping centre. (Image: maps.google.com)

2.5.3.2. Commercial Decentralisation

There are many advantages of having centralised office districts. For example large firms need to be central in order to keep their wages down due to ease-of access for staff. But with the decentralisation of the residential population into the suburbs, office growth in these suburbs followed soon after due to the pressures of the vast distances the public were travelling to their places of work. It can be deduced that the massive increase in office development was the result of two forces: profitability of office development, and an increased demand for office space from large corporations (Fowler, 1993: 142), together with the inevitable need for the public to live relatively close to their places of work.

With the decentralisation of residential and office development came the deconcentration of land use. This meant that as offices and residential units were being built, they were being built at lower and lower densities in peripheral locations. This low density office development ran counter to previous forms of city-building whereby, in the past, the city centre was the focus of commercial activity. Fowler says that the "economic explanations for why firms started locating or relocating in the suburbs begin with the point that downtown areas were becoming increasingly congested and that congestion costs were outweighing the advantages of economies of agglomeration...Changes in transportation and other technology are also factored into the explanation." Giuliano confirms this by saying that "technology is connecting economic activities, enabling them to be physically further apart, reducing the competitive advantage of high-cost, congested urban locations, and allowing people and businesses more freedom to choose where they will live and work."

Figure 37: An example of low concentration commercial development amongst residential suburbs in Bryanston, Johannesburg. (Image: maps.google.com)

For some businesses, face-to-face contact remained important, but for many others "accessibility" was redefined as the speed at which products and services could be delivered. This speed was now dependent on information and transportation technologies as the computer allowed offices to remotely control supply points.

It should be said that once decentralisation of commercial activity began, deconcentrating technology followed – "land-intensive manufacturing, cars and trucks" and communications systems (Fowler, 1993: 143).

The decentralisation of population and employment can be seen in changes in commuter patterns. "The traditional commute to the central city is no longer the dominant commute flow. Commuting between suburban locations is now the major flow in the U.S." (Giuliano, 2004: 87). With this fast emerging pattern, it is clear that there is an increase in suburban job opportunities and fewer centralised job opportunities. This pattern is much more suited to the automobile as suburbs are generally not linked by public transit systems.

"Public transport cannot compete with the superior travel times of the private car for longer trips between dispersed destinations." And as decentralisation and dispersion continues, "an increasingly large proportion of the population will live [and work] in lower density areas where walking and cycling accessibility are poor. This is…the essence of the sustainable transport problem" (Giuliano, 2004: 89).

2.5.4.   REASONS FOR LEAVING THE FORMER CENTRE

2.5.4.1. Congestion (Daniels, 1975: 160)

With an increase in land use intensity, the streets are bound to become congested with both pedestrian and vehicular traffic. The latter becomes far more problematic without a formalised public transport system which extends into the centre itself. This is one of the biggest problems with centralised employment nodes in South Africa.

2.5.4.2. Crime (Daniels, 1975: 160)

Together with congestion, crime is also a major problem in the centralised employment nodes. Although every major city's CBD has problems with crime, South Africa's crime level is very high and appears to be concentrated in central employment nodes, especially where there is residential accommodation mixed into the urban framework.

2.5.4.3. Cost of Land (Daniels, 1975: 160)

The cost of land at the primary central node is generally more expensive than land on the periphery of the city which, when other conditions at the centre approach a critical point, makes the decision to leave the centre a much easier one to make. In terms of property development, it is far cheaper to buy a tract of farm land on the periphery of a city and rezone it than do the same in an already built up area of the city (Fowler, 1993: 144).

2.5.4.4. Need to Expand (Daniels, 1975: 160)

It is far easier to expand a business or industry in a location where land is cheaper and easier to come by. Land in the traditional central city is very expensive because of its desirable, easily accessible location for the majority of the population. A suburban office location allows a horizontal means of expansion, which is far cheaper than a vertical means, which would be the case in a central location.

2.5.4.5. Changing Social and Political Circumstances. (Daniels, 1975: 160)

Sometimes urban planning due to past political initiatives is not suitable to present and future political and social initiatives. This can be said for South Africa's cities because the Apartheid government planned cities to deliberately segregate society and disadvantage most of the population by the location of residents in relation to economic opportunities (Smith, 2001: 8). Today South Africa's political and social initiatives are about uniting a nation, and sometimes the solution to this is the creation of new employment nodes to reach out to the previously disadvantaged population.

2.5.4.6. Building a Corporate Identity

The concept of low density offices provides the opportunity for many buildings to house a single tenant each, as opposed to one high-rise building which would house many tenants. This single tenant occupancy brought the opportunity for the tenant occupying the space to build a stronger corporate identity for themselves (Reilly, 2003: 25). This became a major pull-factor for businesses to locate or relocate in decentralised areas.

2.5.4.7. Suburban "Countryside"

In the case of office parks, companies are attracted to the possibility of a location surrounded by lawns, trees and landscaping which would form an integral part of the working environment (Daniels, 1975: 200).

2.5.5. POLICIES AND STRATEGIES FOR EMPLOYMENT DECENTRALISATION

Various instruments are used in order to promote decentralisation, including, among others, fiscal incentives for investment, financial assistance with removal and establishment costs and fiscal incentives which lower operating costs. (Townroe, 1979: 101)

A policy may seek to reduce employment opportunities in the city, whether or not it is related to new employment being created in decentralised locations. Or the policy may seek to attract outside investment and hence the employment creation in the decentralised locations. Policies which are put in place in order to slow the rate of growth of rapidly growing cities become increasing viable in economic, political and social terms as the absolute size of a city rises. A policy of containment, decentralisation or fostering growth of secondary centres makes sense when the city's population is between 5-10million, rather than 1-2million (Townroe, 1979: 97). The following are some motives for policies and strategies for decentralisation of employment nodes:

2.5.5.1. Relocation of Existing Businesses

In the absolute size city, policies encourage employment opportunities which already exist in the city to close down and move to a decentralised location. Tenants moving into the vacated space will be expanding into the space, hence creating new job opportunities. This is referred to as a "transfer move" for the employment body which was encouraged to move (Townroe, 1979: 98). The firms that take over the vacated space would be firms that remain in the city centre and use the space to expand, or the space would be occupied by new local firms looking for office space, or by in-migrating firms from other areas (Daniels, 1975: 194).

2.5.5.2. Incremental Job Creation

In a relative size city (whereby city growth is an integral part of economic growth and increasing primacy is a normal feature of the early stages of economic growth), the policy may be to direct new investment and the expansion of opportunities away from the city centre. An employer would open a new branch establishment in the decentralised location. This is referred to as a "branch plant move" (Townroe, 1979: 98 & 117).

2.5.5.3. Encouraging Growth of Businesses not Located in a Centralised Node

This would occur if several businesses are already located in a cluster of sort outside the metropolitan centre. The city council would recognise this as a potential strategy for increased economic and employment activity and would encourage the growth of businesses and services around the existing businesses to achieve this.

2.5.5.4. Encouraging New Businesses

The encouragement of the opening of new businesses can encourage a population to become more creative and to establish a competition base in order to reduce monopolies. It also provides new employment opportunities.

2.5.5.5. Attracting International Investments

In some cases, the central business district of a city is not attractive enough for international investors. A new decentralised node can be designed in such a way that it possesses the status and various amenities which international investors might look for. Attracting these investors can be a crucial element in lifting a city's economy, especially one which is in a developing country.

2.5.5.6. Deconcentration of Land Use for Political Reasons

In the case of South Africa in the 1970s, the Apartheid government grew nervous of the over concentration of office development in the city centres and incentivised the relocation of offices to decentralised nodes in the suburbs (Boraine, 2004: 113).

2.5.6. CONSEQUENCES OF DECENTRALISATION

Although the fundamental objective of an employment decentralisation policy is to increase the rate of job creation outside the central city area of concern relative to the rate of job creation within the central city area, a policy of employment decentralisation involves tampering with the existing pattern of market forces operating in the new and existing locations of economic activity (Townroe, 1979: 117).

There are some dangers in the creation of decentralised nodes. As seen in South Africa, many decentralised office nodes are located in or near wealthy suburbs (Boraine, 2004: 115). The effect of this, especially in a place which is already spatially segregated, would aggravate the situation because it would still only benefit some people and businesses whilst disadvantaging many more. There is a danger that decentralising important nodes would move physical and managerial resources, as well as political attention away from pressing issues within the city centre. Other dangers include the possibility of jeopardising the economic stability of the city centre (Townroe, 1979: 117).

Plate 18: Johannesburg CBD is very congested, appears dirty and is perceived as a place of high crime rates due to low income dwellers in the area. A large amount of informal trading occurs on pavements. (Image: Google Earth Streetview 2009)
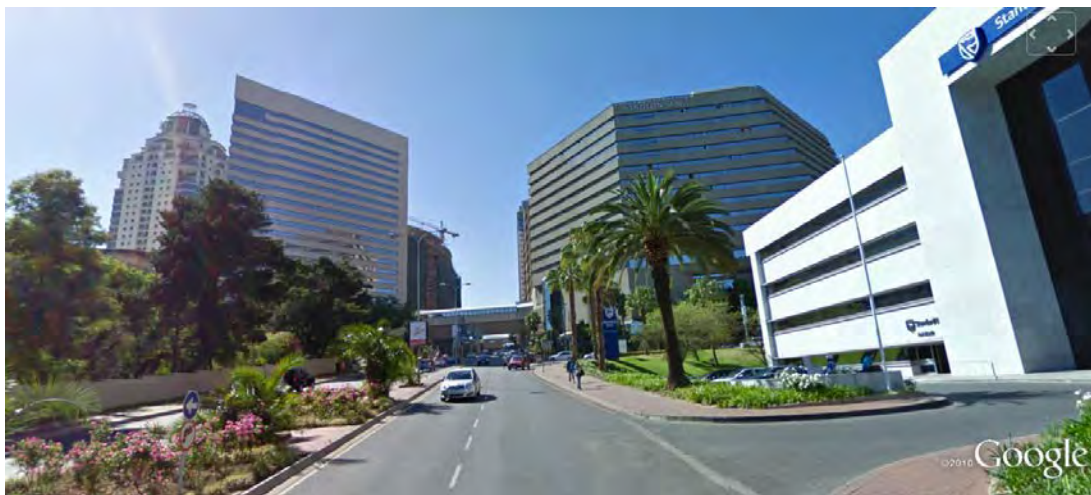
Plate 19: Sandton CBD appears clean and upmarket in comparison with Johannesburg CBD, even though they are located in the same city. There is no sign of informal trading on pavements, or low income building-types. More will be discussed on Johannesburg decentralisation in the precedent study of the city later in this document. (Image: Google Earth Streetview 2009)

"Early suburban office development has often taken place without the benefit of a strategic framework." This resulted in a scattered pattern of office development on the outskirts of London between 1958 and 1965. These developments were located in locations of good transport facilities and "pockets of office workers." The problem with this dispersed settlement of offices which were unrelated to one another was that they tended not to attract a steady stream of clients. Upon learning from these mistakes, "strategic" nodes were located in suburbia for office developments which were located in close proximity to other offices, banks, restaurants, and transport and communication services. This approach worked well, especially when a hierarchy of suburban nodes were used, so long as they did not compete with Central London. Traffic problems did arise, however, as a direct result of the creation of these nodes (Daniels, 1975: 196). This is reiterated by Daniels when he suggests that the

journey to work patterns generated by suburban office could "produce local congestion problems which rival those of the CBD," which is due to the heavy reliance on the use of the private car in suburban locations due to the lack of public transport which is focused predominantly on servicing the central city because the numbers of people are sufficient to sustain such a system (Daniels, 1975: 208).

The effect of localised employment benefits of an office relocation depends "on the demand for labour which they generate and the supply of labour in the area." The labour demand will depend on the distance the office has moved. If the office has moved a short distance from its origin, the likelihood of it keeping original staff would be high, which would result in an almost negligible effect on the local employment benefits of the new area. If the new location is a far distance from the origin, chances are that the firm would want to keep key staff members, such as managers, accountants, executives, systems analysts and some senior staff. Junior staff would normally not follow the company to the new location and this would become a new recruit for the company in the new location (Daniels, 1975: 205-6).

The urban spatial and hierarchical structure of a city or country is stubbornly resistant to a change in emphasis on location. Very large shifts in locational emphasis are difficult to implement politically whilst possibly causing severe social distress and being extremely inefficient in the use of resources (Townroe, 1979: 117).

2.5.7. THE POST-APARTHEID CITY

It has been 17 years since the African National Congress was voted into power in 1994, and 20 years since the abolition of the Group Areas Act in 1991. Yet many researchers, urban planners and architects do not feel that urban restructuring has done enough to improve the lives of the urban poor.

South Africa has been left with cities which have unusual spatial contradictions. On the one hand they are "very spread out" with density levels too low to support a viable public transport system (see figure 39). This encourages private car use, which in turn encourages further sprawl. Because of this vast low-density sprawl, South African cities are not only extremely inefficient in terms of service and infrastructure delivery and use, but also in economic terms (Boraine, 2004: 112).

On the other hand, parts of South African cities are too dense, which leads to "less healthy living conditions." These are generally parts of the city which are inhabited by the poorer population (Boraine, 2004: 112) – see figures 38 and 39.
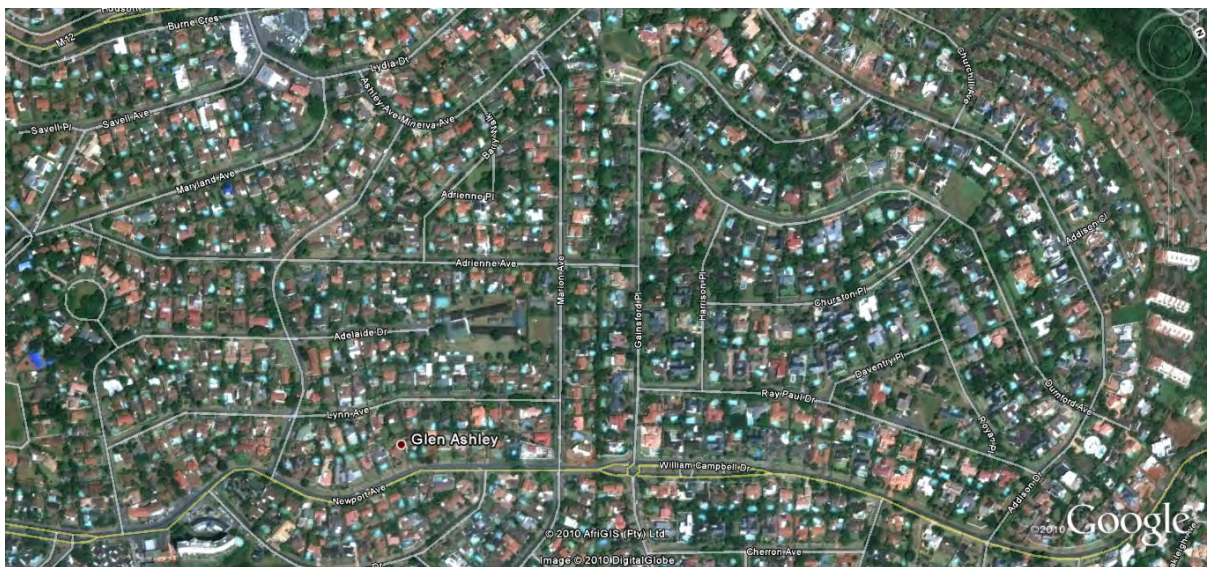
Figure 38: An aerial photograph illustrating the inefficiency of the layout of a typical "white" suburb. This view was taken of Glen Ashley, a suburb north of Durban. These "white" suburbs are found near the places of employment – as seen figure 27. (Google Earth, 2010)
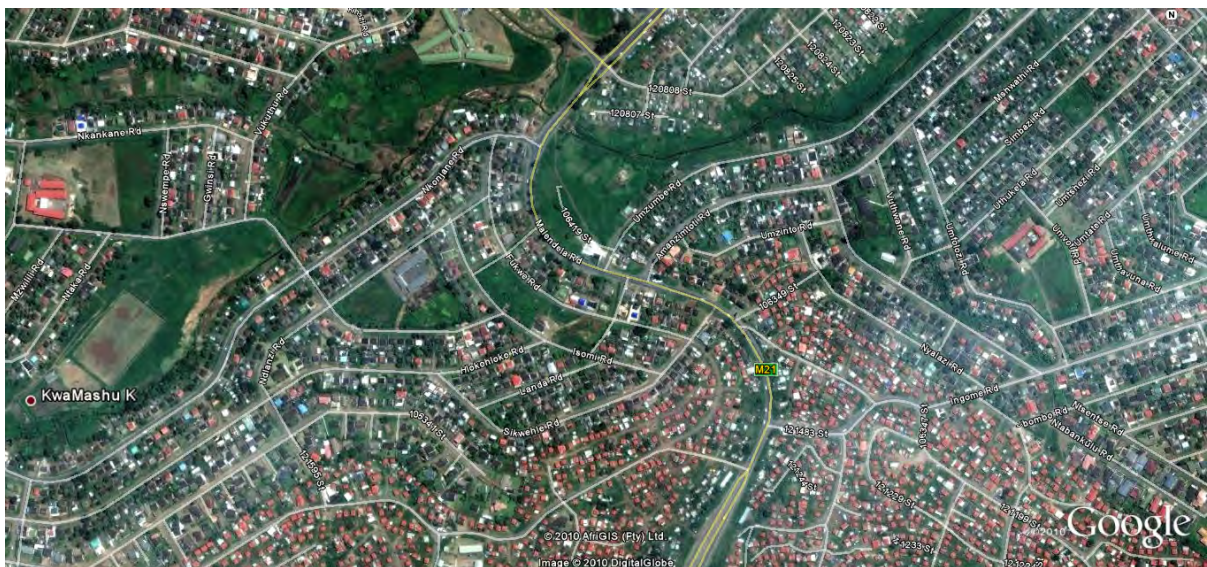
Figure 39: An aerial photograph illustrating the inefficiency of the layout of a typical "black" township. This view was taken of an area of KwaMashu, north of Durban. This area may look like a regular suburb, but the plot sizes are much smaller than in the "white" suburbs, thus greatly increasing the population density. Given that these townships are located on the periphery of cities, this high density of mostly poor people are located far from employment opportunities. (Google Earth, 2010)

Figure 40: An aerial photograph of Hillbrow, Johannesburg. When the Group Areas Act was abolished in 1991, there was a flood of low income people into the built-up areas of South African cities. Landlords abandoned their buildings and slumlords took over. These slumlords crammed as many people as possible into these high-rise buildings to gain maximum profit. The resultant of this was that many people live in over-crowded, unhygienic conditions and cannot afford to live anywhere else.
(maps.google.com)

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South African urban settlements are "out of step with the economic realities of the majority of people and entirely non-sustainable." The settlements do not serve as a means to support and uplift the majority of the population, but rather depress them and impede personal development. A major reason for this is that the spatial constraints are very difficult to overcome (Dewar, 2004: 36).

David Dewar has several proposals which deal with the issues of movement, settlement and places of economic opportunity in South African cities:

- "The compaction of settlements" in order to contain urban sprawl.

- Increase densities in order to support economic and social opportunities.

- "Strong intensification along more lengthy movement routes to ensure the greater viability of public transportation."

- "Breaking down the cellular structure of settlements by promoting lengthy, linking, movement routes which assist in 'knitting' the fabric together."

- "Integration of different modes of public transport."

- Possibly the most interesting of his proposals is that he suggests that a more decentralised pattern of economic and social opportunities needs to occur. He recognises that employment decentralisation has occurred in South Africa, but says that the decentralised nodes have not been directed at the poorer areas (Dewar, 2004: 36).

It is worth noting at this point that such advances have begun to occur in urban fabrics of South African cities. As a case study, the author will investigate a new commercial and social node in the Durban Metropolitan region which has been placed in a buffer zone which previously separated a number of townships from each other, as well as from economic opportunities.

2.5.8. OFFICE DECENTRALISATION IN SOUTH AFRICAN CITIES

This trend was spoken about in general terms in section 2.4, but the author will now speak about this trend in South African cities in specific terms.

"South African cities were designed to encourage decentralisation" (Boraine, 2004: 113).

- 1970s – "the planners were concerned of the over-concentration of key business and financial institutions in the central business district core" and began encouraging the decentralisation of office development. This encouragement took the form of limiting the number of parking bays in the city
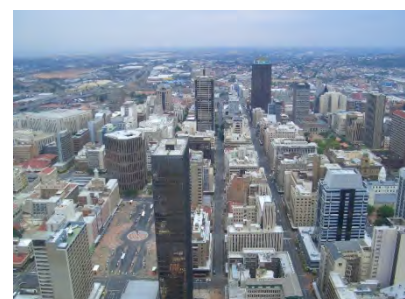
Plate 20: Johannesburg CBD in 2004. The photograph was taken from the roof of the Carlton Centre – the tallest building in Johannesburg. (www.wikipedia.org)

centre whilst failing to compensate with sufficient public transport. At the same time they provided incentives for office developments in the suburbs.

- 1980s – Uncharacteristically large rebates were introduced at the decentralised points which would further encourage flight from the centre.

- 1990s – "Edge city developments had started to spatially fragment a number of key South African cities" (Boraine, 2004: 113).

Plate 21: Rosebank Office Park was built in the 1970s and 1980s. Rosebank is a suburb of Johannesburg. The Office Park is evidently of a much lower density than the CBD.
(Buchanan, 1995: 76)

Plate 22: A photograph of La Lucia Ridge Office Estate – previously shown in plate 12. The estate can be seen as an "edge city" development because it was developed on a greenfield site north of the city of Durban. Notice the low density building typology set in natural landscaped gardens. These offices also have sweeping sea views which add to their desirability. (Author, 2011)

Once the Group Areas Act was abolished in 1991, there was no longer a restriction on movement of people in South Africa, and many people who had previously been forced to live in crowded townships on the city periphery moved into the central city due to its close proximity to employment opportunities and access to services. This radical influx of people brought with it 'crime and grime' and the traditional business areas in South African cities "changed overnight." Ironically, this system of the poorest of people living close to the city centre is commonplace in America, but South Africa has unique social problems which are difficult to overcome.

"New office developments were constructed near wealthy residential neighbourhoods, often bypassing even new decentralised nodes. This spreading out of the city adds to its ecological footprint, and presents traffic planners with huge difficulties in anticipating the ever-changing flows of traffic" (Boraine, 2004: 115). The low density sprawl of office parks became the

preferred choice of office typology for companies leaving the city centre. Because these office parks favour private vehicle usage over public transportation, these, as well as those offices which bypassed decentralised nodes, put additional pressures on the movement systems which were already under immense strain.

It should be reinforced here that the Apartheid city restricted movement between residential areas. The poor members of society who were forced to live in peripheral locations were only given access to the major centres in the form of trains and buses. The new decentralised nodes are located in, or near, wealthy suburbs, which were deliberately designed to restrict the movement of the urban poor into these areas. This means that many of these new decentralised office nodes are not in suitable locations for the poorest members of society, simply because they are not easily accessible to them.

2.5.9. DECENTRALISATION AS A MEANS OF URBAN RENEWAL

Much has been written on urban renewal of Central Business Districts – the heart of cities – but in theory urban renewal can be used to rejuvenate dormitory suburbs and townships in the form of decentralisation of functions such as economic and business opportunities. This concept would prove useful to South African cities due to their sprawling townships located on the outskirts of the cities with limited services and economic opportunities.

2.5.9.1. Urban Renewal

Chris Couch writes on the theory and practice of urban renewal and he says that there is increasing concern over the rigorous physical expansion of cities into surrounding agricultural land whilst large amounts of urban land and buildings are abandoned. This calls for resources to be redirected to re-using these urban areas and buildings within the city for new purposes (Couch, 1990: vii). This is the essence of urban renewal.

Urban renewal is viewed as the "physical change, or change in the use or intensity of use of land and buildings, that is the inevitable outcome of the action of economic and social forces upon urban areas." Initiatives of urban renewal include densifying or de-densifying, public utilities, transportation infrastructure and social facilities which would be provided, expanded, adapted or replaced in the area of concern (Couch, 1990: 1).

Due to urban renewal bringing about "change in the use or occupancy of urban land and buildings," it will be bringing change – whether good or bad – to the living conditions of those who the urban intervention may impact on (Couch, 1990:79). For this reason it needs to be done carefully, and with the local population's best interests

in mind. The following is an example of an urban renewal project in a previously disadvantaged area in South Africa.

2.5.9.2. Walter Sisulu Square, Kilptown, Soweto, South Africa

Although Kliptown is located in the sprawling townships of Soweto, it has always been a mixed community where people of different races and cultures have lived and worked together (Low, 2007: 18). On 29 June 1955, more than 3 000 people of many races gathered in what was named Freedom Square to 'speak together of freedom'. It was a two-day meeting which showed a collective resistance to the Apartheid regime and culminated in the creation of The Freedom Charter (Barac, 2007: 40).

A competition was held in 2002 for the redevelopment of an urban intervention of Freedom Square and Kliptown. It was proposed that the project was to "redevelop the traditional Apartheid-style buffer zone township into a desirable and prosperous residential and commercially locality, using its historical significance and tourism potential as tools for transformation. The following were the main strategic components:

- environmental upgrade,
- economic development and generation of economic activity,
- heritage education and tourism development,
- transport and infrastructure development,
- sustainable neighbourhoods through higher density social housing schemes,
- social development by way of career guidance, computer literacy, HIV/Aids awareness, mobile clinics and legal advice clinics,
- improving institutional arrangements through an overall management strategy (Meyer, 2005: 32).
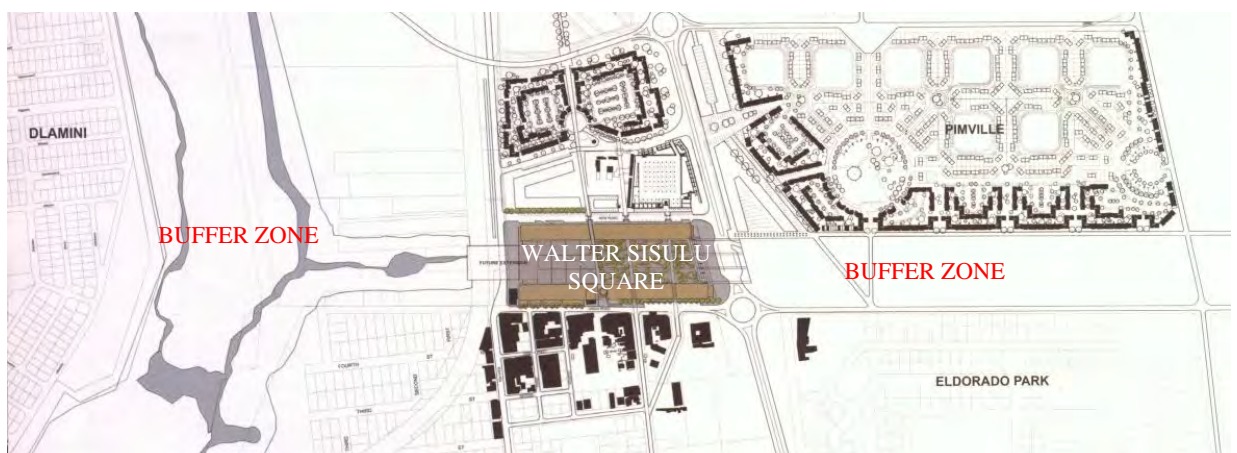
Figure 41: A contextual plan showing the urban form of the areas surrounding Walter Sisulu Square. Notice how segregated the surrounding areas are by buffer zones (Low, 2007: 20).

The objective of the scheme was to "give architectural expression to the ideals of the Freedom Charter through the establishment of nine guiding principles: history, equality, accessibility, vitality, robustness, identity, legibility, symbolism and ecology" (Low, 2007: 19).

The buildings are defined by colonnades running for some 300 metres which frame, define and extend the old square. A diagonal route bisecting the sloping piazza marks the old Kliptown Road whilst anchoring a conical monument in the square which houses an eternal flame and a tablet which is inscribed with the Freedom Charter. A second conical tower punches through the roof of the Market and is clad in reclaimed corrugated iron from dismantled shacks. Grand steps to the east and a low hill to the west give the space the feeling that it is a great urban stage. Nine red brick benches take the form of X's which are significant of votes on a ballot sheet (Barac, 2007: 40). The X-form is repeated many times over in precast concrete facade treatment (see plate 24). The manufacture of these concrete blocks was subcontracted to emerging township construction companies. This was to encourage the local people to have pride in their public buildings because people in their community helped create it. This was intended to for the people to take
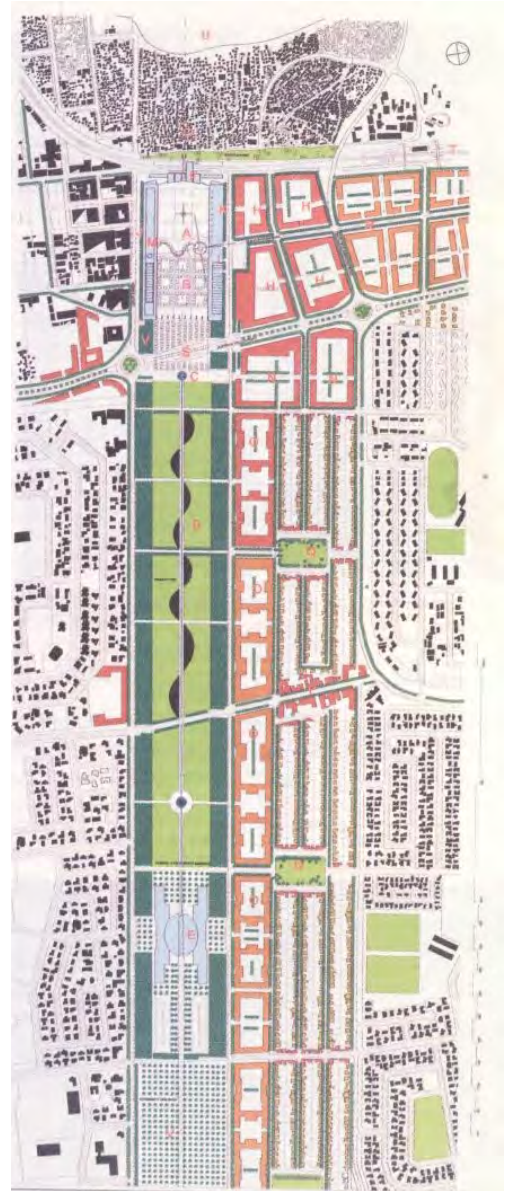
Figure 42: StudioMAS's competition submission for Walter Sisulu Square in 2002. It is evident from this image that the intention was to densify development around Walter Sisulu Square, and the extended formalised public gardens (Krige, 2003: 49).

Plate 23: An aerial view of Walter Sisulu Square of Dedication, illustrating its context od industrial buildings and low density township sprawl. The sheer scale of the structures, as well as its infrastructure-like feel is evident in this image (Low, 2007: 18).

symbolic ownership of the development (Barac, 2007: 46).

The argument arose during the design and construction of Walter Sisulu Square about the challenge of the "architectural fusion of symbol and practicality" when it came to providing space for a community which lacks so much. Design is generally seen as a "wasteful luxury and an insult to the poor" whilst the "public wants space, not style" (Barac, 2007: 42).

Plate 24: In the foreground of this image is the conical tower in the centre of the square. The background shows the modular building design used, and the X-shaped precast concrete block facade treatment (Author, 2008).

This argument was countered by Nabeel Hamdi, a development guru, when he said that responsible design "...offers a shared context of meaning." This puts culture before any other requirement of design whereby "design is not only a 'nice-to-have' extra but a part of what makes city spaces meaningful to even the poorest citizen." The designers of Walter Sisulu Square of Dedication avoided the tug-of-war between space and style. Its architecture, whilst fashionable, speaks of infrastructure whilst maintaining symbolic storytelling (Barac, 2007: 44).
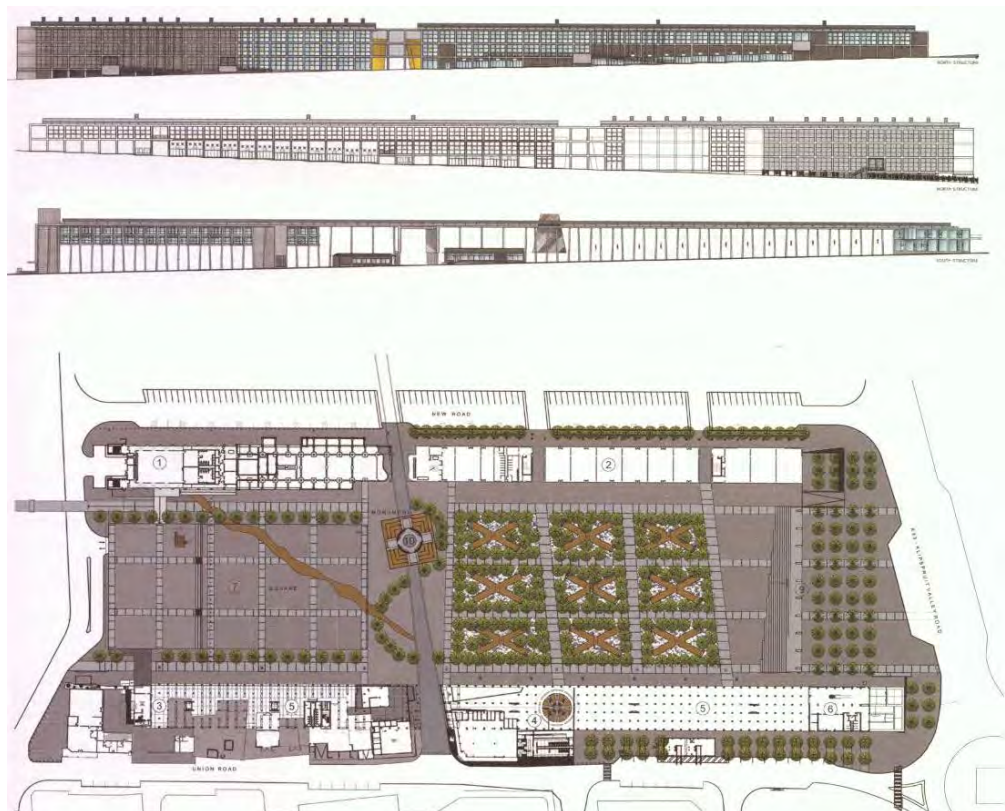
Figure 43: Plans and elevations of Walter Sisulu Square of Dedication. Notice the X-shaped seats which are symbolic of votes on a ballot (Low, 2007: 18).

The architect's intention was to indicate a direction to be taken in Kliptown, rather than a destination with a feeling of finality. It is the beginning of something great (Meyer, 2005: 35).

Although the project as a whole denotes social infrastructure, the architects acknowledge "teething trouble" with the market (Barac, 2007: 46). They refer to the social boundaries left over from Apartheid whereby the success of the development will take time to show itself due to developers' and businesses' scepticism of the development of economic nodes in townships where most of the population is unemployed. A building will not reshape society overnight, but it is a step in the right direction.

2.5.9.3. Summary

Urban renewal is characterised by the physical change in use or occupancy of urban land and buildings. This concept is widely discussed in terms of renewal in the traditional city centres when people and businesses have left in pursuit of lower density, less congested living and working conditions. However urban renewal occurs in areas outside the central city, especially in the case of post-Apartheid South Africa where the urban areas which need the most renewal are the townships located at the edges of the cities.

The Walter Sisulu Square of Dedication in Soweto is one such example where urban renewal has occurred with the intention of improving the social, environmental and economic conditions of Kliptown. It is essential that such urban renewal projects occur in South African townships because these areas house the majority of the population but still lack definitive urban form with public services and economic opportunities, as discussed in section 2.5.8.

2.5.10. SUMMARY AND CONCLUSIONS

It can be seen from this section that office decentralisation is a complex phenomenon, from the events leading up to it, to the reasons why companies choose to leave a centralised location.

The trend seems to have begun with property developers in the United States, and the large portion of the gross national product the development of the suburbs afforded. The sprawl of the suburbs increased the distance between one's place of living and work, therefore it was inevitable that offices would locate within the suburbs so that the distances between home and work were less.

But most of these developments were not near a mass transit line or route, therefore they relied on private vehicle ownership to function. This presents a major traffic problem for city planners as many more cars are on the roads than previously planned. As discussed, developing countries are worse off in this situation than developed countries because they have limited funds with which to provide transportation services, let alone provide for many other shortfalls the country may be experiencing due to its past of unequal development, such as the case of South Africa whilst under the Apartheid government.

Also discussed in this section was office decentralisation in South Africa which appears not to have helped the segregated, fragmented and sprawling nature of our cities. This is because the new office typologies in the decentralised locations have generally been low density in nature which encourages further sprawl, as well as increase private vehicle reliance because sprawl does not allow for viable public transport systems to be sustainable.

Noted in section 2.5.8 was that decentralised office nodes were in or near wealthy suburbs, which benefited only the wealthy because South African cities were designed to keep residential areas apart. This placing of new office nodes in wealthy suburbs directly disadvantages the poorer members of society who were forced to live on the city periphery, and are now cut off from these new office nodes because the few roads that do leave the townships do not pass through the wealthy suburbs where the new office nodes are.

This is the essence of this dissertation as the question arises about whether the office decentralisation which has occurred is appropriate to deal with the social and economic imbalances inherent in post-Apartheid cities.

The answer to this question, upon considering the research in this section, appears that office decentralisation has been targeted to areas which are already wealthy, as opposed to those which need to be uplifted.

That being said, there have been urban renewal based decentralisation projects which aim to make a difference in previously disadvantaged areas. One being Walter Sisulu Square of Dedication in Kliptown, Soweto, whilst another is Bridge City in Kwa Mashu, Durban. The latter will be discussed in Chapter 4.

CHAPTER 3   ANALYSIS OF OFFICE DECENTRALISATION IN CITIES

3.1. OFFICE DECENTRALISATION IN JOHANNESBURG, SOUTH AFRICA

3.1.1. BACKGROUND

Johannesburg is the largest city in Southern Africa, and is also the region's financial capital. It is located in the province of Gauteng and is in close proximity to South Africa's administrative capital of Tshwane. "Johannesburg forms the 'heart' of a polycentric urban region of 'mega city' proportions" (Boraine, 2004: 29). This relatively continuous urban region covers almost the entire Gauteng province which includes Johannesburg, Ekurhuleni, Tshwane, Krugersdorp and Vereeniging. Gauteng is the smallest province in South Africa by area, but houses the largest portion of the population, which is around 11 million (www.StatsSA.gov.za). The largest economic sector by employment in Johannesburg is the financial/business sector. (Boraine, 2004: 24-29).

Johannesburg is the largest city which is not located on a lake, river or coastline (www.southafrica.to). This is due to its mining heritage and resulted in Johannesburg housing the headquarters of many financial institutions in its Central Business District (CBD), as well as the Johannesburg Stock Exchange (which relocated to Sandton in the 1990s). The inner city covers an area of just less than 18km² (www.joburg.gov.za).

3.1.2. CHALLENGES OF DECENTRALISATION IN JOHANNESBURG

As discussed in section 2.5.8 in Chapter 2, incentives were offered to businesses in the 1970s to leave South African CBDs for decentralised locations due to a concern of the over-concentration of land use in the CBDs. This issue was predominantly apparent in Johannesburg, and business flight from the CBD to decentralised locations began fragmenting the city fabric – see figure 44 (Boraine, 2004: 113). Incentives used to encourage businesses to leave the Johannesburg CBD included not providing parking spaces in the CBD whilst failing to counter this by public transport infrastructure. There were also tax incentives at the decentralisation points (Boraine, 2004: 113).

As office decentralisation continued, lower and lower densities of office development occurred to house companies. These took the form of office parks, a typology which was discussed in Section 2.5.1 in Chapter 2. These office parks were built in wealthy suburbs and did not honour public transport routes but used the accessibility of the private car to their advantage. This has created a city which is not pedestrian friendly

or accessible to the poorer members of society, who, as discussed in Section 2.4.2 of Chapter 2, were marginalised by keeping them physically isolated from economic opportunities available in the CBD and now the wealthy suburbs.
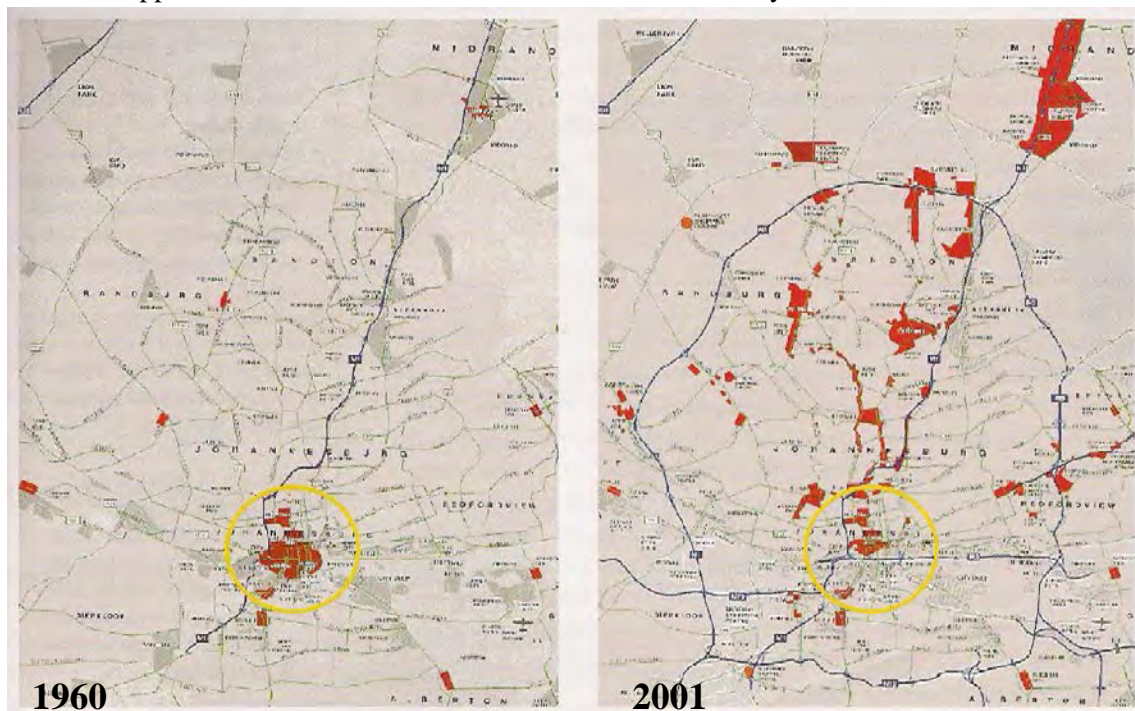
Figure 44: A comparison in the change in location of offices in Johannesburg from 1960 to 2001 (Boraine, 2004: 113).

Plate 25 & Figure 45: Harrowdene Office Park in Woodlands, Johannesburg. These images illustrate the low density nature of office development in the suburbs of Johannesburg, and how close proximity to a major freeway is of importance to this type of development (Buchanan, 1995: 73 & Google Earth 2010).

Although office parks provide a pleasant working environment, they create urban nightmares in terms of traffic congestion due to their reliance on private vehicles and not public transport. This situation is particularly severe in Johannesburg due to the sprawling nature of many, many office park developments, coupled with residential estates which have been constructed in recent years. Traffic congestion at peak hours on the city's roads became so severe that office workers began leaving home much

earlier and going home much later to avoid the characteristic bumper-to-bumper traffic.

These are developments that are found in economic nodes which are located in wealthy suburbs, such as Sandton. This means that the poorer population, which was marginalised by Apartheid planning, is not benefiting from these new economic nodes due to their location within wealthy suburbs which they were actively kept apart from, as well as the lack of mass public transport into these areas other than mini-bus taxis, which add to the congestion on the city's roads.

3.1.3. THE SOLUTION

Recognising that the reliance on the private car will eventually choke Johannesburg and make doing business in the city increasingly difficult, the Gauteng Department of Public Transport announced in 2002 a public transport system which would aim to attract private car users in order to lessen traffic congestion on province's roads (Du Plessis, 2003: 5).

The Gauteng Department of Public Transport announced the commencement of the construction of the Gautrain Rapid Rail Link between Johannesburg and Pretoria. This route was significant because it was the one of the fastest growing development hubs in South Africa, and was being constrained by road traffic congestion (Du Plessis, 2003: 3).

In order to attract private vehicle users to the proposed Gautrain they needed to improve the image of public transport in South Africa. Historically, trains were used in the Apartheid cities as a means of transporting masses of poor, marginalised African people from the townships into the places of economic opportunity. Buses were used to transport poorer white members of society who were located nearer places of economic opportunity. Because the Apartheid city was designed mainly on high speed, limited access freeways (as discussed in Section 2.4.1.2 in Chapter 2), middle and high income groups generally owned private vehicles. Therefore the freedom of the private car was something for the rest of the population to aspire to.

In order for the Gautrain to work, the image of public transport in South Africa had to change because the proposal would aim directly at those who own private cars.

The scheme would also need to go wherever a private car could go – at least for economic purposes. The Gautrain would pass through main economic nodes in Johannesburg, with a final station in Pretoria. It would also link up with O. R. Tambo

International Airport in Johannesburg to promote business tourism (Du Plessis, 2003: 5).

	North-South Commuter	Service opening 2011.
	East-West Commuter	All trains stop at every station, use rear two coaches only.
	Airport	This service is provided via Sandton station only. Use front two coaches only, demarcated: ✈
....	Metrorail Interchange	Change here for Metrorail lines.
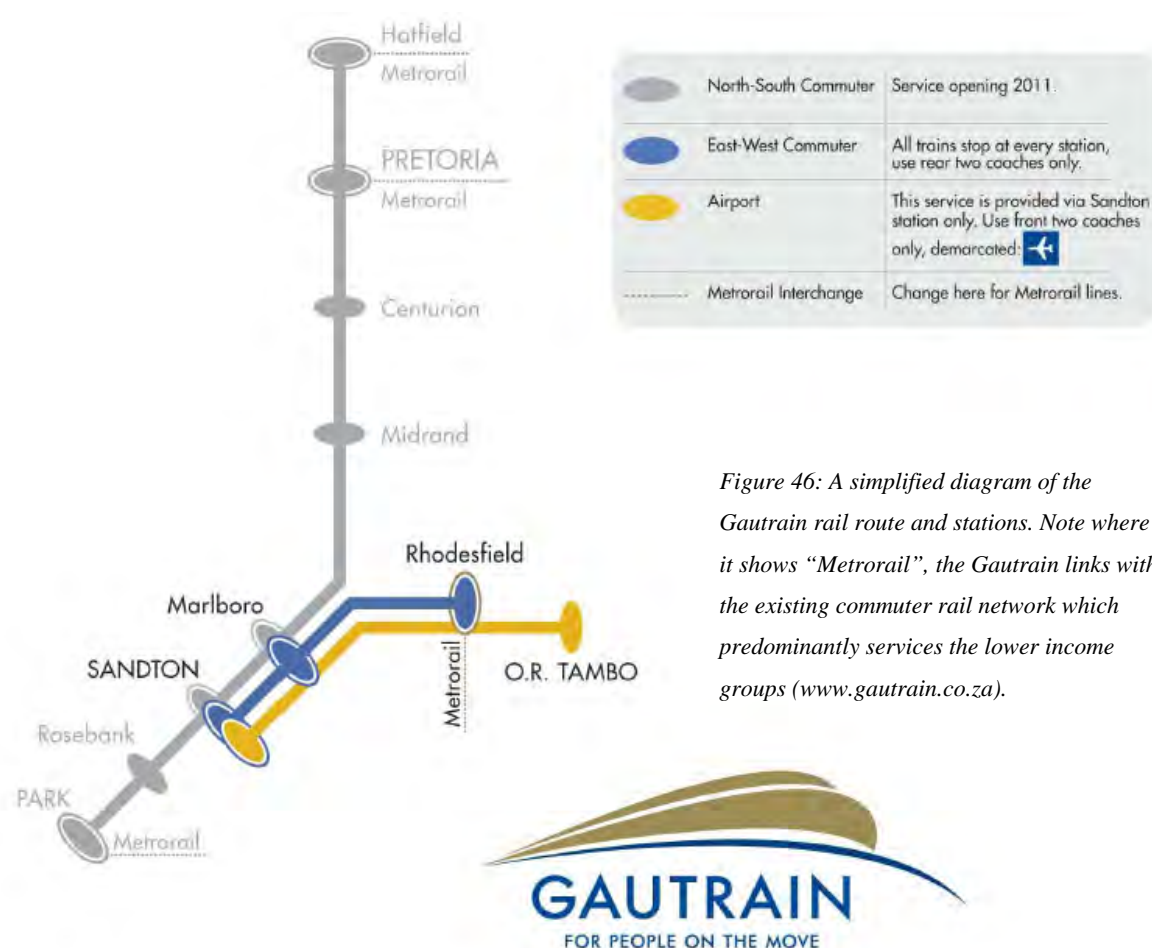
Figure 46: A simplified diagram of the Gautrain rail route and stations. Note where it shows "Metrorail", the Gautrain links with the existing commuter rail network which predominantly services the lower income groups (www.gautrain.co.za).

