The Repurposing of the Bellville Marshalling Yard: Achieving an spatially efficient and equitable Metropolitan Cape Town

By

Dylan Majoos

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Abstract

Metropolitan Cape Town is a city that is characterised by immense scenic beauty which has propelled the city to become one of the top tourist destinations in the world. However, if one explores deeper past the intimate streets of the central city and natural beauty of the Table Mountain, one finds a city that is wrought with a lack of functionality and a generally poor urban experience The city is plagued by the shortcomings of modernist planning and Apartheid spatial segregation which translate in a city which is devoid of appropriate located activity and a separation of land uses and people. Therefore, the majority of the Cape Town built from is devoid of character and activity of which the historic centre enjoys.

Through a thorough analysis, I identified key limiting factors within the urban form of Cape Town. These were primarily attributed to the overwhelming tendency for car dominant planning and the presence of limitless sprawl. It was also acknowledge that separate development and modernist planning ideals still permeate through the urban form and significantly limits the urban experience.

This dissertation identified key interventions which attempted at bringing back a sense of place to soulless communities. The primarily focus was on the emphasis on activity corridor development and the implementation of high density infill development. This afford opportunities to curb urban sprawl and to bring citizens closer to economic and social services which are significantly lacking in the poorer peripheral areas. Lastly, this document highlight efficient precinct design criteria and the effective and efficient division of land.

In conclusion, it was identified that it is paramount to undo the misconceptions of developing a city which is simply drivable and focus more on development that create liveable cities.

Acknowledgements

I would like to thank my supervisor Professor Dave Dewar. It was an honour and pleasure to have worked under you. You have made a ‘planner’ out of me.

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Introduction

As South Africa has recently celebrated 20 years of democracy, it is about time that the utilitarian spatial qualities of Apartheid planning and its effect on the built form be unravelled. A move to a more integrated and socially sustainable city which caters to the current needs of its residents is obligatory. As Cape Town continues to experience a steady rate of urbanisation, the city should actively seek solutions to provide residents with an enhanced urban experience through a well thought out spatial environment in order to provide a better quality of life. Successful cities are those that afford its residents with choice (Dewar et al, 2000). This is the choice of where to reside, where to work and where to play. Unfortunately, due to separatist and modernist planning, Cape Town is a city which affords its resident very little choice.

The economic and social inequality brought on by this spatial inequity is exacerbated by the fact that activity often occurs in spatial locations which are inaccessible to a large proportion of residents. The limit of choice in movement patterns throughout the metropolitan area only adds the city's dysfunction and exacerbates exclusion. It is time to bring citizens closer to opportunities and afford the opportunity for citizens to increase their ability to self-actualise.

This dissertation aims at highlighting the problems which manifests within urban South Africa. It shall then, through a thorough theoretical analysis, aim at provided mitigating concepts intended to solve poor spatial qualities. And lastly, this dissertation shall provide a site and precinct plan of an identified infill site which intends to provide a high density, vibrant urban experience on a well located site. This site identified here is the Bellville Marshalling Yard in the Cape Town metropolitan Area.

1.3 Location of Site

The Bellville marshalling yard is located in the northern suburbs of the City of Cape Town in the now incorporated City of Bellville. Situated just off the main railway line leading to other economic centres of the country. In terms of rail freight movement, it is ideally located at the junction of the coastal and interior railway lines. The railway yard is also located just south of the Bellville Central Business District. The Bellville CBD is an important economic node within the metropolitan region and acts as a secondary node to that of the central Cape Town CBD. For this reason, this site is ideal for the location of infill development and its possible development greatly enhances the overall aim of urban compactness.

1.3 Brief Site History

As the town of Bellville was founded on the rail junction of the interior and coastal railway line, the town marketed itself as the ideal location for a railway marshalling yard. In 1945, a survey was conducted to the viability of this location and in the early 1950's land was set aside by the then national railway agency, SPOORNET, just south of the railway junction and Bellville CBD. The town folk at the time welcomed this boost to the community's economy and over the coming decades, the marshalling yard played a significant role in the town's economic growth (Scheepers, 1981). When initially conceived, it was under the impression that the Bellville rail marshalling yard would grow to approximately 10 times by 1980 from its original size in 1951 (see inset). However, today, although the yard has grown from its original size, it has failed to encompass the predicted growth levels and the land cover over the site is completely inefficient. This is exacerbated by the fact that the neighbouring towns and communities have expanded towards the Marshall yards boundaries and the site now acts as a significant spatial divider within the metropolitan area .

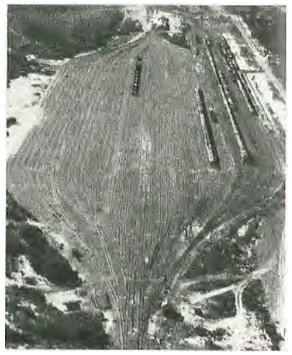
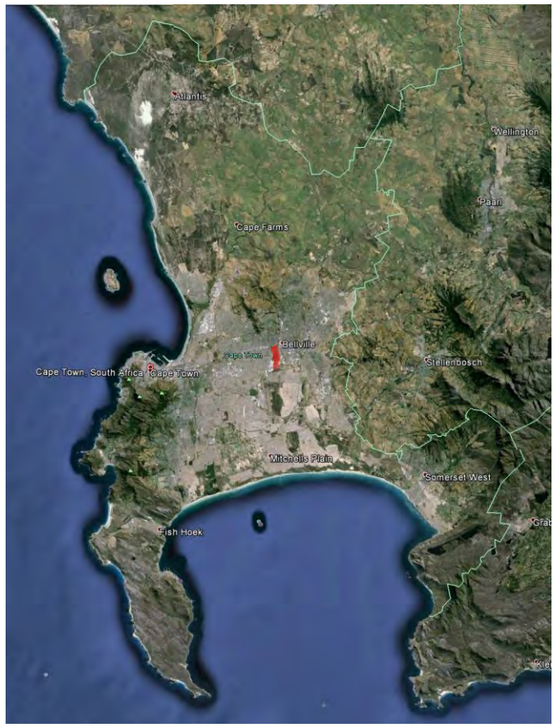


Fig 1.1. Bellville Marshalling Yard (circa 1955) [Scheepers 1998)

Source: Google Maps.2014

Fig 1.2. The Bellville Marshalling Yard



Source: Google Maps.2014

Fig 1.3. The Bellville Marshalling Yard location within Metropolitan Cape Town

Chapter 2

2.1Urban Challenges in South Africa

South African cities are extremely inequitable, inconvenient and inefficient. Dewar and Uytenbogaardt (1991), highlight this fact by stating that South African cities have developed in ways that focus on the extreme separation of land uses through the utilisation of a pro suburban ethos.

Dewar (forthcoming) attributed this inefficient form and layout to two main contributing factors; modernist planning philosophy and the separatist ideology of Apartheid and its subsequent legislations such as the Group Areas act. This combination of forces allowed South African cities to develop in ways that enforced control, promoted the limitation of movements and choice which allowed the then regime to actively provide an appropriate level of national security.

2.2 The effects of modernism in South African cities

The modernist planning movement was aimed at urban restructuring and intended to provide a new design for urban cities. This was the first time that planners decided to engage and change planning settlement. They consciously aimed at breaking the traditions of centuries of settlement patterns in order to create a new and modern city which intended to promote a good life for all. Modernism completely went against all the forms and structures of towns and cities and focus on an anti city ethos. This means that higher densities, small intimate streets and shared public spaces would make way for wide roads, and a suburban style of living (Dewar et al, 2004)

The modernist model within South Africa focused on the philosophy of the single dwelling unit on a free standing plot, the domination of the motor car, the creation of “cell” or inward focused neighbourhoods and the placement of service and minor economic centres within the centre of these cells. Fig 2.1 demonstrates an example of an example of a neighbourhood hierarchy system adopted by the South African planners. This plan is primarily focus on the movement of the motorcar and neglect essential urban characteristics such as activity, choice of movement and primarily made to sustain lower densities (Dewar et al, 2004).

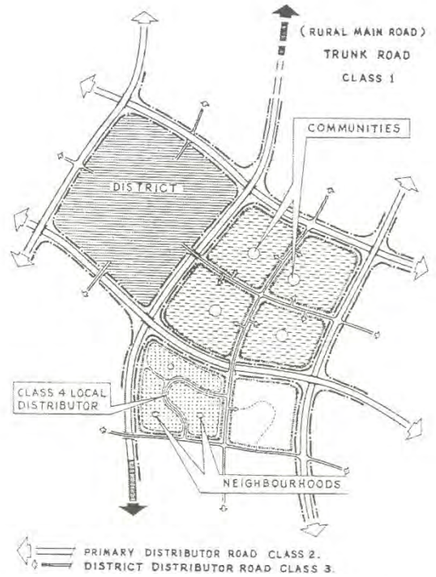


Fig 2.1. Modernist Plan for the Housing Development is South Africa ; From Dewar (2004)

Fig 2.2 and 2.3. Mitchells Plain and Khayelitsha, Cape Town. Examples of modernist settlement building which focuses on low density, enclave neighbourhood cells and vehicular movement : From Dewar (2004)

Ultimately the combination of modernism and Apartheid ideology resulted in 2 main characteristics of South African cities namely low densities and the subsequent urban sprawl and separation.

Sprawl

Modernism focused on the promotion of technologies such as the motor car which was seen as a means of improving lifestyle and quality of life (Deckker, 2000). This led to fragmentation in the form of extremely low densities and eased the planned separation of land uses, classes and races. Modernism followed an ethos of being anti-urban and adopted a more suburban ethos which intended to promote a good urban life which translated in to single plot houses with significant greenery surround the dwelling (Dewar, forthcoming). Carruthers (2002) attributes sprawl to the association of higher densities in locations which are closer to economic opportunities and significantly low land values located for areas located on the urban periphery. Sprawl leads to costly transport contributions to households which find themselves on the periphery**.** This can also results in costly urban infrastructure provision which often gets translated into increased public infrastructure service costs across a metropolitan area (Carruthers, 2002).

Low density sprawl tends to have a negative impact on economic growth as low thresholds provide little opportunities for small business to thrive. These low densities and the associated street patterns promoted by modernism have a far too low of a threshold to successfully support public transport and economic enterprises (Watson 2000). This makes South African cities economically inefficient and this discriminates against smaller businesses by promoting a monopolistic economic environment for those businesses who can afford to be in well located areas. This negatively impacts poorer residences who find themselves on the periphery as they have to travel considerable distances to access economic activity nodes and corridors to maximise their economic choices (Dewar 2000). Due to the high cost required for transport commutes, this reinforces urban poverty and segregation and keeps the urban poor trapped in their dire circumstances

The contemporary urban South African lifestyle mainly consists of life within a single residential dwelling unit. This is irrespective of class, race and income. As single house, low density communities are the common feature of South African cities, the South African identity is now synonymous with occupying a single dwelling unit. This mindset which is heavily influenced by planning practices of the 20th century would have to be progressed into more efficient and sustainable lifestyles as we plan for the future.

Source: Wikipedia.com

Fig 2.4. Khayelitsha, Cape Town. The urban sprawl is only suitable for the motor vehicle as walking distances are too far.

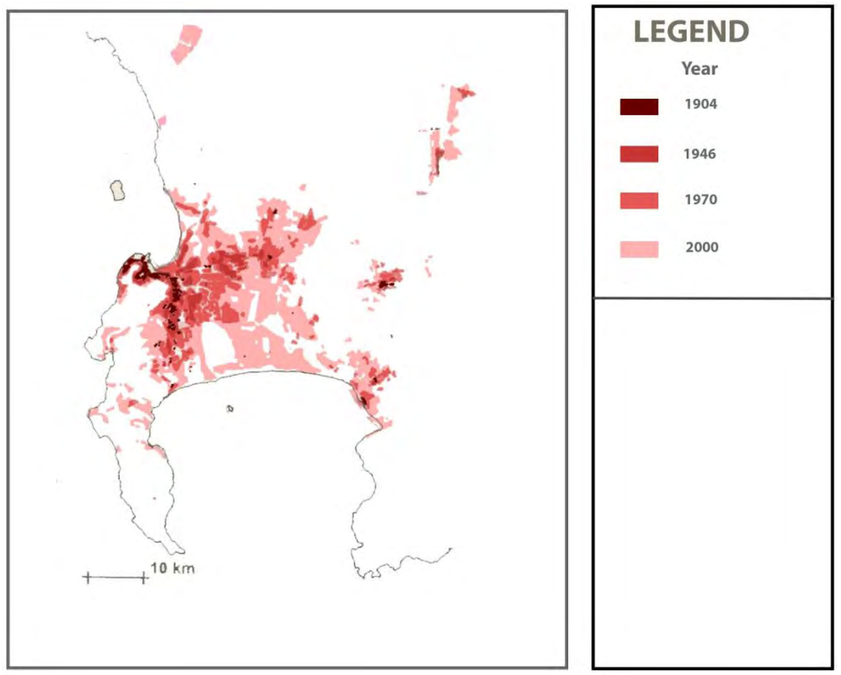


Fig 2.5. To extend of urban sprawl within Cape Town. Most sprawling patterns occurred during the late 1960's onwards (Dewar, 2004)

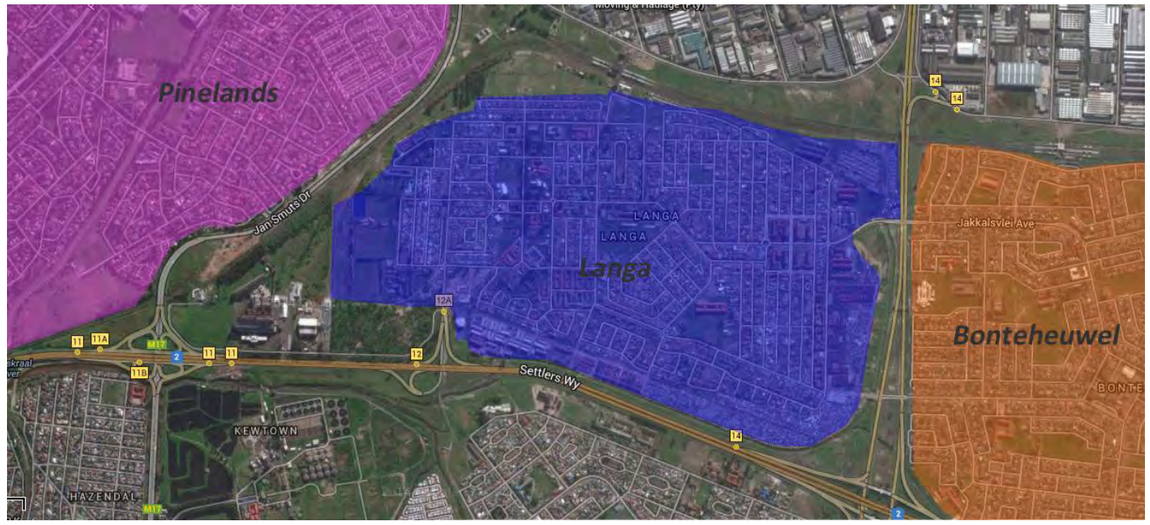
Separation

Fragmentation and separation of cities stem from ideology adapted during the colonial era. Settlement in colonial land was often planned for separated development for the European population and the native population (Balbo, 1993). Cape Town was unique in that it didn't follow this strict separation, particularly during the 19th and early 20th century (Watson 2001). Until the 1950's, Cape Town had a reasonably efficient spatial form considering its unusual physical setting. Suburbs had extended compacted along rail and road routes which was connected to an intensely development central district. Many people lived in mixed areas and the city enjoyed a relatively liberal reputation within the British colonial kingdom and the early half of the 20th century (Turok 2011)

From 1948 onwards, the South African government enforced the system of Apartheid. Apartheid, meaning 'to keep apart', was a system of racial segregation which was enforced through legislation by the ruling National Party Government. The right of the black majority were severely suppressed until the first democratic election and the subsequent inauguration of the new democratic South Africa in 1994. The lean towards car dominance within the implementations of modernist planning allowed the segregated spatial ideals be enforced with ease using infrastructure as the defacto boundaries between class and races. Barriers such as freeways, arterial roads and railways defined racial communities within their respective areas and acted as effective buffer zones.

Today, these buffer zones pose significant barriers to movement, especially to those residents who do not have access to a private motor vehicle. The current road pattern also determines the level of accessibility that exists within South African cities. The modernist planning created a movement system which favours a mono movement pattern which fragments citizens and limits their movement choices.

As transport is an important element of urban structure, the fact that the majority of movement patterns are vehicular based poses a significant hindrance for the integration as many South Africans do not have the access to this (2000). This characteristic of urban South Africa perpetuates the segregated ideals of the past. As Pieterse (2008) refers to successful cities as those that cater for not only the privileged, but those that are able to cater for the needs of all citizens. As the country is celebrating 20 years of democracy, it is imperative that South African cities can represent opportunities in integration and reverse the effects of segregation practices of former times.



Source: Google Maps.2014

Fig 2.6 represents the blatant separation of races within the suburbs of Cape Town. Pink represent a prior white designated neighbour, while the blue and orange represent prior designation black and coloured neighbourhoods respectively. It should be noted the there is no connection between these designed racial areas.

2.3 Contemporary South African Urban Problems

The effects of modernism and apartheid planning have left a significant impact on the South African city which has resulted in unintended and problematic symptoms which plague contemporary South African cities today. After 20 years of democracy and socio-spatial interventions aimed at alleviating the past injustices bestowed upon the South African public, urban metropolitan areas are still defined by a myriad of urban limitations brought on by prior planning ideals. These include the limited choices afforded to citizens, many communities suffer from poorly defined and contained public spaces and the dramatic increase in spatial and economic inequality has led to a drastic increase in violent crime and other social ills. The contemporary South African urban problems discussed here are:

Limited Choice
Poorly defined public space
Inefficient designed / planned public facilities
Crime and Surveillance
Poor located on the Periphery

Limited Choice

A significant impact of the effects of modernism and apartheid on South African cities is that choice is significantly limited. These relate to choice in movement, location, activities and lifestyle (Dewar, forthcoming). As mentioned before, movement patterns have been significantly limited for those who have no access to a motor vehicle. Movement has been focused on vehicle mobility as opposed to activity and accessibility and the pedestrian often find themselves trapped within communities. This greatly limits these citizens choice of movement as they have to endure arduous journeys to access public transport.

Separation and the promotion of single land uses have led to the creation of dormitory towns and communities who are far removed from retail and other economic opportunities. Urban dwellers are therefore faced with only the option of travelling great distances to broaden their choices. This is felt greatly by impoverished communities which are located on the periphery of urban areas. There is a need to alter the dormitory status of poor areas by building a stronger economic and employment base within these areas (Turok 2001). This will have to be improved by the appropriate location of economic and other activities and shall greatly enhance the citizens economic choices.

Successful urban environments are those that focus on liveability and choice. Urban dwellers should be afforded the right to choose where and how they should live. Livability and choice of lifestyle is a matter of urban form as much as it is personal preference (Neuman, 2005). However, upward mobility in South Africa is extremely limited due to the fact that the housing market has limited choice. A shortage of disposal income for many urban dwellers coupled with the extreme shortage of cheap rental accommodation keeps poor urban dwellers in poor located settlements or informal dwellings (Watson 2001). This greatly limits the choice of location within the metropolitan area. This lack of choice is greatly felt within Metropolitan Cape Town.

Source: iol.co.za

Fig 2.7. The many buses that transport residents of outlaying dormitory suburbs to areas of greater economic and social choice daily, Cape Town

Source: iol.co.za

Fig 2.8 Sea Point, Cape Town. A positive urban and intensely active inner city suburb. The number of areas which offer the user a myriad of choices through its successful urban qualities such as this are extremely few.

Poorly defined public and open space

The process of allocating land uses has led to land being designated for one specific function. However, often growth patterns and thresholds are too low to accommodated the allocated use which results in land remain vacant for long periods of time. This scenario is exacerbated by the fact that this land, which is primarily state own, remains unattended during this time period and created poorly defined public and open spaces. The planning process within South African cities is fundamentally flawed by operating in a two dimensional in its approach. It only focuses on spatial and use dimensions, and it critically fails to acknowledge other dimensions to the spatial planning process such as time (Todeschini et al, 2012).

The modernist planning approach has removed the idea of streets and channelled car movement in broad roadways (Todeschini et al. 2012). In the South African context, this has been translated into the implementation of limited access roadways which are characterised by wide medians and shoulder lanes which often lack pavement and other pedestrian infrastructure. Activity of any kind is absent and if present is located off these roads in slipways. These streets, although public in nature, or often not defined and lack the occurrence of public spaces. The focus on the motor as opposed to that of the pedestrian has influenced planning to move away from designing provision for public open spaces within developments.

Source: Google Maps.2014

Fig 2.9 represents an arterial road which has the backs of buildings facing the road. It contains greenery and pedestrian infrastructure in poor condition. This provided an extremely poor urban experience

Source: Google Maps.2014

Fig 2.10. Church Square is a significant public open space within the Bellville CBD, Cape Town. It is however extensively used as a parking area

Inefficient designed / planned public facilities

The Apartheid government provided public facilities on a monumental scale. These facilities were often large in size and operated in a dualistic manner in order to serve racial groups separately. As the preoccupation at the time was focused on security and defence, many government structures and facilities required large areas which provided for the ease of surveillance of the surroundings and allowed for the ease of access control. Today, these have resulted in inefficient land development as vast tracts of land sit unused alongside these facilities.

Large scale state-owned land uses such as military bases, airfields and harbours are often located in prime location where these facilities exist within urban areas. These locations are often highly suitable for other uses and often, due to their Apartheid origins, are presented in inward focus, overtly secure facilities which do not have any interaction with their surrounding land uses.

If redeveloped, these underutilised lands can offer significant beneficial improvements to the urban form by offering opportunities for the implementation of infill housing and other spatially integrated development.

Source: VRCID, 2013

Fig 2.11. The Tygerberg Hospital with the Bellville Marshalling Yard in the background. Due the inefficient land coverage, these facilities represent and extreme waste of valuable land

Lack of Identity and Sense of Place

Identity and sense of place are important for the overall experience a citizen receives when occupying a space. This greatly influence human well being, acceptance and belonging within their neighbourhood. Overall, sense of place therefore refers to the uniqueness that a given area offers its user.

Many residential neighbourhoods, particular large scale housing developments have been designed in a uniform pattern with similar street and housing types which offer little distinction between each other. This lack of distinction gives the areas a lack of identity and is often not conducive to promoting acceptance or the sense of belonging. Uniform and placeless areas often lack quality spatial elements such as landmarks or other special places. These uniform urban landscapes not only lack character, but offer the user a significant lack of urban experience.

Source: iol.co.za

Fig 2.12. An aerial image of Mitchells Plain (circa 1985). Representing kilometres of similar housing designs with no significant landmarks or special places.

Crime and the lack of Surveillance

Although South Africa experienced significant social change post 1994 democratic elections, the country is still marred by the overwhelming occurrences of crime and violence. This unfortunately impacts all aspects of South African urban life. The past 20 years has seen great response to this threat. During the late 1990's, economic activity has tended to shift away from established nodes as these suffered from deteriorating security and safety, experience congestion, litter and other urban management issues (Watson 2001). This exodus of capital to new , secure and inaccessible nodes has unfortunately resulted in the further increase to spatial inequality of South African cities and can be argued has lead to the further increase in crime in abandoned nodes.

The stubbornly high crime rate and exaggerated preoccupation with security undoubtedly promotes an ongoing distrust between the urban middle / upper class and the ever increasing urbanized poor. Crime in Global South countries has brought about a decline in social cohesion and an increase in conflict and insecurity (Watson 2008). This lack of social cohesion poses as a significant barrier to overcoming the high levels of inequality and spatial segregation which worsens the occurrence of crime.

It is argued that crime or perceptions thereof are exaggerated. Burdett et al. (2011) claims that the desires and fears of property consumers are greatly affected by the interpretations of property developers. For instance, by supplying the buyer with costly security options reinforces that crime rates are high and that property and its users should protect itself from this. This leads to a culture of distrust between the rich and poor and often activities performed by the urban poor such as informal trade are viewed with disdain (Balbo 1993). The resultant economic and social dysfunction caused by the lack of trust between classes in combination to the ever-present economic inequality is arguable the main social contributor to urban crime.

It is clear that contemporary South African cities are plagued by complexities which enhance social breakdowns such as crime and violence. Though prevalent, these issues seek immediate resolution. It should be noted as Watson (2009) states that solving these problems is exceptionally multifaceted and lies in the cohesive interventions of political, economic and environmental processes.

Fig 2.13 Source: Skyscrapercity.com

Fig 2.14

Businesses have been fleeing inner centres like the Johannesburg CBD (Fig 2.13) and moved to more secluded and notably inaccessible nodes such as Sandton, Johannesburg (fig 2.14)

Poor Located on the Periphery

The separatist planning ideologies of the past placed poorer and racially excluded citizens on the periphery. This demographic were often housed in dormitory suburbs located at great distances from central urban areas. Many of these suburbs were located 20 – 30 kilometres away from central business areas. Movement from these peripheral areas to the urban centre was only made possible through the employment of single destination transport system which only allowed these poorer urban inhabitants to enter central areas for employment purposes.

This outright spatial separation of race and class has resulted in South African cities consisting of relatively low densities and sprawled outer suburbs. These low densities and the resultant peripheral areas continue to contribute to lengthy commute times and significant cost to transport and other service delivery.

The low density sprawl and its resultant limitation have lead to an inefficient and unequal land market. Centrally located land is primarily of high value due to its easy access to goods, services and the economic system. In contrast, areas on the periphery experience significantly lower values. This peripheral land, due to its low value, is overwhelmingly populated by the urban poor. This demographic is spatially excluded from any activity that occurs within the central or economic areas of urban South Africa. This is exacerbated by the fact that national housing policy requires cheap land, which is often located on the periphery, to construct their social housing projects. As these state provided dwelling are destined for the poor, the spatial location aggravates their marginality.

Due to the low land value and low spending power of the poorer residents, the urban peripheries often lack significant economic investment and the residents lack the ability to generate their own economic activity. This greatly dis-empowers residents within these communities and this lack of access to economic opportunities limits their ability for upward socio-economic mobility. Therefore many residents find themselves trapped within the dire circumstances on the urban periphery.

Source: Wikipedia.com

Fig 2.15 The poor located on the outskirts of Khayelitsha, Cape Town. This location is situated more the 35km from central Cape Town

Chapter 3

This following chapter shall discuss what informs contemporary planning and how do these informants direct planning implementations. This will be done through understanding theoretical implications to planning. Secondly it shall discuss both international and local planning tendencies and how these offer direction to planning within this context. Thirdly it shall discuss various strategies to improve planning implementation and lastly shall identify the required performance qualities needed for the implementation of appropriate planning interventions.

3.1 Planning Theory

Urban planning is a profession which is greatly influenced by theory and informed by context specific criteria. This chapter aims at elaborating on the importance of urban planning theory and how it can play a significant role on the improvement of urban development.

Why we need theory

Urban planning theory acts as an important guiding force to ensure planning development is directed in an appropriate and thought out manner. Theory provides the insight into interventions and answers the questions as to why actions or interventions have been undertaken. Ultimately, theory informs why we do things (Harvey, 2010). Urban planning theory has evolved over the century in response to changing lifestyles and the living conditions taking place within urban areas. However, these changes to planning theory have not always been positive. Feinstein (2005) has raised the question as to why planning gradually moved away from urban tendencies to a more suburban model which aims at developing idealistic human environments, predominately on greenfield sites.

Urban planning in the Global South context has tended to adopt theoretical guidelines which have been formulated in their more developed counterparts. As to be expected, this lack of suitable theory and context relationship has led to inappropriate planning interventions being implemented within poorer and marginalised cities. This has often manifested itself into context inappropriate planning interventions. This often results in urban planning neglecting or incapable of meeting the needs of the urban Global South poor (Friedmann, 2005).

Even with political motivations to adhere to the needs of the urban poor, contemporary African cities still tend to pursue the need to aspire to Global North ideals. Pieterse (2010) highlights the fact that development within contemporary African cities still follows an exclusionary pattern which highlights the fact that African urban planning does not intend to meet the needs of the majority demographic. This could denote that current urban planning theory lacks the ability to engage issues within African cities or that planners and developers are unwilling to adhere to appropriate urban planning and design guidelines.

Appropriate theoretical guidelines are crucial to ensure that the context in which the guidelines are to be implemented are understood. However, African cities seem to suffer from a myriad of assumptions and a general lack of understanding of the structural implications which plague African cities (Pieterse, 2010). Due to this, Parnell (1997) calls for a re-conceptualisation of urban spaces within the Global South. She refers to the development of conventional urban theory that aims at improving prior urban planning theoretical implications. Within the South African context, this will ensure that urban planning theory will be able to be a driving force at alleviating the negative effects of both modernism and Apartheid separate spatial development.
Ultimately, as Feinstein (2005) suggests, planning theory should now aim at describing the societal goals which it intends to instil within development. Overall, it should therefore be able to describe the means of attaining it, and be able to explain the context in which it exists.

What informs planning theory

Within the global south context, the tendency of focussing on planning interventions based on western ideals is fundamentally flawed. Understanding the context in which planning theory is practised is crucial to ensure that interventions are suitable to direction constructive planning actions. Pieterse (2010) suggest that crucial informants for planning theory are the needs of the chosen demographic.

Over time, urban planning theory has moved entirely away from a viewpoint of a design profession to a more social science focus (Feinstein 2005). This has opened doors for planning to play a greater impact on the overall performance of society. In terms of theoretical time periods, contemporary urban planning is now in what is known as the postmodernist theoretical period. This period is characterised by the theoretical inputs of various entities of the urban realm (Sandercock, 1998). The profession now operates within a multi-disciplinarian environment where ideally each role-player plays a crucial role to influence the proposed outcome. In the African context, the

thorough understanding of development studies should greatly inform planning theory (Pieterse 2010).

Urban planning theory is primarily normative by nature (Sandercock, 1998). Over time, urban planning has moved from being conducted in a top down authoritarian manner to one that involves a range of stakeholder involvement. All constituents which are primarily impacted by any planning intervention should ideally have a say in how their needs can be met. Essentially, planning is a communicative practise and is primarily guided by the acknowledgement of human worth and dignity. Sandercock (1998) refers to this as community action where knowledge and action are guided in through social experiences and knowledge of the community. Communicative action theory argues that planning decisions should be reached through collaborative processes involving all stakeholders and conforming to particular rules which ensure that participation is fair (Watson 2003).

Ultimately, the greatest informants to contemporary urban planning are the social needs of the individuals which are greatly affected by planning interventions. By acknowledge this, ensures that planning and subsequent planning theory is capable of adjusting to context and leads to the promotion of equity and prosperity.

Planning theory and the market

The requirements of urban planning theory can often be seen as opposed to the economic requirements of the market. This is due to the fact that planning theory is overly concerned with its own overall needs of guiding society and development (Healey, 1992). However, planning and the market are intricately linked as the one is a significant informant to the other.

It is helpful to distinguish clearly between the needs of development and to that of the property market (Adams et al , 2010). Development is a production process that creates the built environment. This process includes planning. If urban growth was left unabated to market forces, development will be spontaneous, unpredictable and negative to overall social ideals (Adams et al , 2010). This being said, the market and the process of capital accumulation systems has given rise to a number of charges within the urban form over long periods of time and has greatly influenced planning. For example, over time, capital flows arisen from the market tends to switch from one spatial location to another within the built environment (Harvey 1978).

It is crucial that planning understand the needs of the market. For example, issues such as accessibility and ease of movement greatly influences land prices and the development viability (Bertaud, 2014). Encouraging development on centrally located land also increases market viability. Urban planning theory needs to abandon wasteful, normative use of urban land and the preoccupation with the division of land uses as this practice is not spatially or economically viable. Greater freedom should be afforded to market forces on how land is used and developed instead (Bertaud, 2014).

Theory conclusion

Ultimately, It is clear that the needs for southern based theory to find its holding in the planning theory world is crucial to prevent the application of inappropriate Global North based interventions to take place within the Global South context (Pieterse, 2010). In its dealings with the market, Friedmann (2005) states that planning works best if done in conjunction with developers. This can ideally be achieved through public-private partnerships and other such arrangements. Greater cohesion between the markets and planning should be achieved. Urban planning must therefore acknowledge its ability to stimulate markets through regulatory and policy changes. These interventions include the opening of brownfields and other such locations to property development (Adams et al , 2010).

