



Spatial Design for the Lansdowne Road Corridor

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Abstract

The current patterns of urban growth within the city of Cape Town reflect large social inequalities, which is compounded by rapid population growth and urbanisation experienced in the city. The intention of this dissertation is address current socio-spatial inequalities through the management of urban growth, specifically targeted at interventions within the poorest parts of the city through the design of the Lansdowne urban corridor.

The theoretical framework for establishing the tools for the management of urban growth are informed by the generic problems with the structure of South African cities, global challenges that face the growth of all cities, and an understanding of what informs the making of spatial plans. An important finding of this is the need for the re-structuring of South African cities to increase integration of historically fragmented areas.

The spatial analysis represents the application of the theoretical findings to the context of Cape Town. The analysis is undertaken at a number of scales, to establish the constraints and opportunities present in the area, to inform the spatial design of the corridor area. The intention of the plan is to establish where the investment of direct public funds should occur to generate movement of people within the area, which small scale enterprises can respond to, thus strengthening the conditions for self-sustaining livelihood strategies to occur. An essential part of this requires the restructuring of the existing spatial structure to create a more integrated urban form, which is resolved at the precinct scale.

Acknowledgements

I would like to thank my supervisor, Professor David Dewar for his guidance and dedication, and for teaching me the importance of 'method'.

Every week.

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Chapter 1 Introduction

Problem framing

South African cities display a high degree of spatial inequality. Many of the economic opportunities are located within the urban centre, prejudicing those on the urban periphery. Not only do such people sustain higher costs in order to access areas of economic opportunity, but the problem of spatial inequality is further compounded by the fact that little money is generated and retained in peripheral areas.

The south-east section of Cape Town, often termed the metro south-east or the Cape flats, suffers from high levels of poverty and unemployment, poor access to urban activities and lacks any opportunities for employment or income generation. The area thus represents the obvious choice for investigation as to how a structural solution to such inequality can begin.

The study area joins the established nodes in Claremont and Wynberg to the greater Mitchells Plain and Khayelitsha areas along an East-West axis along Lansdowne road, as shown in figure 1.1. The study area is referred to as the Lansdowne corridor, and represents a structural although highly undeveloped link between the areas of Mitchells Plain and Khayelitsha to areas of employment and public institutions. The Lansdowne corridor is also an integral part of a network of corridors that exist within the city, shown in figure 1.2.

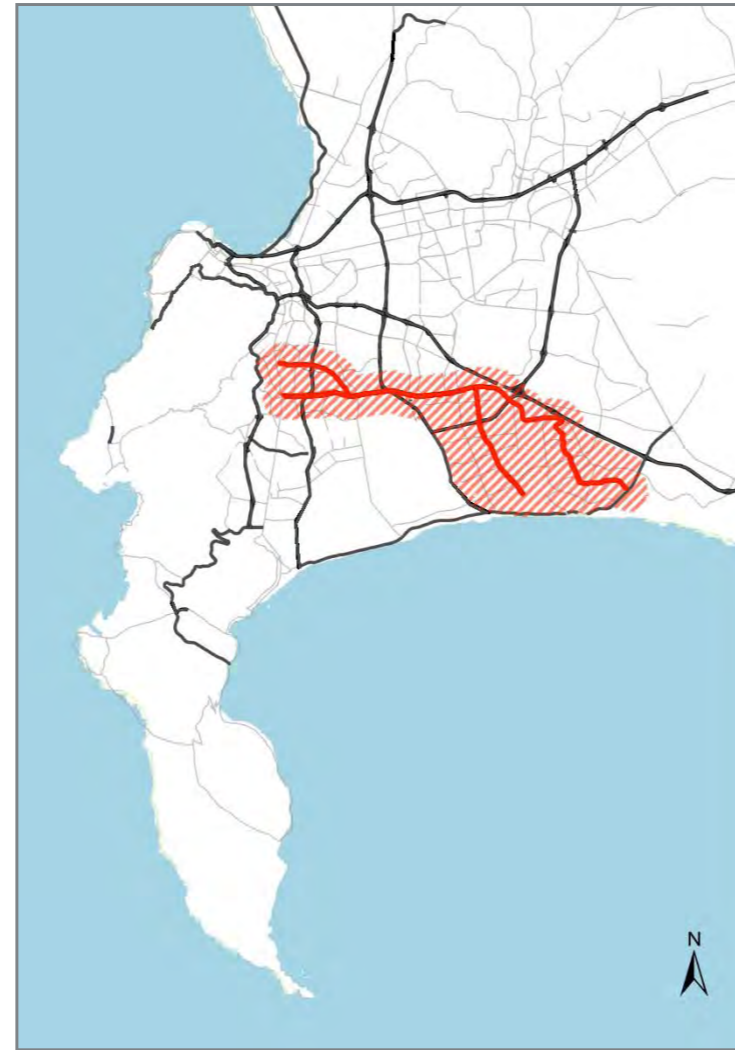


Figure 1.1 Location of the Lansdowne corridor in the context of Cape Town.

Figure 1.2 Location of Lansdowne road in relation to the current corridors in Cape Town (adapted from Dewar and Louw, 2003).

The term 'corridor' used in this dissertation refers to urban development that follows a public transportation route within the city, and includes all development within 1.5 kilometres of the main transport axis.



Images of Lansdowne road (Google, 2013)



Brief and Intention

The intention then of this dissertation is to give direction to the public investment required in the aforementioned study area, in order to enable the necessary conditions for small-scale economic opportunity and thereby redressing the structural stratification of the Cape Town economy.

The brief calls for the spatial design of the area, with the intention of creating the necessary preconditions for a public transportation to occur. In such a context, the role of a public transport corridor will not only enable increased accessibility to the established and emerging employment areas within the city; but the required intensification of development along such a route to provide the necessary thresholds to sustain public transport would result in smaller nodes of economic activity along the route and its surrounds, allowing for the opportunity for money to be generated and reinvested in such areas.

Method

The approach used in this dissertation is the design method. The project ranges across scales, including the sub-metropolitan scale, the scale of the study area and to the precinct scale. This multi-scalar approach is employed for both the analysis and design of the corridor, as the analysis and design phases are intended to inform one another.

Analysis

The Analysis first begins at the sub-metropolitan scale, in order to gain a sufficient understanding of movement within the city. These elements of movement include both metropolitan-based mobility routes, local accessibility corridors and the presence of green space in the form of biodiversity corridors. The intention of the analysis at this scale is to gain an understanding of how the elements of movement work together as systems, and to identify the structural inefficiencies at the metropolitan scale. This also requires an indication of what such pressures have on the site.

The Analysis then drops down to the site level, which consists largely of the South-east quadrant of the city. Before the design of the site can be considered, the limitations of the area first need to be understood. This is done first through an inventory of both the natural and man-made elements of the site. The analysis thus includes an inventory of the bio-physical aspects, heritage and cultural aspects, movement systems, settlement patterns including public facilities, and infrastructure patterns. This analysis is primarily spatial and is compiled from geographical information systems (GIS) data and the relevant maps. The intention then is to ascertain the existing conditions, and the relevant constraints present in the study area, which then informs the relevant constraints and opportunities that will inform the design of the corridor.

Design / Intervention

The intervention begins at the sub-metropolitan scale, and is informed from the constraints and opportunities gained from the analysis of the site. The design for the corridor follows the same sequence as the analysis of the study area. It begins with an approach to conservation of green spaces, followed by the re-structuring of the movement system to create a legible hierarchy of movement which the relative hierarchy of public facilities can respond to. An indication of land-use, built form and urban intensity are then proposed. The design at this scale concludes with the identification of a precinct area in which the proposed design can be refined at the local scale.

Structure of the Document

The first 5 chapters are non-contextual, and begin with chapter 2 which locates the problem of urban growth and its associated consequences within the city of Cape Town, concluding with the importance for proper urban growth management tools. The need for such tools must be well contextualised first within South Africa's historical and political context and secondly within the context of current global urban challenges, which is done in Chapter 3. Chapter 4 then discusses the appropriateness of urban densification models as tools to address the challenges identified in the previous chapter, and introduces the need for strategic densification, and discusses the appropriateness of both Transit-oriented development models and corridor development as tools to address the structural problems of South African cities. Chapter 5 is concerned with establishing the performance criteria that plan making is trying to achieve.

Thereafter the document consists of the application of the previous chapters to the Cape Town context. Chapter 6 consists of an analysis at the sub-metropolitan and site scale. Chapter 7 consists of the concept for the study area which concludes with the identification of a site for intervention. Chapter 8 comprises the design for the chosen precinct, and is followed by a section on developing phasing and implementation.

Chapter 2

Locating the problem: Urban growth in Cape Town

Cape Town's population is experiencing rapid growth, most of which can be attributed to the growth of the urban poor. The form of urban development to house the growing population continues to sprawl outwards, and represents an inefficient use of resources and land, as well as imposes social costs, especially to those located on the periphery.

The current trend in the urban growth of Cape Town, characterised as sprawling type development is concentrated up the West Coast and in the Northern Suburbs. However, in terms of population growth it is the poorest suburbs located in the south-eastern section of Cape Town that are receiving the largest influx of people. Figure 2.1 displays the changing populations within the city. Most of the

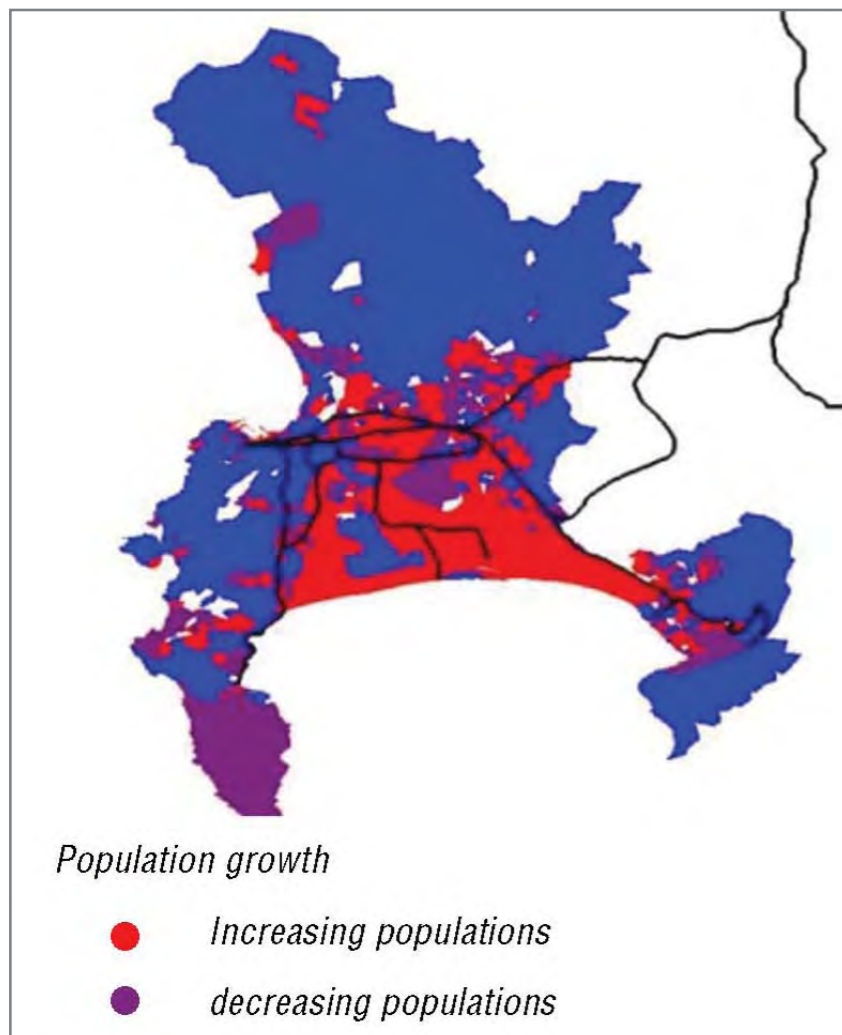


Figure 2.1 Changes in population growth (DGRU, 2008)

city is growing in population, whereas the Northern suburbs and West Coast have large areas with decreasing populations, as sprawl increases. This has numerous negative consequences on city infrastructure efficiency and cost, environmental degradation through encroachment on sensitive environments, land availability, and social economic integration within the city.

Figure 2.2 shows the density distribution of the city in 2001. The densest population areas are those of low-income found in the South-east peripheral Mitchells Plain/Khayelitsha district. Conversely the areas of medium population density are the higher income areas of the City Bowl as well as the Northern and Southern Suburbs

A large problem with Cape Town's spatial structure is the many dense, informal settlements which are located on the periphery and function as entry points to the city for poor migrants, which means that the location of these offer little opportunity to nearby employment, and there are no major well-located informal settlements around

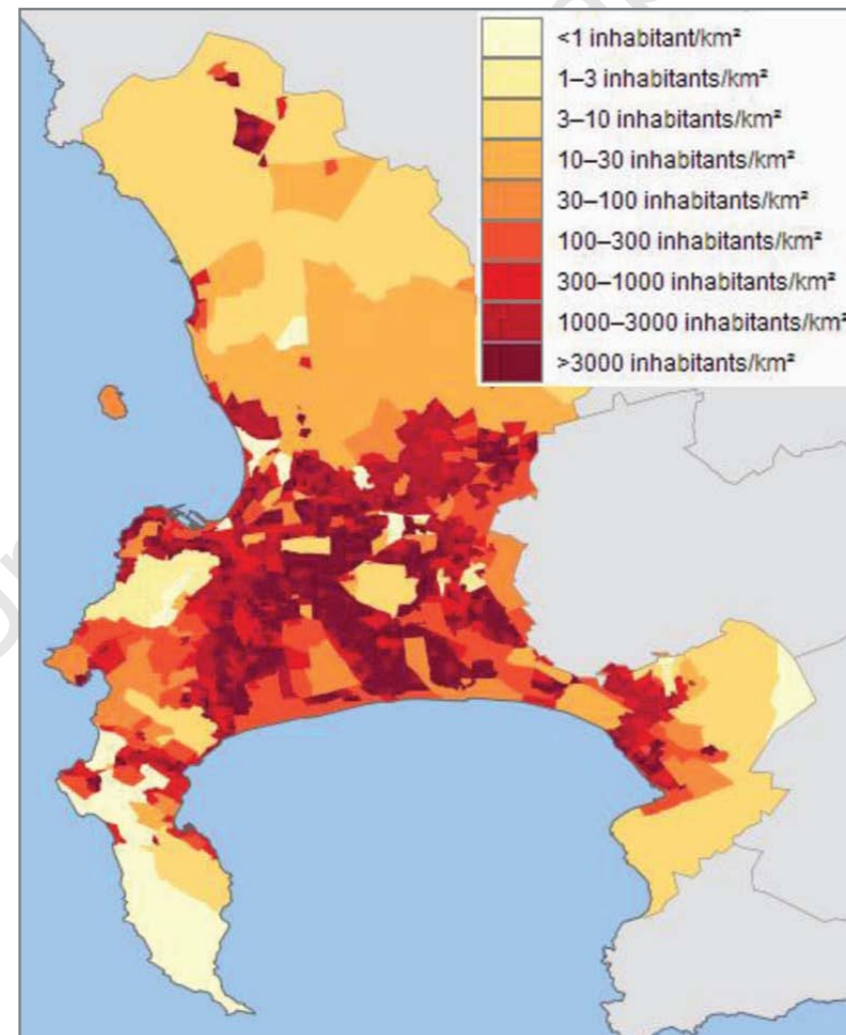


Figure 2.2 Population density distribution (Stats SA, 2001)

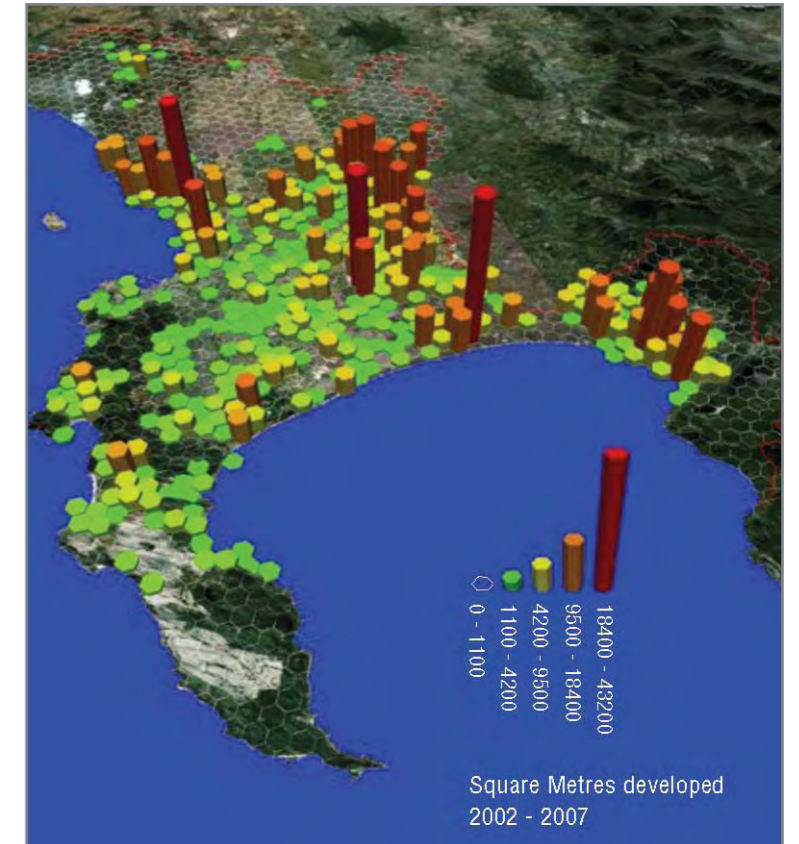


Figure 2.3 Aggregated urban growth 2002 - 2007 (Sinclair-Smith, 2009).

the CBD or inner suburbs. Furthermore, low Income public housing projects and investment in basic services for the marginalised indigent are concentrated predominantly on the Cape Flats where the land in the city is cheapest, perpetuating the polarised pattern of the city (Turok & Watson, 2001). The result is extreme socio-economic polarisation within the city, as the majority of the population resides in the South-east where few job opportunities exist, while the sparsely populated central city and inner suburbs is where the most employment opportunities are found.