The Gautrain would have anchor stations in Johannesburg CBD, O. R. Tambo International Airport and Pretoria CBD. Other key nodes identified for stations in Johannesburg were Rhodesfield, Rosebank, Sandton, Marlboro, and in Pretoria were Centurion and Hatfield (Du Plessis, 2003: 9). Note that these are all major economic nodes.

In order for the Gautrain to function, there had to be dependable public transport around each of the stations. This saw the introduction of the Gautrain Bus which operates in sync with the Gautrain train system. This ensures a reliable transport service could shuttle people from the station to their places of work, and from their places of

Plate 26: The Gautrain (www.gautrain.co.za).

residence to the Gautrain train stations. (www.gautrain.co.za)
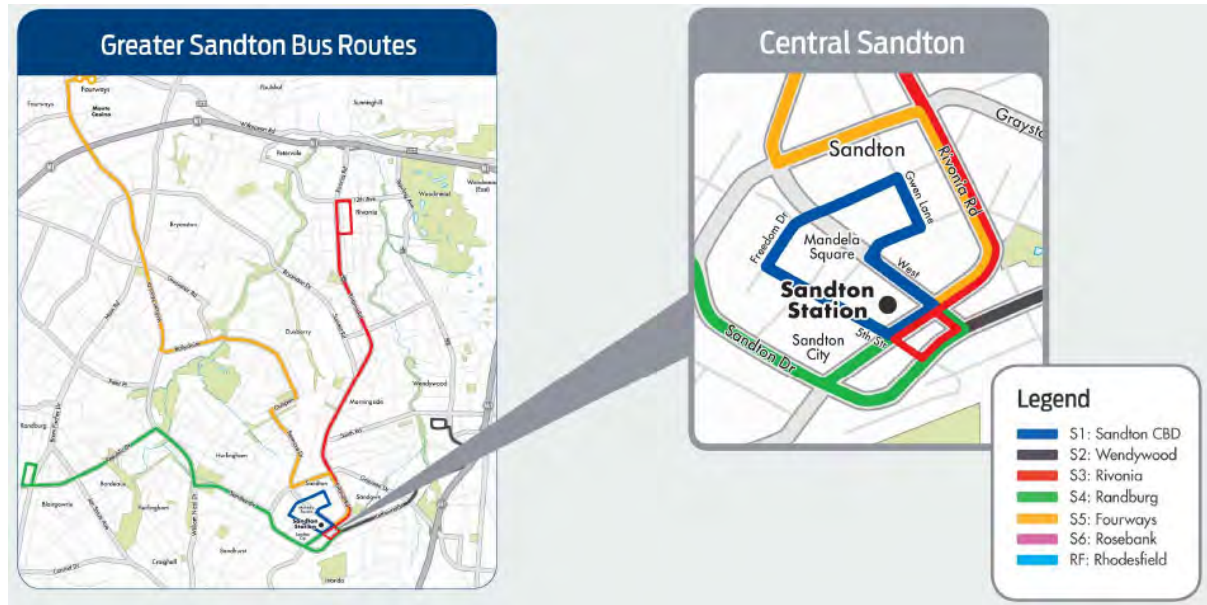
Figure 47: These maps show the Gautrain Bus routes in the Sandton area. Notice they travel along main roads where both commercial and residential properties exist. These bus routes primarily feed the Sandton Gautrain Station, but can be used independently of the Station (www.gautrain.co.za).
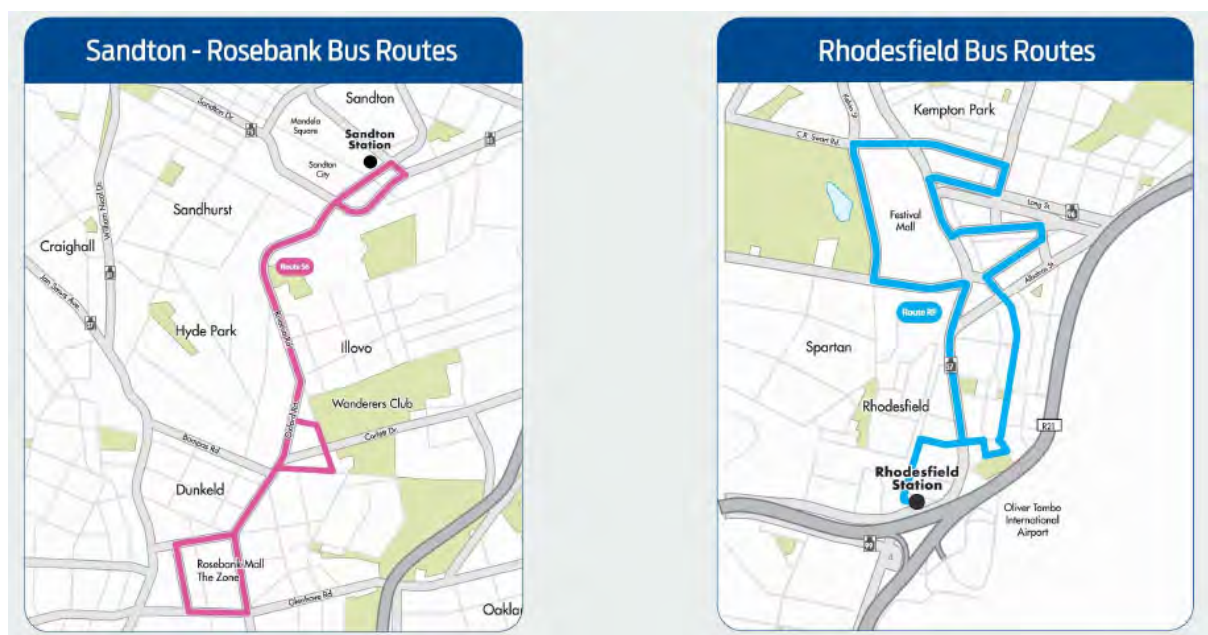
Figure 48: The Sandton-Rosebank Gautrain Bus route links two very important office nodes: the Sandton CBD and Rosebank CBD. A Gautrain Rail Station will be operational in Rosebank in 2011, so in the meantime, this route feeds the Sandton Station.

The Rhodesfield Gautrain Bus route serves the commercial area of Rhodesfield and passes through the residential area of Kempton Park. The Bus route feeds the Rhodesfield Gautrain Station, as well at the existing Metrorail station. (www.gautrain.co.za).

Seeing that the target market for the Gautrain was people with private cars, the developers included large parking garages at train stations to enable a park-and-ride system so that people would not feel they would need to live without their cars.

Plate 28: The Gautrain Bus at the bus depot (www.gautrain.co.za).

3.1.4. SUMMARY AND CONCLUSIONS

The Gautrain is a Rapid Rail Link which aims to remove cars from the roads of Johannesburg. In order to do that, the image of public transport had to be changed in order to attract the middle- to upper income groups because they are the majority of private car users. Even though the aim was to remove cars from the road, the developers included parking garages to encourage park-and-ride systems because of the lack of public transport in the suburbs of the city, and the vast distances one would be required to walk to get to a station, which is the reason people buy cars in the first place.

Also, around the stations are the Gautrain Bus routes which move people to and from the station and their places of work, and to and from the stations from their places of residence. This system would be crucial to the Gautrain's survival because it is all very well having a wonderful train to travel on, but if people cannot get to their destination from the station, the whole system will be worthless.

3.2. DECENTRALISATION IN LAGOS, NIGERIA

3.2.1. BACKGROUND

Originally, Lagos was a war camp, named Eko, for the Benin Empire. It was renamed Lago de Curamo by the settlement of the Portuguese in 1472 and was later named Lagos, after the Lagos in Portugal. In Portuguese, "Lagos" means "lakes" which makes reference to the lagoon Lagos (Nigeria) is located on. Lagos became a British colony in 1861 and it gained independence in 1960. The British made Lagos the capital of Nigeria in 1914 (www.wikipedia.org).

Figure 49: A map showing the geography of Lagos. Lagos Island is the location of the current Central Business District of the city. Notice the awkwardness of this location in relation to the rest of the city (www.wikipedia.org).

Lagos was always a working city, even before colonisation. In the seventeenth century it was a fishing town, and during colonisation in the eighteenth and nineteenth centuries, it was transformed into a bustling industrial and commercial city. Before the British arrived, Lagos was a major slave trade centre and this brought vast wealth to the city. The British snuffed out the slave trade upon their arrival and used the city for its natural resources. In fact, some ex-slaves returned to Nigeria and ended up working for the British administration because they had been exposed to western education (Williams, 2008: 112).

Geographically, Lagos is a coastal city located in West Africa on a lagoon which separates the Lagos Island (the former town and the present day Central Business District) from the mainland. The geography of the city's location is one of the major factors which limits the city's efficient growth and development, but this limitation on available land causes an increase in density.

Lagos is one of the world's fastest growing cities, with an annual population increase of 600 000 people (www.lagosstate.gov.ng), and is predicted to be the world's third largest city by 2015 (Jarvis, 2010). According to census data from the official Website of the Lagos State (the state in which the city of Lagos is situated), the population of Lagos State is approximately 17.5 million (www.lagosstate.gov.ng). Lagos State can be seen as a Megacity of Lagos, which will be discussed in section 3.2.2.

3.2.2. CHALLENGES OF DECENTRALISATION IN LAGOS

Between 1960 (the year of Independence) and 1979, Lagos's population grew from a little less than 500 000 (Williams, 2008: 112) to 3 720 000 at an average 8% annual increase (Ladas, 1979: 7). Coupled with this extremely rapid growth was the insufficient infrastructure which could not cope with the increasing numbers of people, and with increasing densities. This created very unsafe and unhygienic living conditions in many parts of the city.

Another problem with this rapid increase in population was that government funds were being channelled into the development of Lagos whilst neglecting the rest of the country, which left many towns and cities underdeveloped and lacking infrastructure (Ladas, 1979: 7). This increased the influx of people into Lagos.

Plate 29: An aerial photograph of Lagos Island. The tall buildings in the distance indicate the CBD. Notice how the lagoon separates the CBD from the rest of the city (www.wikipedia.org).

There was another population surge in the 1970s when there was a boom in the petroleum industry (Williams, 2008: 112).

At the rate of population growth between 1960 and 1979, the population of Lagos would have reached 25 million by the year 2000 (Ladas, 1979: 7).

3.2.3. PAST SOLUTIONS

A regional development masterplan was proposed in the late 1970s with the intention of decentralising the functions of Lagos to surrounding towns (Ladas, 1979: 7). Unfortunately the plan was scrapped in 1982 when the country entered 16 years of military rule by governments which had no interest in investing in infrastructure to cope with the vast population of Lagos (Williams, 2008: 112).

The main goals of the masterplan were to "slow down the trends of excessive centralisation in Lagos and to create conditions favourable for a balanced distribution of people and activities throughout the state" (Ladas, 1979: 7).

The principles which would have been adhered to would be that the community structure would be based on the functional interdependence among communities which

would fall into a natural hierarchy. The other principle would be the adoption of a "dynamic growth pattern following one preferential direction which will prevent future strangulation due to concentric development of the existing centre" (Ladas, 1979: 7).

The masterplan was organised into seven development areas which included six major urban communities and three rural communities. Each of the six major communities would be situated along a zone of central functions which would have allowed for further growth. A grid-iron pattern would have been introduced with the intention of rationalising the urban fabric to promote efficiency and to create connections with surrounding areas (Ladas, 1979: 7).

By the year 2000, the intended image of Lagos State would be one of integration which consisted of a network of transportation and utilities corridors whilst each major centre would specialise in either services, administration, industry or recreation and tourism. The central functions would be located in such a way as to strengthen the main north-south axes connecting Lagos with the rest of Nigeria, whilst strengthening existing links among smaller urban settlements by means of a proposed transport network which would lead to the development of secondary development axes between new secondary centres. These centres and development corridors would attract a large part of the population which would otherwise have been concentrated in Lagos (Ladas, 1979: 10).

It is unfortunate that this plan was never implemented because it would have decreased the density of Lagos whilst investing in infrastructure which would have rationalised the city as well as helping the city cope with rapid population growth.

Figures 50 and 51: Illustrations of regional intentions of Lagos
(Lodox, 1979: 8-9)

3.2.4. CURRENT SOLUTIONS

With the onset of military rule came chaos in terms of organisation of services and availability of public transport. The public transport system functions much like the South African mini-bus taxi industry does, but instead Lagos possesses a fleet of thousands of yellow buses. Traffic management systems have not been enforced which has caused chaos on the city's road network, which is possibly even worse than Johannesburg's situation.

Once military rule ceased in 1998, a new government took charge and began developing large-scale infrastructure projects to deal with the chaotic urban landscape of Lagos city which, in 2006, was home to nearly 8 million people, whilst Lagos State was home to 17.5 million (www.lagosstate.gov.za).

3.2.4.1. The BRT System

The then Lagos State Governor, Bola Tinubu, initiated the Lagos Bus Rapid Transit (BRT) system (www.wikipedia.org), the first phase of which was officially opened on March 17, 2008 (www.lamata-ng.com).

The BRT system relies on the use of "dedicated 'interference free' segregated lanes to guarantee fast and reliable bus travel" (www.lamata-ng.com). The reason for segregating the BRT lanes from regular lanes is to ensure timely, reliable operation of the bus system, even when the other lanes are congested.

Plate 30: A photograph showing the chaotic yellow buses on the "normal" roadway, and the line-up of blue BRT buses in their dedicated lane during peak hours. Notice the queue of people waiting to board the BRT buses. (www.skyscrapercity.com).

The BRT system functions as a subway system on the road in that it is designed as a high capacity public transport system, and takes people to and from designated stations along a defined route, at a defined routine so that people can organise themselves around the BRT system, as opposed to the public transport system organising itself around people.

The system in Lagos aims to reduce traffic congestion whilst giving the poorer members of the city the mobility they need at a cheap price (www.lamata-ng.com)
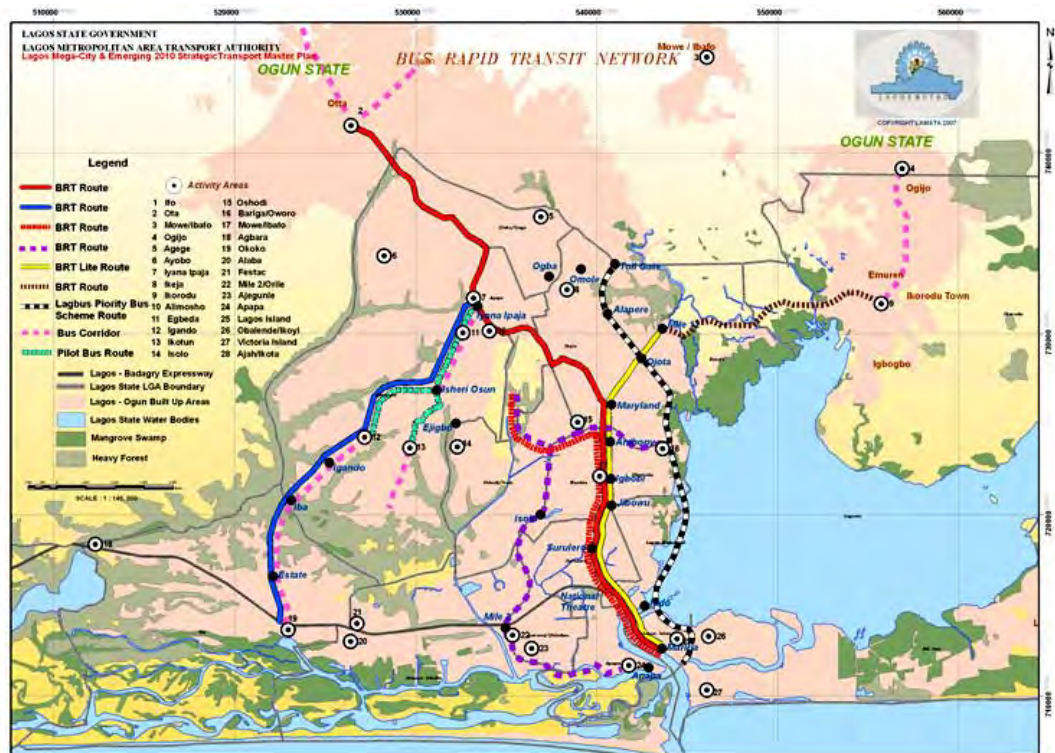
Figure 52: A map showing the BRT routes in Lagos (www.lamata-ng.com).

Although the BRT system has been a resounding success (it moves 200 000 people daily, and in the two years of its operation it has moved 120 million people (www.lamata-ng.com), it still is not a big enough infrastructure investment for the scale of Lagos, therefore the Light Rail system is currently under construction.

3.2.4.2. The LRMT System

The Lagos Light Rail Mass Transit (LRMT) system is currently under construction and the first phase, which comprises the Blue and Red lines,will be operational by 2012 and 2013 respectively (www.skyscrapercity.com).

Figure 53: A map showing the Blue and Red Light Rail lines which will be operational by 2012 and 2013 respectively (www.skyscrapercity.com).

Figure 54: A map showing all proposed Light Rail lines in Lagos (www.lagosrail.co

Rail corridors	Length (Km)	Forecasted passengers/Hour	Due Date
Red Line (Agbado to Marina) – already commissioned	31	80,000	2013
Blue Line (Okokomaiko to Marina) – already commissioned	27	40,000	2012
Green Line (Marina to Lekki free zone)	37	35,000	2015
Yellow Line (Otta\MMA to Iddo)	34	40,000	2020
Purple Line (Redemption Camp to LASU (Ojo)	60	35,000	2018
Orange Line (Redemption Camp to Marina)	42	25,000	2020
Brown Line (Mile 12 to Marina)	20	25,000	2016
Monorail (Ikoyi/VI)	15	20,000	2013
Monorail (Ikeja)	20	25,000	2013

Table 1: A table illustrating the development intentions of the Lagos Light Rail system in terms of length, passenger/hour rate and completion date (www.skyscrapercity.com).

According to Lagos Rail, the Blue Line will travel through one of the most densely travelled corridors in the city. It will pass through and near residential areas, commercial areas and industrial nodes such as the Volkswagen vehicle assembly plant. This line will follow the route of the freeway, and will be located between west- and east-bound carriageways. Elevated pedestrian walkways will be used in order to ensure safe access to the Light Rail stations (www.lagosrail.com).

Figure 55: A map showing the Blue Line's route and stops. (www.lagosrail.com).

The Red Line passes through some of the most densely populated areas in Lagos, hence the greater projected passenger/hour rate. The Red Line will share the section of the Blue Line when crossing into Lagos Island (www.lagosrail.com).

The intention of the Lagos Light Rail scheme is to rationalise the transportation system in a "chronically congested" city (Lagos State Government, 2008: 5).

The system functions as a subway does in that it is a formalised point-to-point system on a predefined route, as opposed to the present informal taxi and bus services which follow the needs of the passengers.

Figure 56: A map showing the Red Line's route and stops. (www.lagosrail.com).

Plate 31: An artist's impression of the Lagos Light Rail and BRT systems. Notice they both run on lanes independent of the main road. The traffic to the left of the image is indicative of the current traffic situation in Lagos (www.skyscrapercity.com).

3.2.5. SUMMARY AND CONCLUSIONS

Lagos is one of the fastest growing cities in the world, and has been for many decades. It grew from 500 000 people in 1960 to 17.5 million in 2006. The rejected masterplan of the 1970s attempted to decentralise the city's functions in order to disperse and de-densify the city because population density was beginning to show signs that it was nearing a dangerous point in terms of health and safety, as well as stress on the existing infrastructure due to the emphasised centrality of the city. But, as noted, these plans were put on hold in 1982 and during the 16 years of military rule which followed. Minimal maintenance and construction of infrastructure occurred during this time which did not help the dire living conditions of this city, as well as the city's organisation in terms of urban structure.

Since the military government was overtaken by a democratic one in the 1990s, a more rational approach to city planning has occurred in Lagos. Traffic congestion was always an issue in the ever expanding city, and with irrational town planning coupled with a chaotic public transport system, traffic management was almost impossible.

Bold solutions were required to attempt to make Lagos a more liveable city, and one which would make doing business more attractive, seeing that Lagos is West Africa's commercial hub.

The first of these solutions came in the form of the Bus Rapid Transit (BRT) system which uses a bus system similar in nature to a subway system. Buses travel on dedicated lanes in order to provide a regular, reliable, timely, point-to-point service. This system was a resounding success, and in the first two years of its implementation the service carried 120 million passengers.

However, it was recognised that this service alone would not be enough to make a substantial long-term difference in the traffic congestion problems of Lagos. This brought on the proposal of a Light Rail Network which would function in a similar fashion to the BRT, except it would be on rails. It would be more expensive to implement than the BRT, but it would be more efficient, and would carry many more passengers, than the BRT.

Two of the proposed nine routes are currently under construction. They are the routes which would be accessible to the majority of the population in the most congested parts of the city.

The Light Rail and BRT systems will function together to move people around the city of Lagos. Although the city remains centralised in terms of commercial activity, each of the stations is located at points of activity, whether residential, shopping, minor business, industrial or entertainment.

3.3. OFFICE DECENTRALISATION IN MELBOURNE, AUSTRALIA

3.3.1. BACKGROUND

Figure 57: A map showing the location of some of Australia's cities. Melbourne is located in the South Eastern corner of the country (Google Earth 2010).
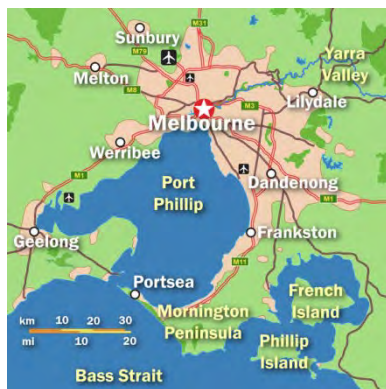
Figure 58: A map showing the location of Melbourne city centre in relation to its surroundings. The pink shade in the image is the development pattern, and major roads have also been shown. (www.wkipedia.org).

Melbourne is situated on the Yarra River and is located in the State of Victoria in the South East of Australia. It was founded in 1835 and in 1847 it was declared a city by Queen Victoria. During the Gold Rush in the 1850s Melbourne became one of the world's largest and wealthiest cities. (Morris, 2008: 9)

Today Melbourne has an extensive public transport network including commuter trains, trams and buses. This network brings residents from the suburbs into the city centre efficiently, which helped the CBD retain its importance as the commercial hub of the city.

There are many similarities between the cities of Durban and Melbourne. They are both harbour cities: Durban has the largest harbour in South Africa (www.durban.gov.za) and Melbourne has the largest harbour in Australia (State Department of Victoria

Department of Infrastructure, 2007: ii). Both Durban and Melbourne are the second largest cities in their respective countries: Durban has a population of approximately 3.5 million (StatsSA, 2007), whilst Melbourne has a population of approximately 4 million (Lahey, 2009) and both cities were founded in 1835 by British settlers.

Melbourne is known as one of the world's most liveable cities (Morris, 2008: 53).

3.3.2. CHALLENGES OF DECENTRALISATION IN MELBOURNE

Melbourne is based roughly on a rectangular grid because the topography allows for it. Also, although the CBD is dense with commercial activity, most of Melbourne's land is taken up by sprawling suburbs. The suburbs which are nearest the CBD are served efficiently by Melbourne's extensive public transport network, but suburbs further away from the CBD are not served very well, and because these areas are the least dense, they are the most attractive areas for development.

Although Melbourne has an extensive public transport system, which removes many motorists from the roads, many people rely on private cars for their journeys to and from work. The arterial road system mainly consists of radial and rectangular grids (see Section 2.2.2.), and with the limited major road crossings of the Yarra River, this leads to a concentration of vehicular traffic on the Monash-West Gate route. This route is both a major commuter and freight route from the south-eastern and western suburbs to the CBD. The peak period for east- and west-bound traffic on the Monash-West Gate route is lengthening each year (State Department of Victoria Department of Infrastructure, 2007: ii).
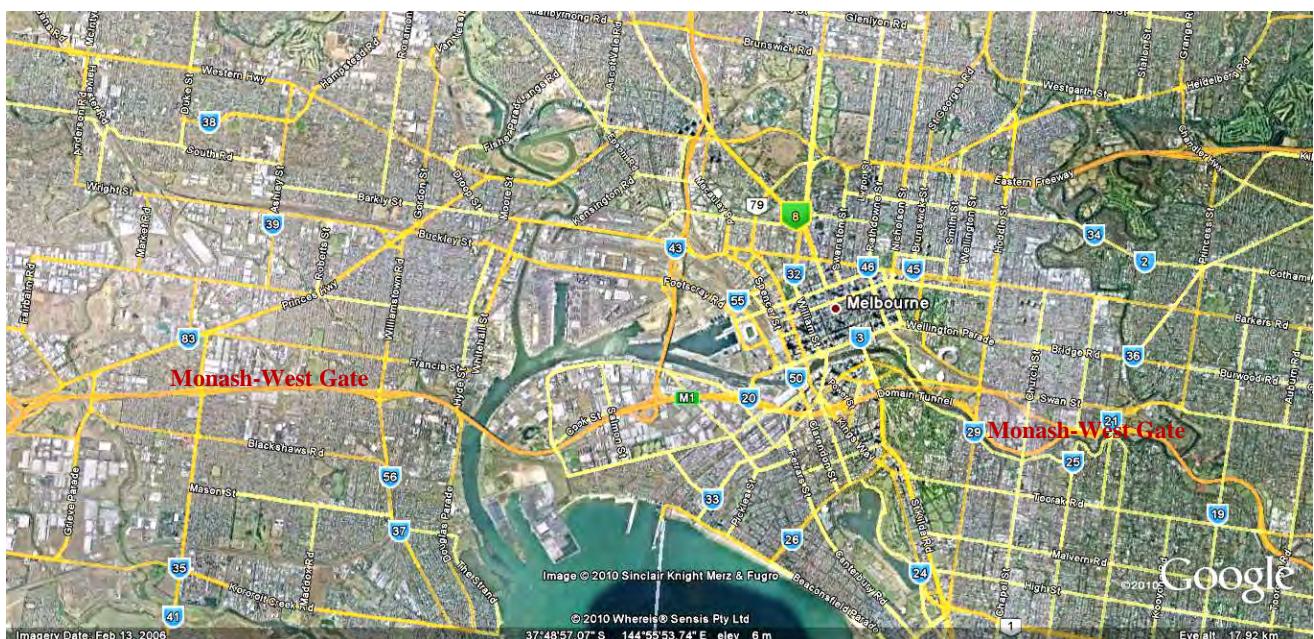
Figure 59: A map illustrating the road network in Melbourne. The word "Melbourne" shows the location of the CBD (Google Earth 2010).

Melbourne has also experienced office decentralisation for the same reasons discussed in section 2.5.4.
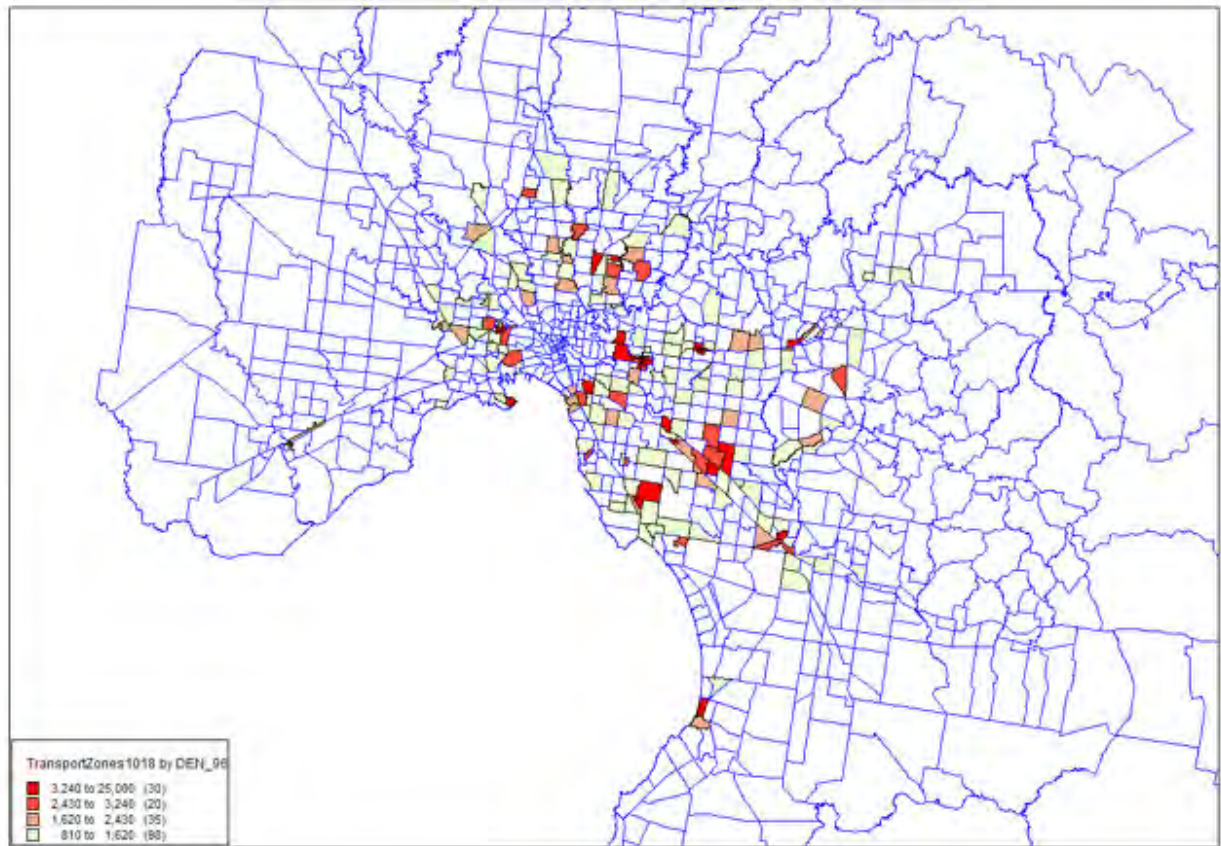
Figure 60: A map illustrating suburban job concentrations in Melbourne in 1996 (Davies, accessed 2010: 605).

Although it is clear that office decentralisation has occurred in Melbourne on a large scale, the integrity of the CBD remains due to its importance as a cultural and commercial hub of the region.

There is concern, however, that the integrity of the CBD, and the efficiency of the public transport system, would not be sustainable due to the rapid increase in population Melbourne has seen in recent years (Lahey, 2009).

In 2009, Melbourne's population increased by 90 000 and studies show that this rate of increase is set to continue. Whilst an increase in population is good for the city's economy and property prices, it increases the pressure on the already stressed public transport system. There have been reports that at peak times, trains sometimes carry up to 1 200 passengers whilst they are defined as "overcrowded" if they carry more than 798 (Lahey, 2009).

To summarise Melbourne's urban status:
- Office decentralisation has occurred

- The integrity of the CBD remains strong due to cultural and business significance
- Extensive, but stressed, public transport system
- Monash-West Gate Freeway is becoming extremely congested due to minimal alternative routes through the city
- There has been a rapid increase in population
- Suburban sprawl

3.3.3. THE SOLUTION

Since the 1980s Melbourne has been moving toward a more sustainable, liveable future, and Central Melbourne is recognised around the world for this fact. It has replaced the idea of a "central business district" with one of a "central activities district" whereby the area is recognised as a centre of many activities, not just business (Adams, 2009: 41).

Adams says that the Australian Government needs to contain development to within the city boundaries. He says that the previous policy was to push the boundary further out to enable cheaper land to come available for development. The government has realised now that this policy is not sustainable and has changed their policy to encourage higher density residential developments to occur closer to economic opportunities (Adams, 2009: 41-42).

Adams suggests transforming the suburbs into activity centres which would be developed as miniature versions of the central cities, "with higher densities, quality streets, a mixture of uses and good access to public transport" (Adams, 2009: 42).

This approach, Adams says, will help with the rapid increase in population that Melbourne has experienced recently because a higher density of residential development will occur in areas with good access to public transport (Adams, 2009: 42).

Adams also suggests that these activity centres be connected by a network of high density, mixed-use corridors along all existing and proposed public transport routes. This would increase the efficiency of the public transport system whilst granting access to the largest portion of the population. This densification would decrease the need for the city boundary to be pushed out. These corridors would be located alongside low density suburbs, therefore the suburbs would be conveniently situated near public transport.

This plan recognises that the suburbs exist, and that their approach needs to be changed in order to cope with rising population and traffic congestion. The activity centres which would be located in the suburbs would be places of employment opportunities which would not compete with those offered in the city centre. This would reduce the need for many people to travel into the city centre. This would reduce traffic congestion and travel time. These activity centres would also be centres of entertainment, relaxation and shopping.
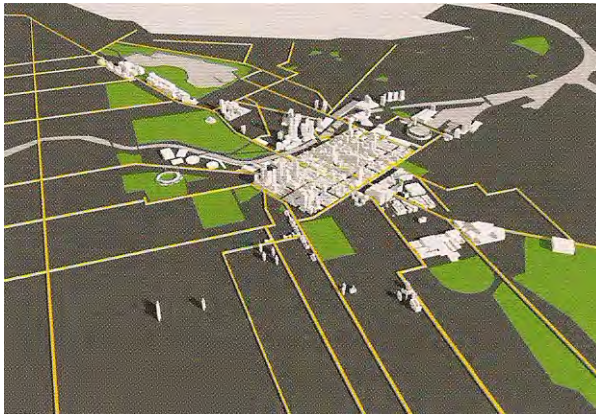
Figure 61: A 3D model showing the existing urban structure of Melbourne, illustrating in white where dense development has occurred (Adams, 2009: 42).

Figure 62: A 3D model showing the proposed urban structure of Melbourne, illustrating in white where dense development occurs. Notice the dense development occurs along major transport routes. This "ribbon" development speaks of a similar theory brought forward by David Dewar, discussed in section 2.4.3, whereby development corridors occur in order to support a more efficient public transport system (Adams, 2009: 43).

3.3.4. SUMMARY AND CONCLUSIONS

Rob Adams's theory suggests a method of decentralising the city to counteract the process of sprawl. He suggests creating mixed-use nodes, namely "activity centres," to anchor suburbs, and to tie them and the activity centre of the city, which was previously the central business district, together by way of a network of high density corridors along public transport routes.

This theory should work, but to address the other problems the city of Melbourne faces, the public transport network capacity would need to be increased substantially, and its range would need to be increased to include regular service to outlying suburbs.

3.4. SUMMARY AND CONCLUSIONS

This chapter illustrates methods which have been used in order to pull decentralised cities together, or to suggest methods of decentralisation to control urban problems. The solutions stated in this chapter aim to make the city in question function more efficiently.

The following summarises the solutions discussed in this chapter:

- High speed rail system which has stations in commercial nodes. A dedicated bus network feeds the local high speed rail stations.
- Actively decentralise a city in order to de-densify it by creating nodes of intensity in either the least dense areas of the city, or areas which are least developed.
- Bus Rapid Transit Network (BRT) is a form of mass public transit which uses buses.
- Light Rail Network is a form of mass public transit which uses streetcars/trams.
- High density, mixed commercial/residential corridors along existing major routes with public transport to activate suburbs, as well as to link together decentralised office nodes, and these to the central business district.
- Changing the function of centres from "Central Business Districts" to "Central Activities Districts."

CHAPTER 4   CASE STUDY: THE CITY OF DURBAN

4.1. OFFICE DECENTRALISATION IN DURBAN, SOUTH AFRICA

4.1. BACKGROUND

The city of Durban is located the on the east coast of South Africa, in the province of KwaZulu-Natal. Today it is a part of the eThekwini Municipality in which 3.5 million people live (StatsSA, 2007). Durban is marketed as "South Africa's Playground" because it has a sub-tropical climate and extensive beaches which provide conditions for a thriving tourism industry.

Figure 63: A map of South Africa, indicating that Durban is located on the east coast of the country (www.wikipedia.org).

The coastline along which Durban lies was first sighted by Portuguese explorer Vasco da Gama on Christmas Day in 1497 who named the area "Natal", or Christmas in Portuguese (Walker, 1964).

In was not until 1825 that the first European settlers occupied the area where the modern city exists. This was a group of 25 British settlers, under the command of Lieutenant F. G. Farewell, who had travelled from the Cape Colony. Farewell's travelling companion, Henry Francis Fynn, managed to befriend King Shaka Zulu who granted the settlers a "30-mile strip of coast a hundred miles in depth" (Walker, 1964). It was decided in 1835 that the settlers would build a

Figure 64: A basic road map of Durban, indicating the form of the city. Notice the scale of the harbour under the word 'Durban' (www.wikipedia.org).

capital town on the site, and would call it d'Urban, after Sir Benjamin d'Urban, then governor of the Cape Colony (www.sahistory.org.za).

The modern city of Durban was planned, as in all South African cities, by the Apartheid planning principles which, as discussed in section 2.4, were based on Modernist planning principles with a distorted and exaggerated separation of uses. This means that the urban poor (historically, black people) were placed at the edges of the city, therefore far from economic

opportunities, whilst the more affluent white population were located nearer the city centre, therefore closer to economic opportunities.

Today, along with its roaring tourism industry, Durban has the largest harbour in South Africa (www.durban.gov.za). This harbour has always been an important part of the city's economy by creating many jobs in the industrial, manufacturing and import and export sectors (Boraine, 2004: 28).

Plate 32: An image showing Durban's CBD in relation to the harbour (Author: 2004).

Due to the economy specialising in services related to the harbour, the Central Business District (CBD) is located adjacent to it. It could be argued that this specialisation prevented Durban's CBD from falling so catastrophically into the "crime and grime" image which Johannesburg CBD became after the fall of Apartheid.

4.2. EXISTING DECENTRALISED OFFICE NODES IN THE GREATER DURBAN AREA

The quality of Durban CBD's environment did, however, drop after the fall of Apartheid which caused many businesses to relocate to suburban locations. Generally they chose the wealthy suburbs: initially the Berea and Westville to the immediate west and further west respectively of the CBD, later La Lucia Ridge and Umhlanga Ridge which are 15 kilometres north of the CBD, and more recently Kloof and Hillcrest which are approximately 30 kilometres west of the CBD, and are seen as wealthy white suburbs.

Figure 65 shows the relation between office nodes in the greater Durban region. It can be seen from this that Berea is central to most office nodes which makes it a desirable location for many businesses. Umhlanga and Bridge City are examples of controlled office decentralisation because they are planned in conjunction with the Durban City Council, whereas office locations such as Berea, Westville, Kloof and Hillcrest are developer-driven, therefore they are examples of uncontrolled office decentralisation. However, the City Council has allowed developers to alter the zoning in these areas for office use, thereby supporting it. That being said, Umhlanga is using the market to drive the interest in the area as opposed to government subsidy.

The following sections will be localised studies of specific office locations and how their urban framework relates to pedestrians and modes of transportation available in each case.

Figure 65: A diagram showing the locations at which office development has occurred (Aerial photograph: Google Earth).

INDIAN OCEAN

LA LUCIA
UMHLANGA

BRIDGE CITY

CENTRAL
BUSINESS
DISTRICT

HARBOUR

BEREA

WESTVILLE

PINETOWN

KLOOF

HILLCREST

7.40km

OFFICE LOCATION:
CENTRAL BUSINESS DISTRICT
AND BEREA

Figure 66: A map of the Berea area in Durban, illustrating the various locations where offices have decentralised to (Google Earth, 2010).

Central Business District

Businesses predominantly manufacturing/light industrial

Decentralised Offices

Train Station

4.2.1. Office Location: Central Business District

The Central Business District (CBD) of Durban is the place where the original town of Durban was first established. It was developed there due to its proximity to the natural harbour.

The present-day CBD has retained its importance due to this proximity to the harbour, although the quality of the working and living environment here has deteriorated. High density high-rise office and residential buildings characterise the CBD, but there are also warehouses and light industrial buildings here. Retail outlets are predominantly on the ground floor addressing the street.

All modes of public transport (train, bus, mini-bus taxi) culminate in the CBD. This makes it a very vibrant place with many people passing through it. The one problem with the public transport system, however, is that all routes begin and end in the CBD. There is no means by public transport to move between suburbs. This possibly adds to the private vehicles on the roads because it is perceived in South Africa that public transport is for the

Plate 33: The CBD is characterised by dense high-rise office and residential buildings (Author: 2010).

Plate 34: Due to the high water table of the CBD, multi-storey parkades were built to accommodate the increase in car ownership. Pine Parkade can be seen to the right of this image. (Author: 2010).

Plate 35: There is a municipal bus rank in the CBD. There are two train stations but they are located on the edges of the CBD (Author: 2010).

poorer classes, and a middle class person may not want to go into the CBD and end up in a possibly dangerous position.

The CBD is very pedestrian friendly and buildings respond positively to the street in the form of shops opening out onto the pavements because most of the people in the city move about on foot. However the CBD is perceived as congested, noisy, dirty and crime-ridden, which makes it an unattractive location for businesses of a higher calibre.

Plate 36: There are several minibus taxi ranks in the CBD, as well as ranks for private bus companies (Author: 2010).

4.2.2. Office Location: Berea

The Berea is an old suburb of Durban, therefore has many historical houses. Many of these houses were converted into A-Grade offices in the mid-1990s (see figure 66 for an analysis of office locations in the area). Cowey (Problem Mkhize) and Florida Roads were primary targets of this office

decentralisation and house conversion. The trend is still occurring and is gradually spreading along the length of Cowey Road and into streets around Florida Road. There have been some purpose-built suburban offices in Berea, for

Plates 37 & 38: Cowey Park is a purpose-built suburban office located on Cowey (Problem Mkhize) Road. It contains a petrol station and shops on the ground floor, two levels of parking, and two levels of offices (Author: 2011).

Plate 39: A Heritage Listed building on the corner of Cowey and Marriott Roads with restaurants on the ground floor and offices on the first floor. This building is across the road from Cowey Park (Author: 2011).

example Cowey Park on Cowey Road (see plates 37 and 38).

Cowey and Florida Roads have attracted professional businesses, for example architects, engineers and lawyers, as well as services such as travel agents, estate agents, hair and beauty salons and doctors and dentists. Florida Road has a concentration of entertainment and dining establishments aimed toward the younger generations whilst Cowey Road is focused more on the mature clientele in the types of restaurants and shops available.

Plate 40: Another original Heritage Listed building on the corner of Cowey and Marriott Roads. This previously was a house which has been converted into office premises (Author: 2011).

Plate 41: Evidence of the office typology available in Cowey Road (Author: 2011).

Although this may seem like a good thing for the suburb because the converted houses are well kept in order to maintain a good company image, the fact remains that they are only occupied during office hours. This brings the problem of lower levels of vigilance for crime in the area after hours. One company the author spoke to has had three burglaries in a single year. Burglars target business premises because they know they will be vacant at night, but also they know that they house valuable items such as computers.

Figure 67: A section through the typology of office commonly found in Berea. This exact example is located between Cowey and Linden Roads. Notice staff parking is accessed from the smaller street at the rear whilst visitors' parking is located on the larger, main road in the front. This is a converted veranda-style house (Author: 2011).
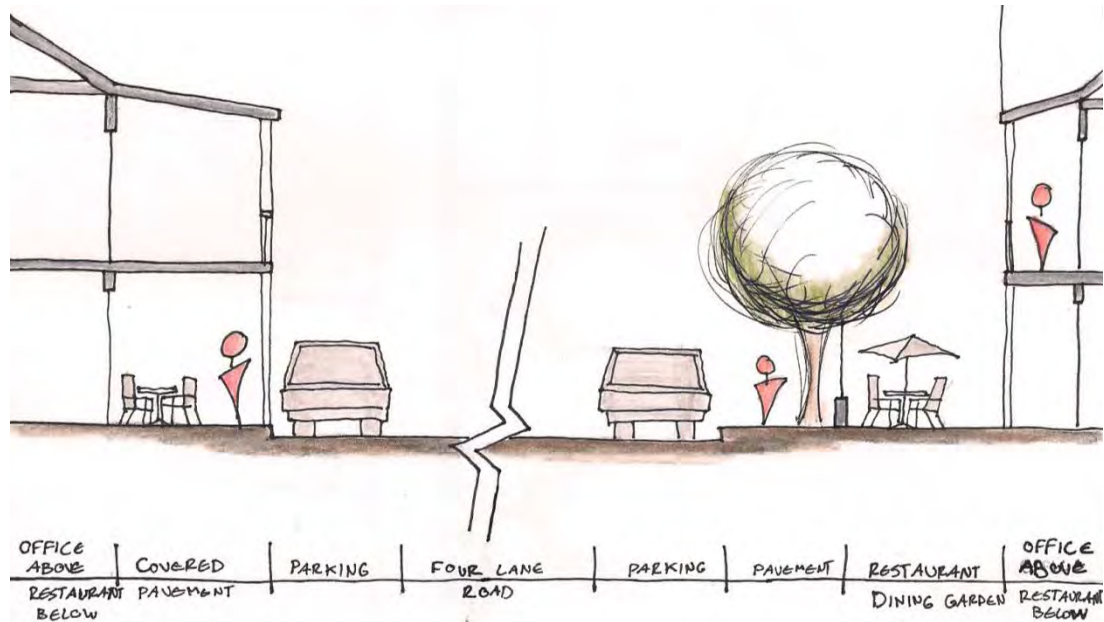
Figure 68: A section of Florida Road illustrating the pedestrian friendliness of the buildings along the road, as well as the availability of parking along the street (Author: 2011).

Berea remains a popular choice of offices due to its close proximity to the Central Business District and its ease of access to other decentralised office locations such as Westville. It is also popular due to the availability of public transport in the form of regular buses and mini-bus taxis. The availability of both off- and on-street parking is an advantage in Berea. Also, especially in Florida Road, how the buildings relate to the street in a humane manner which indicates the importance of the pedestrian. With regard to Florida Road, this is a mixed-use precinct whereby offices, residential and entertainment activities exist side-by-side thereby creating an area

Plate 42: A Heritage Listed building on Florida Road. The building engages with the street by extending its veranda over the pavement so that the restaurants on the ground floor can place tables on the pavement. The first floor of this building is used as offices (Author: 2011).