Contemporary planning theory allows the opportunity to encourage equity and integrated development. However, although planning aims at finding a consensus between all constituents involved in the planning process, it should be noted that this is often a cumbersome task and dealing with often conflicting rationalities is a great limitation to the implementation of planning theory (Watson 2003). Urban rationalities comprise of realities of individuals who often hold different worldviews and an overwhelmingly different value systems. Finding a consensus, although difficult, is essential. This limitation should not however hinder the planning process and theory needs to be robust enough to be able to adjust to the context in which it finds itself in. Finally Watson (2003) confirms that in order for forward thinking urban planning to be successful, contemporary planning theorists should be able to grapple with the fact that the understanding of Global South urban realities is complex and adjust context specific theory and interventions accordingly.

3.2 International Tendencies

This section shall look into the international tendencies that give direction to urban planning and development. This discussion below shall focus on the effects of:

- Globalization
- Food security
- Water Scarcity
- Climate Change
- Urban Sustainability

Globalization

Over recent decades, advances in technology have vastly changed social, economic and political processes. The onset of globalization has seen great improvement in the efficiency and competitiveness of many countries. According to Friedmann (2005), forms of globalisation have in some way or another, played a significant role in the shaping and influence of society. He states the early forms of great empires in addition to the period of colonialism are forms of globalisation where a regions ability to thrive was based on its ability to efficient share goods and services with their other countries and empires.

Today, modern globalisation has allowed for international trade to become more fluid. This has translated into capital and markets being less fixed (Thornley et al, 2011). Overall, globalization has allowed for greater opportunities for the growth of trade and capital which has provided tremendous overall economic prosperity over the recent decades. The modern form of globalization has had significant impact on the modern development of urban areas. The emphasis on the flows of commodities has encouraged urban areas to be more efficient. This emphasis on efficiency and market ability has forced metropolitan regions to vie competitively for economic opportunities (Newman, 2000). This need to impress the global market for much needed investments has contributed to positive effects such as the construction of large scale infrastructure projects and the processes of renewal and gentrification. However, the need for competitiveness and efficiency can lead to great social polarisation. In the ever increasing need to find low cost, high profitable processes, the urban poor are at great risk of being exploited through exclusion and exploitation.

Spatially, globalization has lead to the constant restructuring of cities. The change in international macroeconomic policies has placed lesser power to the state. This has forced spatial planning to adapt to this shift whereby the market and private developers are now the driving force within urban planning (Friedmann 2005). Due to less government control in urban processes, large underused state facilities and land have embarked on undergoing great change in order to make way for redevelopment to accommodate a new city economy (Harris, 2001). Examples of this are the Old London Docklands which have made way for the financial centre of Canary Wharf and the Melbourne Docklands which now accommodates a new and thriving mixed use development.

Source: mirror.co.uk

Fig 3.1 and 3.2 : Canary Wharf , London in 1983 and 2013 respectively. Harbours have made way for a new form of industry

The ability to share information and the promotion of a world class lifestyle brought on by globalisation can have negative effects on local culture and traditions (Newman, 2000). The need to aspire to a certain lifestyle portrayed in information mediums such as the media and television can have certain impacts on how Global South urban residents choose to live. This being said, globalisation has the opportunity to provide urban regions with greater variety of economic opportunities and a significant promotion for the increase in the quality of life. However, this advantage generally depends on the urban regions political and social capacity to adapt to constant changes in the global economic markets (Harris ; 2001).

Lastly, in order for modern cities to survive globalisation and the opening of cities to the world economy, it is imperative that the city is able to handle continual states of change. In addition, urban areas should possess the ability to forego incremental adjustments to both internal and external market forces and be able to comply with the development needs of being integrated into the global society (Newman, 2000).

Food Security

In light of changing environmental patterns and the rise in urbanization, the issues of food security have increased over recent decades. This global strain on agricultural practices is greatly felt by those who are marginalised and are unable to provide resilience towards changing food sources.

Mwoniki (2011) defines food security as a situation in which all people at all times have physical and economic access to sufficient, safe and constant food sources which are able to meet the dietary needs. She goes on to state that food security has 3 aspects namely food availability, food access and food adequacy. Food availability refers to the amount of food that is available to the population. This includes the type and variation of food types. Food access refers to the identification into whether there is equality in the accessibility of food to the general population. And lastly, food adequacy refers to the nutritional value that the available food provides the population.

Urban food security within the urban Global South is of great concern. For impoverished rural dwellers, food cultivation and subsistence farming provided a readily available food source. However, poor urban dwellers lack access and ownership to land which makes the access to food entirely depended on money as subsistence within the urban environment is deemed impractical (Van der Merwe, 2011). Poorer nations have an over arching problem of having significant barriers between food production and the market. These barriers include lengthy travel distances between farm and market and the inability to support small scale farming on land which is easily accessible to urban areas (Mwoniki, 2011). These small scale farming requires higher technology and scientific interventions which are often out of reach for the Global South farmer. Ultimately these farmers resort to low technology farming techniques which require larger farmland and force the farm to be located on distant, cheap land. This translates into often costly food prices. As impoverished urban households lack the capacity to purchase sufficient food affordably or possess the resources to grow their own food source, this places these individuals at great risk of being food insecure.

The effects of globalization, macro-economic policies and legislative capacities play heavily on food availability. These forces and a nation's role and capabilities towards it, ultimately determine how resilient a nation is to threat to this security. Developed nations have alleviated this threat by providing targeted food security interventions. These include food aid in the form of direct food relief, food stamp programs or subsidized food

products (Mwoniki 2011). Less developed and Global South countries have attempted to imitate this but with lesser success. This is due to the fact the marginalised countries suffer from weaker safety nets for the impoverished coupled with the inappropriate disaster risk management strategies (Van der Merwe , 2011).

It is clear that the answer to reducing food insecurity is by increasing the agricultural output in order to increase the amount of food available to a population. In addition to this, as urban dwellers are depended on currency to obtain food, interventions aimed at reducing food prices are essential. These interventions include the protection of peri-urban agricultural land from urban sprawl and the possible location of agricultural uses within a built urban form. This will ensure that an agricultural practise are productive and efficient and provides the populace with a readily available food source at an affordable price.

Water Scarcity

According to the United Nations Water Report (2007), water is essential for all economic development and for the success of healthy and thriving ecosystems. As water is essential for human existence, the preservation of this vital resource is critical. This resource also plays a significant role in providing means of producing and maintaining agriculture which has greater implications on food security and on the success of industries which has economic and political implications. Currently, the global water availability is being placed under ever growing strain from the needs of human development.

Water scarcity refers to the point at which the maximum impact of all users impact on the overall supply or quality of water (UN, 2007). This usually occurs when water becomes depleted due to excessive or inappropriate use. However, according to White (2012), the definition of water scarcity is context specific and its calculation or definitions are not necessarily universal. This is due to the fact that the United Nations Water has not developed a consensus on how to accurately measure water scarcity (White, 2012). However, irrespective of this, water is still a valuable and critical resource and every effort should be attempted in order to preserve it.

Agriculture accounts for 70% of all water usage globally. It is projected that over the next 30 years, this figure will grow by 14%. It is clear that in light of human food security, agriculture is instrumental for human survival (UN, 2007). Although large scale irrigation programmes are essential for producing productive farms, these have to be

conducted in responsible ways. Studies have shown (UN, 2007) that an overreliance on water usage for agricultural needs as opposed to human consumption needs can have negative implications for human health and contributes to the spread of disease. This conflict between agriculture, human consumption and the needs of the environment could possibly be the cause of significant economic and political stress in the near future.

Currently, there is no official global water shortage, but there are some regions within the world that are prone to water scarcity which are caused by droughts and the resultant famines (UN, 2007). A significant number of these regions occur within the most impoverish and deprived countries which often are the main catalyst for water scarcity. Ultimately, there should be greater cohesion between the water needs of human development to that of the water needs of the natural environment. Therefore human activity which utilises water should aim to be as frugal as possible and should eliminate any forms of water pollution.

Climate Change

The discovery of climate change has been the most defining issue of the last century. The response to the discovery of this phenomenon has been varied. Studies have proven that climate change brought on by global warming has been responsible for dramatic shifts in weather patterns and the increase in extreme climatic conditions (Rottle, 2008) . As planning is a profession which aims at foreseeing future urban development, understanding the implications of climate change is essential in ensuring that the urban form develops in a way that is resilient to change and seeks to mitigate the causal factors of global warming.

Rottle et al, (2008) identifies 3 perspectives to be considered when relating to climate change. These are referred to as adaptation, mitigation or uncertainty strategies. These 3 perspectives provide different approaches and viewpoints to dealing with climate change. Using these perspectives cities should find ways of being social and physically resilient to climate changes and develop according. Rottle et al. (2008) states that it is imperative for urban planning to respond to the call to mitigate the effects of climate change through the reduction on greenhouse gas emissions and by effectively minimising the negative effects of human settlement on the environment. Blakely (2007) confirms that it is best to incorporate sustainable technologies in the design of communities to make them more self reliant and independent from outside infrastructure and servicing in times of extreme climatic changes or by the onslaught of extreme weather conditions. In planning for the uncertainty of climate change, urban planning requires a paradigm shift which calls for new and innovative settlement principles.

Interestingly, studies (Blakely, 2007) have shown that the provision of large urban parks within built up urban areas has a significant mitigating effect on global warming. Blakely (2007) confirms that the locating of large green areas within cities have the ability to act as cooling agents within the urban form. He attributes this cooling effect to the combination of shade produced by trees and the foliage ability of evaporative cooling. Therefore interventions such as the greening of urban spaces, the allocation of green corridors and urban agriculture can not only solve issues pertaining to environmental protection and food security, but also have a positive effect on the mitigation of global warming.

Planning's response to the onset of global warming is extremely crucial. The profession has a significant role in protecting human development from potential risks. However, planning has an obligation to encouraging the reduction of energy demand which is the main cause of green house gas emission (Davoudi, 2009). Negative urban practises such as sprawl and car dominant planning should make way for the reduction in settlement size, the increase of densities, the allocation of mixed use development which reduces commutes and the increase in the efficiency of public transport which encourages urban dwellers to forego the use of the private motor vehicle.

Urban Sustainability

In light of contemporary global issues such as rapid urbanization and environmental degradation, the ideology of urban sustainability has gained tremendous ground over recent decades. A suitable definition of sustainability was highlighted in the Brundtland report (1987) where the sustainability refers to the notion that the resource needs of current development does not impact on the human and environmental needs within the future. Therefore, sustainability practices require inhabitant needs to be met without imposing on the needs of others within different regions or of that of future generations. Alberti (1996), states that urban sustainability refers to a particular relationship between the needs of the environment and the needs of humans. Therefore the needs of the urban form should not impede on the needs of the environment.

Overall, cities are responsible for 80% of all energy consumption (UNEP, 2011). This figure is set to increase in light of rapid population growth and the onset of extreme rates of urbanisation. Therefore, if environmental sustainability is to be achieved, changes in current human and urban development trends have to be made. Alberti (1996) identifies 3 criteria to understanding and defining urban sustainability. The first being acknowledging the rates of use of renewable resources and that these rates do not exceed the replacement rates

of the renewable resources. The second is the understanding of the rate of use for non renewable resources and that this does not exceed the rates of the development of non renewable resources. And lastly, urban sustainability seeks the acknowledgement of the rate of pollution and whether it exceeds the natural assimilative capacity of the environment.

In terms of urban planning, urban sustainability translates into urban development that can achieve an appropriate balance between economic, social and ecological imperatives (Pieterse, 2011). The pattern of urban development has not encompassed this balance. Gasson (2007) states that the problem with the city vs nature relationship is the unequal balance of ecological usage, land consumption and the loss of sense of place by the deterioration of landscapes caused by the overpowering of urban needs. It should be understood that cities are entities which exist within the natural environment. This realisation that the urban environment is imbedded within natural one can promote a thinking that the city and environment can coexist cohesively. It should also be understood, that the one is heavily dependent on the other. However, the problem is that cities, due to their sprawling tendencies tend to overrun any cohesion that could possible take place with nature (Gasson, 2007).

Ultimately, in light of contemporary environmental issues, the achievement of urban sustainability is essential in ensuring that urban development does not negatively impede on the needs of nature. It is clear, as Alberti (1996) states, the urban and environmental systems are tightly interrelated and the urban is heavily depended on the natural process of nature. Urban planning therefore has the obligation to enhance the relationship between the urban and rural and not see each as separate entities (Gasson, 2007). For this reason, it is imperative that there should be acceptance of the importance of both urban and rural and that the latter gains significant prominence within the urban environment. Certain possibilities for the enhanced cohesion between these two entities can be brought through the location of environmental protection areas, the provision of urban agriculture and the promotion of environmentally sustainable urban form.

3.3 Planning strategies

Urban Growth management

In order to provide efficient urban environments within South African cities, greater densities are required. This will ensure that goods and services are within easy reach of residents and that population threshold are conducive for sufficient economic activity and the promotion of small businesses. Various urban theories have been developed in order to ensure that urban developed meets the criteria of being efficient, sustainable and equitable. The following section shall discuss planning strategies in order to promote greater urban growth management. It shall firstly discuss the benefits of densification and the compact city. Then it shall further elaborate on densification strategies which can be utilised in order to achieve a dense and compact urban form.

Compact City / Densification

Characterised by sprawl, South African cities are extremely inefficient which leads to the unequal distribution of goods and services. The ideal urban environment is that of the compact city that allows citizens to live in close proximity to opportunities and services and therefore promotes equity through distributive justice. For the city to be fair and just, it needs to offer the inhabitant a range of costs and benefits and these need to be evenly distribution in a means that is easily accessible and obtainable (Burton, 2000).

The main advantages of higher density of the compact city are;

- less car dependence,
- it supports public transport,
- revitalisation and regeneration of declining inner city areas.
- increase the access to service / facilities and the
- the conservation of countryside
- Allows for Diversity (Burton , 2000):

Less Car Dependence

Current low densification patterns promote a motor vehicle dependence which is both exclusionary as it hinders those who don't have access to cars. It places considerably strain on the environment as sprawl and vehicle emissions poses a threat to valuable biotic ecosystems. As human interaction is reduced as motor speed is increased, an urban form which focuses on the unrestricted movement of vehicular traffic produces a harsh environment which reduces urban activity.

Higher density development focuses on the increase and provision of quality place making as opposed to basic traffic function. Increase densities also bring with it, an urban lifestyle with all functions and services which are within walking distance. This format has the benefit of forcing the citizen to participate within the urban realm.

Supports Public Transport

Compact cities necessitate the need for efficient transport systems which aim at mass commuting movements. Development should shift away from car dominant planning to that of transit oriented whereby develop focuses on the need of public transit.

Therefore densification has the added benefit of encourage increased investment in public transport and encourage authorities to move away from the focus of the private motor vehicle and the implementation of transport oriented development. According to Newman (1996), cities that invest in their public transport get twice the economic benefit than those that focus on highway investment. Dewar (2008) mentions that by making cities more compact, it emphasizes the social advantage of public transport over private which therefore increases accessibility. This is improved by the added integration between land uses and transport planning.

Regeneration

It seems the there is a global shift which is acknowledging the benefits of living in higher density, intimate neighbourhoods. Urban dwellers are now finding cities which are polluted, congested by traffic and contain dangerous unwalkable roads unattractive caused by sprawl and subsequent car dominant planning (Newman 1996). This view has been translated into the restructuring and regeneration of poorly planned and previously neglected and derelict inner city neighbourhoods within many global cities. This turn towards urban restructuring is great opportunity to undo the negative effects caused by the neglect of inner city areas due to changing spatial economic movements.

Source: Mabonengprecinct.com

Source: Mabonengprecinct.com

Fig 3.3 and Fig 3.4; The exterior and interior of a once vacant clothing manufacturing building in the neglected suburb of City and Suburban, Johannesburg. Developers have converted it into residential units.

Conservation of the Countryside

The current low density sprawl with it's over reliance on the private motor vehicle leads to increase emissions of greenhouse gases. The tendency to continue this low density sprawling growth also places strain on the surrounding agriculture and natural land which surround urban metropolitan areas. The idea of the compact city, through its increase in density and infill development can make development in natural areas unnecessary. In times of environmental changes, the ideology of what McHarg (1969) describes as 'dominate and destroy' where development needs supersede those of the environment should no longer persist. The overcoming of this line of thinking shall make way for progressive environmental protection measures as globally, environmental degradation has reach critical levels.

Source: MLA architects

Fig 3.5. Low density urban sprawl in Durbanville, on the outskirts of Cape Town which threatens to extend into the surrounding greenfields.

Diversity

Successful and lively cities are those that offer diversity and contain districts which serve more than one function (Jacobs , 1961). Mixed uses are essential to ensuring that neighbourhoods contain activity throughout all times of the day and night. Jacobs (1961) attributed diverse neighbourhoods to those that contain mixed uses, walkable streets and high densities. Densification allows for more activity generating opportunities to be located within these mixed used neighbourhoods. These neighbourhoods would have a high number of residents who in turn create an atmosphere for economic activity. Currently, the densities within South African cities are too low to create vibrant local markets and other self generating economic activity (Dewar 2011). This is exacerbated by the preoccupation of the separation of lands uses which effectively eradicated any form of constant and diverse activity.

Conclusion

These advantages mentioned here are extremely beneficial and can help South African cities solve its urban spatial issues through realising integrated and constitutionally based cities. Dewar et al (1991) mentions that in order for South Africa to promote social and economic change, it is imperative to create qualities of urban cities as opposed to the current application of extensive surburbia. Lastly, the compact city ideal is an appropriate way of solving the 3 most important structural elements of urban cities which are employment, housing and transport connections (Turok 2001).

3.4 Densification Strategies

Two appropriate densification strategies have been identified for achieving compact urban development within South African cities. These are:

- Corridor Development
- Transit Orientated Development

Corridor Development

What are urban corridors

Priemus et al (2001) refers to urban corridors as bundles of infrastructure that link two or more nodal point within urban areas. Corridors follow an historic urban form which contain urban 'main streets' where business tended to locate on a main movement route. Often these contained business which catered to the needs of individuals who not only move through the area but also those that reside in side streets coming off these main street corridors. Corridor development is dependent on higher densities to ensure that appropriate thresholds are achieved for the resultant economic activity.

Built urban form often contains increased urban dynamics along arterial routes and main movement patterns. These corridors therefore allow for an easier provision of services as these act as activity spine across metropolitan areas. The intensification of activity through corridor development has the ability to create special places and to reinforce movement routes within greater urban areas. Within the South African context, this is essentially for creating just and integrated metropolitan areas.

What are the Benefits of Urban Corridors

Activity corridors are essential characteristics of urban areas and play a crucial role in the access to services and the economic integration of residents from peripheral areas. Corridor development is essential in achieving densification and an urban form that better supports public transport. Efficient higher densities are best achieved through the implementation of corridor development (Todeschini et al 2012).

Source: VRCID, 2012

Fig 3.6. The Voortrekker Road Corridor in Cape Town. Although the densities are low, it contains significant mixed use activity along its length

As South African cities are characterised by separation and inward focused or enclave neighbourhoods, corridor development gives the opportunity of ensuring the continuity of the urban fabric in order to blur the artificial boundaries between segregated areas Dewar et al, 1991). Corridors also afford the opportunity to promote intensity. It does this through the promotion of non-motorised transport, public transport and the promotion of small business (Dewar 2011). Having activity located along corridors creates offer a favourable comparative advantage to small business that are able to meet the needs of the local high density neighbourhoods. This works best when local resources are produced, and traded within the given locality.

According to Dewar (2000), activity corridors offer safety and reduced crime through the notion of surveillance. This occurs when more people are present within public spaces that criminal activity is hindered. This phenomenon is enhanced where corridors contain mixed use developments which include residential units. This translates to more people who use the space throughout the day and night and results to more eyes that will be watching the street. Therefore, activity corridors have the ability to resolve community concerns such as safety and security by increased surveillance by the increased number of users in addition to the promotion of slower movement of vehicular traffic on road safety (Tiwari et al, 2008). Dewar (2008) states that in order to optimise the benefits of activity corridors, it is crucial to increase accessibly to the corridor as much as possible through the development of numerous exit/entry points.

Transport Orientated Development

What is Transport Orientated Development

Transport oriented developed (TOD) neighbourhoods is development that is primarily based on the movements of public transport (Wilkinson, 2006). This allows activity to be centred on rail or bus movements as opposed to that of the motor vehicle. The ideal definition of a TOD would be a neighbourhood which consists of development which contain goods and services within ideal walking distances of public transport. For example, economic activity extends for 400m to 800m from transit stations. This allows the urban fabric to primarily be developed at a human scale. Therefore densities should range between the medium to high which are able to contain appropriate thresholds and sustain human based needs.

To increase choice and to avoid favouring the motor vehicle, the road network is typically laid out in an open grid pattern as opposed to a closed road system with confusing layouts, cul de sacs and a lack of road hierarchy (Wilkinson, 2006). This type of layout is extremely favourable to the pedestrian. To further opposed the motor vehicle, TOD's provide extensive provision for pedestrianized spaces and a promotion of non motorised transport networks (NMT).

Source: Wikipedia.com

Fig 3.7. An example of TOD development in Curitiba, Brazil. This particular TOD is supported by a bus system.

What are the Benefits

The idea of TOD has been extremely beneficial for the promotion of 'smart city growth' and the realisation of the 'compact city' (Wilkinson, 2006). TOD's have been increasingly popular due to high public transport ridership and the responses to the limitations of motor vehicle usage such as congestion and the high cost of fossil fuels. Due to the promotion of higher densities and human scale development, TOD's allow for significant provision for public and civic spaces which work best when comprised of mixed land and building uses. These public spaces are best located at significant movement intersections and transport interchanges. This is particularly the case of intersection of pedestrian and other NMT movements.

The design of TOD neighbourhoods, in particular the provision made for walking and cycling movements, enhances a community's general liveability and has the added benefit of promoting healthier and safer lifestyles (Wilkinson, 2006). The promotion of NMT infrastructure over the motor vehicle also prevents the occurrence of fatal accidents to the pedestrian and cycling when they came into contact with the motor vehicle.
Overall, TOD shall increase the accessibility and integration needed within contemporary South African cities. The characteristics of TOD's adhere to the policies and spatial legislation which have the agenda of overcoming the legacy of socio-spatial fragmentation and the dysfunctional urban development patterns which have been inherited from the short-sighted views of Apartheid styled spatial planning (Wilkinson 2006). TOD allows for the promotion of quality and well defined public space which encourages interaction between urban residents and allows for a communicative and sociable society. This is greatly needed in a country which is still trying to overcome social and racial differences. Finally, the promotion of public transport over the use of the private motor vehicle is paramount in the age of climate change and the high prices occurring in the current oil peak.

3.5 Identification of Performance Qualities

The previous chapter identified the shortcomings of South African cities are primarily based on the limits of modernism and the separatist principles of Apartheid spatial planning. The combination of these two factors has culminated in a South African urban environment that is wrought with limitations and constraints. To counter these inadequacies, future spatial plans should comprise of unique and specialised performance criteria needed to unlock the potential of the urban South African city. The following performance qualities are been considered through the identification of the needs of South African cities. These seek to solve the broad complexities currently present within the urban environments.

Integration

Integration is an important criteria for contemporary South African urban development as segregated urban features are in the continuing process of being dismantled. Integration refers to the connecting of different fragmented and separated parts or elements of the city (Uytenbogaardt, 1991). According to Lynch (1960), the ideal city is one that affords the user an enormous variety of goods, services and the inclusion of all types of people. People of all races and classes should feel comfortable in their urban settings and should feel no restrictions in their movements, quality of life and access to urban features.

The term integration has implications on social, economic and cultural level. This means that no person, within the urban environment, should feel excluded due to their cultural preferences, their socio-economic standpoint and/or their social preferences and lifestyles. In order to achieve greater urban integration, the focus of future development is best promoted through a more urban model as opposed to the current suburban model which encourages urban fragmentation through sprawl and enclave or exclusionary based development.
Dewar (forthcoming) attributes the principle of continuity as central to the concern of integration. Continuity refers to the connections and continuations of positive urban features which allow urban dwellers to access urban elements effortlessly which enable interaction between individuals and urban processes. There are 3 types of continuity. This being the continuity of movement which ensures the ease of movement, the continuity of the urban fabric which limits fragmentation and the continuity of green space which protects biodiversity (Dewar , Unconfirmed).

Equity

The notion of equity is an important aspect of the urban form and plays an important role in the mitigating of previous Apartheid city characteristics. In urban planning, equity primarily refers to accessibility (Dewar, forthcoming). This access generally pertains to the unabated access to activities and opportunities. Physical access refers to the availability of movement systems which encourages movement throughout the urban form and that does not discriminate on the movement routes that a user may choose. For this to occur, modes such as walking, cycling and public transport should be encourage and development should move away from unfair requirements of the motor vehicle.

Urban environments are opportunities to put distributive justice into effect. According to Burton (2000), distributive justice is the fair and just appointment of resources within society. Currently, South African cities only offer limited spatial locations for economic and social activities. This leaves a large proportion of the urban form with little or no access to the activity. Cities should strive to aim at mitigating the spatial and social limitations to this access by ensuring urban opportunities are spatially located to suit the needs of all urban dwellers. This fairness of the spread of opportunities within the urban form shall ultimately result in the promotion of equitable cities.

In order to satisfy this criteria of equitable development, spatial planning should aim to focus on the enhancement of accessibility connections and routes and to effectively diminish the volume and preoccupation of vehicle mobility and move to more accessible means of transport (Dewar 2008). Lastly, social services and facilities should also be readily available to urban inhabitants and distances between dwelling and essential services should be conducive to walking or short transport journey

Choice

Intense and complex urban environments represent a greater array of stimulus to which the urban dweller can enjoy and ultimately respond to**.** Choice refers to the options available to citizens in how they choose to live their lifestyles, their choice of location and the choice to access a range of goods and services.

There are a number of limitations to choice currently imposed on South African urban dwellers. The majority of these are simply a manifestation of prior segregation ideology which is yet to be broken down. Dewar (forthcoming) mentions that choice for the urban dweller should be varied and not comprise of 'either – or' choice. This relates to whether a resident can choose to live in an urban and intense environment, yet this should not translate into the foregoing of access to quality open space or other important choices.

In terms of economic activity, choice is an important criterion. The promotion of the choice of location proves successful for the encouragement of small business to flourish. Increasing choice shall occur through the promotion of urban interventions which allow a greater number of locations for economic activity to occur. This allows business access to a wider customer base gained through the increased activity that choice provides. Giving freedom of choice adds to a varied mix of activity and results in a diverse urban experience.

Ultimately the most successful cities are those that offer a wide range of a mix of choices to people. Pieterse (2009) concludes that to satisfying human rights within a city is not simply about service delivery but more about the number and quality of living, working and playing choices that it can offer its inhabitants.

Improved Sense of Place

Successful cities are those that are able to provide the user with unique and quality spaces. Sense of place refers to a certain quality of a particular space or area which makes it unique to others (Lynch 1960). Therefore sense of place greatly enhances a user's pleasure and experience when occupying a given urban space.

The provision of quality public and open spaces encourages a sense of belonging within residents and is a contributing factor to improving the quality of life. Higher densities are needed as they provide close-knit communities to promote and encourage social interactions between city dwellers. This social interaction greatly increases urban experience which in turn increases the sense of place. Mumford (1961) identifies that human beings natural thrive within intimate, aesthetically pleasing spaces and this has tremendous effect on human well being. Furthermore, Dewar (Forthcoming) attributes a quality sense of place as special places where individuals, regardless of personal resources and class, are able to utilise a space collectively in a manner that promotes equity and dignity.

Efficiency

Urban efficiency refers to the minimising of cost, through time and money, to access of goods, services and other human needs (Lynch, 1960). Dewar (1998) describes efficient cities are those that provide the user with a range of locations choices which are to their convenience where business owners can manufacture, trade and deliver services. This allows the user to locate and operate in means that is productive for them and allow for the proficient and natural flow of urban processes. This is best achieved through promoting of greater accessibility network through which movement and information can flow.

Urban efficiency translates into providing the urban user with a variety of movement and services options to which is both at their convenience and to one of their choice. The term urban efficiency also refers to the optimisation of the use of resources. This ensures that urban processes require very little inputs and produce minimal negative outputs such as pollution. Therefore, urban efficiency is greatly impacted by the modes of transport available and the overall extent of the build form.

Sustainability

Sustainability refers to the usage of resources in a manner that meets the current needs of an urban environment, without negatively impacting on the resources needed for the future (Alberti 1996). The urban sustainability criteria shall focus on the improvement and protection of urban ecological space. This will be done through the protection of natural ecosystems and the sustainable utilisation of natural systems through urban agriculture and other green economic resources.

The requirement of urban sustainability has ecological, social and fiscal implications. Ultimately, urban sustainability seeks to ensure that the urban locality uses the maximum amount of renewable resources as opposed to other polluting energy sources. The utilisation of renewable sources minimises the amount of wastes that is generate for urban needs and ultimately allows the urban form to have a minimal ecological impact as possible (Dewar, forthcoming).

CHAPTER 4

4.1 Nature of Plan

Spatial frameworks provide tools for urban growth management and allows for the sufficient levels of structure and order to guide and frame urban development (Dewar et al, 1991). Plans should focus on a minimalist approach and should give maximum freedom for ingenuity and creativity of both designers and that of decision makers. Ultimately, the nature of plan should be conceptual. This allows it to focus on all aspects of the urban experience and deal with the full nature of the problem experience within current urban environments (Dewar 2014).

There are two main approaches to spatial planning. The first is programmatic planning approach whilst the second is the non programmatic approach. Although these approaches are contradictory to each other, both approaches have a significant role to play in the overall aim of improving the urban qualities of South African cities.

Programmatic planning is a land use planning model which is based on the assumption that land uses can be planned (Dewar 2011). Although feasible, this planning approach is cumbersome as it often difficult to correctly assume how and when thresholds occur. Programmatic planning is primarily driven by the performance of the city as a whole and not by the maximisation of the parts (Dewar 2011). Therefore, it often neglects to ensure the threshold capabilities or the growth capacities of urban public realms. And unfortunately, as programmatic planning follows a strict framework, it has the ability to lead to hampering of individual choice and the natural growth of urban settlements.

Non programmatic finds a compromise as it allows thresholds to develop naturally and whereby development can naturally adapt to growth (Dewar 2008). To achieve a functioning city, Dewar (2011) argues that a move away from programmatic, land use based planning should make way for structural – spatial approaches which has structure and space at their core and which integrates spatial , design , and public realm qualities. As the development of urban growth is broad, non programmatic planning also allows for greater involvement of other stakeholders within a malleable framework which fosters collaboration and does away with development entities operating in silos (Dewar , forthcoming).

Uytenbogaart et al. (1999) affirm that positive urban environments are complex and rich and that spatial plans are inadequate at creating or replicating this. Alternatively, it should plainly provide for the preconditions in order for urban intimacy and complexity to occur. Ultimately, a plan should guide and inform settlement development in a means that is not too rigid or restrictive. It should allow for the independence of owners and users of the space to define their own meaning and experience. Lynch (196o) describes successful cities as those where urban inhabitants are able to actively form their own stories and spaces and have the ability to create new activities through the freedom of choice.

The nature of plan should lastly include an equitable design principle. This diversity should offer the inhabitant a range of choices and aesthetic visuals which they experience while using the space. Cities work best if they are to grow and develop in what Crane (1964) describes as a 'city of a thousand designers'. Strategic planning with little prescriptive limitations and development restrictions is essential in achieving this.

Source.UrbanLandMark

Fig 4.1. An example of programmatic planning. Vacant land awaiting development in Mitchells Plain, Cape Town. The land has been allocated for commercial and public facilities and awaits development once appropriate thresholds have been reached.