The current trend of low-density urban sprawl seems likely to continue in this current trajectory as can be seen in figure 2.3 that despite the largest population growth occurring in the South-east, the bulk of spatial growth has occurred in the North, West and Somerset West. Thus the issue of sprawl and economic segregation are two major concerns for the growth of the city.

Furthermore, the rapid increase in the population of Cape Town through natural and migratory growth has seen a marked increase in demand within both the formal and informal property markets. A contributor to demand on the Cape Town formal property market is

the growing middle class population of Cape Town that has been propelled by economic growth in the region.

Cape Town's current urban edge delineates a physical limitation on the expansion of available land. Over the period of 2002-2008, modelling performed estimates that the number of formal market dwelling units in the CMA has grown by 15,700 units per year (CoCT, 2010:11) and it is predicted that levels of such growth will persist.

The combined market forces of strong demand and limited supply in the formal property/housing market has resulted in an extremely steep price gradient for the housing and land markets (Turok & Watson, 2001). This means that entry into the formal market is greatly restricted as prices are so high relative to the incomes of new entrants. In addition, incremental pricing for improved housing or better location for work and public amenities is extremely steep. In the case of the Cape Town formal housing market this is the failure for the provision of housing which is affordable to those ineligible for state subsidised housing, yet do not have enough income to enter into the lower end of the formal housing market. It is furthermore projected that the total population of Cape Town will grow by nearly 60% over the next 35 years (CoCT, 2010). This will mean that, unless the current settlement patterns and trends can be altered to accommodate such growth, such urban containment tools such as the urban edge will need to be reconsidered.

Coupled with the Cape Town's rapid population growth is the growing proportion of the aged and youth relative to total population. This is mainly due and the impact of HIV/Aids (City of Cape Town, 2006j). This has specific spatial requirements, as an increasingly ageing population will need appropriate social and healthcare facilities, while mechanisms will also have to be found to effectively engage the large proportion of youth through sport, recreation and employment, and by increasing the level of education.

Structural problems with the layout of the city also contribute to poor urban performance. The inefficient transport infrastructure and layout contributes to the social polarisation within the city, and reflects high costs, as travel is inconvenient and expensive, especially for the urban poor who are located on the periphery.

Transport infrastructure in conjunction with settlement patterns affect congestion within the city, which impose detrimental effects on the environment through carbon emission and pollution, as well as effecting productivity and spatial desirability. The average travel-to-work time in Cape Town is just over an hour, which represents large economic, environmental and social costs (SACN, 2011). This is largely due to the concentration of jobs at the major economic nodes, and the diffuse sprawl in the Northern suburbs, and the consequent lack in population density to meet the required thresholds to sustain public transportation. This has resulted in a

city where 49% of households own cars, the highest in the country (SACN, 2011), whereas those without a car are effectively trapped on the periphery.

"High capacity transport connections, between the Cape Flats and work opportunities in the central city and northern suburbs, are fundamental to the city's functionality...The busiest rail corridor in the country is between Khayelitsha and Cape Town central station, with about 340 000 daily passenger trips." (SACN, 2011:76)

The overall poor performance of the city and its socio-economic inequalities require improved management of urban growth to curtail the entrenched socio-economic polarisation that exists within the city, and the high costs that such inefficiencies propagate.

To establish the way forward to achieving a well performing city, the management of urban growth must be first understood in terms of the current urban challenges that exist. It is firstly necessary to understand the generic problem of South African cities in order to establish the urban challenges that require rectification. The challenges of population growth and rapid urbanisation need to be further understood in the global context, as this puts strain on the planet's resources. Once these urban challenges can be properly understood, urban performance qualities can be arrived at in order to determine what spatial planning should be trying to achieve, in terms of addressing the socio-economic polarisation in the city of Cape Town.

The application of these ideas can then be applied to the management of urban growth in Cape Town's south-east sector, which displays the highest levels of inequality in the city, through the restructuring of urban growth along the Lansdowne road transport corridor.

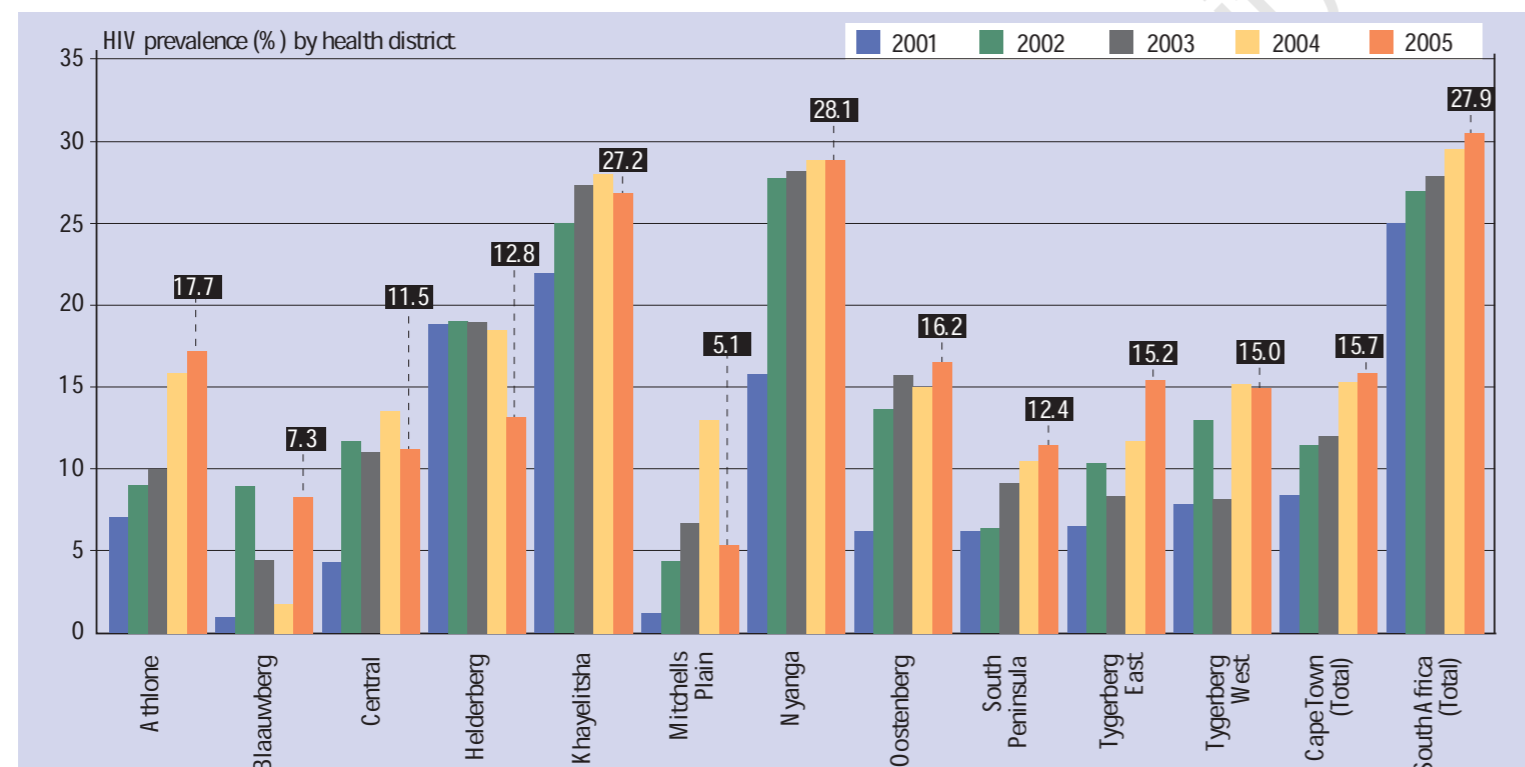


Figure 2.4 HIV prevalence by district (CoCT, 2005)

Chapter 3

Urban challenges

3.1 Challenges in the South African context

Rapid urbanisation and the majority of urban growth in South Africa has occurred within the last 60 years. Currently South Africa is 62% urbanised and this figure is rapidly increasing. However, South African urbanisation differs from that of other developing countries, as it is only since the 1980s that largely restricted access of the black population into South African cities became deregulated (Dewar, 2000).

South Africa also has a relatively high gini-coefficient which indicates a high degree of socio-economic polarisation. The figure was recorded at 63.1% in 2009 (Worldbank, 2013), where 0% indicates perfect socio-economic equality and 100% indicates perfect inequality. Furthermore, the effects of globalisation, the decline of the manufacturing sector and the growth of tertiary economic sectors has meant further struggles for the urban poor to find employment. It is thus unsurprising that the unemployment rate for South Africa is 29.8% (Stats SA, 2011). Thus the combination of urban in-migration and natural population increases means an ever increasing population of the urban poor within South African cities (Dewar, 2000). The result of this is that South African cities are now synonymous with informal development to meet the needs of the urban poor, in terms of both housing and the economy, a reality which is only likely to increase. However, to understand the current spatial patterns of South African cities, the effects of Apartheid and Modernist planning ideals must first be dealt with.

Racial segregation enforced through the South African Apartheid laws, which came to end with the achievement of democracy in 1994, left a legacy of highly socially and economically unequal cities in South Africa. The legacy of Apartheid, along with the ideals of modernist planning, have achieved urban forms that display high levels of fragmentation, separation of land-uses and urban sprawl. This has resulted in cities that display a high degree of spatial inequality, as many of the economic opportunities are located within the urban centre, prejudicing those on the urban periphery. Not only do such people sustain higher costs in order to access areas of economic opportunity, but this problem of spatial inequality is further

compounded by the fact that little money is generated and retained in peripheral areas.

3.1.1 Apartheid and Modernism

South Africa can be seen to have adopted urban planning ideals and policies from the global North, which strongly entrenched modernist planning ideals, and are still visible in the form of South African cities today (Dewar, 2000). These include: separation of activities and land-uses to avoid conflict, and a pro-suburban ethos and the promotion of the neighbourhood unit, where residential zones take the form of 'cells' of development that are oriented inwardly, and are not integrated but are simply linked by movement infrastructure. Modernist ideals also gave the highest priority to vehicular movement, and its ease of movement (even though an increasing amount of households do not own a car).

Apartheid, denoted in Afrikaans to mean "the state of being apart" was a system of racial segregation enforced through legislation by the ruling white National government, under which the rights of the majority black inhabitants of South Africa were curtailed until South Africa held its first democratic election in 1994.

The apartheid model was primarily concerned with separating people of different races, and thus modernist ideals that called for the separation of land-uses were highly supportive of an Apartheid planning agenda. The Apartheid city consisted of central and desirable areas reserved for whites, which were then surrounded by lower cost but higher density housing for the Indian and Coloured middle class, with the low density uniform zones of basic dwelling units on the periphery to house the black working class (Smith, 2003). These segregated 'group areas' and 'townships' on the periphery were often located far from sources of employment, as in some cases forced removals of 'non-whites' were relocated as far as 60 kilometres from the urban centre.

3.1.2 Spatial Legacy of Apartheid and Modernism

The combination of both Modernist and Apartheid planning resulted in South African cities which display an urban form characterised by low densities, fragmentation and separation.

Fragmentation of the urban form was the result of development which occurred in relatively discreet parcels of land, separated by

freeways or open space buffers to limit interaction between races and land-uses (Dewar, 2000). At the small scale, neighbourhood 'cells' of residential development consisted of "discreet collections of parts, with no overarching cohesion" (ibid, 211), as seen in figure 3.1. At the larger scale, the grain of the urban fabric was left coarse due to the vast tracts of unutilised open land and freeways.

The separation of land-uses, urban elements and racial groups motivated by both modernist and apartheid planning ideals is most evident in the separation of residential areas from areas of employment (Dewar and Uytenboogardt, 1991). This results in spatial patterns where residential areas are mono-functional, and large costs have to be sustained to reach areas of employment or

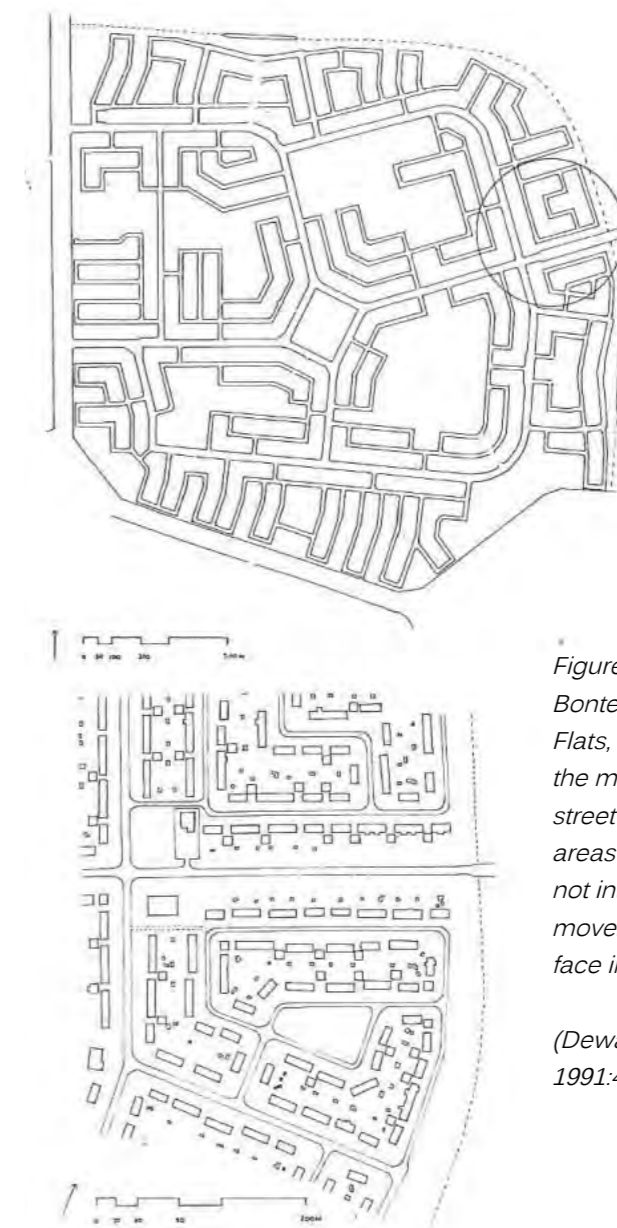


Figure 3.1
Bonteheuwel, in the Cape Flats, Cape Town, shows the monotonous layout of a street system which promotes areas of low intensity, and are not integrated into the larger movement system, but rather face inwardly.

(Dewar and Uytenboogardt, 1991:45)



Figure 3.2 aerial showing where the R300 in Cape Town currently terminates in Brackenfell, where it meets the N1, which serves to fragment the urban area. (Skyscrapercity, 2012)

other urban activities. The use of buffer zones to minimize interaction between races and land-uses also contributed to a more sprawling urban footprint (Smith, 2003). This also resulted in settlement building which planned different urban elements in isolation, and thus the urban environment as a whole lacked any over-arching framework to tie together or relate elements to one another.

The pro-suburban ethos promoted by modernist planning ideals resulted in South African cities which are characterised by low density residential neighbourhoods. This resulted in homogenous suburbs whose low density sprawling forms created monotonous residential environments with no distinctive character or legibility of the urban form. Furthermore, the obsession with the suburban residential model meant a lack in variation of housing typologies, resulting in a lack of choice of residential environment for many South African city dwellers.

The spatial consequences of an urban form that is characterised by urban fragmentation, separation of land-uses and low densities is a highly inefficient spatial structure. The costs of inhabitants to access different parts of the city is large as vast areas need to be covered in order to do so. Furthermore the low density patterns display a highly inefficient use of costly infrastructure.

3.1.3 The post-Apartheid city

Increasing Informality

Smith (2003) indicates that as Apartheid drew to an end, it was evident that the entrenched spatial patterns were still to survive for some time, as segregation would no longer be motivated by racial exclusions but by affordability, predicting that no structural change in the apartheid city could be expected. Simon (1989), in his revision of Ron Davies's (1981) portrayal of the apartheid city, believed that the post-apartheid city would be one of continuing segregation and separation, due to the highly unequal housing stock and associated surrounding environment. He thus envisioned that "class divisions steadily augmenting the racial separation inherited from the past, would produce a city characterised by some commentators as 'de-racialised apartheid'" (Smith, 2003:30).

A reaction to the classical apartheid city was increasingly visible in the accretion of informal settlements in peri-urban areas and in unused land in urban areas. According to Mabin (1991), the 'mushrooming of informal residence' had already begun during the 1970s and 80s, where the existing planned townships began to be overshadowed and overcrowded by informal, non-rural population concentrations (Tomlinson, 1994) due to the inflexible apartheid policies, and the inability of the state to build sufficient numbers of houses to meet the rising needs (Smith, 2003). Furthermore, the extent of informality within South African cities is increasing, due to rapid urbanisation and rising unemployment.