Plate 43: This is a new building constructed on Florida Road. It was designed to tie in with the vernacular of the area – that being Natal Veranda Style. Basement parking was decided upon to meet parking requirements. Ground floor is retail, and the top two floors are offices (Author: 2011).

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which is active during all hours of the day and night. This is preferable because it increases vigilance which decreases the likelihood of crime.

Plate 44: A complex of service offices on Florida Road. Businesses such as hair salons, doctors, dentists and picture framing galleries have their premises here (Author: 2011).

OFFICE LOCATION:

WESTVILLE

Figure 69: A map of Westville area in Durban, illustrating the various locations where offices have decentralised to(Google Earth, 2010).

Central Business District

Decentralised Offices
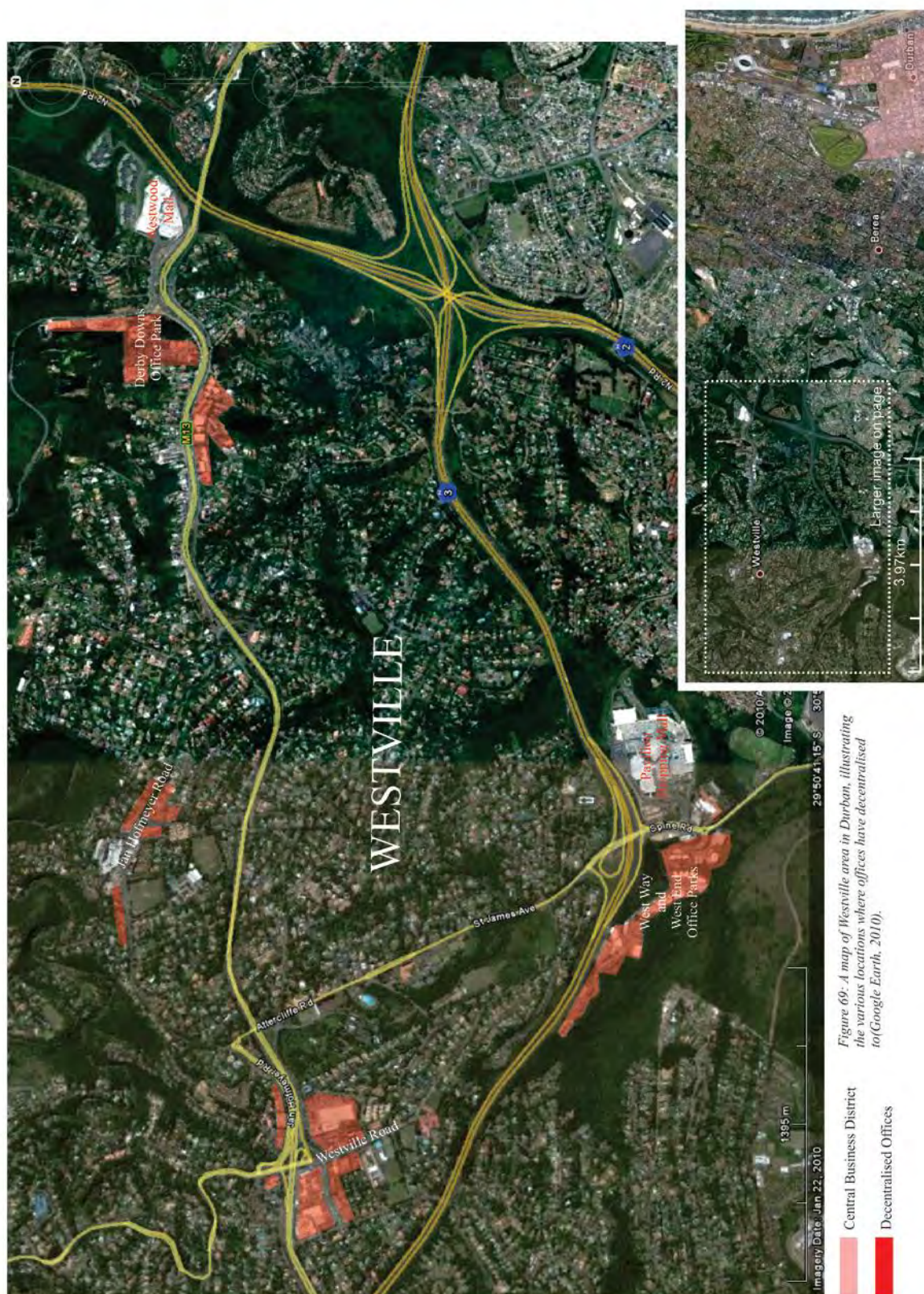
4.2.3. Office Location: Westville

Westville is an established middle-to-high income suburb which has its own 'town centre'. Seeing that the houses in the suburb are not protected by heritage due to their age, developers have had no trouble in demolishing houses and replacing them with office buildings.

Plate 45: An image of Derby Downs Office Park in Westville (Author: 2011).

Westville has Derby Downs Office Park which is located near the M13 freeway and the University of KwaZulu-Natal Westville Campus and Westwood Mall (see figure 68 for an analysis of the location of offices in the Westville).

Plate 46: An image from within Derby Downs Office Park in Westville. Notice how the car is more important than the pedestrian in terms of urban space (Author: 2011).

It is a large office park which has a single entrance and extends deep into the site. There is no boom gate into the office park and, although guards monitor vehicles entering and leaving the property, they do not restrict access, therefore there is a perceived level of security within the office park, although the premises are monitored by a security company.

Plate 47: Another image from within Derby Downs Office Park in Westville. Notice how narrow the pedestrian walkway is compared to the urban space reserved for cars (Author: 2011).

Each office building within Derby Downs has its own staff and visitors' parking, and the buildings relate to these, rather than pedestrian walkways because most people enter the office park by car (see figure 69 for a section illustrating this relationship).
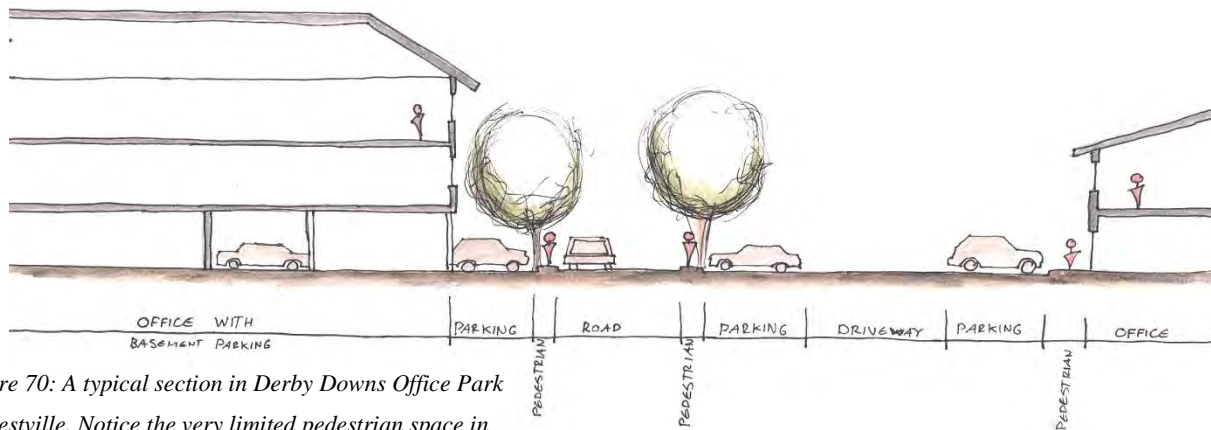
Figure 70: A typical section in Derby Downs Office Park in Westville. Notice the very limited pedestrian space in relation to vehicle space. Also the buildings relate more to vehicles than to pedestrians, example the basement parking facing onto the street (Author: 2011).

Other office parks in Westville are the West Way and West End office parks near the Pavilion shopping mall and N3 freeway. These office parks are still under development but there are already many office buildings here. These office parks, as are all office parks, are best suited to private vehicle access due to their close proximity to very busy roads and freeway which would not be ideal for pedestrian activity. The only form of public transport to West Way and West End is mini-bus taxis. Due to the terrain, the buildings within the West Way and West End office parks do not relate positively to each other as there are some very steep slopes within the office parks. However the main road in the office park is tree-lined and makes for a very peaceful environment. The building style within West

Plate 48: An image of an office building in West End Office Park, near the Pavilion shopping mall in Westville (Author: 2011).

Plate 49: Another image of an office building in West End Office Park, near the Pavilion shopping mall in Westville. It can be seen from this image that West End Office Park allows more urban space for pedestrians than Derby Downs Office Park. (Author: 2011).

Way and West End Office parks is very corporate, and they are intended to appear as office buildings.

Offices along Jan Hofmeyr Road in Westville are stand-alone office buildings and converted houses. New office buildings here are either purposefully office-building style (see plate 50), or they have been

designed with the intention to blend into the residential suburb (see plate 51) in which they sit. These are more pedestrian friendly than office parks, although they are still best approached by car because they all provide large

amounts of parking in front of them.

Offices on Westville Road form part of the Westville CBD, although they take the form of suburban office buildings, whereby the buildings are not positioned on the street boundary but behind a perimeter wall, behind which is parking for

visitors and staff (see plates 52, 53 and 54). This typology does not

Plate 50: Office buildings at the intersection of Jan Hofmeyr and Salisbury Raods. These buildings have been designed without the intention of blending in with the surrounding residential suburb (Author: 2011).

Plate 51: An office building at the intersection of Jan Hofmeyr and Salisbury Roads which was designed to blend into the residential suburb in which it sits. Notice the amount of parking provided in front of it (Author: 2011).

Plate 52: Office buildings on Westville Road, at the Westville CBD. The buildings are new and are protected by walls and fences which do not allow for a good pedestrian experience. Although on a public bus and taxi route, these buildings have large parking lots which shows their dependence on the private car (Author: 2011).

relate to the street, therefore does not interact with pedestrians.

The public transportation that serves Westville is buses and mini-bus taxis. No rail link exists in this area.

Plate 53: An office building on Westville Road, near the Westville CBD. There is a large parking lot in front of the building which shows its reliance on cars. Although the road onto which it looks is a main arterial, the building addresses the street, therefore addressing pedestrians (Author: 2011).

Plate 54: An office building in the Westville CBD. It is obvious from this view that the building does not address pedestrians as it is difficult to know where the pedestrian entrance is (Author: 2011).

OFFICE LOCATION:

KLOOF AND HILLCREST

Figure 71: A map of Hillcrest and Kloof, illustrating the location of offices in these sprawling suburbs 30 kilometres from Durban CBD (Google Earth, 2010).

Central Business District
Decentralised Offices

4.2.5. Office Location: Kloof and Hillcrest

Kloof and Hillcrest are middle- to high-income white suburbs which are located approximately 30 kilometres inland from Durban's CBD. They have become nodes of economic activity because the people living in Hillcrest and Kloof would travel vast distances to work in Durban. There became a need for residents to live closer to their place of work, therefore developers jumped at the opportunity to develop offices in these outlying suburbs. Low density offices and office parks have been built along the M13 freeway which runs through these areas, as well as along Old Main Road which passes through Hillcrest. See figure 124 for an analysis of office locations in the Kloof/Hillcrest region.

The sprawling nature of the built form of Kloof and Hillcrest makes the pedestrian insignificant due to the vast distances one would need to cover to get from point A to point B. Although there is a train line which runs through Kloof and Hillcrest, there are no stations in use in these areas. The only mode of public transport that is available is minibus taxis. This means that the road network is constantly under strain by large volumes of private vehicle traffic. This

Plate 55: Belleview Campus, off Village Road in Kloof, is a complex which includes offices and a tertiary education centre. It is a relatively new development which is popular with prestigious businesses (Author: 2011).

Plate 56: An office building on Jan Smuts Road in Hillcrest. The building overlooks the Old Main Road/M13 freeway off-ramp and is surrounded by parking (Author: 2011).

Plate 57: An office building on Inanda Road in Hillcrest. The building is shielded from the road by trees, but it is located across the road from a taxi rank which makes it accessible to pedestrians (Author: 2011).
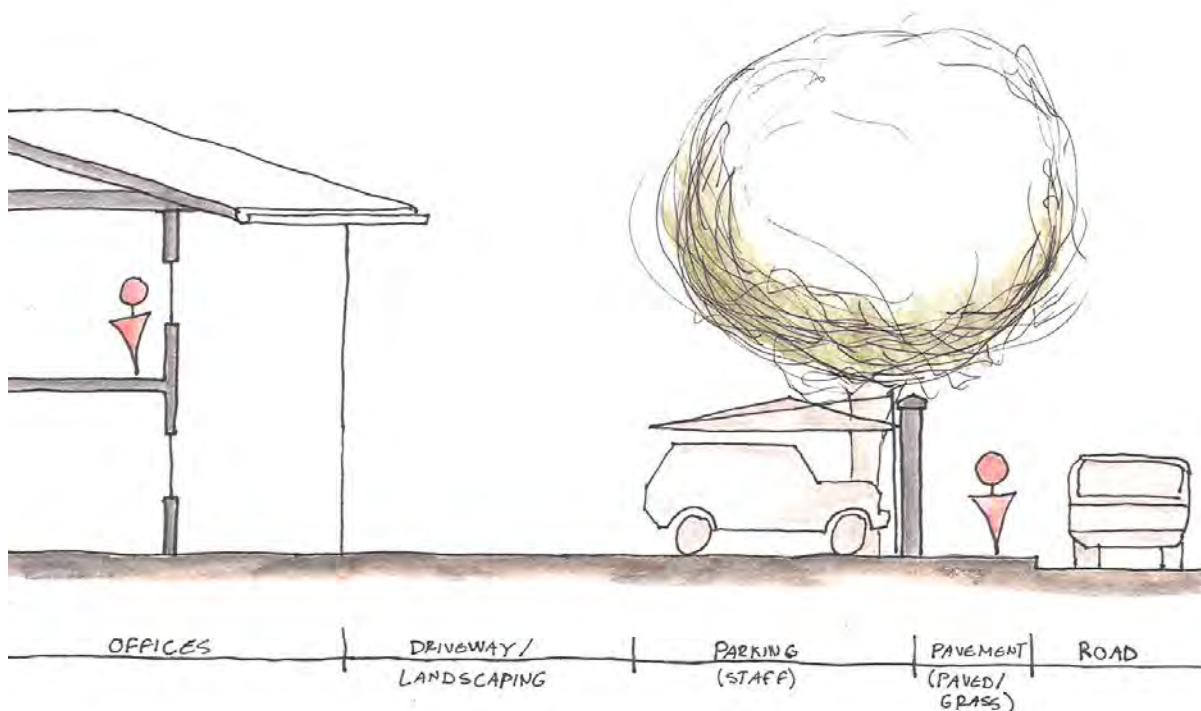
Figure 72: A typical section of how offices in Hillcrest and Kloof address the street. Some offices are completely hidden from the street by trees. Walls and fences, and parking and landscaping separate the pedestrian from offices, creating a hostile street environment for the pedestrian (Author: 2011).

is ironic because people move to Kloof and Hillcrest to escape the congestion and pollution of the city for a more relaxed life in the 'country'.

The pedestrian experience is a lonely one because most buildings, especially offices and office parks, are behind high walls and fences, and the buildings are surrounded by layers of parking and planting so that the buildings are set far back from the street resulting in low levels of vigilance (see figure 72).

Plate 58: An office building on Old Main Road in Hillcrest. It appears to be a house which has been converted and extended to accommodate offices (Author: 2011).

Plate 59: A new office building on Old Main Road in Hillcrest. It is obvious that this building is taking on a residential style in order to blend into the residential suburb surrounding it. Parking is still important however and the property is surrounded by a high wall which makes it pedestrian unfriendly (Author: 2011).

Plates 60 and 61: Marketing boards for office and retail space along Old Main Road in Hillcrest (Author: 2011).

OFFICE LOCATION:

LA LUCIA RIDGE AND

UMHLANGA RIDGE
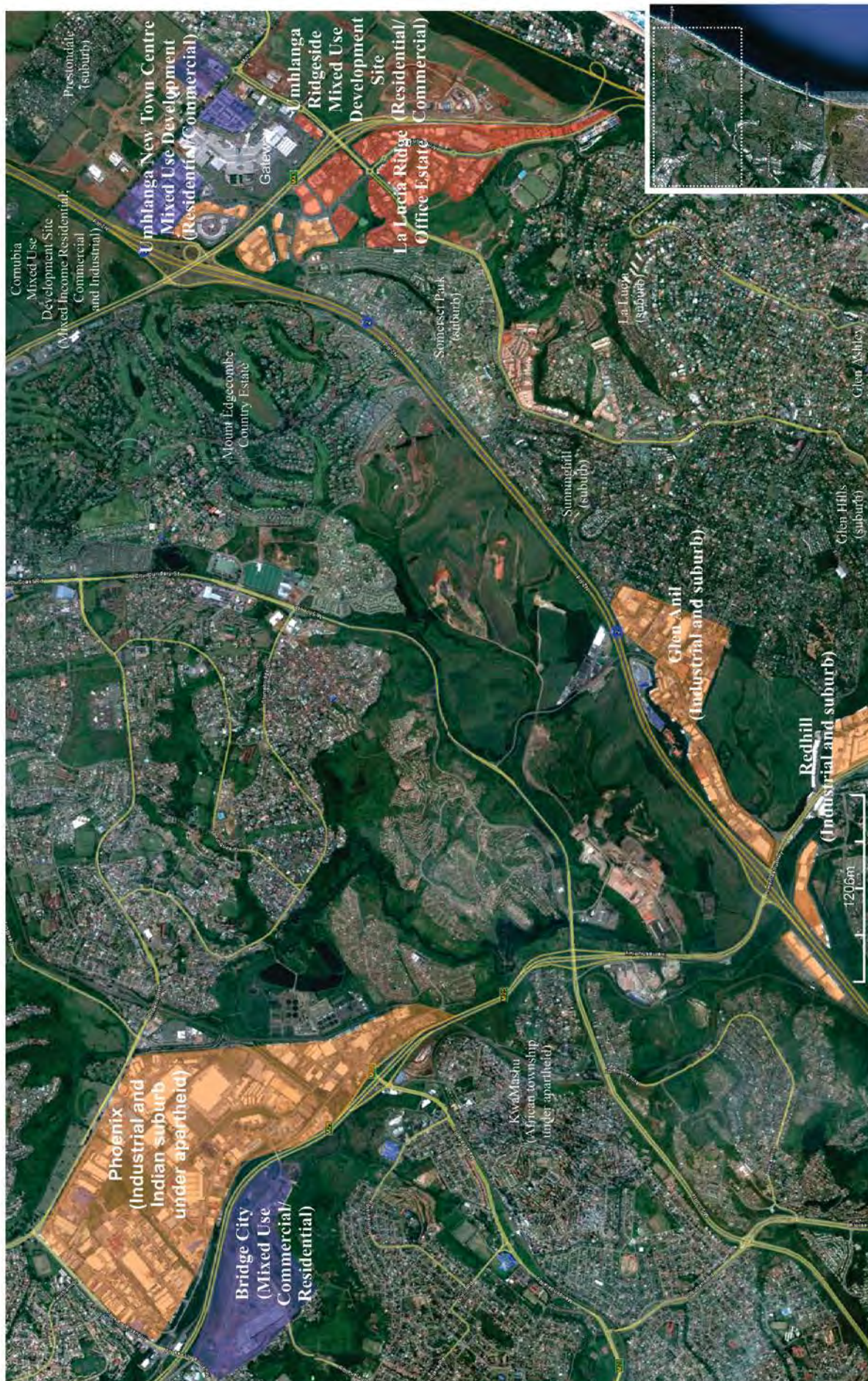
Figure 73: A map of Durban North/La Lucia and Umhlanga, north of Durban's CBD, illustrating that even the most recent decentralised office nodes are located in areas nearest the more wealthy suburbs (Google Earth, 2010).

Central Business District
Businesses predominantly manufacturing/industrial/light industrial
Decentralised Offices
Decentralised Offices (Mixed use residential/commercial)

4.2.5. Office Location: La Lucia / Umhlanga

La Lucia and Umhlanga have always been suburbs in which very wealthy people reside. They are seen as white suburbs, although with the fall of Apartheid, people from other race groups who are rising economically choose to live here. La Lucia became the catalyst for creating commercial interest in the north Durban region. La Lucia Ridge Office Estate was developed in the late 1990s to create an environment which is low density in nature in order to attract new investment in the city due to the stagnant nature of the CBD (see figure 72 for an analysis of office locations in the Umhlanga region).

Upon visiting La Lucia, the buildings in the La Lucia Ridge Office Estate, and other surrounding

Plate 62: La Lucia Ridge Office Estate from Armstrong Avenue. Notice the low density nature of the buildings and allowances for green areas. Also notice the estate is fenced and is not accessible from this street. Also the pedestrian pathway is very narrow compared with the allowance for green areas (Author, 2011).

Plate 63: Another office park on Armstrong Avenue in La Lucia. Again, low density typology with a large portion of the site reserved for parking (Author, 2011).

office estates, have an air of wealth and status. The language of the buildings speaks of offices, but they are a maximum of three storeys high, and spaced fairly far from one another with natural park lands between them.

In section 2.5.1.2 it is said that businesses choose to move to office parks for their tranquillity, away from congestion of the CBD. This is ironic, however, because at peak times, the roads in La Lucia Ridge become completely clogged with cars. Even at lunch time there is traffic congestion in the area. This is due to the nature of office parks, and their reliance on the private car.

Figure 74: A section showing how buildings in La Lucia Ridge Office Estate relate to the street and the pedestrian. Although there is a lot of visibility throughout the area, there is still the feeling of separation from the buildings by the pedestrian (Author, 2011).

Armstrong Avenue is a single carriageway with very wide, grassed pavements. Intersections take the form of traffic circles which are good for keeping traffic moving at low volumes, but do nothing to help the flow at peak times. In fact they add to the congestion. There is no public parking on this, or any other, road in La Lucia Ridge. The only available parking is within the gates of the surrounding office estates. The only reliefs in the line of the road are bus stops, although buses are infrequent in this area, and as will be noted in section 4.4, getting hold of a bus timetable requires more effort than it is worth for these office workers, most of whom can afford cars. Mini-bus taxis also use these bus stops, and are operational at peak times.

Another feature of these office parks is that they are all fenced. This makes the commuter feel as though the road is only there for the sole purpose of transporting people as quickly as possible through the narrow space which remains between fences. It can be argued that these are watered down Apartheid city principles (discussed in section 2.4.2). It speaks of edges and divides, and the paths are only used as a means to get people from point A to point B in the quickest time possible. It still speaks of a segregated society, even though the people working there are of all backgrounds.

The pedestrian experience of La Lucia Ridge Office Estate is not a pleasant one because none of the buildings address the street in a pedestrian-friendly manner. They tend to be imposing masses surrounded by moats and walls for security. This makes

the pedestrian feel completely excluded from the office parks and is not the most ideal way to break down the Apartheid legacy.

However there is a higher market-driven demand for office space within office parks than office space within a mixed-use residential and commercial node such as the Umhlanga New Town precinct. This is due to the building of a corporate image of a company by owning their own building in an office park.

With this new commercial interest in the La Lucia/Umhlanga area, the Umhlanga Ridge New Town Centre began construction with Gateway Mall as its catalyst. The New Town Centre is a mixed-use node of residential, office and light industrial uses, and is laid out on a grid for efficiency in higher density development (see figure 75).

This development is much more compact than the office estates in La Lucia. New Urbanism was used as a development concept whereby the hierarchy of public space is of primary importance. The development consists of public, semi-public and private spaces. Although there is parking along the streets, all office and residential parking is located in basements beneath buildings and courtyards which helps to create a much more pedestrian friendly environment.

Figure 75: An image showing the precinct plan of the Umhlanga New Town Centre. Note the dependence on roads and freeways (Pauling, 2001: 8).

Plate 64: Palm Boulevard in Umhlanga New Town Centre. The building typology is mixed use and is much more dense than La Lucia Ridge Office Estate (Author, 2011).

Most buildings in the New Town Centre are mixed-use, where the general pattern is that the ground floor is retail, the next two- to three floors are offices, and the floors above these are residential (see figure 76).

Pedestrians have been given preference over vehicles in the way the pavements and streets have been integrated and paved. Buses and mini-bus taxis serve the New Town Centre, but taxis are more frequent than buses. This is possibly due to the taxi rank which has been incorporated into the rear of Gateway. Although this provision for pedestrians has been made, there are not many pedestrians on the streets. This is possibly due to the availability of parking in each building, as well as the lack of an efficient public transport system which would generate much more pedestrian activity.

Plate 65: Aurora Drive in Umhlanga New Town Centre. It is clear from this image that the intention of this precinct is to densify the area to make it a much more pedestrian friendly environment (Author, 2011).

| BUILDING (RESIDENTIAL) | PEDESTRIAN WALKWAY | PARKING / LANDSCAPING | ROAD | PARKING/ LANDSCAPING | PEDESTRIAN WALKWAY | BUILDING (MIXED-USE) |
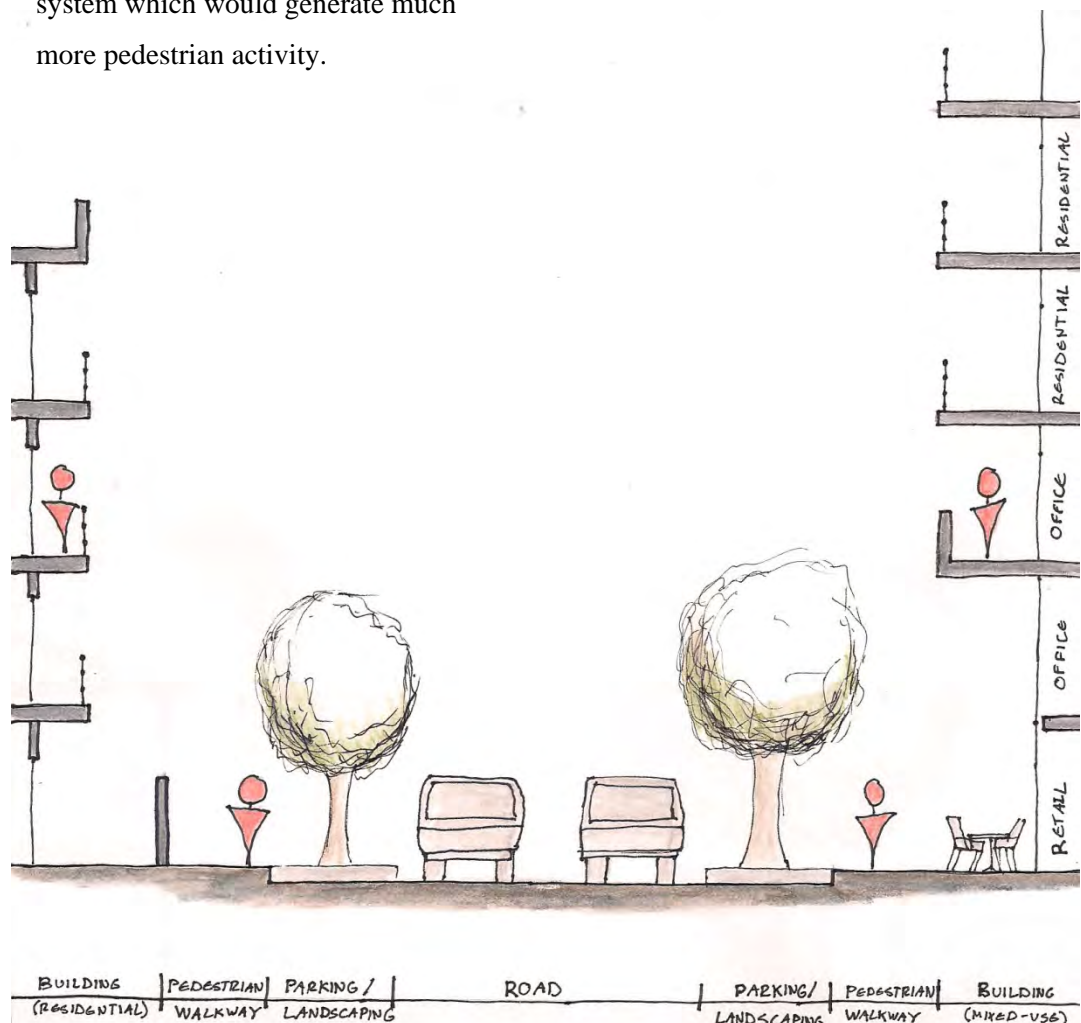
Figure 76: A typical section through a street in the Umhlanga New Town Centre. It is evident that it is a much more pedestrian friendly environment due to the reduced distance between buildings, but also that the buildings relate to the street (Author, 2011).

As with La Lucia Ridge Office Estate, roads are the only means by which one can access the Umhlanga New Town. There is no rail link to this area. Due to the increased density of this development, traffic congestion is a problem at peak times, especially seeing that there are no traffic lights at intersections as yet.

Plate 66: The taxi rank beneath Gateway Mall. This is the only depot for public transport in the New Town area. Another taxi rank is located at the bottom of Armstrong Avenue (Author, 2011).

Figure 3: Spatial Development Framework

Figure 77: An illustration of the eThekwini region. It shows in the form of dots all the investment nodes the city is working toward intensifying in order to decentralise employment opportunities (Durban Central City Council: Spatial Planning Department, 2010).

The coloured circles and dots in figure 77 show the location of economic and/or civic centres within the eThekwini Municipal area. The image is used in this document to illustrate the city council's plan of controlled decentralisation throughout the metropolitan area.

As the orange arrow in figure 77 shows, the overall development direction that the Durban City Council intends for the city is northward, with Umhlanga being strategically placed midway between the new King Shaka International Airport and the Central Business District. Both Umhlanga and the Central Business District are shown as "Major Investment Nodes" which shows that these are the primary areas of focus for the city's investment management in terms of growth centres.

The blue dots in figure 77 show mixed investment nodes. This implies that these nodes require varying types of infrastructure development. For example the Umlazi node may require more social facilities while the Hillcrest node requires more infrastructure required for intense office and residential development.

It can be seen in figure 77 that the Durban City Council is focusing their attention on the creation of new centres and the maintenance of existing centres in areas north of the N3 freeway, for example Hillcrest, Pinetown, Clermont, Kwa Mashu, Bridge City, Umhlanga, Verulam and Tongaat.

With this analysis it can be seen that areas which need attention in the city south of the N3 freeway may be neglected, for example the sprawling township of Umlazi, which encompasses a far greater region than the dot shown than it would be able to realistically service.

The following are analyses of new decentralised office nodes in the eThekwini Municipality. The first is Bridge City which is a new town centre that is under construction between the townships of Kwa Mashu, Inanda and Ntuzuma, north of the N3 freeway. The second is Ridgeside which is a new development in Umhlanga.

4.4.1. Mixed Investment Node: Bridge City, Kwa Mashu
Upon realising that economic opportunities were only presenting themselves in previously advantaged areas, the eThekwini Municipality joined forces with Tongaat Hulett to form Bridge City. According to the official Bridge City website, "Bridge City is a new town centre that is being created 17 kilometres from the Durban city centre, bridging the communities of Phoenix and Inanda, Ntuzuma and KwaMashu (INK) and linking them into the urban system. This visionary new town will serve as

the social and commercial centre to an area housing a population of over 800 000 people, who at present have generally poor access to facilities and social services.

Plate 67: A photograph taken from the rooftop of the Bridge City Shopping Centre showing the context of Bridge City: industrial buildings and a low density sprawl of townships. Just visible over the hill are the luxury apartment buildings of Umhlanga (Author, 2011).

Plate 68: Bridge City Shopping Centre is the only completed building in Bridge City at the moment. Notice the wide road, however, which is intended to accommodate large volumes of vehicular traffic whilst maintaining a pedestrian friendly environment (Author, 2011).

Figure 78: The master plan of Bridge City which is under construction in an Apartheid buffer zone between the townships of Inanda, Ntuzuma and KwaMashu. This scheme aims to bridge physical barriers enforced by the Apartheid system by creating employment opportunities in an area which needs them most (www.bridgecity.co.za).

"It will be a catalyst for economic growth and the empowerment of surrounding communities by improving their access to public transport and opportunities to work, travel, shop and do business within the INK area, via a symbiotic relationship between the public and private sectors." (www.bridgecity.co.za) See figure 78 for the

master plan of Bridge City, and see figure 73 for its location in relation to Umhlanga and La Lucia.

Plates 69 and 70: Bridge City Shopping Centre is the only building which is operating in the precinct at the moment. It is forming the catalyst for development, much like Gateway Shopping Mall did with Umhlanga New Town. It is clear that the design of the mall attempts to activate the street by having shops opening out onto it so it does not create a hostile pedestrian environment, although it is still a typical suburban mall in that it concentrates the shopping experience in internal walkways and provides parking on the roof (Author, 2011).

Upon visiting Bridge City, it was evident that there is a heavy police presence in the area. The Bridge City Shopping Centre is complete and operating whilst the magistrates court is currently under construction. The

Plate 71: The taxi rank on the roof of Bridge City Shopping Centre (Author, 2011).

main roads of the urban scheme are complete, some of which are totally paved to promote pedestrian movement whilst others are paved only in sections where pedestrian flow is expected.

Bridge City Shopping Centre is designed to house a railway station under the building with a taxi rank on the roof. The latter is complete whilst the former is still under construction.

Bridge City is a form of controlled

Plate 72: The magistrates court in Bridge City which is under construction (Author, 2011).

decentralisation, but is, in the opinion of the author, better suited to the South African spatial problem left by Apartheid than the decentralised node of Umhlanga which is located very near the most affluent members of society. The author is in favour of Bridge City because it addresses social and economic issues by being placed in a township which was devoid of economic, educational and social opportunities.

Time will tell, however, whether businesses feel Bridge City is a viable location to conduct business. The odds are against the location due to the bad reputation of townships. They are seen crime-ridden places and only the poorest of the poor live there. This is in essence the social construct the Apartheid government wanted to create. This social construct still exists in South Africa, and it will need to be broken down in order to allow developments such as Bridge City to begin changing the urban landscape of South African cities.

4.4.2. Major Investment Node: Ridgeside, Umhlanga

A new development in Umhlanga is Ridgeside, which is located across Umhlanga Rocks Drive from the New Town Centre. It is intended to have several nodes which include a mixed-use node, an office node, a high density residential node and a low density suburban node. This development is located on the last remaining greenfield sea-facing site in the Umhlanga region (Albonico, 2008: 42-46).

MIXED USE
(UNDER CONSTRUCTION)

RIDGESIDE OFFICE PARK
(UNDER CONSTRUCTION)

Figure 79: The master plan of the Umhlanga Ridgeside development. It is sandwiched between La Lucia Ridge Office Estate to the west, Gateway and Umhlanga New Town Centre to the north-west, and Umhlanga Manors residential estate to the north east. Note, again, the dependence on roads and freeways as the development is bound by two freeways (Albonico, 2008: 43).

Upon visiting the office estate site, a similar situation to La Lucia Ridge Office Estate emerges. There is large-scale infrastructure for road-based transport with no provision of parking on the new road other than within the office park. Bus stops have been provided on the new road, but it will be a while before they are used by the public due to the continuing construction in the area. Buildings in the Ridgeside Office Park are much larger than those in the La Lucia Office Estate, but the space between them remains fairly vast. It is clear that the area is developed around the private vehicle, and that the new road infrastructure intends for large volumes of traffic to pass through Ridgeside.

Plate 73: A photograph from within Ridgeside Office Park (Author, 2011).

Plate 74: A photograph taken outside the Ridgeside Office Park. The office park is to the right of the image. To the left is a bus stop with a bus slip lane. Notice the vast road-traffic infrastructure (Author, 2011).

The Ridgeside Office Park is the same at La Lucia Ridge Office estate in that it is fenced and does not allow pedestrian interaction between the main road and buildings. The main road gives the impression that it will form the infrastructure for the river of cars which will pass through it and not the pedestrian.

Plate 75: This image shows how the office park is protected by a fence and wide grass verges with minimal regard to pedestrian experience, for example there is a lack of trees to provide shade (Author, 2011).

Plate 76: This image is from within the office park. Notice the provision for parking on the street, but there is still a lack of interaction between the street and the road with most buildings. (Author, 2011)

4.4. CHALLENGES OF DECENTRALISATION IN DURBAN

The problem with Durban's decentralised office nodes is that they are only accessible by road transport. As touched on in section 2.5.8, the commuter train system in South African cities is designed to bring the urban poor from outlying townships into the CBD of the city. This train service is the only form of mass public transportation in the eThekwini Municipality, and is in direct competition with the mini-bus taxi industry and bus companies which add many vehicles to the roads.

Plate 77: South Africa's commuter rail network, Metrorail. (www.prasa.com)

In terms of the different modes of public transport available, timetables for the train services are readily available on the internet and in train stations; minibus taxis do not run on a schedule; and the timetables for the many bus operators in the eThekwini region are almost non-existent. One sees many buses on the city's roads, but there is no identifiable way of knowing where they came from, or where they are going to, or along which route. The lack of an easy-to-use public transport system in areas which are not serviced by a train line appears to be promoting the use of the private car. The only bus service in Durban which is easy-to-use is the People Mover bus service which runs within the CBD and surrounding high density residential areas.

Plate 78: A minibus taxi rank in Soweto, Johannesburg. (www.cmt4austin.org)

Plate 79: The Mynah bus is one of many bus services which do not market their routes and timetables in a user-friendly manner (www.engineeringnews.co.za).

The People Mover bus system functions on a rotational basis on set routes. It can be seen as a mass public transport system because buses depart stops every 15 minutes (www.durbanpeoplemover.co.za). A bus route and timetable is available on the internet, and the routes are shown at every stop so that people know exactly where the bus is going, and a bus ticket is valid for one hour once purchased on the bus. The buses are air-conditioned, most are wheel-chair friendly and are brightly decorated so that they stand out from the rest of the traffic.

Plate 80: The People Mover buses are very identifiable due to their bright marketing (www.flickr.com).

One would think that such an organised and predictable system would thrive in a city where other modes of transport are much less predictable. However the mini-bus taxi industry still rules the streets, and the People Mover buses suffer from very low passenger volumes, even though they pass through the most densely populated parts of the city.

Figure 80: A simple diagram of the routes the People Mover bus system follows. There is a similar diagram at each stop. It is clear from this diagram that the city is trying to implement a system which is understandable to all members of the public (www.durbanpeoplemover.co.za)
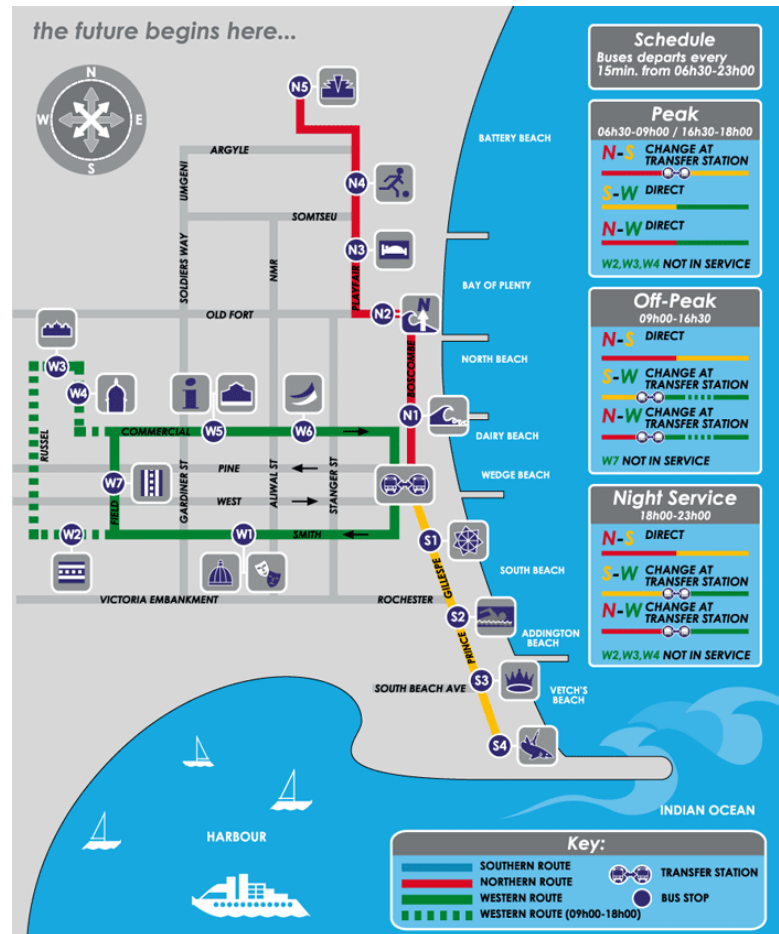
It is clear from figure 80 that the People Mover is NOT a solution to office decentralisation. It was mentioned here to illustrate that the eThekwini Municipality does have one scheduled, well-executed and easy-to-use bus service. But it services only a very small area of the city: the CBD.

To clarify, Durban's decentralised office nodes are not serviced by a mass transportation system. Train lines do not run through, or pass near them. They are serviced by irregular mini-bus taxis (Gateway Mall was designed with a large taxi rank beneath it) and bus services which are far from user-friendly.

Durban's decentralised office nodes are best accessed by the private car. If a suitable, user-friendly public transport system is not implemented in order to serve the nodes and their surrounding suburbs soon, Durban's roads will become clogged and we will see traffic congestion which rivals that of Johannesburg.

4.5. POSSIBLE SOLUTIONS

Based on the precedent studies conducted in Chapter 3, the following are possible solutions to help Durban's decentralised office nodes function in unison, and to create a more efficient working and living environment for the city's residents:

- High speed rail system which has stations in commercial nodes. A dedicated bus network feeds the local high speed rail stations.
- Actively decentralise a city in order to de-densify it by creating nodes of intensity in either the least dense areas of the city, or areas which are least developed.
- Bus Rapid Transit Network (BRT) is a form of mass public transit which uses buses in a similar fashion to trains in a subway system.
- Light Rail Network is a form of mass public transit which uses streetcars/trams in a similar fashion to trains in a subway system.
- High density mixed commercial/residential corridors along existing major routes with public transport to activate suburbs, as well as to link together decentralised office nodes, and these to the central business district.
- Changing the function of centres from "Central Business Districts" to "Central Activities Districts."

CHAPTER 5   ANALYSIS AND DISCUSSION OF QUESTIONNAIRES

A questionnaire is a research instrument which consists of a series of questions for the purpose of gathering information from respondents. A researcher can reach far more respondents with questionnaires than with focused interviews, and standardised answers make questionnaires useful when data is required for statistical purposes. Standardised answers also make the task of analysing the data less complicated for the researcher. Questionnaires are limited by the fact that respondents must be able to read them. This could prove troublesome when, for example, the questionnaire is set in English but the respondent cannot speak the language. Another disadvantage is that questionnaires are not intended as in-depth interviews, thus the respondent may not have the opportunity to validate his or her answer, thereby involuntarily withholding information which could be useful to the researcher. The research required for this document is quantitative, not qualitative. Therefore focused interviews will not be required.

5.1.   QUESTION 1: BACKGROUND OF RESPONDENTS

Question one in the questionnaire is intended to gain background information on the respondent in order for the author to understand the specific respondent's personal situation.

5.1.1.   ANALYSIS OF QUESTION 1

			OFFICE LOCATIONS		
			Durban CBD	Berea / Morningside	La Lucia / Umhlanga
RESIDENTIAL LOCATIONS		Glenwood	4%	4%	4%
		Berea / Morningside		13%	17%
		Pinetown	4%	4%	4%
		Hillcrest / Gilletts		9%	
		Reservoir Hills		4%	
		Chatsworth	4%	4%	
		Phoenix		4%	
		Durban North		9%	
		Isipingo	4%		
		Durban CBD		4%	
		Bluff			4%

Table 2: Respondents' office location in relation to their living location.

As can be seen by the figures in Table 2, many of the respondents live outside of the area in which they work with the exception of 13% who live and work in the same area: Berea / Morningside.

Respondents were asked to give the distance in kilometres from their place of residence to their place of work, and the time it took to travel between these places.

5.1.1.1. Office Location: La Lucia / Umhlanga

29% of the respondents work in La Lucia / Umhlanga.

The 58% of the respondents who work in La Lucia / Umhlanga live in Berea / Morningside said the distance travelled is 15km to 17km and travel time is 30 minutes during peak times and 20 minutes during off-peak times. All of these respondents used private transport to get to and from work.

The 14% of the respondents who work in La Lucia / Umhlanga and live in Pinetown said the distance travelled to work is 28km with a minimum travel time of 40 minutes. This respondent uses private transport.

The 14% of the respondents who work in La Lucia / Umhlanga and live in Glenwood said the travel distance to work is 19km with a travel time of between 30 and 40 minutes. This respondent uses public transport.

The 14% of the respondents who work in La Lucia / Umhlanga and live on the Bluff said the distance travelled to work is 35km with an off-peak travel time of 45 minutes and a peak travel time of between 1 and 2 hours. This respondent uses private transport.

5.1.1.2. Office Location: Berea / Morningside

55% of the respondents work in Berea / Morningside.

23% of the respondents who work in Berea / Morningside live in the same area and said their travel distance to work is between 1 and 3km, with a travel time of between 5 and 10 minutes. All of these respondents use private transport.

15% of the respondents who work in Berea / Morningside live in Durban North said their travel distance to work is between 10 and 12km with a travel time of 15 minutes during off-peak times and between 20 and 30 minutes during peak times. Both respondents use private transport.

15% of the respondents who work in Berea / Morningside live in Hillcrest / Gillitts and work in Berea / Morningside said the travel distance to work is between 25 and 32km with a travel time of 25 minutes during off-peak times and between 35 and 45 minutes during peak times. Both respondents use private transport.

8% of the respondents who work in Berea / Morningside live in Glenwood and works in Berea / Morningside said the travel distance to work is 3km with a travel time of 10 minutes during off-peak times and 25 minutes during peak times. This respondent uses private transport.

8% of the respondents who work in Berea / Morningside live in Reservoir Hills said the travel distance to work is 12km with a travel time of 15 minutes during off-peak times and 30 minutes during peak times. This respondent uses private transport.

8% of the respondents who work in Berea / Morningside live in Chatsworth said the travel distance to work is 22km with a travel time of 30 minutes at off-peak times and 50 minutes at peak times. This respondent uses private transport.

8% of the respondents who work in Berea / Morningside live in Durban CBD said the distance to work is 5km with a travel time of 10 minutes during off-peak times and 20 minutes during peak times. This respondent uses private transport.

8% of the respondents who work in Berea / Morningside live in Phoenix said the travel distance to work is 20km with a travel time of 1 hour 45 minutes. This respondent uses communal car sharing to get to work.

8% of the respondents who work in Berea / Morningside live in Mariannhill / Pinetown said the travel distance is approximately 10km with a travel time of approximately 45 minutes. This respondent uses public transport.

5.1.1.3. Office Location: Durban CBD

17% of respondents work in Durban CBD.

25% of respondents who work in Durban CBD live in Glenwood and said the travel distance to work is 7km with a travel time of 15 minutes. This respondent uses private transport.

25% of respondents who work in Durban CBD live in Isipingo and said the travel distance to work is 30km with a travel time of 15 minutes during off-peak times and between 45 to 60 minutes during peak times. This respondent uses private transport.