4.2 The Role of the Planner

In today's South Africa, the role of the planner is a crucial one. In light of the need to propel South African on a sustainable and democratic path, it is imperative that spatial planning grapples with the issues of the broader planning agenda's and the philosophies of sustainable development (Watson 2009). Planners play a crucial role in mitigating the effects of urban poverty and social inequality. Due to the complexities of the urban issues present within South African city, the planner cannot solve these alone (Watson 2009). Therefore, the planning profession and the subsequent planners role falls within an inter- disciplinarian approach

In light of contemporary social issues, planning has an obligation to involve the concerns of resource depletion, environmental change and overall local and global inequalities (Watson 2008). It is therefore the prerogative of professionals to ensure that urban development is able to progress towards a sustainable future which is responsible for the desires of the present and that of the protects and ensures the desired future.

Chapter 5

5.1 Introduction to context

The previous chapters have outlined the current spatial constraints and subsequent theoretical guidelines for the spatial interventions required in the contemporary South African cities. This analysis and theoretical review has allowed for the understanding of the unique urban challenges that face South African cities.
Cape Town suffers from a myriad of urban spatial limitations ranging from sprawl to the inefficiency of its public transport network. It is therefore imperative that future planning aims to promote the removal of spatial constraints and promote a more successful urban form. The theoretical analysis is a fitting guide for the development of appropriate strategies to counter these negative qualities which inhibit the metropolis from performing efficiently and equitably.

The following chapter shall focus on the analysis of the study area. This will begin with its role within the greater Cape Town metropolitan region. Further analysis shall be conducted in order to establish the sites relation to its immediate surroundings and environs. This analysis shall contain a brief conceptual interventions aimed at alleviating constraints which were indentified through analysis. This will be done in order to determine the opportunities and constraints which will subsequently inform the design and function of the site and lastly to guide the overall plan. The theoretical analysis from the preceding chapters shall then be applied to the identified site to ensure that concepts proposed shall be informed by appropriate theory and guidelines.

5.2 Metropolitan Spatial Analysis

This section shall comprise of a detailed spatial analysis of the Metropolitan Cape Town area which will focus on the movement, environmental and the location of higher order facilities aspects of the city. The analysis of these 3 identified aspects is crucial as they form an important part in the efficient functioning of a metropolitan area. This shall then inform the brief conceptual interventions which are required to alleviate the dysfunctional characteristics of the 3 identified aspects identified in the analysis.

Movement Analysis

Cape Town boasts a significant public transport system. All movement tend to have overwhelming focus on the central CBD with highest hierarchy of movements all terminate in the Cape Town CBD.

Public transport

Cape Town, like all other South African cities, has public transport in the form of overland rail, a local bus service and the minibus taxi service. Recently, there has been the addition of a Bus Rapid Transit system which aims at integrating and modernising the public transport movements within South African cities. This latest mode of transport has a primary aim of promoting spatial integration through easily accessible and efficient public transport system (CoCTa, 2012).

Bus

The metropolitan area is well served by a local bus service. For example , the Golden Arrow Bus Company is the oldest and largest with South Africa, currently operate 1100 busses over 900 bus routes. An analysis on fig 5.4 , which depicts all bus routes within the Cape Town metropolitan, all areas of the City of Cape Town are within walking distance of a local bus route. However, the financial constraints of this service is extremely limited and as shown in fig 5.1, the bus service is unable to run consistently throughout the day. This means that particular

bus routes may only operate in one direction during the morning and then does the reverse route in the afternoon. Therefore, the service is primarily suited to conveying commuters to their place of employment in the morning and finally back to their place of residence in the evening. For this reason, although served by a comprehensive bus service, it is an inefficient transport system as it fails to provide the commuter choice in movement throughout the day.

CAPE TOWN - BLOUBERG - MELKBOS - KOEBERG

MONDAYS TO FRIDAYS ***EFFECTIVE DATE: 2014/06/09 TIMETABLE NUMBER: 0016 01***

CAPE TOWN	--	06:00	06:55	--	--	--	--	08:00	--	--	--	14:00	14:50a	--	--	--	17:10	--	--	--	--	--	--
FORESHORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	via	--	--	--	--	--	--
N1-MARINE DR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	via	--	--	--	--	--	--
SALT RIVER MARKET	05:08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CAMBRIDGE	05:15	06:20	--	--	--	--	--	--	--	--	--	14:35	15:40a	15:45b	--	--	--	--	--	--	--	--	--
KILLARNEY	05:30	06:35	07:25	07:00	07:05	07:20	07:30	08:40	08:00	08:15	08:30	14:40	15:50a	15:55b	--	16:40a	--	17:25	--	--	--	--	--
PARKLANDS	--	--	--	via	via	via	via	--	via	via	via	--	--	--	--	--	--	--	--	--	--	--	--
SUNNINGDALE	--	--	--	via	via	via	via	--	via	via	via	--	--	--	--	--	--	--	--	--	--	--	--
BLAAUWBERG RD	via	via	via	--	--	via	--	via	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BLAAUWBERG RIDGE	--	--	08:00	07:40	07:45	07:50	08:00	--	08:30	08:50	09:00	--	--	--	--	17:10a	--	18:00	--	--	--	--	--
BLOUBERG	via	--	--	--	--	--	--	via	--	--	--	via	via	via	--	--	via	--	--	--	--	--	--
MELKBOS	via	--	--	--	--	--	--	via	--	--	--	via	via	via	16:25a	--	via	--	--	--	--	--	--
KOEBERG POWER STN	05:50	07:20	--	--	--	--	--	09:20	--	--	--	15:20	16:30a	16:15b	16:45a	--	18:00	--	--	--	--	--	--

SATURDAYS

CAPE TOWN	06:30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CAMBRIDGE	07:00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
KILLARNEY	07:10	11:30	12:30	12:35	13:00	13:50	14:50	15:20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PARKLANDS	--	--	--	via	--	--	--	via	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SUNNINGDALE	--	--	--	via	--	--	--	via	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BLAAUWBERG RD	--	--	via	--	via	via	via	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DOLPHIN BEACH	--	--	--	--	13:10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BLAAUWBERG RIDGE	--	--	--	12:55	--	--	--	16:20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BLOUBERG	via	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BLOUBERGSTRAND	--	11:45	13:00	--	--	14:00	15:00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MELKBOS	via	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
KOEBERG POWER STN	07:55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

SUNDAYS - NO SERVICE

ABBREVIATIONS

a - Mondays,Tuesdays,Wednesdays,Thursdays
b - Fridays

Source: gabs.co.za

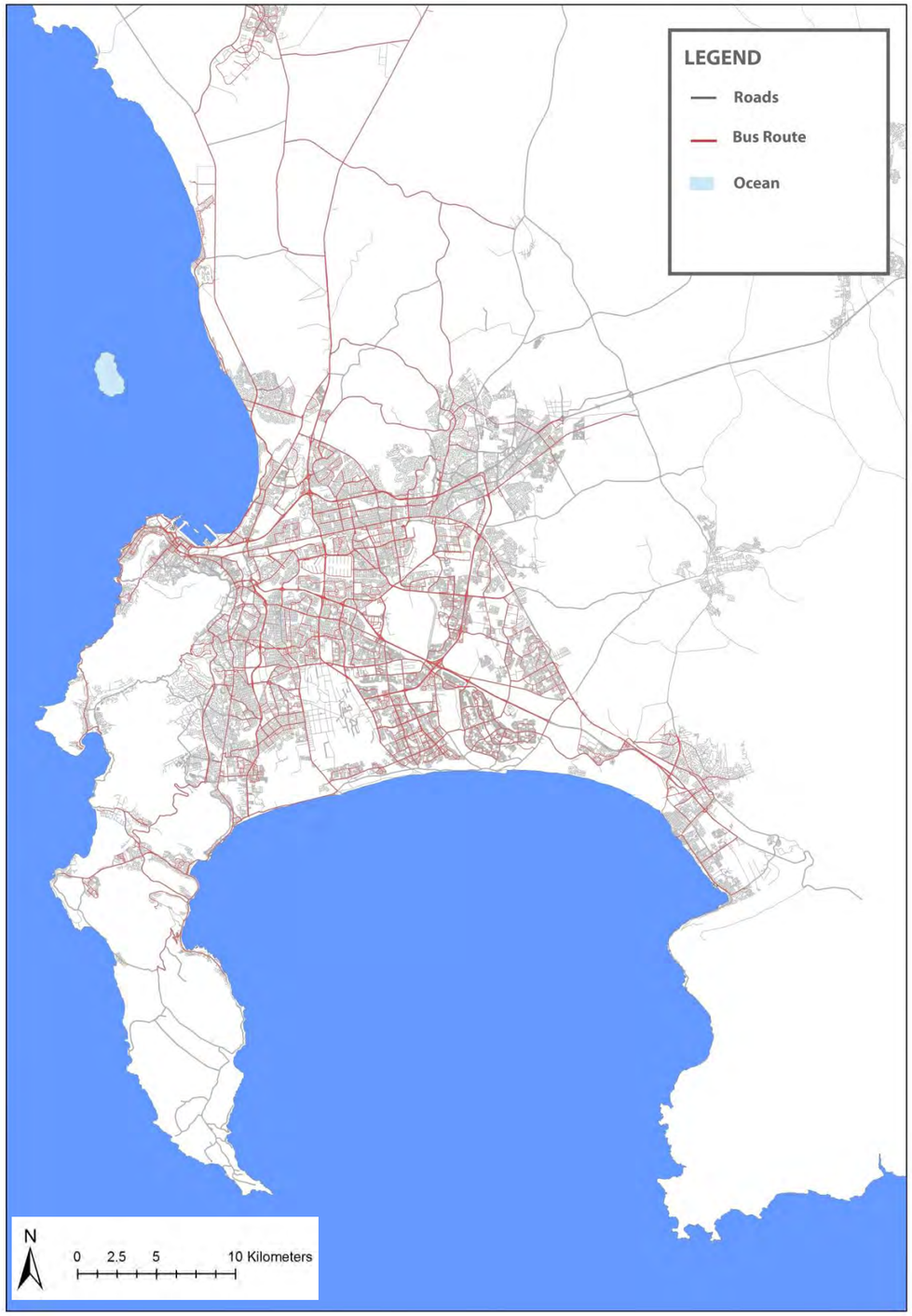
Fig 5.1. Demonstrates the inefficient and infrequent operational times of the Metropolitan bus system

Source: gabs.co.za

Fig 5.2. A decades old high bodied bus still in operation

Source: gabs.co.za

Fig 5.3. A newer low bodied bus (left) alongside a decade old high bodied bus (middle to right)



Source: CoCT GIS Data, 2014

Fig 5.4: The location of bus routes within Metropolitan Cape Town

Train

The Cape Town overland commuter rail system has had an important role in the early development and growth of the Cape Town metropolitan area. A large number of the early suburban growth and development was rail oriented. Most major economic nodes and centres are located along this highly travelled public transport system. Although, Cape Town boasts the most comprehensive commuter rail system within any South African city, its radial plan ultimately makes the network focus exclusively on the central Cape Town central station. All 5 operational lines and a total of 460km of service track all terminate at this central terminus. As demonstrated in fig 5.8. , many areas of the metropolitan area are not serviced by this crucial public transport mode. It is clear to see that there is a lack of circular rail routes which allow for integrated movement. The combination of the radial design and not serving crucial areas also make this transport mode highly inefficient.

Fig 5.5. A refurbished South African Class 5M2A in operation since 1962

Fig 5.6. A South African Class 10M3 constructed during the 1980's

Fig 5.7. The South African Class 10M5. Although the latest commuter trains within South Africa. It is based on the refurbished underpinnings of a train from the 1960's

Source: Urbanrail.net

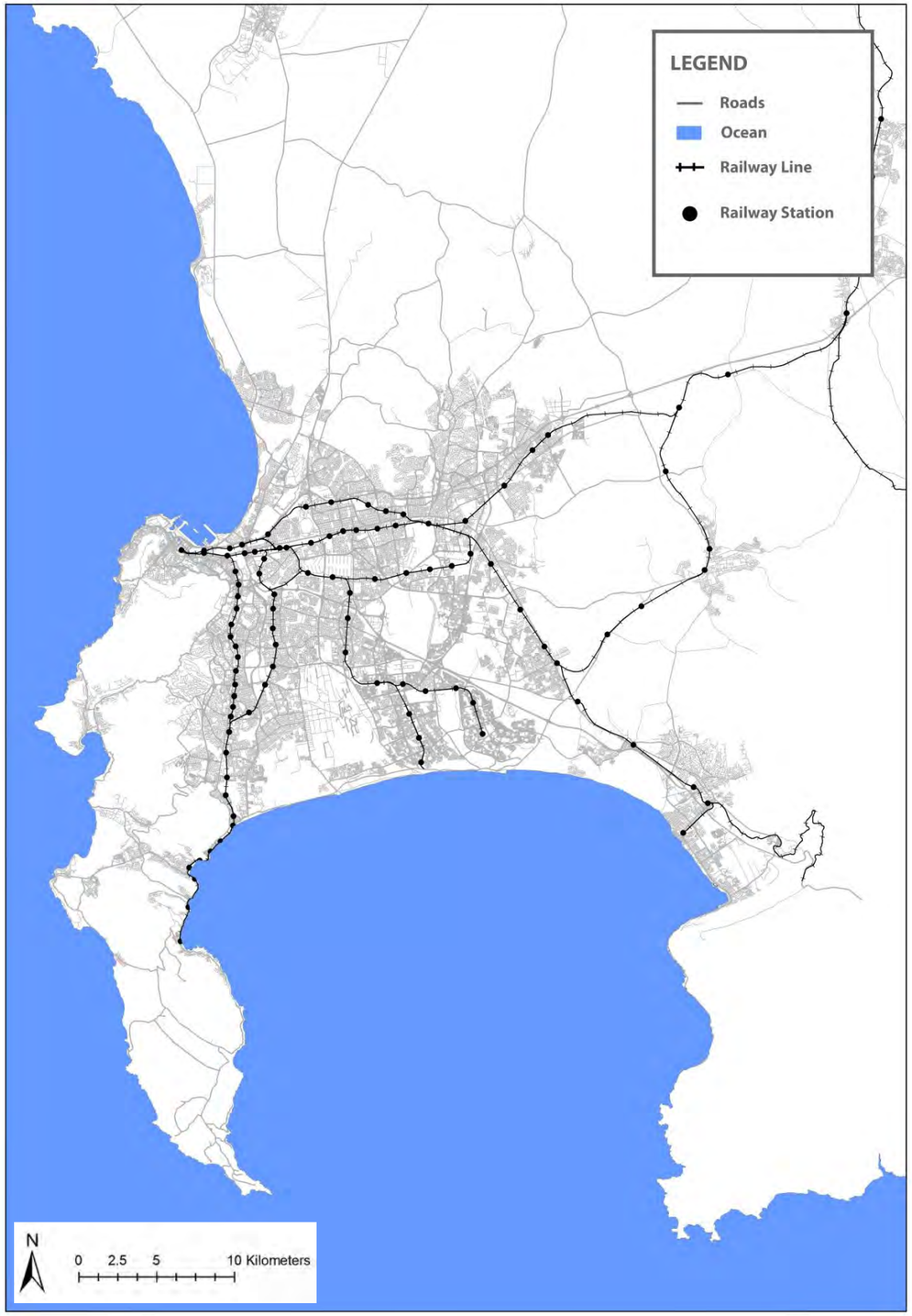


Fig 5.8. A map depicting the rail network in metropolitan Cape Town

Source: CoCT GIS Data, 2014

Mini Bus Taxi

The minibus taxi industry form during the 1980's to fill the gap left by the transit vacuum caused by the reduced spending in public transport during this time . During the late 1970's , government spending focus less on transit and more on other infrastructure such a roads and freeways (Barrett;2003).

Today the minibus taxi has the largest market share of public transport within South African cities, enjoying a total of 60% of the all commutes. However, in comparison, Cape Town has a significantly lower use of the minibus taxi industry and rail dominates the mode of transport taken (Clark et al; 2002.

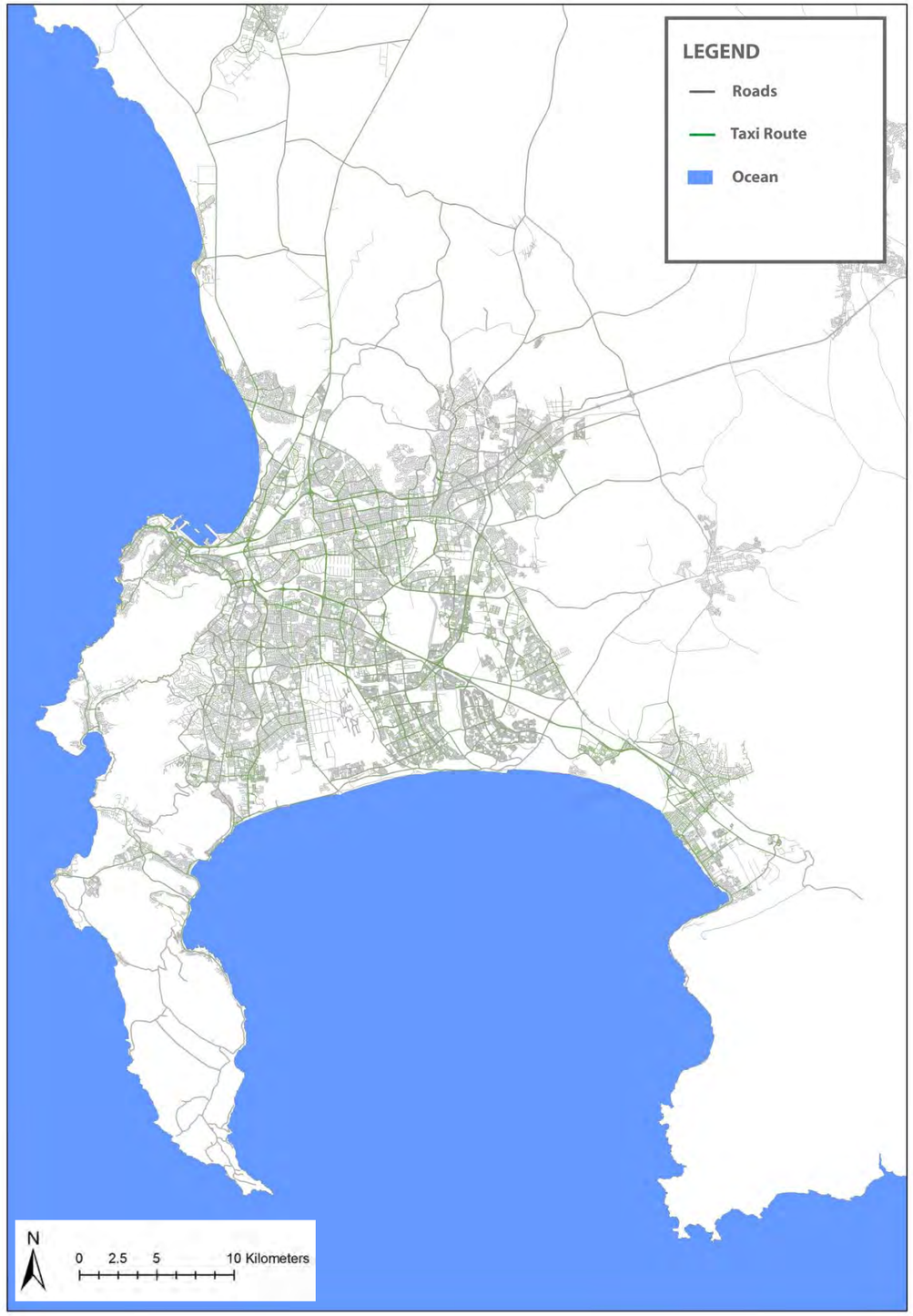
A minibus usually comprises of a 16 seater vehicle which operates in an informal manner with no fix schedule and an often inconstant route. These are often highly organised in unions and taxi associations who vie for their share in this lucrative industry. In Cape Town, through negotiations, minibus taxi's run on fixed routes in order to prevent violent confrontations between taxi groups and organisations over these lucrative routes. However, these routes often then not, mimic the routes of the bus system which in turn causes conflict between these modes of transport (Barrett, 2003).

Source: Wikipedia.com

Fig 5.9. The Cape Town central Minibus Taxi Rank

Source: Wikipedia.com

Fig 5.10. An example of a minibus taxi, Sea Point, Cape Town. There are no fixed taxi stops and taxi conveniently stop where passengers desire to embark or disembark



Source: CoCT GIS Data, 2014

Fig 5.11. Mini bus Taxi routes within Metropolitan Cape Town

Vehicular movement

Vehicular movement, as in many other South African cities, dominates the hierarchy of movement systems within Cape Town. This has been to the detriment of the overall movement within urban South Africa as many individuals do not have access to a motor vehicle. Cape Town is serviced by a freeway system, although currently incomplete, once again in focused on the Cape Town central business district.

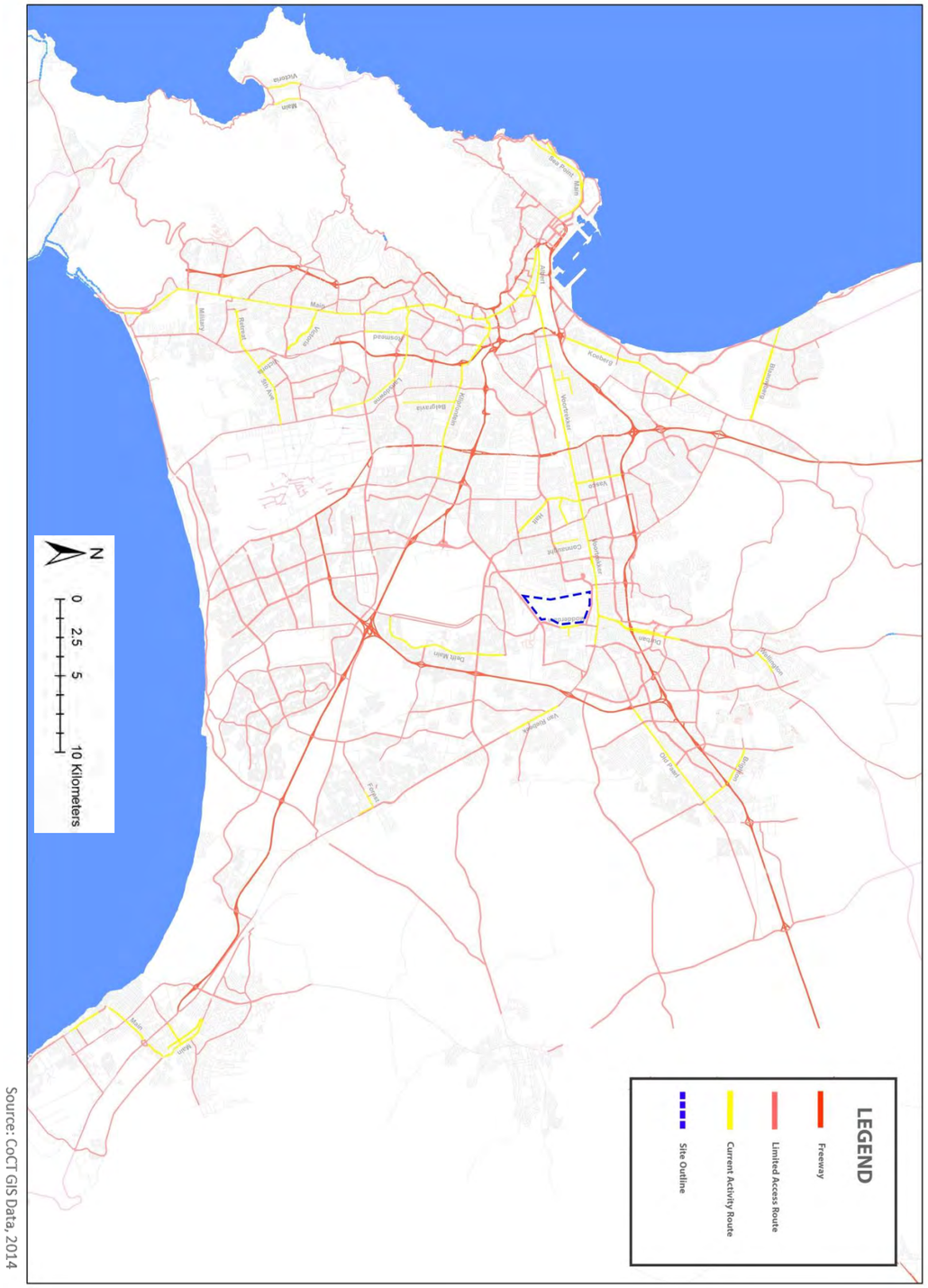
The urban landscape is crowded with limited access roadways which are designed as vehicle distributors and funnel vehicular movement away from residential neighbourhoods and activity streets on to arterial roadways. Although convenient for the motor car user, these limited access roadways act as significant spatial barriers and cut off neighbouring communities from each other. Fig 5.13. Show the extent to which limited access roadways have overpowered transport planning within Cape Town. The focus on vehicle mobility far outweighs the provision for activity and corridor development. The main characteristic of arterial and limited access roadways is that activity is discouraged.

This preoccupation with limited access roadways makes both the movement patterns and the urban form extremely inefficient as it is safe to assume that not many residents have access to a private motor vehicle. This is particularly the case in the poorer south-east of the metropolitan area which unfortunately suffers the bulk of the car designed layout within Cape Town. It should be noted that there are no activity roads within the poorer south eastern part of the metropole.

Source: Google Maps.2014

Fig 5.12. An example of a limited access roadway. Characterised by wide median, large vehicle lanes and shoulders. No traffic interruptions from surrounding land uses and backs of buildings line the roadway (Parow, Cape Town).

Fig 5.13. Map depicting the location of limited access roadways to activity streets within metropolitan Cape Town.



Source: CoCT GIS Data, 2014

High Order facilities analysis

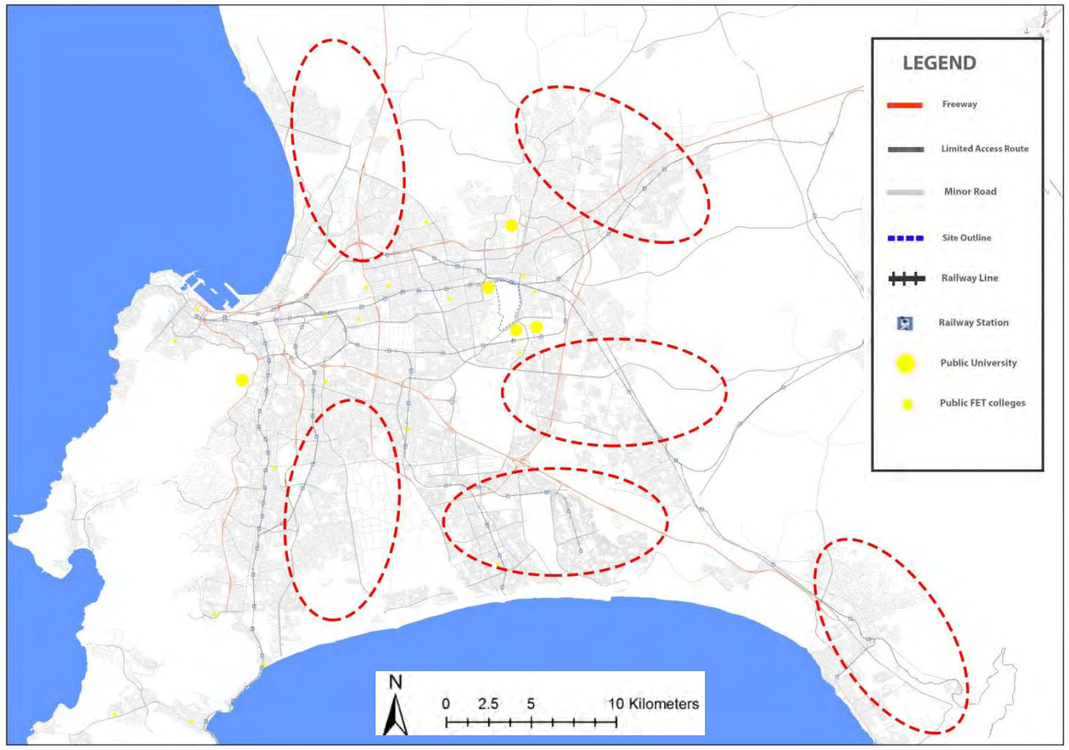
Higher order facilities are those that offer a vital service to human needs and are essential for the improvement of quality of life and the social sustainability of communities. Their location and accessibility is crucial to ensure that an urban area is functional and able to offer overall social equality to its residents. For this analysis, the spatial location of higher order facilities such as tertiary education facilities and tertiary medical facilities shall be evaluated. This will be done in relation to the proposed site of this document.

Tertiary Education facilities

The Cape Town metropolitan area has a number of tertiary education facilities which offer a wide range of educational opportunities to its residents. These facilities range from world class universities to small scale private tertiary training colleges.

Fig 5.15. Highlights the location of these facilities within the metropole. Universities are primarily located in the northern part of the Cape Town. In fact, the University of the Western Cape, The Cape Peninsula University of Technology and the Stellenbosch University Medical School all border the proposed site.
Smaller tertiary institutions such as private colleges and Further Education Training (FET) colleges are primarily located in areas that are easily accessible by public transport. These are mainly found along the commuter rail system.

Unfortunately, the metro South East is significantly lacking in tertiary education facilities. This is particularly worrying as this area of the metropolitan area houses a significant number of the city's poor. This lack of access to educational facilities can significantly hamper the social and economic upward mobility of those residing in the metro south east.



Source: CoCT GIS Data, 2014

Fig 5.14. The locations of education facilities within the Cape Metropolitan Area (red indication areas which lack these facilities)

Tertiary Health Facilities

Cape Town boasts high quality tertiary health facilities and generally access to healthcare within the metropole is high (PGWC, 2013). Fig 5.16. Demonstrates the location of high order tertiary medical facilities within the Cape Town metropolitan area. The majority of tertiary health facilities within the metropole are located along the established development spines of the Voortrekker Road in the north and Main Road in the south. These facilities are both private and public. It should be noted that access to primary clinics are good and all areas within the Cape Town metropole are afforded this essential service.

The metro south east once lacks significant access to higher order health care facilities. However over the past 5 years the Mitchells Plain and Khayelitsha General Hospitals, which are 2 large tertiary facilities , have opened in an attempt to alleviate the issue of access to quality health services (PGWC, 2013). Unfortunately, there are still vast areas of the metropole which require its residents to travel significant distances to access higher order medical facilities.