Housing Policy

Today, the distribution of housing in South African cities still displays an inarguably apartheid structure consisting of low densities and the separation of functions. Post-apartheid urban policies have been characterized by a market-driven "neo-liberal bias that quickly codified an equally oppressive structured process that can be termed class apartheid" (Bond 2003, 40).

After democracy was achieved in South Africa in 1994, the state's solution to the rapid increase of informal settlements was the delivery of subsidised housing on cheaper peripheral land, often without much regard to the established social and economic dimensions of these settlements (Huchzermeyer, 2004). The National Housing Policy (NHP) dispersed housing subsidies which included a basic 'top structure', of which the government promised delivery of 1 million in the first 5 years. "Since the political imperative is to provide as much superstructure as possible, the land price becomes the softest variable and housing schemes continue to be erected on cheaper peripheral land" (Dewar, 2000: 216). Thus National housing policy in itself can be seen to promote low-density, and thus increasingly marginalised forms of development. Furthermore, the fixation of such policies with reaching numerical targets, resulted in little time or energy to consider the potential unintended consequences of a persistently fragmented overall spatial form (Harrison et al, 2003; Royston, 2003).

The National Development Plan's vision for 2030 (2011) acknowledges the view that state funding should be directed towards the development of public infrastructure, in reality "despite a BNG (Breaking New Ground) emphasis on affordable inner city housing as part of a broader urban renewal strategy, municipalities have



continued to focus attention on housing developments on greenfield sites where targets are more easily met " (2011:244). Thus due to economies of scale, and the fact that the state continues to be the provider of low-cost housing, the form of such delivery will continue to favour the use of land on the periphery for single-storey residential units. Therefore, in terms of service delivery, the once off subsidy is essentially the policy instrument that promotes large, mono-functional mass housing projects (Goodlad, 1996).

Institutionally, the post-apartheid urban policies have added to urban fragmentation (Pieterse, 2009). The contradicting and often competing roles of sectoral policy initiatives, such as transport, housing, primary health care, economic development, driven by powerful national government departments often operate in silo's and are not well integrated with one another (ibid). An added problem with such inflexible policies is that the South African intervention framework has "essentially discouraged any intermediate construction of formal dwellings, prior to the layout of housing units in mass" (Huchzermeyer, 2004: p15).

Developer Led / Suburban Model

Another contributor to the increasingly sprawling urban form of South African cities is that urban growth is driven by the private sector and has been largely unconstrained by urban growth management policies. The priorities of the private sector also demand large tracts of cheap land and thus economies of scale mean that profits are maximised when development occurs on the periphery. Aside from the spatial inefficiencies, it is often the state that bears the burden of increased infrastructure demands to service new developments on the periphery. Furthermore, it is the pre-occupation with the 'suburban dream' of most South Africans which aspire to owning a free-standing house enclosed by a private garden that demands such forms of development.

3.1.4 Spatial consequences present today

The spatial legacy of Apartheid and Modernism created settlements characterised by low densities, fragmentation and separation. The neo-liberal agenda of post-1994 housing policy along with the priorities of private development has arguably further entrenched such a spatial legacy. These spatial patterns have resulted in a number of consequences which hinder the efficiency and social equity of South African cities today.

Large Aggregate Amounts of Movement

Although the intention of the Apartheid regime was to separate racial groups, these segregated groups still interacted on a daily basis, thus the Group Areas Act of the 1950's was a system not so much of segregation, but rather of constant migration. Such migratory practises were so entrenched that they are still a spatial reality of South African cities today (Bremner, 2007). This is because, although the Group Areas Act was repealed in 1991, many families had invested resources in their houses in remote locations and forged strong community ties (Dewar, 2000), coupled with the low land value in these locations, meant that uprooting was not financially nor socially viable.

The economically stagnant low-density residential areas, coupled with the large grain of the urban fabric means that for many South Africans, constant migration between these fragmented areas is still a daily occurrence (Dewar, 2000), which impose severe burdens of time, money and labour performance (Tomlinson, 1994). While settlements have continued to sprawl outwards, urban employment and commercial opportunities have not mirrored this trend. This is because, according to Dewar (2000), of the low investor confidence in such areas due to the high perceptions of risk, and the fact that the patterns of access to such areas has not changed much since 1994.

The consequence of such large aggregate amounts of movement is the experience of higher costs in terms of time and money for residents of the city, as well as higher costs in terms of infrastructural investments needed to account for the large volumes of metropolitan investment. The high levels of predominantly vehicular movement also result in high environmental costs such as air pollution and greenhouse gas emissions.

Increasing poverty on the periphery

The low-density dormitory suburbs, which began under Apartheid and which have persisted largely due to the structure of national housing policy has served to further exacerbate poverty and inequality. This is because it is the urban poor who are located on the urban periphery, thus sustaining higher transportation costs to reach places of employment, and are also often located on environmentally hazardous land with little developmental potential. Public transport is rendered inefficient due to the inability to reach minimum thresholds because of such low overall densities. The result of which is that many households are effectively trapped in remote locations (Dewar, 2000).

Lack of vibrant local markets

The spatial structure of South African cities that promotes mobility over accessibility, results in limited access vehicular routes which "create impenetrable barriers and reduce opportunities for small income-generating businesses because of the diffuse nature of local markets" (Dewar, 2000: 211). The low densities of South African cities ensures that aggregated purchasing power will never be great enough to generate a vibrant small-scale business sector.

Inaccessible and inefficient social facilities

Exclusively residential zones were developed as collections of individual housing units arranged into discrete neighbourhood clusters, with the intention that this would promote a sense of community. With the aim of ensuring equitable access to facilities, social and community facilities were then dispersed evenly and indiscriminately throughout the proposed neighbourhood unit. The downfall of this is that such residential units are devoid of any hierarchy of facilities and thus display no movement hierarchy, and thus are rendered permanently homogenous and largely sterile.

In developing countries such as South Africa, lack of resources and unforeseen financial constraints often result in inadequate social services, either due to the failure of such facilities to be delivered, or the severe impairment of their ability to function (Dewar and Uytenboogardt, 1991). Thus when such facilities were not constructed, the isolated and largely inaccessible layout of these neighbourhood units means that residents have to sustain much higher costs to reach maintained facilities in neighbouring areas. This also leads to large amounts of residual space within settlements that were originally intended to house such facilities. This in turn dilutes thresholds, ensuring that such facilities are never constructed, and contributes to the coarsening of the urban fabric.

Lack of Sense of Place and identity

Aside from contributing to urban fragmentation, the creation of urban barriers through the prioritising of roadways as mobility routes, also fails to acknowledge the importance of human and settlement scale. This results in the distortion of urban structure, as the street is not integrated into the community it serves. The failure to acknowledge the role of the street, and other public spaces, is apparent in the low-density suburban developments. In such areas, the public street now prioritises private vehicular movement over pedestrian activity. Similarly, the quality of public space in poorer areas is generally inadequate when considering the vast amounts of people they serve,

and the small size of their dwellings. The low-density dwellings and lack of other buildings fail to define or to give scale to the public spaces (Dewar, 2000). Thus the sprawling residential areas of South African cities fail to exhibit any sense of place, nor to contribute to the legibility of the urban form as a whole.

3.1.5 Towards higher densities

Thus, fragmentation, separation of uses and low densities all serve to inhibit the performance of South African cities and result in high social, economic and environmental costs, with the largest consequence being the increased marginalisation of the urban poor.

Harrison (2003) reports that the pursuit of higher densities and the integration of spatially separated areas is seen as a way to address problems of urban fragmentation produced under Apartheid. An obvious means to address social inequality and combat urban poverty is income generation. However, Dewar (2000) argues that self-generated income can only be possible through intensive local markets, which are more viable at higher densities, rather than suburban neighbourhoods. "When local markets are intensive, diversification and specialisation – the motors of economic growth – are promoted" (Dewar, 2000: p212). Furthermore, the viability of public services and social facilities and their efficiency increase at higher densities.

Improvement thus requires an increase in the efficiency of the system in order to decrease the aforementioned costs, which can be achieved through greater compaction through urban containment policies.

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3.2 Urban challenges in the global context

This chapter seeks to draw out and explain the current problems facing urban settlements and their consequences for urban form, as a starting point in determining the role of urban planning today. The chapter will first discuss the effects of rapid population growth and urbanisation and its consequence of urban poverty, and secondly the effects of human activities on the earth's finite resources and its relationship to the threat of climate change, food and water security, resilience to natural disasters and fossil fuel depletion. Thereafter, the effects of globalisation and economic restructuring will be discussed.

3.2.1 Population growth and rapid urbanisation

According to the UN, humanity reached a major demographic milestone in 2008, when the world's population became predominantly urban (UN Habitat, 2009). The most rapid rates of urbanisation and population growth are being felt in developing countries, with the most growth occurring in cities. Furthermore, many developing countries are experiencing hyper-urbanisation, which occurs when urban population growth exceeds urban carrying capacity, particularly in terms of employment, and results in high levels of unemployment (Clark and Tsai, 2009).

Rapid population and urbanisation not only puts strain on environmental resources, but, along with globalisation and economic restructuring, has many social and economic impacts on urban areas. The failure of the rate of economic development to match that of population growth in developing countries will arguably only lead to the deterioration of all aspects of sustainability (Burgess, 2000).

In developing countries, the increased mechanization of agriculture has forced many of the rural population to migrate to cities in search of better opportunities. However, the newly urbanised are often located in remote locations where land is more easily available and less subjected to formal regulations (UN Habitat, 2009), yet is without access to the most basic services or infrastructure. This condition puts increased strain on their cities, where infrastructure and governance are often inadequate, and has contributed in such circumstances to the creation of slums or informal settlements. These settlements are characterised by insecure forms of tenure and a lack of basic infrastructure and services and characteristically poor quality of housing. It is furthermore predicted that by 2020 1.4 billion

of the world's population will be living in slums (ibid), indicating the trend that rising levels of poverty are expected to accompany rapid urbanisation.

3.2.2 Resource Depletion and Environmental threats

Current settlement and human patterns, namely increasing global populations, industrialisation, pollution, food production and resource depletion, are rapidly approaching a situation where the earth's resources can no longer support such activities.

Furthermore, the effects of climate change and the increases in global average temperature can be directly attributed to human activity (Ziervogel and Taylor, 2011), primarily through the burning of fossil fuels such as oil, coal and natural gas, and the release of green-house gases into the atmosphere. Such global problems that have manifested through improper use and exploitation of natural resources exhibit highly unequal socio-economic distributions: the highly urbanised developed countries, with 25% of the world's population consume 70% of world's energy, 75% of its metals, and 85% of its wood, and produce most of its wastes (Clark 1996).

The exploitation of natural resources and the inhibiting of natural and ecological processes, due to resource over-use and pollution, have hindered the function of many important ecological processes (UN Habitat, 2009). Thus in the face of climate change, which brings more erratic weather patterns, harsher climatic conditions and increased frequency of natural disasters (Benton-Short and Short, 2008), the world's now compromised natural systems are less resilient to changes in the environment and environmental hazards. Current forms of urbanisation has meant the location of mainly the urban poor in areas that are prone to natural disasters, as UN Habitat reports that 4 of every 10 non-permanent residences in the developing world are located in areas threatened by natural disasters (2009: 5).

Water security

These harsh climatic conditions brought about by climate change are extreme on both ends of the scale. They result in increased flooding and storm surges in some areas, and yet drier climates in other areas (Ziervogel and Taylor, 2011). These harsh climatic conditions, along with the growing demand for potable water by an ever-increasing global population, have meant a growing concern for water security in the future. Furthermore, an increasing global population means increasing demand for water-intensive agriculture

and certain industrial practises, as well as wasteful behavioural suburban patterns that demand water for domestic use (such as gardens and swimming pools).

Food security

Climate change has also meant harsher climates in the drier months, with the result being that much of the agricultural lands have not sustained enough rainfall to deliver previous quantities of produce. This occurrence, along with the increasing conversion of agricultural land for urban development, due both to increasing global populations and rapid urbanisation, has meant that food security is fast becoming a threat to the future of the planet. When the cost of food and water escalates due to their increasing scarcity, it will be the urban poor who are undoubtedly prejudiced the worst. Furthermore, economic globalisation, which has seen the subsidising of many farms in the developed world, has also resulted in the over-supply of produce, thus decreasing the profitability of local farms in the developing countries and contributes to an increase in poverty.

Fossil fuel depletion

The exploitation of natural resources also includes the expenditure of scarce resources such as fossil fuels. As demand for fossil fuels is maintained and the supply is diminishing, the price of such resources will continue to escalate. Decreasing the demand for fossil fuels and the adoption of alternative sources of energy (such as solar, hydro and wind power) is thus not only necessary to decrease green-house gas emissions, but also are important to ensure that the poor are not further excluded from opportunity and services due the rising unaffordability of transport and utilities.

Cities that exhibit low density urban forms thus contribute to green house gas emissions and resource depletion through the prioritisation of private vehicular transport as the main mode of movement, and the fact that people are required to travel large distances to reach places of employment. One key element in reducing green-house gas emissions therefore is to reduce the aggregate amount of movement which occurs within cities.

3.2.3 Globalisation and economic restructuring

Urbanisation of the world has led to new ways in which we understand the globalisation of capital, labour and culture, to form a new mode of capitalist development that is highly flexible and information-based, facilitated by the progression in information and communica-

tions technologies (Soja and Kanai, 2007). One of the most profound effects of globalisation and economic restructuring has been the change in urban labour markets, which have seen an increase in the service sector and a decline in manufacturing, resulting in increasing socio-economic polarisation (UN Habitat, 2009).

Globalisation has meant access to global surplus labour that is flexible, adaptable and cheap (Shatkin, 2007), an important outcome of which is the placement of restrictions on the labour force to increase profitability. These include short-term contractual labour, restrictions on age and gender and the reduction of power of unions, all of which function to further disempower the working class.

Both a result and reaction to this, especially within developing countries, is the existence of the informal economy (Shatkin, 2007; UN Habitat, 2009), which has not only persisted in the face of globalisation, but in many cases has expanded (Portes, 1989). The growth of the informal economy may be directly attributable to the neoliberal agenda of globalisation due to: aversion to labour unions; reaction to state regulations; and new industries that rely on less regulated labour markets (ibid). Furthermore, informal housing is strongly related to flows of labour, the demand for urban space and the inflexibility of the formal housing market.

Globalisation and economic restructuring have affected both developed and developing countries in various ways, although the impact of which is often determined by local factors and governance (Shatkin, 2007; UN Habitat, 2009). Macro-economic policies that accompany globalisation (such as liberalisation, deregulation and privatisation) can limit government's power to ensure social well-being and inclusion (Beall, 2002). Most developing countries, to keep up with global competition, have seen their independent policy making ability eroded (Khor, 2000). Views from Institutions such as the World Bank believe that globalisation empowers private sector interests and thus ensures a more subservient role of local government. Furthermore, as Soja and Kanai (2007) regard, the increasing competition between global cities and regions has led to the pre-occupation with the attraction of investment and tourism, causing attention to be diverted away from the fulfilment of social services and community needs. It is thus unsurprising that Davis, in his book 'Planet of Slums' (2006) attributes the explosion of urban poverty to the adoption of neo-liberal forms of governance and the embracing of market forces.

3.2.4 Towards higher densities

Urban areas in both the developed and developing world will increasingly feel the effects of climate change, resource depletion, water and food security and economic instability and restructuring (UN Habitat, 2009). However, given the rapid urbanisation rates within developing countries, the importance of management of urban growth is even more pertinent if social inequalities and the increased marginalisation of the urban poor is to be avoided.

Chapter 4 Urban growth management

4.1 The need for urban densification

The two previous chapters have illustrated the need for urban containment policies to manage urban growth, to rectify urban patterns inherited from South Africa's political history, and in terms of the current challenges that face the entire globe. Urban densification (or compaction) is the means of restricting a city's lateral growth to curtail urban sprawl and thus increase densities within the urban footprint.

Internationally, the movement towards urban compaction has been driven by a focus to increase environmental sustainability and efficiency and decrease emissions. In the developing world however, support for the ideas of urban compaction has emerged as a response to the need to find more socially sustainable urban forms (Burton, 2000; UN Habitat, 2009). Burgess (2000) agrees that given the significant social and environmental problems associated with high levels of poverty, it is not surprising that in developing countries the compact city agenda is concerned with the improvement of socio-economic conditions and the provision of services, rather than with transport related inefficiencies and carbon emissions. This chapter will assess the compact city approach, not just as a means to promote a more environmentally sustainable urban form, but to create a more socially equitable city.

"The so-called compact city has a variety of definitions but in general is taken to mean a relatively high-density, mixed-use city, based on an efficient public transport system and dimensions that encourage walking and cycling" (Burton, 2000: p1969). The process by which urban compaction is achieved is usually termed intensification or densification and involves urban infill development, more intensive use of urban buildings and an increase in the density of population in urban areas (Burton, 2000). An important characteristic of the 'compact city' is a higher degree of mixed land uses. Burgess offers a tentative definition of contemporary compact city approaches as "to increase built area and residential population densities; to intensify urban economic, social and cultural activities and to manipulate urban size, form and structure and settlement systems in pursuit of the environmental, social and global sustainability benefits derived from the concentration of urban functions" (2000:10).

4.1.1 Environmental Benefits

The environmental benefits of the compact city approach include decreased emissions, more efficient use of natural and finite resources and the protection of natural processes and the mitigation of environmental threats due to climate change. The ways in which such benefits can be achieved is expanded on below.