25% of respondents who work in Durban CBD live in Chatsworth and said the travel distance to work is 22km with a travel time of 60 minutes. This respondent uses public transport.

25% of respondents who work in Durban CBD live in Pinetown and said the travel distance to work is approximately 10km with a travel time of 15 minutes during off-peak times and 30 minutes during peak times. This respondent uses public transport.

5.1.2. SUMMARY AND CONCLUSIONS

The results of Question 1 illustrate the distance between the respondents' places of residence and their places of work, as well as the time it takes for them to travel between the two.

The respondents who work in La Lucia / Umhlanga live between 15 and 35 km from work with travel times that vary from 20 minutes to 2 hours.

The respondents who work in Berea / Morningside live between 1 and 32km from work with travel times that vary from 5 minutes to 1 hour 45 minutes.

The respondents who work in Durban CBD live between 7 and 30km from work with travel times that vary between 15 and 60 minutes.

5.2. QUESTION 2: EXISTING PUBLIC TRANSPORT

Question two in the questionnaire sought to gain information on the availability of public transport in the locations in which respondents live and work, and whether the respondents use the available public transport.

5.2.1. ANALYSIS OF QUESTION 2

Although only 21% of the respondents use public or communal transport, the questionnaire asked all respondents what public transport is available in the area in which they work as well as in the area in which they live.

The results from this question are inconclusive because people who work in the same area have given different answers. These people are those who use private transport and are probably unaware of the available public transport in the area. However, Table 3 and Table 4 illustrate the modes of public transport respondents mentioned in their respective residential and office areas.

		AVAILABLE PUBLIC / COMMUNAL TRANSPORT
RESIDENTIAL LOCATIONS	Glenwood	Metered Taxi; Minibus Taxi; Bus; Car Sharing
	Berea / Morningside	Metered Taxi; Minibus Taxi; Bus; Car Sharing
	Pinetown	Train; Minibus Taxi; Bus
	Hillcrest / Gilletts	Minibus Taxi; Car Sharing
	Reservoir Hills	Minibus Taxi; Bus
	Chatsworth	Minibus Taxi; Bus; Car Sharing
	Phoenix	Car Sharing
	Durban North	Metered Taxi; Minibus Taxi; Bus; Car Sharing
	Isipingo	Minibus Taxi; Car Sharing
	Durban CBD	Metered Taxi; Minibus Taxi; Bus
	Bluff	Train; Metered Taxi; Minibus Taxi; Bus; Car Sharing

Table 3: Public / Communal transport available in the areas in which the respondents live.

One respondent who does not use public transport added in their answer that there is no single mode of transport that will get them from their place of residence to their place of work. Another said that there is no direct bus from their place of residence to their place of work, whilst another said that all public transport terminates and begins in the CBD and is inconvenient if one needs only to go to a neighbouring suburb.

5.2.1.2. Available Public Transport in Office Locations

		AVAILABLE PUBLIC / COMMUNAL TRANSPORT
OFFICE LOCATION	Durban CBD	Metered Taxi; Minibus Taxi; Bus; Car Sharing
	Berea / Morningside	Metered Taxi; Minibus Taxi; Bus; Car Sharing
	La Lucia / Umhlanga	Metered Taxi; Minibus Taxi; Bus; Car Sharing

Table 4: Public / Communal transport available in the areas in which the respondents work.

As Table 4 shows, all of the office locations in which the respondents work have access to metered taxis, mini-bus taxis, buses and car sharing. But despite the fact that Durban CBD does have a train station, albeit on the

outskirts of the CBD, the respondents who work in the CBD did not mention the availability of the train station.

5.2.1.3. Public Transport Users

21% of the respondents use public transport to get to and from work.

The first respondent lives in Chatsworth and works in Durban CBD. This respondent uses the bus because she feels it is cheaper and safer to use. This respondent also said that the public transport system is difficult to understand due to its inefficiency.

The second respondent lives in Pinetown and works in Durban CBD. This respondent uses mini-bus taxis and buses because they are convenient and cheap. This respondent finds the public transport system easy to understand because it follows simple rules and it is available at all times.

The third respondent lives in Pinetown and works in Berea / Morningside. This respondent uses mini-bus taxis to get to and from work because he finds that the buses are too crowded after coming from the townships, and because of this they do not stop to pick up more passengers. This respondent says that the public transport system is difficult to understand due to its irregular schedule of operation.

The fourth respondent lives in Glenwood and works in Umhlanga. She uses mini-bus taxis because they are fast, and because they use the freeway as opposed to buses which travel through the suburbs. She finds the public transport system easy to understand because it is simple.

The fifth respondent lives in Phoenix and works in Berea / Morningside. This respondent uses taxi or car sharing as a means to get to and from work because she says communal travel is safer and that the public transport system is difficult to understand.

5.2.2   SUMMARY AND CONCLUSIONS

Due to the personal nature of this question, it is difficult to come out with a definitive conclusion although the data presented here does allow for discussion.

It appears that the respondents who use private transport are more-or-less unaware of the available transport in the areas in which they live and work. This could be a result of two scenarios: the first could be that the public transport that is available is not

marketed well enough, resulting in people choosing to use private transport because obtaining information on public transport timetables and routes requires a large amount of effort; or it is because the respondents own a car that they are ignorant at the available public transport because it does not concern them.

It can be seen that metered taxis, mini-bus taxis, buses and car sharing are available in Berea / Morningside, La Lucia / Umhlanga and Durban CBD, although as mentioned in section 5.2.1.3 a train station does exist in Durban CBD but none of the respondents felt it useful enough to add to their list of available modes of public transport.

60% of the respondents who use public transport say that the public transport that is available is difficult to understand. The 40% that said the public transport system was easy to understand have probably used it extensively and frequently, thus understanding exactly how the system works.

5.3. QUESTION 3: REASONS FOR NOT USING PUBLIC TRANSPORT

Question three in the questionnaire was aimed at those respondents who do not use existing public transport. The question sought to find the reasons why respondents do not use existing public transport.

5.3.1. ANALYSIS OF QUESTION 3

79% of the respondents said they do not use public transport. The following is a list of reasons why they do not use public transport:

- Inconvenient (37% of respondents who do not use public transport)
- Unreliable (16% of respondents who do not use public transport)
- Safety concerns: drivers / lack of maintenance (16% of respondents who do not use public transport)
- Unaware of available public transport (16% of respondents who do not use public transport)
- Routes: No direct link from place of residence to place of work - in order to get anywhere with public transport one has to pass through the CBD (16% of respondents who do not use public transport)
- Would take too long (11% of respondents who do not use public transport)
- Lack of flexibility (11% of respondents who do not use public transport)
- Irregular schedule (11% of respondents who do not use public transport)
- Preference (11% of respondents who do not use public transport)
- I have my own car (11% of respondents who do not use public transport)

- Occupation requires private vehicle (11% of respondents who do not use public transport)
- Live close enough to walk to work (5% of respondents who do not use public transport)
- Respondent not located on a public transport route (5% of respondents who do not use public transport)

5.3.2. SUMMARY AND CONCLUSIONS

It is clear from the list above that many of the respondents feel that public transport is inconvenient. This is possibly due to other given reasons: unreliability; irregular schedule; no direct link from place of residence to place of work and lack of flexibility. Three respondents said "there is no public transport" whereas in fact there is in the area to which they were referring, which shows that they are unaware of the availability of public transport for possible reasons as mentioned in section 5.2.1.4.

5.4. QUESTION 4: POSSIBLE SOLUTIONS PART 1

Question four in the questionnaire was designed to test the possible public transport and urban design solutions which were uncovered in the precedent studies in Chapter Three.

5.4.1. ANALYSIS OF QUESTION 4

The first question in this section asked if it would be useful to link all decentralised office nodes by means of a public transport system which runs through residential areas.

5.4.1.1. 'YES' to Linking Decentralised Office Nodes with Public Transport

79% of the respondents said 'YES', it would be useful to link all decentralised office nodes by means of a public transport system. The following were their comments:
- More people would use public transport therefore it would ease congestion on the roads (26% of respondents who answered "yes")
- Cost effective to user (16% of respondents who answered "yes")
- Effective use of resources (5% of respondents who answered "yes")
- It must be quick, convenient, and have somewhere to park one's car (5% of respondents who answered "yes")
- Save on petrol and upkeep costs on private cars (5% of respondents who answered "yes")
- I would be very happy to use a train (5% of respondents who answered "yes")

- People would be able to go to work with no fear of being late (5% of respondents who answered "yes")
- Public transport would replace private transport (5% of respondents who answered "yes")
- Less road maintenance (5% of respondents who answered "yes")
- Less accidents (5% of respondents who answered "yes")
- Must be reliable – can be relaxing as opposed to stressful (5% of respondents who answered "yes")
- Environmentally friendly due to less cars on the roads (5% of respondents who answered "yes")
- This works in other developed countries in the world (5% of respondents who answered "yes")
- Convenient to get to work (5% of respondents who answered "yes")
- One could choose a convenient route without having to travel into the city and then out again as we have now (5% of respondents who answered "yes")

5.4.1.2. 'NO' to Linking Decentralised Office Nodes with Public Transport

21% of the respondents did not think it would be useful to link all decentralised office nodes by public transport. The following were their comments:

- Decentralisation has happened for a reason. People must travel by any means available
- Low interconnection is required. Every employee goes home to office. Probably one in 50 employees go office to office
- Roads are already congested
- It may waste one's time and money

5.4.1.3. Possible Modes of Public Transport

In the questionnaire the 79% of respondents who thought linking the decentralised office nodes by means of public transport were given the option to choose between three (3) possible modes of public transport which were taken from the precedent studies in Chapter 3. Table 5 illustrates the results:

Fast Rail Link	Bus Rapid Transit (BRT)	Light Rail Transit (LRT)
37%	26%	37%

Table 5: Possible modes of public transport.

Some respondents provided reasons for their choice.

The first respondent chose the Fast Rail Link because, although it is probably the most expensive option, it will allow for larger economic growth.

The second respondent chose the Bus Rapid Transit because Durban's topography and infrastructure is better suited to road than rail.

The third respondent chose the Light Rail Transit for its larger volumes and the fact that it would function on a system independent of the congested road network, thereby making it more efficient.

The fourth respondent said that he would ideally choose the Light Rail Transit, but said it would be a major initial expense. The respondent changed his answer to the Bus Rapid Transit "if it is as efficient as European systems."

The fifth and final comment on this question was that a combination of the Bus Rapid Transit and Light Rail Transit would be most effective.

5.4.1.4. Controlling Urban Sprawl

Respondents were asked if they thought that densifying residential and office development along existing major routes in order to maximise the efficiency of public transport would slow the rate at which Durban is growing geographically.

Yes	No	Unsure
8%	75%	17%

Table 6: Verdict on densifying existing major routes.

The feedback from this question is quite stark. The respondents strongly felt that densifying major routes in order to maximise the efficiency of public transport *would not* slow the rate at which Durban is growing geographically.

A respondent who answered 'no' left a comment: *not significantly. I don't think availability of public transport influences developers' decision as to position of new office parks etc.*

A respondent who answered 'yes' left a comment: *there is only so much space one can utilise.*

5.4.2. SUMMARY AND CONCLUSIONS

This section showed some interesting results from the questionnaire. 79% of respondents said 'YES' to linking Durban's decentralised office nodes by means of a public transport system.

37% of the abovementioned chose a Fast Rail Link as the mode of transport they would implement, 26% chose the Bus Rapid Transit and 37% chose the Light Rail Transit. Some respondents suggested a combination of the Bus Rapid Transit and Light Rail Transit systems whilst other said that road-based transport would better suit Durban's topography and infrastructure.

When asked whether densifying existing major routes in order to maximise the efficiency of public transport in order to slow the rate at which Durban is growing geographically, respondents strongly disagreed.

5.5. QUESTION 5: POSSIBLE SOLUTIONS PART 2

Question five in the questionnaire was designed to test the concepts uncovered in the precedent and case studies in Chapters Three and Four respectively about the city-wide issues relating to employment nodes.

5.5.1. ANALYSIS OF QUESTION 5

5.5.1.1. Working Close to Home

The first question in this section asked the respondents whether they would consider working in a 'town centre' if one existed in the area which they live where work opportunities were available. Table 7 illustrates the results.

Yes	No	Indifferent
67%	29%	4%

Table 7: Verdict on choosing to work in a 'town centre' which is located close to home with work opportunities.

It can be seen from Table 6 that 67% of the respondents would prefer to work in the area in which they reside. The following are common reasons given by those who would choose to work closer to home:

- Saving in transport costs (31% of respondents who would choose to work in the area in which they live)
- Convenience (25% of respondents who would choose to work in the area in which they live)
- Time-saving (25% of respondents who would choose to work in the area in which they live)
- Savings on petrol and maintenance costs (12% of respondents who would choose to work in the area in which they live)
- More environmentally friendly (12% of respondents who would prefer to work in the area in which they live)

- Opportunity to walk to work and experience the city (6% of respondents who would choose to work in the area in which they live)
- Increased productivity and quality of life due to the extra time available which would normally be spent travelling (6% of respondents who would choose to work in the area in which they live)

The following are the reasons given by the 29% of respondents who would not choose to work in the area in which they live:

- Would not want the area in which they live to become commercialised (29% of respondents who would not choose to work in the area in which they live)
- I like the company I work for and travelling is not a problem (29% of respondents who would not choose to work in the area in which they live)
- Prefer to live out of town, away from traffic (14% of respondents who would not choose to work in the area in which they live)
- Private transport allows one to organise one's own life and to not be limited to the areas which are serviced by public transport (14% of respondents who would not choose to work in the area in which they live)
- The convenience of private transport makes the benefit of reduced travel time insignificant (14% of respondents who would not choose to work in the area in which they live)

5.5.1.2. Central Business Districts versus Central Activity Districts

Respondents were asked if their perception would change about the Central Business District if it was referred to as a "Central Activity District." Table 8 illustrates the findings:

Yes	No	Unsure
25%	71%	4%

Table 8: Verdict on whether respondents' perception of the Central Business District would change if it was referred to as a "Central Activity District."

It is clear from the findings in Table 8 that the majority – 71% - of respondents' perception of the Central Business District would not change if it was referred to as a "Central Activity District." Below are some of their comments:

- Just a name – labels make no real difference (24% of respondents whose perception would not change)

- "Activity" implies leisure pursuits – something the respondents would not associate with the CBD (12% of respondents whose perception would not change)
- They are one and the same (6% of respondents whose perception would not change)
- People understand the CBD and its meaning (6% of respondents whose perception would not change)
- A name would not change the operation of the CBD (6% of respondents whose perception would not change)

25% of the respondents said their perception of the Central Business District would change if it were referred to as the "Central Activity District." Below are some of their comments:
- It sounds more like an exciting social space (17% of respondents whose perception would change)
- "Central Activity Districts" implies a mixed-use area, amenable to all (17% of respondents whose perception would change)
- "Activity" is non-specific (17% of respondents whose perception would change)
- "Activity" suggests busy – busy would equate to more opportunity and growth (17% of respondents whose perception would change)
- I would assume that it would be busy all the time with not only business activity happening, but also social activity (17% of respondents whose perception would change)

5.5.1.3. Spreading Economic Opportunities

The final question in this section asked the respondents whether they thought that spreading economic opportunities throughout the city, including the creation of new economic nodes in previously disadvantaged areas, would be beneficial to both businesses and local residents. Table 9 illustrates the results:

Yes	No	Unsure
79%	17%	4%

Table 9: Verdict on whether spreading economic nodes throughout the city, including previously disadvantaged areas, would be beneficial to both businesses and local residents.

As can be observed from Table 9, a 79% majority of the respondents think that spreading economic opportunities throughout the city, including the creation of new economic nodes in previously disadvantaged areas, would be beneficial to both businesses and local residents. A few respondents commented on their positive answer:

- People would then live where they work
- Businesses would be happier because their employees would no longer be late for work resulting in increased productivity
- It is a sustainable and more economically viable plan for setting out a city to ensure a happier and more profitable population
- One respondent said that it would work only if particular areas were monitored closely regarding crime.

17% of respondents said that spreading economic opportunities throughout the city, including the creation of new economic nodes in previously disadvantaged areas, would not benefit both businesses and local residents. Below are some of their comments:

- Economic nodes could include industrial businesses which are not desirable in residential locations.
- It is all about perception. Townships would still be considered 'unsafe' areas.
- Safety reasons and distances into some of the rural areas.
- They (previously disadvantaged) would not use them and will probably vandalise them.

5.5.2. SUMMARY AND CONCLUSIONS

Question 5 set out to test various solutions uncovered in the precedent and case studies discussed in Chapters 3 and 4 respectively.

When asked whether they would choose to work in the area in which they lived, 67% of the respondents said they would choose to do so. The most common of their reasons were "saving on transport costs", "convenience" and "time-saving."

29% of the respondents said they would choose not to work in the area in which they live. The respondents' primary reasons being: "would not want the area in which I live to become commercialised" and "prefer to live out of town – away from traffic."

When asked whether their perception of the Central Business District would change if it was referred to as the "Central Activity District", 71% of the respondents said that it would not change their perception. Their main comments were "It is just a name – labels make no real difference" and "Activity implies leisure pursuits – something the respondents would not associate with the CBD."

25% of the respondents said that it would change their perspective of the Central Business District. Their main comments were "I would assume that it would be busy all the time with not only business activity happening, but also social activity" and "It sounds like an exciting social space."

When asked whether they thought spreading economic opportunities throughout the city, including the creation of new economic nodes in previously disadvantaged areas, would benefit both businesses and local residents, 79% of the respondents said that it would. Their comments were "People would then live where they work", "It is a sustainable and more economically viable plan for setting out a city to ensure a happier and more profitable population" and "Businesses would be happier because their employees would no longer be late for work resulting in increased productivity."

The 17% who did not think it would be beneficial to both businesses and local residents had the following comments: It is all about perception. Townships would still be considered 'unsafe' areas; Safety reasons and distances into some of the rural areas; and they (previously disadvantaged) would not use them and will probably vandalise them.

5.6. QUESTION 6: OFFICE LOCATION FACTORS

Question six in the questionnaire was only presented to those respondents who choose the location of their company's offices, i.e. business owners and directors. The intention of this question was to get insight into the motives behind the choice of location of businesses.

5.6.1. ANALYSIS OF QUESTION 6

9% of all respondents were company directors. 100% of these once had offices in the Central Business District and now have offices in Berea / Morningside.

The period in which these companies had offices in the Central Business District ranged between two (2) and forty-five (45) years. The following were some reasons for companies' directors to choose to have offices in the Central Business District:

- Proximity to the harbour
- Proximity to customs

- Reasonably central for staff
- Face-to-face contact with clients / related companies / accountants / banks

The following are the reasons given by directors for why they chose to move their offices from the Central Business District to a decentralised location:

- Traffic in the CBD
- Safety of staff, especially after hours
- Crime and grime
- Pursuing a more relaxed workplace
- There was no longer the need for close proximity to other companies – telephones / internet / email

The directors were asked if they would consider moving their offices to a new economic node in a previously disadvantaged area. 100% of directors said they would not consider moving their offices to new economic nodes in previously disadvantaged areas. The following were their reasons:

- My location needs to be central to, and have easy and timely access to the harbour and customs.
- Concerned about crime in previously disadvantaged areas
- It would be a hostile environment for a company which has been around since before Apartheid fell.

5.6.2. SUMMARY AND CONCLUSIONS

From the analysis it can be seen that company directors chose to have their offices in the Central Business District for differing reasons. For some their proximity to the harbour was important whilst for others face to face contact with clients, allied companies, accountants and banks were most important.

The reasons for moving their offices from the Central Business District to a decentralised location were to escape the traffic, crime and grime and to pursue a more relaxed work place.

When asked whether they would consider moving their offices to a new economic node in a previously disadvantaged area, the directors said that the location would not suit the needs of their company, crime would be of concern, and it would be a hostile environment for a company which has been around since before the fall of Apartheid.

CHAPTER 6   ANALYSIS AND DISCUSSION

Realising that office decentralisation had, in fact, occurred in South African cities, the author set out to show whether the new decentralised nodes were in locations which were beneficial to all city dwellers.

In terms of city planning, the South African context is unique due to its history of Apartheid whereby cities were designed to impede movement between residential areas, and to disadvantage the majority of the population by placing them in townships far from economic opportunities. This issue is the primary reason the author chose to research this topic.

According to Systems Theory, George Chadwick said that a system is a set of objects, together with relationships between the objects and between their attributes. Objects are the components of the system, attributes are the properties of objects, and the relationships between the objects make the system useful. Although the relation of this theory to office decentralisation is discussed in the summary of section 2.1.3, it is easy to see how this relates to office decentralisation and the functioning of a city with multiple centres: all decentralised centres need to be linked with each other in order for the city to function as a single system.

Kevin Lynch says that there is a public image of any city, and this image is the juxtaposition of many images which are experienced by the observer. These images take on many different forms, each with their own symbolic meaning. Lynch identifies the elements as: paths; edges; districts; nodes; and landmarks. The significant elements to this research are paths (these are routes through the city, connecting its various parts), edges (relating to Apartheid planning, people were disadvantaged by physical and natural barriers), districts (areas with a common, recognisable activity, such as a Central Business District), and nodes (strategically placed points in a city, which can be districts, a train station, a building, a park, etc.)

Kevin Lynch speaks of urban form typologies. The Linear Form, the Linkage System, the Radial System and the Grid System. These are discussed in detail in section 2.2.2, but their significance in this research is that they form clues of how to analyse existing cities, and predict where decentralised office nodes may occur. They also give options for future design considerations in urban schemes, for example the Radial System may illustrate a means of linking the decentralised nodes in South African cities. This would also illustrate how Systems Theory can work in city planning, whereby it is the relationship between the centres which make the whole system useful.

Ebenezer Howard's Garden City concept was discussed because it was the first act of decentralised planning, albeit residential. It was also discussed in order to introduce the Modernist view of city planning because the latter was informed by the former because it suggested zoning laws within cities.

Apartheid cities were developed around Modernist planning, but this view of planning was distorted to suit political agendas. This planning involved an overriding concern with separation of activities and income groups. It is clear how this was distorted by Apartheid planners when they placed black people on the edges of cities with barriers preventing them from accessing the white areas which were closer to economic opportunities. Because of this, Apartheid cities can be seen as "doughnuts," with the greatest population density located on the edges of the city. These township areas were, and still are, greatly underserviced. Living standards in these areas are still much lower than the white areas within the city. There are limited economic opportunities in townships whereas there are many new economic developments still appearing in wealthy suburbs.

Apartheid cities were spatially fragmented which resulted in exaggerated distances over which people needed to move to get from place to place. In order to achieve this, planners used limited access freeways and railways as "urban umbilical cords" to ensure fast movement within the city. Due to this vast distance, Apartheid cities are pedestrian unfriendly.

The decentralisation in cities in general was governed by the invention of different modes of transport. Trains and streetcars (Light Rail) induced a star-shaped city form whereby development occurred along the railway lines. Upon the introduction of the private vehicle, cities became much more random and less organised, which brought with it congestion.

In order to understand office decentralisation, we need to understand suburbanisation. Residential suburbs were marketed by developers as a good investment to own one's home, and the clean air and quiet away from the city centre is what all members of society should strive for. Also, it gave the opportunity for individualism.

In terms of office decentralisation, it was inevitable that companies would move closer to residential areas as low density development began to cover great geographical areas. People began wanting to live closer to their places of work. Also, technology and transportation has evolved so that it enables companies to be physically further apart.

The following are reasons companies choose to leave the former Central Business District: congestion, crime, cost of land, the need to expand, changing social and political circumstances, building a corporate identity and pursuing a more relaxed working environment.

Some cities have policies for employment decentralisation. As seen in section 2.5.5, the following are strategies for employment decentralisation: relocation of existing business, incremental job creation, encouraging growth of businesses not located in a centralised node, encouraging new businesses, attracting international investments, and deconcentration of land use for political reasons.

There are some dangers in decentralising cities. The main one is that political and managerial attention may be diverted from pressing issues in the former Central Business District. Also, new nodes have appeared in wealthy residential areas which disadvantage the majority of the public in South Africa's case because movement between residential areas was impeded by Apartheid design.

Johannesburg, Lagos and Melbourne were looked at as precedent studies. They were looked at in terms of their background, challenges they face and solutions they have come up with in order to resolve their urban problems. The following are their solutions:

- Fast Rail Link
- Bus Rapid Transit (BRT)
- Light Rail Transit (LRT)
- Densification along existing major routes to improve public transport efficiency
- Referring to the Central Business District as the "Central Activities District"

Chapter 4 looks at Durban as a case study, and also discussed the city in terms of background and the urban problems it faces. A major problem Durban faces with its decentralised office nodes is that they are only accessible by road transport. The train system that currently exists only links the townships to the Central Business District (CBD), and no other office district. This train service is the only mass public transport system in the eThekwini Municipality and is in direct competition with the mini-bus taxi industry and bus companies, which add many vehicles to the roads.

It was found that train schedules are very easy to come by on the internet, although there is very little information available at stations, but the only bus schedule that is easy to find is the People Mover Bus which only operates within the CBD. The other city bus schedules are difficult to come by. Mini-bus taxis form a large portion of public transport used in the city, but this service does not have any time schedule.

It can be seen by this that the city is strangled by the lack of an easy-to-use public transport system, whilst the only easy-to-use modes are the train and People Mover Bus systems, but these do not move between decentralised office nodes – which the author considers to be a very pressing issue.

CHAPTER 7   CONCLUSION AND RECOMMENDATIONS

7.1   CONCLUSION

It has been found in this dissertation that South African cities have experienced office decentralisation on various scales and at various intensities. Most these office nodes have occurred in previously wealthy white suburbs classified as such under Apartheid planning. This has been to the detriment to the majority of the public because movement between residential areas was restricted during Apartheid.

This feature of the Apartheid city has not changed, which means people who use public transport to get to work, who live in one suburb and work in another, usually have to travel into the central business district (CBD) then back out to the suburb in which they work. Apartheid cities were designed to place the poorest members of the population on the outskirts of the city which increased their travel time to places of work which were typically found in the CBD. As stated in subchapter 2.5.2, "the time spent travelling is time not spent doing other things" (Giuliano, 2004: 51).

Now with office decentralisation occurring at a rate which is quicker than transport infrastructure delivery, the time spent travelling in increasing, which is further detracting from the time the poorest members of society could spend on bettering their lives by way of either education or second jobs.

The majority of the decentralised office development in South Africa has been developer, or market driven. This means that new office nodes are in locations which suit the developer's wallet, as opposed to the public's needs.

Office parks are the most common form of decentralised office development in South Africa. This type focuses on good road connections. It can be seen in many cities that little, or even no, form of mass public transport exists where office park development has occurred. This shows a preference to the previously advantaged white South African population who were expected to use private vehicles because they could afford to. This fact is, again, to the detriment of the poorest population who rely on public transport in the form of railways. Due to office jobs moving away from mass public transport, road-based public transport is taking preference over rail-based transport which undermines existing rail infrastructure and creates a heavy burden on traffic flows on the city's roads whilst creating more noise and air pollution than ever before.

There have been some reactions to office decentralisation, as well as the sprawling nature of South African cities.

It is expected that office decentralisation has reached its peak in terms of the creation of new nodes (Reilly, 2003: 24). This has allowed the Gautrain project to react to traffic movement patterns and enable city integration on a greater scale. The Gautrain project is intended to operate in conjunction with existing rail infrastructure as well as bus systems which would shuttle people around the areas surrounding stations.

A reaction to the sprawling nature of South African cities can be seen in a form of office decentralisation. Developments which follow the concept of New Urbanism have sprung up in several South African cities. Whilst these are pedestrian-oriented developments, they are in locations where mass public transport does not exist, which means they rely heavily on people arriving by private vehicle which they park in large underground parking garages. The purpose of New Urbanism developments is to provide a 'compact city' environment which would provide mixed-use residential, office and retail components within walking distance of one another. New Urbanism intends to integrate people from different social backgrounds, however in South Africa it has been primarily an exclusive development type which attracts only the wealthy.

Office decentralisation can be used as a means of urban renewal. This use could be greatly used in order to bring jobs to black townships in South Africa. Walter Sisulu Square in Soweto, discussed in subchapter 2.5.9.2, is an example. The creation of job opportunities within townships could help the time-spent-travelling problem discussed previously. It would reduce the need for people to commute vast distances to work every day, and would help traffic congestion in the city as a whole. The problem with this solution is that townships are not seen as attractive areas to conduct business in. Perhaps the space between townships and wealthier suburbs – known as buffer strips – can be used in order to provide attractive locations for office job creation.

Motivation for office decentralisation in the past has been focused on escaping crime and congestion of the CBD for cheaper land in the 'suburban countryside' where the needs for expansion and the building of a corporate identity exist. However, motivation for office decentralisation in the post-Apartheid city includes the responsibility of providing office job opportunities to the members of society who were marginalised by Apartheid laws and planning regulations.

Office decentralisation in this regard can be seen as an advantage of the trend, so long as the proposed office nodes are linked to the greater network of existing office nodes in order to allow for maximum economic possibilities within a city.

As discussed in subchapter 2.1, the city can be seen as a system, within which are a series of subsystems. In terms of decentralisation of city centres, each centre can be seen as a subsystem of the "larger" system. The systems principle of "wholeness" will be formed by the differing centres' ability to function together as a single entity, and the principle of hierarchy would be seen as the level of importance placed on each centre, which is a naturally occurring phenomenon in any case.

In terms of the "size" and "scale" of the system, the "larger" system would be the metropolitan region, and the elements or *objects* would be the different centres within the city. The most important feature of any system, and which makes the system useful, is the *relationship* between the *objects* which make up the system. The *relationships* between the centres of a city are the means by which they are connected, for example road or rail, and by what each centre specialises in, for example manufacturing, commerce, residential, etc.

It can be seen that cities are systems containing many components and subsystems which work together to form a whole to achieve a single goal.

It is clear from the above that applying systems theory to planning in post-Apartheid cities would help greatly in bridging divides between communities, and enable the city to function as a single entity as opposed to one which is fragmented by space and obstacles.

It is hereby concluded that office decentralisation which occurs in locations which would benefit all city dwellers, together with enhanced direct transport linkages to other centralised and decentralised office nodes within the city, will help unify post-Apartheid South African cities. This would in turn make them function more efficiently, make them more profitable, and would give time back to marginalised communities with which they can use to better themselves in economic terms, as well that of education.

7.2.   RECOMMENDATIONS

Upon undertaking a questionnaire exercise, which tested the Literature Review, Precedent Studies and Case Study, the following recommendations can be made.

The research suggests that an integrated public transport system be introduced to decentralised cities in order for them to perform as one. In the case of Durban, if a public transport system were to be developed it would need to be convenient, reliable, safe and well marketed. It would not necessarily bypass the CBD, but it would need to have routes that operate suburb-to-suburb, as opposed to suburb-to-CBD-to-suburb. It would also need to be fast, flexible and operate on a regular schedule.

79% of respondents of the questionnaire said linking the decentralised office nodes in Durban by means of an efficient public transport system would definitely be useful to them and other city dwellers. This link can be backed by Systems Theory, whereby it is the relationship between the objects or centres which make the system or city useful. The author therefore recommends these links between decentralised office nodes need to occur.

37% of respondents said a Fast Rail Link would be best, 37% said a Light Rail Network would be best, and 26% said a Bus Rapid Transit would be best. Given Durban's topography and existing infrastructure, the author would recommend a combination of: either an improved and extended Metrorail network or Light Rail; and Bus Rapid Transit. A Fast Rail Link would be extremely costly to implement, and would not suit Durban's topography. The Metrorail or Light Rail Network would run between the decentralised office nodes. The stations would be placed far apart, and these would be serviced by the Bus Rapid Transit system that would pass through nearby suburbs and districts in order to deliver people to their destinations.

79% of respondents of the questionnaire said that spreading economic opportunities throughout the city, including previously disadvantaged areas, would be beneficial to both residents and businesses. The author therefore recommends this occurs. Based on the comments left by directors of companies, the businesses would have to be of a certain nature, and a company which had existed before the fall of Apartheid would find a township location a hostile place to do business. Therefore new businesses would be attracted to an office node in these locations.

Although both Kevin Lynch and David Dewar recommend that development density should increase along major routes in order to maximise the efficiency of public transport and to control urban sprawl, 75% of respondents said this would not work. A possible reason for it not working is the reality of developers acquiring cheap land in locations which are not serviced by public transport. However, the author would recommend this densification occurs because the current public transport system is

heavily financed by public funding due to the sparseness of dwellings in South African cities which leads to low ridership levels.

71% of respondents did not think referring to the Central Business District as the "Central Activity District" would change their perception of the area. However those respondents who said it would change their perception suggested it would speak of a more round-the-clock, mixed-use environment which is non-specific to business, but more of a social space where business, living and entertainment activities could occur. Such an environment would be important to implement in a new commercial node, and possibly over time introduce many more entertainment activities into the CBD so that it becomes multifunctional in order to avoid the area becoming dead and dangerous at night. It is for this reason that this idea of Central Activity Districts should be implemented.

To conclude, the author recommends:
- the development of new decentralised office nodes in previously disadvantaged townships;
- either the extension of Metrorail services, or the development of a Light Rail system, which operates between all decentralised office nodes, and a Bus Rapid Transit system to service the Metrorail or Light Rail stations;
- the densification along major existing routes in order to maximise the efficiency of public transport.
- referring to important nodes as "Central Activity Districts"

This dissertation focused on office decentralisation. It touched on residential decentralisation because it was a means of introducing the primary topic. However residential decentralisation is a topic which could be further researched in that the decentralisation of the commercial centre would imply that commercial centres become more closely integrated with residential development. This questions whether there is still a need for residential decentralisation. Decentralisation of industrial employment nodes was not discussed at all in this dissertation, although many jobs are created by industrial plants. This could be researched as a topic in itself.

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APPENDICES

APPENDIX A: **SAMPLE OF QUESTIONNAIRE SENT TO EMPLOYEES**

RESEARCH QUESTIONNAIRE

The subject of the research document I am currently writing revolves around office decentralisation. One refers to the 'decentralisation' of offices when they are found in different parts of a city. For example in Durban we have offices in the Central Business District, but we also have offices on the Berea, in Westville, La Lucia, Umhlanga, Kloof and Hillcrest.

Please answer the following questions honestly and to the best of your ability.

Please return them to me as soon as possible.

QUESTION 1

1.1. Your Name (for my identification purposes only. It will not be disclosed in the research document)

1.2. In which area/suburb/township do you live? (Please state the street and the area name)

Glenwood Durban → Cato Road off Moore Rd.

1.3. In which area/suburb/township do you work? (Please state the street and area name)

La Lucia Ridge — Crane gate Road

1.4. How far in terms of distance is the place you live from the place you work?

18.8 km

1.5. How long in terms of time during peak and off-peak periods is the place you live from the place you work?

+ – 30 – 45 Minutes

QUESTION 2

2.1. What forms of public/communal transport are available in the place you live? (e.g. train, metered taxi, minibus taxi, bus, car sharing)

2 Taxi's.

2.2. What forms of public/communal transport are available in the place you work?

Most Bus & Taxi

2.3. Do you use public/communal transport to get from the place you live to the place you work?

Yes.

(If you answered 'no', please jump to QUESTION 3)

2.4. If you answered 'yes' to question 2.3, which mode/s of transport do you use?

Taxi its Quicker

2.5. For what reason do you use the mode/s of public/communal transport mentioned in question 2.4?

It is Fast. bus goes to Via Durban North, Whereas Taxi Tax Takes Freeway.

2.6. Do you find the public transport system easy to use and understand?

Yes.

2.7. If you answered 'yes' to question 2.7, what makes the public transport system easy to use and understand?

It is Simple

2.8. If you answered 'no' to question 2.7, what makes the public transport system difficult to understand?

(Please jump to QUESTION 4)

QUESTION 3

3.1. For what reason do you not use public transport?

_____

_____

_____

QUESTION 4

4.1. Seeing that office decentralisation has occurred in Durban, do you think it would be useful to link all the locations in the city where offices have appeared by a means of public transportation? Bearing in mind such a system would travel through residential areas.

yes .

4.2. Could you explain your answer to question 4.1?

_____

_____

4.3. If you answered 'yes' to question 4.1: could you choose one of the following modes of public transport which you think would suit the task of linking the areas in which offices have appeared in Durban, and give a reason for your choice:

a)   A **fast rail link** whereby the train stations would be located in major business centres. An extensive, well organised and marketed bus system which would travel deep into surrounding suburbs would service the fast rail stations.

b)   A **Bus Rapid Transit Network** (BRT) functions like a train or subway system but makes use of existing roads. The point of this system is to maximise the efficiency of the busses by giving them dedicated lanes to travel on, with bus stops spaced fairly far apart at strategic points along the major routes. These stations would be serviced by other, smaller, busses to take people into the surrounding areas.

c)   A **Light Rail Network** would function in a similar way to a BRT system, but it would have a higher passenger capacity. Light rail, traditionally called trams or streetcars, can run on major routes with stops spaced fairly far apart at

strategic points which would be serviced by either busses or a localised light rail network. Trams run on rails and have the ability to travel on regular streets.

Your Answer:

Light Rail Net work.

4.4. Do you think linking the decentralised office areas by intensifying the development (increase population and business density) along existing routes between these areas in order to maximise the efficiency of existing public transport would slow the rate at which Durban grows geographically?

QUESTION 5

5.1. If a 'town centre' existed with work opportunities available in the area in which you live, would you choose to work there rather than at your present place of work?

Yes.

5.2. Please explain your answer to question 5.1:

Less Time taken to get to work. & es Expensive

5.3. Would your perception of Central Business Districts change if they were known as "Central Activity Districts"?

yes

5.4. Please explain your answer from question 5.3:

As it would Make it easy for Me to get to work in less time

5.5. Do you think spreading economic opportunities throughout the city, including the creation of new economic nodes in previously disadvantaged townships like kwaMashu, Inanda and Umlazi, will be beneficial to both businesses and local residents?

yes.

5.6. If you answered 'no' to question 5.5, could you explain your answer?

_____

_____

END OF QUESTIONNAIRE
Thank you for your time.

RESEARCH QUESTIONNAIRE

The subject of the research document I am currently writing revolves around office decentralisation. One refers to the 'decentralisation' of offices when they are found in different parts of a city. For example in Durban we have offices in the Central Business District, but we also have offices on the Berea, in Westville, La Lucia, Umhlanga, Kloof and Hillcrest.

Please answer the following questions honestly and to the best of your ability. Please return them to me as soon as possible.

QUESTION 1

1.1.   Your Name (for my identification purposes only. It will not be disclosed in the research document)

1.2.   In which area/suburb/township do you live? (Please state the street and the area name)
        Hedge Row, Brighton Beach, Bluff

1.3.   In which area/suburb/township do you work? (Please state the street and area name)
        Umhlanga Ridge

1.4.   How far in terms of distance is the place you live from the place you work?
        35km

1.5.   How long in terms of time during peak and off-peak periods is the place you live from the place you work?
        off-peak = 45 mins - Peak can take anything from 1 - 2 hours.

QUESTION 2

2.1.   What forms of public/communal transport are available in the place you live? (e.g. train, metered taxi, minibus taxi, bus, car sharing)
        all of the above but none will take you directly to your destination so more than one type of public transport would have to be taken each way.

2.2.   What forms of public/communal transport are available in the place you work?

minibus taxi

2.3.   Do you use public/communal transport to get from the place you live to the place you work?

no

(If you answered 'no', please jump to QUESTION 3)

2.4.   If you answered 'yes' to question 2.3, which mode/s of transport do you use?

2.5.   For what reason do you use the mode/s of public/communal transport mentioned in question 2.4?

2.6.   Do you find the public transport system easy to use and understand?

2.7.   If you answered 'yes' to question 2.7, what makes the public transport system easy to use and understand?

2.8.   If you answered 'no' to question 2.7, what makes the public transport system difficult to understand?

(Please jump to QUESTION 4)

QUESTION 3

3.1.   For what reason do you not use public transport?

It would be most inconvenient and would take too long

QUESTION 4

4.1.   Seeing that office decentralisation has occurred in Durban, do you think it would be
        useful to link all the locations in the city where offices have appeared by a means of
        public transportation? Bearing in mind such a system would travel through residential
        areas.

        yes

4.2.   Could you explain your answer to question 4.1?

        as long as the transport is convenient and quick and there is a safe place to park your
        car while taking public transport

4.3.   If you answered 'yes' to question 4.1: could you choose one of the following modes
        of public transport which you think would suit the task of linking the areas in which
        offices have appeared in Durban, and give a reason for your choice:

        a)   A **fast rail link** whereby the train stations would be located in major business
                centres. An extensive, well organised and marketed bus system which would
                travel deep into surrounding suburbs would service the fast rail stations.

        b)   A **Bus Rapid Transit Network** (BRT) functions like a train or subway
                system but makes use of existing roads. The point of this system is to
                maximise the efficiency of the busses by giving them dedicated lanes to travel
                on, with bus stops spaced fairly far apart at strategic points along the major
                routes. These stations would be serviced by other, smaller, busses to take
                people into the surrounding areas.

        c)   A **Light Rail Network** would function in a similar way to a BRT system, but
                it would have a higher passenger capacity. Light rail, traditionally called trams
                or streetcars, can run on major routes with stops spaced fairly far apart at
                strategic points which would be serviced by either busses or a localised light
                rail network. Trams run on rails and have the ability to travel on regular
                streets.

        Your Answer:

        a

4.4.   Do you think linking the decentralised office areas by intensifying the development (increase population and business density) along existing routes between these areas in order to maximise the efficiency of existing public transport would slow the rate at which Durban grows geographically?

no

QUESTION 5

5.1.   If a 'town centre' existed with work opportunities available in the area in which you live, would you choose to work there rather than at your present place of work?

yes

5.2.   Please explain your answer to question 5.1:

I would save on petrol, hence less polution and I would have at least an extra 2 hours for myself which is spent sitting in my car going to and from work.

5.3.   Would your perception of Central Business Districts change if they were known as "Central Activity Districts"?

no

5.4.   Please explain your answer from question 5.3:

I think Central Activity Districts would cover everything required without having to travel too far.

5.5.   Do you think spreading economic opportunities throughout the city, including the creation of new economic nodes in previously disadvantaged townships like kwaMashu, Inanda and Umlazi, will be beneficial to both businesses and local residents?

no

5.6.   If you answered 'no' to question 5.5, could you explain your answer?

they won't use them and will probabley trash them.

END OF QUESTIONNAIRE

Thank you for your time.

RESEARCH QUESTIONNAIRE

The subject of the research document I am currently writing revolves around office decentralisation. One refers to the 'decentralisation' of offices when they are found in different parts of a city. For example in Durban we have offices in the Central Business District, but we also have offices on the Berea, in Westville, La Lucia, Umhlanga, Kloof and Hillcrest.

Please answer the following questions honestly and to the best of your ability.
Please return them to me as soon as possible.

QUESTION 1

1.1.   Your Name (for my identification purposes only. It will not be disclosed in the research document)

_____

1.2.   In which area/suburb/township do you live? (Please state the street and the area name)
_Pinetown_____

1.3.   In which area/suburb/township do you work? (Please state the street and area name)
_Durban_____

1.4.   How far in terms of distance is the place you live from the place you work?

_____

1.5.   How long in terms of time during peak and off-peak periods is the place you live from the place you work?
_30 mins – peak   15 mins – off-peak_____

QUESTION 2

2.1. What forms of public/communal transport are available in the place you live? (e.g. train, metered taxi, minibus taxi, bus, car sharing)

train, minibus taxi, bus

2.2. What forms of public/communal transport are available in the place you work?

minibus taxi & bus

2.3. Do you use public/communal transport to get from the place you live to the place you work?

Yes

(If you answered 'no', please jump to QUESTION 3)

2.4. If you answered 'yes' to question 2.3, which mode/s of transport do you use?

mini bus taxis & bus

2.5. For what reason do you use the mode/s of public/communal transport mentioned in question 2.4?

convenient & cheap

2.6. Do you find the public transport system easy to use and understand?

Yes

2.7. If you answered 'yes' to question 2.7, what makes the public transport system easy to use and understand?

follows simple rules → available at all times - till late, pay at door or before you get off

2.8. If you answered 'no' to question 2.7, what makes the public transport system difficult to understand?

(Please jump to QUESTION 4)

QUESTION 3

3.1.   For what reason do you not use public transport?

_____

_____

_____

QUESTION 4

4.1.   Seeing that office decentralisation has occurred in Durban, do you think it would be
        useful to link all the locations in the city where offices have appeared by a means of
        public transportation? Bearing in mind such a system would travel through residential
        areas.

        Yes

4.2.   Could you explain your answer to question 4.1?

        People who work on all these places should be
        able to access public transport with no fear of
        being late.

4.3.   If you answered 'yes' to question 4.1: could you choose one of the following modes
        of public transport which you think would suit the task of linking the areas in which
        offices have appeared in Durban, and give a reason for your choice:

        a)   A **fast rail link** whereby the train stations would be located in major business
                centres. An extensive, well organised and marketed bus system which would
                travel deep into surrounding suburbs would service the fast rail stations.

        b)   A **Bus Rapid Transit Network** (BRT) functions like a train or subway
                system but makes use of existing roads. The point of this system is to
                maximise the efficiency of the busses by giving them dedicated lanes to travel
                on, with bus stops spaced fairly far apart at strategic points along the major
                routes. These stations would be serviced by other, smaller, busses to take
                people into the surrounding areas.

        c)   A **Light Rail Network** would function in a similar way to a BRT system, but
                it would have a higher passenger capacity. Light rail, traditionally called trams
                or streetcars, can run on major routes with stops spaced fairly far apart at

strategic points which would be serviced by either busses or a localised light rail network. Trams run on rails and have the ability to travel on regular streets.

Your Answer:

Light rail network – best of both.

4.4. Do you think linking the decentralised office areas by intensifying the development (increase population and business density) along existing routes between these areas in order to maximise the efficiency of existing public transport would slow the rate at which Durban grows geographically?

Yes.

QUESTION 5

5.1. If a 'town centre' existed with work opportunities available in the area in which you live, would you choose to work there rather than at your present place of work?

Yes

5.2. Please explain your answer to question 5.1:

It is all about convenience – able to save as you would be able to go home for lunch.

5.3. Would your perception of Central Business Districts change if they were known as "Central Activity Districts"?

Yes

5.4. Please explain your answer from question 5.3:

activity suggests busy – busy would equate to more opportunity + growth

5.5.   Do you think spreading economic opportunities throughout the city, including the creation of new economic nodes in previously disadvantaged townships like kwaMashu, Inanda and Umlazi, will be beneficial to both businesses and local residents?   Yes

5.6.   If you answered 'no' to question 5.5, could you explain your answer?

END OF QUESTIONNAIRE

Thank you for your time.

RESEARCH QUESTIONNAIRE

The subject of the research document I am currently writing revolves around office decentralisation. One refers to the 'decentralisation' of offices when they are found in different parts of a city. For example in Durban we have offices in the Central Business District, but we also have offices on the Berea, in Westville, La Lucia, Umhlanga, Kloof and Hillcrest.

Please answer the following questions honestly and to the best of your ability.
Please return them to me as soon as possible.