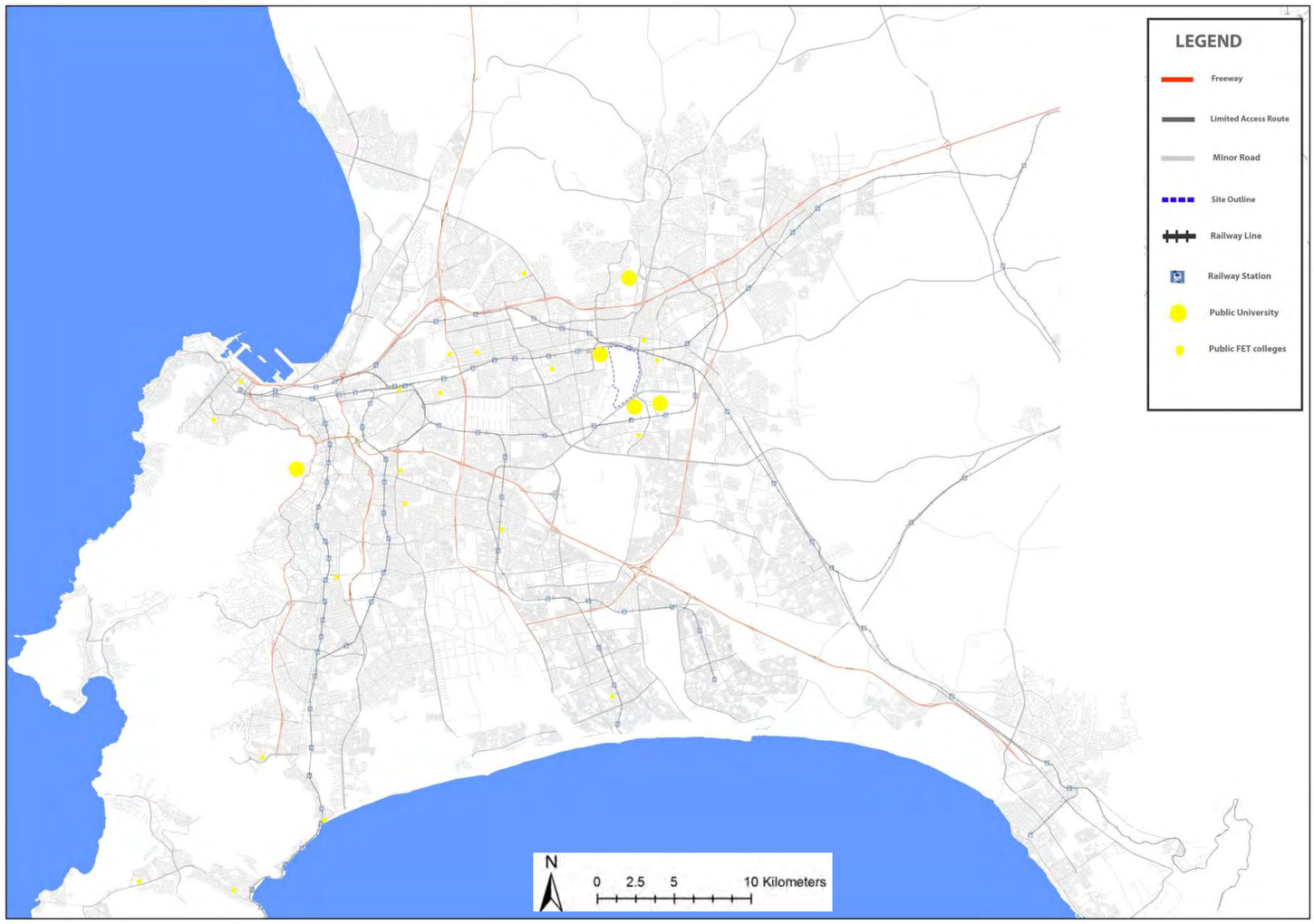


Fig 5.15. Location of Tertiary Educational Facilities in Metropolitan Cape Town

Source: CoCT GIS Data, 2014

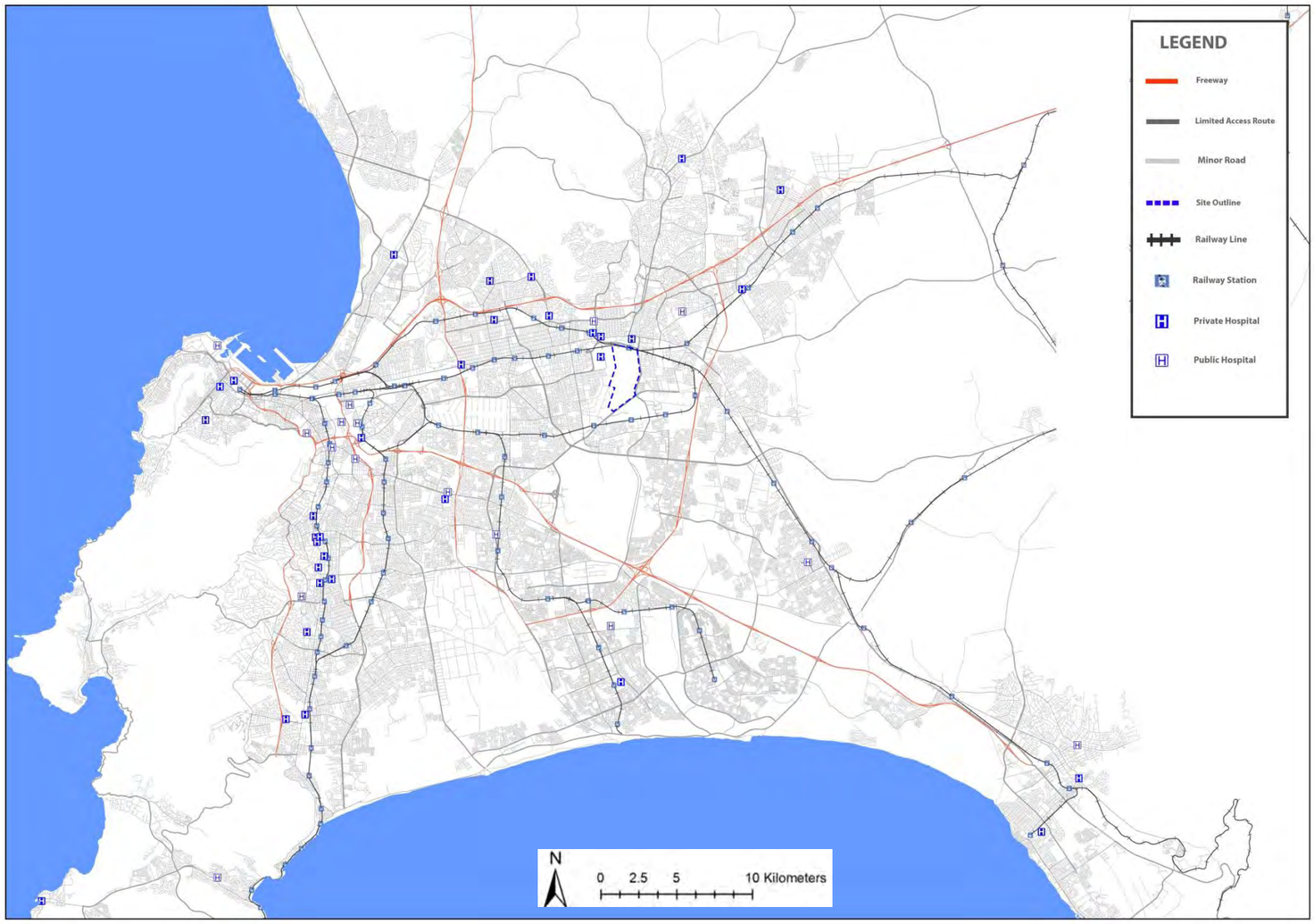


Fig 5.16 . Location of Tertiary Medical Facilities in Metropolitan Cape Town

Source: CoCT GIS Data, 2014

Green Systems

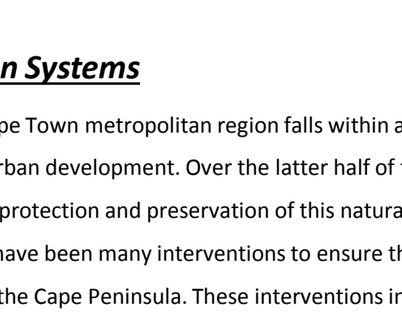
The Cape Town metropolitan region falls within a unique biodiversity kingdom which is under constant threat from urban development. Over the latter half of the 20th century, the rapid urban growth has placed great strain on the protection and preservation of this natural ecosystem.

There have been many interventions to ensure the protection of the highly threatened biodiversity located within the Cape Peninsula. These interventions include the provision of protected areas and the provision of an urban edge which ensures that the extent of urban growth of Cape Town does not impact on the surrounding natural vegetation and agriculture.

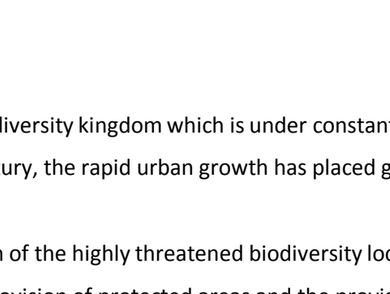
Protected Areas

Fig 5.20. Illustrates the location and extent of environmental protected areas within the Cape Town metropolitan area. Development and other harmful human activity are prohibited within its confines and these protected areas ensure that the natural vegetation is rehabilitated and restored to its natural state.

Although the major biomes fall within these protected areas, the perennial rivers which flow through the metropole do not benefit from this protection. Although there are buffer zones which prevent urban growth from inundating river and riparian zones, these rivers suffer from extreme pollution and neglected. Many rivers have long since been canalised and their natural role in the biodiversity of the Cape Peninsula have been lost.



Source: CoCT Website



Source: CoCT Website

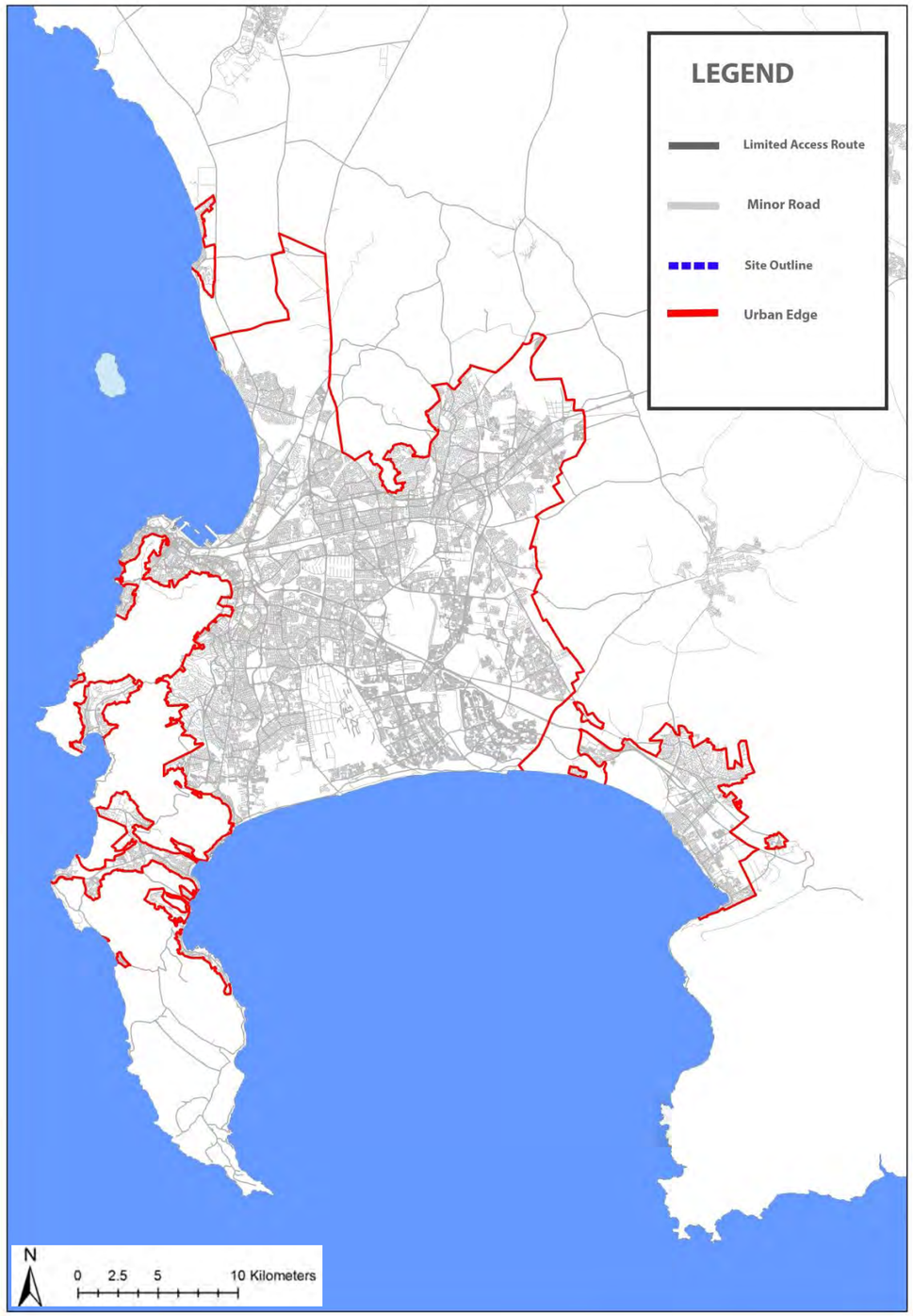
Fig 5.17 and fig 5.18 The Wolfgat Nature Reserve located within the Metropolitan Area.

Source: CoCT Website

Fig 5.19 . The canalised Elsieskraal River in Pinelands, Cape Town. The river bed and banks have been concreted. This river now primarily acts as a stormwater system as opposed to a natural system.

Fig 5.20. The location of Protected Areas in Metropolitan Cape Town (Green Represent protected areas)

Source: CoCT GIS Data, 2014



Source: CoCT GIS Data, 2014

Fig 5.21. The Urban Edge of metropolitan Cape Town

Urban edge

The current Spatial Development Framework (2012) of the City of Cape Town maintains an urban edge which is a demarcated line to which urban development cannot breach. This ensures the containment of development and the promotion of infill and compact city development. This is essential as the land outside these boundaries contain highly intensive agricultural land uses and the presence of extremely critical biodiversity areas.

Fig 5.22. illustrates the urban edge and how it aims at protecting the surrounding agriculture areas surrounding the Cape metropole. This in turn will force urban growth to repurpose vacant and brownfields sites in order to satisfy urban growth.

5.3 Metropolitan Spatial Concept

The spatial conceptual interventions for metropolitan Cape Town aims at addressing the 3 urban elements mentioned above. This shall firstly focus on the improvement of movements systems, secondly on the location of higher order facilities and lastly on the protection of the existing green systems

Green Systems

In order to protect the valuable agricultural land that borders the metropolitan built area, the extent of urban growth shall be curtailed through the prohibiting of sprawl development. This shall be enforced by the already existing urban edge legislation. Existing green systems within the built environment shall be identified and where possible greenfield sites shall be protected and preserved. Infill development shall at best occur on existing brownfield and other underutilised sites.

The proposal for the green systems of the metropolitan scale shall follow a concept of providing green rooms to which the urban resident can enter into a natural environment. The green rooms allows the citizen to easily escape the urban realm and utilise and enjoy environmental areas with great ease. The conceptual map Fig 5.23 identifies the location of green rooms. Where possible these rooms should be connected through green corridors. This allows for the natural movement

Ideally, green protected areas within the metropolitan area shall be connected through protection and buffer zones along existing perennial and non-perennial rivers. As part of the protection, these river courses should be restored to their natural state in the locations where they have been canalised or rerouted to the storm water system.

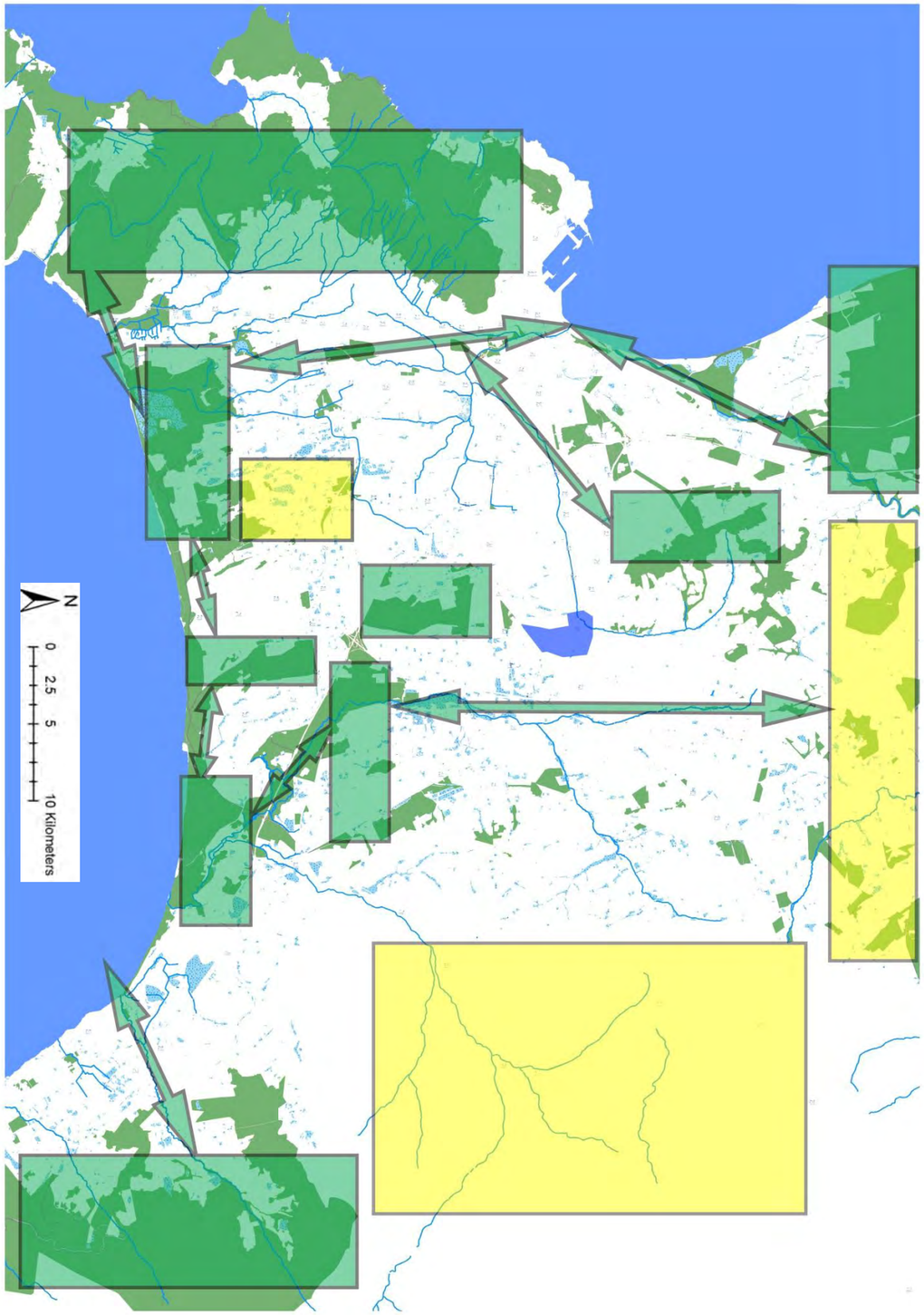


Fig 5.23 Conceptual idea of utilising green rooms

Source: CoCT GIS Data, 2014

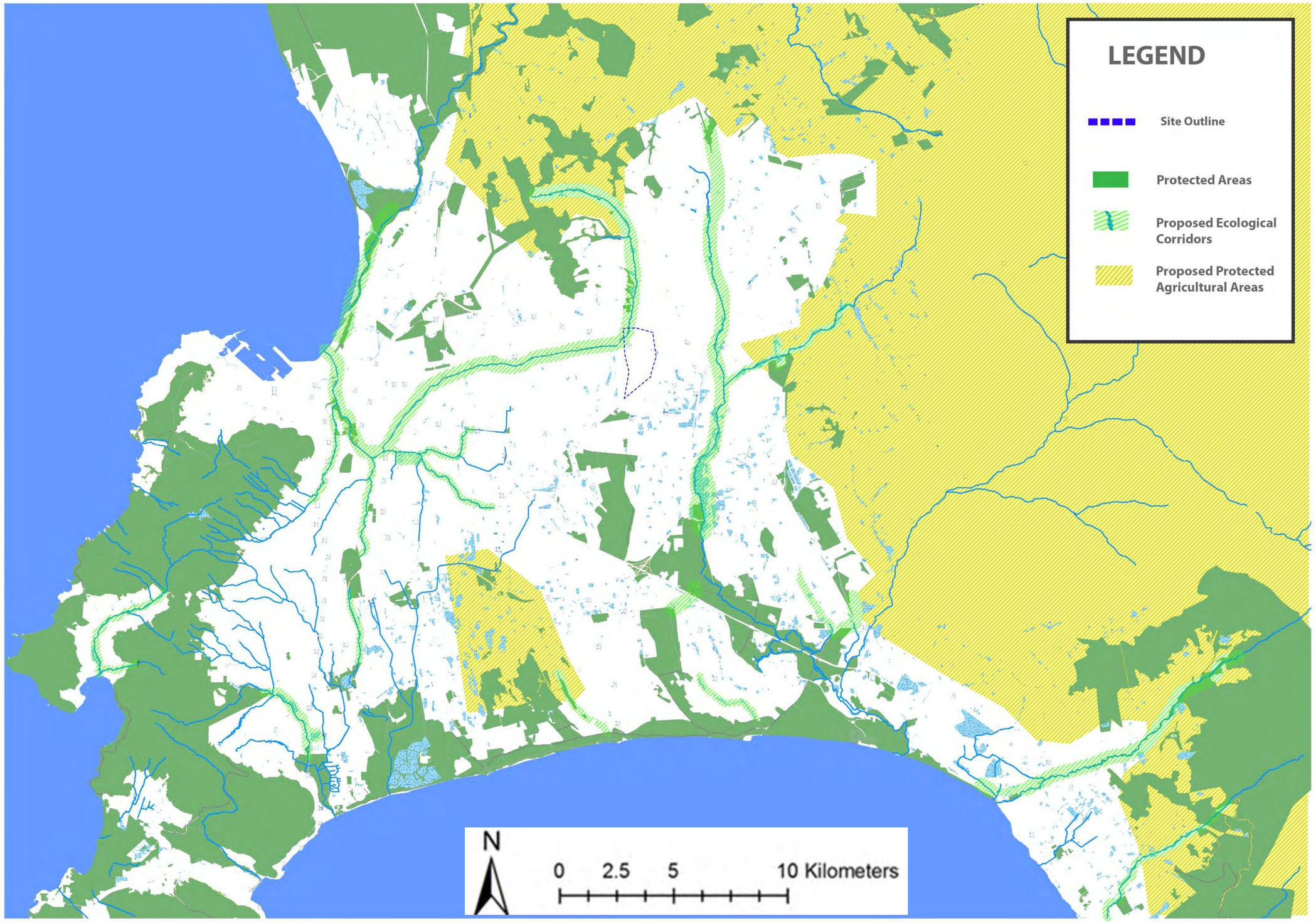


Fig 5.24. The environemental Concept for Metropolitan Cape Town

Source: CoCT GIS Data, 2014

Movement Systems

The conceptual interventions on the movement systems within metropolitan Cape Town shall focus on the breaking down of the car dominant road network in combination with the implementation of a spatially integrated transport system.

Road Network

This proposal aims at providing enclave neighbourhoods, which are currently spatially segregated due to the over utilisation of limited access roadways, with greater integration to its surroundings. Ideally, limited access roadways should be located at distance of 5km – 7 km apart. Currently, mobility routes are located 1km to 2km and create small enclave neighbourhoods within its grid format. Key mobility roads shall be identified for activation by promoting connecting roads and economic activity. Certain mobility routes shall be identified and remain as such while the remaining shall be converted into hybrid corridors.

Dewar (2008) defines hybrid corridors as those that seek both mobility and the positive urban structural objectives such as economic activity. Fig 5.25 – fig 5.27 demonstrates the changes required in the current road network. It highlights which mobility roadways shall be converted and offer mixed use opportunities within the underutilised road reserve and adjacent plots .These hybrid corridors shall complement the existing and historic corridors which occur within Cape Town.

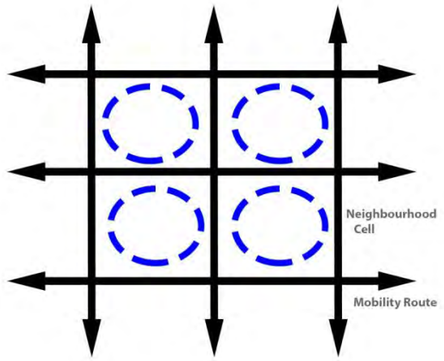


Fig 5.25. The current movement system and how it creates neighbourhood cells

Adapted from Dewar and Louw (2003)

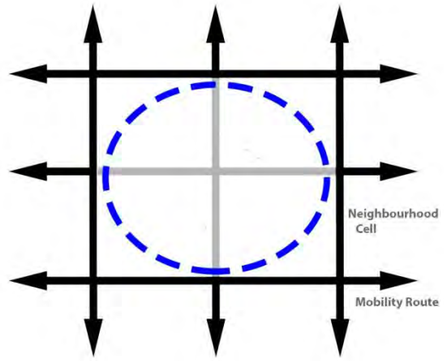


Fig 5.26. Enlarging neighbourhood cells

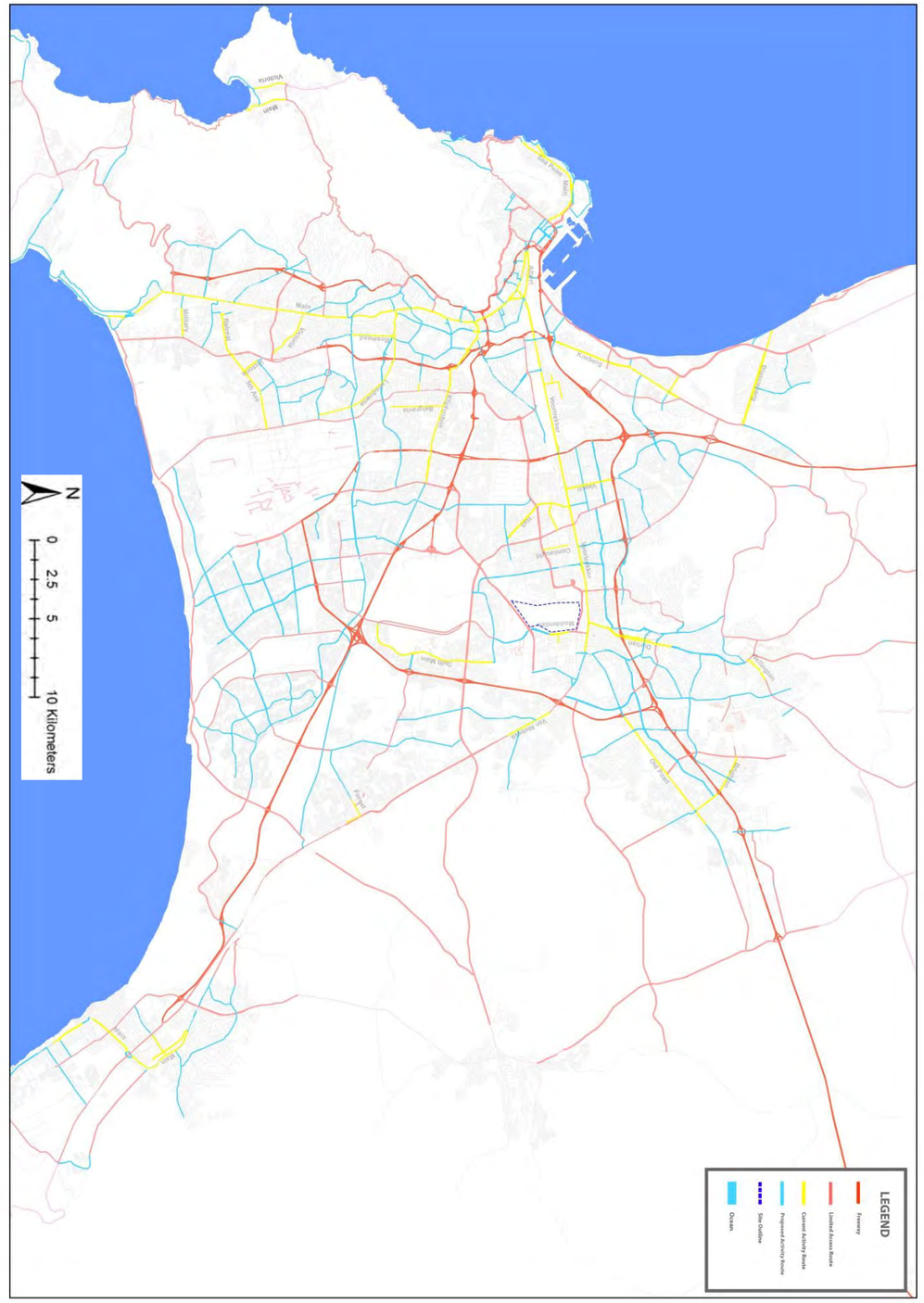


Fig 5.27. The breakdown of the limited access roadway system in Cape Town

Source: CoCT GIS Data, 2014

Public Transport

The highest order public transport movement within Cape Town is the commuter rail system. This network needs significant intervention in order to improve system functionality through increased modal connections and the addition of connecting or circular of lines. However, this intervention necessitates great cost and lengthy expropriation efforts. In order to counter the mono-directional and centrally focus rail system, a Bus Rapid Transit system is required to fully integrate all areas of the metropole. A Bus Rapid system is ideal as it is cheaper to construct and operational cost are minimal. This is in great contrast to the expanding of the existing rail network which requires costly land expropriation or subterranean construction in the form of subways.

What is Bus Rapid Transport

A Bus Rapid Transport system is a relatively new form of urban transport. They are essentially a metropolitan bus system which consists of its own separate bus running ways, vehicles which are easy to board through multiple doors , attractive and innovative stations and an easy to use and operate service patterns (Levinson, 2003). Many cities around the world have adopted this form of public

transport as it is seen as both efficient and cost effective. BRT systems have been perceived to be environmentally responsive and a cost effective means of urban mobility (Levinson, 2003). For this reason, BRT is suitable solution for solving public transport spatial inefficiencies within a city like Cape Town. The provision of a safe, and reliable public transports will aid the overall aim of moving commuters away from motor vehicle journeys and has the ability to move more people than multiple minibus taxi's which have currently filled the public transport vacuum.

Source: CoCT Website

Fig 5.28. Example of a BRT station in Cape Town

Source: CoCT Website

Fig 5.29. A BRT bus running along segregated busways in Cape Town

The overall benefits of implementing a BRT system is that it allows for operation flexibility and has the ability to adapt to staged and incremental urban development as opposed to other forms of fixed public transport such as the street car, light rail or overland rail (Levinson, 2003) . It is therefore extremely cheap to construct and maintain in relation to other modes of public transport. This flexibility also allows the system to be easily integrated into other existing transport networks within an urban area and is therefore ideal at increasing urban mobility.

The BRT system concept proposed here shall be fashioned in a grid formation which offers easy interchange points where the existing rail network and newly proposed BRT routes connect. Fig 5.32 demonstrates the location of the BRT trunk routes which are proposed for this document. Due to their movement capabilities, BRT trunk routes are best located on mobility roadways which have an existing 50m wide road reserve. The local bus service would then provide further access into the urban fabric. Higher order facilities are best located in areas where BRT and BRT/Rail interchanges occur. These interchange leave opportunity to create quality public spaces and the promotion of economic activity that can benefit from the increase in pedestrian traffic generated from the commuters.