Protection of valuable agricultural land

The current rate of land conversion is accelerating due to contemporary city forms of "dispersed and sprawling footprints" (Gasson, 2007: p3), and thus policies to promote urban densification can be seen to promote conservation of the surrounding undeveloped land. As climate change poses a threat to both food and water security, the importance of conserving agricultural land is vitally important. Furthermore, with the imminent depletion of fossil fuels it is also important that agricultural land remain in close proximity to urban areas, to minimise the distance between produce and consumer.

Decreased Emissions

Rapid acceleration of urban sprawl is generally associated with the widespread adoption of automobile transport, especially in the 1950s and 1960s (Anderson et al, 1996). With a new private and highly flexible mode of transport, individuals could choose residential locations far from their workplace. With no geographical boundaries restricting their growth, residential suburbs thus emerged on the fringes of cities with no regard to their accessibility to public transport infrastructure (ibid). The benefit of the compact city model is the increased feasibility of public transport, thus reducing emissions and contributing to environmental sustainability. Not only do higher density urban forms sustain the use of public transport, but as urban densities increase, energy use and emissions from transportation decrease (Newman and Kenworthy, 1989). Furthermore, in a compact city form there will be a higher concentration of retail, commercial and employment opportunities within close proximity to one another, making the use of non-motorised forms of transportation more feasible.

Increased resilience to climate change

Gasson also writes that Human survival can be put at risk if natural resources that provide water, energy, materials and food are destroyed (2007). The protection of ecological processes is vital in terms of the mitigation of natural disasters and the increased

resilience to climate change, and is accomplished through the protection of biodiversity and natural buffer areas. Furthermore, to promote biodiversity and the integrity of ecological processes, open spaces should not be isolated, but rather linked or in close proximity to facilitate the migration of species between them (Gaston, 2010). In the more compact urban forms, open and biodiverse areas are less fragmented than in low-density forms, and the continuity of open space is more likely. Furthermore, sprawling urban forms have a larger amount of paved surfaces (Benton-Short, 2008), which inhibit ground-water reabsorption and lead to a higher risk of flooding.

4.1.2 Densification and social equity

The thrust behind urban densification in developing countries is currently focussed on the improvement of socio-economic conditions (Burgess, 2000), including the promotion of social equity and justice and the elimination of poverty (Burton, 2000). Advocates of the compact city agree that urban densification promotes social equity and increase the life chances of the poor (Burton, 2000; UN Habitat, 2009). The way to increase accessibility to all urban opportunities is to decrease the need to travel (Dewar and Uytendogaardt, 1991; Owens) through promoting a more compact urban form with a more integrated and mixed land-use pattern.

Improved access to facilities and open space

A more compact city form improves access to facilities due to proximity, as well as increasing choice and freedom, as there are more likely to be a range of facilities in the area as minimum thresholds are met (Burton, 2000). Furthermore, at higher densities social amenities are often less vulnerable to change and thus degradation or fall into disrepair (Dewar and Uytendogaardt, 1991). In the compact city, communities are also more likely to be more mixed and therefore low-income groups are less likely to suffer from the added disadvantages of being spatially segregated and thus under-served (van Kempen, 1994).

Better access to green space

Green spaces located within cities shape the character of the city and create a sense of place for its inhabitants, as well as contribute to our orientation within the urban landscape (Gaston, 2010). This is more so when such spaces are located within dense cities as there is a higher contrast between the city scale and the vegetation, allowing for a more memorable experience. Open spaces are also better appreciated in the city, as open land is scarce, rendering them more memorable. Critics of the compact city model argue that lower

density settlements mean that the poor have better access to green open spaces and parks (Burton, 2000). However, in more marginalised areas where the perception of safety is an issue, the placement of green spaces in denser urban areas may be more beneficial. A more dense urban form also means that the wilderness beyond the city borders is more accessible.

Reduced Commuting and better access to employment

The reduction in distance between residence and the workplace, due to urban densification and increased in mixed-use intensity means that the disadvantaged spend less time and money commuting to work. According to Cass "one of the conditions which may exacerbate and perpetuate disadvantage is locality, living in a region (often as a result of severely restricted housing options) where access to a range of necessary education and public sector services is limited, where suitable jobs are scarce, and the potential journey to and from work long and expensive" (1990: 11).

Feasible public transport and NMT

One of the strongest arguments for the compact city model is the increased feasibility of public transport as more people are concentrated along each stopping point along the route (Newman, 1992). Furthermore, low density urban forms generate more need to travel, as the separation of land uses and activities is much greater, and thus the viability of public transport is highly dependent on the density and locations of these uses (Owens, 1992). Thus Owens strongly suggests that policies and attempts to achieve sustainable urban development must include measures to reduce the need for movement, and therefore the physical separation of urban uses is the main constraint to achieving this (ibid). Thus the smaller the separation between different land uses, the lower travel needs are likely to be, thus increasing the feasibility of other more sustainable modes of travel such as walking and cycling (ibid). Thus according to McLaren (1992, p. 217), "High residential densities can only contribute to reducing trip length and encouraging modal shift if the trip generators are appropriately located"

Mixed use and increased livelihood strategies

Perhaps then the biggest contribution that more compact urban forms can make to social equity is through the promotion of a higher degree of mixed land uses. Jane Jacobs, in her book *The Death and Life of Great Cities* (1961) argued that for an urban environment to be vibrant, ordered chaos achieved through a mixture of land-uses is required. She regards areas that are devoid of a mixture of housing

types, social facilities and commercial uses are socially unsustainable. Furthermore, the presence of 'eyes on the street' is achieved through an intensification of mixed land-uses, meaning that at all times of the day activity on the street can be expected, which deters wrongdoing and promotes personal safety (Elkin et al, 1991; Goodchild, 1994; Jacobs, 1961). Opposing views, which argue that high rise inner city dwellings contribute to crime and social malaise, have more to do with the high rise environment than higher density forms (Burton, 2000). This points to the fact that there are desirable level of height and urban form if higher densities are pursued.

In developing countries, which display rapid urban growth rates and high levels of poverty, there is a need to promote the conditions for small scale and self-generated economic activity to occur (Dewar and Uytendogaardt, 1991). The intention then of compact city models is to create an urban system that holds the needs of the pedestrian as the first priority. "The more compact the local market, the greater the range of potential economic opportunities which present themselves to all inhabitants. This is particularly important in the case of small economic enterprises. Because of the lower volume of output of small enterprises, the larger the proportion of distribution costs to total costs; faced with this, the compact city favours small entrepreneurs" (ibid: 43).

In sprawling forms however, places of economic opportunity do not occur ubiquitously, but rather only at specific points that are generally dominated by larger enterprises. Thus the diffuse markets that characterise sprawling low-density forms can often be seen to encourage economic monopolisation. In compact forms that exhibit a relatively larger local population, greater economic diversification and specialisation is more likely to occur (Dewar and Uytendogaardt, 1991). This is due to economies of scale, as diverse opportunities are created due to a higher consumer base, which renders all economic services to be viable. Therefore "compacting the city is the precondition for generating small scale economic growth" (ibid: 45).

In regards to developing countries and their high levels of poverty, Burgess (2000) puts forward that in terms of the desire for higher densities, the central problem is the low level of effective demand generated by the population, irrelevant to the densities at which they occur. He warns against the assumption that in developing countries, densification alone would be sufficient to generate the functional thresholds for public transport. This further emphasises the need to well-integrate the appropriate pre-conditions for small

scale economic generation to accompany densification strategies to achieve appropriate forms of densification.

4.1.3 Disadvantages of densification for the urban poor

Smaller Living environments

Urban compaction and its associated higher density housing often means reduced space for living quarters, and little if any space for garden space. Although higher density residential development may still be in proximity of recreational and green open spaces, in light of the future threats of climate change, the lack of garden space to promote urban agriculture needs to be considered. However, this must also be considered in terms of land markets. The advantages of smaller living space is outweighed by the social and economic benefits of densification and increased proximity to services. However, this points to the fact that policies for sustainable urban agriculture must accompany urban compaction, and that the higher density housing needs to be associated with adequate public space.

Lack of Affordable Housing

A common perception is that the urban growth management structures, such as the enforcement of an urban edge, serve an overall benefit to cities (Blair, 2001; Nelson and Peterman, 2000). However, critics of the compact city, and most notably its enforcement through growth management tools such as an urban edge, believe that densification policies will reduce rather than improve the affordability of housing for the urban poor as land will be more scarce and therefore more expensive (Breheny, 1992). This will no doubt further inhibit social justice, as the cost of housing is a key factor determining the disposable income and quality of life of low-income households (Burton, 2000).

4.1.4 Towards strategic densification

Support for the ideas of urban compaction have emerged as a response to the need to find more sustainable urban forms for the urban areas of the developing world. There are thus many characteristics of the compact city approach that can be seen to contribute towards social equity and most notably support the preconditions for small-scale economic opportunity. However, given the high rates of poverty in developing countries, it is important that policies that advocate urban densification do not further marginalise the poor through effectively excluding them from urban land markets. This asserts that models used to achieve urban densification need to be strategic.

4.2 Strategic Densification

In South Africa, urban compaction has been seen as a means to address issues of social equity (Todes, 2003). This has meant a focus on restructuring the city to better integrate the urban poor, so that their access to urban opportunities is increased. According to Harrison (2003) the key elements of the compact city approach include increasing urban densities, restricting urban sprawl, mixed use development and the support of public transportation. This is achieved through the use of urban growth boundaries, infill development, strategic infrastructural investments and the designation of urban corridors.

4.2.1 Restructuring and Strategic Densification

Burgess (2000) asserts that most urban environmental problems such as high uses of energy and carbon emissions can be attributed to problems within the urban structure. Ideas of urban compaction and sustainability should thus also rectify structural changes to the urban environment through restructuring urban movement systems (ibid). Haughton and Hunter (1994) furthermore regard that an approach to planning is needed that does not aim to densify all areas of the city indiscriminately, but rather does so strategically with strong conceptualisations of appropriate urban form. Along with Beaumont and Keys (1982) and Brotchie (1992), they advocate an urban form that would “foster the development of a number of strong sub-centres within the city, concentrating traffic flows sufficiently to encourage public transport provision” (1994: 95). This calls for densification and the intensification of mixed land-uses that is strategically located and structurally driven.

A number of spatial models have been developed to restructure urban environments and achieve the desired sustainability benefits of higher densities. They include infill development around existing established nodes, Transit Oriented Development (TOD) and urban corridor development.

4.2.2 Different Models for compaction

Both TOD and urban corridors advocate strategic densification of the urban form, and consider public transportation to be a main structuring element of urban form. As Owens notes (1992), this allows for a variety of urban activities, as certain land-uses are better suited to the economic activity of public transportation than others.

Transit Oriented Development

Transit Oriented Development was first introduced in the United States, advocated by Peter Calthorpe, and gained prominence in the 1990s along with the supporters of ‘smart growth’ and ‘new urbanism’ who promoted the idea of creating walkable neighbourhoods and the increased viability of public transport. This urban model entails the restructuring of urban areas along light rail or rapid bus transport systems, where dense mixed uses are generated around these transit stations or interchanges. TOD is defined as accommodating a mixture of urban uses within walking distance from a transit stop or interchange and a significant commercial area.

The local nodes formed from TOD are kept small to keep walking distance to a minimum, and thus extend to a maximum radius of 800 metres around a transit station. The design also requires that the development occur at human scale to retain a positive urban environment, even though densities range between medium to high. This requires the provision for adequate public spaces. Furthermore, the road layout of such neighbourhoods is based on the gridiron movement system (Wilkinson, 2006), which facilitates equity of access for all, as the road network consists of integrators rather than barriers, and enables a high degree of choice of movement for the pedestrian.

The advantages of TOD include the reduction in aggregate private vehicle use within the city, and the densification around transit interchanges which supports an increased viability of the use of public transport. Wilkinson (2006) also argues that the benefit of TOD is that neighbourhood residents are more likely to utilise public transportation that is easily accessible to them, and the proximity of places of employment to public transport nodes is effective in minimising the need for private car use (Owens, 1992). Furthermore, the design of TOD includes allowances for NMT, which decreases the use of fossil fuels and thus green-house gas emissions. Wilkinson (2006) also advocates that the merit of TODs include elements of ‘value capture’, where the initial investment in transport infrastructure serves to increase densities in the area or specific site, causing the area to be more commercially desirable. This translates into the ability of local government to ‘recapture’ some of the initial investment costs through increasing property rates in areas in TOD areas. In terms of social justice, the increases in property rates revenue can be channelled into providing much needed facilities such as schools.

At the larger scale, TOD neighbourhoods tend to be located near significant metropolitan nodes, which facilitates a restructuring of the urban system ‘node by node’ along a city-wide network of public transport routes (Wilkinson, 2006). In this way, TOD can achieve greater compaction of the urban form as a whole, whilst still allowing for areas of lower density within the city.

The application of TOD which has generally been in developed countries, can be seen to largely mirror environmental concerns by curtailing urban sprawl and limiting car dependence, and has not been focussed on attaining social equity. TOD does however have the potential to ensure that the poor are housed closer to urban opportunities, and encourages integration of people of different income groups by locating them in close proximity to each other.

However, as the urban form achieved from TOD is ultimately nodal (UN Habitat, 2009). In the South African context, there is a need for urban densification models to address issues of spatial fragmentation as well as social justice. Thus the importance of intensifying the connections between such nodes is an important consideration, and will be addressed through an exploration of the urban corridor model.

Corridor Development

According to Owens (1992) “Promoting public transportation has implications for urban form, not just in the sense of creating stronger sub-centres within the city, but also encouraging linear development of cities along transport routes” (1992: 100). However, this should not just occur along a thin band of ‘ribbon’ development, but should rather consist of a broad band of urban development of high densities and mixed land-use intensification, located along a public transport route, with moderate overall densities (Dewar and Uytenbogaardt, 1991; Owens, 1992).

The main benefit of the corridor model is that it “provides various economic opportunities along itself, which ensure the existence of the necessary thresholds to sustain its operations” (Warnich and Verster, 2005: 345). Corridor development thus encourages the decentralisation of economic activity in order to increase convenience and thus reduce aggregate amounts of movement. Corridor planning, as an approach, seeks to promote intensity, to encourage non-motorized and public transportation, to stimulate a mix of activity, to promote small business, and to promote urban integration (Dewar, 2010:).

Within cities, it is movement flows which determine the most intensive activities. The greater number of local areas that a corridor integrates, the greater its potential as an organising element of more intensive activities (Dewar and Uytendogaardt, 1991).

However, the intensity itself should not be continuous, as the corridor is not an elongated node (Warnich and Verster, 2005). Rather, urban activities tend to agglomerate or cluster according to the relative accessibility of points along it (Dewar: 2010). Corridors can thus be regarded as 'beads on a string' with different activities tending to grow towards each other over time, as seen in figure 4.2.1.

There exists certain requirements for the efficient functioning of urban corridors. These elements include: a major transport route; a variety of public transport modes; linkages between nodes and sub-nodes; intensive human interaction; availability of services; intensification of development; and public investment in the immediate proximity of the corridor (CSIR; Priemus and Zonneveld, 2003).

Advantages of Corridor Development for South African cities

The urban corridor model and TOD are not mutually exclusive and can address problems of sprawl and separation of uses through promoting higher density development and increasing the intensity of mixed use development. However, this section puts forward that the question of urban restructuring should begin with urban corridors, as they are well suited to address the South African problem of fragmentation through promoting spatial integration and thus contributing to enhanced social equity. Using the criteria proposed by Dewar and Uytendogaardt (1991) for achieving integration, namely through promoting continuity of the urban fabric and by using connector routes as urban structuring elements, the appropriateness of corridor development to achieve greater spatial integration and promote social equity within South African cities is discussed below.

Restructuring urban growth along connector routes allows intense activities to respond directly to movement systems, to allow for a "mutually-generative relationship between movement intensive flows and human-intensive activities" (Dewar and Uytendogaardt, 1991: 49) which would result in linear urban activity corridors. When flows are channelled along defined routes, different sizes of enterprises and activities, with different generative capacities, are able to find suitable areas at which to locate. Smaller businesses can furthermore benefit from the energy generated by the larger activities

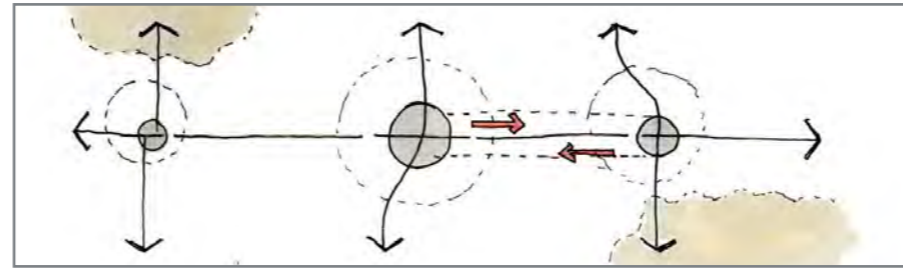


Figure 4.2.1 diagram showing corridor growth (adapted from Dewar and Louw, 2003).

or enterprises (which are generally located at the most desirable points) and can take up interceptor locations in relation to these larger generators. Accordingly, both small and large enterprises find locations within the system. This maximises economic efficiency as all enterprises benefit in some degree from the generative capacity of others. Furthermore, no enterprise or activity is reliant solely on its locality only, as movement routes connect it to the consumers in neighbouring areas.