QUESTION 1

1.1.   Your Name (for my identification purposes only. It will not be disclosed in the research document)

1.2.   In which area/suburb/township do you live? (Please state the street and the area name)
DURBAN   CBD

1.3.   In which area/suburb/township do you work? (Please state the street and area name)
MORNINGSIDE   DURBAN , PROBLEM MKHIZE RD

1.4.   How far in terms of distance is the place you live from the place you work?
10 km²

1.5.   How long in terms of time during peak and off-peak periods is the place you live from the place you work?
PEAK TIMES 20MINS   OFF PEAK - 10 MINS

QUESTION 2

2.1. What forms of public/communal transport are available in the place you live? (e.g. train, metered taxi, minibus taxi, bus, car sharing)

TAXi , Bus , MiNi BUS

2.2. What forms of public/communal transport are available in the place you work?

MiNi Bus

2.3. Do you use public/communal transport to get from the place you live to the place you work?

_No_

(If you answered 'no', please jump to QUESTION 3)

2.4. If you answered 'yes' to question 2.3, which mode/s of transport do you use?

_____

_____

2.5. For what reason do you use the mode/s of public/communal transport mentioned in question 2.4?

_____

_____

2.6. Do you find the public transport system easy to use and understand?

_____

2.7. If you answered 'yes' to question 2.7, what makes the public transport system easy to use and understand?

_____

_____

2.8. If you answered 'no' to question 2.7, what makes the public transport system difficult to understand?

_____

_____

(Please jump to QUESTION 4)

QUESTION 3

3.1. For what reason do you not use public transport?

LACK OF CONVENIENCE, OCCUPATION
REQUIRES THAT I HAVE A VEHICLE.

QUESTION 4

4.1. Seeing that office decentralisation has occurred in Durban, do you think it would be useful to link all the locations in the city where offices have appeared by a means of public transportation? Bearing in mind such a system would travel through residential areas.

YES

4.2. Could you explain your answer to question 4.1?

It would be CONVENIENT TO GET TO WORK,

4.3. If you answered 'yes' to question 4.1: could you choose one of the following modes of public transport which you think would suit the task of linking the areas in which offices have appeared in Durban, and give a reason for your choice:

a) A **fast rail link** whereby the train stations would be located in major business centres. An extensive, well organised and marketed bus system which would travel deep into surrounding suburbs would service the fast rail stations.

b) A **Bus Rapid Transit Network** (BRT) functions like a train or subway system but makes use of existing roads. The point of this system is to maximise the efficiency of the busses by giving them dedicated lanes to travel on, with bus stops spaced fairly far apart at strategic points along the major routes. These stations would be serviced by other, smaller, busses to take people into the surrounding areas.

c) A **Light Rail Network** would function in a similar way to a BRT system, but it would have a higher passenger capacity. Light rail, traditionally called trams or streetcars, can run on major routes with stops spaced fairly far apart at

strategic points which would be serviced by either busses or a localised light rail network. Trams run on rails and have the ability to travel on regular streets.

Your Answer:

C, LARGER VOLUMES, IT WILL FUNCTION ON ITS OWN SYSTEM INDEPENDANT OF OUR CONGESTED ROAD NETWORK. HENCE MORE EFFICIENT

4.4. Do you think linking the decentralised office areas by intensifying the development (increase population and business density) along existing routes between these areas in order to maximise the efficiency of existing public transport would slow the rate at which Durban grows geographically?

NOT SURE

QUESTION 5

5.1. If a 'town centre' existed with work opportunities available in the area in which you live, would you choose to work there rather than at your present place of work?

YES

5.2. Please explain your answer to question 5.1:

OPPORTUNITY TO WALK TO WORK AND EXPERIENCE THE PULSE OF THE CITY

5.3. Would your perception of Central Business Districts change if they were known as "Central Activity Districts"?

YES, SOUNDS MORE LIKE AN EXCITING A SOCIAL SPACE

5.4. Please explain your answer from question 5.3:

"

5.5. Do you think spreading economic opportunities throughout the city, including the creation of new economic nodes in previously disadvantaged townships like kwaMashu, Inanda and Umlazi, will be beneficial to both businesses and local residents?

YES

5.6. If you answered 'no' to question 5.5, could you explain your answer?

_____

_____

END OF QUESTIONNAIRE

Thank you for your time.

Page | 5

RESEARCH QUESTIONNAIRE

The subject of the research document I am currently writing revolves around office decentralisation. One refers to the 'decentralisation' of offices when they are found in different parts of a city. For example in Durban we have offices in the Central Business District, but we also have offices on the Berea, in Westville, La Lucia, Umhlanga, Kloof and Hillcrest.

Please answer the following questions honestly and to the best of your ability.

Please return them to me as soon as possible.

QUESTION 1

1.1.   Your Name (for my identification purposes only. It will not be disclosed in the research document)

1.2.   In which area/suburb/township do you live? (Please state the street and the area name)
PENZANCE RD / GLENWOOD

1.3.   In which area/suburb/township do you work? (Please state the street and area name)
9th AVE./ MORNINGSIDE

1.4.   How far in terms of distance is the place you live from the place you work?
2.5 KM'S

1.5.   How long in terms of time during peak and off-peak periods is the place you live from the place you work?
OFF PEAK: 10 MINS / PEAK: ± 25 MINS

QUESTION 2

2.1.   What forms of public/communal transport are available in the place you live? (e.g. train, metered taxi, minibus taxi, bus, car sharing)

METERED TAXI

2.2.   What forms of public/communal transport are available in the place you work?

METERED TAXI

2.3.   Do you use public/communal transport to get from the place you live to the place you work?

NO

(If you answered 'no', please jump to QUESTION 3)

2.4.   If you answered 'yes' to question 2.3, which mode/s of transport do you use?

_____

_____

2.5.   For what reason do you use the mode/s of public/communal transport mentioned in question 2.4?

_____

_____

2.6.   Do you find the public transport system easy to use and understand?

_____

2.7.   If you answered 'yes' to question 2.7, what makes the public transport system easy to use and understand?

_____

_____

2.8.   If you answered 'no' to question 2.7, what makes the public transport system difficult to understand?

_____

_____

(Please jump to QUESTION 4)

QUESTION 3

3.1.   For what reason do you not use public transport?

THERE IS NONE !

QUESTION 4

4.1.   Seeing that office decentralisation has occurred in Durban, do you think it would be useful to link all the locations in the city where offices have appeared by a means of public transportation? Bearing in mind such a system would travel through residential areas.

YES

4.2.   Could you explain your answer to question 4.1?

LESSEN THE BURDEN OF TRAFFIC / POSSIBLY MORE COST EFFECTIVE.

4.3.   If you answered 'yes' to question 4.1: could you choose one of the following modes of public transport which you think would suit the task of linking the areas in which offices have appeared in Durban, and give a reason for your choice:

a)   A **fast rail link** whereby the train stations would be located in major business centres. An extensive, well organised and marketed bus system which would travel deep into surrounding suburbs would service the fast rail stations.

b)   A **Bus Rapid Transit Network** (BRT) functions like a train or subway system but makes use of existing roads. The point of this system is to maximise the efficiency of the busses by giving them dedicated lanes to travel on, with bus stops spaced fairly far apart at strategic points along the major routes. These stations would be serviced by other, smaller, busses to take people into the surrounding areas.

c)   A **Light Rail Network** would function in a similar way to a BRT system, but it would have a higher passenger capacity. Light rail, traditionally called trams or streetcars, can run on major routes with stops spaced fairly far apart at

strategic points which would be serviced by either busses or a localised light rail network. Trams run on rails and have the ability to travel on regular streets.

Your Answer:

(b)

4.4. Do you think linking the decentralised office areas by intensifying the development (increase population and business density) along existing routes between these areas in order to maximise the efficiency of existing public transport would slow the rate at which Durban grows geographically?

NO.

QUESTION 5

5.1. If a 'town centre' existed with work opportunities available in the area in which you live, would you choose to work there rather than at your present place of work?

NO

5.2. Please explain your answer to question 5.1:

OUR AREA IS STRICTLY RESIDENTIAL, AND I WOULD WANT IT TO STAY THAT WAY!

5.3. Would your perception of Central Business Districts change if they were known as "Central Activity Districts"?

NO

5.4. Please explain your answer from question 5.3:

JUST A NAME!

5.5. Do you think spreading economic opportunities throughout the city, including the creation of new economic nodes in previously disadvantaged townships like kwaMashu, Inanda and Umlazi, will be beneficial to both businesses and local residents?

I DOUBT IT

5.6. If you answered 'no' to question 5.5, could you explain your answer?

ITS ALL ABOUT PERCEPTION . . . TOWNSHIPS, ETC, WOULD STILL BE CONSIDERED AS 'UNSAFE' AREAS.

QUESTION 6

This question is directed at people who decide which location a company's office premises will be.

6.1. In what location are your company's office premises presently? (Please state the street and suburb/area)

9th AVE. MORNINGSIDE

6.2. Has your company ever had office premises in the Central Business District?

YES

(if you answered 'no', please jump to question 6.6)

6.3. If you answered 'yes' to question 6.2, could you give the time period in which your company's office premises were in the Central Business District?

2 YEARS.

6.4. If you answered 'yes' to question 6.2, could you give reasons why your company had offices in the Central Business District? (e.g. access to public transport; central to all employees; proximity to other companies; proximity to the harbour; need for face-to-face contact with clients etc.)

PROXIMITY TO HARBOUR, CUSTOMS, AND ALSO REASONABLY CENTRAL FOR ALL STAFFS.

6.5. If your company once had office premises in the Central Business District but now has offices in a suburban location, could you give reasons for your decision to move to the current location? (e.g. escaping "crime and grime"; building a corporate image in a stand-alone building; employee's car ownership; pursuing a more relaxed workplace etc.)

TRAFFIC, SAFETY OF STAFF (ESPECIALLY AFTER HOURS), CRIME, PROSTITUTION.

6.6. If your company has not previously had office premises in the Central Business District, could you give reasons for your choice in your company's current office location?

6.7. Please state whether you would consider moving your company to a new economic node in a previously disadvantaged area such as the one described in question 5.5, and give reasons for your answer.

NO. MY LOCATION NEEDS TO BE CENTRAL TO, AND PROVIDE EASY & TIMELY ACCESS TO THE PORT & AND CUSTOMS.

END OF QUESTIONNAIRE

Thank you for your time.

RESEARCH QUESTIONNAIRE

The subject of the research document I am currently writing revolves around office decentralisation. One refers to the 'decentralisation' of offices when they are found in different parts of a city. For example in Durban we have offices in the Central Business District, but we also have offices on the Berea, in Westville, La Lucia, Umhlanga, Kloof and Hillcrest.

Please answer the following questions honestly and to the best of your ability.
Please return them to me as soon as possible.

QUESTION 1

1.1.   Your Name (for my identification purposes only. It will not be disclosed in the research document)

1.2.   In which area/suburb/township do you live? (Please state the street and the area name)
MACKEURTAN AVENUE, DURBAN NORTH

1.3.   In which area/suburb/township do you work? (Please state the street and area name)
COWEY ROAD (PROBLEM MKHIZE) ESSENWOOD

1.4.   How far in terms of distance is the place you live from the place you work?
_10 KM_

1.5.   How long in terms of time during peak and off-peak periods is the place you live from the place you work?
20 min / 15 min

QUESTION 2

2.1. What forms of public/communal transport are available in the place you live? (e.g. train, metered taxi, minibus taxi, bus, car sharing)

_____

2.2. What forms of public/communal transport are available in the place you work?

___AS ABOVE_____

2.3. Do you use public/communal transport to get from the place you live to the place you work?

___NO_____

(If you answered 'no', please jump to QUESTION 3)

2.4. If you answered 'yes' to question 2.3, which mode/s of transport do you use?

_____

_____

2.5. For what reason do you use the mode/s of public/communal transport mentioned in question 2.4?

_____

_____

2.6. Do you find the public transport system easy to use and understand?

_____

2.7. If you answered 'yes' to question 2.7, what makes the public transport system easy to use and understand?

_____

_____

2.8. If you answered 'no' to question 2.7, what makes the public transport system difficult to understand?

_____

_____

(Please jump to QUESTION 4)

QUESTION 3

3.1. For what reason do you not use public transport?

1. CONVENIENCE . 17min TRIP BY CAR ± 45 BY TRANSPORT.
2. FLEXIBILITY . I CAN GO TO WORK AT ANY TIME.
3. USE OWN TRANSPORT FOR WORK - SITE VISITS ETC.

QUESTION 4

4.1. Seeing that office decentralisation has occurred in Durban, do you think it would be useful to link all the locations in the city where offices have appeared by a means of public transportation? Bearing in mind such a system would travel through residential areas.

NO

4.2. Could you explain your answer to question 4.1? LOW INTERCONNECTION REQUIRED.
I.E EVERY EMPLOYEE GOES HOME TO OFFICE
PROBABLY 1:50 EMPLOYEES GO OFFICE TO OFFICE

4.3. If you answered 'yes' to question 4.1: could you choose one of the following modes of public transport which you think would suit the task of linking the areas in which offices have appeared in Durban, and give a reason for your choice:

   a)   A **fast rail link** whereby the train stations would be located in major business centres. An extensive, well organised and marketed bus system which would travel deep into surrounding suburbs would service the fast rail stations.

   b)   A **Bus Rapid Transit Network** (BRT) functions like a train or subway system but makes use of existing roads. The point of this system is to maximise the efficiency of the busses by giving them dedicated lanes to travel on, with bus stops spaced fairly far apart at strategic points along the major routes. These stations would be serviced by other, smaller, busses to take people into the surrounding areas.

   c)   A **Light Rail Network** would function in a similar way to a BRT system, but it would have a higher passenger capacity. Light rail, traditionally called trams or streetcars, can run on major routes with stops spaced fairly far apart at

strategic points which would be serviced by either busses or a localised light rail network. Trams run on rails and have the ability to travel on regular streets.

Your Answer:

_____/_____

_____

4.4. Do you think linking the decentralised office areas by intensifying the development (increase population and business density) along existing routes between these areas in order to maximise the efficiency of existing public transport would slow the rate at which Durban grows geographically?

NOT SIGNIFICANTLY. I DON'T THINK AVAILABILITY OF PUBLIC TRANSPORT INFLUENCES DEVELOPERS'

QUESTION 5   DECISION AS TO POSITION OF NEW OFFICE PARKS ETC.

5.1. If a 'town centre' existed with work opportunities available in the area in which you live, would you choose to work there rather than at your present place of work?

NO

5.2. Please explain your answer to question 5.1:

THE CONVENIENCY OF OWN TRANSPORT WITH A 17 MIN TRAVEL TIME. SAVING 10MIN IS NOT SIGNIFICANT.

5.3. Would your perception of Central Business Districts change if they were known as "Central Activity Districts"?

YES.

5.4. Please explain your answer from question 5.3:

ACTIVITY IS NON SPECIFIC. THE HARBOUR IS AN ACTIVITY / WORKEND IS AN ACTIVITY DISTRICT THE BEACH FRONT IS AN ACTIVITY DISTRICT, ETC.

5.5.   Do you think spreading economic opportunities throughout the city, including the creation of new economic nodes in previously disadvantaged townships like kwaMashu, Inanda and Umlazi, will be beneficial to both businesses and local residents?

NO

5.6.   If you answered 'no' to question 5.5, could you explain your answer?

ECONOMIC NODES COULD INCLUDE FACTORIES, PANEL BEATING SHOPS ETC WHICH ARE NOT DESIRABLE IN RESIDENTIAL. REALLY! TRY TO PUT A PANEL BEATING SHOP IN FOREST DRIVE AND SEE WHAT HAPPENS.

QUESTION 6

This question is directed at people who decide which location a company's office premises will be.

6.1.   In what location are your company's office premises presently? (Please state the street and suburb/area)

COWEY ROAD   ESSENWOOD

6.2.   Has your company ever had office premises in the Central Business District?

YES

(if you answered 'no', please jump to question 6.6)

6.3.   If you answered 'yes' to question 6.2, could you give the time period in which your company's office premises were in the Central Business District?

45 YEARS

6.4.   If you answered 'yes' to question 6.2, could you give reasons why your company had offices in the Central Business District? (e.g. access to public transport; central to all employees; proximity to other companies; proximity to the harbour; need for face-to-face contact with clients etc.)

FACE TO FACE CONTACT WITH CLIENTS, RELATED COMPANIES - ENGINEERS / OUR ACCOUNTANTS / OUR BANK ETC.

6.5. If your company once had office premises in the Central Business District but now has offices in a suburban location, could you give reasons for your decision to move to the current location? (e.g. escaping "crime and grime"; building a corporate image in a stand-alone building; employee's car ownership; pursuing a more relaxed workplace etc.)

ESCAPING CRIME AND GRIME, MORE RELAXED WORKPLACE, NO LONGER NEED FOR PROXIMITY TO OTHER COMPANIES AND TRAFFIC

6.6. If your company has not previously had office premises in the Central Business District, could you give reasons for your choice in your company's current office location?

6.7. Please state whether you would consider moving your company to a new economic node in a previously disadvantaged area such as the one described in question 5.5, and give reasons for your answer.

NO. CRIME AND GRIME, ENVIRONMENT. IT WOULD BE A HOSTILE AREA FOR A "PREVIOUSLY ADVANTAGED" COMPANY. AFFIRMATIVE ACTION IS PROOF OF THIS.

END OF QUESTIONNAIRE

Thank you for your time.

A STUDY OF THE DECENTRALISED BUSINESS NODES OF THE POST-APARTHEID CITY OF DURBAN.

Toward a New Business District as Part of the Greater Durban Business System.

By

Jeffrey Timm

DESIGN REPORT
FOR
A Dissertation Submitted in partial
fulfilment of the requirements
for the degree of
Master of Architecture

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CONTENTS

CHAPTER 1   INTRODUCTION

1.1. INTRODUCTION

This design report follows on from the research document written by the author on the topic of office decentralisation in South Africa, questioning whether new office nodes are located in areas which benefit all communities. The research shows that the new office nodes are not located in areas which benefit all communities because the new nodes are located in suburbs which are already wealthy, whilst movement between residential areas remains restricted from stringent apartheid planning laws.

1.2. URBAN DESIGN CONSIDERATIONS

1.2.1. Greater City Context: Durban, South Africa

In terms of the greater city context, apartheid cities were spatially fragmented by design. This resulted in exaggerated distances over which people needed to move to get from place to place. In order to achieve this, planners used limited access freeways and railways as "urban umbilical cords" (Dewar, 2004: 13) to ensure fast movement within the city.

These routes all culminated at the Central Business District, which is where the bulk of the office-related jobs were found. Office decentralisation then occurred in a random fashion, depending only on road and freeway access, and on the developer's greed. This means that the decentralised offices are dissociated from one another.

In terms of Systems Theory, George Chadwick said that a system is a set of objects, together with relationships between the objects and between their attributes. Objects are the components of the system, attributes are the properties of objects, and the relationships between the objects make the system useful. It is easy to see how this relates to office decentralisation and the functioning of a city with multiple centres: all decentralised centres need to be linked with each other in order for the city to function as a single system.

An example of such a system would be Kevin Lynch's Radial System, whereby outlying nodes are connected by a circular transportation line, and transport lines from these nodes converge at the central business district – see figure 1 (Banerjee, 1990: 79-80).
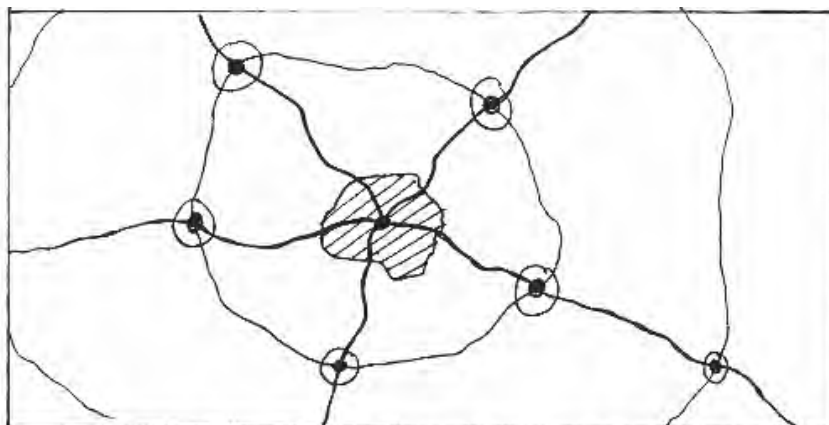
Figure 1: The radial system involves a single major centre. Minor centres occur at intersections of the major routes which lead into the major centre, and the minor routes which encircle the major centre (Author 2010).

In the case of Durban, if a public transport system were to be developed it would need to be convenient, reliable, safe and well marketed. It would not necessarily bypass the CBD, but it would need to have routes that operate suburb-to-suburb, as opposed to suburb-to-CBD-to-suburb. It would also need to be fast, flexible and operate on a regular schedule.

1.2.2. Micro Context: Urban Design

The research from document one calls for the creation of a town centre-type development which is located in an area which is easily accessible to communities who need access to job opportunities, as well as transport services.

This implies locating the site within, or near a previously disadvantaged township. In order for a development like this to work, however, other income groups will be required to provide employment for those who have not had as fortunate upbringings. It is therefore suggested that the site be located in a buffer strip left by apartheid planners as a means of separating communities of different races and income groups. These buffer strips present the perfect opportunity to bridge physical barriers between communities in South African cities.

The site should be in a location which needs economic activity, as it has been noted in the theoretical case studies that office decentralisation has not occurred in areas where it is needed the most; therefore the site should be in a location which is devoid of economic activity.

The site should appeal to both large companies and Small, Medium and Micro Enterprises (SMME's) in order to lift the economic state of the area which is devoid of economic activity, many types of businesses need to be accounted for in order to move up the commercial ladder, and the development of the urban fabric of the site should support such advancement.

The site should be in a location which needs a form of mass public transportation as it has been argued that any modern city needs mobility to function efficiently. Mass public transport in South Africa was granted to the disadvantaged black population, so in order to include them in an undertaking of economic advancement, a form of mass public transport needs to be incorporated into the scheme. Also, there is a negative view by those who can afford private cars towards mass public transportation in South Africa because public transport was only given to the disadvantaged black population. This public transport should provide direct links to other decentralised office nodes in the city.

The urban design should follow, as closely as possible, the New Urbanism model of development. This allows a much more integrated, mixed-use approach to urban planning. This is a concept which counters Modernist planning – on which apartheid planning is based – because it does not separate uses into "neighbourhood units." It is a much more pedestrian-friendly environment because buildings are of a higher density than suburban-type development. It also supports public transport because of the increased critical mass of the area.

1.2.3. Summary and Conclusions

According to Systems Theory, it is the relationships between objects which make the entire system useful. If this is considered in the South African city context, decentralised office nodes are not connected in an efficient manner, which makes the city as a whole inefficient. It also means that all nodes are not accessible to all of the population thereby disadvantaging many by the lack of opportunities available in their vicinity. In the South African city's case, this generally means that the African population is further disadvantaged by movement of office employment opportunities to residential areas which they were previously restricted from entering, rendering their situation worse off.

The author proposed two urban interventions for the city of Durban. The first is the creation of a new, decentralised mixed-use residential and office node in a location which favours the previously disadvantaged African communities. This node should be designed by the principles of New Urbanism, and should cater for large and small businesses.

The second intervention is to create direct links between the new and existing decentralised office nodes in the greater Durban area by way of fast and reliable public transport, in keeping with Systems Theory.

1.3. JUSTIFICATION OF BUILDING TYPOLOGY

1.3.1. Introduction

Although the urban design sector of this project will be an important one, it is the building which will be of utmost importance because it will have to showcase all of the theories discussed in the research document and the design report.

The proposed building typology is a:
Multi-Modal Transport Interchange and Business Incubator

1.3.2. Justification of Transport Interchange

The very idea of a transport interchange is one of the convergence of many, many people. This is, in essence, what this research is about. It is about bringing physically separate

communities together by reaching out to them in order to unite them. The urban scheme will provide office space, and if public transport is to be prioritised in the new centre and the city as a whole, there needs to be a place where all of the various modes converge.

1.3.2.1. Railway Station

This is the mode of transport which will connect the new decentralised node to the rest of the city. It will bring the largest number of people to the site because it has the capacity of doing so. Efficient mass public transport is what South African cities need in order to counter the heavy reliance South Africans place on private vehicles.

Railways are also the mode of transport which the most disadvantaged members of society have access to, which, by including a railway station in the building typology, will grant them access to new economic opportunities.

1.3.2.2. Minibus Taxi Rank

Minibuses are a symbol of black economic empowerment during the apartheid period (Smith, 1992: 182). Taxis form an integral part of the public transport system in South Africa and need to be included in any decision on the development of transport interchanges because they carry a very large number of passengers. The problem with taxis is that they do not run on a schedule which makes them inconvenient for predictable journeys.

Taxis currently run in competition with the railways. This should not be the case is this is detrimental to both industries. It also adds to traffic congestion on freeways because taxis make further trips than necessary due to the availability of railways. The safety of passengers is also a concern, as well as the environment due to many additional vehicles on the roads.

It is for the symbolic reason of black economic empowerment that minibus taxis are included in the building. It is also a practical decision because it may allow less competition between taxis and trains because they are integrated within a building. Taxis bring lower income users to the interchange.

1.3.2.3. Bus Rapid Transit Station

Although there is not a Bus Rapid Transit (BRT) network in Durban, the author proposes there should be. Based on the public transport issues in the city, and the challenging terrain, it is the cheapest and possibly the most effective option because it makes use of existing road infrastructure.

BRT is marketed as a dignified means of public transport. It functions like a subway train system because it runs on a defined, segregated road to a predictable schedule. It is intended in this proposal to use a BRT system to entice the population who can afford to buy private vehicles to choose to use public transport instead.

1.3.3. Justification of the Business Incubator

Business incubators are generally non-profit organisations which provide non-financial assistance to small entrepreneurial businesses. They provide space at an affordable rate in which companies can conduct their business, as well as guide the development of these businesses for between three- to four years, after which time they 'graduate' from the incubator and go out into the business world on their own.

It was decided to add a business incubator to the project because the site location affords such an opportunity due to the proximity to communities which are not equipped with skills which would enable them to rise out of the harsh financial and social predicaments they are in. A business incubator can also be used as the first rung of the business ladder in the urban scheme.

It was decided to place the business incubator in the same building as the transport interchange because it affords maximum access to the clients (tenants) of the business incubator, but also to their prospective clients. It would also provide entrepreneurs maximum exposure whilst starting their business due to the vast numbers of people who would pass through the interchange every day.

1.3.4. Summary and Conclusions

The decision to design a multi-modal transport interchange in a location which is located between communities which are physically separate, and of different demographic backgrounds and income groups provides an ideal opportunity to allow them to blend.

The integration of differing modes of transport is intended to cater to different markets and differing distances to travel.

The business incubator is intended to be seen as the first rung of the business ladder in the urban scheme. It is intended as a form of education for those who are from disadvantaged backgrounds who want to better themselves and rise out of the predicament they were left in due to apartheid laws and planning.

The proposed building is intended to break barriers and become a place where all racial and income groups converge.

**CHAPTER 2   BUILDING TYPOLOGY: TRANSPORT INTERCHANGE AND
            BUSINESS INCUBATOR**

2.1. THE IDEA OF A MODAL INTERCHANGE

"Our transportation options define city form, shape living patterns, underpin economic efficiency, and help realise social equity." For users in the cities of developing countries, public transport is often the only cost-effective option for accessing jobs and public services. For cities in developed countries, public transport is increasingly seen as a means of addressing traffic congestion, local air quality, energy security, and global climate change (Wright, 2010: 269).

A modal interchange is a place or building where multiple modes of transport converge. For example, the building could be the link between a Bus Rapid Transit network, minibus taxi routes and a railway. A building of this type allows itself to be a hive of activity which, in turn, can be seen as a catalyst for urban development.

The human activity present in a modal interchange affords the ideal platform for retail and start-up businesses; therefore the interchange should cater for these. Space for start-up businesses should take the form of a Business Incubator, a model which will be discussed later in this chapter.

The following building typologies will be discussed in order to form an understanding of the overall building typology which will be designed.

2.2. RAILWAY STATION

Railway stations have played important roles in city formation and transportation for more than 150 years. They are functional public buildings which are viewed as landmarks, points of entry into, and points of exit out of urban areas. They are places of happiness upon greeting whilst simultaneously are places of sadness upon saying goodbye. Below will discuss in brief the history of railway stations, then principles to be adopted when one is designing one.

2.2.1. A Brief History of Railway Stations

With the invention of the steam locomotive in 1830, the railway industry exploded into many companies who provided rail-base transportation services (Holland, 1971: 35). "The railway companies built to last. Their buildings remain amongst the most massive and enduring structures of the nineteenth century" (Binney, 1979: 6).

The nineteenth century major city railway stations were a direct product of the Industrial Revolution. The building types were innovative, monumental in scale and were "unparalleled in their impact on the city scene." For the first time large numbers of people were able to travel rapidly between towns and cities which was "an extraordinary social phenomenon" (Binney, 1979: 24).

There became a hierarchy of railway station types because each had varying levels of importance as a result of the numbers of people who passed through them:

- Major Stations: These formed the terminus of railway lines in inner city locations. These buildings were opulently celebrated because they were the first and last port of call for any person travelling into or out of the city. For this reason it is a requirement of these stations to reflect the principles of the city.

- Suburban Stations: These are an intermediate size station between those of major and rural. The suburban station is important because they have the opportunity to use place-making architecture in a location which is devoid of quality public buildings. This station type will serve people who do not usually use trains because they have private vehicles. Usually the railway tracks are on the surface in these areas which divides the suburban landscape, and stations form the link between the divides.

- Rural Stations: These stations link the rural location to the bigger city thereby being the point of potential growth for the area. These stations are usually the focal point for social and business meetings, and are tourist information centres.

Modern stations remain "one of the most important modern building types. They perform a variety of functions, besides giving access to trains: they are shopping malls, meeting places and urban landmarks" (Edwards, 1997: vii).

2.2.2. Design Principles of Railway Stations

2.2.2.1. Function

Brian Edwards says that the modern railway station is a place where tourists, commuters, salesmen, retailers, train spotters and the homeless converge, and that the station is a microcosm of the city in that it has the strengths and weaknesses of the urban whole which are all packaged under one roof. The railway station is the point in the city which has the greatest variety of land uses in the smallest, most intense enclosed area (Edwards, 1997: 21).

Regarding whether the Information Technology era in business has reduced the need for the mass movement of people in cities, Edwards validates the railway's role and

the importance of moving people around the city by saying that this "movement of people is essential to conducting business, engaging in social contact, and contributing towards cultural well-being" (Edwards, 1997: 25). He also says that transport is not a luxury, but is an essential component of the modern age (Edwards, 1997: 25).

Railway stations are urban gateways and landmarks. Stations form gateways for "floods of arriving and departing passengers, who do not usually stay long in stations but experience them in passing" (Edwards, 1997: 25). As opposed to art galleries or shopping malls which people travel *to*, stations are buildings which people travel *through*. In terms of social responsibility, "the station has the task of humanising mass transport – of giving journeys a dignified beginning and end" (Edwards, 1997: 26).

Edwards says that stations are important economic catalysts which have in the past led to large scale urban development or redevelopment of previous slum areas (Edwards, 1997: 17).

2.2.2.2. Light, Structure and Detail

Light, structure and detail are used to guide passengers through various levels and in different directions in complex stations. Details near eye level give legibility to interior spaces whilst structural rhythms of columns or beams indicate preferred routes and give clear direction to organisational or spatial hierarchies. Light, especially daylight, has the ability to focus attention on important spaces such as ticket halls, or leading passengers toward platforms and entrances (Edwards, 1997: 98).

Structure and light are inseparable elements because structure is expressive whilst light highlights important aspects of the building, and structure usually plays an important role in the spatial organisation of stations (Edwards, 1997: 98).

There are usually two levels of lighting in stations. The core areas should be brightly lit whilst platforms should be less bright. The brightly lit core will naturally attract passengers disembarking trains in that direction (Edwards, 1997: 81).

The architectural expression of the station must guide passengers to avoid the use of signs and direction boards. Light, structure and detail must be used most notably in the most highly trafficked areas in order to avoid disorientation. This often occurs at stairs and escalators due to changes in direction or level (Edwards, 1997: 99).

2.2.2.3. Circulation

The station is a large building, and it must make smooth connections to the urban fabric in which it sits. "Travellers must be presented with clear routes to pedestrian ways, access roads, car parks, taxi ranks, bus stops etc." Architectural language must be employed on the external facade to communicate entrances with the surrounding urban fabric (Edwards, 1997: 64).

The station layout should be such that sightlines in the mayor circulation areas are not obstructed and the widths of routes should determine their relative importance in the circulation system (Edwards, 1997: 64).

Movement paths should be segregated. There should be different routes and entrances for passengers who are arriving and departing, and pedestrian, car and bus movements should be placed in separate zones. Where cross-flows occur, pedestrians must have right of way in an obvious manner (Edwards, 1997: 65).

There is a progression through four zones within the station:
- The arrival point;
- The access and ticket zone;
- The commercial and waiting zone;
- The platform and boarding zone (Edwards, 1997: 114).

There needs to be a clear path from the ticket hall to the trains without obstruction. The most important features, such as the ticket office, need to be given the strongest architectural form whilst the language of design should show functional hierarchies (Edwards, 1997: 66).

2.3. MINIBUS TAXI RANK

2.3.1. A Brief History of the Minibus Taxi Industry

Before 1976, the apartheid government had a policy of "one-man-one-business" whereby African traders were only allowed to own a single business in African townships, and they were not allowed to form partnerships in order to share capital to create a large, more profitable business (Smith, 1992: 182).

Together with this, those African taxi operators who managed to become legalised were restricted to carrying five passengers but were often harassed by traffic officials and their vehicles confiscated for petty offences (Smith, 1992: 183).

Becoming a legalised taxi operator was an extremely difficult process. It was for this reason that many taxi operators resorted to pirate operations. This resulted in "taxilords" who usually only owned one or two cars because this was the limit the government gave Africans in owning vehicles (Smith, 1992: 183).

After the Soweto uprising in 1976, the government's policy toward the taxi industry shifted from repression to tolerance. As stated, African taxis could prior to this event carry up to five passengers. Following this change in stance from the government taxis were allowed to carry up to eight passengers plus one driver. These vehicles were known as "8 + 1s" (Smith, 1992: 184).

In 1980 the government established a commission of enquiry with the aim of "depoliticising" transport in South Africa. The two arguments heard at this enquiry were the bus operators whose market had been heavily eroded by the African taxi industry, whilst the second was the capital available which favoured deregulation (Smith, 1992: 184).

In October 1980, taxi operators converged in Orlando to put up a united front in order to stand up for their industry. Resolution was reached, and the Southern Africa Black Taxi Association SABTA) was formed by the merger of various regional taxi associations (Smith, 1992: 184).

Between 1982 and 1990, membership to SABTA rose from 20,000 to 50,000. In 1992, SABTA represented 400 local, 45 regional and five provincial taxi associations (Smith, 1992: 184).

By 1989 the taxi industry had captured the largest share of the African commuter market which resulted in a dramatic reduction of the number of passengers using buses and trains (Smith, 1992: 187).

The taxi industry was always marginalised by planning laws and government design briefs. It has not been until recently that taxi ranks have been given a sense of dignity and permanence in South Africa's cities. Examples of these will be discussed as precedent and case studies later in this document.

2.3.2. Design Principles of Taxi Ranks

As with all public transport nodes, there are several design principles by which a taxi rank should be built, although there has not been much written on the subject. Precedent studies

will be used to illustrate the most practical examples and ideas later in this document, but for the purpose of this subchapter the following basic principles are suggested by the author.

Seeing that it is road-based form of transport, at the ranks taxis and pedestrians will be sharing the same space. For this reason much attention must be paid to the separation of these routes, and how their crossing points are treated.

Vehicular circulation within the rank must be as logical and as smooth as possible, with clearly defined entrance and exit points.

The rank should also accommodate trading space. As with all transport interchanges, the allowance for trading is an important one due to the vast numbers of people who pass through these building typologies.

Other principles pertaining to taxi ranks will be discussed in precedent studies later in this document.

2.4. BUS RAPID TRANSIT (BRT) STATION

2.4.1. The Idea of BRT Networks

Bus Rapid Transit was developed to provide a railway metro-like speed, capacity and amenity features but at a fraction of the cost (Wright, 2010: 270).

Bus Rapid Transit is a high-quality bus-based public transport system which:
- utilises separated rights-of-way;
- provides rapid and frequent services;
- uses integrated routes and corridors;
- has secure and weather-protected stations;
- uses sophisticated fare and information systems;
- uses clean vehicle technologies;
- has ease of access for pedestrians; and
- has good marketing and customer services (Wright, 2010: 270).

The idea was perfected in the Brazilian city of Curitiba in the 1970's when the city was investigating the development of a railway metro, but funding was an issue. The then mayor of the city said later "Sometimes when you have no money, you learn to be creative" (Wright, 2010: 270). Curitiba's BRT is so successful because it was integrated into the urban master plan of the city where development was densified along the BRT routes in order to increase the population who would use the system.

The reason BRT is so cost efficient is because uses existing road infrastructure. The busways are segregated lanes from private vehicle traffic, usually in the centre of the road. This increases the buses' efficiency and ability to run on a set schedule – something which minibus taxis do not do. This ability allows members of the public to plan their lives to maximise their time of doing things apart from travel. Minibus taxis depart only when they are full, as opposed to a set schedule, which means travel time is lengthened unnecessarily. As stated previously, time spent travelling is time not spent doing more important things, such as work or study which are means of advancing the social and income ladder.

BRT networks are present in many, many cities around the world, including Johannesburg and Cape Town. Durban does not have a BRT network, the author proposed there should be one due to the cost-effectiveness, and ability to use existing infrastructure to provide a predictable public transport system which the public can rely on.

2.4.2. Design Principles of BRT Stations

As mentioned above, the idea of Bus Rapid Transit networks is to function like an urban railway network, and the stations need to speak of this level of sophistication, functionality and efficiency. The design criteria for BRT stations include the following:

- Stations should also have a distinctive design to show that BRT is a high-class system.
- They should provide universal access to buses. Ramp access to the station from street level so that passengers board level with the bus floor.
- They should shelter passengers from rain and sun, but should operate without air-conditioning.
- Adequate space for boarding should be provided, as well as waiting which should have seating available.
- Pre-boarding fare collection should be a feature in the station in order to allow very rapid passenger boarding times.
- Security, durability of materials, lighting and travel information should also be taken into account (www.gzbrt.org).

It can be seen that a Bus Rapid Transit network is a cheap alternative to an urban rail system, yet is fulfils the same purpose of moving large numbers of people in the most efficient, organised fashion, and station design is imperative in making this level of efficiency possible.

2.5. BUSINESS INCUBATOR

2.5.1. The Idea of Business Incubators

A business incubator is an economic development tool which aims to accelerate the growth and success of entrepreneurial companies. These programs provide business support and resources to companies which are starting out. The ultimate goal of the business incubator system is that the tenants will become freestanding and financially viable (www.gov.mu).

Generally, a business incubator is a physical location which provides a set of services to entrepreneurial companies. These services may include a specific type of office space, flexible lease terms, access to technology, financing and technical assistance such as marketing, legal services, human resources and other business development services. The intention of business incubators is to place complementary companies in close proximity to each other in order to promote the transfer of knowledge. These programs are an approach to accelerate the development of technologies, industries and business skills in developing countries (Davies, 2009: 5). Mark Davies notes, however, that the needs of communities in developed countries are often radically different to the needs of those in developing countries.

Generally business incubators will assist their tenants for between three and five years, after which time they will be required to move out of the incubator and into the formal sector.

2.5.2. Business Incubators in South Africa

As a result of the apartheid system, the majority of the population in South Africa have very limited means of gaining skills to be employed by, or to start a business in, the formal economy. "It is almost impossible for SMME's to obtain markets from big businesses outside of BBEE opportunities" (Seda-eThekwini Annual Report 2009/2010: 5). Seda has indicated that the informal economy is saturated, and that some informal traders have been in the same place business-wise for many years. There are several agencies which run business incubation programmes in South Africa. Seda-eThekwini and Smart Xchange are two of them and will be discussed as case studies later.

2.5.3. Design Principles of Business Incubators

The success of business incubators lies in the following:
- The volume of companies involved in the programme is important because this will lead to natural clustering and collaboration;
- Entrepreneurs will learn more from each other, and other businesses, than consultants;
- Combining start-ups with mature companies in the same buildings encourages collaboration;
- Diversified models of incubation and office rentals keeps programmes sustainable and independent;

- I the incubator is not 100% publicly funded it will remain focused on tenants and services provided to them; and
- Strict entry criteria which are focused on innovation and implementation can ensure high success rates
- A strong manager who monitors both mentors and companies is vital;
- From the outset, incubators create a climate of collaboration and networking (Davis, 2009: 6).

Because each incubator focuses on a different industry, trade or commercial sector, there are many configurations of building typologies of business incubators. Some may be in a complex of incubator buildings, where each building specialises in a specific trade. For example at Seda eThekwini there is a fashion school on the level above a bakery training facility, and in the next building is a shoe maker, and in the next is a haberdashery training centre which has a toilet paper maker as a neighbour. All of these trades are in the same complex.

It may seem chaotic, but the incubator management team helps guide each entrepreneur into the formal sector. For example those learning to bake in the baking training facility at the incubator work for Total petrol station bakeries.

Other business incubators, such as Smart Xchange, focus on a different clientele. They have a single office building in Durban CBD which has been divided into private office suites for entrepreneurial companies but have communal facilities such as meeting rooms and photocopy facilities. The entrepreneurial companies under the guidance of Smart Xchange are related to the Information and Communications Technology (ICT) sector, so they are more likely to benefit from one another in terms of knowledge sharing and growth than Seda eThekwini.

Basic design principles of business incubators would therefore be:
- The building or complex needs to have a communal, networked, feel in order to encourage social and business networking;
- New and mature companies should be mixed up within the building or complex in order to promote networking and knowledge sharing at different stages of the programme;
- Communal meeting rooms need to be provided in order to cater for the businesses, but also for NGO and sponsor meetings;
- Office space needs to be flexible due to short or no lease agreements in order to avoid costly alterations to office partitions;

- Because business incubators are essentially places for learning, training rooms need to be provided; (Davis, 2009: 21-25)
- There is a need for on-site management and administration.

2.6. SUMMARY

This chapter discussed the three different functions, railway station, taxi ranks, BRT station and business incubator, which need to be in the final building. It was important to discuss in brief the theory behind each function, and how they each work in terms of its own sub-functions in order to understand the design criteria for each.

The next chapter will discuss precedent studies conducted on railway stations, urban designs and Bus Rapid Transit stations.

CHAPTER 3   PRECEDENT STUDIES

3.1. RAILWAY STATION: LEIDEN STATION, NETHERLANDS

The reason this station is being used as a precedent study is because of the way in which the main entrance addresses the public space in front of it and the type of development which is around it. According to Brian Edwards, bus and rail services need to be integrated in order to encourage people to abandon their cars. Leiden station is a good example of the integration of these modes.

3.1.1. Addressing Public Space

Plate 1: This image shows how Leiden Station addresses the public square in front of its main entrance. It also shows how buses, bicycles and pedestrians have right of way in this area (Google Earth, 2011).

As can be seen in plate 1, the main entrance of Leiden Station addresses the public square in front of it by having a larger-than-necessary facade. This facade is large, but it is a modular framework of steel which gives the building and public space a sense of scale and proportion.

Surrounding buildings are a mixture of high- and low rise, with cafes and flower sellers spilling out onto the pavements. It is clear in plate 1 that buses and cyclists have right of way in the streets whilst private vehicles are diverted to other routes.

3.1.2. Integration of Train and Bus Services

Figure 2: This image shows how Leiden Station addresses the public square in front of its main entrance. It also shows how private vehicles are diverted to other routes whilst buses circulate to their parking and arrival/departure area which are obscured from view of most of the public square. (Google Earth, 2011).

The integration of train and bus services at Leiden Station is an important one. Each service separately plays an important, yet different, role in the movement of people about the city and local community. The way in which Leiden Station deals with these modes is in interesting one. The entrance to the station has been given prominence by terminating the visual axis from the square and street in front of it (see Plate 1) whilst the buses are taken around the corner and out of view until a viewer is standing directly in front of the station entrance. This is a clever way of creating spatial hierarchy, although this hierarchy may not be the best solution to integrating the different modes of public transport with the urban fabric because the modes of lesser prominence may suffer from under utilisation due to poor public image.

3.1.3. 2010 Urban Design Proposal by Maxwan Architects

Maxwan Architects proposed in 2010 a master plan intended to transform the Leiden Station and its adjoining precinct from a typical railway station area to a vibrant new high-density
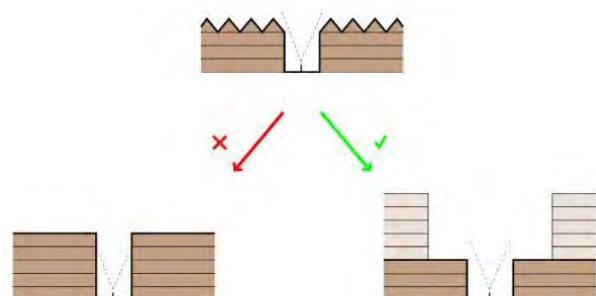
Figure 3: A diagram showing how high-rise buildings should be set back from the street to allow natural light to the street. It is a way of combining traditional low-rise development with the modern necessity of high density high-rise development (www.archello.com).

neighbourhood which would strengthen the connection between the historic city centre in the south and Leiden's Bio-Science district in the north.

Figure 4: These diagrams illustrate the existing urban linkages in the precinct around Leiden Station verses the proposed urban linkages. Notice how the proposal links with surrounding areas including across the railway line. Also how the city blocks are transformed into pedestrian streets (www.archello.com).

Of primary importance to the designers was to create a natural transition from the historic centre to a new high-density neighbourhood whereby the street network has a similar grain and scale in the manner in which new buildings were designed. "By combining low street facades with set back high-rises, high density is created while attractive light streets, squares and green spaces are retained" (www.archello.com).

Plate 2: A 3D rendering of the urban proposal. New buildings are white, existing buildings are grey, and the station is brown. Notice how it has been densified most around the station entrance and public square (www.archello.com).

The urban plan comprises 1000 residential units, business incubator premises as well as large international firms. There would also be an extension to a major shopping centre in the area, intelligent parking solutions and a new transport hub consisting of an indoor bus station and a light rail station. There would also be enhanced connections for pedestrians and cyclists at street level between the two sides of the stations. These routes

Plate 3: A 3D rendering of the urban proposal showing the public square. This rendering also shows the manner in which buildings will be set back from the street to allow daylight to reach the streets. (www.archello.com).

would be kept separate from cars, buses and trams which would make a safer pedestrian experience (www.archello.com).
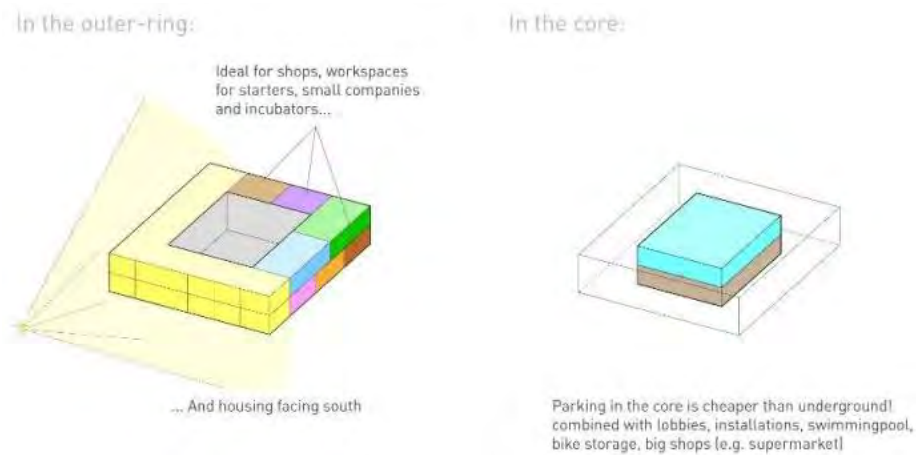
Figure 5: Diagrams showing how the bases of the buildings would be utilised. Noting that the Netherlands are in the northern hemisphere, the proposals here would be reversed for the southern hemisphere. For example housing would be north facing as opposed to south facing as shown in the illustration (www.archello.com).