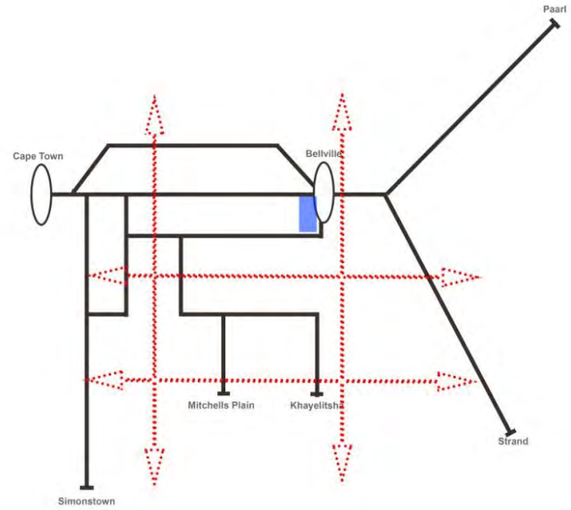


Fig 5.30. A conceptual transport system with the existing rail (black) with a BRT (red) orientated in a grid format. (Blue represents site)

Fig 5.31. A final intergrated transport diagrammatic map. The black represents the existing rail while blue represents BRT. Circle are BRT interchanges while square represents BRT/Rail interchanges. (Blue square represent the site)

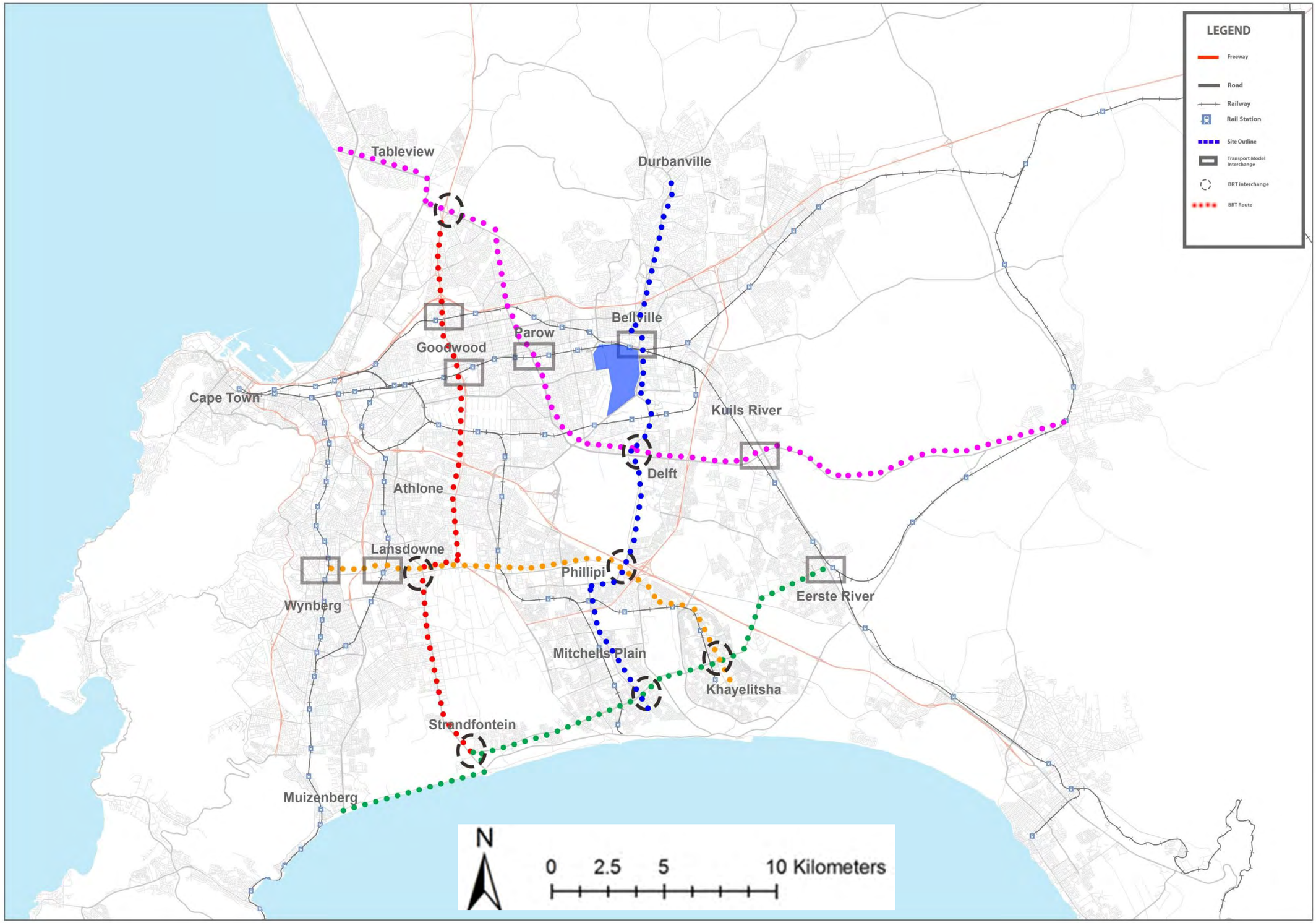


Fig 5.32. The conceptual proposals of the BRT trunk route system in Metropolitan Cape Town

Source: CoCT GIS Data, 2014

Activity Corridor Development

For its large urban footprint, metropolitan Cape Town only has 2 significant regional activity corridors. This being the Main Road corridor to the South running through the southern suburbs of Cape Town and the Voortrekker Road Corridor running east through the northern suburbs. These corridors present significant economic potential for the areas in which it occurs. However, there are significantly large areas of the city that do not benefit from any regional economic activity generated from this urban feature.

This proposal seeks at increasing the number of regional activity corridors within the metropolitan area. This shall intend to serve the regions of Cape Town which does not possess this crucial urban feature, particularly in the metro South East. Metro activity corridors are those that have development on the movement route on which the activity is hinged. It also provides for the provision of economic activity and the promotion of service delivery.

It should be noted that historically, activity corridors do not develop programmatically. Activity has naturally developed in a corridor formation due to its location on and proximity to a movement pattern. The orders of activity corridor hierarchy have depended on the movement systems present on and around the street on which it is hinged. Therefore, as movement patterns shall be a great informant of how these corridors developed, this proposed corridors shall, as much as possible, coincide with movement systems such as the proposed BRT mention in these document, and the presence of local bus services and mini bus taxi.

This proposal identifies two significant locations for a metro activity corridor. Fig 5.34, demonstrates that this will be positioned in a north-south direction and an east-west direction along Lansdowne Road and Symphony/Delft Main/Sheffield/AZ Berman Road respectively. This shall create the formation of a metro activity corridor grid. This shall greatly increase the benefits of metro activity corridors throughout the entire metropolitan region. This is particularly the case in the impoverished and underserved metro south east.

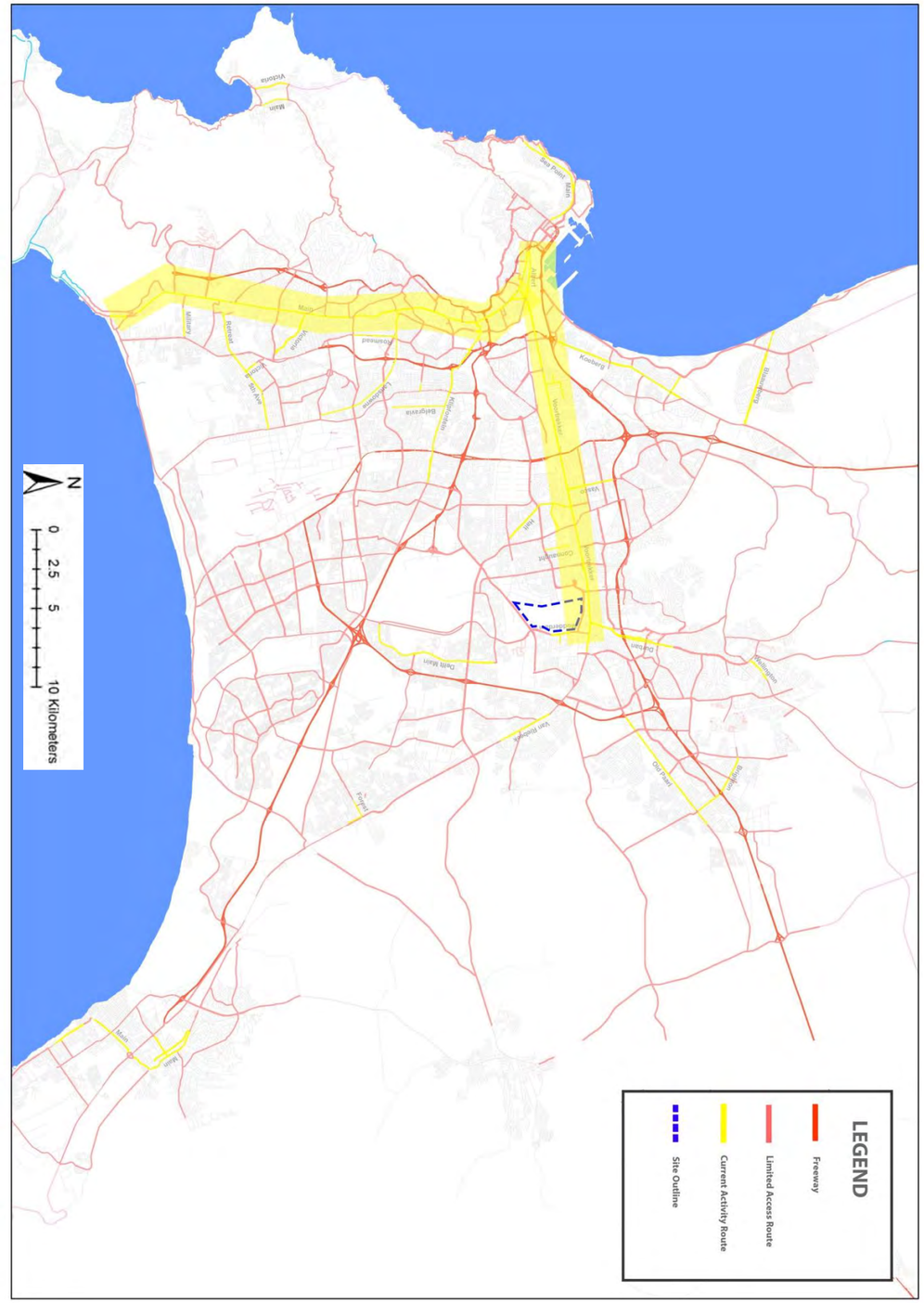
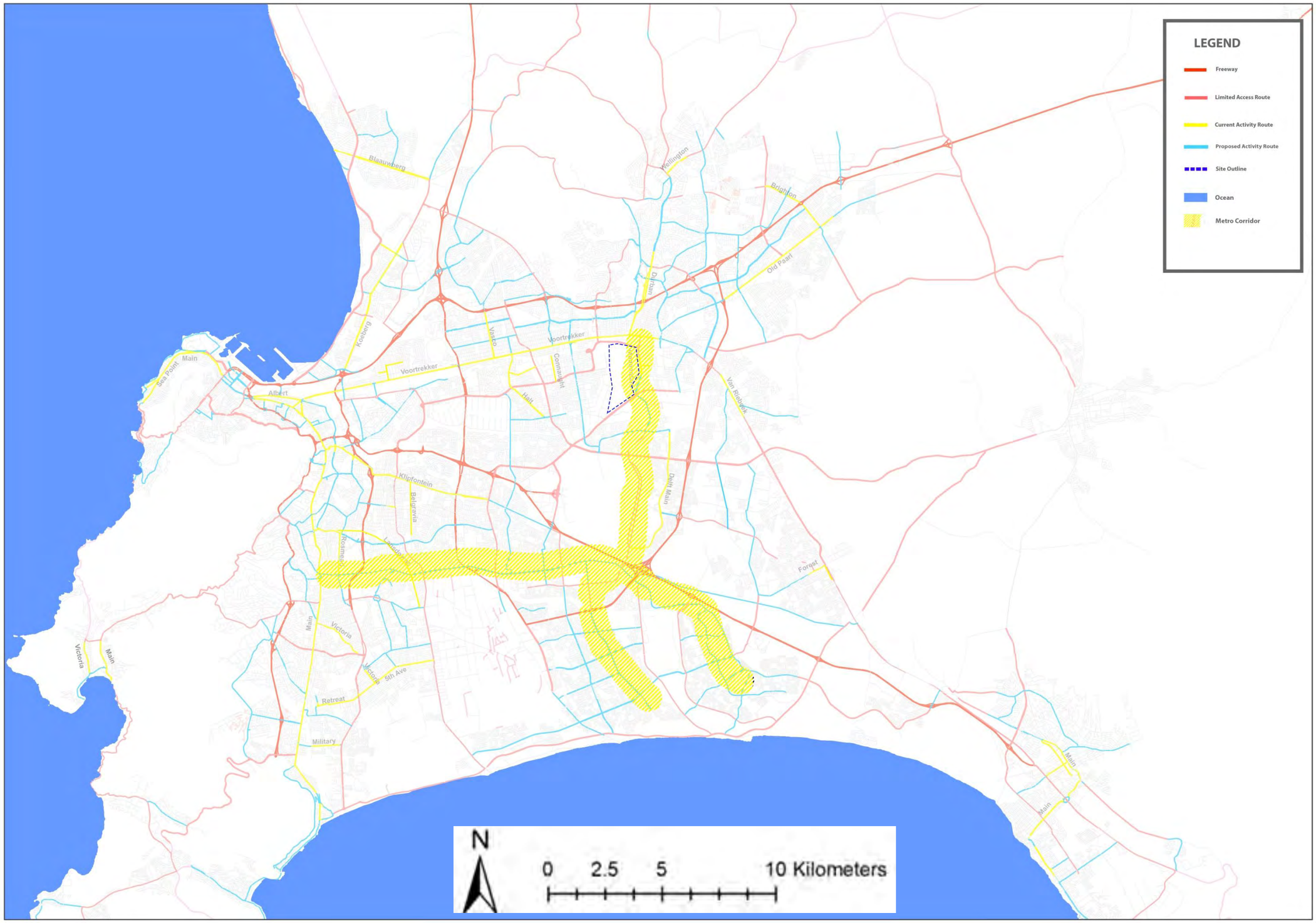


Fig 5.33. The location of the metro corridors (A) Voortrekker Road corridor (B) Main Road corridor

Source: CoCT GIS Data, 2014



Source: CoCT GIS Data, 2014

Fig 5.34. The proposed location of the metropolitan activity corridor

5.4 Site and environs analysis

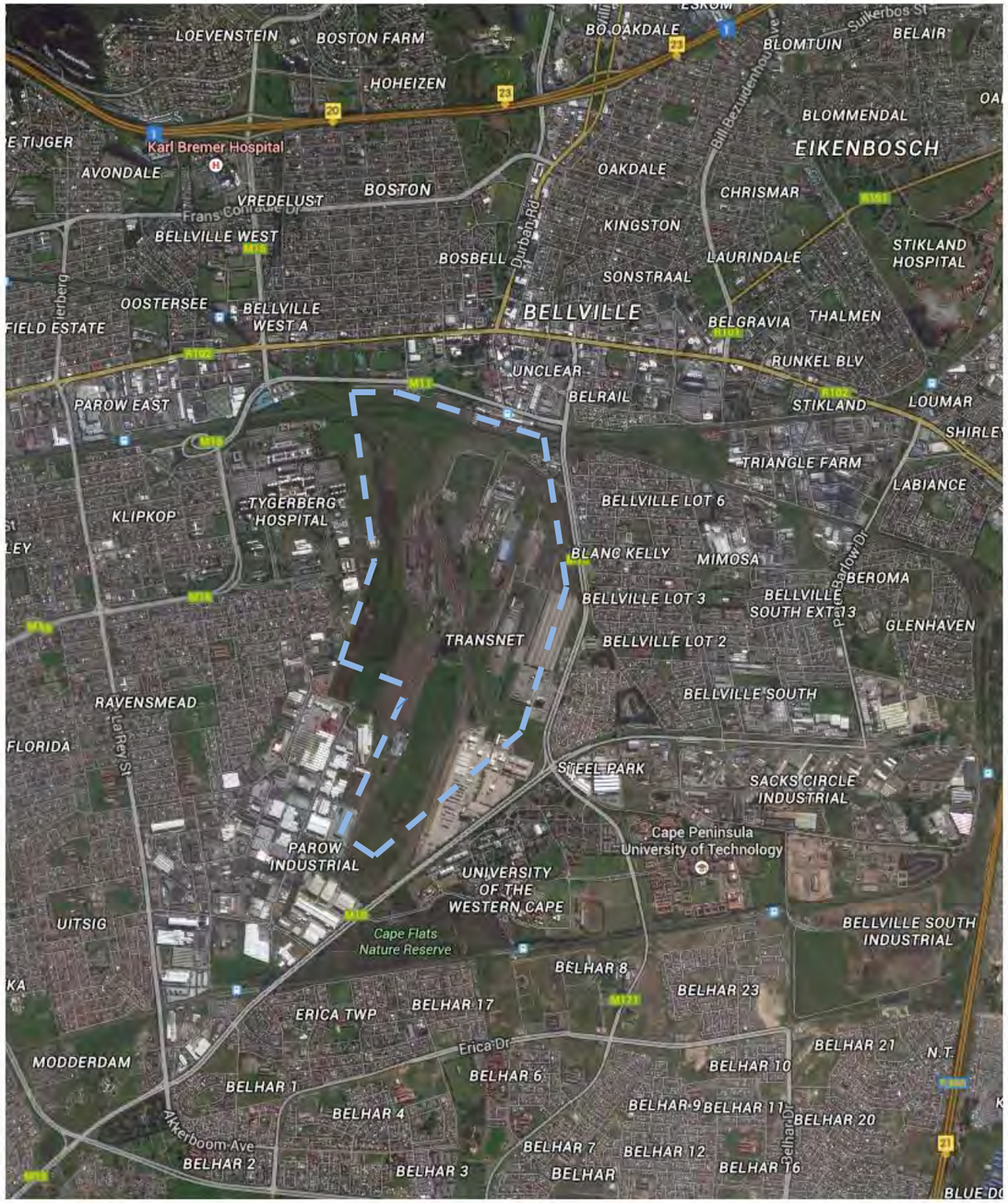
The following analysis shall focus on a smaller scale encompassing the proposed Bellville marshalling yard site and its immediate surrounds. This particular analysis shall look at the limiting factors present within the environs of the site and subsequently aim at suggesting improvements to the identified poor performing urban elements through conceptual interventions.

This analysis shall focus on:

Historical Spatial Growth of the Site and Surrounds

The towns of Durbanville, Bellville and Parow where establish in 1825 , 1861 and 1891 respectively. By the end of the Second World War, these towns were still predominately rural in character. The towns were linked on a west/ east and north/south axis along the Voortrekker Road (then Maitland Road), the railway line and Durban road (Du Plessis, 1998). The 1960's saw tremendous growth in the South African economy, and the Tygerberg region (which encompasses part of the Cape Town northern suburbs in which the site is located) benefitted greatly during this period. The town of Bellville marketed itself as an attractive settlement and attracted several large scale industries and became the Cape home for Afrikaner based financial and insurance institutions. The Spoornet marshalling yard south of the Bellville CBD was another investment attraction for the region (Scheepers, 1981) . The 1960's to 1980's saw tremendous growth in population within the Tygerberg region and the 3 towns growth joined to form one continuous urban form during this period (Du Plessis, 1998). The conurbation of these towns was the beginning of the formation of the Cape Town Metropolitan area.

The late 1960's saw a general shift within the urban landscape of South Africa. Due to a growing economy and increasing income levels, the availability of the motor car became more accessible and car ownership increased drastically (Du Plessis, 1998). This influenced urban planners to adopt more modern urban planning strategies in order to accommodate this trend. This shift in planning had great effects on the areas surrounding the site in particular. The gridiron layout of existing neighbourhoods gave way to road layouts which reflected this car domination and neighbourhood road design soon focused on a car centric design of arterial roads with large lanes and shoulders.



Source: Google Maps.2014

Fig 5.35. The site and environs. (Site outlined in blue)

The significant shift in growth patterns began in the late 1980's and early 1990's which, saw the advent of the regional mall and the office park development. This saw retail and commercial activities move away from crowded CBD's to more sprawling low density developments located in scenic environments. This occurred in both the towns of Parow and Bellville (Bellville had reached city status in 1979) where these activities moved to the northern fringes of the town along the Tygerberg hills often leaving behind neglected business nodes (Du Plessis, 1998).

Source: wikipedia.com

Fig 5.36. Bellville CBD. The vacant land (a) is the Bellville Marshalling Yard

Source: Skycrapercity.com

Fig 5.37 The Newer node of Northern Bellville. It is located 5km north of the Bellville CBD

The housing typology has remained single story, single family units with only flats located along the main corridors as these residents tends to favour access to public transport. Due to the single family, low density typology, in addition to the self sustaining commercial and retail areas, the Tygerberg region has still been able to maintain its medium town character. This is despite the region being fully incorporated into the greater Cape Town Metropolitan area and fulfils a crucial economic role within the city region (Du Plessis, 1998).

Commercial Development

As is typical of many towns, there is a concentration of commercial development along the main streets or 'main drag'. In the towns of Parow and Bellville, the strip is located along Voortrekker Road and Wellington Road within Durbanville. The Parow and Bellville central business districts occurred where this main shop lined street lies adjacent to the railway station. Over time, commercial ribbon development occurred along the entire length of Voortrekker Road and Durban Road.

The general northern movement of capital within Bellville, which began during the late 1980's , saw a character change of the Bellville CBD and immediate Voortrekker Road corridor. At the same time, the areas of Khayelitsha on the Cape Flats, and Elsies River / Belhar within the then Parow municipality, was growing rapidly without significant shopping facilities of their own. With the construction of the R300 freeway, arterial routes such as the Francie Van Zyl arterial road and the advent of the minibus taxi industry saw the accessible Bellville CBD catering for the new diverse clientele (Du Plessis, 1998).

Overtime, the Bellville CBD, which was once home to major banking and insurance institutions, has now gone through significant decline and where in the late 2000's , vacancy rates were generally high. However, this has gradually improved over the past 5 years (CoCTb, 2012). The first decade of the 21st century saw many immigrant communities that have now called central Bellville home and has evolved the character of the node considerable. Informal trade activity has now been increased although this has been major part of the retail environment and culture within the Tygerberg for more than a century. Bellville and Parow have long provided space for informal and farm stall trade and these have contributed greatly to the character of the CBD of the towns (Du Plessis, 1998).

Source: Google Maps.2014

Fig 5.38 Voortrekker Road within the Bellville CBD

Industrial Development

During the period between 1960 – 1990's, The Tygerberg region was once home to many large scale heavy industries which at the time benefitted from significant government incentives. Industries within Bellville included heavy metal fabrication , glass manufacturing, food processing and significant paper and packaging plants. The Parow industrial area was home to the overflow of the textile and clothing industry of Cape Town (Du Plessis, 1998). The change in government
macro-economic policies during the advent of democracy saw a great decline in these industries which resulted in great job losses which was greatly felt within the adjacent communities during the late 1990's to early 2000's (GTP,2014). Today however, due to the fact that the Bellville industrial areas are highly accessible by transport infrastructure, having large tracts of plot sizes, it has now become home to a growing number of logistical and storage facilities and is now one of the most sought after industrial land within the Greater Cape Town Metropolitan Area (GTP, 2014).

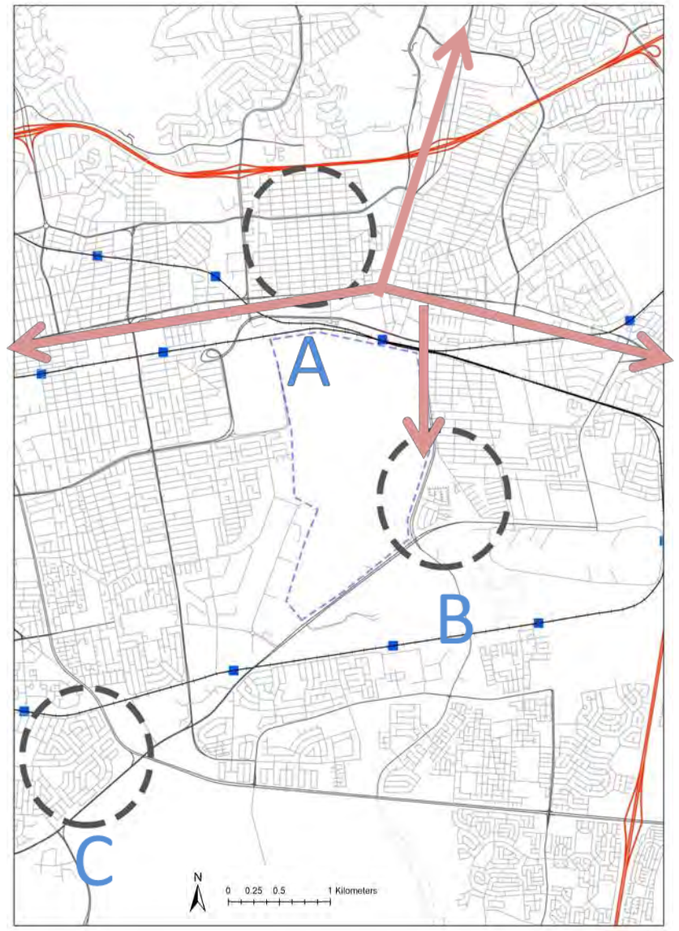
Source: Google Maps.2014

Fig 5.39. An industrial estate bordering the site. Note the large scale plot sizes (Labelled C on Fig 5.35

Movement Systems

Street layout

The surrounding street configuration shall be analysed to understand current accessibility patterns which exist around the site. These street configurations can greatly influence the design of the proposed site and ensure that it is properly integrated into its surroundings.



Source: CoCT GIS Data, 2014

Fig 5.40. A represents a grid street pattern B represents a inward/enclave street pattern while C represents a modernist car dominated road layout

The arrows represent activity streets

Grid

Areas to the immediate north and east of the Transnet Marshalling Yards contain a regular grid pattern with intensive and intimate street interaction. These areas (Labelled A) are older areas of Bellville which were primarily developed from the late 1800's to 1950 (Scheepers , 1998).

This layout is extremely favourable for the pedestrian and represents a permeable environment for through movement and integration. These areas present favourable layouts for activity which are presented in the shop-lined streets of Voortrekker and Kasselsvlei roads orientated in a west – east direction and the Durban and Modderdam Road (Robert Sobukwe) in a north – south direction.

Source: CoCT GIS Data, 2014

Fig 5.41. Boston, Bellville represents a old grid road pattern develop at the beginning of the 20th century (Labelled A on fig 5.35)

Inward Focused Road Layout

The area represented as b and C in Figure 5.40 demonstrates a street layout which is characteristic of an inward focus development. The layout of this particular neighbourhood is not integrated into the surrounding movement systems and translates into cumbersome movement within the development. This layout promotes low intensity due to movement being forced to go around the neighbourhood as opposed to

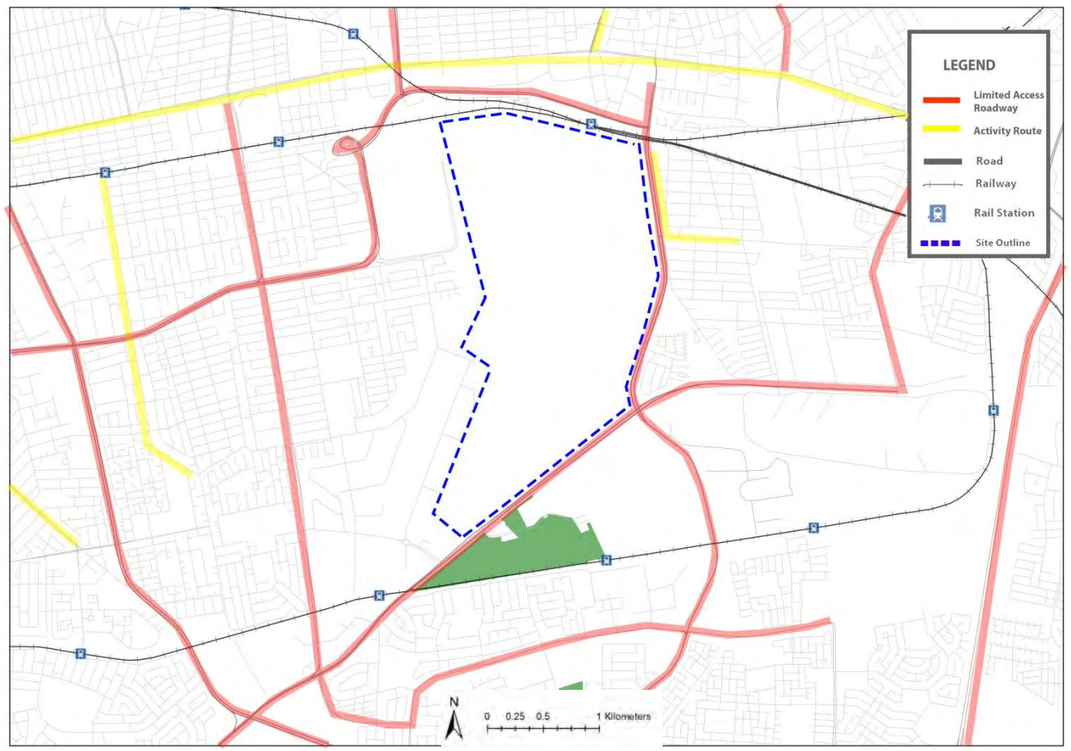
through it. The land use within this neighbourhood can only be residential and other activity cannot be supported as the internal thresholds of such inward focus neighbourhoods are far too low.

Source: CoCT GIS Data, 2014

Fig 5.42. Greenfields, Bellville. A car oriented design from the beginning of the 2000's (Labelled B on Fig 5.35)

Arterial / Limited Access Roads

The environs are dominated by mobility routes. It is clear that the environs of the proposed site have been heavily influenced by the ideologies of modernism. This manifests itself into the overuse of vehicular mobility routes and the prominence of inward focused neighbourhoods with single entrances. It can be assumed that the designers of this part of metropolitan Cape Town predicted that private vehicular movement would be the predominant mode of transport. Unfortunately, this has translated into many of the neighbourhoods within the immediate area to not be conducive to walking. This is a significant limitation, as the socio economic profile of the immediate neighbourhoods is significantly low (Census 2011).



Source: CoCT GIS Data, 2014

Fig 5.43. A map depicting arterial routes in relation to activity routes

Source: Google Maps.2014

Fig 5.44. Robert Sobukwe Road/ Modderdam Road. An example of an limited access roadway. The Bellville Marshall Yard is behind the fence on the right

Source: Google Maps.2014

Fig 5.45. Connaught Street, Parow A historic activity street. Today it lacks sufficient activity due to movement patterns being diverted onto limited access roadways.

Railway

Bellville's history is that of a town which experienced significant development due to the construction of a railway connection into the interior during the mid 1800's (Scheepers, 1998).Due to this close relationship with railways, the areas surrounding the site are well resourced in terms of commuter rail infrastructure.

Fig. 5.46. demonstrates the extent to which the commuter railway system serves the areas surrounding the site. In total, 10 commuter railway stations situated on 4 different railway lines all located within a 2km radius from the site. This represents an extensive railway network which is located within easy walking distance.

The benefit brought of the close proximity of the railway stations are eradicated due to the overall pedestrian unfriendly street layout. The system is made more inefficient as these stations are situated in placeless locations which do not interact with the surrounding street layout or existing land uses and is therefore incapable of generating sufficient activity (Fig 5.47). This occurrence is not experience on the main northern line which abuts the Voortrekker Road corridor and benefits from a thriving economic activity.

Source: CoCT GIS Data, 2014

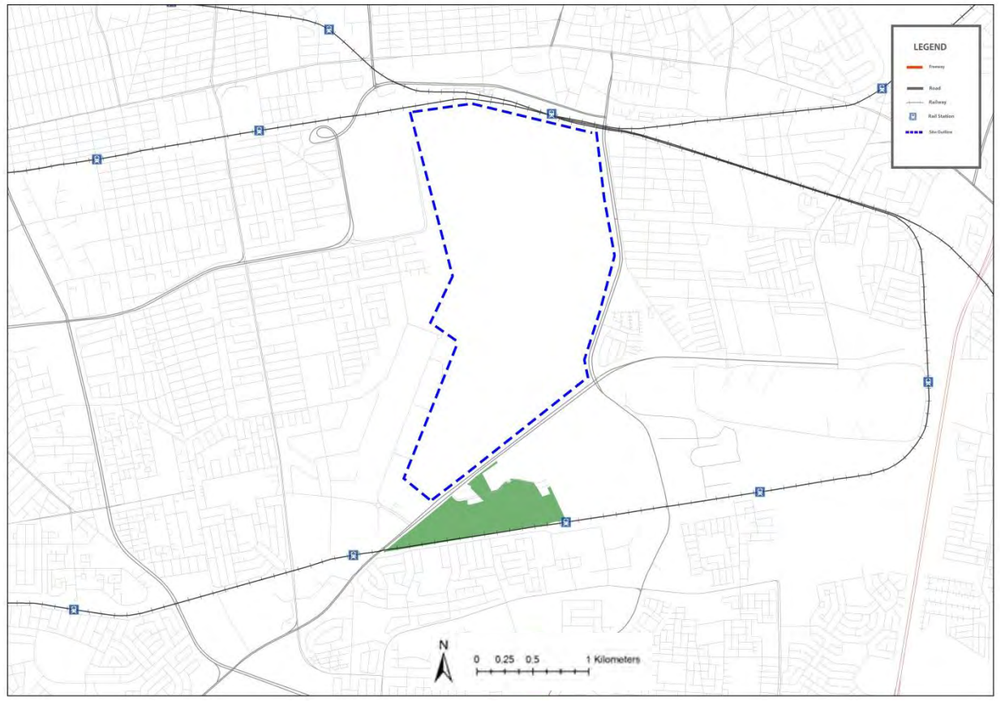


Fig 5.46. A map depicting the site and the surrounding railway network

Fig 5.47. A placeless railway station just south of the University of the Western Cape. Not the are no significant spatial interaction within and it is essential located in a 'no mans land'.