Corridor development "has the potential to reach a greater number of people than exclusively node-based forms of development" (Dewar and Uytendogaardt, 1991: 49). A more integrative linear system allows the poor to benefit from the purchasing power of wealthier people passing through, and the range of activities available to everyone is much wider, as such activities are not only serving a single small community. This also helps to make community facilities more efficient, and the increased through traffic, and the sharing of activities and facilities, will further reinforce a range of activities (Lotz, 1995) and promote social integration between neighbouring communities.

Because of the structural clarity and legibility of the system, the corridor has a protective function and allows for very fine grained and secluded residential spaces to occur in close proximity of high intensity activities (Dewar and Uytendogaardt, 1991). This structural configuration also provides space for less competitive functions to locate, such as social facilities, thereby promoting social interaction and increased integration in the area (Warnich and Verster, 2005).

Development of an activity corridor can create a strong and well defined city structure as they "offer a means to integrate those parts of the metropolitan area with no coherent and integrated structure into the larger urban environment" (Lotz, 1995). In the South African context where residential neighbourhoods display a cellular structure that faces inwardly, the structure of urban corridors can fulfill the role

of space integrators, rather than the current movement structure that functions as space bridges (figure 4.2.2). Space bridges are defined as limited-access routes which connect a few select points along their length, whereas space integrators accommodate stop-start movement.

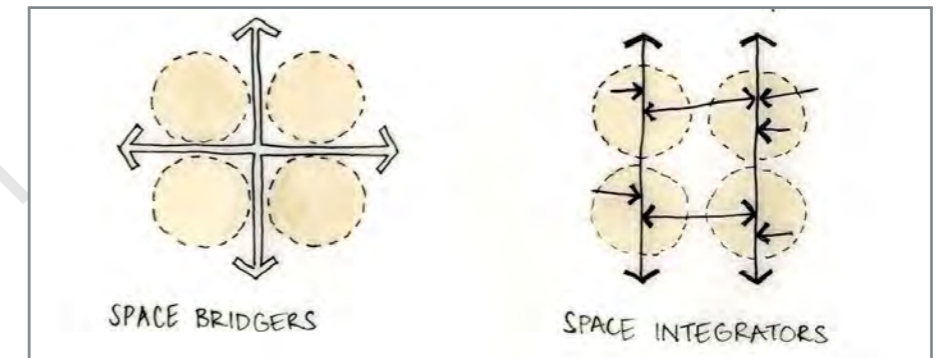


Figure 4.2.2 diagram of space bridges and space integrators (adapted from Dewar and Louw, 2003).

According to the UN Habitat Report on Sustainable Cities (2009), urban compaction in developing countries must also show major concern with improving infrastructure, services and facilities to areas located on the periphery. Added to this is the need to promote economic development and employment in such areas. The report goes on to say that densification and intensification along transport corridors is most beneficial to the under-served areas on the periphery, as they have the most to gain (ibid). In this way linear forms of development can be seen to promote resilience within South African cities. In terms of corridor development, once the movement system is established, activities can immediately locate along them. As growth occurs, activities would naturally extend further along the route (Dewar and Uytendogaardt, 1991), thus directing urban growth.

As Burgess (2000) suggests, the most widely accepted model for urban restructuring and densification in the developing world are those that follow a linear transport-orientated system, channelling urban growth along -public transport routes. Given the spatial legacy of sprawl, fragmentation and separation of land-uses inherited from modernism and apartheid planning principles, densification and intensification along transportation corridors is arguably the most suited model in terms of restructuring South African cities to make them more equitable.

Chapter 5

Elements of the plan

The previous section outlined the need for urban growth management, from both the South African context and the global perspective, asserting that solutions are to be found in urban densification strategies, specifically in the need for strategic densification. Now that the need for urban growth management has been established, the following chapter outlines the criteria to assess urban performance which will inform the making of a plan, followed by a discussion on the nature of the plan.

5.1 Identification of performance qualities

Urban Sustainability

Urban sustainability requires that resources are used efficiently to sustain the urban activities present in a city, and broadly includes ecological, economic and social sustainability. This firstly requires the sustainable use of natural resources so as not to hinder ecological processes, so that ecological functions and natural environments can be sustained. In terms of urban form this requires that settlements be compact, to reduce aggregate amounts of metropolitan movement, and to protect valuable land from urban development. Urban sustainability also promotes the resilience of urban settlements. Places are given a specific identity from a combination of natural and cultural landscape features. Such places must be distinctive in their regions to maintain identity (Gasson, 2007) and to contribute to the resilience of the urban environment. This is achieved through the creation of settlements which display timeless qualities and an enjoyable urban environment, along with the ability of settlements to accommodate growth and change. Socio-economic sustainability requires that current human activities and consumption patterns do not compromise the needs of future generations and that the conditions occur which enable people to provide for themselves.

Efficiency

Efficiency refers to the efficient use of resources and infrastructure within a settlement. Given the current strains on resource depletion, the efficient use of limited resources is vital to ensuring the sustainability of urban settlements. The structure and form of a settlement are the main determinants of urban efficiency. More compact urban settlements are more efficient, as investments in utilities and services provide for a larger amount of people, and infrastructure such as

roadways are not required to span such large distances.

The achievement of urban efficiency also minimises social costs, of time and money, with regard to accessing places of employment and social services. Lynch defines efficiency as “the cost, in terms of other valued things, of creating and maintaining the settlement, for any given level of attainment of the environmental dimensions” (1960: 118).

Equity

Equity refers to the ability to access urban opportunities, such as places of employment and public and social services. “The ideal city is imagined by some as being a great centre where one has easy access to an enormous variety of goods, services and other people” (Lynch, 1960: 187). Elkin et al (1991) require that both intra-generational equity providing for the needs of the least advantaged in society, and intergenerational equity, ensuring a fair treatment of future generations, need to be considered in the creation of equitable cities. Furthermore, an equitable society also demands that the most vulnerable of the population have easy access to these opportunities and services

“The three important sub-dimensions of access are the diversity of things given access to, the equity of access for different groups of the population, and the control of the access system” (Lynch, 1960: 203). According to Lynch, access is defined as the ability to enter a space without barrier or regulation.

In the context of South African cities where levels of poverty are high and many do not own private cars, equitable settlements must prioritise the use of non-motorised and public transport. This requires that pedestrian movement be unconstrained to ensure that the entire population can access urban opportunities with ease.

Integration

The degree to which urban areas and activities are integrated has an effect on overall urban performance (Dewar and Uytendogaardt, 1991). Integration refers to connecting different fragmented and separated parts or elements of the city together. Settlements should seek to integrate the various elements of work, play, and living. Integration also refers to the integration of various modes of transportation so that each mode can fulfil its specific role and thus support the need for other modes of transportation.

Achieving integration and continuity of the urban fabric promotes interdependence between local areas (ibid). This means that areas do not need to be entirely reliant on their own facilities and services, and it is also a pre-condition for efficient public transport to occur. Integrated urban systems also expose people to more services and thus also mean a more efficient use of infrastructure.

Freedom and choice

Integrated urban systems also create more opportunities to which people can respond, thus rendering the urban environment more convenient. And thus highlight the importance of the affording of the idea of choice when it comes to how people utilise their surrounding environment. Complex and diverse urban environments represent a greater array of stimuli to which people can respond.

Legibility

Lynch argues the importance of the ‘sense’ of a settlement, defined as “the clarity with which it can be perceived and identified. (1960: 131). Lynch’s elements of legibility (1960) serve to create a more legible and recognisable city form, with which one can orient oneself. This is done through the use of edges, paths, alignments, focal points, gateways and entries, views, domains and places. Furthermore, such elements are important to differentiate between different urban environments, as different urban activities respond to different urban elements.

Vibrancy

Vibrant urban environments are created through a mixture of different urban activities and land-uses. “The most fertile ground for the generation of urban opportunities is created through intense interaction and high levels of population support” (Dewar and Uytendogaardt, 1991). Successfully performing environments are therefore highly diverse and complex, as they contain a variety of activities to which people can respond to. Urban settlements that display high densities exhibit vibrancy as they have intensive pedestrian movement.

5.2 The Nature of Plan

Spatial plans provide a tool for urban management through their ability to provide structure and order to urban growth (Dewar and Uytendogaardt, 1991). Where 'order' is the outcome of conscious spatial response and 'structure' denotes the spatial geometry of settlements.

The Laissez-faire approach to planning operated on the assumption of 'the market knows best', where planning and public investment were seen as supportive and facilitative of private actions. This can also be seen to be correlated with the dominant regional economic theories up until the 1990s that were preoccupied with supporting economic growth, believing that the 'trickle down' of benefits would ultimately sustain or provide for the rest of the needs of society. However, it is now widely believed that such thinking generally resulted in further economic inequalities between economic centres and their peripheries (Nel, 2001).

An opposing conceptualisation is a more strategic approach to planning, where spatial plans are viewed as a framework to guide private investment, and a higher emphasis is placed on the public investment and more stringent restrictions on private actions. However, Albrechts (2004) criticises such traditional land-use planning as successful in prohibiting undesirable development, but unable to create desirable development. However, according to Dewar and Uytendogaardt, an assessment of urban areas suggests that neither approach to planning has been successful, as the making of successful urban environments "requires the exercise of both freedom and constraint" (1991: 23).

Positive urban environments are rich and complex, and although complexity cannot be designed, the preconditions for it can be (Dewar and Uytendogaardt, 1999: 23). Constraint is an important element of plan-making as it stops development occurring out of purely private-sector driven needs, which may be to the detriment to the larger community or the surrounding environment. Freedom on the other hand is an essential element of plan-making as it allows not only for the occurrence of vibrant urban environments, but also allows for dynamic change in a city. However, freedom exists only where there is choice to which desirable private interests can respond. This requires that plans of this nature are to designate what needs to be publicly provided to achieve coherence and continuity

of the whole, while generating a variety of choice to which desirable private interests can respond.

A more strategic form of planning is thus concerned rather with the minimum intervention necessary to achieve a desirable urban environment. However, plan-making also recognises that urban areas are made up of elements that exhibit different hierarchies. "The strategic plan identifies the expected economic base, drivers for change and major factors affecting the spatial distribution of population, employment and services" (UN Habitat, 2009: 162). As the strategic spatial plan is focused on the development of key areas, it is thus more dynamic and open to change than the more prescriptive Master plan. Healey (2009) believes that not only does the strategic spatial plan allow for change, but it encourages and is directed towards change, and encourages a momentum towards some directions more than others.

Strategic planning requires that the central decisions that give structure to the urban form are more restrictive, whereas other areas and aspects of the plan are given greater freedom. This allows the plan to be more dynamic and to better respond to unforeseen changes in the future, and also allows for variations in constraint and restrictions which allow for a greater variety of urban opportunities. This is also more efficient as it requires minimum actions necessary to achieve the desirable urban environment. This is particularly applicable to planning in developing countries where state funds and the capacity for intervention are often small.

Chapter 6

6.1 Introduction to context

The previous chapters have sought to establish the theoretical framework required to understand the challenges facing urban growth in both the context of the spatial structure of South African cities, and in terms of the challenges associated with rapid urbanisation that are facing all cities.

Given the problem of spatial inequality in the city of Cape Town, efforts to promote strategic densification and urban integration are arguably most needed in the peripheral areas of the city which display high levels of poverty.

This chapter consists of an analysis of the study area and its broader context to establish the opportunities and constraints which will inform the design of the corridor area, whilst keeping in mind the need to address the challenges previously outlined.

The application of the theoretical framework can then be applied to the management of urban growth in Cape Town's south-east sector, which displays the highest levels of inequality in the city, through the restructuring of urban growth along the Lansdowne road transport corridor. However to address the problem of urban growth and spatial inequality, the urban conditions will first be assessed at the sub-metropolitan scale.

6.2.1 Metropolitan Spatial Analysis

To understand the constraints and realities that influence the functioning of the Lansdowne corridor, an analysis must be undertaken first at the metropolitan scale. At this scale, it is necessary to understand movement systems and how they interact.

These movement systems include the movement of people in terms of all of the metropolitan modes of transport, including vehicular and rail. This thus also requires an understanding of barriers that serve to restrict or direct movement, and these take the form of green spaces and green corridors. Lastly, the location of higher-order facilities and dominant nodes of employment serve as metropolitan movement-generators.

Movement Analysis

The movement patterns in Cape Town resemble a largely radial structure, where all metropolitan movement radiates outwards from the CBD, as seen in figure 6.2.1. This pattern of movement is not only highly inefficient in terms of congestion, but the lack of adequate N-S and E-W movement axes mean that transportation between areas within the city often occurs via the CBD. Thus those located on the periphery experience both higher time and monetary costs to access other parts of the city.

Furthermore, the South-East quadrant of the city currently lacks adequate metropolitan movement linkages. The rail line which services this area is not integrated with areas to the west nor to the emerging economic node of Bellville in the North. Furthermore, the distances between the stations are too large to be considered easily accessible to those they serve.

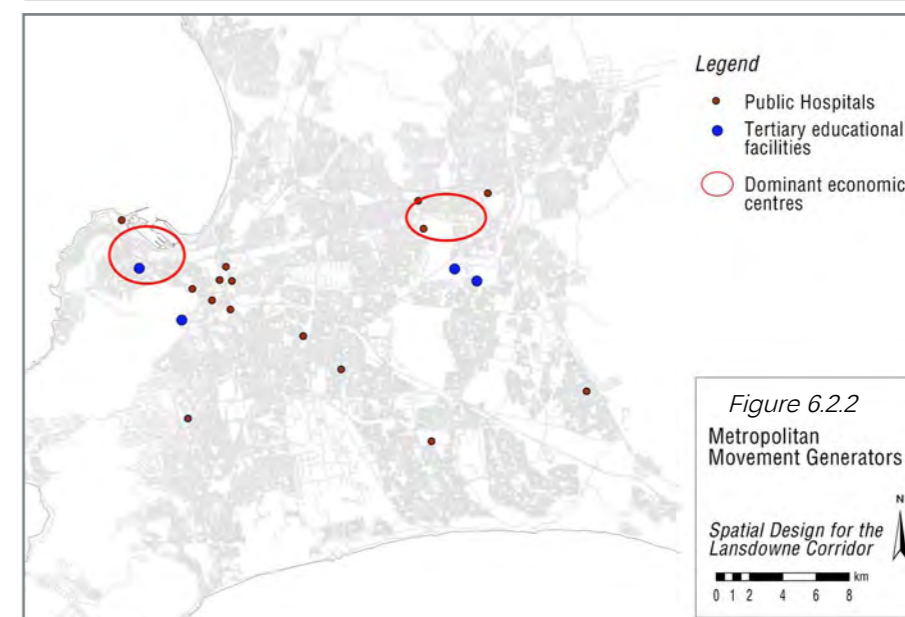
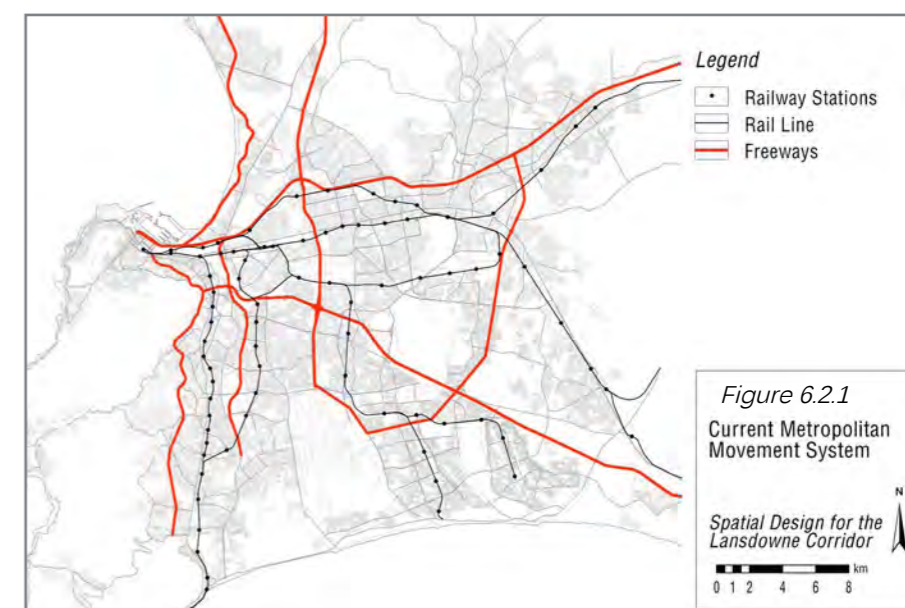
Movement Generators

As the South-East quadrant of Cape Town houses many who work in the industrial sector, the connection to emerging industrial nodes, located mostly in the North-west and Western areas of the city, is another important metropolitan linkage that needs to be addressed.

Cape Town's current Bus Rapid Transport (BRT) initiative in terms has focussed largely on reducing movement congestion along the roads that lead to the CBD rather than to address the structural problems of the inaccessibility of some areas in the city.