This is the type of development which the author is looking at in terms of urban design and functional requirements for both the urban design and building typology design phases in this project and the urban proposal discussed in this chapter provides valuable information in terms of parking solutions, building typology and building street set-backs in order to maximise the pedestrian experience at street level. It also speaks of making the station the focal point of the development, as well as introducing linkages to surrounding areas, which is the basis of the author's urban design intentions.

3.2. RAILWAY STATION: WATERLOO STATION, LONDON, UNITED KINGDOM

3.2.1. Introduction

Waterloo Station is an international railway terminal in London which is used by the Eurostar high speed trains which link United Kingdom, France and Belgium via the Channel Tunnel. The station existed previously, but Nicolas Grimshaw added to it in 1993 in order to include the international terminal. The Eurostar international terminal was moved from Waterloo Station to St. Pancras station in 2007. Sadly the tracks previously used by the Eurostar at Waterloo are not in use (news.bbc.co.uk).

The purpose of using Waterloo Station as a precedent study is not to illustrate how international railway terminals function, but how light and structure are used in stations to create a theatrical experience.

3.2.1. Light

Brian Edwards said that one of the primary requirements of railway station design is the use of natural light to give the traveller an uplifting experience whilst in the station building. He also said light should be used to give the station legibility without having to rely on signage (Edwards, 1997: 98).

Waterloo International Station illustrates how natural light can be used in such a way that creates a sense of arrival and amazement. It also becomes a theatrical experience because the trains are silhouetted against the clear glass which provides a rhythm when trains are in motion.

3.2.2. Structural Detailing

The structure of the shed roof covering the station platforms has been made at light as possible in order to maximise the view through the station. " A new wall rigged exactly like the mast of a yacht provides as near transparent a view as possible from the concourse level of the main part of Waterloo Station across to the new terminal" (Aldersey-Williams, 1994: 96).

Plate 5: A view of the exterior structure of the glass roof at Waterloo Station (Davey, 1993: 35).

existing roof structure

bow string column

12 mm toughened glass

stainless steel casting

service mezzanine

passenger information board

ticket concourse
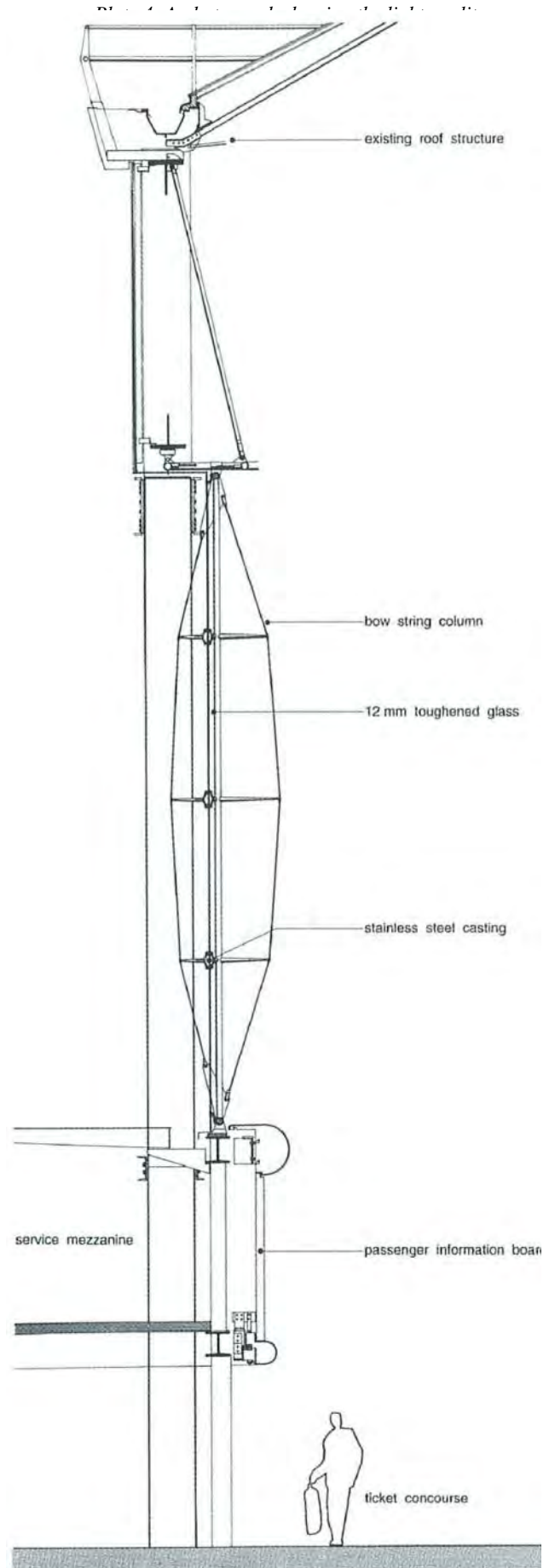
Figure 6: A detail of the wall between the main Waterloo Station and the new international area. It has been designed to maximise views into the new area (Aldersey-Williams, 1994: 96)
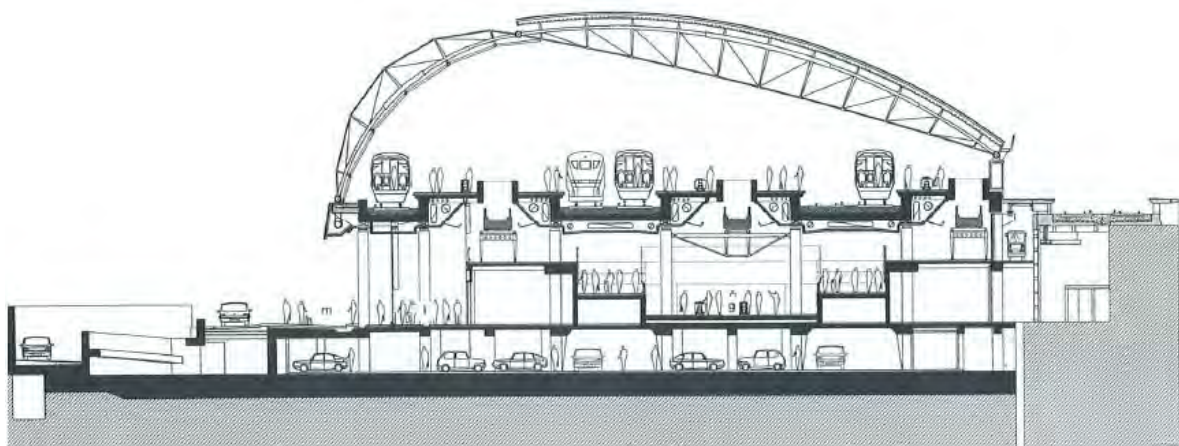
Figure 7: A section through the circulation areas in Waterloo Station. Notice the structural detailing in the design of the roof structure (Davey, 1993: 32).

3.2.4. Summary and Conclusions

It is a great pity that Waterloo International Station is now disused because the architecture is an amazing feat of engineering in order to provide a huge, unobstructed platform area with the drama of having a glass wall feature so that passengers can see out of the building whilst waiting for their train, but also the movement of trains against this window creates a sense of activity. This large expanse of glass adds to the uplifting feeling which is required in station design.

The detailing in Waterloo International Station is aimed at providing the space with an uncluttered, unobscured feeling throughout. It is a lightweight steel structure which does disappears into the background because it allows the space to be the most important element.

3.3. TAXI RANK: METRO MALL, JOHANNESBURG, SOUTH AFRICA

3.2.1. Introduction

In 1999, Metro Mall Development Framework was prepared and formalised. This framework was part of an urban-renewal initiative for Newtown, which was an area within the Johannesburg inner city which had declined into an "urban wasteland" (de Jager, 2003: 40). The Metro Mall project was seen as one which would form a catalyst for the link between Braamfontein to the north with the Newtown Cultural Precinct to the south.

Plate 6: Metro Mall's distinctive architecture, emphasised entrances and robust materials (de Jager, 2003: 43).

3.2.2. Functional Requirements

The Metro Mall building typology is a combination of

bus ranks, minibus taxi ranks, formalised street traders, retail outlets and office space for building management staff.

The building brief called for ranking for 25 buses which served 35 different routes, holding facilities for 2000 minibus taxis – with differentiated areas allocated to each taxi operator and association – with sufficient ranking and loading space. It was estimated that 100,000 commuters would use Metro Mall's transport facilities. (de Jager, 2003: 40).

Together with the transport facility, Metro Mall needed to accommodate 800 traders and retailers. (de Jager, 2003: 40).

3.2.3. Design Resolution

Metro Mall is spread over two sites, across the road from one another. The designers, Urban Solutions Architects + Urban Designers, labelled these "Land parcel C" and "Land parcel B" respectively (de Jager, 2003: 40).

Figure 8: The ground floor plan of Metro Mall land parcels C (to the left) and B (to the right). Notice how the taxi ranking is located on the inside whilst trading occurs along the street fronts (de Jager, 2003: 41).

Land parcel B uses an existing four-storey parking garage, and this is used mainly as the minibus taxi holding component, with traders on the ground floor along the street fronts. Commuter loading is provided on the western side of this building where additional trading stalls, food courts, recreational areas and transport association offices are located (de Jager, 2003: 41).

Land parcel C is a totally new building which accommodates a similar function to that of Land parcel B, but on a much larger scale and over three levels. This structure caters for the bus rank, minibus taxi rank, management offices, storage facilities for the traders, recreational ablution facilities for the various taxi and hawker associations, offices for the various bus companies and the Metropolitan Trading Company which manages the complex (de Jager, 2003: 41).

Metro Mall is designed around basic inner city building principles. Transport functions are internalised and hidden from view whilst retail and trading occur externally, which activates the street.

Plate 7: An oblique view of Metro Mall minibus taxi holding facility. Notice how, even though it is predominantly a parking garage, the street is activated by the way the facade is broken up into what appears to be separate buildings, as opposed to one long flat wall (de Jager, 2003: 42).

Apart from the logistical organisation of the buildings themselves, the basic design principles of both land parcels are to complete "the street grid to enable the continuity of movement; supporting public mobility via various transport modes; promoting mixed-use and urban opportunities; observing street boundaries in construction of perimeter buildings with active street edges; and acknowledging the street as a public space, allowing equal opportunities of access and freedom of movement" (de Jager, 2003: 41).

3.2.4. Summary and Conclusions

Metro Mall provides a sense of dignity of the previously marginalised activity of trading, and the public transport mode of the minibus taxi. Materials used are robust to indicate a sense of permanence in these activities. Entrances to the buildings are emphasised to provide urban landmarks.

Metro Mall is a public facility which illustrates a level of acceptance of previously marginalised activities, whilst promoting the activation of street fronts by placing the active edges facing outward, as opposed to inward which suburban malls are famous for doing. This is a bold step by the designers in this regard because the suburban malls turn their backs on their surroundings, whilst Metro Mall feeds its surroundings with activity.

3.4. BUS RAPID TRANSIT STATION: GUANGZHOU, CHINA

Although this study is intended for the actual BRT stations and road modification and design in Guangzhou, a brief introduction of the city is required in order to provide context for the design of the stations and roads.

Guangzhou is a rapidly growing city in China. In the year 2000 it was home to 6 million people, and in 2010 it was estimated that it was home to 13.25 million (www.demographia.com). This makes it China's third most populous city.

With this rapid urban expansion the city needed to expand their public transport network in order to handle the extra volume. The city already had a high speed railway and an underground metro railway network, but there was still congestion in the city so the municipality implemented the world's second largest BRT network which began operating in February 2010 and it currently makes 800,000 passenger trips per day (Fjellstrom, 2010).

Although Guangzhou's BRT stations are some of the largest in the world – around 260m (Fjellstrom, 2010), lessons can be learnt from how they are integrated into the urban fabric, how they are accessed by pedestrians, and how one should roll out an effective BRT network.

Plate 8: The Guangzhou BRT stations. Notice the high density development around the stations. This supports public transport usage and makes the network viable (www.gzbrt.org).

Plate 9: The Guangzhou BRT stations are placed at existing urban features, such as public squares, parks and pedestrian crossings as well as train stations. This helps to tie the BRT network into the existing urban fabric (www.gzbrt.org).

3.4.1. Guangzhou BRT Stations

Guangzhou is the first BRT system in Asia to determine station size by station demand. This resulted in station lengths ranging from 55m to 260m (Fjellstrom, 2010).

The stations have been designed based on the BRT bus frequency at each station, the numbers of boarding and departing passengers at each station, and the number of waiting passengers for each route at each station.

Plate 10: A BRT station at night. Waiting benches and travel information can be seen in this image (www.gbrt.org).

Due to the large passenger volumes, the BRT stations are divided into 'modules' or 'substops'. A substop is a section of the station which operates as a separate stop which

usually has space for two BRT buses to queue in addition to the 15m in and out slipways. The substop with space for two buses effectively doubles the capacity of the single stop (www.gzbrt.org).
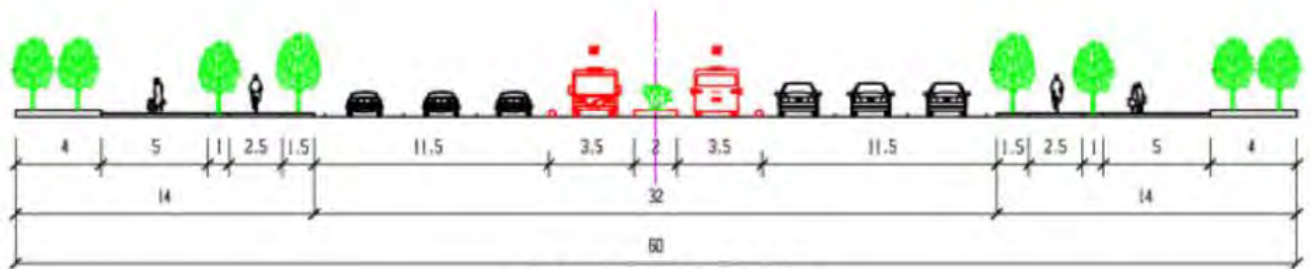
Figure 9: Section showing road spacing for Guangzhou's BRT network. Between station intervals. Notice single lanes available for BRT. Units are metric (www.gzbrt.org).

中山大道BRT标准路段断面图

Figure 10: Section showing road spacing for Guangzhou's BRT network at stations. Notice two lanes available at stations. Units are metric (www.gzbrt.org).

中山大道BRT站台路段断面图
(对开式侧式站台)

With regard to station alignment and size, the BRT stations in Guangzhou, as with best BRT examples in other cities, are located in the middle of the road they are travelling on. Between stations it is acceptable to have a single lane travelling in each direction, but at stations it is best to have two lanes per direction in order to facilitate overtaking (www.gzbrt.org).

The platform height of the Guangzhou BRT stations is 35mm – the same height as the floor of the buses. This is to enable rapid embarking and disembarking (www.gbrt.org).

A feature of the Guangzhou BRT is that it is physically integrated with the underground metro at three stations (see figure 9). This is part of the city's overall integrated transport network initiative (www.gbrt.org).
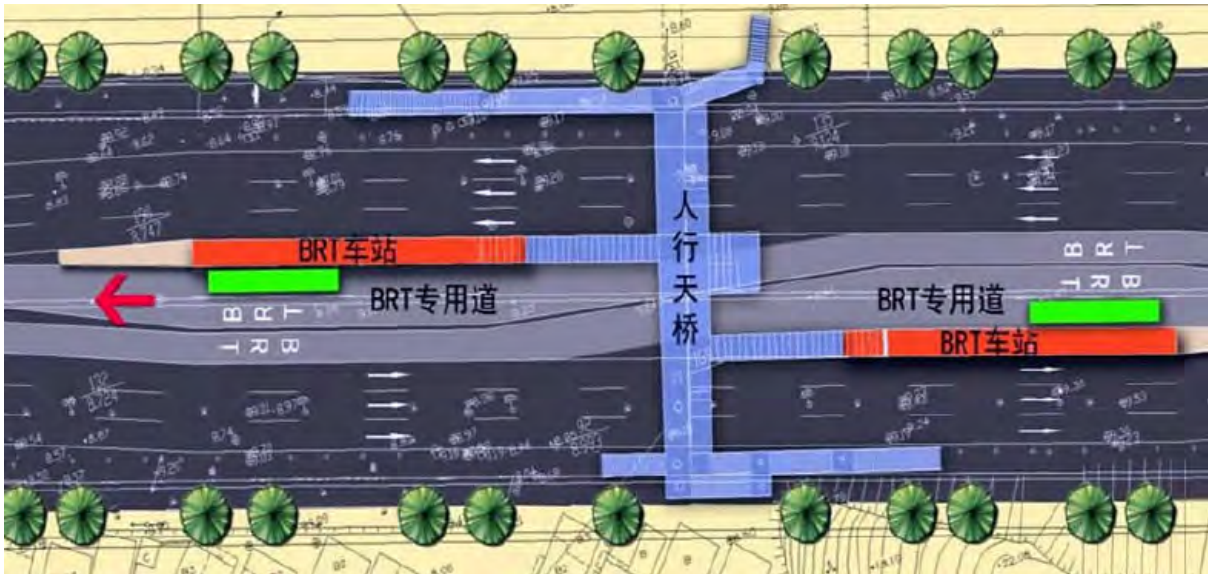
Figure 11: A diagram showing a one module station with a bridge linkage over the roadway (www.gzbrt.org).
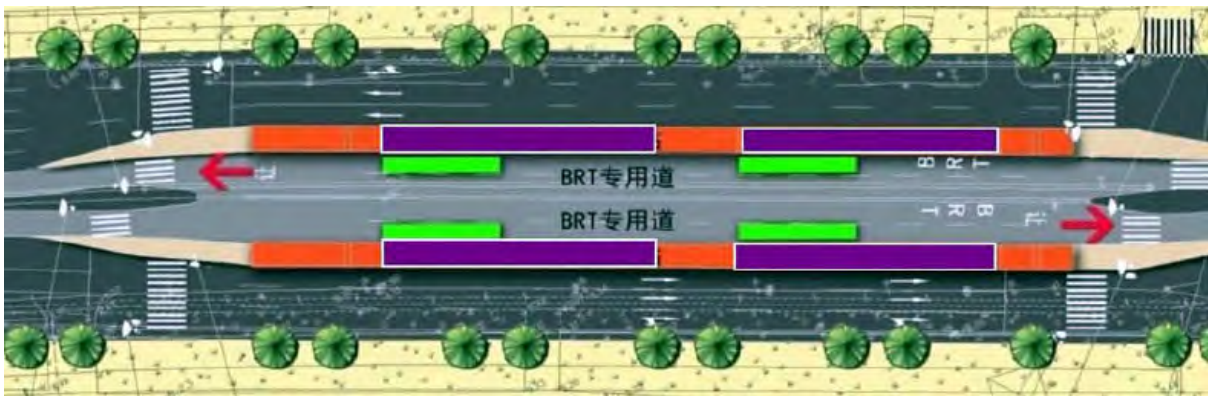
Figure 12: A diagram showing a two module station. Notice the BRT roadway increases from single lane to two lanes upon entry into the station zone. This is to allow overtaking to occur seamlessly (www.gzbrt.org).

Figure 13: An illustration showing a proposed BRT/underground metro interchange. (www.gzbrt.org).

3.4.2. Summary and Conclusions

To conclude, Guangzhou BRT is a good example of how BRT networks can be integrated with other modes of transport. The information available on Guangzhou BRT is valuable in terms of road structure and platform requirements and provides insight into how complex logistical patterns need to be made simple in order for the system to function efficiently. BRT Stations need to tie into the existing urban fabric. In order to do this they need to make reference to public open spaces, green parks, public parking facilities, population density, and road intersections so that passengers have points of reference and so that the stations are scaled correctly for their purpose.

3.5. SUMMARY AND CONCLUSIONS

The precedent studies conducted in this chapter serve as a means of gathering information of how the functions within the proposed building have been undertaken in buildings of dissociated functions.

Leiden Station was looked at for the manner in which it addresses public space and the way in which buses were integrated into the design. After which an urban design proposal of the surrounding vicinity was discussed to illustrate a possible way forward for the urban design component of the design.

Waterloo International Station was discussed in order to provide insight into how light and structure are used together to give the feeling of spaciousness and efficiency at a railway platform level. It also shows how light can be used to provide an uplifting experience in a station.

Metro Mall provides insight into a relatively new building typology in the democratic South Africa: a permanent home for a minibus taxi rank. The building is designed in such a way that it gives sense of dignity the the previously marginalised activities of trading, and the public transport mode of the minibus taxi.

Guangzhou BRT is a good example of how BRT networks can be integrated with other modes of transport. The information available on Guangzhou BRT is valuable in terms of road structure and platform requirements and provides insight into how complex logistical patterns need to be made simple in order for the system to function efficiently.

The next chapter will discuss a case studies of a recently completed railway station in Durban in order to understand the current requirements of a local station; case studies of business incubators in Durban in order to understand the functional and spatial requirements of a local business incubator, as well as a minibus taxi and bus rank in Soweto, Johannesburg.

CHAPTER 4 CASE STUDIES

4.1. RAILWAY STATION: MOSES MABHIDA STATION, DURBAN, SOUTH AFRICA

Moses Mabhida Station was completed in 2010 to give rail access to the Moses Mabhida Stadium during the soccer world cup, but also to act as a strategic transport node for the King's Park Sporting Precinct and the broader Umgeni rail corridor after the event (Cooke, 2010: 18).

4.1.1. Functional Design

As noted in 2.2.2.3, Brian Edwards said the train station is divided into four zones: the arrival point; access and ticket zone; commercial and waiting zone; and the platform and boarding zone. The Moses Mabhida Station was designed to maximise the efficiency of passenger and staff movement through it. "Every aspect of the design was based on that principle, from the functional layout to the design of the furniture" (Cooke, 2010: 19). The transition between Edwards' four zones is a seamless one. See Appendix I for a planning analysis.

The station is a simple two-level design whereby passengers approach it from Isaiah Ntshangase Road (formerly Walter Gilbert Road) which is a bridge across the railway line. The entrance to the building and reception facilities – such as ticketing facilities, turnstiles and concourse access – are located on the higher level. Lifts and staircases grant access to the lower level which is where the platforms are located (Cooke, 2010: 19).

Public announcement systems, electronic displays, signage, advertising and furniture have been integrated into the design in order to avoid clutter, make maintenance easier whilst facilitating comfort

Plate 11: This image shows the entrance to Moses Mabhida Station from Isaiah Ntshangase Road. Notice how the entrance is clearly identifiable by the over-sailing roof (Author, 2011).
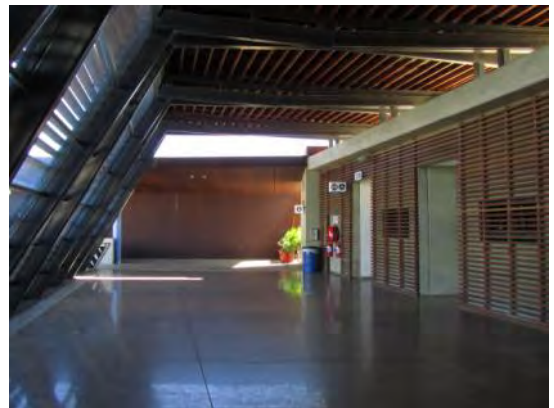
Plate 12: The concourse in the station is wide enough to cope with large volumes of passengers. There is an overall feeling of spaciousness in the station (Author, 2011).

Plate 13: This image shows the two level layout of the station works. It also shows how main concourse of the station is positioned over the tracks, and two side concourses which each contain two staircases and a lift (Author, 2011).

and smoothing the movement of large numbers of people (Cooke, 2010: 19).

The station design and choice of materials is robust in order to handle the rigorous demands of foot traffic. The choice of materials is drawn from Durban's industrial heritage with concrete being used as floor finishes, self-weathering steel for cladding and timber slats for solar screening. Toughened and laminated safety glass has been used in all windows for protection from intruders, as well as the live railway wires (Cooke, 2010: 22).

LEGEND

1. Info Kiosk
2. Toilets
3. Mechanical Services
4. Kitchen/ Staff Room
5. Seminar Room
6. Locker Area
7. Admin Store
8. Cash in Transit
9. Cash Room
10. Strong Room
11. Supervision Office
12. Clerk Office
13. Tellers

14. CCTV
15. Supervision Office
16. Kitchen/ Staff Room
17. Toilets
18. Lockers
19. Security Room
20. Officer in Charge
21. Strong Room
22. Holding Cell
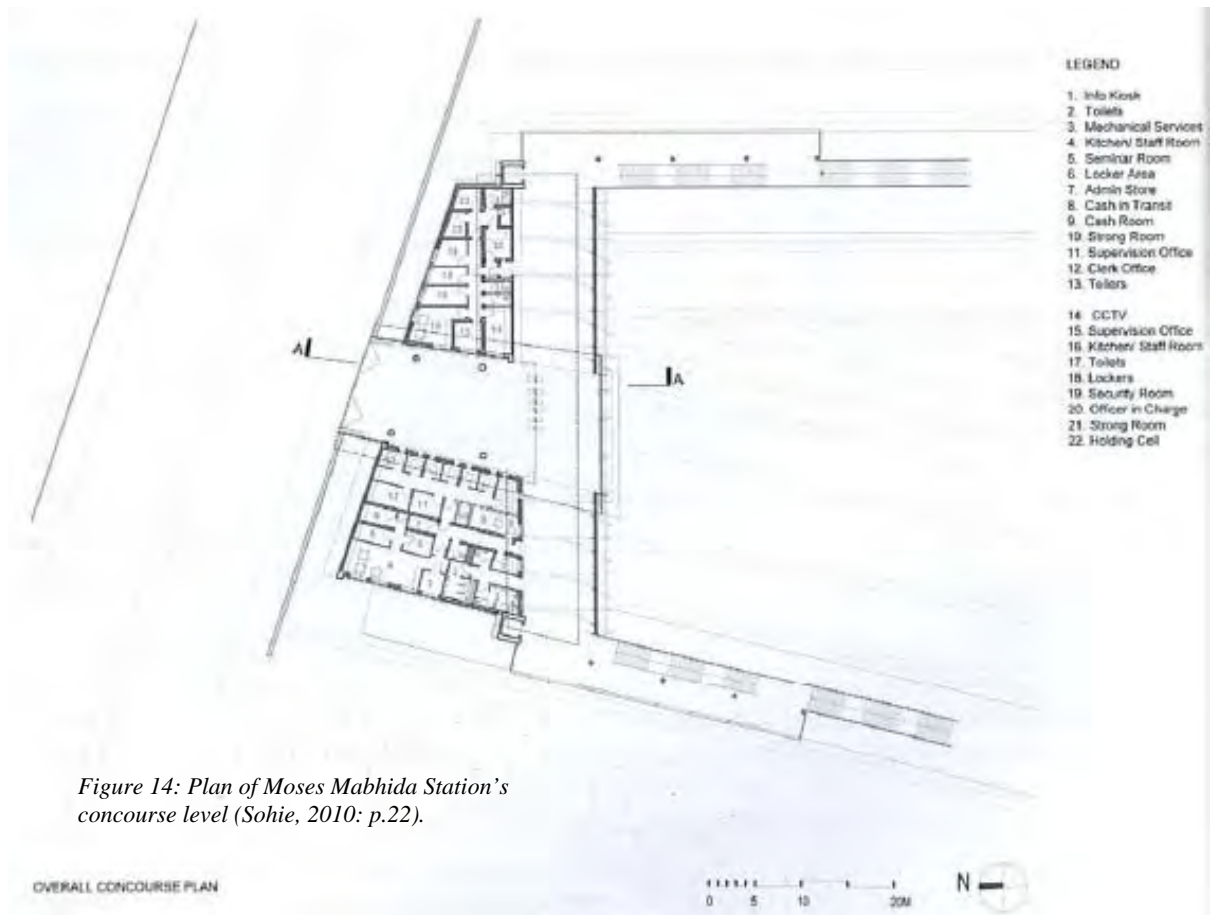
Figure 14: Plan of Moses Mabhida Station's concourse level (Sohie, 2010: p.22).

OVERALL CONCOURSE PLAN

0   5   10   20M

N

WEST ELEVATION
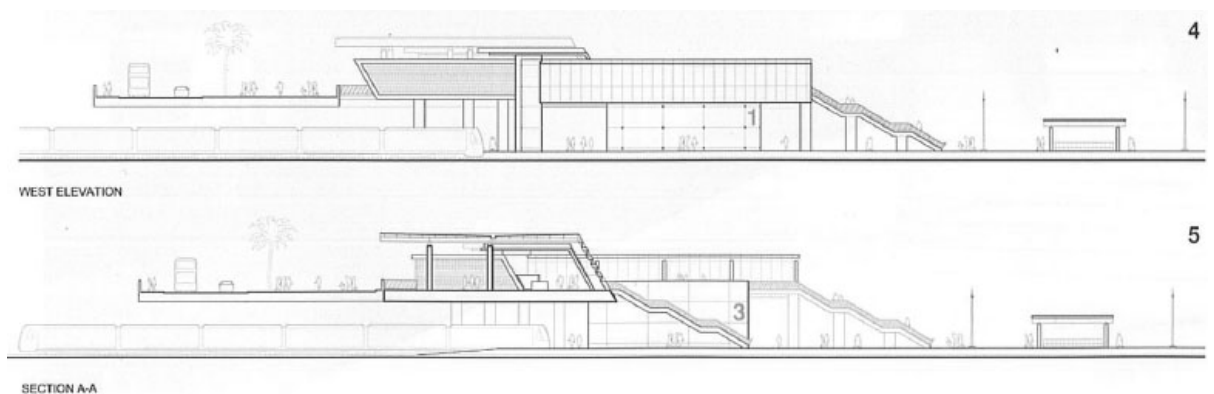
SECTION A-A

Figure 15: Sections and Elevetionsof Moses Mabhida Station, illustrating the how the two-level design functions (Sohie, 2010: p.19).

4.1.2. Architectural Expression

The design of the station intended to integrate architectural vision, civic identity and the urban context with the rigorous demands of passenger flows and operational demands. The design intended to show that public transport can be dignified by creating a strong station identity for one which is positioned next to the bold new stadium (Cooke, 2010: 18).

Plate 14: An image showing the limited pallet of materials and bold architectural forms, giving public transport dignity (Author, 2011).

Edwards said that the use of light is a very important element of station design as it can be used and manipulated to direct passengers to important areas in the building without the necessity for signage. Moses Mabhida Station's principal architectural element is its use of light. "By day, sunlight enlivens the juxtaposition of the three other materials (concrete, steel and timber), creating a dynamic carpet of woven shadows throughout the station. By night the station transforms into a glowing lantern" (Cooke, 2010:22).

Plate 15: Waiting benches along the platforms. Notice the clear view waiting passengers have of the track to watch for incoming trains (Author, 2011)

4.1.3. Summary and Conclusions

Moses Mabhida Station is a good example of a recently completed commuter and events railway station in the new, democratic South Africa. It deals with issues of identity, of changing the perception of railway stations in the country, of functional design and of linking the built form to its context. A simple materials pallet afforded bold architectural forms whilst the use of both natural and artificial light creates an uplifting experience for every passenger who passes through the station.

4.2. BARAGWANATH TAXI RANK, SOWETO, JOHANNESBURG

4.2.1. Introduction

Baragwanath transport interchange, by Urban Solutions Architects + Urban Designers, is part of the 1997 Baralink Development Framework which aims to reverse the effects of apartheid planning by using public transport to better integrate Soweto with Johannesburg (Low, 2007: 44).

Whilst addressing one of the busiest transport nodes in South Africa, Baragwanath transport interchange needed to accommodate bus companies, minibus taxi associations, street traders and city officials in a single development (Low, 2007: 44).

Plate 16: Identity-creating landmark towers. They are decorated by local craftsmen and women which assists in the public feeling an attachment to the building (Low, 2007: 45)

4.2.2. Design Challenges

The primary challenge the designers faced was the very long, thin nature of the site. On average the site is 50-metres wide, but 1,300-metres long, following a main access route into Soweto. The challenge of this length was to ensure the building functioned correctly, considering how spaced out services would need to be (Low, 2007: 45).
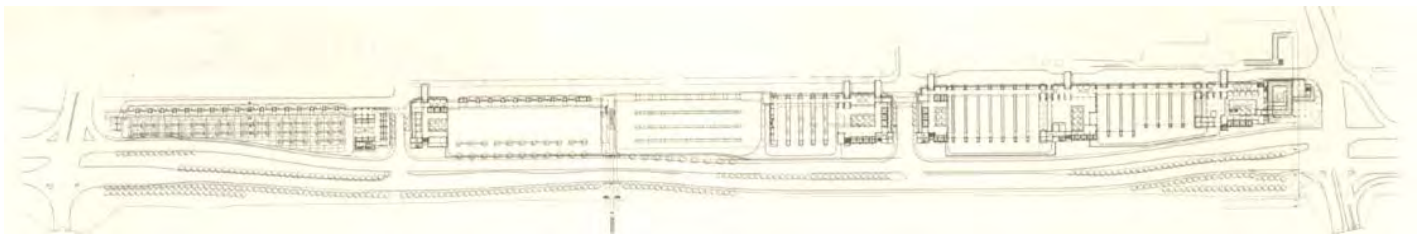
Figure 16: A plan showing the total length of Baragwanath Transport Interchange. It is clear how challenging the proportions must have been for the designers from this image.
(Low, 2007: 44)

An arcade which runs along the length of the site is used as a linking device. This device is the "binding element onto which all various functional requirements are attached" (Low, 2007: 45). This arcade connects commuters from one facility or station to the next, and this element forms the focal point of the development.

The journey along this long arcade is "spatially differentiated with reference to the functions that happen along it" (Low, 2007: 45). Landmark tower structures are positioned at focal points and at points of entry in order to aid in orientation of the public.

Plate 17: The arcade which runs the length of the interchange, used as a linking device, is shown in to the right of this image. The robustness of materials can be seen in the extensive use of concrete. This image also illustrates the legibility of the building, using roof heights and columns to define where vehicles and pedestrians are meant to be (Author, 2008)

The choice of materials includes robust brickwork and off-shutter concrete which gives the impression of permanence in terms of this building in specific, but the building typology in general. This was needed because taxis and traders have always been marginalised (low, 2007: 44). This building gives them a dignified place to conduct their business.

4.2.3. Functional Requirements

More than 70% of Soweto's commuters pass through the interchange, therefore the design had to handle the large volume of buses and minibus taxis which would use the facility. The transport requirements included 22 bus ranking bays for both long and short haul operators; and 650 minibus taxi holding and ranking bays which represent twelve taxi operators serving the routes between Soweto and Johannesburg (Low, 2007: 44).

Plate 18: This image illustrates the materials used in the building. It Also shows how the building is intended to become an uplifting experience. This is shown in the high volumes and floating roof forms (Author, 2008)

There has been long-standing rivalry for space between bus and taxi operators and traders. Getting this relationship right was crucial to the success of the design (Low, 2007: 44).
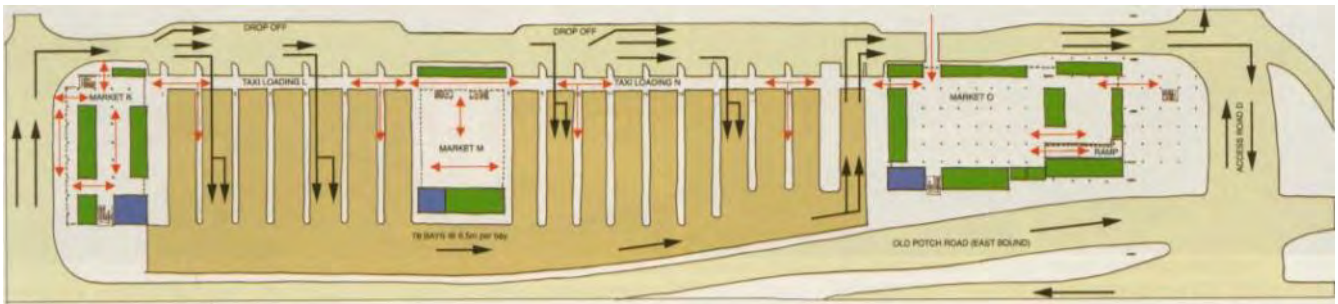
Figure 17: This diagram illustrates pedestrian and vehicular circulation paths. Black arrows show Vehicular movement whilst red arrows show that of pedestrians (Low, 2007: 46)

The development needed to create space for 500 traders. Most of these are accommodated in the arcade which links all of the building's functions. The traders have been provided with storage facilities, management offices and support infrastructure, and traders' stands vary in size in order to accommodate different types of traders (Low, 2007: 44).

Plate 19: This is an image of the face which faces the main road leading into Soweto. It is clear that effort has been made to reduce monotony in order to provide an interactive and interesting experience at both pedestrian and vehicular speeds (Low, 2007: 45)

4.2.4. Summary and Conclusions

The Baragwanath Transport Interchange is an example of how public architecture can be used as a catalyst for the development of new urban spaces and fabric is formerly under developed and marginalised environments in South African cities.

This case study is useful in terms of how it creates public identity in its architecture, and how it uses this to create the sense of place for the surrounding locality. It illustrates, too, how

traffic circulation within such a structure operates in order to facilitate the free flow of pedestrians as well as vehicles in a very busy, confined area. It is also a good example of how traders are integrated into the design of the building.

4.2. BUSINESS INCUBATOR: SEDA-ETHEKWINI BUSINESS DEVELOPMENT CENTRE

4.3.1. Introduction

Seda stands for Small Enterprise Development Agency. They are a national government, non-profit organisation who run business incubation programmes for entrepreneurs. Seda-eThekwini Business Development Centre was established in 1997 and was – and still is - backed by the eThekwini Municipality, hence 'eThekwini' in the name.

Funding has been provided by the eThekwini Municipality, as well as corporates such as Toyota, McCarthy Auto Holdings, Bosch and Associates, Petronet,

Plate 20: The entrance to the Seda-eThekwini complex on Johannes Nkosi Street, Durban (maps.google.com)

Figure 18: This is an oblique aerial view of the Seda-eThekwini complex in its context. (maps.google.com)

Shepstone & Wylie, Standard Bank, ABSA Bank, Nedbank, Group 5, BP, Shell and the South African Sugar Association (Seda-eThekwini Annual Report 2009/2010: 2).

The Seda-eThekwini complex is located within the Warwick Triangle in Durban, in close proximity to Berea Station. The Warwick Triangle is arguably the busiest part of the city due to its role as a major transport interchange hub on the outskirts of the central business district. This creates perfect conditions for start-up businesses to flourish due to easy access to public transport and the hive of constant activity surrounding Seda.

4.3.2. Services Seda Offers its Clients

Seda refers to their tenants as 'clients'.

The business development centre became eThekwini's primary agency engaged in providing support services to emerging entrepreneurs in Durban. The following are services offered to clients of Seda-eThekwini:

- Business Advice;
- Business Planning;
- Tender Assistance;
- Training; and
- Mentorship

Standard Bank, ABSA Bank and Nedbank were approached by Seda to supply funding to them, but also to give easier access to finance to Seda's entrepreneurial clients, people who banks would normally be reluctant to lend to without the client being under the business incubator's guidance (Seda-eThekwini Annual Report 2009/2010: 2).

4.3.3. Spatial Requirements at Seda Premises

The functional requirements of Seda-eThekwini are divided into three distinct groups:

- Seda management staff;
- Seda client office and workshop space; and
- Communal space and facilities.

4.3.3.1. Seda Management Staff

Accommodation is provided for the staff of Seda in a single building. Upon entering this

Plate 21: This image is of the signboard just inside the entrance at the Seda-eThekwini complex. It lists all the companies which Seda mentors (Author, 2011)

building is a general reception room with a receptionist. Adjoining this room is a communal room with internet facilities available free to the clients of Seda, as well as a consultation counter, behind which are offices where several managers work. A box of current available tenders is located in this room.

Off the reception area is a security controlled door which provides access to the upstairs cellular offices of the CEO of Seda and his support staff.

4.3.3.2. Seda Client Office and Workshop Space

Mr. Mgcini Mbele, Business Information Manager at Seda, was kind enough to meet with the author and show him around the Seda-eThekwini complex.

Accommodation at Seda-eThekwini is varied in its typology in order to suit the clients of the organisation. The space Seda offers is leased to its clients at a very low rate so it is up to the clients to do what they wish with it. Seda has many clients, but the following paragraphs will name a few of the significant ones.

Plate 22: This is an image of the building in which warehouse space is leased to Seda-eThekwini clients (Author, 2011)

Plate 23: This is an image of the building which contains the bakery on the ground floor and fashion school on the first floor (Author, 2011)

There is a building of cellular offices leased to Seda clients which contain start-up engineering companies, accountants, fashion designers and a magazine publication to name a few.

In another building is a printing company which, Mr. Mbele says, is highly successful, a man with a toilet paper making machine and another with a successful soap manufacturing and bottling plant. These businesses lease warehouse space as well as office space.

In another building is a bakery, where clients of Seda learn to bake here but are employed by Total garage shops. The space above the bakery is leased to a fashion design school which, Mr. Mbele says, employs 42 staff members.

4.3.3.3. Communal Space and Facilities

According to Mr. Mbele, communal spaces play a vital role in the Seda-eThekwini complex. A courtyard becomes a meeting space for companies and their prospective

clients, whilst at the same time it is used as a
place to relax. There are seven training rooms
of varying sizes, as well as a conference room
which can handle up to 150 people. There is a
restaurant on site, as well as a Standard Bank
branch where clients of Seda can open
accounts, withdraw money and seek financial
advice. There is also an ABSA office within
the complex which only offers business and
financial advice.

Other communal facilities include free internet
at dedicated computer stations. These are used
by Seda clients to access emails and internet
banking. Mr. Mbele says that Seda clients have
requested wireless internet so that they can
connect via their laptops and not have to wait
for a computer to become available.

*Plate 24: The communal courtyard at the
Seda-eThekwini complex (Seda-eThekwini
Annual Report 2009/2010)*

4.3.4. Primary Issues Faced by Seda's Clients

According to Mr. Mbele, the biggest problems facing
start-up businesses which approach Seda are:

- the lack of information or knowledge about running a business;
- the language barrier between native languages and English, the latter of which is
  widely accepted in the business world; and
- access to finance, and knowing how to spend it appropriately.

Another issue Mr Mbele says is a prominent one is the lack of professionalism in their clients'
branding of their products. As part of their non-financial assistance to their clients, Seda helps
with the branding of their products. Sometimes they do this in-house, but sometimes it is
outsourced to companies outside of Seda.

Mr. Mbele says it is easier to convey information to entrepreneurs via computer, as opposed
to paper and pen. Perhaps this is because the computer is a much more interactive tool than
paper and pen.

Seda hosts training sessions for is clients with regard to learning how to run a business,
accessing finance and to teach them how to spend it appropriately. Seda hosts many other

training sessions on different topics as well. These sessions are sometimes funded by Seda, but usually they are sponsored by outside companies. People who conduct the training sessions are not employed by Seda, but belong to other organisations.

4.3.5. Summary and Conclusion

Seda-eThekwini is a bold business incubator initiative which hosts a wide variety of companies. They target previously disadvantaged groups who have not been exposed to the education necessary for running a successful business. In a way Seda is an education institution, but is it more a place of hope, and of a brighter future for their clients.

Seda-eThekwini is located within Warwick Junction – a chaotic, busy, and sometimes even a threatening place. Upon entering the Warwick Junction complex the author got an overwhelming feeling of happiness and hope. There is a very positive atmosphere within the complex, and the people there know that they are making a difference, not only to their lives, but to the way in which the previously disadvantaged members of South African society are perceived.

4.5. SUMMARY AND CONCLUSIONS

Moses Mabhida Station provides insight into the accommodation required for a modern railway station in South Africa, whilst Baragwanath taxi and bus rank provides useful guidelines for vehicle circulation as well as choice of materials for use in a busy transport interchange.

SEDA-eThekwini is a unique entrepreneurial business advisory model which can be implemented in order to help reduce poverty in South Africa.

CHAPTER 5   SITE SELECTION

5.1. SITE SELECTION CRITERIA

a) The Site should integrate different income and racial groups.

In order to overcome the stigma left by apartheid planning which was based on racial and income groups, the site should bridge between dissociated communities.

b) The Site should be in a location which needs economic activity.

It has been noted in the theoretical case studies that office decentralisation has not occurred in areas where it is needed the most; therefore the site should be in a location which is devoid of economic activity.

c) The Site should be in a location which needs a form of mass public transportation.

It has been argued that any modern city needs mobility to function efficiently. Mass public transport in South Africa was granted to the disadvantaged black population, so in order to include them in an undertaking of economic advancement, a form of mass public transport needs to be incorporated into the scheme. Also, there is a negative view by those who can afford private cars towards mass public transportation in South Africa because public transport was only given to the disadvantaged black population.

d) The Site should appeal to both large companies and SMME's.

In order to lift the economic state of the area which is devoid of economic activity, many types of businesses need to be accounted for in order to move up the commercial ladder.

e) The Site should be supported by critical mass of existing residential districts.

This is imperative in order to sustain a public transport system but also the jobs which will become available in the locality.

f) The Site should contribute to the social and cultural upliftment of communities which surround it.

Because the government has community upliftment programs in place, the proposal should compliment these so that it adds to the existing efforts, as opposed to undermining them.

5.2. POSSIBLE SITES

5.2.1. OPTION 1:

HILLCREST / MKHOLOMBE

ON

BLESSING NINELA ROAD

5.2.2. OPTION 2:

KWADABEKA / CLERMONT

AT THE INTERSECTION OF

WYBANK ROAD

AND THE FUTURE EXTENSION OF

DINKLEMAN ROAD

5.2.3. OPTION 3:

UMLAZI / CHATSWORTH / HAVENSIDE / LAMONTVILLE

ON

SILVERGLEN DRIVE

OPTION 1

OPTION 2

OPTION 3

BRIDGE CITY

LA LUCIA / UMHLANGA

HILLCREST

KLOOF

PINETOWN

WESTVILLE

BEREA

CENTRAL BUSINESS DISTRICT

HARBOUR

INDIAN OCEAN

7.40km

A diagram showing the locations
at which office development has
occurred
and where the three site options are
located
in relation to those nodes
(Aerial photograph: Google Earth).