Source: Google Maps.2014

The effects of Apartheid

Racial separation within the Tygerberg region occurred marginally during the first half of the 20th century. However, with the election of the National Party in 1948 saw more stringent separation laws come into effect. Towns within the Tygerberg region quickly adopted planning strategies to satisfy the new separatist laws such as the Group Areas Act. In Bellville, the main northern railway line became the racial barrier and Bellville South became the declared coloured area in 1958. Whites South of the railway line and Coloured families north of the line had to move into the racial designated area (Scheepers, 1981).

The town of Parow (which is on the western border of the site) used vacant land to separate the racial groups. The newly proclaim coloured area of Ravensmead and Elsies River (then Tiervlei) had grown significantly due to the enforced of the group areas act within the town. Over time, this divide was enforced by the Francie Van Zyl Arterial road (Scheepers, 1981).

It should be noted that during this time, African families where discourage to live and work in the Tygerberg region. Like many South African towns, the separate racial groups had their own social and economic services which resulted in often duplicated services in respective racial group areas. The planners of the day chose to locate industrial development to the south of Parow and Bellville as these were closest to the coloured neighbourhoods which were seen as the labour pool for these burgeoning industries. These residential neighbourhoods also formed a buffer zone from the heavy industries for white neighbourhoods (Du Plessis, 1998).

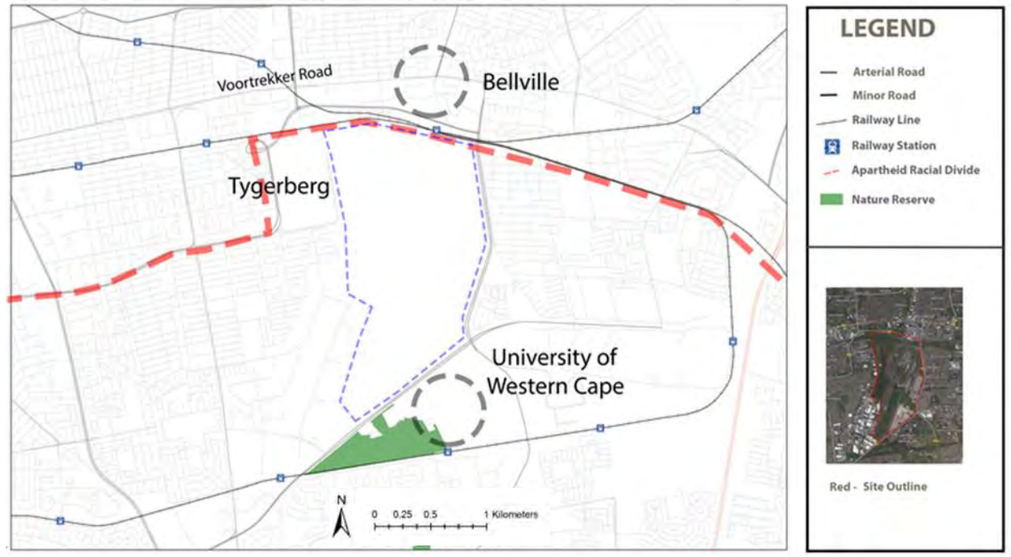


Fig 5.48. A racial separation delineation during the Apartheid era

Source: CoCT GIS Data, 2014

Lack of Integration Today

Although South Africa progressed to a democratic society and is now celebrating 20 years of a successful democracy, the urban landscape is still scared by the separated ideologies of Apartheid. Fig 5.48 demonstrates the racial delineation. Impenetrable barriers such as railway lines and arterial roads which where once employed as racial seperators, today, pose as significant movement obstacles. This limitation still prevails although the onset of democracy as brought with it the freedom of movement.

The surrounding site and environs boast a number of movement and activity generators. However, these are not connected to each other and there is considerable lack integration between them. Fig 5.49. demonstrates the location of the activity generators such as the University of the Western Cape, Cape Peninsula University of Technology, the Tygerberg Hospital and the Bellville CBD. These activity nodes lack sufficient movement systems and routes between them although being in relative close proximity to each other. In fact, the proposed site of the Transnet Marshalling Yard acts as a significant barrier between all the institutions and locations mentioned above. This lack of integration is worsened by the fact that these institutions are laid out and developed in an inward focused manner which does not interact to its surrounding areas.

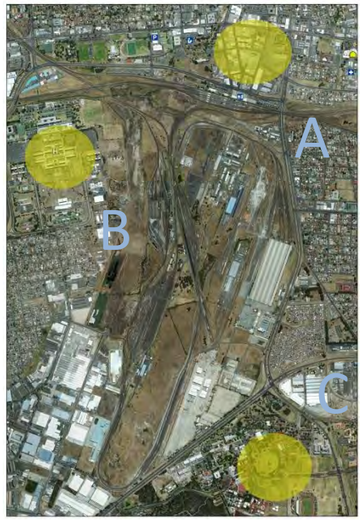


Fig 5.49. Source: Google Maps.2014

Fig 5.50.

Fig 5.49. The location of the Bellville CBD (A) , Tygerberg Hospital (B) and the University of the Western Cape (C)

Fig 5.50 The University of the Western Cape (D) and the Cape Peninsula University of Technology (E) . Note the lack of integration between these institutions

Inefficient Land Coverage

The surrounding area consists of a significant amount of government owned institutions. These institutions are primarily of a higher order consisting of regional hospitals, regional and special schools and high order transport infrastructure. However, as demonstrated in fig 5.51– 5.52. these facilities are located on large plots of land which far exceeds the amount necessary for the building profile. This results in dead space. Vacant land abutting these facilities represents key housing infill sites and its land release can greatly assist in the aim of densification.

Fig 5.51. Source: CoCT GIS Data, 2014

Fig 5.52

Source: CoCT GIS Data, 2014

Fig 5.51. The University of the Western Cape (A) and the Cape Peninsula University of Technology (B)

Fig 5.52. The Tygerberg Hospital Campus. Note the large tracts of unused land. The vacant land to the right forms part of the Bellville marshalling yard.

5.5 Site and Environs concept

Following the analyses of the immediate surroundings of the site, conceptual interventions shall now be proposed in order to alleviate the limitations mentioned above. These shall focus on the breaking down of inward focus neighbourhoods, activity streets and infill development.

Infill Development

The layout of roads and the inefficient use of land on government facilities have left large tracts of unused land within the surrounding area of the proposed site. These vacant open spaces could possible create great opportunity for the increase in densities through the promotion of infill development.

Fig 5.53 – fig 5.54. demonstrates examples of land that has been made unusable. In order to promote vehicle mobility, an arterial route has been constructed through this industrial development. However, it has been left open tracts of undeveloped land which occur between the arterial and the service road which is too small for any development. To compound this issues, this open space suffers from a lack of landscaping and resulted in a sandy tract of land. Fig 5.53 demonstrates how a change in the layout can open up opportunities for infill land and a slight

Source: Google Maps.2014

Fig 5.53. An arterial road with an two service parallel service roads. This car dominated design is spatially inefficient.

Fig 5.54. The slight change in the road layout opens up valuable industrial land situated on a movement route.

The Tygerberg Hospital is an example of an institution which contains an excessive wastage of large tracts of land and is representative of many such facilities within Cape Town. Almost all of this unused is located on the very edges of the hospital campus. In order to solve this inefficiency, land abutting the surrounding movement systems has the opportunity to be developed into mixed use buildings and opens up the possibility of increasing the integration of the medical facility to the immediate surroundings. Fig 5.55 – 5.56 , demonstrates how unused land within the Tygerberg Hospital can be developed in order to greatly enhance the facilities interaction with the surrounding urban fabric.

Source: CoCT GIS Data, 2014

Fig 5.55. and fig 5.56 The location of land that is suitable for infill development.

Fig 5.57 – fig. 5.58 demonstrates how land uses shall be efficiently administered to produce an effective infill development. Vacant land that abuts the mobility route can be activated by the development of higher density development. This particular route is located between the Universties of the Western Cape and the Cape Peninsula University of Technology. This shall greatly enhance the interaction between these two facilities. Although this type of infill development along mobility routes has been emphasised on this location, this type of infill development is suitable for all mobility routes.

Source: CoCT GIS Data, 2014

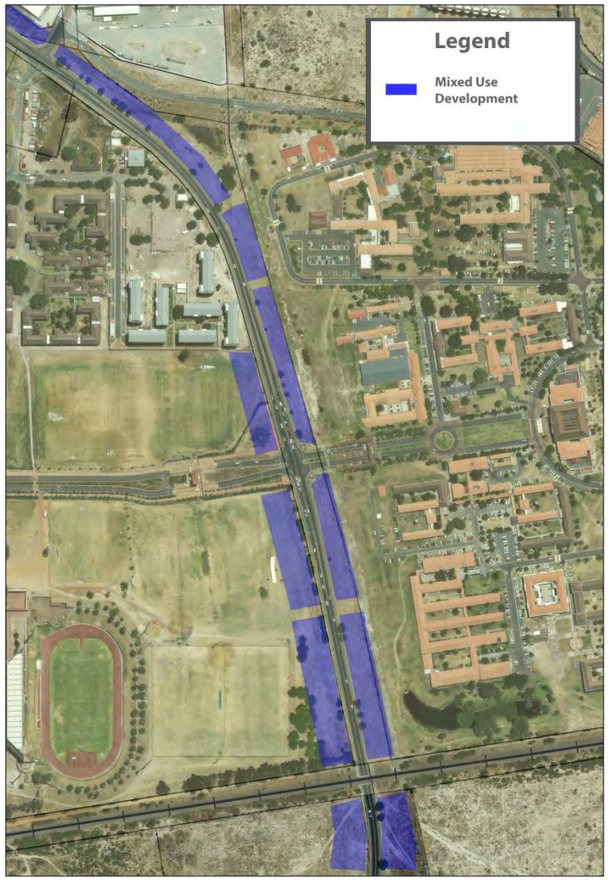


Fig 5.57 – Fig 5.58 . How infill development can increase integration and produce an activity corridor. The Western Cape University is located at (A) while the Cape Peninsula University of Technology is located at (B)

Breaking down of inward focus neighbourhoods

Integration and ease of movement are instrumental to promoting social integration. Therefore, were possible, inward focused development should be eradicated by the construction of connecting streets and neighbourhood edges which interact with the surroundings. The combination of inward focused neighbourhoods with its low thresholds in combination with the overt use of mobility routes which discourages activity and translates in an urban landscape which is not conducive to any urban qualities. This has significantly negative impact on the promotion of small businesses and the overall growth of an area's economy.

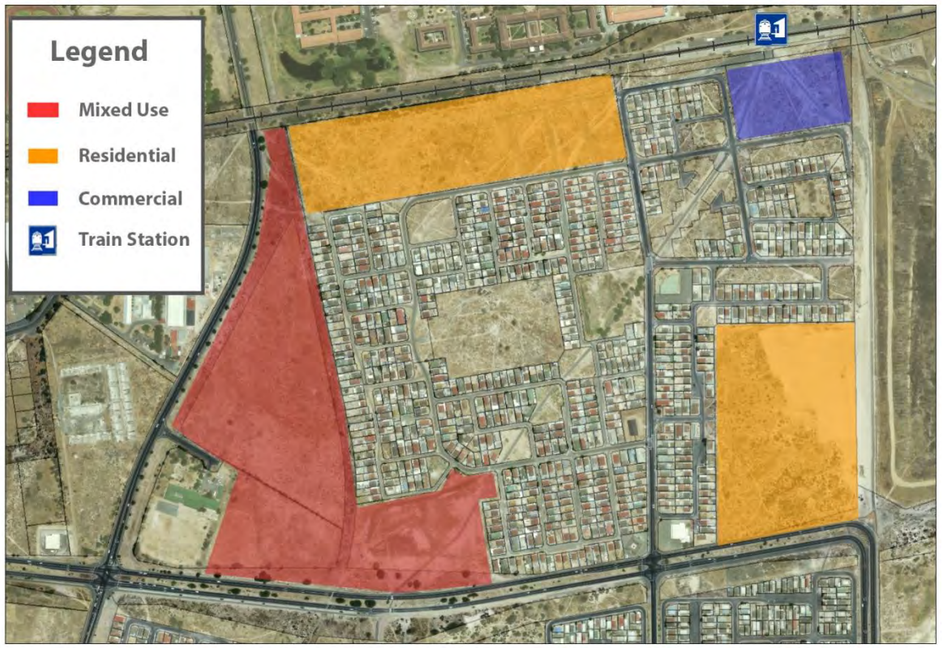
Fig 5.59 demonstrate an example of an inward focused development within close proximity of the proposed site. This particular neighbourhood is setback from the movement system which combined with its mono functional land use makes it devoid of any activity. There is only one vehicular access to this development. Pedestrian access is not provided. The vacant land separating the development from the surrounding

mobility road contain makeshift tracts that have been eroded through the sandy landscape as pedestrians work their way through the vacant land to access public transport. Although there is a railway station present, it is not integrated into the development. This irresponsible development creates an environment that is entirely devoid of a sense of place and lacks any opportunities to provide urban qualities.

The inward nature of this neighbourhood can be lessened by the implementation of street connection and pedestrian walkways to the surrounding movement roads and systems. Fig 5.59 demonstrates how the neighbourhood cells can be broken down through the implementation of medium to high density land uses along the mobility routes. This developed would then be interacting with this movement route. This shall significantly slow down traffic which is favourable for activity. The slower traffic also has the potential of creating a safer pedestrian environment

Fig 5.59 – fig 5.60. The enclave neighbourhood can be made to interact with its surroundings demonstrated here. This is representation of many such neighbourhoods within the surrounding area.

Source: CoCT GIS Data, 2014



Activity Street

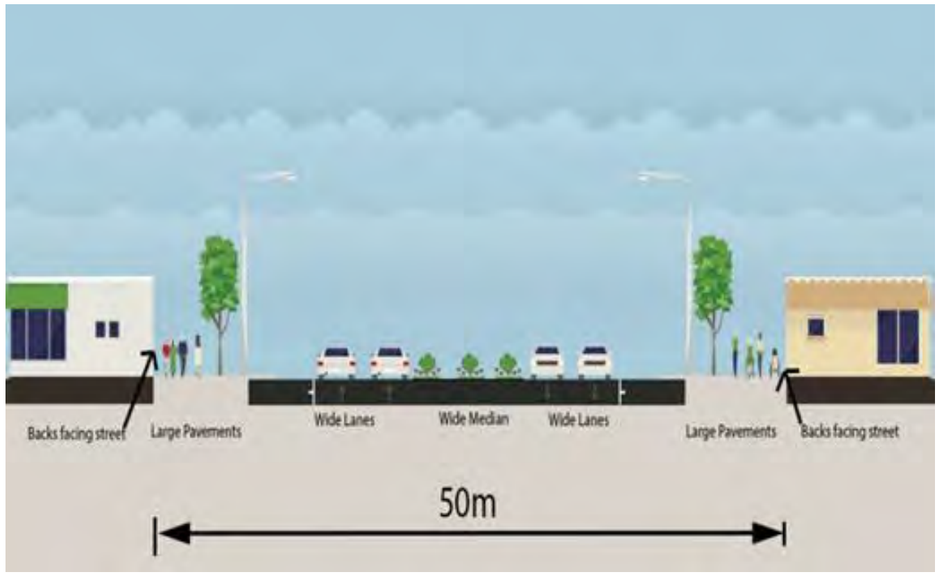
In order to undo the overt use of mobility routes stressed throughout this document, corridor activation shall involve the connecting the surrounding enclave neighbourhoods to the mobility and movement routes. Fig 5.61 – fig 5.62 demonstrates how through adjusting the existing road network, land gets opened up for mixed use development along the mobility route. This shall significant slowdown traffic and the business located along this road (represent in blue on map) shall benefit from the greater thresholds of the surrounding neighbourhoods and commuters that pass through on the movement route.

This is similar to the concept of hybrid activity street mention in the metropolitan concepts. In addition to the increase in connector streets. The existing 40m – 50m wide road reserve shall be shorted to 20m and the remaining 20m – 30m shall be zoned for mixed use development Fig 5.63 – fig 5.64. demonstrates the shortened width of the roadway along with the accompanying buildings. The overall aim is at slowing down traffic to safer speeds and the presence of property options affords business and residential buyers more choice of ideal locations along busy movement corridors.

Source: CoCT GIS Data, 2014

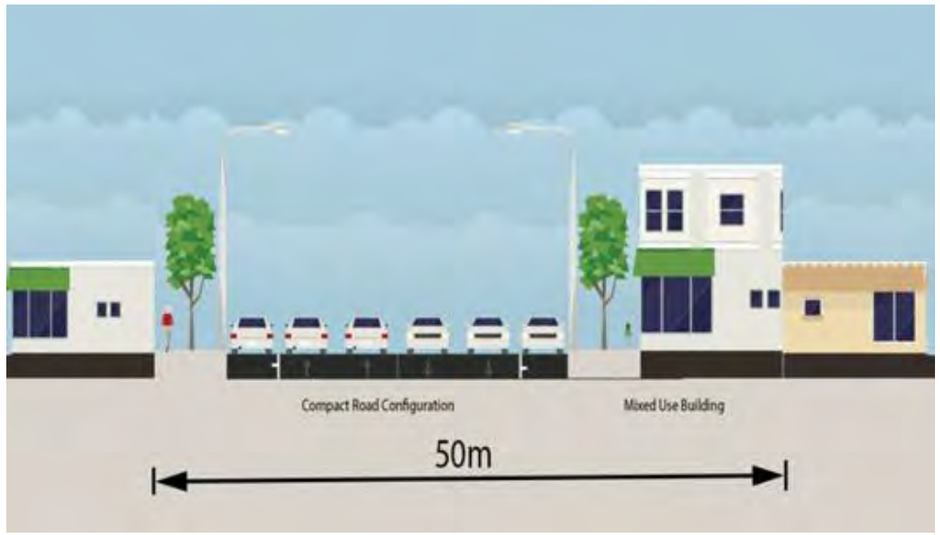
Fig 5.61. A arterial road with which cuts through a neighbourhood

Fig 5.62. Through increase street connections to the arterial allows for the formation of an activity corridor



Source: By author using streetmix.net

Fig 5.63. A large arterial road with the backs of buildings facing street



Source: By author using streetmix.net

Fig 5.64. How infill buildings can create corridors in existing arterial roads

Chapter 6

6.1 The Site

The Transnet Railway Marshalling Yards located in Bellville, Western Cape is situated on well located land that if developed, can greatly increase the overall urban performances of the surrounding community. This current site represents a total of 400 hectare of developable land.

This proposal shall focus on the promotion of an ideal urban development plan. It shall attempt through implemented appropriate design strategies, demonstrate how development can achieve good urban qualities.

This will be done through a design which aims at implementing urban qualities which are necessary for a successful and efficient urban environment. These include the promotion of ideal densities, provision of green spaces, the provision of public services, availability of quality public spaces and the emphasis of efficient movement through the promotion of walking and non motorised transport.

Source: CoCT GIS Data, 2014

Fig 6.1. The Bellville Marshalling Yard, Cape Town

6.2 Bio-Physical Analysis

The following analysis shall focus on the bio-physical components of the site and determine how these will inform any proposals posed for the site. Through this analysis, it shall be determine where development should be avoided and where it should tread lightly in order to protect and restore the natural element of the site. This analysis shall also determine how the bio-physical environment has any implications on the development of the site. This will then guide the project in a suitable and sustainable path and ensure that development can withstand any geographical or environmental factors. The elements of the biophysical environment to be analysed in this sections are the geology, soil, topography, hydrology and the biotic systems.

Geology

The geology of the Earth's surface has been evolving through the process tectonic movements and weathering over a period of hundreds of millions of years. This has seen drastic changes to the landscape of the Cape. Over the millennia, the area that is now known as the low laying Cape Flats was once a shallow ocean and the mountain and hill ranges of the peninsula where once islands. There is also evidence that 17 000 years ago, the ocean was 100m lower than it is today and that Robben island in the Atlantic Ocean was once a hill on the landscape (Theron, 1998).

This change and makeup of the geological formation has a significant impact on the urban development and engineering inputs needed for building construction. Issues such as the location of faults and the ability of rock types to accommodate building foundations and building weights are of great importance for the establishment of safe and viable urban development.

The geological composition of the site is primarily sedimentary. This sediment rock is composed of quaternary alluvium and this geological formation is the primary geological form that occurs on the low lying areas of Cape Town (Theron, 1998). This geology type poses no constraint to building or agricultural uses. It should also be noted that there are no faults which run through the area. Therefore no building modifications or special construction measures are needed for future development of the site.

Soil

Over time, solid rock formation undergoes changes due to the powerful forces of erosion. This is caused by the effects brought on by the climate, topography and the presence of plant and animal species (Lambrechts, 1998). The by product of eroded solid rock is soil. This alluvial sediment or soil is an important product of nature and is essential for the sustaining of the natural ecosystems and subsequently plays a crucial role in the survival of life on earth. In terms of human development, soils determined whether agriculture process can take place and how their water holding abilities impacts on the occurrences of flooding.

The soils present on the site are alluvium based and has a significantly sandy composite structure. The texture is deep, sandy lamotte soils which are prevalent throughout the plains of the Cape Peninsula. This soil type has limited agricultural value and requires some modification to support crops (Theron, 1998). The sandy alluvium soils found on the plains have notoriously low water holding capabilities and are prone to being waterlogged. This is due to the fact that the soils have significantly low clay content. The levels of clay within soils determine the water holding and nutrient levels of particular soils (Lambrechts , 1998). This lack of water-holding capabilities leads to the formation of perennial and non perennial wetlands which are common feature within the Cape Peninsula landscape.

Sandy soils are generally unsuitable for dryland crop but through the process of claying and intensive irrigation, these limiting factors present within the soil can be mitigated (Lambrechts , 1998). In terms of urban development, the soil types present within the site pose no building constraints and no engineering interventions are needed.

Topography

The landscape of the Cape Peninsula is full of contrasts and variety. From steep mountainous regions with cliffs and rocky outcrops of the Cape Mountain Ranges, flat low laying plains of the Cape Flats to the rolling hilly topography of the Tygerberg hills and the Boland region. This variety gives the Cape Peninsula a unique characteristic and it gives a rich visual landscape to the region. Topography impacts human development in many ways. Activities such as agriculture and urban development have limitations in terms of the types of slope and gradients that they can.

accommodate. The steeper the slope or higher the gradient, the more engineering intervention is required to ensure that human activity is able.

The site is located on a generally flat land with an average gradient of 1:400. The average height of the site is 60m above sea level. There are no significant ridges or cliffs present within the landscape. Due to the incorrect channelling of the Elsieskraal River, which runs along the northern border of the site, soil erosion has formed ditches and steep banks which range from a height of 2m to 5m. These would have to be restored by correcting the natural flow of the Elsieskraal River. Overall, the relatively flat land and absence of any significant gradients or slopes present no engineering and building limitations and is therefore highly suitable for development in this regard.

Climate

Climate plays on important role on the prerequisites for activities such as agriculture and more importantly human comfort. Issues such as rainfall, temperature and wind prevalence can greatly affect the experience within a given environment. Appropriate urban development would have to adapt to climatic conditions to ensure that quality of life is not negatively impacted by the climatic forces of nature.

Rain

The site benefits from the pleasant weather generally experienced within the Cape Peninsula. The Cape's pleasant Mediterranean climate with 80% of rain falling during the winters months of April to September results in a high number of sunny and cloudless days (Lambrechts, 1998). Due to the varied topography of the metropolitan area, there is a range of annual rainfall amounts recorded for different areas of Cape Town. This site falls in an area which experience significantly little rainfall compared to other high lying regions on Cape Town. The annual rainfall for the site ranges from 400mm to 600mm. Due to the soil type and the level of annual rainfall, winter months often bring about the occurrence of non – perennial wetlands which a great number of fauna and flora depend on. However, the summer months are particularly dry and often necessitate the need for irrigation for greenery (Lambrechts, 1998).

Wind

The site rarely gets strong winds of more than 20 kph. The average daily wind run (the amount of kilometre of wind per day) is significantly higher during summer. The predominant winds during the winters months are a chilly North Westerly and during the summer, a cool South Easterly (Lambrechts, 1998). The summer South Easterly wind acts as a considerable cooling effect and gives the region a comfortable temperature. Uncomfortable conditions and higher temperatures occur however, when these cooling winds subside in the late summer months of February to March. The drier months are also prone to the occurrences of wildfires (Lambrechts, 1998). It should be noted the site falls within a region of the metropolitan Cape Town which receives the least amount of wind.

Hydrology

As an essential life giving element, water plays a primary role in supporting all life on this planet. The availability of water, both above and below ground is essential to ensuring the liveability and the economical viability of a given site. This is particularly the case in the form of uses such as agriculture and recreational parks.

After the small Elsieskraal River, the areas surrounding the site have a lack any significant watercourses. The run-off from the Tygerberg Hill ranges have long since been canalised and channelled into the exisiting storm water system. Floods due to run-off from the Tygerberg Hills were of great concern and were the cause of great damage to property within the early settlement of Bellville, Parow and Durbanville. These flats were the natural drainage areas for this run off. This prompted early engineers and planners to mitigate these events by diverting the Elsieskraal River away from the sandy flats of the lower Tygerberg and into a newly directed canal as conflict grew between natural run off and urban development (Scheepers , 1981).

The Elsieskraal River runs along the northern boundary in addition to a number of non-perennial wetlands. As mentioned earlier, the moderate rainfall of 400mm – 600mm annually makes these natural water catchment systems essential in storing water from precipitation and overall is essential for the natural ecosystem of the region (Theron, 1998). Today, these wetlands are overpopulated by alien vegetation and pollutants. In its current state; the river course possesses little ecological value due to its concrete banks and bed.

Flora and Fauna

The Cape Peninsula boasts a wide variety of flora and fauna. Unfortunately, this unique biome suffers from varying stages of endangerment. The urban growth of the lowlands of the Cape Peninsula has massively reduced the original extent of the natural vegetation (Wood, 1998). The original vegetation is now confined to steep and rocky slopes which are unsuitable for development. The Cape metropolitan area also contains a number of small protected natural reserves which aims at protecting the unique flora which exists in the area. However, these only represent a significantly small area overall.

Flora

The site falls within the Cape Floristic Region which is the smallest of the six floristic kingdoms of the world. This kingdom is considered to be the richest in the world and consists of 8550 plant species in total (Wood, 1998). There are 7 types of vegetation found within this floristic kingdom. These are namely Mountain Fynbos, Sandplain, Fynbos, Coastal Renosterveld, Mountain Renosterveld and Strandveld.

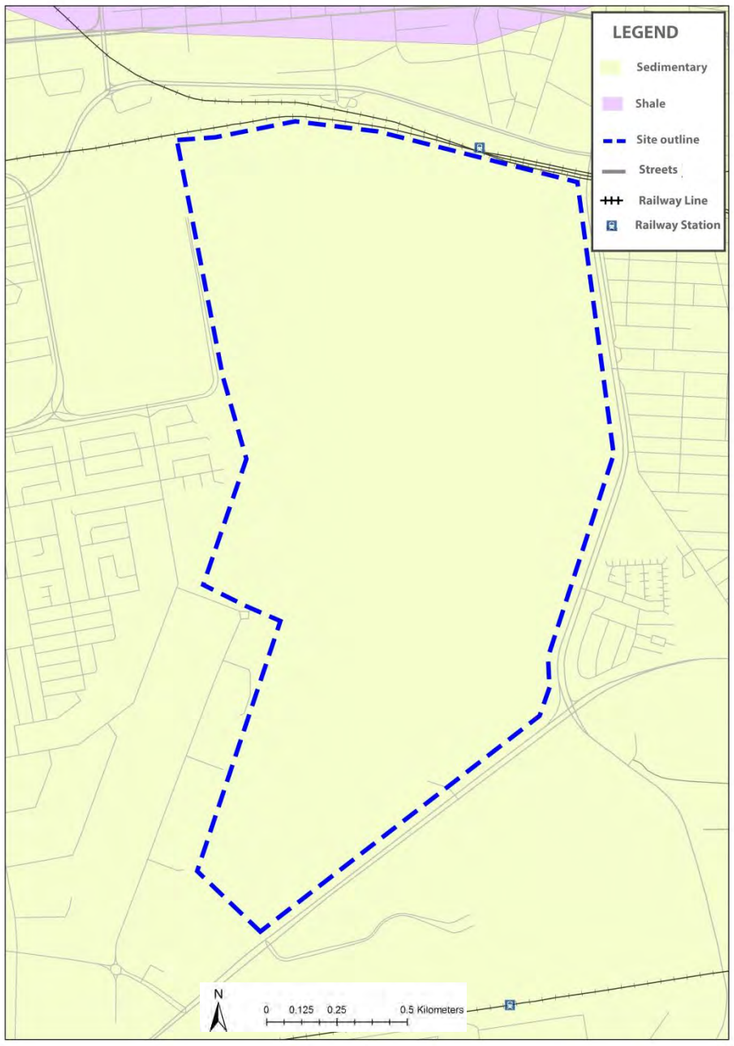
The lower lying plain of the Tygerberg region, on which the site is located, comprises of Sandplain Fynbos. This Sandplain Fynbos thrives on nutrient poor acidic soils. It consists of shrub like vegetation surround by soft sand as the soil does not promote the growth of grasses. Overall, of this vegetation type, only 1% of its original extent remains. This is in a more threatened state than the overall Cape Floristic Kingdom to which only 3% of the natural extent remains (Woods, 1998).

As the site was earmarked for the Transnet Marshalling Yard, massive vegetation removal occurred to clear land for the development in the 1950's (Scheepers , 1981). Over the decades, as the site became underutilized and left to stand vacant, the remaining unused parcels of land became populated and overwhelmed by alien vegetation. Alien vegetation present within the site includes acacia species such as wattle, Port Jackson and reed species such as water Hyacinths.

Fauna

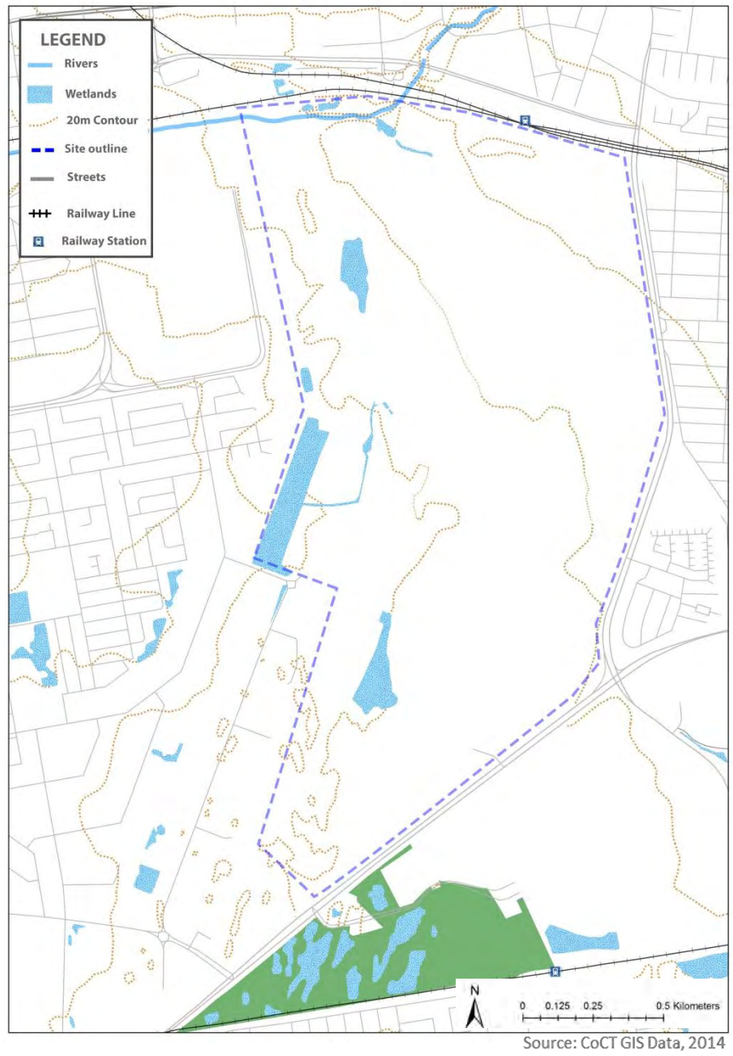
The Tygerberg region and the low laying plains surrounding it originally contained a wide variety of animal species. These include larger mammals such as rhinoceros, elephant, lion, leopard, Cape Buffalo and Eland. These became extinct relatively quickly after the arrival of settlers in the area during the early 1800's (Wood, 1998).