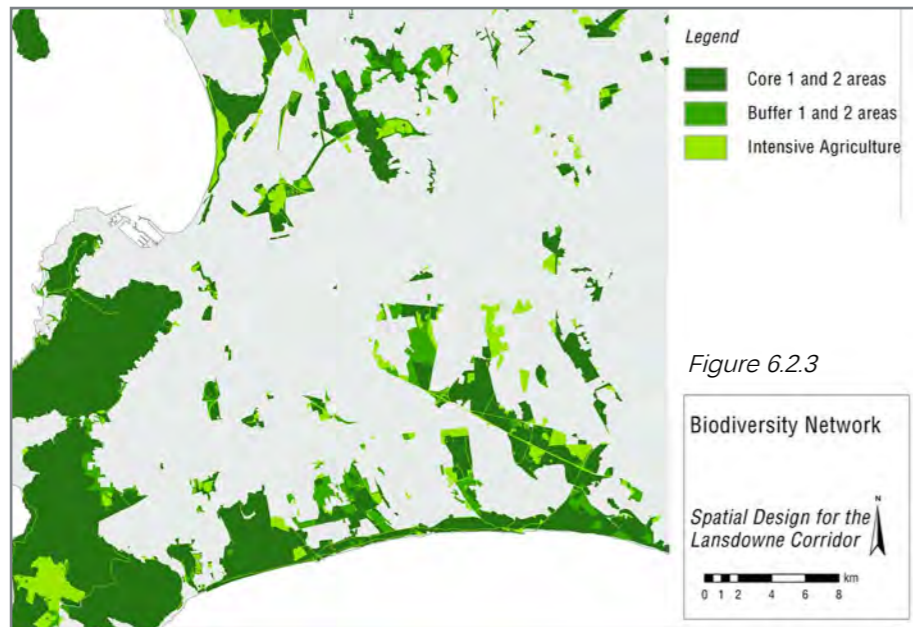
Green Systems

Green systems that function to restrict urban development consist of areas that are highly valuable in terms of biodiversity or in terms of agricultural potential. The integrity of ecological processes and biodiversity occurs when green open spaces are joined by green corridors to promote the migration of species between them. It is thus the protection or enhancement of such corridors that should guide or restrict urban growth at the metropolitan scale.

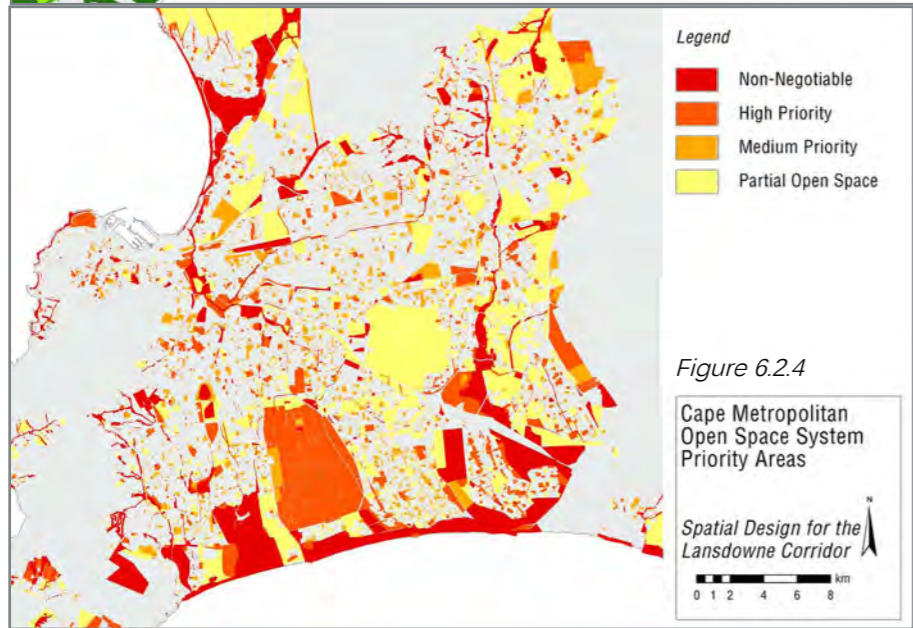


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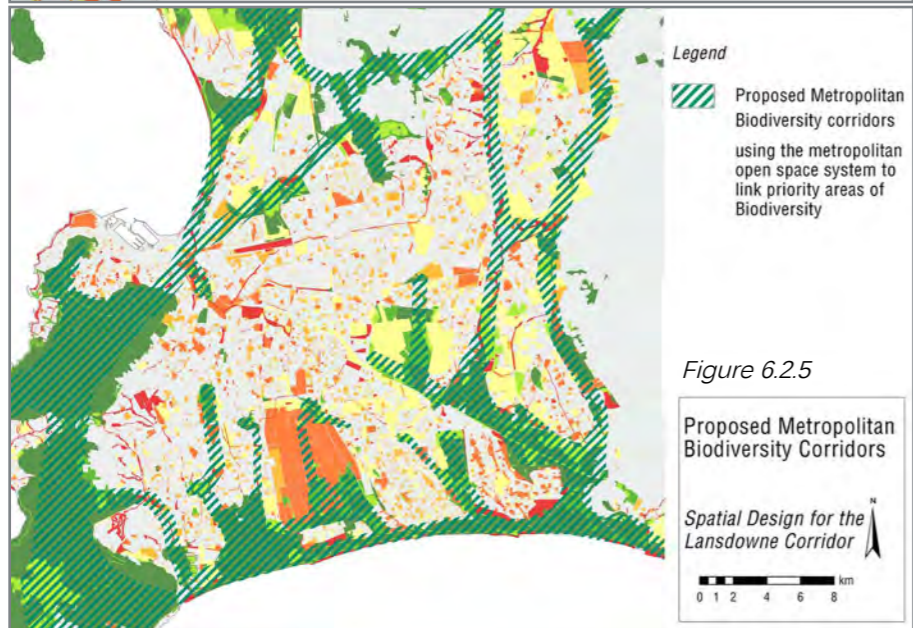
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6.2.2 Metropolitan Concept

The metropolitan spatial concept begins with establishing green corridors to restrict urban growth. Thereafter, the metropolitan movement system is restructured to resemble a grid rather than radial system, through the creation of linkages between these currently linear movement systems.

Biodiversity Corridors

The green corridors are intended to connect areas of critical biodiversity, and thus by restricting urban development in such areas, they function to direct urban growth. As green corridors promote the migration of species which is essential to maintain the ecological integrity of such areas, the corridors themselves can be considered higher priority than disparate areas of biodiversity. Figure 6.2.3 shows the areas of critical biodiversity in the metropolitan area. However, it can be seen that the existing areas of biodiversity are not interconnected by any metropolitan green system, thus lacking a hierarchy.

Thus in order to establish a system of green corridors, the Cape Metropolitan Open Space System (CMOSS) (see figure 6.2.4) was used as a means for connecting the areas of important biodiversity. A composite of biodiversity and open spaces was then used to establish the location of green corridors, as shown in figure 6.2.5.

The importance of this is that a system of hierarchy is created, distinguishing then between areas of biodiversity, and of those within green corridors of metropolitan significance.

Movement Systems

In terms of metropolitan movement, the spatial concept prioritises the linking of currently linear movement systems. The rail system is considered to be the highest order in terms of metropolitan significance, and thus the concept prioritises joining or closing the gaps between the currently linear railways. As rail transportation caters for trans-metropolitan movement, the closing down of the railway system requires a mobility-based form of transportation, such as the BRT (Bus Rapid Transport) system.

Metropolitan Spatial Concept

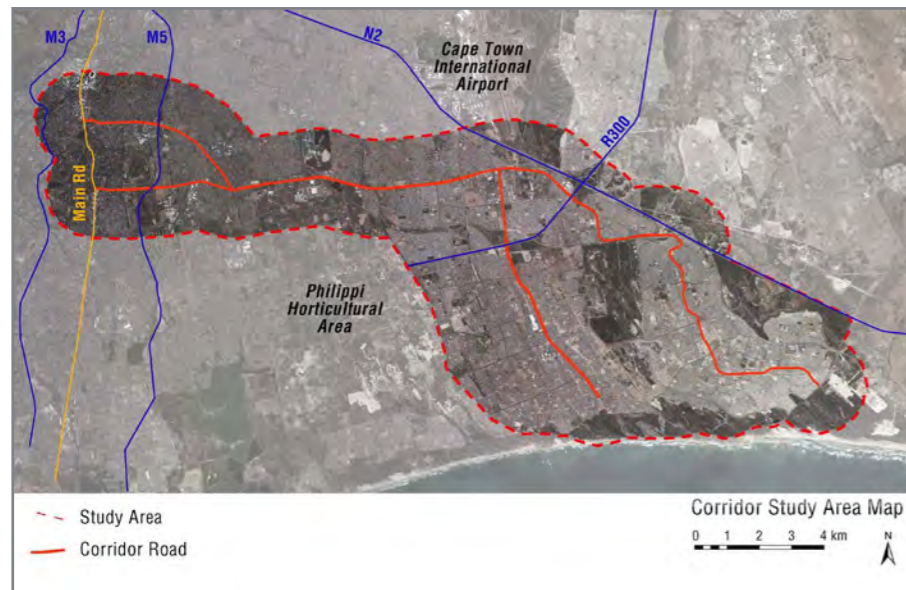
The spatial concept thus envisions the BRT system as joining up the current railways system, and to connect currently inaccessible areas of the city (such as the Metro South-east) to higher order public facilities and areas of employment.

Both the green biodiversity corridors and the movement concept are combined in figure 6.2.6 to provide a metropolitan concept. This concept is then intended to inform the design of the Lansdowne corridor in terms of the relevant metropolitan movement structure.



6.3 Site and Environs

The study area consists mainly of a 1.5 kilometre band of development either side of Lansdowne road, and consists of the greater Philippi, Mitchells Plain and Khayelitsha suburbs. The study area joins the established nodes of Claremont and Wynberg to the southern end of Khayelitsha, and is enclosed by the N2 freeway in the north-east section.



The analysis of the site and its environs at the scale of the Lansdowne corridor is undertaken systematically. It begins with an analysis of the natural landscape, which consists of all of the biophysical aspects of the site, which is then followed by identifying the cultural aspects of the landscape, as well as the cultural aspects of the natural landscape. Thereafter, the analysis focuses on the man-made elements of the site, beginning with the movement systems and then moving on to analysis of facilities and settlement patterns.

6.3.1 Bio-Physical Analysis

The Bio-physical elements of the corridor consisting of Geology, Soils, Topography, Climate, Hydrology and Biotic Systems are analysed systematically to ascertain the biophysical constraints and opportunities that will inform the spatial development of the corridor. The analysis begins firstly with an inventory for each biophysical element, which are then interpreted into relevant constraints for development. It must be noted that for certain biophysical elements, interventions are required to establish the necessary constraints for development in the area.

	Typical Guidelines / reasoning	Criteria	Indicator	Development Restrictions	
Geology	Avoid geological hazards	Foundation Conditions		No-Go	
Soils	Development and foundation conditions	Clay content	< 15%	Suitable	
	Preserve natural resources	Agricultural Potential	Medium or higher	No-Go	
	Preserve natural resources	Building sand		Tread lightly / Opportunity	
Topography	Avoid steep slopes for development	Slope	< 9 degrees 9-15 degrees	Suitable Moderately suitable	
	Avoid developing in ridges			Unsuitable	
Climate	Avoid areas exposed to prevailing winds	High points / hilltops	Avoid wind exposed peaks	No-Go	
		Valley bottoms / Wind tunnel areas	SW-NE axis	Mitigate with design measures	
	Avoid cold slopes		South facing slopes	No-Go	
	Avoid cold and wet slopes		S-E facing slopes	No-Go	
Hydrology	Avoid development in frost belts	Prone in river courses		No-Go	
	Hazard avoidance	Wetlands		No-Go	
		Protect river and groundwater quality	Large rivers	30 to 50m buffer	No-Go
		Minor Rivers	15 to 30m buffer	No-Go	
		Flood plains		No-Go	
		Aquifers	Sensitive /threatened	No-Go	
Biotic Systems	Protect Threatened ecosystems	Biodiversity Areas	Core 1 and Core 2	No-Go	
	Support Areas of biodiversity		Buffer 1 and Buffer 2	No-Go	
	Protect existing Agriculture		Intensive Agriculture	Tread lightly / Opportunity	
	Protect Open Space systems for the migration of species	Metropolitan Open Space System	Non-negotiable priority areas		No-Go
			High Priority Medium Priority Partial Open Space		No-Go when linking areas of Biodiversity

Table 6.3.1 shows the method used to assess the various constraints of each biophysical element

The extent of the constraint is then categorised according to the permissible extent of development it could support:

No - Go

restricts all urban development as the biophysical characteristics render the area undevelopable.

Tread Lightly / Opportunity

requires that any proposed development be limited in its intensity, and should take advantage of possible resources in the area.

Tread Lightly

requires that any proposed development be limited in its intensity

Suitable

deems the area suitable for all urban development

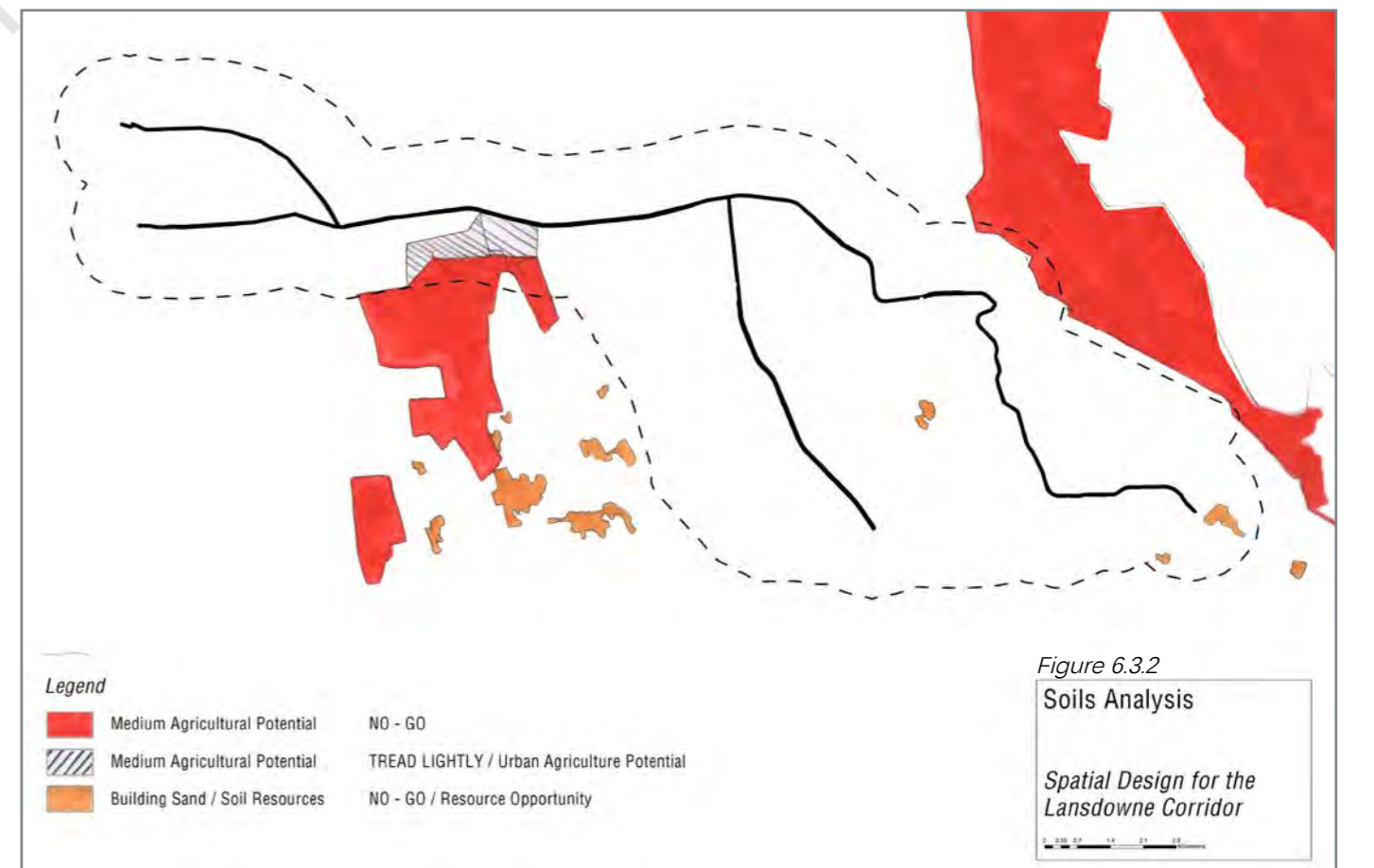
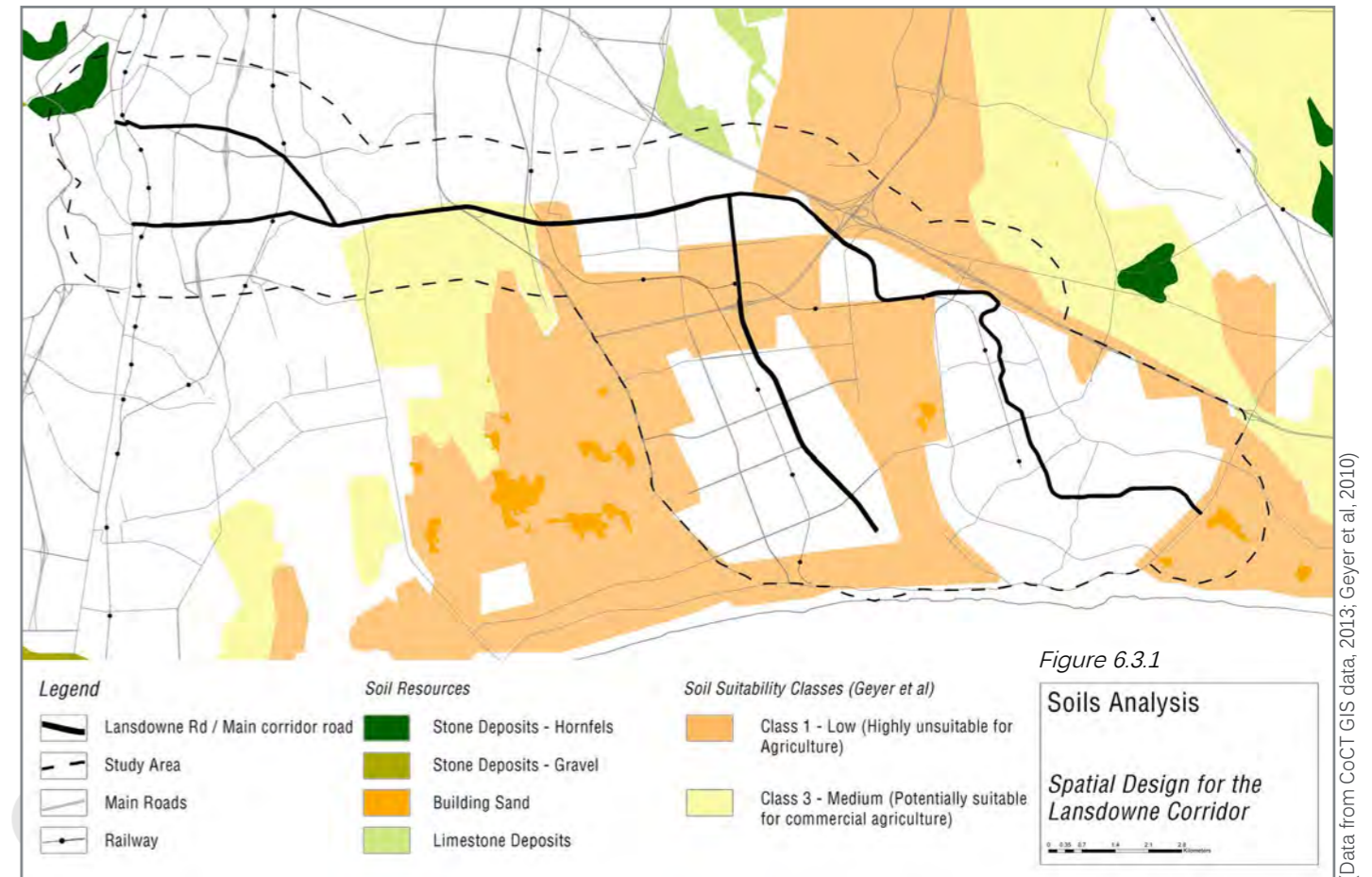
Geology

The bedrock present in the study area is Malmesbury Shale and is suitable for both urban and agricultural development. No geologically significant constraints exist in the study area, and there are no fault lines. However, above the bedrock the area is essentially a vast sheet of aeolian sand, ultimately of marine origin, which has blown up from the adjacent beaches over a period on the order of a hundred thousand years.