5.2.1. OPTION 1:

HILLCREST / MKHOLOMBE

ON

BLESSING NINELA ROAD
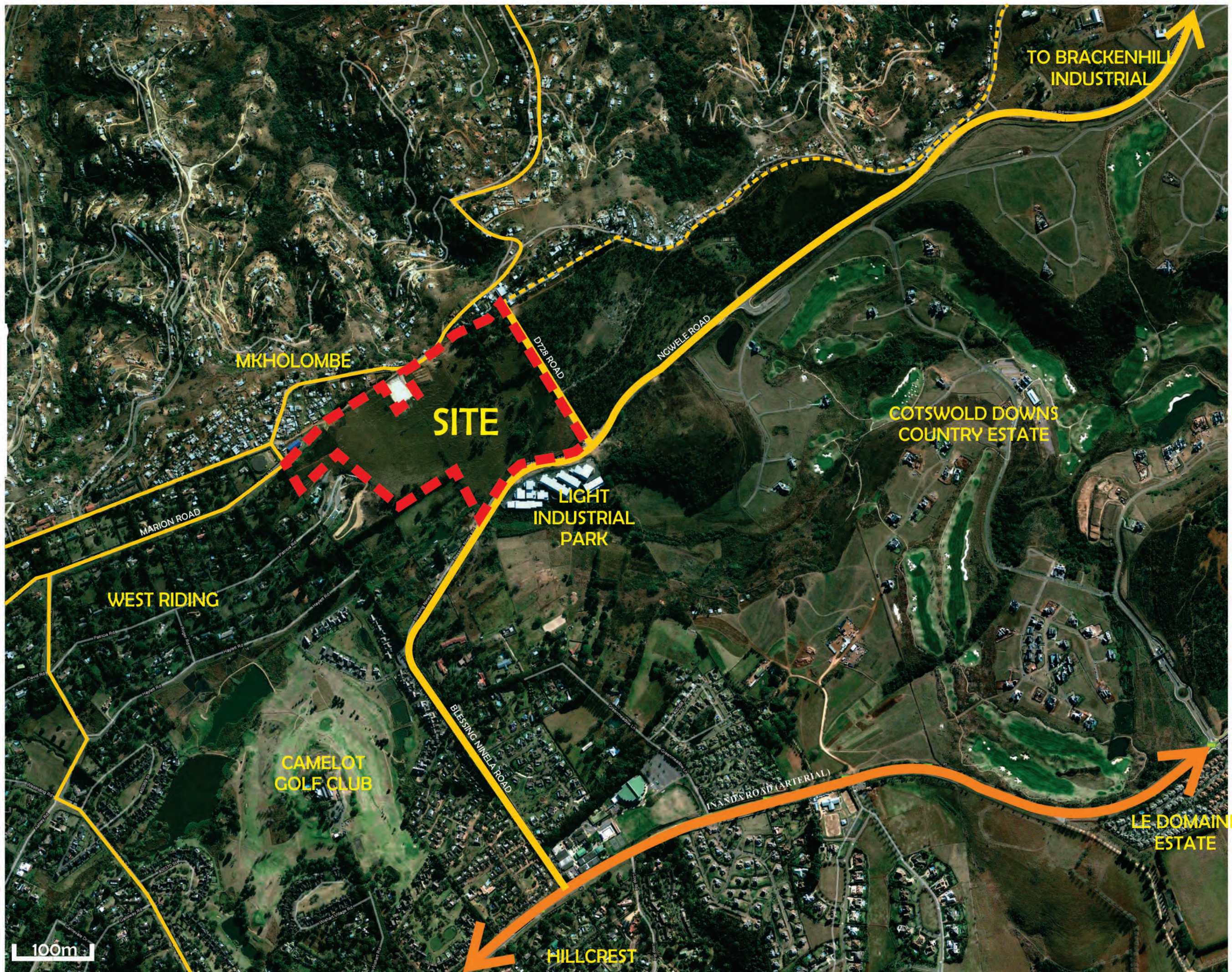
Figure 10: This is an aerial map of the Hillcrest /Mkholombe site. One can see that there is no critical mass to support a viable public transport system which makes it unattractive in terms the site selection criteria (Google Earth, 2011).

TO BRACKENHILL INDUSTRIAL

MKHOLOMBE

D728 ROAD

NGWELE ROAD

SITE

COTSWOLD DOWNS COUNTRY ESTATE

LIGHT INDUSTRIAL PARK

MARION ROAD

WEST RIDING

BLESSING NINELA ROAD

CAMELOT GOLF CLUB

INANDA ROAD (ARTERIAL)

LE DOMAINE ESTATE

HILLCREST

100m

5.2.1. OPTION 1: HILLCREST / MKHOLOMBE

5.2.1.1. Short Description

This is a greenfield site in Hillcrest which is bordered by Blessing Ninila Road/Ngwele Road, D728 Road and a farm road. Is can be accessed from the arterial Inanda Road via Blessing Ninela Road.

The locality of this site is one illustrating both ends of the income spectrum. The site is bordered by the Mkholombe township area which houses low-income residents, medium income residential suburban houses in West Riding, and high income golf estates such as Cotswold Downs and Camelot.

Apart from the small industrial park across Blessing Ninela Road/ Ngwele Road from the site, there is Brackenhill Industrial to the north east along Ngwele Road, and Hillcrest is a burgeoning office employment node, although no offices exist in this area.

5.2.1.2. Site Against the Criteria

a) The Site should integrate different income and racial groups.

> Yes. High, medium and low income groups reside in close proximity,
> although the nature of the development in the form of estates
> does not allow much scope for integration.

b) The Site should be in a location which needs economic activity

> Not necessarily, due to Brackenhill Industrial and Hillcrest office nodes in
> close proximity, although the latteris expanding at a rapid rate.

c) The Site should be in a location which needs a form of mass public transportation.

> Yes, there is no train station in close proximity although a railway line runs
> near the area.

d) The Site should appeal to both large companies and SMME's

> Yes

e) The Site should be supported by critical mass of existing residential districts

> No. Surrounding areas are sprawling, low density suburbs and
> townships.

f) The Site should contribute to the social and cultural upliftment of communities which surround it.

> Yes, but the nature of the development in this area will make it difficult to aid in
> uplifting the communities around it.

5.2.1.3. Summary and Conclusion

This Hillcrest site appears to be a good one due to its proximity to all income groups, as well as piggy-backing on other economic nodes. Although upon further inspection the type of existing residential development does not allow for an open and integrated society. It also does not allow for walkability due to the sprawling, low density nature of the existing development.

5.2.2. OPTION 2:

KWADABEKA / CLERMONT
AT THE INTERSECTION OF
WYBANK ROAD
AND THE FUTURE EXTENSION OF
DINKLEMAN ROAD

Figure 11: An aerial photograph showing areas around the site as well as major and minor routes.
(www.durban.gov.za 2011)

Figure 12: An aerial photograph showing how the new road will link the site to Pinetown
in the south and to Newlands and other northern suburbs and townships in the north.
(www.durban.gov.za 2011)

5.2.2. OPTION 2: KWA DABEKA / CLERMONT

5.2.2.1. Short Description

The site is located within the KwaDabaka township, north of Pinetown, Durban. What attracted the author to this site is the proposed extension of the dual carriageway of Dinkleman Road from Pinetown in the south to join with Dumisani Makhaye Drive in the north. This will provide a direct link from the northern suburbs and townships to the employment opportunities available in Pinetown but also allow easier cross-city movement and divert a large amount of vehicular traffic away from the congested N2 freeway.

The exact site chosen is located at the intersection of existing Wyebank Road and the proposed extension to Dinkleman Road. It is a relatively narrow piece of land which the extended road will bisect. Wyebank Road provides a direct route from the middle- to upper-income suburb of Kloof whilst Dinkleman Road provides a direct route through lower-middle and middle income suburbs of Clermont and Berkshire Downs to Pinetown Industrial. Therefore although the site itself is surrounded by the KwaDabeka township, it has easy access to lower-middle, middle and upper income groups.

The site itself is baron with dirt roads and no elements of place-making. Wyebank road appears to be fairly active, currently forming the primary route into surrounding areas. Although there are small pavement businesses along Wyebank Road, there is not much in the way of employment opportunities in the area, and due to the extension of Dinkleman Road incomplete, there is no direct route to Pinetown's primarily industrial employment nodes. This, therefore, gives potential to the site for office development for SMME's and a street community.

Due to the future road development, there is scope at this stage to propose a means of dealing with the street interface, and also how to implement public transport into the street design.

The primary drawback of this site is that the City of Durban has proposed a large scale urban intervention for KwaDabeka, Clermont and Berkshire Downs. Their proposal has not, however, indicated what they intend on doing with the specific site chosen.

5.2.2.2. Site Against the Criteria

a) The Site should integrate different income and racial groups.

      Yes, but is located within a township which could be unattractive to other income groups.

b) The Site should be in a location which needs economic activity.

      Yes, although the proposed road will link the site to industrial zones.

c) The Site should be in a location which needs a form of mass public transportation.

Yes, there is no train station in close proximity and currently road-going modes are not favoured due to the quality of roads in the area.

d) The Site should appeal to both large companies and SMME's.

Yes to SMME's, perhaps not to large companies. The location is off the beaten track and could be a potentially hostile environment to conduct business in. Although its location between townships and suburbs is a good one in terms of providing access to jobs.

e) The Site should be supported by critical mass of existing residential districts

Yes. The density of the surrounding township is high, whilst that of the surrounding suburbs is medium.

f) The Site should contribute to the social and cultural upliftment of communities which surround it

Yes

5.2.2.3. Summary and Conclusion

This site has potential due to the city's commitment to upgrading the urban infrastructure and the provision of the new road. This could be seen as a drawback in terms of choosing this site, however, because the city is already planning to upgrade the area.

The site did not fulfil all of the criteria. It is not in a location which is attractive to middle- and upper income populations. It is also not a location which would be attractive to large, higher paying, businesses but it is a location which is attractive to SMME's.

In its favour, the site has very poor access to public transport and is an area which needs a place-making intervention.

5.2.3. OPTION 3:

UMLAZI / CHATSWORTH / HAVENSIDE / LAMONTVILLE

ON

SILVERGLEN DRIVE
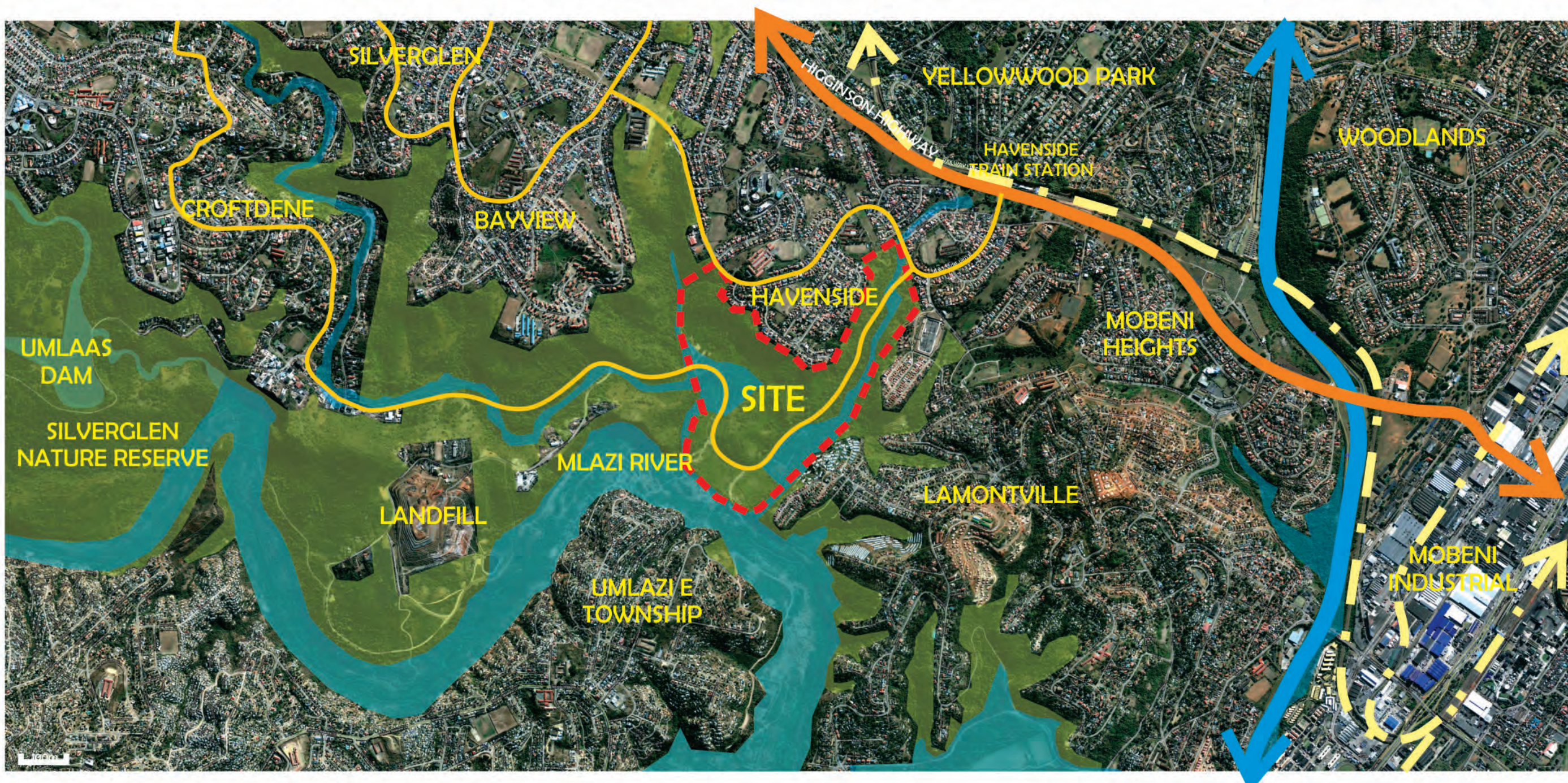
Figure 12: An aerial map of the site showing existing roads, railways and surrounding communities (Google Earth, 2011).

SILVERGLEN
CROFTDENE
BAYVIEW
SILVERGLEN
HAVENSIDE
YELLOWWOOD PARK
HIGGINSON HIGHWAY
HAVENSIDE TRAIN STATION
WOODLANDS
UMLAAS DAM
SILVERGLEN NATURE RESERVE
SITE
MOBENI HEIGHTS
LANDFILL
MLAZI RIVER
LAMONTVILLE
UMLAZI E TOWNSHIP
MOBENI INDUSTRIAL

Plate 7: View of the site from Umlazi E township (Author, 2011)

5.2.3. OPTION 3: UMLAZI / CHATSWORTH / LAMONTVILLE

5.2.3.1. Short Description

This is a greenfield site which is currently under D'MOSS in terms of town planning. It is a piece of land which is bordered by many separate communities which, under apartheid, were developed unequally in terms of urban environmental quality and availability of public services. They are similar in that, although they are located near industrial employment, they are all located relatively far from office-type employment.

On the northern and western sides of the site are Havenside and greater Chatsworth respectively which are a combination of low, middle and high income, traditionally Indian suburbs. To the east is Lamontville which is a low-middle income suburb with many informal settlements appearing. To the south is the Mlazi River, across from which is the Umlazi Township.

None of the above areas are linked to each other by road. Mass public transport, in the form of trains, is available in Chatsworth along Higginson Highway. Umlazi does have four train stations, but none are near the proposed site. Lamontville has no mass public transport available. Minibus taxis are used frequently in all surrounding areas.

A single road, Silverglen Drive, passes through the site. Existing road access is via the Higginson Highway into Havenside Drive, into Silverglen Drive. The Silverglen Nature Reserve is near the site which covers an area of more than 200-hectares.

5.2.3.2. Site Against the Criteria

a) The Site should integrate different income and racial groups.

> Yes, it is located between very low to upper middle income groups.

b) The Site should be in a location which needs economic activity

> Yes, even though there is significant industrial development in close proximity, many businesses are operating out of houses and on pavements in surrounding areas.

c) The Site should be in a location which needs a form of mass public transportation.

> Yes, although there is potential to bring a railway line into the area.

d) The Site should appeal to both large companies and SMME's

> Yes to both SMME's and larger companies. Industrial zones in close proximity could warrant office needs. Also proximity to Higginson Highway to bring workers and clients who have cars. Access to labour in Umlazi and Lamontville, and access to

previously disadvantaged university graduates to fulfil Black Economic Empowerment (BEE) requirements.

e) The Site should be supported by critical mass of existing residential districts.

Yes. There is evidence to suggest that Lamontville's density is increasing. Umlazi is sprawling but the plots are very small with many people living in each house, thus creating a very high density. Chatsworth and Havenside are low-medium density suburbs.

f) The Site should contribute to the social and cultural upliftment of communities which surround it

Yes

5.2.3.3. Summary and Conclusion

It can be seen that the Umlazi / Chatsworth / Lamontville site meets all the criteria by which the site will be chosen. Although the site is challenging in terms of geography, it appears to be appropriate for the purpose of demonstrating the theories discussed in the Literature Review.

5.3. SUMMARY AND SITE CHOICE

Out of the three sites discussed in subchapters 3.1, 3.2 and 3.3, the author is most convinced by Option 3: Umlazi / Chatsworth / Havenside / Lamontville.

Option 3 meets all the criteria and the author feels strongest about this site. The site could facilitate the linking of dissociated communities and form a hub of exchange of differing income groups and business types. It is in close proximity to low, middle and middle-upper income groups and has easy access to a freeway which would facilitate economic activity. It is also near a railway line which could easily be branched into the area.

Option 2 did not meet all the criteria. The area would not suit office employment as it is located in a township which may be a hostile environment to conduct business, although SMME's may flourish in the area. It is also not located near all income groups although the future road may bring economic opportunities to the KwaDabeka township.

Option 1 also did not meet all the criteria. Although the area looked promising in terms of the mix of income population and the burgeoning industrial and office nodes,

it would not be practical due to the low density, sprawling nature of development in the area.

CHAPTER 6

SITE ANALYSIS

6.1. CONTEXTUAL ANALYSIS: SURROUNDING COMMUNITIES
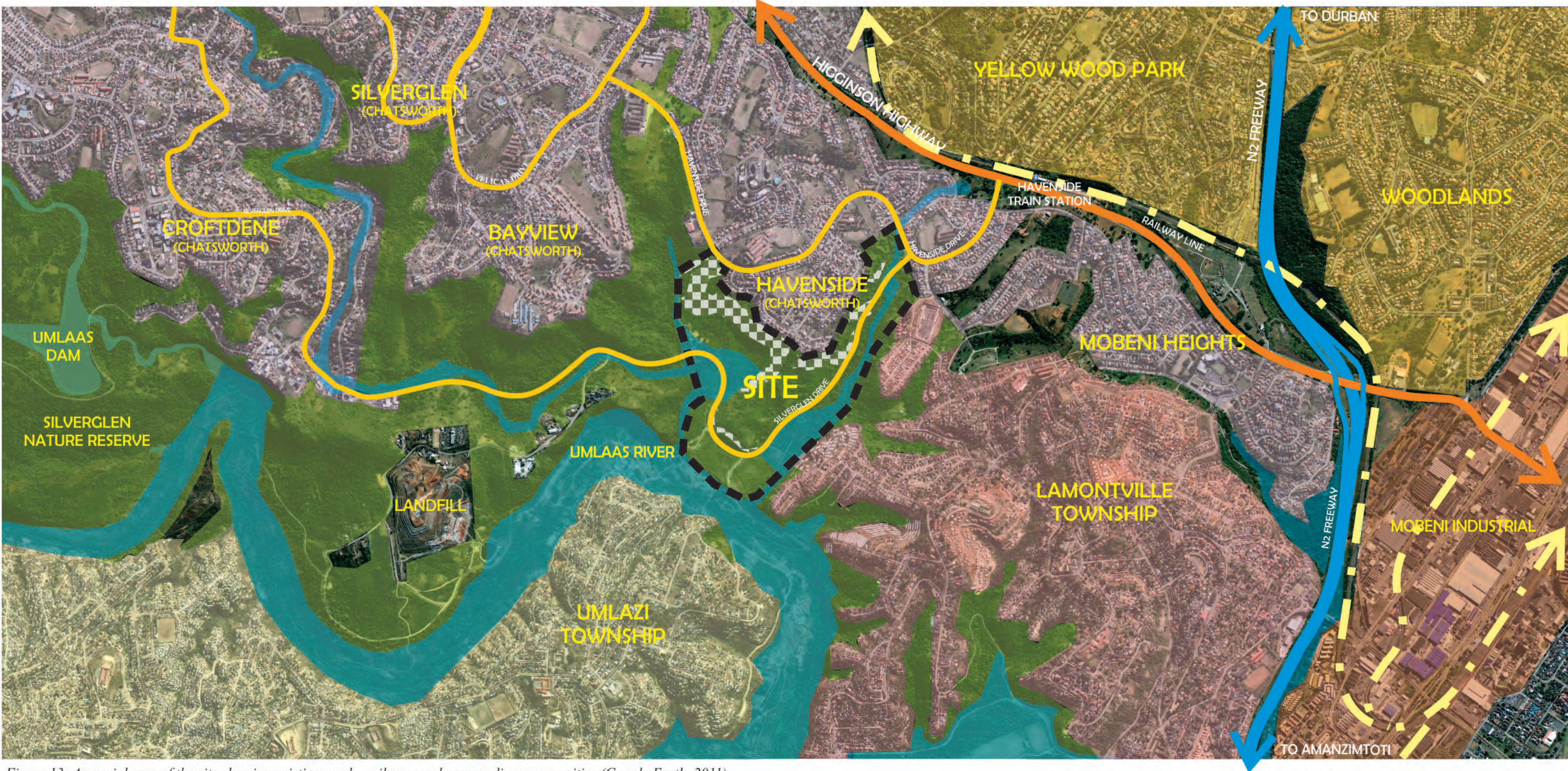
Figure 13: An aerial map of the site showing existing roads, railways and surrounding communities (Google Earth, 2011).

CHAPTER 6   URBAN AND SITE ANALYSIS

6.1. CONTEXTUAL ANALYSIS: SURROUNDING COMMUNITIES

6.1.1. Yellow Wood Park

In terms of apartheid planning, Yellowwood Park is a middle-upper class white suburb and is segregated from surrounding suburbs by means of railway lines and vegetation.

Yellow Wood Park is home to 5000 people of which 65% are white, 18% are African and 15% are Indian. The data shows that only 4% of the economically active population is unemployed, and that 57% of households earn between R76 801 - R307 200 per annum making Yellow Wood Park a lower-middle class suburb (www.capmon.durban.gov.za).

Plate 26: This is an image of a typical Yellow Wood Park suburban home. Notice the well-kept pavements, quality of building and planting within the property walls (Author, 2011).

6.1.2. Woodlands

In terms of apartheid planning, Woodlands is a working class white suburb.

Of the 8900 people who live in Woodlands, 47% are white, 37% are African and 17% are Indian. The data shows that 7% of the economically active population is unemployed, and 47% of households are those which earn between R38 401 - R153 600 per annum, making Woodlands a predominantly lower class suburb.

Plate 27: This is an image of typical houses in Woodlands. Notice the poor levels of maintenance, indicating a lack of money in the community (Author, 2011).

Access to both Woodlands and Yellow Wood Park is by road, and there are no on- or off-ramps to the N2 Freeway which passes between the suburbs, and neither suburb has easy access to neighbouring Chatsworth across the railway line and Higginson Highway (www.capmon.durban.gov.za).

6.1.3. Chatsworth

This is an Indian township which consists of mostly poor and working class people, although there are some wealthy areas. As a direct result of the Group Areas Act of 1950, most Indians residing in Durban were put in Chatsworth, a piece of land which was taken from around 600 Indian farmers. Due to the common historical struggle, Chatsworth has a strong sense of community (www.durban.gov.za). There are many suburbs within Chatsworth. The following are those in close proximity to the chosen site.

Of the total population of 13 280 residing in *Croftdene*, 97% are Indian. 10% of the economically active are unemployed and 84% of households earn between R9 201 - R153 600 per annum making Croftdene a lower class suburb. (www.capmon.durban.gov.za).

Silverglen has a population of 8 200, of which 87% is Indian and 12% is African. 8% of the economically active are unemployed and 57% of households earn between R9 601 - R153 600 per annum, 10% have no income and 12% earn between R153 600 - R1 228 800 per annum, making Silverglen a mixed low, middle and upper class suburb (www.capmon.durban.gov.za).

Bayview has a population of 12 900, of which 87% is Indian and 12% is African. 13% of the economically active are unemployed and 73% of households earn

Plate 28: This is an image of the community of Havenside. Notice the change in the quality of the road and pavements, as well as the densely packed housing (Author, 2011).

Plate 29: An image of a local CBD at the intersection of Silverglen and Pelican Drives in Chatsworth. Notice the poor building quality and lack of place-making architecture (Author, 2011).

Plate 30: An image of a large house in Havenside, Chatsworth, showing that middle-upper income people do reside in these areas (Author, 2011).

between R4 801 - R76 800 per annum, making Bayview a low class suburb (www.capmon.durban.gov.za).

Of the total population of 9 500 residing in *Havenside*, 95% are Indian. 7% of the economically active are unemployed and 65% of households earn between R19 201 - R153 600 per annum making Havenside a lower-middle class suburb (www.capmon.durban.gov.za).

Mobeni Heights has a population of 4 400, of which 56% is Indian and 41% is African. 16% of the economically active are unemployed and 70% of households earn between R4 801 - R153 600 per annum, 14% of households having no income and a significant 9% earning between R153 601 - R614 400, making Mobeni Heights a mixed low, middle and middle-upper class suburb (www.capmon.durban.gov.za).

Plate 31: An image of Mobeni Heights (Author, 2011).

6.1.4. Lamontville Township

Lamontville is Durban's oldest African township. It was constructed in 1934 for the "aspiring African middle class" but also housed workers in nearby industrial areas. According to a resident, the houses were built and intended for married couples whilst hostels were built and intended for single people. It was only in the late 1980's that people could own or rent houses (www.durban.gov.za).

Plate 32: Lamontville Township. Notice the poor quality of housing, streets and pavements (Author, 2011).

Lamonville is home to 30 000 people, of which 41% are between the ages 15-35 whilst only 27% are aged between 35-64. As with Umlazi, this is due to a much lower life expectancy due to HIV/Aids and the high birth rate in the area. Only 18% of the economically active population is employed

Plate 33: Lamontville Township. There are a large number of informal dwellings in this area (Author, 2011).

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whilst 28% is unemployed. 26% of households do not have an income and 49% earn between R4 801 - R76 800 per annum. It is clear from these figures that there are very few jobs available to the residents of Lamontville, although the residents here appear to have jobs that pay better than Umlazi E (www.capmon.durban.gov.za).

6.1.5. Umlazi E Township

Umlazi was the destination of many Africans who were forcibly removed by government as part of a "slum clearance" exercise in Cato Manor in the 1940's (Sigcau, 1997: 55). Umlazi was established as an African township in 1967 under the National Party government (www.durban.gov.za). Today Umlazi is the biggest township South Africa - whilst Soweto is bigger, it is made up of many smaller townships (www.hlolaumlazi.co.za) - and indeed in KwaZulu-Natal (www.durban.gov.za).

Umlazi E is across the Umlaas River from the proposed site. It is home to 19 000 people, of which 42% are between the ages 15-35 whilst only 24% are aged between 35-64. This is due to a much lower life expectancy due to HIV/Aids and the high birth rate in the area. Only 18% of the economically active population is employed whilst 26% is unemployed. 27% of households do not have an income and 62% earn between R1 - R38 400 per annum. It is clear from these figures that there are very few jobs available to the residents of Umlazi E, also education and social services are limited (www.capmon.durban.gov.za).
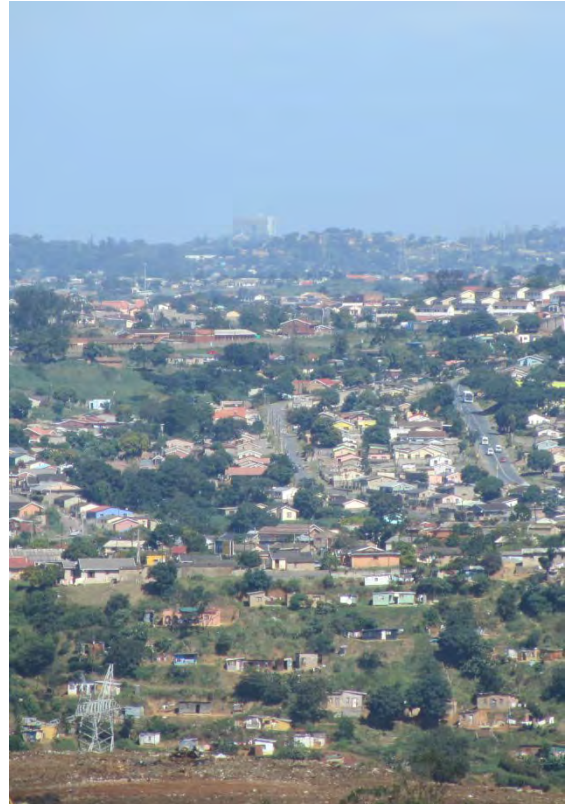
Plate 34: Umlazi. This image shows the sprawling nature of the township (Author, 2011).

Plate 35: Umlazi, across the Umlaas River from the site. Notice informal dwellings precariously built on steep land (Author, 2011).

6.2. CONTEXTUAL ANALYSIS: TRANSPORT LINKAGES

6.2.1. Freeways

Chatsworth is fed by the secondary freeway Higginson Highway which links with the N2 national freeway. Umlazi is fed by the Mangosuthu Highway, but this is a far distance from the site. Woodlands and Yellow Wood Park have access to the Southern Freeway which is far from the site. Lamontville does not have easy access to a freeway, although it is located next to the N2.

6.2.2. Local Community Roads

The local roads in all communities surrounding the site are confusing to navigate. This is possibly due to apartheid planning with the intention of making the lives of races other than that of the white population as difficult as possible. The local roads do not link up with surrounding communities which enhances the segregation between them.

6.2.3. Railways

There is a railway line which follows the Higginson Highway into Chatsworth. There is a station on the opposite side of the freeway to Havenside. There is also a railway line which runs into Umlazi which has four stations in the township, but none are located near enough to the site to be effective.

6.3. SITE ANALYSIS (geographical)

Although it is a greenfield
site, it is protected by D'MOSS, which means a significant portion of the site must remain untouched in order to preserve the flora and fauna of the area.

The site is bound by the Umlaas Rive to the south west, as well as flood planes to the east and west.
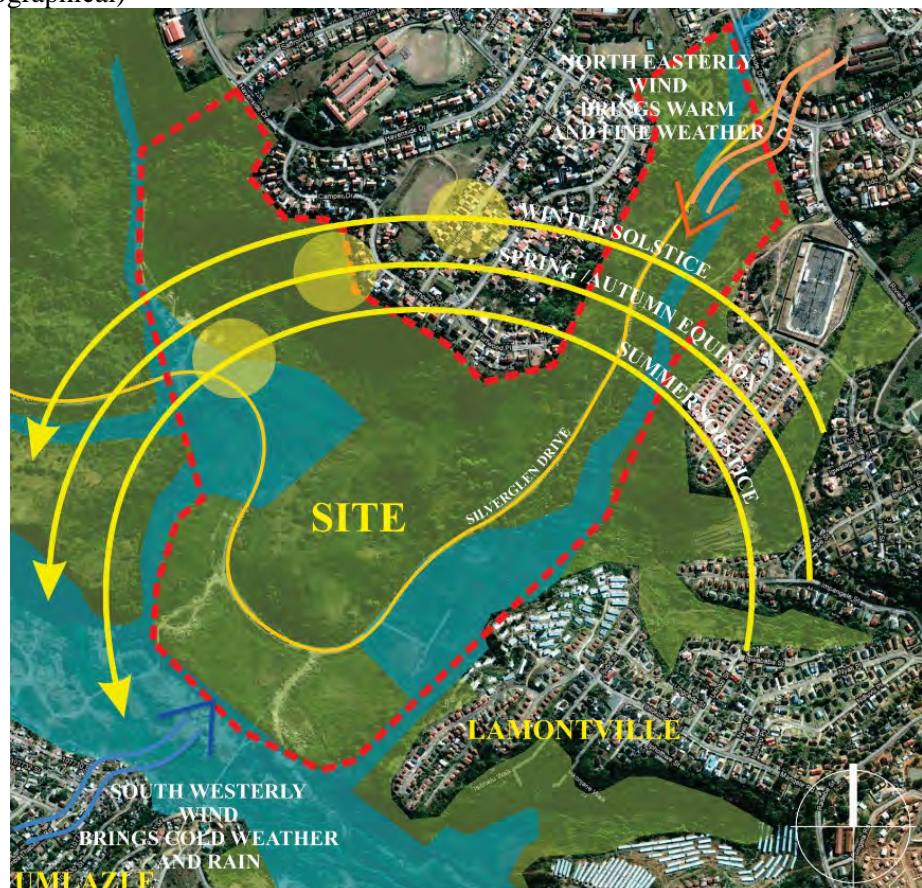
The site is very challenging in terms of terrain, and parts of it are too steep to build on.

SITE PLAN WITH CONTOURS

SITE SECTION B-B

SITE SECTION A-A

FLOOD PLANES

VIEW FROM ACROSS THE RIVER

CLIFF FACES

VIEW FROM ACROSS THE RIVER
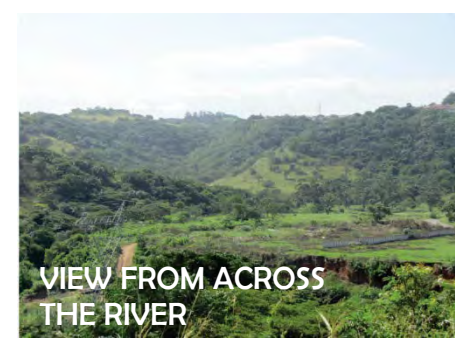
CHAPTER 7   URBAN AND BUILDING DESIGN BRIEFS

7.1. URBAN DESIGN BRIEF

Although the purpose of this dissertation is to derive a building from the research data, the topic and data researched requires a large-scale urban intervention in order to deal with the issues discussed previously. In order to derive the brief for this urban design intervention, we must look back on this data.

Due to the actual outcome of this project needing to be a building, the urban design will be developed simply to address the concepts and theories discussed in the document, and to inform the final building.

In order to link with the topic, research data and general city planning and marketing strategy, the following are urban design intentions:

- The Site must be designed as a *town centre* which accommodates all income groups and cultures of the surrounding communities.

- The usage of the land will be mainly *corporate offices, Small, Medium and Micro Enterprises (SMME's) and residential*. The site also allows the opportunity of creating a waterfront along the river which could become an *entertainment node*.

- Building typologies must cater for larger businesses in the form of office parks, SMME's in dedicated premises near public transport and mixed use buildings of residential, retail and office space.

- *Linkages from surrounding communities must culminate on the site* to aid integration and increased access to the rest of Durban.

- The urban design must make provision for a *transport interchange of trains, Bus Rapid Transit and minibus taxis*. This transport interchange will be the catalyst for development, and would serve as the hub for the site and all surrounding communities.

- There is a need for a place in which SMME's and larger businesses blend, therefore a place which includes *shared office facilities* will be required.

7.1.1. Linkages

Linkages are the most important aspect of this design proposal. The site was chosen specifically to illustrate how intentionally physically dissociated communities can be integrated with each other, but also with the rest of the city.

The site needs to be a meeting point for all surrounding communities, but also form a gateway to other parts of the city; therefore linkages need to be bold and positive gestures in order to make an impact.

All modes of transport need to be taken into account: high volume public transport in the form of bus rapid transit and rail networks, arterial roads for local traffic, and pedestrian links for those who do not have private transport.

The site will form a hub of employment and transport infrastructure. It is intended that this hub is linked via public transport services with other office nodes within the greater Durban area. The linkages will need to uphold this characteristic.

7.1.2. Zoning

From the abovementioned intentions, the following five zones need to be included in the urban design:

7.1.2.1. Mixed-Use Zone

This is to be mixed residential and office premises. There should be a hierarchy of public, semi-private and private spaces and the whole area should be as walkable as possible. The development should be orientated toward maximising the efficiency of the public transport systems which will be introduced, meaning building densities should be greatest along routes and near stops, and diminish as one moves away from the routes and stops.

The urban design of this zone should take on the principles of New Urbanism, discussed in subchapter 2.4.4 of the research document. These principles include densifying development with the intention of creating mixed-use, safe, walkable, public transport orientated

Plate 36: Example of a semi-public square at Umhlanga New Town Centre, Durban. Notice place-making structure (Author, 2010).

environments for residents, visitors and office workers alike. The public areas should be of a high standard and consideration should be given to the manner in which pedestrians and vehicles cross paths.

Although densities should be medium-to-high, building setbacks, as in the proposal by Maxwan Architects around Leiden Station, Netherlands, should be designed in such a way to

let as much natural light reach the street as possible. Buildings should be sophisticated yet functional in order to promote the progress and common goals of the surrounding communities. Their facades should speak to the pedestrian more than vehicles to keep the pedestrian interested and involved in the space. The ground floors should be retail and restaurants, the two floors above this should be offices, whilst the remaining floors are residential. All parking should be located in basements.

Plate 37: Example of how balconies relate to pedestrian street at Umhlanga New Town Centre, Durban. This is a form of passive surveillance (Author, 2010).

This mixed-use zone will form the 'town centre' of the urban design. It will have a Bus Rapid Transit route running through its main axis which will terminate with the transport interchange and business incubator.

7.1.2.2. Office Park Zone

This zone will be used as a catalyst for development, much like how La Lucia Ridge Office Estate was used in order to create development and investment interest on Umhlanga Ridge. Office Parks will be used in order to create office space which is perceived as safe in order to promote corporate interest in the area. The typology of building will be that of gated estates which comprise stand alone, low density, low-rise office buildings where parking is provided but hidden from view by either the use of vegetation, or that of basement parking.

Plate 38: La Lucia Ridge Office Estate, Durban. Notice the low density nature of development, stand-alone buildings and their connection with vast landscaped gardens (Author, 2010).

Although this building typology promotes private vehicle use, this is the intention because as discussed in the research document, due to apartheid planning, middle and upper income groups use private transport due to their location in relation to available public transport. This acceptance of the private vehicle in the development of office parks is warranted in order to entice middle and upper income groups to the site in and to create initial activity there.

The road connecting the various office parks will be part of the Bus Rapid Transit network for those who work in the office parks but do not own cars.

7.1.2.3. Waterfront Entertainment Zone

This zone will be the centre of entertainment for the region. It will comprise a network of streets filled with shops, bars, restaurants, clubs and cinemas. Along the river's edge will be a promenade, onto which will look restaurants, hotels and specialised shopping facilities.

The building typology in this zone will comprise low-to-medium rise, medium density dwellings, mixed-use, but focused on entertainment. Ground floors should be retail,

Plate 39: Crown Casino and Entertainment Complex, Melbourne, Australia. Alongside the Yarra River is a building complex of a shopping mall, casino, cinema, food court, and the river's edge is used as a public entertainment space which has a fire display every evening at 9pm which adds to the character of the area (Author, 2010).

restaurants, clubs and other entertainment facilities, the first floor should be offices whilst the second and perhaps third floor should be residential. All parking should be located in basements so that the streets are for the sole use of pedestrians.

The waterfront zone will be busy twenty-four hours a day.

7.1.2.4. Ecological Zone

Due to the site being zoned as D'MOSS, a certain amount of land will need to be left untouched. Although this land needs to be retained, all efforts need to be made in order to make the area safe for use. It should be promoted as a picnic area, or a place for local business people to hold meetings. It should be transformed into a pleasant place to be and to walk through, as opposed to one which is dangerous and crime-ridden. Open lawns should be created for play areas for families with children, and gazebos and pavilions should be erected so that people

Plate 40: A revitalisation initiative, Docklands in Melbourne has interesting built forms which entice people to use the space. On the ground floor of these buildings are restaurants whilst above them is residential. Building heights have been staggered, with some very tall, place defining, forms (Author, 2010).

Plate 41: A park in Melbourne, Australia with a traditional gazebo which provides an historical reference to when the park was created. Notice the open lawns and large trees which creates a safe environment (Author, 2010).

can sit in shade other than that which is made by trees. These buildings can also be used in order to link the Nature Zone to the new built form of the town centre.

7.1.2.5. Transport Interchange and Business Incubation Zone

This zone will take the form of the building which will be discussed in greater detail in subchapter 7.4. But briefly, this will comprise a single building which will accommodate a railway station, a Bus Rapid Transit station, a taxi rank and business incubator for Small, Medium and Micro Enterprises.

7.1.3. Summary and Conclusions

Generally speaking, the urban framework must be pedestrian friendly with large emphasis placed on the use public transport. There should be a hierarchy of spaces, from public, semi-public to private. Mixed-use development will ensure a safe place for a live, work, play lifestyle by using passive surveillance techniques which will prevent the area from dying at night which would create a hostile environment.

Linkages from surrounding communities are vital to the concepts and theories involved in this scheme. They must take the form of road, rail and pedestrian means to culminate on the site in order to create a town centre which can be used by everyone. This will signify a truly democratic, post-apartheid town centre.

7.2. BUILDING BRIEF: TRANSPORT INTERCHANGE AND BUSINESS INCUBATOR

7.2.1. Introduction

The proposed building is a transport interchange with a business incubator component. The transport interchange will comprise a train station, a Bus Rapid Transit station and a taxi rank. In order to design an appropriate interchange, one needs to analyse the potential numbers of people who would pass through the building, as well as have an understanding of the site context, which then informs the design of an optimal transport interchange relevant to its specific location.

7.2.2. Site Location

Figure 14 shows the level of importance placed on the transport interchange in the urban design proposal. This shows that it is intended that public transport is the generator of development in this locality, and the building should be designed to cater for public functions. It should also be noted that the majority of the people living around the interchange will rely on public transport because they will not own private vehicles.

The urban design site was chosen because it was located between three communities which are dissociated due to apartheid city planning. Rail infrastructure does exist in Chatsworth and

Umlazi, but Lamonville and Umlazi E are not served by rail. A rail line can be branched off from the Chatsworth line before the Havenside station.

The site of the transport interchange is very prominent. It is at the end of a large hill, and can be seen from many locations. It is intended in the urban design that the transport interchange forms the termination point of an axis on the hilltop. The station will be located on the slope of the hill so that it can be used as a pedestrian link from the lowest level of the urban site to the highest level. This aids in the design of the interchange because of the necessity of having several levels in the building which serve different functions.

The site location of the transport interchange is a symbolic one, just as much as it is practical. It is symbolic because it forms the heart of the urban design and the surrounding communities. It links these areas together whilst also linking the different levels of the urban design together. It is practical because of the design requirements of the building typology, also because it is located in an area which is devoid of public transport.
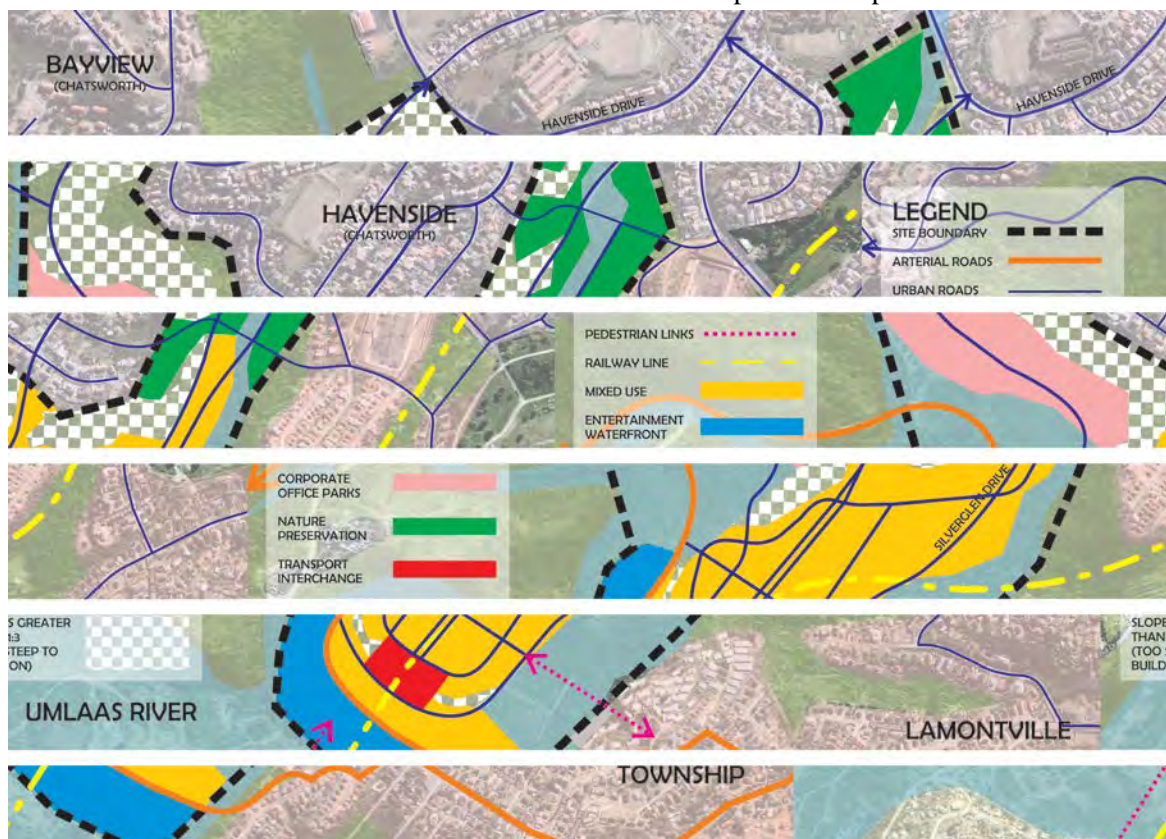
Figure 25: This diagram shows an interim urban design of the chosen site. The location of the proposed transport interchange is shown in red. The site of the transport interchange is located at the end of an axis and on a steep slope in order to address extreme level changes of the urban design (Author, 2011).

7.2.3. Functional Requirements

The functional requirements of the proposed building arise from the need of a public transport interchange in the location discussed in subchapter 7.2.2, as well as from the need for

employment opportunities in locations which are devoid of these due apartheid planning, coupled with office decentralisation which has occurred in areas which are already wealthy, whereas the chosen site is in a location which is inherently poor, with poor access to employment opportunities due to apartheid planning.

The proposed building will have the following functions:

7.2.3.1. *Providing public transport for the people who will live in the new urban scheme, as well as for those who live in surrounding communities.*

The transport interchange is intended to have a railway station, a taxi rank and a Bus Rapid Transit (BRT) station.

Although the city of Durban does not yet have a BRT system, the author proposes it should due to significant traffic congestion and challenging terrain which would make a high-speed rail network very costly. BRT also uses existing infrastructure which makes it cost effective.

The reason for the modal interchange is due to varying degrees of access to modes of public transport in the surrounding areas. For example Lamontville is only served by minibus taxis whilst Umlazi and Chatsworth are served by rail as well minibus taxis.

It is intended that the taxi rank will accommodate short-haul minibus taxi routes from Chatsworth and Lamontville which would feed either the railway station and BRT, or the proposed town centre itself. The BRT will serve mainly Yellow Wood Park, Woodlands, Chastworth and Mobeni Heights, and will bring workers to the town centre, or to the railway station. The BRT will also shuttle people around the proposed town centre. The railway station will have a dual function of bringing people from Umlazi to the proposed town centre for work, but also serve as the point of arrival and departure for commuters from all surrounding communities travelling into the city centre, or other areas, for work purposes.

In order to design such multi-modal interchanges effectively, one needs to know the numbers of people who would pass through the interchange at peak times.

Table 1 shows the potential passenger figures which could flow through the station per day. The figures are based on the census 2001 data which was tabulated for the eThekwini Municipality and released on www.capmon.durban.gov.za. Table 2 transforms the data obtained from Table 1 into how passenger numbers could split into different transport modes at the interchange.