Today smaller mammal species such as the small grey mongoose, Cape Porcupine, the bar eared fox and the striped field mouse are still commonly encountered within the area. There is also vast number of smaller species. These include primitive invertebrate species such as insects, amphibians and reptiles. These small creature provide a great food source for the 158 bird species which have been recorded within the area (Wood , 1998). Unfortunately there are very few studies which researched the extent of the numbers of these animals, particular within the urban areas of the Tygerberg Region.



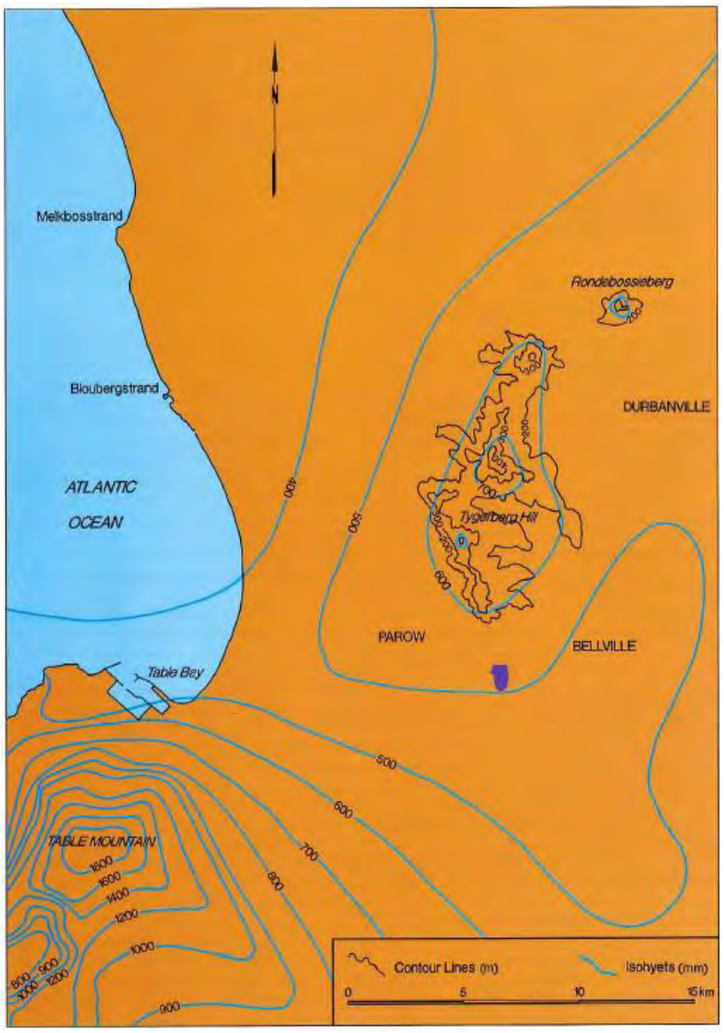
Source: CoCT GIS Data, 2014

Fig 6.2. The geological composition of the site



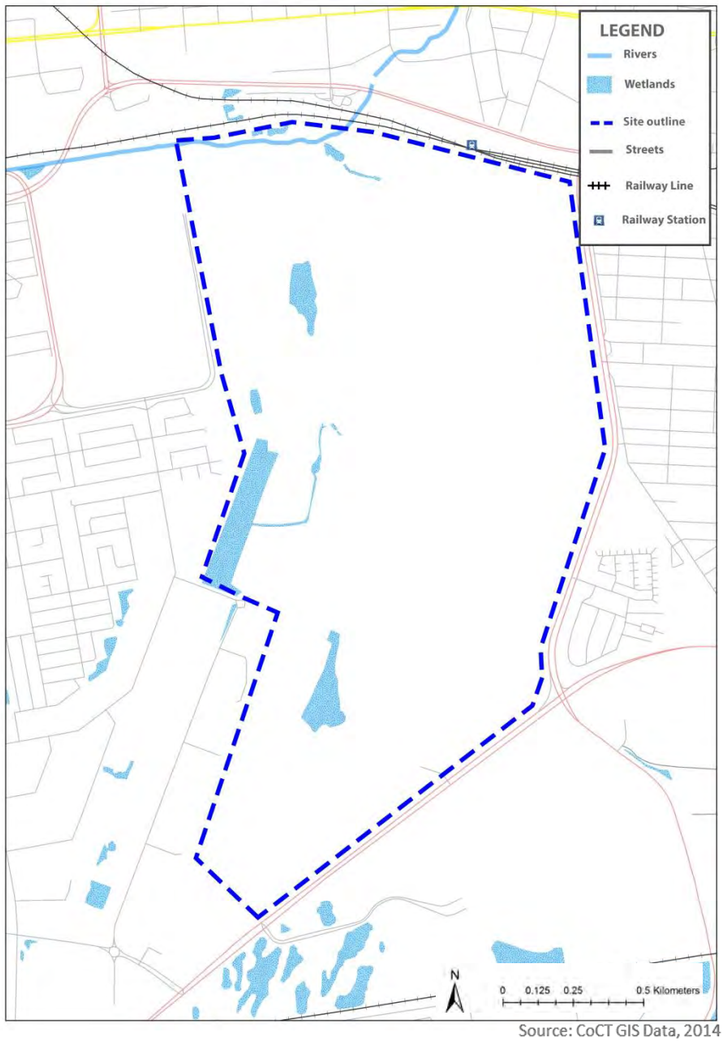
Source: CoCT GIS Data, 2014

Fig 6.3. The topographical features of the site



Source: CoCT GIS Data, 2014

Fig 6.4 . The climatic map demonstrating isohyets (rainfall) (Scheepers, 1998)



Source: CoCT GIS Data, 2014

Fig 6.5. Map depicting hydrological features of the site

Constraints and Informants

From the bio-physical analysis above, we can conclude an environmental informants and constraints map which demonstrates areas which are not suitable for development and those that are suitable but require development to tread lightly.

The red (fig 6.6) represents no-go areas for development . This area contains the Elsieskraal River an features a 50m buffer zone surrounding it. It is crucial that the original watercourses and riparian zones are protected as these play a crucial role within the ecosystems. Therefore, urban development should remain clear of this natural watercourses.

The site contains a number of wetlands which have been demarcated as tread lightly. It has been demarcated as such because although the wetlands do play crucial role to the fauna that exist within the site, these water bodies are not in their original state and have overtime simply formed within depressions in the disused land on the Bellville Marshalling Yard.

It should be noted that the majority of building restrictions are located on the western portion of the site. This can greatly inform the usage for this section of the site. Having a protected river, and ecologically degraded allows for the opportunity for this proximity of the site to contain the location of a large park and an environmental protection area.

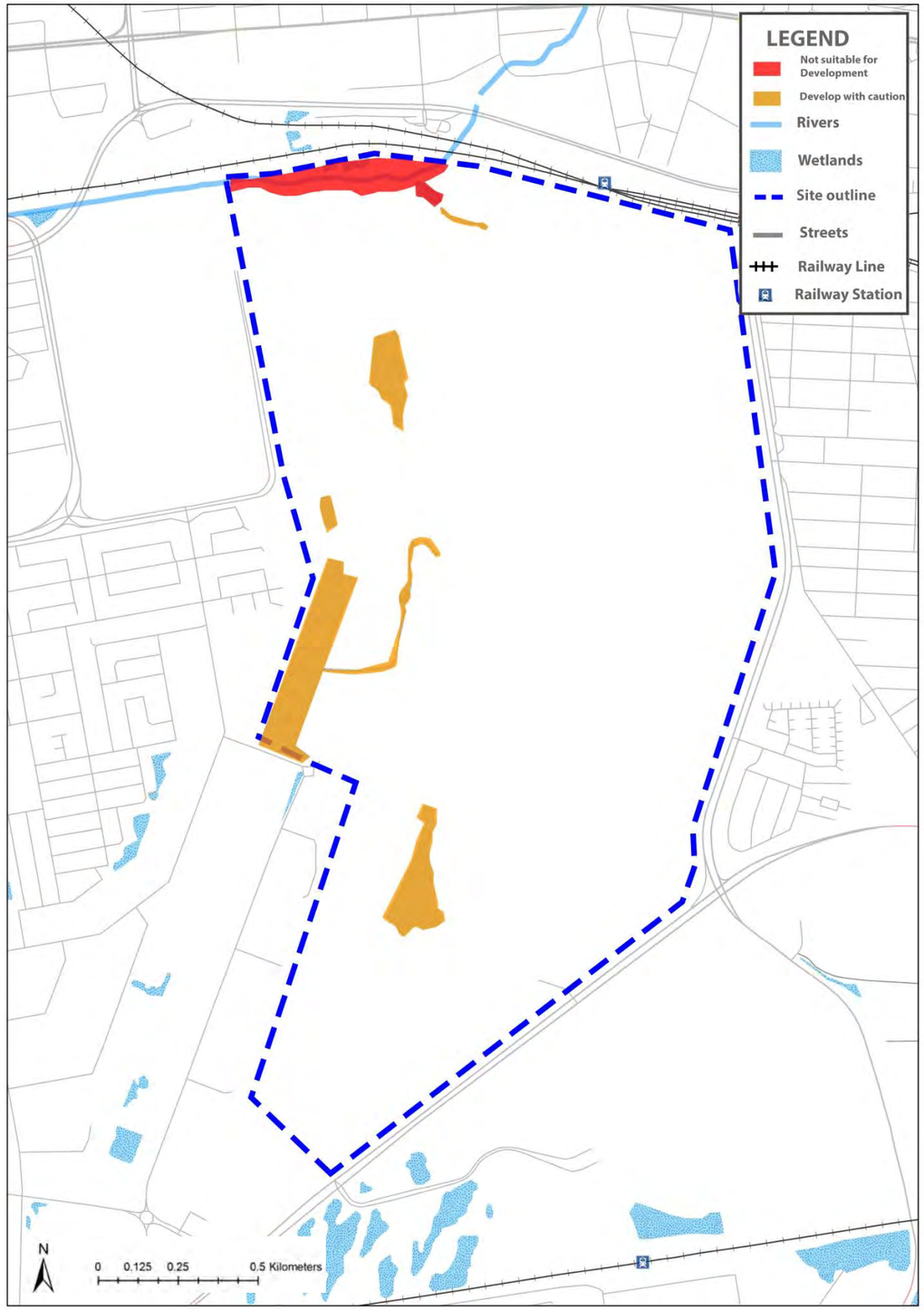


Fig 6.6. An opportunities and Constraints Map

Source: CoCT GIS Data, 2014

Source: CoCT GIS Data, 2014

Fig 6.7 . The proposal for the Bellville Marshall Yard Site

Street Layout

The street layout is essential in determining the movement which occurs within a community. It is important that a street layout informs the location of activities in combination with the efficient choices of movement.

In order to promote greater permeability for the pedestrian, this development shall follow a strict gridiron street pattern. In order to enhance the benefits of the grid and to undo its somewhat monotonous layout, this layout shall consist of a variation of orientations of the grid. The orientations shall, at best, conform to the outlines of the site in addition to the angles of the surrounding street pattern in order to ensure greater interaction with the surrounding streets and movement patterns (fig 6.10).

Fig 6.11, demonstrates the movement hierarchy promoted by the street pattern. This shall focus on a main north-south , west – east, and diagonal movement. This is in order to increase the permeability of movement as much as possible.

Superblock

Superblocks are defined by internal distributor streets. Ideally, superblocks shall be 300mx300m in size and be arranges in a gridiron. These blocks once again are scaled to the pedestrian but also include the requirement of other modes of transport and movement.

The internal distributor street which border the superblocks shall allow for the provision of the movement of vehicular based traffic, public transport and non-motorised transport such as cycling. The ideal width of these streets is 20m – 30m wide in order to accommodate the pavement (pedestrians) , traffic lanes and public transport movement.

Block size

A block size of 65mx65m is ideal for the pedestrian as it allows for comfortable walking distances and the ability for development to be suitable for the human scale. This permeable block size also allows for the impeding of traffic flow due to numerous intersections. This results in slower moving traffic which vastly increases pedestrian safety. Traffic safety is also increased through other interventions which mitigate car prominence such as pavement widening and the removal of parking facilities. This also benefits the local economic activity by compelling motorist to engage with commercial and retail offerings as opposed to travelling past it. Having shorter blocks has the benefit of creating increase permeability particularly for the pedestrian.

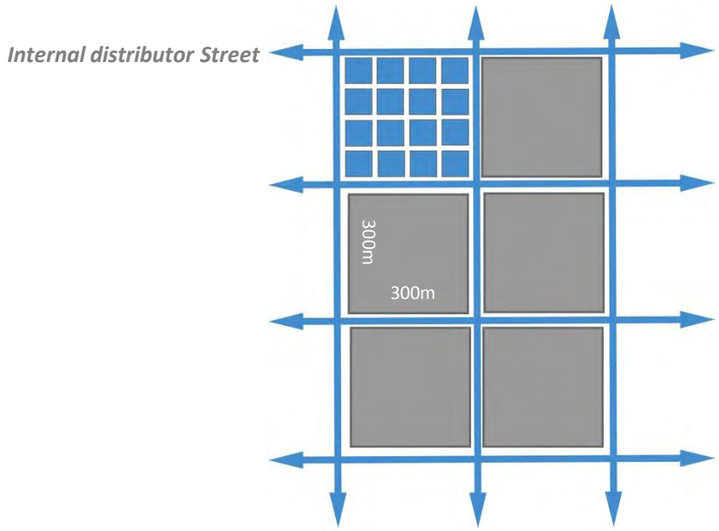


Fig 6.8. Superblock

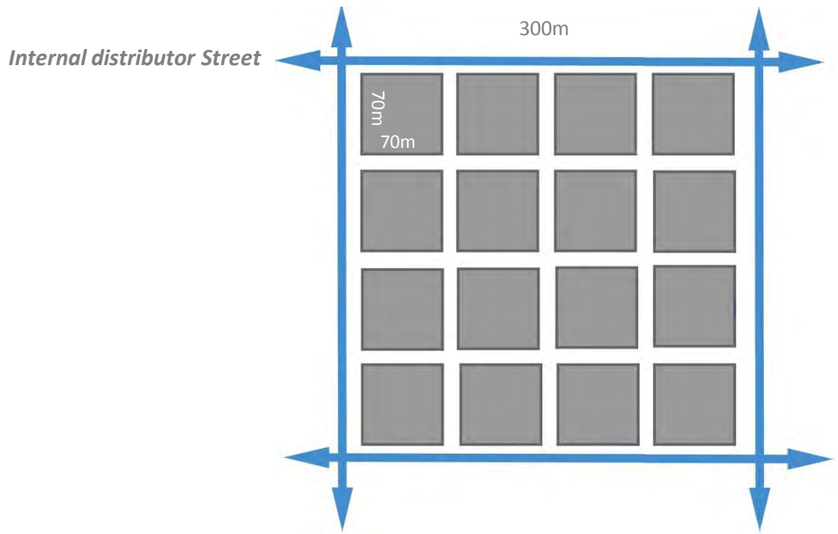


Fig 6.9. The breakdown of blocks

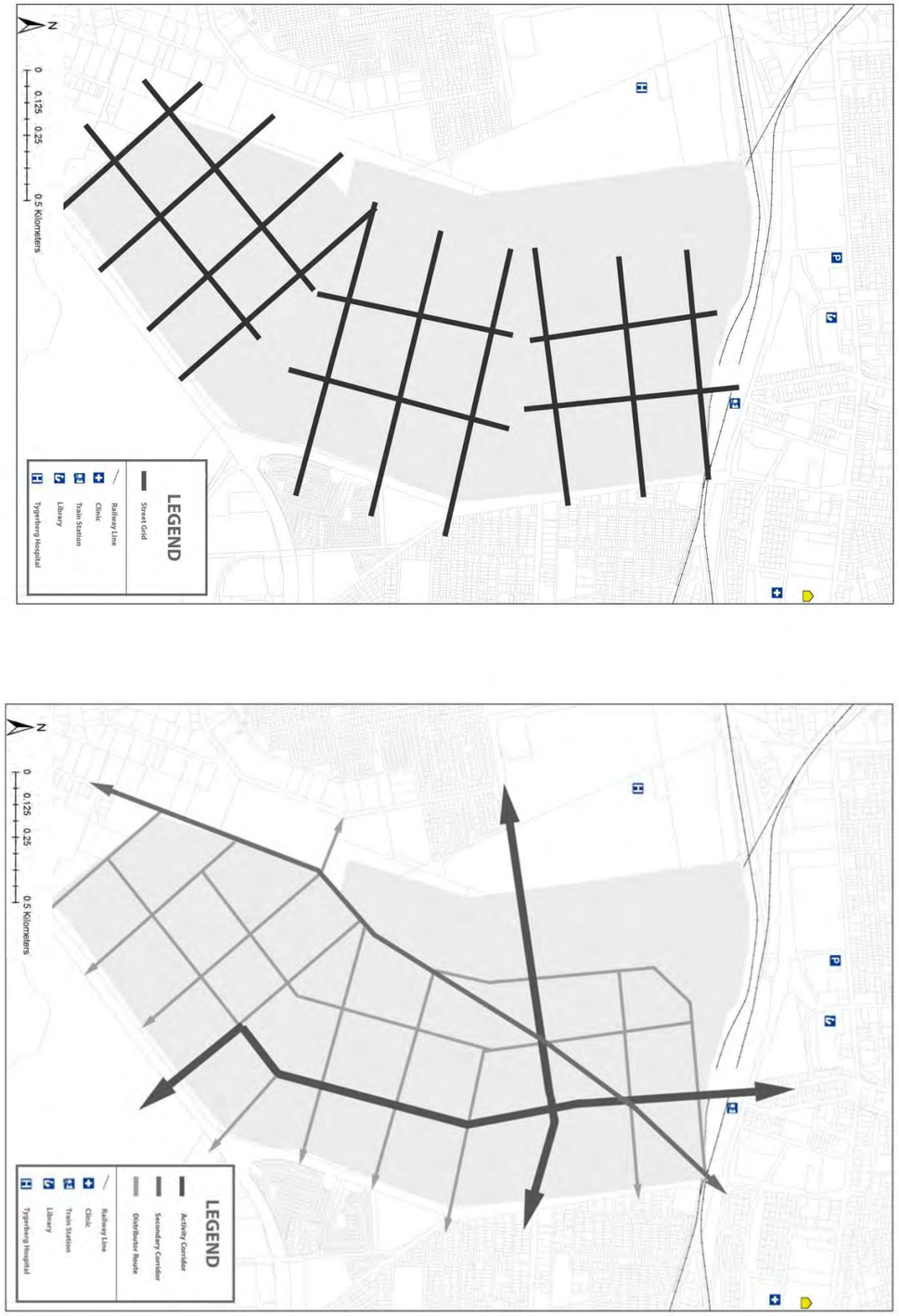


Fig 6.12 The location of proposed activity corridors

Fig 6.10. A demonstration of the cracked grid

Fig 6.11. The hierarchy of movement through the proposal

Activity Route

An activity route shall run along the length of the site in a north-south direction and in an east – west direction. These activity corridors aims at providing activity links through the site and act as a connection system within the surrounding area. This is important as the Bellville Marshalling Yard site acts as a significant spatial barrier between the surrounding areas.

The highest order activity corridor shall aim at connecting the Bellville CBD in the north with the University of the Western Cape and ultimately the Unibell (UWC) train station in the south. The second order activity corridor (east – west) aims at connecting the minor existing corridor on the east of the site (Kasselsvlei Road) with the Tygerberg Hospital and Parow to the west of the site.

The Activity routes shall contain the highest order movement systems and represent the main directional axis of the site.

Public Transport

Infill development in close proximity to economic opportunities has the benefit of bringing more people closer to employment opportunities. This greatly limits the appeal of the private motor vehicle as commutes are significantly shortened through the implementation of high densities and made more convenient through the use of public transport.

Private vehicular movement shall be discouraged through the employment of a number of tactics. These include the limitation of on-street parking, a large number of intersections and the availability of public transport as an appealing alternative. Due to the proposed high density of the site, the provision of an efficient public transport system is essential in ensuring efficient movement within the site.

Public transport will be provided in the form of a tram, an internal bus service and non-motorised transport (NMT). These will occur within a hierarchy and shall intersect at transport modal interchanges (fig 6.16) .

Tram

The tram shall provide the primary north- south movement along the proposed corridor with connecting interchanges to other modes of transport. The tram will run along the median of the corridor strip with stations located at distances of 300m. The station platform will be located between the two directions of tram system in order to avoid pedestrian / motor vehicle conflict. Pedestrians shall then be able to crossover to the pavement at signalled pedestrian crossing to maximise pedestrian safety. The operation of the tram shall be in rapid format with trams departing every 15 min to 30min depending on the time of day.

Bus

The internal bus system proposed for this development shall provide localised movement through a system of 3 loop routes which aim at connecting the commuter to the far reaches of the site. In addition, it will also provide a means of connections to other modes of transport through transport interchanges. This system shall run in mixed traffic, as due to the primary focus of public transport development, the traffic volumes intended to be generated within this development are too low to justification for the provision of bus lanes. The system shall operate on an efficient and convenient schedule which is easy to understand. This operation of the bus system shall be in rapid format with the departure of buses occurring every 15 min to 30 min depending on the time of day.

Non-motorised Transport

The majority of public transport infrastructure posed for this site shall be in the form of a non-motorised transport system. These include walkways and cycle lanes. Walkways shall include throughways between blocks in order to increase its permeability and affords options for the development of public spaces within these blocks. The cycle lane network shall be extensive throughout this site as this mode of transport shall be greatly encouraged. This network, which is designed is a grid like manner, provides the cyclist with access to all reaches of the development. Where these cycle lane route intersect, provision has been made for public spaces which shall act as rest areas. Public water fountains and bicycle racks shall be provided along the entire cycle route system.

Source: Wikipedia.com

Fig 6.13. Toronto Street Car System. This extensive system offers segregated tramways and dual tram / car lanes. Station platforms are located on curbs which are between lanes at large street intersections.

Source: CoCT Website

Fig 6.14. A segregated cycle route. Cape Town. These routes provide safe roadways for cyclists and aims at introducing cycling as a convenient, healthy and safe mode of transport.

Source: CoCT Website

Fig 6.15. A accessible low floor bus. Edmonton, Canada. These busses allow easy access to the elderly and persons with physical disabilities.

Fig 6.16. The internal transport system for the site

Street Cross Sections

There are 3 main street hierarchies proposed for this site. These are based on the role that it plays on the movement patterns. All streets within the site have a significant provision for the pedestrian and favours walking over the vehicular movement.

The highest order street is the main activity corridor which contains the internal tram system. This street has a width of 30m. Fig 6.17, demonstrates how this street layout has been divided. In total, a width of 11.5m has been dedicated to the pedestrian. Buildings along this street shall contain ground floor retail with 4 -6 floors of mixed uses, which includes residential and commercial above. The ground floor is intended to provide street interaction and the height of buildings aim at providing appropriate human scaled and appropriately contained public street.

The next street shall be 20m wide. (Fig 6.18) As with the activity corridor street, the motor vehicle plays a significantly small role over other modes of transport. This level of street shall contain the bus system and the NMT network. The bus system shall operate on dual functional lanes which became restricted for passenger vehicle users during peak hours. The cycle lanes are deliberate setback and separated from traffic lanes by greenery to prevent conflict between these two modes of transport.

The street level is 10m wide (fig 6.19). These shall be extremely intimate streets. Small traffic lanes discourage fast moving traffic. The street has 2.2m of pavement on each side. The buildings adjoining these streets shall vary depending on where these are located

Fig 6.17. The cross section of the main activity corridor

Fig 6.18 The cross section of a 20m wide internal distributor street

Fig 6.19. The cross section of a minor street

Green Space

The availability of quality green spaces is essential for the promotion of a healthy lifestyle within an urban area. The presence of green spaces affords citizens places which can be utilized for both relaxation and recreation. The provision of green spaces also has the benefit of bringing much needed softening of the hard concrete and asphalt surfaces which are in abundance in modern cities.

Nature Reserve

In an attempt to restore the original course of the Elsieskraal River and its original floodplains, a nature reserve shall be allocated in order to restore the natural vegetation which has long since been degraded over the decades due to urban development and vegetation removal. Due to the complete degradation of the natural fauna and flora, this green area shall aim at environmental restoration and offer the reinstatement of the natural habitat. The Sand Plain Fynbos which once covered the area shall be restored with the provision made for naturally occurring wetlands. This restoration of the natural habitat will involve the complete removal of the alien species such as Wattle and Port Jackson which is so prevalent within the site.

Green spaces

The development shall allow for the provision of a number of small parks in order to offer residents sufficient access to greenery and soft landscaping. This provision for green space is essential due to the projected high densities intended for the site. In total, 6 green spaces are provided within this development with great care being considered to its location which is based on the amount of residents for which it can serve.

Landscaping shall intend to be done using trees which are indigenous to South Africa. It is important that these trees are able to handle the soft sands and climatic conditions present within the site. The parks shall range in size from the smallest being roughly the size of one block with the dimensions of 65mx65m to the large comprising of 2 blocks with a dimension of 65mx140m.
Surveillance is important for the success of quality open spaces. Therefore properties surrounding the green spaces shall face the park as much possible. These properties should ideally comprise of 2 or more stories to enhance the effect of surveillance on the green open space.

Urban Agriculture

A large proportion of land has been allocated for the purpose of intensive agriculture. This urban agriculture initiative aims at alleviating food security issues by bringing food production closer to the market and its consumers.

Due to the climate and soil conditions, only small scale dryland crop is possible. It is essential that thorough programs of soil enrichment and intensive irrigation is provided in order for agricultural land uses to be successful. Therefore significant support is required for potential farmers in the form of access to agricultural research in order to adopt efficient and appropriate farming techniques for the conditions present within this site.
Wherever possible, irrigation shall be provided by the natural collection of rain water and run off from the surrounding Tygerberg Hills. This shall occur through the utilisation of catchment ponds and reticulation areas. The opportunity for small scale dryland crop farming affords the opportunity for land redistribution which is a significant agenda for the South African government.

Precedent / Examples

Fig 6.20. Young Milkwood Trees in central Cape Town. These trees are local and indigenous to the area. Locally and indigenous trees should only be planted in public open and green spaces.

Fig 6.21. The Green Point Park, Cape Town. This successful large urban park only contain local and indigenous trees and vegetation.

Fig 6.22. Philippi Horticultural Area, Philippi Cap e Town. This agricultural spaces located within Metropolitan Cape Town acts as a significant producer of food for the surrounding urban area.

Source: CoCT Website

Public Open Space

The provision of well located and appropriately defined public spaces are essential in assuring that citizens have access to quality public spaces that allow for the promotion social interaction. In a country where social integration is an overarching goal for the realisation of democratic ideals, it is important that citizens are able to utilise public spaces in ways that encourage individuals to socialise and engage within the open public realm.

Public spaces are best located where they are able to benefit from a high number of pedestrian movements. Ideal locations for this to occur would primarily be along public transport stations and interchanges. Additional location are along lengthy activity corridors where the public space acts as a much needed break in the urban street.

This proposal indentifies 2 hierarchies of public spaces. The first being that of public spaces located along transport interchanges, while the second are public spaces which are located within the vicinity of public service buildings.

Public transport based public spaces are itself defined the hierarchy of the transport interchanges along which it is situated. This is due the amount on pedestrian traffic which would be generated from the particular public transport movement. For example, the interchange between a tram system and a bus system is significantly larger and supported by a greater amount of economic activity than a public space located along the interchange of a bus and NMT route. Interchange public spaces along NMT routes occur in great number within the proposal as this form of transport movement is favoured over the others. The open spaces along cycle routes act as resting spaces and allow for welcomed interruptions in the cycle commute.

Public spaces situated alongside public service institutions act as converging spaces for the pedestrian traffic generated from these facilities. These spaces provide areas where the pedestrian can congregate and socialise. Activity generating recreational facilities such as skate parks and basketball courts shall be located along supporting public facilities such as schools.

Ideally, vehicular traffic should be diverted around and away from public open spaces which are designed primarily for the pedestrian. A concept of this is the pin wheel. As demonstrated in the fig 6.23. the pin wheel forms a break in an activity corridor with the location of the public space situatedin the centre while the exit routes of the activity corridors are offset to give the pinwheel formation. Vehicular traffic would be diverted around the public space in a one-way directional movement.

Another formation of public space along an activity corridor would be the location of the space with the centre at the intersecting of activity corridors . This allows for the break in the urban form in addition to the provision for space for activity generated by interchanging of public transport modes which occurs at this intersection. The break allows for the diversion of vehicular traffic around the public space in a one way clockwise direction therefore providing a safe space for the pedestrian. The public space formed within this intersection shall provide an extremely high order pedestrianized area and therefore generates great opportunity for the installation of informal trade infrastructure.

Fig 6.23. A Pin Wheel. The public space (brown) is located in the centre while the traffic is directed around the space.

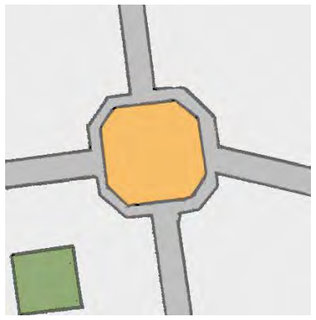


Fig 6.24. A public space (brown) located within the centre of tow movement routes.

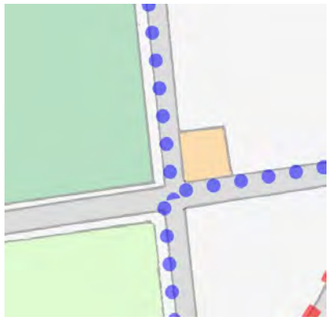


Fig 6.25. A public space (brown) located at the connection of bus routes (blue dotted line)

Precedent / Examples

Fig 6.26. An open space between the Public Sports facility and the Magistrate Court, Khayelistha, Cape Town.

Fig 6.27. Constitution Square, Mexico City. An example of a high order public space in the centre of major movement systems.

Fig 6.28. Cape Town Station Square. An example of a space between transport modes

Public Services and Institutions

The provision of public services is essential in ensuring that citizens are afforded their fundamental basic human and democratic rights. It is crucial that all South Africans are able to access quality public services which are within short distances from where citizens reside. For this reason, this development aims at providing prospective residents with easy access to public facilities through ensuring that these institutions are located in easily accessible locations.

This proposal aims at providing the appropriate number of public facilities by ensuring that the threshold for the facilities provided do not exceed their maximum number of population that they can serve.

Public facilities shall be arranged in the form of clusters. Service clusters are the groupings of public institutions in a means that is convenient to the user as these services are now positioned in one location. It also assists with the success of the given public institutions as many of these facilities are reliant on the other.

There shall be a hierarchy of clusters. This hierarchy is based on the level of services provided by the facilities within the clusters. There shall be 3 levels of service clusters, namely primary, secondary and tertiary.

Primary service clusters consist of high order facilities such as:

1. Police Station
2. Medical Facilities
3. Tertiary education facilities

Secondary service clusters consists facilities such as:

1. Post Office
2. Library
3. High School
4. Clinic

Tertiary service clusters consists lower order facilities such as:

1. Primary Schools
2. Primary medical facilities

Proposed Densities

The overall densities proposed for this site shall be significantly higher than those already present within the Cape Town metropole. This is done in order to meet the aims of densification and to be able to bring more people closer to services and opportunities which are present in the site surrounds.