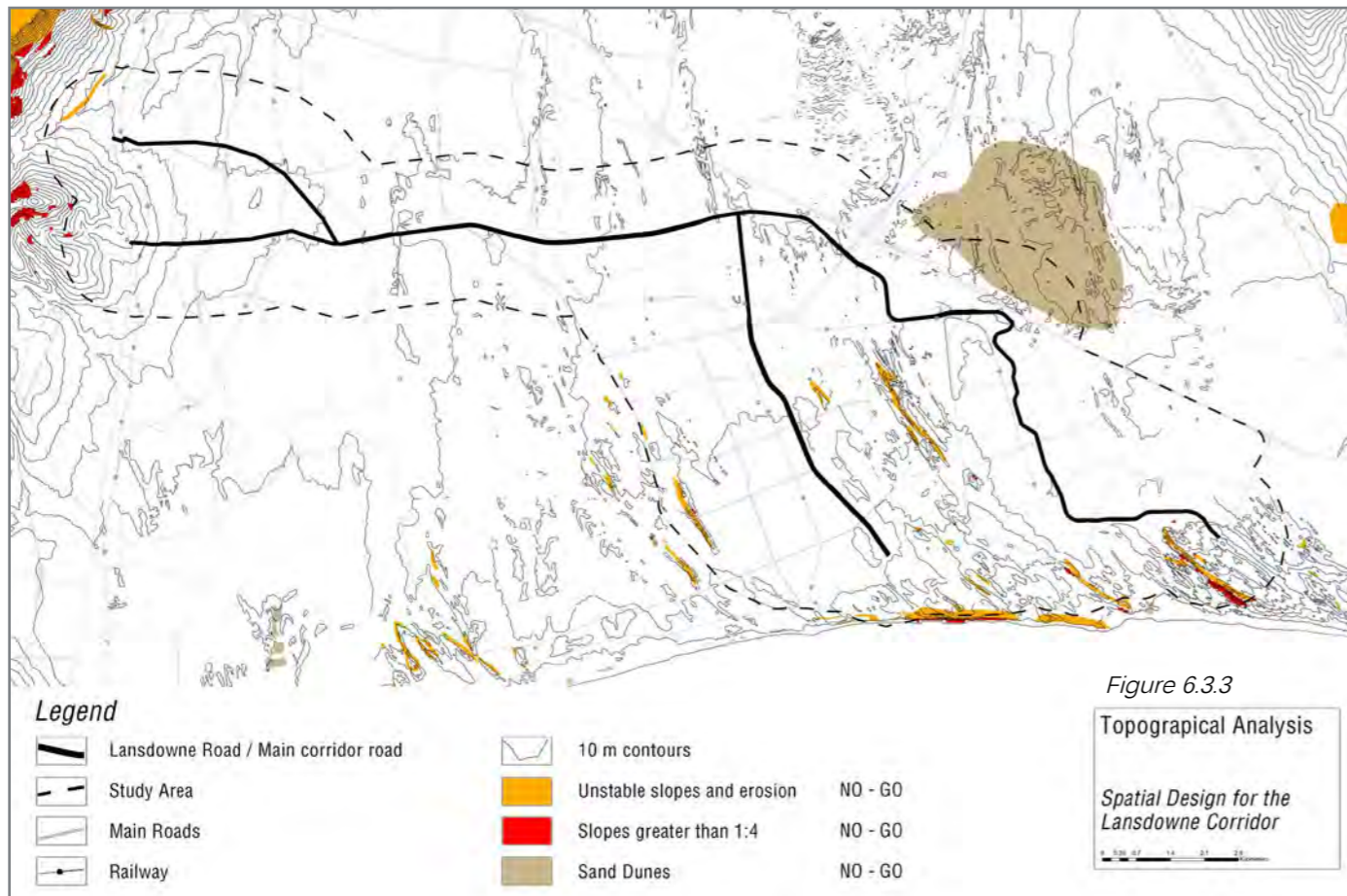
Soils

The important attribute of soils that requires protection from urban development is the soil's agricultural potential, due to the ever increasing need for cities to be food secure. Agricultural potential is an expression of the internal attributes combined with the necessary external inputs required for agricultural production (MacVicar, 1974). The properties used to determine the attributes of the land include the texture of the soil, its structure, chemical composition, mineralogical composition, parent material, depth, slope, and drainage. It is usually determined using historical values such as production, volume or the net turnover per area measured over a period of time (Geyer et al, 2010).

The Agricultural potential of an area is categorised generally as high, medium or low. Soils with a medium suitability class are regarded as potentially suitable for commercial agriculture and in this context are considered a 'No-Go' area for development. The Soils Analysis map (figure 6.3.1) shows that in terms of the study area, soils of medium agricultural potential are generally located in the Philippi Horticultural Area (PHA). However, the North-East segment of the PHA has been contaminated by polluted groundwater and storm-water runoff. Thus in terms of identifying constraints (shown in figure 6.3.2) this area was not considered a 'No - go' area.



(Data from CoCT GIS data, 2013; Geyer et al, 2010)



(Data from CoCT GIS data, 2013)

at Cape Town

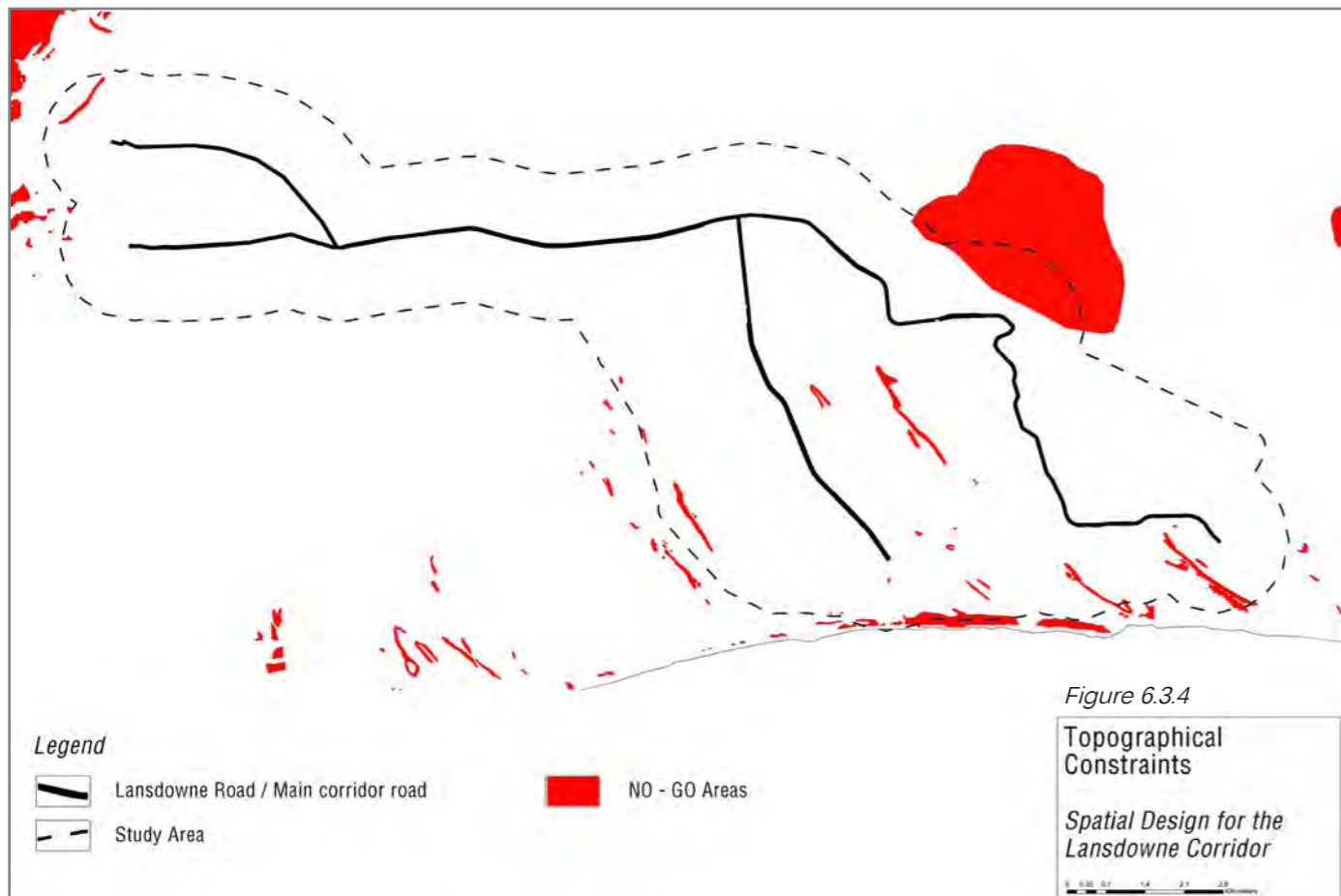
Topography

To the west the expanse of the Cape Flats is limited by rising ground that slopes up towards the mountains of the Cape Peninsula, while in the east the land rises gradually towards the Hottentots Holland ranges and other elevated regions of the interior of the Boland, however the study area itself is almost entirely flat.

An Inventory of the topographical elements in the corridor do not display many constraints, except for the prominence of sand dunes in the area, shown in figure 6.3.3 and 6.3.4. However, the generally flat topography of the area does impose other constraints, such as the inability of the land to drain water in the wet winter months, which will be expanded on further in the section on hydrology.



Satellite image facing eastwards, showing the topography of the Cape Flats

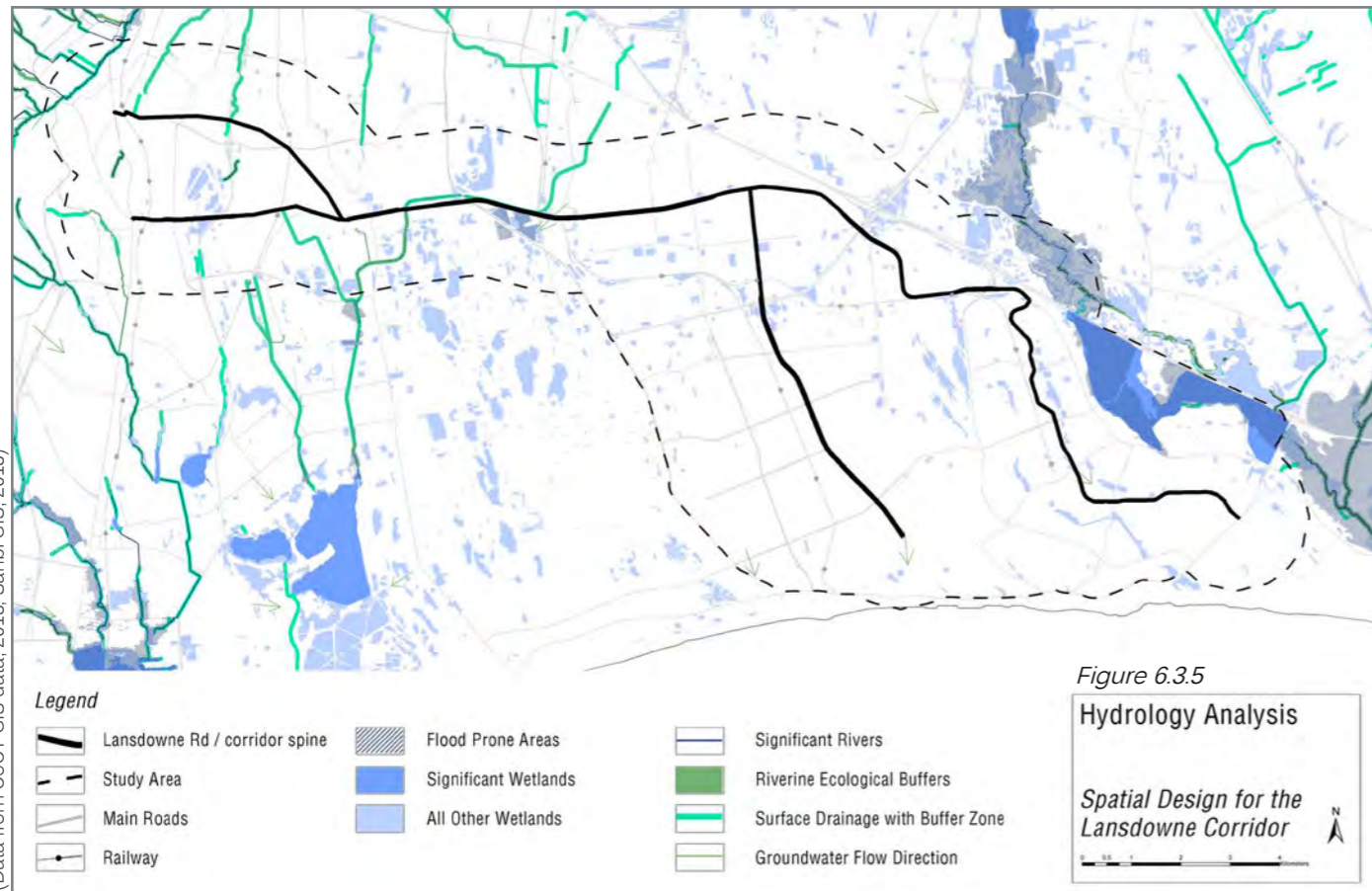


Climate

The area has a Mediterranean climate, with warm dry summers and cool, damp winters. It is generally exposed to the wind, both from the north west in winter and Southerly or Southeasterly in summer. Although the winter wind is accompanied by high levels of rain, it is the summer wind that is the most problematic in this area as it results in high levels of discomfort for those living in the area as sand is constantly blown around.

The high levels of rainfall in July and August, coupled with the inability of water to drain off the flat terrain means that the area is constantly flooded, with devastating affects to these in informal dwellings.