	POPULATION				IN- AND OUT-BOUND PASSANGERS	
	Total Population	**Total Employable Population**	**Total no. Unemployed**	**Proposed Transport Mode**	**Proposed no. Inbound (town centre)** *Calculated: no. Unemployed +10% of total population*	**Proposed no. Outbound (commuter: city and other areas)** *Calculated: 20% of Proposed no. Inbound*
Yellow Wood Park	5,066	2,500	185	BRT --------- Park & Ride	591 --------- 100	138
Woodlands	8,924	4350	660	BRT --------- Park & Ride	1,152 --------- 100	310
Chatsworth (Havenside; Bayview; Silverglen; Croftdene)	43,787	14,130	5,330	Minibus Taxi ---------- BRT --------- Park & Ride	4,700 ---------- 4,809 ---------- 200	1,942
Mobeni Heights	4,384	2,060	700	BRT	1,138	228
Lamontville	29,879	13,770	8,250	On Foot ---------- Minibus Taxi ---------- BRT ---------- Train	2,000 ---------- 4,000 ---------- 3,238 ---------- 2,000	2,248
Umlazi E	19,132	8,385	4,990	On Foot -------- Train	903 -------- 6,000	1,381
Umlazi (overall)	According to Prasa, 221,300 passenger trips are made daily on the existing Umlazi rail corridor (Prasa, 2006: 41). It is estimated that 1/5 of this number will pass through the proposed station.			Train	44,260	8,852

	Total Residential Units	**Approx. Total Population**	**Approx. Total Employable**	**Proposed Transport Mode**	**Proposed no. Inbound (town centre)** *Calculated: 10% of approx. Total population*	**Proposed no. Outbound (commuter: city and other areas)** *Calculated: 10% of approx. Total employable*
Urban				On Foot	300	

Design Proposal	3,000	7,000	4,000	-------- BRT -------- Park & Ride	-------- 350 -------- 50	-------- 400
TOTALS					**75,891**	**13,776**

Table 1: This table shows the workings of arriving at the population the transport interchange would potentially serve daily. Note this is not an outline of passengers moving through the station at peak times (Tabulation by Author, 2011, initial figures obtained from www.capmon.durban.gov.za and Prasa, 2006: 41).

	MODAL SPLIT AT STATION				
	Trains	**Minibus Taxis**	**Bus Rapid Transit (BRT)**	**On Foot**	**Park & Ride**
Inbound (town centre)	*(25% of total inbound + Umlazi overall @ 44,260)* 8,000+44,620 =52,268	*(28% of total inbound exluding Umlazi overall @ 44,260)* 8,700	*(36% of total inbound exluding Umlazi overall @ 44,260)* 11,278 = total arriving in urban scheme. *Total arriving at interchange = 20% of total outbound.* 20% of 13,775 = 2,755	*(10% of total inbound exluding Umlazi overall @ 44,260)* 3,203	*(1% of total inbound exluding Umlazi overall @ 44,260)* 450
Total Inbound (to town centre)	**75,899 commuters**				
Outbound (commuter: city and other areas)	8,265 *(60% of total outbound)*	2,755 *(20% of total outbound)*	2,755 *(20% of total outbound)*	-------	-------
Total Outbound (from station)	**13,775 commuters**				
TOTAL MOVEMENT WITHIN BUILDING	60,525	11,455	5,510	3,203	450

Table 2: This table shows how the population who pass through the station daily would potentially split into the various modes of transport (Tabulation by Author, 2011).

It can be seen from Tables 1 and 2 that more passengers will be flowing into the "town centre" than flowing outward to the rest of the city. This is deliberate due to the creation of jobs in the new town centre. Provision must be made for people to

work in areas other than the town centre, and this is where the modal interchange becomes an important part of the development.

It is clear from the figures in Table 2 that the majority of the population will access the urban scheme by the proposed Bus Rapid Transit (BRT) as routes will pass through areas in which the population rely on private vehicles to get around. These areas generally are generally not serviced by minibus taxis either, which is why the population is greater. BRT routes will form the most prominent public transport mode within the town centre.

Minibus taxis must be taken into account as they play a vital role in the transportation of people. Their intended role is to work with the BRT to deliver people from surrounding communities to the town centre at transport interchange.

Pedestrian access to the interchange is encouraged due to the critical mass of surrounding communities, as well as the proposed mixed use town centre.

From Table 2 it is estimated that 60,525 people will pass through the train station daily; 11,455 will pass through the taxi rank daily; and 5,510 will pass through the BRT stations daily.

7.2.3.2. *Providing office space for start-up companies in the form of a business incubator.*

The urban design intends to serve as a town centre for the surrounding communities so that it forms a place which bridges buffer strips that were used by apartheid planners to separate communities of different races and income groups. The town centre needs to appeal to Small, Medium and Micro Enterprises (SMME's) as well as large corporations. It is for this reason that the business incubator is included in the proposed building to serve as a catalyst, or starting point, of office development in the area. It is intended that once SMME's "graduate" from the business incubator they will move into premises surrounding the station because they will be able to retain their client base but also provide employment for the surrounding communities. This will also inform the design of the transport interchange.

Office parks are part of the urban design proposal and are intended to help SMME's become established companies by supporting them by way of sponsorship or by the purchase of their products.

It is important to have the business incubator within the transport interchange because it provides maximum exposure to the start-up companies due to the large volumes of

people passing through the building each day. It is also very convenient for the tenants because they may not have funding for private transport, but also the location appeals to potential clients who are in a similar position.

More than anything, a business incubator is a place to learn how to manage and run a business, which makes it a place of learning. Although it is not a learning institution, it is of a similar typology.

This business incubator will have office space available for up to 30 start-up companies (floor area dependent). Companies will remain under the mentorship of the incubator for three consecutive years. Therefore there would be ideally 10 companies in their first year, 10 in their second and 10 in their third year of mentorship. The years should not be clumped together but dispersed amongst other years in order for the sharing of knowledge to occur across all years.

Along with private office space for the clients of the incubator (the companies), there needs to be office space for the management staff of the incubator itself. There also needs to be communal meeting spaces for the incubator clients, as well as training rooms, banks and access to internet, telephone, fax and photocopy facilities.

7.2.4. Brief

The brief calls for a unique mix of building typologies, located within an urban design which has not been built yet. The proposed building is intended to act as a catalyst for development in a location which was previously a buffer strip of land between dissociated communities brought upon by apartheid planning. It is intended for this urban design and building typology to serve as an example by which actively decentralising the office employment in a post-apartheid city can bring economic advantages to the previously disadvantaged communities during apartheid. The reason for this pledge is due to the observation that office decentralisation has not occurred in areas where economic upliftment is needed desperately.

The building typology will be a transport interchange incorporating commuter trains, Bus Rapid Transit and minibus taxis. As part of this interchange there needs to be a park-and-ride parking garage for those who want own cars but want to leave them in a safe place whilst using public transport. Retail is also an important part of the interchange, and will add to the revenue of the building. Outlets need to be located in strategic locations yet must not interfere with the pedestrian traffic flow through the concourses in the building. Station ticketing and management offices also need to be accounted for. These need to be located near the main

entrance for security and ease-of use of the public. The whole interchange needs to be light, airy and legible.

Under the same roof will also be a business incubator which will need to have its own entrance yet still be accessible to the concourse in the building. The business incubator needs to have private office space for clients, communal meeting rooms, training rooms, management offices, kitchens, canteens, ablutions and informal meeting spaces. This part of the building needs to have a professional feel in order to teach the start-up companies about the outside world.

To conclude the list of functions required in the building:
- Transport Interchange
  - Commuter Railway Station
    - Public Square / Entrance
    - Access and Ticketing
    - Retail / Waiting / Ablutions
    - Platforms / Boarding
  - Local Minibus Taxi Rank
    - Parking and Roadways for Taxis
    - Waiting / Boarding Pavements
    - Retail / Informal Trade
    - Ablutions
  - Bus Rapid Transit Station
    - Ticketing
    - Waiting / Boarding
    - Exit
  - Park and Ride Facilities
- Business Incubator
  - Incubator Management Offices and Reception
  - Cellular Rentable Client Office Space
  - Communal Formal Meeting Rooms
  - Communal Informal Meeting Spaces
  - Communal Internet, Facsimile, Photocopy Rooms
  - Tea Kitchens
  - Ablutions
  - Private Access

7.2.5. Schedule of Accommodation

The schedule of accommodation for the proposed transport interchange and business incubator will be broken into four sections: railway station; Bus Rapid Transit Station; minibus taxi rank; and business incubator. Each of these have very different requirements which is why they will be broken into sections.

7.2.5.1. Railway Station

The schedule of accommodation for the railway station will be based on data gathered from precedent and case studies of various stations, as well as published data by the Passenger Rail Agency of South Africa (Prasa) and Metrorail.

According to Prasa's National Railplan Consolidated Report of August 2006, the existing Umlazi rail corridor is categorised as a level "A" route (Prasa, 2006: 27). This means that the route has a high service level, and ranks amongst the top rail corridors where rail is a more appropriate and cost effective means of transport than other modes. Passenger numbers range between 20,000 and 40,000 per hour on this route (Prasa, 2006: 23). Although the proposed station is not on this route, it will be able to feed off this large number of commuters. It is therefore suggested by the author that the link between the Umlazi corridor and the Chatsworth corridor become an "A" level route. This would give the proposed station the following operational requirements:

	Level of Service Required
Hours of Service (from first train in the morning to last train at night)	21 hours 02:00 to 23:00
Train Intervals: Peak	1 train / 6 minutes
Train Intervals: Shoulder Peak	1 train / 10 – 12 minutes
Train Intervals: Off-Peak	1 train / 20 minutes

Table 3: "A" level route requirements specific to the eThekwini region (Prasa, 2006: 29).

At peak times, it equates to 10 trains per hour which will pass through the proposed station. According to the Prasa National Railplan Consolidated Report, there is a difference between the crush loading, safe loading and the preferred loading capacities of coaches.

Crush loading shows the actual passenger loading per coach. The highest level of crush loading would normally occur during the weekday morning peak period, when passenger demand is greatest. This level of loading is a very uncomfortable trip for passengers, as well as a safety hazard in the event of an emergency (Prasa, 2006: 57).

Safe loading is the maximum design loading of the coaches, whilst the preferred loading is a more comfortable travelling load. Each region in South Africa has its own figures on these loads. The following table illustrates those of eThekwini:

Loading Type	eThekwini
Crush Loading:	
Per Coach	300
Per 12 car train	3,600
Safe (Normal) Loading:	
Per Coach	250
Per 12 car train	3,000
Preferred Loading for "A" level Corridor	
Per Coach	160
Per 12 car train	1,920

Table 4: Crush, Normal and Preferred passenger loading on "A" level routes specific to the eThekwini region (Prasa, 2006: 58).

From Table 4 it can be seen that there are large differences in passenger loading figures. The author shall use the preferred (normal) loading figure of 250 per coach, 3,000 per 12 car train because this is the actual design load of the coaches.

It is stated in the Prasa National Railplan Consolidated Report that 221,300 daily passenger trips are made on the Umlazi rail corridor – the largest number in the eThekwini region (Prasa, 2006: 41). The calculation in Table 1 shows potential users in Umlazi E, and not the whole of Umlazi. It is for this reason that the potential number of train-users in the proposed station be increased to the maximum capacity of 30,000 passengers / per hour. This figure is based on 10 trains of 12 coaches each, loaded to the preferred normal loading rate of 250 persons per coach, arriving per hour, during morning peak time.

The railway station is intended to have four platforms. A worst-case scenario needs to be designed for, which is four fully loaded trains arriving simultaneously. This equates to 4 x 3,000 = 12,000 passengers arriving at the same time.

	Value
Circulation	1.5m² per person (Blow, 2005: 163)
Average Speed of Passenger	78m per minute (1.3m/s) (Blow, 2005: 163)
Flow Rate	33 people per metre per minute (Mthembu, 2008: 96)
Ticket Window Capacity	143 people per 15minutes (Mthembu, 2008: 96)

Table 5: Table showing related passenger spatial and movement standards.

Passengers are expected to detrain at a rate of 300 people per minute (ILISO, 2006: 16, through Mthembu, 2008: 97). This means that a full load of 3,000 passengers will detrain in 10 minutes.

Each passenger arriving at, or departing from, the station during peak hour is likely to spend as little time in the station as possible due to the rush they may be in. Also, each detraining passenger will walk through the station at differing speeds. This means that the maximum of 12,000 passengers will not arrive at the main hall, or gathering space, at the same time. It is for this reason that this gathering space may accommodate half of the maximum number of detraining passengers.

RAILWAY STATION ACCOMMODATION SCHEDULE				
PUBLIC INTERFACE				
Accommodation	**Function**	**Area per unit**	**No. Required**	**Total Area**
Main Hall	Main gathering space	6,000 x 1.5	1	9,000m²
Ticket Office	Ticket sales cubicles. If 143 people are served per 15 minutes at each cubicle, 572 people will be served per cubicle per hour. This number will be supplemented by	3m²	12,000 ÷ 572 = 21 tellers required, but 12 tellers	36m²

	automatic ticket machines.		will be provided.	
Information Kiosk	Information given about trains and their times, also navigation through rest of building.	12m²	1	12m²
Turnstiles	Barrier between paid and non-paid areas		12	
Platforms	Each platform island is to be 9 metres wide, and 270 metres long (Prasa, 2011: 33)	2,430m²	2	4,860m²
TOTAL RAILWAY RELATED PUBLIC AREA				**13,728m²**
Retail	Planned along the main concourse within the station, as well as on the exterior near the station entrance. Outlets would include bookshops, gift shops, clothing, electronics and a convenience supermarket			3,300m²
Restaurant	If 1 person = 2m² (Lawson, 1987: 78) 120 seater restaurant Kitchen = 1/3 of dining area	240m² 80m²	3	720² 240²
Coffee Shop	If 1 person = 1.6m² (Lawson, 1987: 78) 100 seater coffee shop Kitchen = 1/3 of dining area	160m² 53²	3	480m² 159m²
Fast Food Outlet	If one person = 1.6m² seated, and 0.6m² queuing (Lawson, 1987: 78) 50 seats dining + 30 standing queue Kitchen = 1/3 of dining + queuing area	57m² 28m²	11 11	627m² 308m²
TOTAL LETTABLE SPACE WITHIN RAILWAY STATION				**5,594m²**
Public Ablutions	Figures based on SABS 0400-1990. Considering peak demand			

	would be 12,000 persons:			
	Male:			
	WHB	1m²	24	24m²
	WC	2m²	24	48m²
	Urinal	1m²	50	50m²
	Female:			
	WHB	1m²	29	29m²
	WC	2m²	90	180m²
	Male and Female Disabled	4m²	2	8m²
TOTAL PUBLIC ABLUTIONS AREA				**339m²**
TOTAL PUBLIC AREA				**19,793m²**
ADMINISTRATION AND SECURITY				
Accommodation	**Function**	**Area per unit**	**No. Required**	**Total Area**
Supervision Office	To monitor tellers and activity in the main public areas	9m²	2	18m²
Clerk Office		10m²	1	10m²
Cash Room		7m²	1	7m²
Cash in Transit		5m²	1	5m²
Strong Room	Large sums of cash are held on the premises	3m²	1	3m²
Admin Store		3m²	1	3m²
Tea Kitchen/ Staff Room		40m²	1	40m²
Locker Rooms		9m²	2	18m²
Officer in Charge	To manage security systems and to react to security breaches	9m²	1	9m²
CCTV Monitoring Room		15m²	1	15m²
Security Room	Offender questioning	9m²	1	9m²
Holding Cell	In case of suspected security breach	3m²	2	6m²
Staff Ablutions	Figures based on SABS 0400-1990, and 30 persons will be on duty simultaneously: Male:			

	WHB	1m²	2	2m²
	WC	2m²	1	2m²
	Urinal	1m²	2	2m²
	Female:			
	WHB	1m²	2	2m²
	WC	2m²	3	6m²
TOTAL ADMINISTRATION AND SECURITY AREA				**157m²**
PARKING				
Park-and-Ride	This is the total park-and-ride requirement for the interchange.		450 bays	
Parking for Workers	Park-and-Ride + 10%. For workers in the railway station.		45 bays	
TOTAL PARKING			495 bays	
TOTAL RAILWAY STATION AREA				**19,950m²**

Table 6: Table showing proposed accommodation schedule for the railway station component..

7.2.5.2. Minibus Taxi Rank

The schedule of accommodation for the minibus taxi rank will be based on data gathered from precedent and case studies of various taxi ranks in South Africa. As this building typology is not widely documented in terms of standards, and the fact that this typology is only gaining a sense of real design and dignity in recent years, the case studies will be followed as a guide, and capacity will be derived from the author's estimated usage of 11,455 in Table 2.

It is estimated that 75% of the 11,455 minibus taxi passengers will pass through the rank at peak, and shoulder peak times, bringing the estimated peak/shoulder peak time usage to 8,591 passengers. Shoulder peak times are the hours either side of the high peak times. For example, high peak is 7am-8am, shoulder peak is 6am-7am and 8am-9am.

	Percentage	Value
Shoulder Peak (6am-7am)	20%	1,718
Peak (7am-8am)	60%	5,155
Shoulder Peak (8am-9am)	20%	1,718
Total (6am-9am = 3 hours)	**100%**	**8,591**

Table 7: Table showing proposed passenger numbers at the taxi rank during peak and shoulder peak times.

The rank will be designed for a worst-case scenario of 6,000 passengers (estimated peak + aprox. 15%) arriving and/or departing in the space of one hour, representing 1,000 passengers per ten minutes.

The vehicle chosen by the author as a standard is the Volkswagen Crafter. The chosen model has a long wheel base and a high roof. The reason the author has chosen this vehicle is because it vehicle is used by the minibus taxi industry, and is arguably the largest in terms of dimensions which is important in accommodating it in the design. A diagram showing its physical dimensions can be found in Appendix III-a.

The model of Volkswagen Crafter chosen can be configured to carry 15 + 1 (passengers + driver) (www.burnt-tree.co.uk). From this an estimate can be made of how many taxis will be required to serve the worst case scenario passenger count by dividing the number of passengers by the capacity of the vehicle.

	Value
Worst Case Scenario Passenger Count per High Peak Hour	6,000
Volkswagen Crafter Passenger Capacity	15
No. Taxis Required per Hour	**400**
No. Taxis Required per 10 minutes	**± 67**

Table 8: Table showing proposed number of taxis required per hour, and per 10 minutes during high peak hour.

The number of taxis required can be rounded off to 68 to ease calculation. Together with loading bays, taxi ranks require holding areas where taxis are stored and washed whilst waiting for passengers, for a free space at the loading area – with the examples of Metro Mall and Baragwanath Interchange discussed as precedent and case studies respectively.

In Metro Mall there are generally two holding bays per loading bay (de Jager, 2003: 40). This means that the holding bays required for the proposed taxi rank would be 68 x 2 = 136 bays.

Other functions which are required in the taxi rank include "formalised" informal markets, as in the Baragwanath Interchange, formal retail outlets, security and management offices and public ablutions.

MINIBUS TAXI RANK ACCOMMODATION SCHEDULE				
PUBLIC INTERFACE				
Accommodation	**Function**	**Area per unit**	**No. Required**	**Total Area**
Taxi Loading Bays	Where taxis are loaded with passengers. Vehicle area = ± 15m²	2 x15m² (multiply by 2 for roadway estimate)	68	2,040m²
Taxi Holding Bays	Where taxis are stored and washed whilst waiting for loading space.	15m²	136	2,040m²
TOTAL AREA REQUIRED FOR VEHICLES				**4,080m²**
Passenger Loading Pavements	It is estimated that 4 taxis will be loaded simultaneously, one behind the other. 68 (total taxis) ÷ 4 = 17 rows.	1.5m (4x7m [taxi length]) = 42m²	17	714m²
Information Kiosk	Information given about taxis and their routes, also navigation through rest of building.	12m²	1	12m²
"Formalised" Informal Trading	Planned along pedestrian routes within and around the rank. All require lockable storage.			400m²
Public Ablutions	Figures based on SABS 0400-1990. Considering peak demand would be 6,000 persons: Male: WHB WC Urinal	1m² 2m² 1m²	14 13 30	14m² 26m² 30m²
	Female: WHB WC	1m² 2m²	17 50	17m² 100m²
	Male and Female Disabled	4m²	2	8m²
TOTAL AREA REQUIRED FOR PEDESTRIANS/PUBLIC				**1,248m²**

ADMINISTRATION AND SECURITY				
Accommodation	**Function**	**Area per unit**	**No. Required**	**Total Area**
Management Office	To manage traders and taxi operators.	9m²	1	9m²
Supervision Office	To monitor activity in the public areas.	9m²	1	9m²
Officer in Charge	To manage security systems and to react to security breaches	9m²	1	9m²
CCTV Monitoring Room		15m²	1	15m²
Admin Store		3m²	1	3m²
Tea Kitchen		4m²	1	4m²
Locker Rooms		5m²	2	10m²
ADMINISTRATION AND SECURITY AREA				**59m²**
PARKING				
Parking for Workers			4	
TOTAL PRIVATE PARKING FOR MINIBUS TAXI RANK			4	
TOTAL MINIBUS TAXI RANK AREA				**5,492m²**

Table 9: Table showing proposed accommodation schedule for the minibus taxi rank component..

7.2.5.3. Bus Rapid Transit (BRT) Station

The schedule of accommodation for the Bus Rapid Transit will be based on data gathered from recommended practice documents and market research reports from the United States of America which include the basic specification of buses and the manner in which the stations and roadways are designed around these specifications. These are relevant because bus dimensions are standard, and amenities within Bus Rapid Transit stations are more-or-less standard, with few elements dependent on contextual conditions.

The size of BRT required is dependent on passenger demand (APTA Standards Development Program, 2010: 14). The passenger demand of the stations will be calculated using the same method as that of the minibus taxi rank.

Capacity will be derived from the author's estimated BRT usage of 2,755 arriving and 2,755 departing the proposed interchange in Table 2. These figures need to be added together

because this will form the total capacity of the BRT stations required. The total required capacity will need to be 5,510.

It is estimated that 75% of the 5,510 BRT's passengers will pass through the rank at peak, and shoulder peak times, bringing the estimated peak/shoulder peak time usage to 4,133 passengers.

	Percentage	Value
Shoulder Peak (6am-7am)	20%	826
Peak (7am-8am)	60%	2,481
Shoulder Peak (8am-9am)	20%	826
Total (6am-9am = 3 hours)	**100%**	**4,133**

Table 10: Table showing proposed passenger numbers at the taxi rank during peak and shoulder peak times.

The rank will be designed for a worst-case scenario of 2,800 passengers (estimated peak + aprox. 15%) arriving and/or departing in the space of one hour, representing 467 passengers per ten minutes.

An important variable in BRT station design is the type of bus which will be used in the system. The author has selected a 12 metre low floor bus. The following are primary reasons for using a low-floor bus over a high-floor bus:

- Low-floor buses are much more user-friendly because there is usually only one step up from pavement level necessary, or slight raising of the pavement is easy in order to achieve level-boarding of the bus.
- Platform heights do not pose serious danger to passengers.
- The engines are located at the back of the bus and provide a much quieter and smoother ride than the high-floor bus, where the engine is located beneath the passenger seating area.
- The low-floor bus can use green technologies for power. For example hydrogen gas or hybrid electric (www.mantruckandbus.com).
- Although high-floor buses are cheaper and in wider use within eThekwini, low-floor buses can be used as part of a marketing scheme to change the perception of bus transport.

There is the option of using 18-metre articulated buses in the system due to their higher capacities, but the 12-metre standard bus is preferred due to the generally low density development in surrounding communities which would favour more frequent stops by smaller

buses, than less frequent stops by larger buses. Also there are many communities which would be served by the BRT system which would favour many smaller buses than fewer larger ones. Standard buses are preferred on "feeder" routes whereas a combination of standard and articulated buses is preferred on "trunk" routes (VTA Transit: 2007: 3).

The vehicle chosen by the author as a guide is the MAN Lion's City. The exact specifications of the vehicle can be found in Appendix III-b, but for our purposes now the length of the vehicle is 12-metres, the width is 2.5-metres and it is 2.88-metres high. The bus has three doors: the front-most one is intended as the entrance whilst the other two are exits. This model can take 27 seated- and 75 standing passengers (www.mantruckandbus.com), bringing the maximum capacity to 102 passengers. From this an estimate can be made of how many buses will be required to serve the worst case scenario passenger count by dividing the number of passengers by the capacity of the vehicle.

	Value
Worst Case Scenario Passenger Count per High Peak Hour	2,800
MAN Lion City Passenger Capacity	102
No. Buses Required per Hour	**28**
No. Buses Required per 10 minutes	**± 5**

Table 11: Table showing proposed number of buses required per hour, and per 10 minutes, during high peak hour.

Bus Rapid Transit stations can be designed to cater for more than one vehicle to dock at once. The data from Table 11 suggest that at high peak time, there could be a need for more than one bus to dock every two minutes. To enable at least 5-minutes docking time per bus, at least three buses will need to be able to dock simultaneously.

At worst there is the potential that there could be 306 (3 buses x 102 passengers) passengers alighting buses whilst 306 passengers are waiting to board at one moment in time. This means that at worst 612 people will pass through the BRT stations simultaneously. This figure is for both directions. For one direction it will be 306 passengers at worst. Although, remembering there are two stations – one per direction of travel – there is still the need for this larger number during high-peak times.

Due to the nature of a transport interchange, these BRT stations will be inherently need to be designed as high-volume spaces. In order to aid with the efficiency of the operation at these stations, the following are design suggestions:

- A transition area should be provided. This area should be welcoming and provide passengers with BRT system information before they enter the platform area (APTA, 2010: 30).
- A closed fare system should be used. This system uses foregates, or turnstiles at stations to control access to the boarding areas. This method ensures payment has been made which speeds up the boarding process (VTA Transit, 2007: 71)
- Automatic ticket machines should be placed in the transition area (APTA, 2010: 30). This method of purchasing tickets is much more efficient than via tellers, and also enhances the image of the mode of transport.
- Real-time passenger information systems should be used in conjunction with how the waiting areas are arranged.
- Seeing that it is a high-volume station, it is suggested that leaning rails are installed instead of actual seating (APTA, 2010: 22). This is due to the frequency at which the buses pass through the station.

With this information it is possible to piece together a schedule of accommodation for the BRT station, bearing in mind that there needs to be two stations: one for each travelling direction.

BUS RAPID TRANSIT STATION ACCOMMODATION SCHEDULE				
PUBLIC INTERFACE				
Accommodation	Function	Area per unit	No. Required	Total Area
Bus Parking Bays	Where buses park next to the platform Vehicle area = 30m²	(2 x30m²) (multiply by 2 for overtaking roadway estimate)	6	180m²
Platform	Length is determined by the no. Buses required simultaneously. Width is a function of the anticipated passenger loads.	Length = 3x12m = 48m. Area = 0.7x612 (passenger max.)	2	858m²

		(APTA, 2010:15) = 429m²		
Turnstiles			4	
Transition / Ticketing Area:	Automatic ticket machines (If 143 people are served per 15 minutes at each machine, then 4 machines will be needed to serve 380 passengers in 10minutes)	1m² + queuing space for 306 passengers @ 0.5 x 306 ÷ 4no. = 38.25m² per machine	4	157m²
Public Ablutions	Although BRT stations do not have public ablutions, because these stations will be incorporated into a transport interchange, the additional people within the interchange from the BRT need to have access to ablutions. These will be added to the ablution facilities of the railway station.			
	Figures based on SABS 0400-1990. Considering peak demand would be 610 persons Male:			
	WHB	1m²	4	4m²
	WC	2m²	3	6m²
	Urinal	1m²	12	12m²
	Female: WHB	1m²	7	7m²
	WC	2m²	16	32m²
	Disabled Male and Female	4m²	2	8m²
PARKING: Park-and-Ride bays have been included in the Railway Station Park-and-Ride				

figure.	
TOTAL BUS RAPID TRANSIT STATION AREA	**1,264m²**

Table 12: Table showing proposed accommodation schedule for the Bus Rapid Transit Station in the interchange.

7.2.5.4. Business Incubator

The schedule of accommodation for the Business Incubator will be based on data gathered from the case studies presented in this document, as well as general office planning guidelines.

It is suggested in the brief that the business incubator should cater for businesses which will eventually acquire office space in the urban scheme. It is for this reason that office-related businesses are catered for within the business incubator. This means that rentable space will be in the form of office suites.

It was suggested in the brief that up to 30 companies should be mentored at the same time. This is number is subject to space requirements of the companies who are renting the space, but the number 30 is based on the assumption that each company will occupy an office of 15m². This is large enough for either: a single workstation and meeting table with storage, or up to three workstations with storage (Neufert, 2000: 347). Some companies may require less space than this whilst some may require more, but 15m² is used as an average in order to maintain the desired number of 30 companies under mentorship.

In order to determine the population of the building, a worst case scenario will be 30 companies occupied by three persons each. This amounts to 90 people working in the rentable office areas.

Together with office space, the these companies require larger, communally available meeting rooms, training rooms and events halls, as well as informal areas to relax and mingle with other entrepreneurs and possibly the public or clients. The meeting rooms, training rooms and events halls may be used or hired by people outside the business incubator, therefore they must be designed to function independently of the incubator. They also require ablution facilities and tea kitchens.

In addition to the companies under mentorship of the business incubator, the incubator itself employs people who require office space to conduct their business. According to Seda-eThekwini's construction incubator website, the incubator management structure consists of the following members (the organogram can be found in Appendix A): board of trustees/directors; CEO; personal assistant; regional manager; mentor manager; finance

manager with an assistant; training manager; and training consultant (www.sci.co.za). This organogram does not include a receptionist, however the author recorded seeing one when visiting the Seda-eThekwini complex. The management staff also requires ablutions, a boardroom and tea kitchen.

Some business incubators employ one receptionist to handle all calls and queries for the entrepreneurial companies. It is suggested by the author that the businesses who cannot afford to employ a receptionist should be covered by a common one – the one mentioned in the paragraph above. If, however, some companies can afford one, it will be encouraged they do in order to lift the company's status.

In total, the business incubator will need to accommodate nine permanent staff members. It is expected that there will be a board of directors consisting of nine members (Seda eThekwini, 2010) who will each require a private office. There is also the need for a boardroom. It is expected that temporary workstations and/or meeting rooms for an additional eight staff members not based on the premises will be required (www.sci.co.za). In total, 26 management staff will need to be accommodated in premises within the business incubator.

OFFICE SECTOR ACCOMMODATION SCHEDULE				
BUSINESS INCUBATOR CLIENTS (TENANTS)				
Accommodation	Function	Area per unit	No. Required	Total Area
Office Space	Cellular offices for entrepreneurial companies.	15m² +15% for circulation (Neufert, 2000: 346)	30	518m²
Meeting Room	1 meeting room per 55 workplaces - where working sessions within group of outside personnel occur (Duffy, 1976: 161).	12m² (90pop. ÷ 12m²)	2	24m²
Informal Communal Meeting Space	If each company has a meeting which involved two of their staff members and two visitors/consultants, 60 + 60 =	369m²	1	360m²

	120 people could use this space at once. 3m² per person (Duffy, 1976: 159).			
Lecture Rooms	Lecture Rooms of differing sizes are required (Seda-eThekwini, interview with Mr. Mbele)			
	30 people @ 2m²/person (no. of individual entrepreneurs)	60m²	1	60m²
	60 people @ 2m²/person	120m²	1	120m²
	120 people @ 2m²/person (total management + total tenants)	240m²	1	240m²
Internet / photocopy / facsimile facilities	These can be accommodated in a single room. A wireless network will be present, to which entrepreneurs who have laptops will be able to connect, however 10 computer stations (1/3 of companies) will be provided. Two photocopy/printer machines and two facsimile machines will be provided.	If: *1 computer station = 1.2m², 1 photocopy / printer = 1.2m², 2 facsimile machines sit on table of 1.2m²,* then total area + 15% circulation = 18m²	1	18m²
Tea Kitchen		9m²	1	9m²
Public Ablutions	Figures based on SABS 0400-1990. Considering total office workers would be 90 persons Male: WHB	1m²	4	4m²

	WC	2m²	3	6m²
	Urinal	1m²	5	5m²
	Female:			
	WHB	1m²	5	5m²
	WC	2m²	7	14m²
	Disabled Unisex	4m²	1	4m²
TOTAL INCUBATOR CLIENTS (TENANTS) AREA				**1,387m²**
INCUBATOR MANAGEMENT / ADMINITRATION				
Reception	Shared with incubator tenants	25m²	1	25m²
CEO	Requires office space. Meetings would generally be held in meeting rooms.	15m²	1	15m²
Personal Assistant (PA) to CEO		9m²	1	9m²
Regional Manager		9m²	1	9m²
Mentor Manager		9m²	1	9m²
Finance Manager and assistant		15m²	1	15m²
Training Manager		9m²	1	9m²
Training Consultant		9m²	1	9m²
Additional Offices	For those who are employed by the incubator but work there on occasion.	9m²	2	18m²
Meeting Rooms	Boardroom @ 2m² per person (Duffy, 1976: 159). Nine board members + CEO + PA = 11. Round off to 12.	24m²	1	24m²
	Smaller meeting room for between 6-8 people @ 2m² per person.	16m²	1	16m²
Tea Kitchen		4m²	1	4m²
Public Ablutions	Figures based on SABS 0400-1990. Considering total office			

	workers would be 30 persons			
	Male:			
	WHB	1m²	2	2m²
	WC	2m²	1	2m²
	Urinal	1m²	2	2m²
	Female:			
	WHB	1m²	2	2m²
	WC	2m²	3	6m²
	Disabled Unisex	4m²	1	4m²
TOTAL MANAGEMENT / ADMINITRATION AREA				**180m²**
LETTABLE OFFICE SPACE				
Additional Lettable Office Space	For companies not under mentorship of the Business Incubator, but wish to occupy office space in the station.			1,400m²
Ablutions	Figures based on SABS 0400-1990. Considering total office workers would be 90 persons			
	Male:			
	WHB	1m²	4	4m²
	WC	2m²	3	6m²
	Urinal	1m²	5	5m²
	Female:			
	WHB	1m²	4	7m²
	WC	2m²	7	14m²
	Disabled Unisex	4m²	1	4m²
TOTAL LETTABLE OFFICE AREA				**1,436m²**
PARKING				
Parking for Incubator Tenants	1 bay per office + 20% visitors' parking = 30+6		36 bays	
Parking for Admin Staff	Directors; CEO; PA, managers and training consultant + 20%		20 bays	
Parking for Lettable Offices	4 bays/100m²		56 bays	
TOTAL PARKING		**112 bays**		
TOTAL OFFICE SECTOR AREA				**3,003m²**

Table 13: Table showing proposed accommodation schedule for the Business Incubator in the interchange.

From Tables 6, 9, 12 and 13, it is possible to assemble a final overview of the accommodation schedule of the proposed Transport Interchange which includes railway station, taxi rank, bus rapid transit station and business incubator respectively.

TRANSPORT INTERCHANGE AREA BREAKDOWN	
Component	**Area**
Railway Station	19,950m²
Minibus Taxi Rank	5,492m²
Bus Rapid Transit Station	1,264m²
Business Incubator	3,003m²
TOTAL AREA	**29,709m²**
TOTAL PARKING	611 bays

Table 14: Table showing the total area of the proposed Transport Interchange broken into components. Also shown is the overall parking requirement, including park-and-ride as well as workers' and staff parking.

CHAPTER 6   CONCLUSION AND RECOMMENDATIONS

6.1. CONCLUSION

The solution to the research issue required an urban intervention which would ties surrounding communities together, whilst linking the new node with the rest of the city by means of public transport.

The new node needs to show how actively decentralising office development can bring business and economic opportunities to those who have been previously disadvantaged due to historic Apartheid planning.

The new node needs to have an office park component, mixed use and entertainment zones, as well as a transport interchange. This interchange is the building which is focussed on to further the design to show the principles of systems theory and Kevin Lynch's edges and paths, and how linkages can be used in order to bridge boundaries which had been left by history.
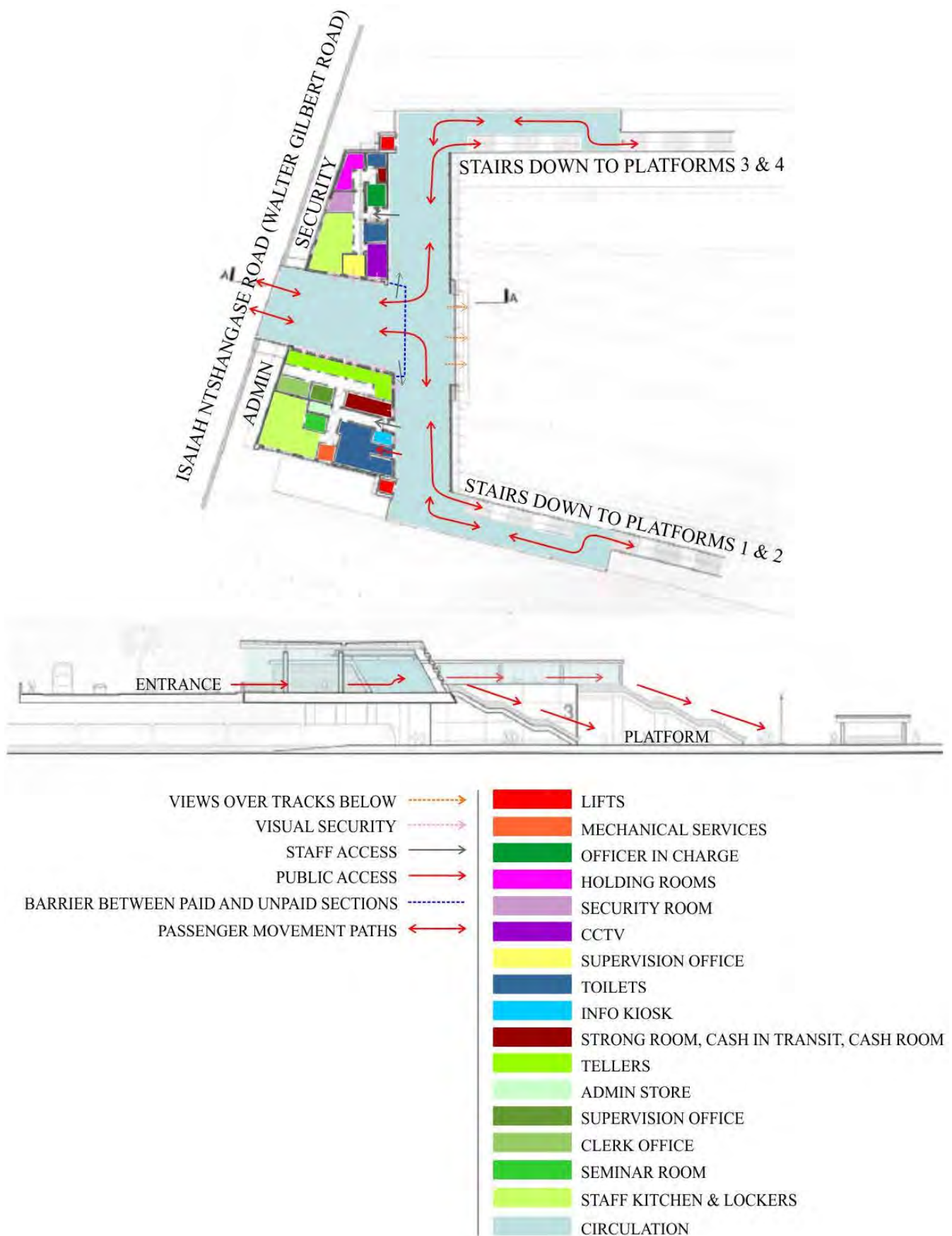
6.2. RECOMMENDATIONS

It is recommended that the precinct be developed as a multi-cultural regional centre which is linked to all other decentralised business nodes for the purpose of providing access to jobs to those who had been disadvantaged due to the location of existing nodes being near wealthy suburbs, as well as providing public transport which would link the nodes for the purpose of creating an efficient business environment.

The transport interchange will use the same principles of linkages, edges, bridging boundaries and creating pathways as the urban scheme. It will be a building which the public will identify with, therefore it must be somewhat of an icon, and be in a prominent location within the urban precinct.

It is recommended that this urban precinct become a model for future decentralised development within South Africa in order to counter the fragmented nature of Apartheid planning.

STAIRS DOWN TO PLATFORMS 3 & 4

ISAIAH NTSHANGASE ROAD (WALTER GILBERT ROAD)

SECURITY

ADMIN

STAIRS DOWN TO PLATFORMS 1 & 2

ENTRANCE

PLATFORM

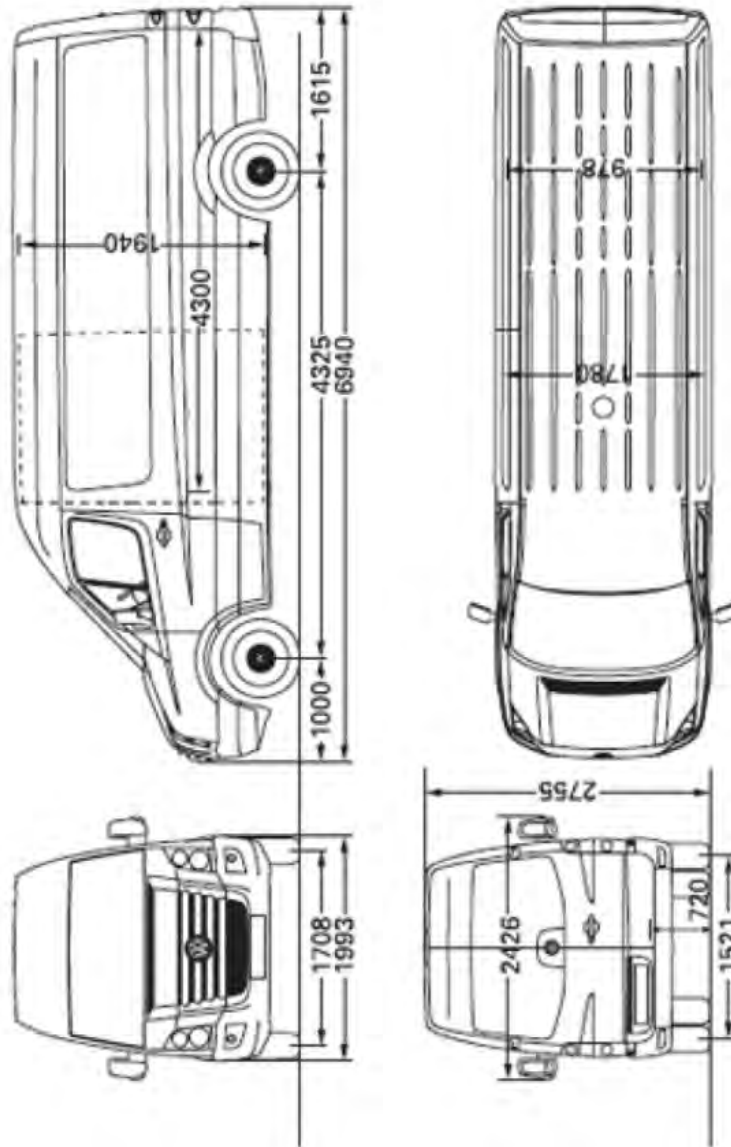|	
VIEWS OVER TRACKS BELOW --------->	LIFTS
VISUAL SECURITY --------->	MECHANICAL SERVICES
STAFF ACCESS ———————>	OFFICER IN CHARGE
PUBLIC ACCESS ———————>	HOLDING ROOMS
BARRIER BETWEEN PAID AND UNPAID SECTIONS ---------	SECURITY ROOM
PASSENGER MOVEMENT PATHS <———>	CCTV
	SUPERVISION OFFICE
	TOILETS
	INFO KIOSK
	STRONG ROOM, CASH IN TRANSIT, CASH ROOM
	TELLERS
	ADMIN STORE
	SUPERVISION OFFICE
	CLERK OFFICE
	SEMINAR ROOM
	STAFF KITCHEN & LOCKERS
	CIRCULATION

APPENDIX II: VEHICLE DIMENSIONS

a. Minibus Taxi: Volkswagen Crafter

Crafter 50 High Roof

b. BRT Bus: MAN Lion City
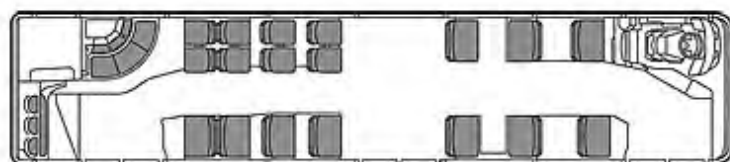
Lion's City (12 m, vertical engine)

- Maximum space utilisation
- Vertical engine is exceptionally low-maintenance
- Maintenance-friendly engine, as it has good accessibility
- Lower engine weight, therefore more standing room and lower fuel consumption

Data sheet	Lion's City (12 m, vertical engine)
Length	11.980 mm
Width	2.500 mm
Height	2.880 mm
Wheelbase	5.875 mm
Overhang	2.700 mm / 3.405 mm
Headroom[1]	2.318 mm
Height raised floor	370 mm
Luggage compartment	–
Entrance height	320 mm / 340 mm / 340 mm
Axle load[2]	7.245 kg / 11.500 kg
Gross vehicle weight	18.000 kg
Engine	EEV: 290 HP
Gear box	4-speed automatic gearbox or 6-speed automatic gearbox
Seating	Up to 27 scheduled-service seats
Equipment	Bright colours, comfortable seating, cantilevered seats with no underseat props, tinted side windows, steeples entrances, kneeling function, ergonomic cockpit; folding ramp for wheelchairs and prams optional, equipment to suit the disabled possible

[1] Standing height is clear dimension between doors 1 and 2
[2] Axle load at front / rear (drive axle) / rear (trailing axle)

Seating example
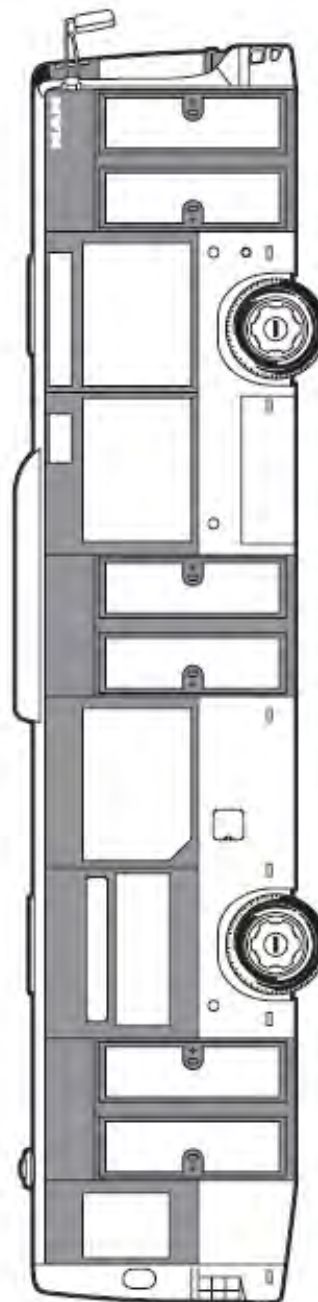
Passenger capacity: 27 passenger seats and 75 standing places
2 or 3 doors possible

Vehicle length: 12 m
Engines: common-rail diesel engine,
Euro 4, 206 kW (280 hp)
EEV, 191 kW (260 hp)

Lion's City
Low-floor city bus with vertical engine

Figure 30: Specifications of the MAN Lion City bus (www.mantruckandbus.com).

APPENDIX III

DESIGN DRAWINGS

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