The ideal density for the site shall be 250 units per hectare. Building typologies and housing types shall provide for the average of 3.5 persons per household. This figure is based on the overall average of persons per household within the Cape Town metropolitan area (Census 2011). Fig 6.31 demonstrates the average land usage of the site. Using the figure that 45% of land will be allocated for residential, this translates into an estimated total population of approximately 65 000 people. .

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Density Gradient

Although the site shall possess a high average density of 250 units per hectare, in order to provide variation and choice in the development of the site. Densities shall vary from high densities with building typologies such as blocks of flats to low density development consisting of single dwelling units and family homes.

A density gradient shall range form higher densities which offer a great number of public spaces and building interaction with the public realm, while lower densities over less public interface and affords greater privacy.

Fig 6.30 demonstrates the location of densities. The higher densities shall be located towards the north of the site (numbered 1). This portion of the site is situated adjacent to the Bellville CBD and therefore is highly suitable for higher density development. Areas adjacent to the natural park are ideal for high density residential development as these shall provide a great vista along the edges of the green space.

The main activity corridor shall contain significantly high density in comparison to its surroundings throughout its entire length. This is to ensure that activity is promoted on this movement route. For this reason, the activity corridor shall act as a density spine and represent a unique visual feature for the site.

Densities towards the south western portion (numbered 2 and 3) shall consist of the lowest densities within the site. This area is ideal for low rise residential and industrial uses as these activities are predominant on the surroundings of this portion of the site.

Land use Guideline

The primary role of the site shall be residential. However, in order to promote vibrancy and variety, the site shall provide a large variety of land uses. These include provision made for commercial, agricultural and industrial zoning.

The breakdown of percentage of land coverage is as follows

Allocation	Percentage
Movement	20%
Green Space (Excluding nature reserve, urban agriculture)	5%
Commercial/ Industry	20%
Public Facilities	10%
Residential	45%

Fig 6.29 demonstrates how land uses shall be guided through the site. It should be noted that this is not a strict zoning map and that designated land uses should be guided by developer needs. Mixed uses are prevalent towards the northern portion of the site. This is due to its close proximity to the Bellville CBD. This is also the most highly accessible area of the site due to the intersection of high order movement routes. The activity corridor shall be mixed used. The south portion of the site shall be highly suitable for industrial uses do to this land use being present outside the borders of the site in this vicinity. An area just off the central activity spine is suitable for light industrial uses. This is due to the customer requirement, light industrial business can benefit from being in close proximity to a movement system. The remainder of the site shall be primarily residential.

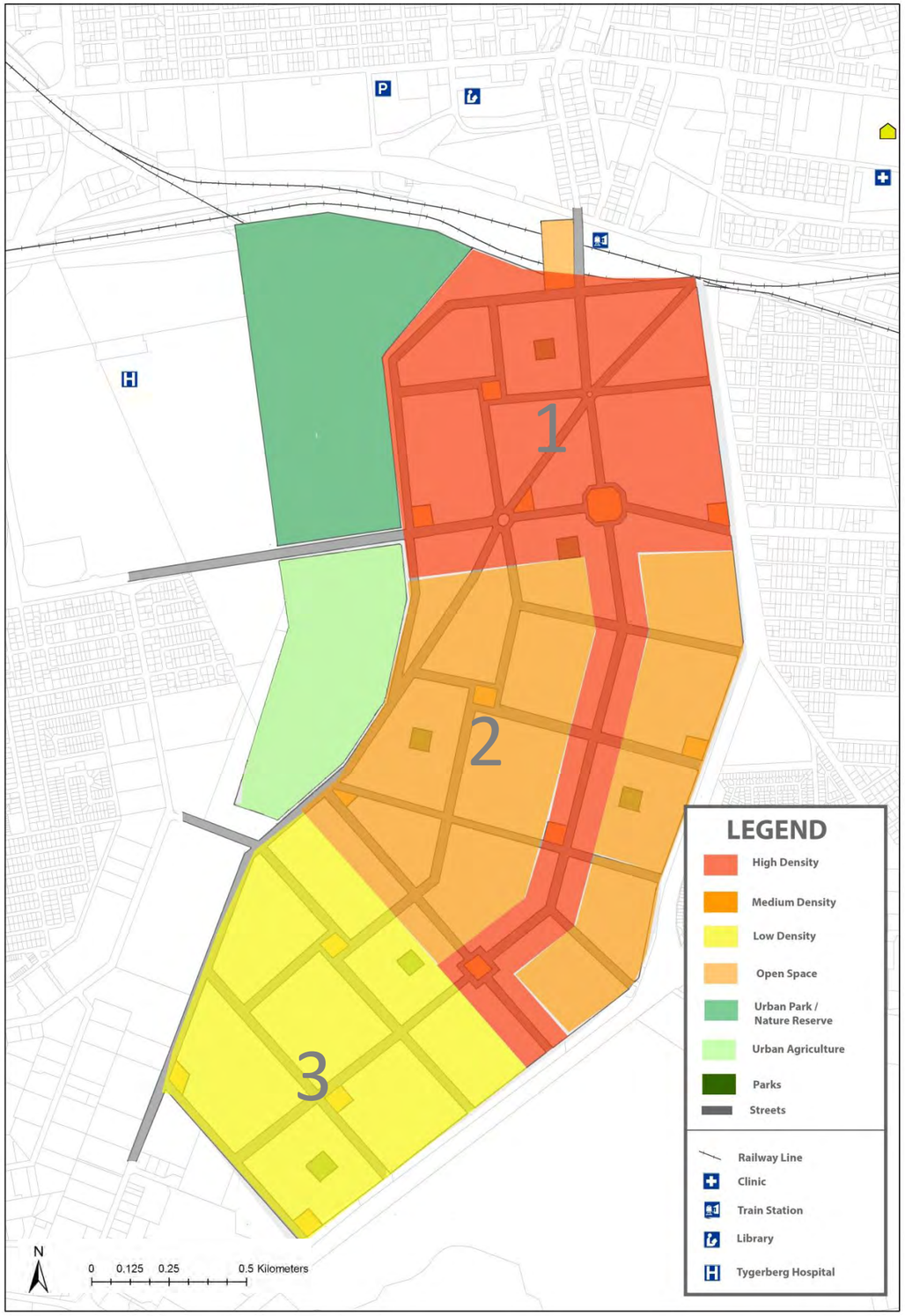

Fig 6.30. The proposed densities

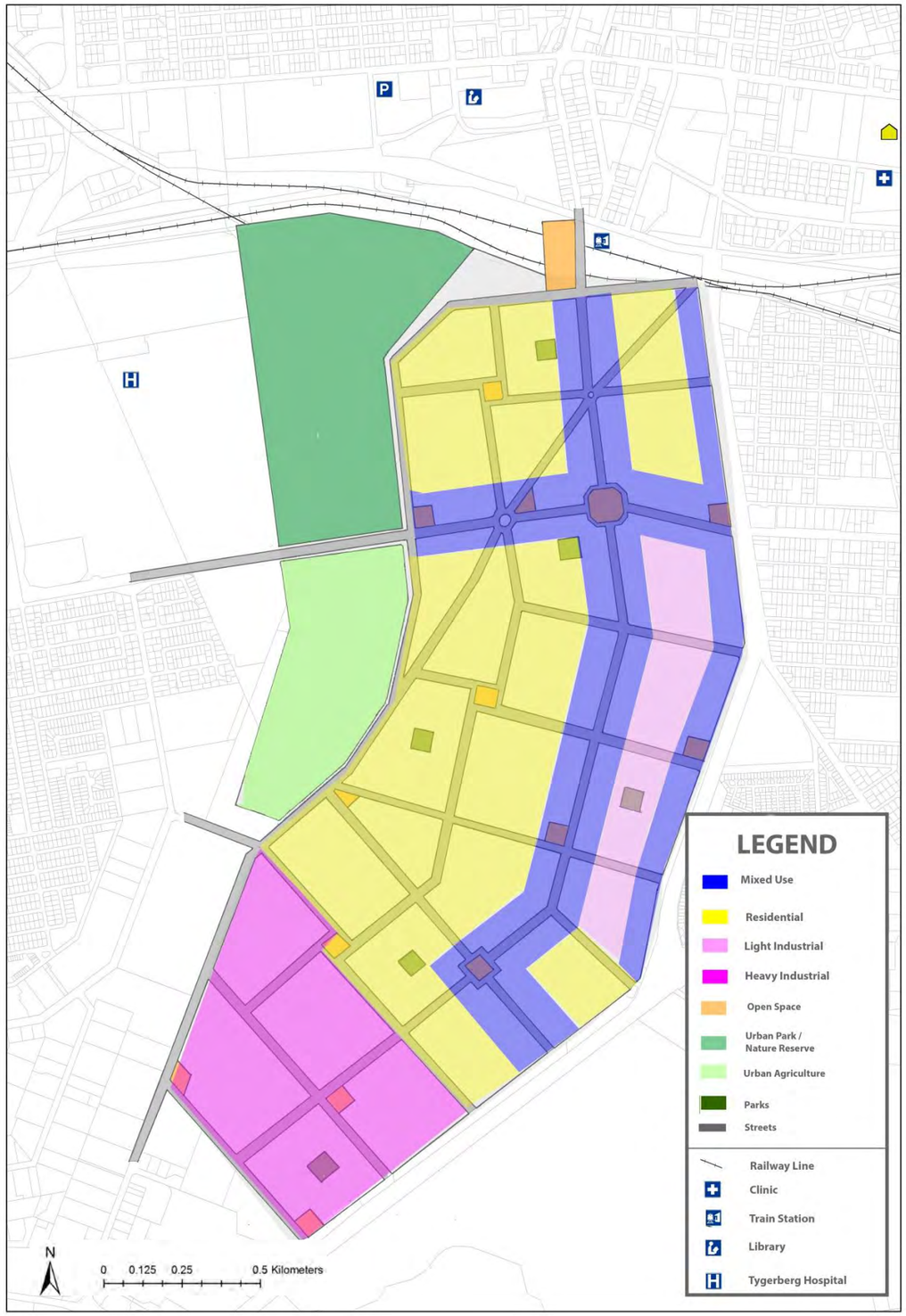

Fig 6.31. A broad land use guideline

Chapter 7

7.1 Implementation

The total extent of the site (200 Ha) represents a significantly large portion of land. As the overall aim of the project is to promote equitable city development, great amount of choice should be given into who shall be involved in the development of the site. This translates into allowing opportunities for a wide range of stakeholders to get involved in the overall development of the site as opposed to monopolistic development by one or a few developers.

The overall development philosophy is that of creating a diverse and equitable urban development process that promotes equitable stakeholder involvement and opens the market to include smaller development firms. This process of encouraging more developers to participate in the land market of the site shall ensure greater variety in building typologies and shall greatly contribute to the unique sense of place.

Public Private Partnership

An appropriate operating process for an urban development project of this size shall be the implementation of a public-private partnership (PPP). According to South African law, a PPP is a contractual agreement between a public sector institution/municipality and a private party. This arrangement allows the private party to assume the financial, technical and operational risk in the design, financing and building of the project. The PPP intended for this project shall essentially consist of a private company which performs the duty of a municipality function (SADNT; 2014)

Phasing

It order to promote the greatest efficiency in the development of the site, the progress of development is broken down into 4 stages. Development of this site shall be planned non-programmatically. This means that the extent of the growth of the site shall be based on demand and developmental capabilities. In order to follow a non programmatic planning approach, each stage would need to be fully developed before embarking on the development of the following

stage. This prevents vacant and underutilised land being present within a neighbourhood for significant periods of time and allows for the efficient provision of facilities and services.

Each phase shall include its own service allocation appropriate to the population thresholds.

Therefore, the development of services shall be provided on a needs basis. As much as possible, the mechanical practice of allocating land to be left vacant awaiting the construction of public facilities once appropriate thresholds have been met shall be avoided. Utilities and infrastructure shall only be constructed for the phase which is currently being developed. This prevents costly infrastructure burdens and the occurrence of infrastructure being left unused.

First phase

The first phase (refer to fig 7.1) shall include the implementation and outline of the nature reserve and the initiation of urban agriculture within the areas outlined in the site plan. The promotion of the restoration of the natural vegetation and the development of the urban park shall be the significant landmark for the site and therefore has the ability to attract subsequent development to the site in the following phases of development.

The urban agricultural project shall be initiated during this first phase of development. It is a significant long term project which shall occur incrementally over a lengthy period of time. This is due to the soil intervention requirement and the procedure required for the implementation of land redistribution processes.

Second Phase

The second phase of development shall consist of the development of the northern portion of the site. This extent of development shall comprise of an area of approximately 72 hectares which would equate to a total of 9 superblocks. This portion has been identified for the initial urban development of the site due to its location adjacent to the Bellville CBD. This phase of the site shall contain the highest densities within the site and has the possibility of being in great demand due to its proximity to the economic activity of the Bellville CBD.

The street layout and main connecting streets to the surrounding urban form shall be constructed in this phase. These streets are important because these shall contain the main movement routes of the site in addition to serving as significant connecting routes. For this reason, these streets shall act as the main activity corridor within the site.

The first service cluster shall be constructed in this phase. This cluster shall provide primary services and contain facilities such as police station, medical facilities and higher education opportunities. In addition to this, in order to satisfy non programmatic planning, secondary and tertiary clusters shall be proposed in order to meet the needs of the population within this phase of development once population thresholds have been met.

Infrastructure shall be provided for the entire portion of this site. This will be laid beneath the proposed street layout. This shall ensure the efficient development of the site.

Third Phase

The third phase comprises of the development of approximately 100 hectare portion of land immediately south of the second phase. The commencement of this phase will occur once all plots within the previous phase have been developed. This is to ensure that sites within the second phase are not vacant for lengthy periods of time.

This phase shall include the development of additional service clusters. This will be based on the population growth and the need for certain facilities once the appropriate thresholds have been reached. It should be noted that this portion of the site has a lower density than the previous phase and therefore development might not warrant too many service clusters.

Once again, infrastructure shall be provided for the entire portion of this site. The bulk infrastructure will be an extension of that provided in the second phase of development.

Fourth Phase

The fourth and final phase of development shall occur on the remaining southern portion of the site. This shall comprise of an area of approximately 85 hectares.

Construction of additional service cluster will once again be informed on the total population and implemented in a non programmatic way. This will be based on the thresholds for which these services can successfully operate. This portion of the site shall contain the lowest densities which

would necessitate very few service clusters. Bulk infrastructure for this phase of development shall be extended to now serve the entire site.

Economic layout / efficient for change.

The use of a grid layout shall be employed as much as possible within this proposal as it is the ideal layout to promote movement, permeability and the economic viable division of land. The relative uniform blocks created within a gridiron system allows for efficient plot sizes. As cities and the location of land use changes over time, gridiron street patterns affords the opportunity for the natural change in the urban economy and therefore is extremely flexible. This is opposed to other forms of street layouts such as those containing curves and cul-de-sacs as these are primarily only suited for one particular land use.

The grid layout is simplistic and presents an urban environment which not only is easy to navigate but easy for the user to understand. Grid layout also allows for a larger amount of intersections which assists with overall movement and the slowing down of vehicular traffic. Economic activities in the form of commercial and retail streets are also promoted within the larger grid system.

The implementation of the grid allows movement patterns to spread throughout an area as the gridiron allows for permeable movement. This gives opportunities for activity to occur at a variety of locations and greatly increase economic viability. This is opposed to the employment of mobility which essentially funnel movement and the possibility of activity through a site instead of within it.

7.2 Identification of Precinct

The precinct identified for this document shall the northern portion of the site. This site has been identified as it forms part of the first phase of urban development (second phase overall) of the overall plan . This precinct also contains the highest densities and therefore is ideal in demonstrating how urban densities can be achieve in urban infill development (refer to fig 7.2).

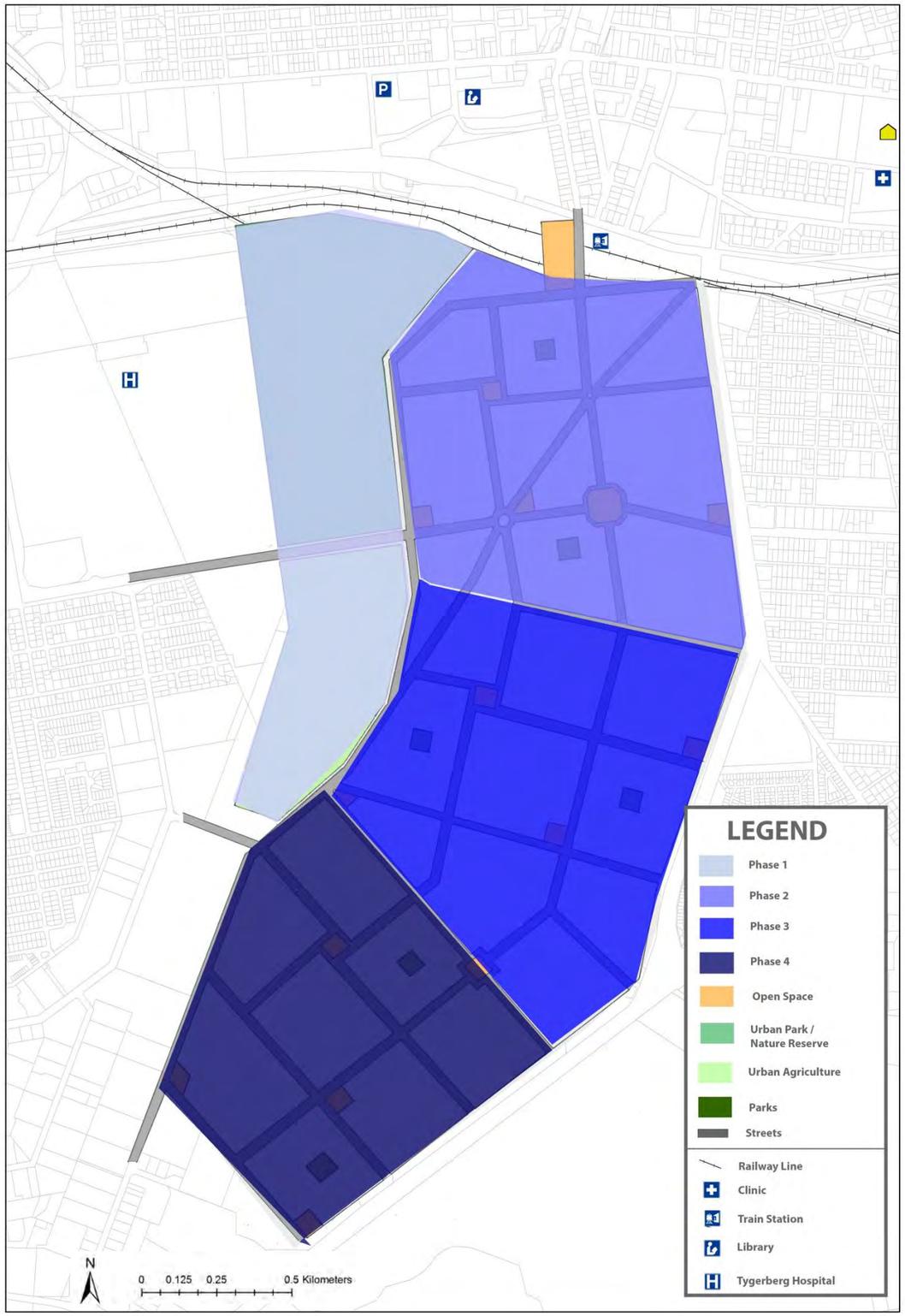

Fig 7.1. The phasing increments

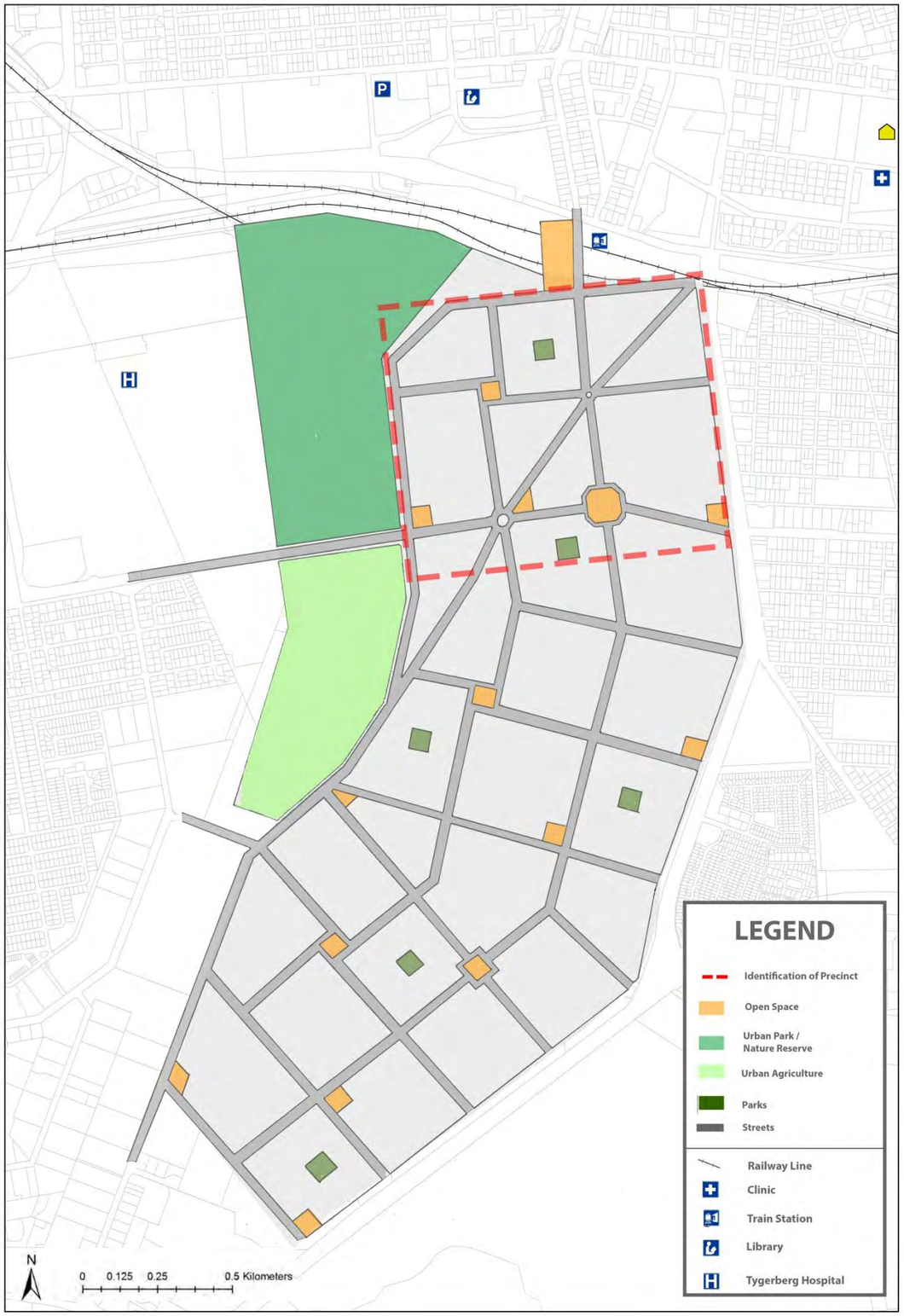

Fig 7.2. The identification of the precinct to be analysed in the following section

Chapter 8

8.1 Precinct

In order to create a diverse and vibrant development, a variety of building typologies and building designs are required to provide a rich and rewarding urban experience. This vibrancy brought on by the variety should be translated in the plot allocation and general land use guidelines.

The overall aim of the site and this subsequent precinct is to create a place that offers the user a unique experience and contains a distinct character. This would be based heavily on what Trancik (1986) describes as place theory. Place theory is a design theory that incorporates components of human needs and adheres to the cultural, historical and natural contexts. This is to create a place that is able to appropriately respond to the human contexts in which it exists.

According to Bentley (1985), a design of a place can greatly influence the choices that people make. He goes on to say that designing urban environments affects where individuals go within a development, how they understand what the space is used for and whether individuals can find their own identity within the space. Bentley (1985) identifies 7 levels of design responsiveness which are namely:

1. Permeability (defines accessibility)
2. Variety (defines the levels of choice)
3. Legibility (the ability to understand the space)
4. Robustness (the ability for a place to fulfil different purposes)
5. Visual appropriateness (defines the meaning of the spaces)
6. Personalisation (the ability for uses to personalise space)
7. Richness (the number of choices available to the user)

These levels have been translated into the design of the precinct (fig 8.1). Overall the criteria of choice have been the main criteria throughout this precinct. This choice refers to the choice of movement, location of activity, and choice of lifestyle. Intensity and urbanity have been particularly important in the design of the precinct. The greater the number of people, i.e. pedestrians, cars, trams, buses determines the vibrancy of the precinct (Jacobs, 1985). Great consideration has been placed on the involvement of people within the spaces in this precinct.

8.2 Precinct design

Location of Green Spaces

This precinct has 2 significant green spaces. These green spaces are strategically located to serve the high density residential units which are present in this precinct. They are ideally located within a superblock and are served only by the lowest order movement routes.

Open Space

This precinct shall contain a number of quality public open spaces. As public spaces are an important aspect of this site, this precinct contains a total of 5 quality open spaces. Public spaces act as pedestrian spaces which are either located at interchanges, movement connections or the proximity to public facilities.

A on figure 8.1, represents a gateway public space which acts as a visual effect when looking into the site from its surroundings. These spaces provide quality public gathering places as one enters the site from the movement systems surrounding the site. B, represents a public space with is located within close proximity to public facilities. The format of this space is positioned in a pin wheel which directs traffic around the space. C, is the main public space within the entire site. It occurs on the main intersection of the 2 highest order movement routes. It is therefore the largest and shall comprise of significant public art design and informal trading infrastructure. D , demonstrates a public space at the convergence of 3 movement routes. All these spaces offer the opportunity for public meetings, open air concerts and informal trade which aim at providing the public with spaces which they can personalise.

Fig 8.1 . The precinct

8.3 Designation of Plots

Variation in Plot Sizes

Having variation in plot sizes ensure that this precinct offers a variety of building typologies (numbered on figure 8.1) . This variety allows for difference activities and users to find place within the precinct. Different plots sizes eliminate building monotony and creates unique urban environment. This variety of building typologies and choice greatly improves sense of place.

This creates what Crane (1964) describes as a city of 1000 designers. The variety also allows a diverse array of developers to utilise plots of the choosing and to their ability of developing it. Having a variety of developers ensures that the site shall forego monotonous development of building types.

Small, economic plot sizes

The ideal plot sizes shall be those that have a small street frontage as possible. This ensures that plots have a significantly lower input from bulk infrastructure which runs along the street. Having elongated plot sizes also allows for the efficient land coverage by allowing greater land coverage being used up be development as opposed to streets which is the case in longer, shallow plots (fig 8.1).

Corner Plots

In order to avoid an inactive side of a building to face a street, corner plots shall be larger than normal in order to accommodate an L-shaped building (numbered 2 on fig 8.1). This building configuration enables a public space to be made available at the intersection of the street. This space allows for both building edges which face the space to sustain ground level interaction.

Terminations of view

Plots that occur at the termination of a street or T-junction shall represent a termination of view along the street which ends at the junction (numbered 3 on figure 8.1). Buildings located on the plots offer a visual feature and therefore these plot sizes shall be larger to accommodate landmark buildings.

Row Houses

Row houses allow for single to multiple dwelling units to be able to provide a continuous enclosed street. These plots shall have short street widths and most of the building coverage being occupied through the length of the plot.

Row houses will be located on plots which offer a varying level of public/private and street interface. This will depend on the depth of the plot from the street frontage. (Numbered 4 on figure 8.1 demonstrates a block which contains row houses. The outer plots have a short street frontage 9mx15m and offer very short setbacks. The plots located within the centre of the block are considerably larger (15mx15m) and offer opportunity for single dwelling houses which are located in a private location situated away from the street.

Corridors

In the natural growth of cities, stores and services have tended not to develop in isolation. These activities have natural associated themselves in a corridor format, alongside each other along movement routes which are serves by transport systems (Jacobs, 1985). This cluster of retail and commercial activities shall contain a variety of shops and services based on the richness of choices which rely on the vast variety of individuals which the site shall comprise.

Plots along movement systems shall be larger at a size of approximately 20mx30m. This is to allow for the development of 3-6 stories mixed use buildings

Perimeter Blocks

Perimeter blocks are city blocks which comprise of plots which contain plots and buildings coverage that allow for public interface at the front with a private open space at the back of the buildings (Bentley et al, 1985). These plots shall contain significantly high densities with buildings ranging from 4 – 6 stories. The private open space within the centre provides a communal space for residents of the buildings within the block. These blocks also provide pedestrian walkways which allow for permeability and access to the space within the block (Numbered 5 on figure 8.1).

Activity Corridor

The main activity corridor of the site runs through the precinct in a north-south direction. This main corridor shall act as the main spine of the development of the site. And it shall contain the majority of retail opportunities (Fig 8.2) . The secondary arterial which runs from east to west shall too contain retail and mixed use opportunities, however, at a smaller scale.

Service Cluster

Fig 8.2 demonstrates the location and layout of a service cluster. This primary service cluster contains a police station, medical facility and a tertiary education facility. To benefit from the activity generate from these facilities, a public square has been positioned within the cluster.

Fig 8.2. The location of the corridor and service cluster

Movement

Fig 8.3, illustrates the movement patterns through the precinct. The tram runs through the corridor and loops back from the bottom of the site to connect at the main corridor at A. Open public spaces occur at public movement interchanges. As the densities within the precinct are generally high, all major streets shall contain provision for public transport and the motor vehicle movement is discouraged.

Fig 8.3. Public Transport movement through the precinct

Land Use guide

Mixed uses shall be located primarily and the main axis routes. There are a total of 3 axis routes in this precinct. Light industrial uses shall be on located just off the main activity corridor and to towards the south-eastern portion of the precinct. This land use is characterised by larger plot sizes.

Fig 8.4. Broad land use guideline of the site

Chapter 9

Conclusion

The negative effects of modernism with its subsequent sprawling and car dominant tendencies are a highly inappropriate planning method within the South African urban context. Future planners should tackle these limitations brought on by this approach head on and acknowledge that the current status quo of development offers the South African city dweller a rather bleak urban experience. It is imperative that future development aims at achieving densification and infill characteristics and place the ideals of social, environmental and economic sustainability at the core of development philosophy. This is of utmost important given that inequality, which is a stubborn hurdle for this nation to overcome, is exacerbated by the inefficient and inadequate urban form.

It is clear that future spatial development should move away from making a city that is simply drivable to one that is liveable. As described in this dissertation, a liveable city is one that is able to offer the user a myriad of choices and allows citizens to self-actualize in an integrated and equitable urban form. This dissertation deliberately aimed at using local examples to explain urban qualities in order to identify successful local examples as precedent for future development.

Planning implementation should do away with the mechanical engineering approach which tends to focus on programmatic views and thresholds and seek for a for multi-dimensional approach which aims at replicating and reinforcing positive local urban qualities in order to create a more natural and vibrate city which would therefore naturally satisfy the needs of the urban dweller.

I shall end of with this, we should aimed to allow for mixed, vibrant and intense neighbourhoods which go back to the times of District Six, Cape Town in the early to mid 20th century. A city where stories can be told, people can converse and memories can be made. It is time to move the citizen out of their cars and enclave neighbourhoods and back into the street.

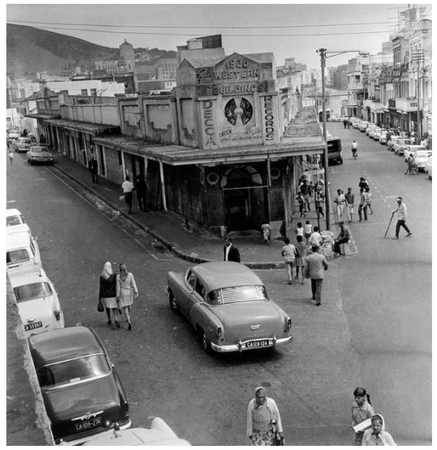

Fig 9.1 District 6 (circa 1960) This once mixed, vibrant and intimate inner city suburb of Cape Town which grew naturally over centuries. Perhaps planning should guide development in returning to this natural form of settlement making.

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