(Data from CoCT GIS data, 2013; Sanbi GIS, 2013)

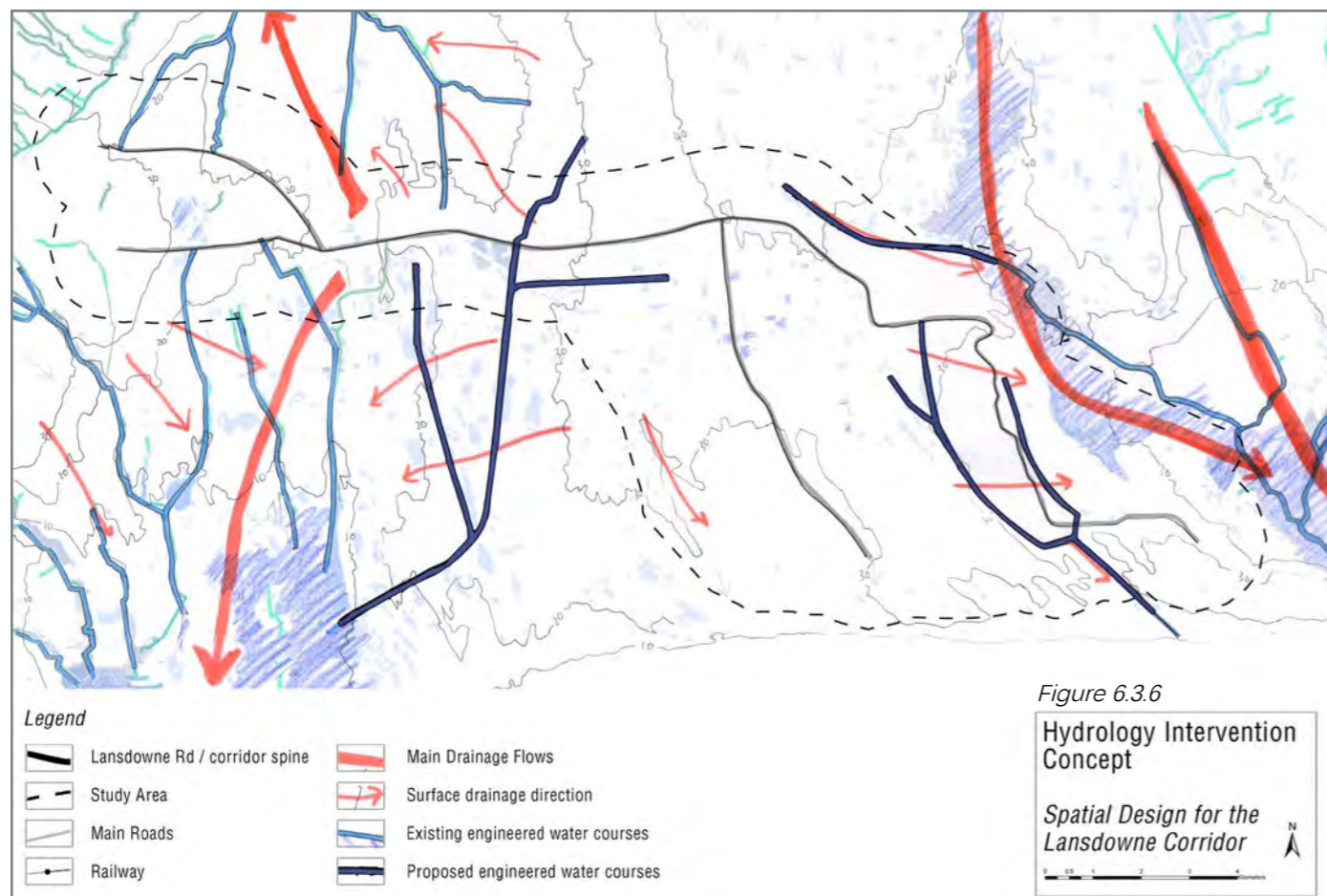


Hydrology

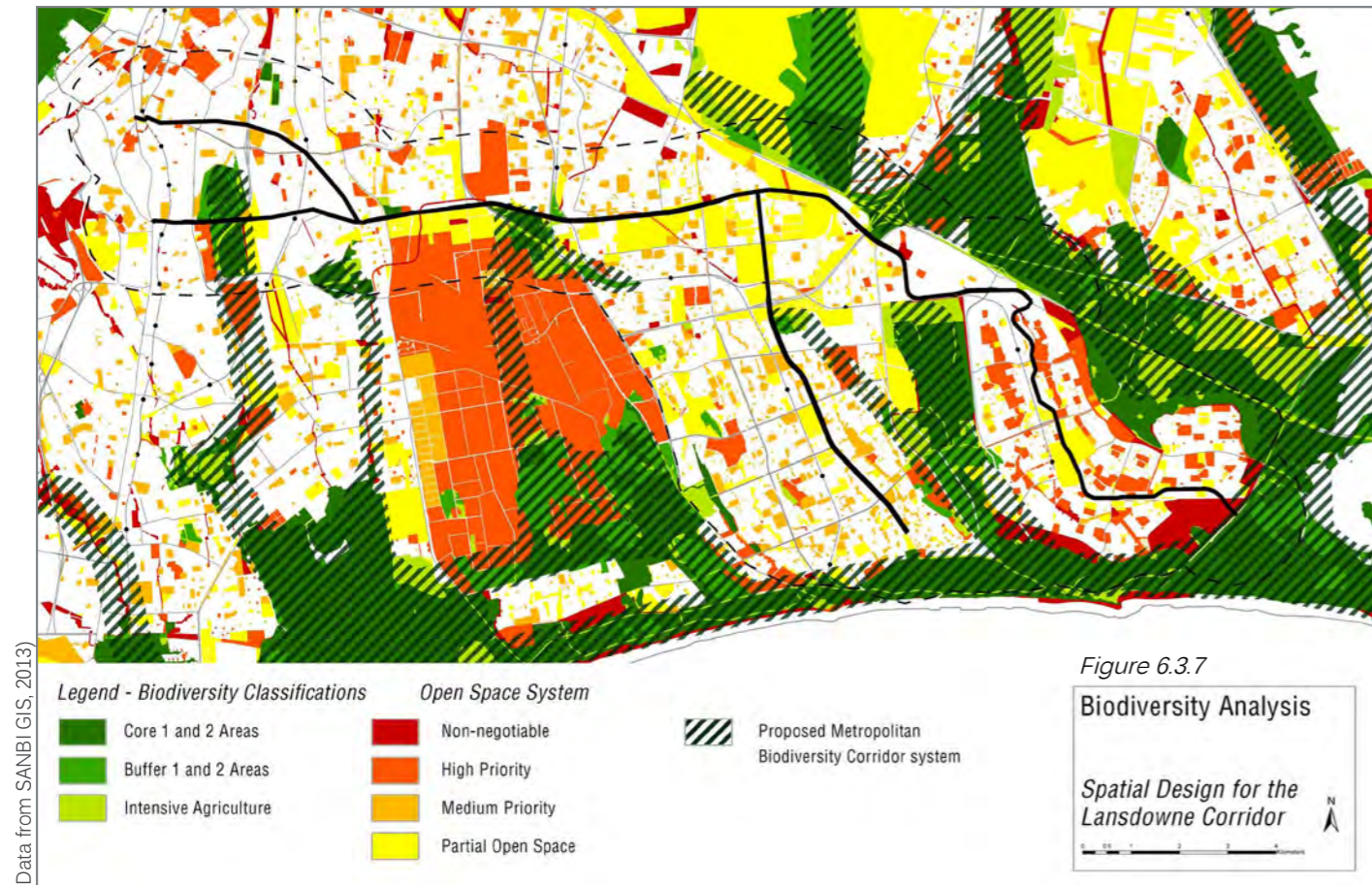
The flat low lying lands mean that drainage of water is not adequate, which results in flooding of the study area every winter. Figure 6.3.5 shows that there are many wet areas within the study area, and areas that are prone to flooding. Furthermore, the figure shows a lack of surface drainage systems in the mid-section of the study area.

As the area has such a large occurrence of water bodies, the mitigation of certain flood prone areas should be incorporated into the analysis in terms of determining the hydrological constraints in the area. If this step was not undertaken, the presence of water in the area would make most of the study area undevelopable.

Figure 6.3.6 therefore shows a drainage concept for the area to mitigate the occurrence of flooding. This would require the engineering of drainage systems and the grading of land to direct water runoff into these drainage routes. An adequate buffer would be required to support a riparian ecosystem as well as mitigating the damage caused by flash floods. The location of these proposed drainage systems flow accordingly with the contour lines



Flooding in Philippi (iol, 2012)



Biodiversity

The biodiversity analysis of the study area mirrors the same approach given to biodiversity at the sub-metropolitan scale, which prioritises the importance of biodiversity corridors. As these corridors promote the migration of species which is essential to maintain the ecological integrity of such areas, the corridors themselves can be considered higher priority than disparate areas of biodiversity.

The biodiversity corridors proposed in the metropolitan concept are thus applied to the corridor area, to distinguish areas of highest priority. This is shown in figure 6.3.7 which shows the demarcation of the corridors in relation to existing areas of biodiversity and the Cape Metropolitan Open Space System (CMOSS).

The system of green corridors was established by using the CMOSS to connect areas of important biodiversity.

Figure 6.3.8 shows the biodiversity constraints for the study area. The areas of highest conservation are therefore the areas of critical biodiversity that make up part of the biodiversity corridor system.

Furthermore, the demarcation of biodiversity areas took into account the proposed riverine systems to mitigate flooding in the study area, as riparian systems display significant ecological corridors.

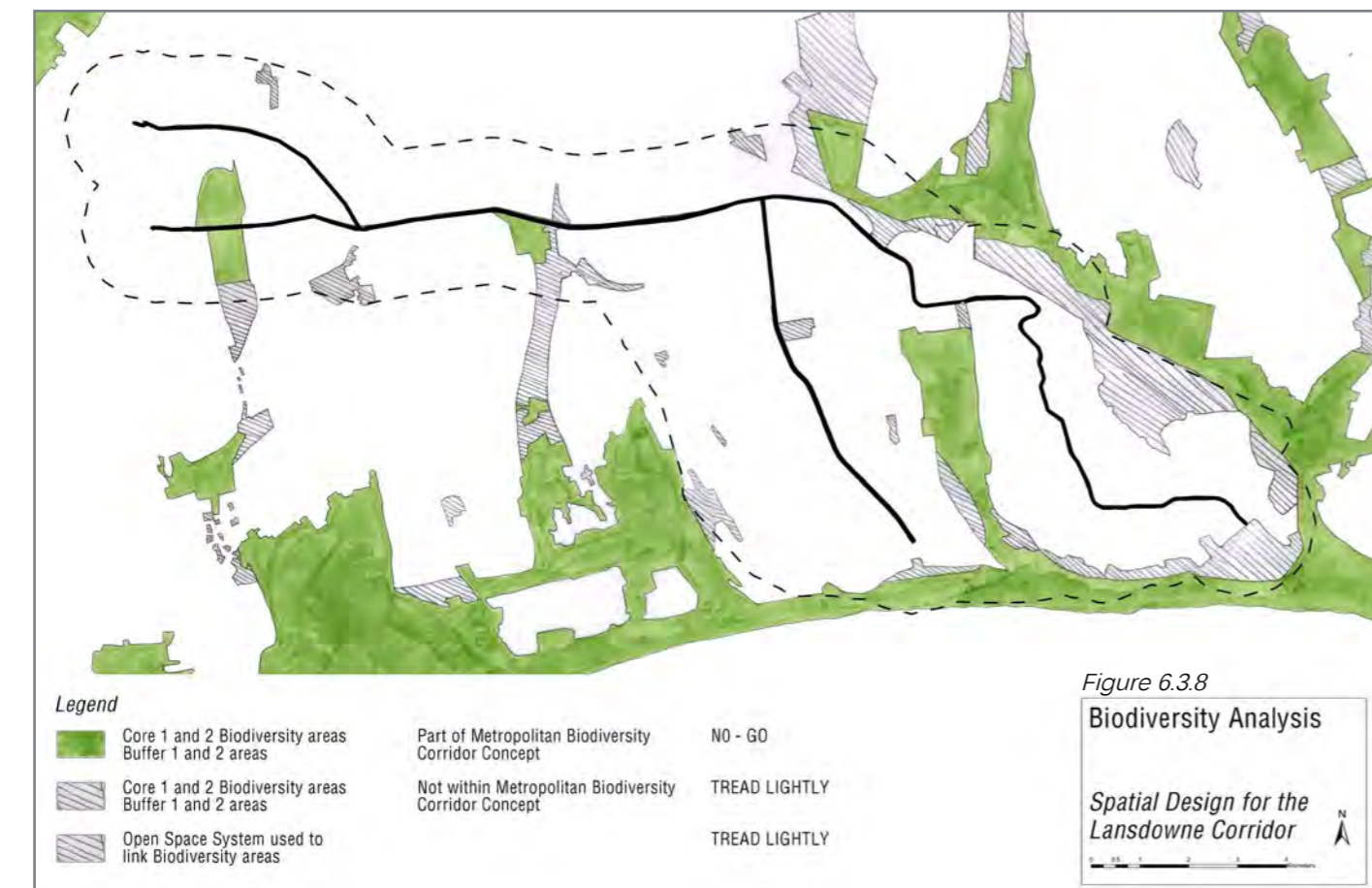
Bio-physical constraints

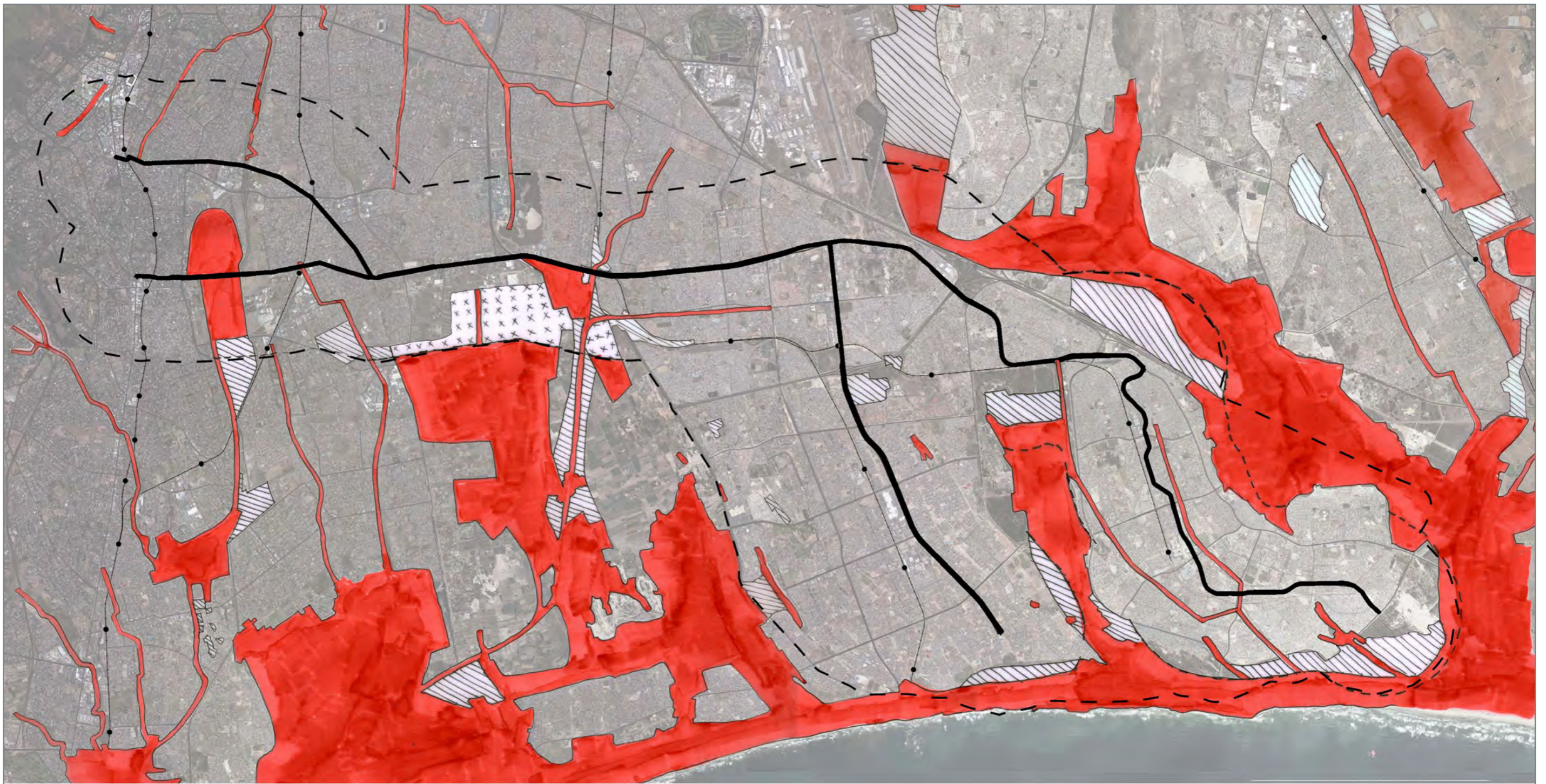
Figure 6.3.9 shows a composite of all of the relevant bio-physical constraints and opportunities in the study area. The elements that display the largest constraints are hydrology, biodiversity and soils with significant agricultural potential.

The surface drainage systems proposed to mitigate the risk of flooding in the study area are incorporated into the biodiversity areas, as the riparian ecosystems can also be used to link areas of biodiversity. These areas exhibit the opportunity for NMT (Non-motorised transportation) pathways and to form an open space system that joins recreational areas.

The areas of agricultural potential present in the study area display an opportunity for urban agriculture, and for the inclusion of housing typologies that incorporate small holdings. There is also the opportunity for an agricultural educational facility in this area.

The biophysical opportunities and constraints, once combined with the analysis of movement systems and public facilities, will inform the design of the study area.





Legend

-  Lansdowne Road / Main corridor road
-  Study Area
-  Main Roads
-  Railway

Constraints and Opportunities

-  NO - GO
-  TREAD LIGHTLY - Opportunity for recreation
-  Opportunity for Urban Agriculture / Small holdings

Figure 6.3.9

Biophysical Constraints

Spatial Design for the Lansdowne Corridor



0 0.5 1 2 3 4 Kilometers

6.3.2 Movement Analysis

An analysis of movement in the study area considers all modes of movement. This includes rail, vehicular movement, public transport and non-motorised transport infrastructure (NMT). An understanding of the hierarchy of movement systems is important, especially when considering vehicular movement, as some roadways cater for trans-metropolitan movement; and others for local movement. A diagram of movement hierarchies and the access they permit is shown in figure 6.3.10. Also important in the understanding of movement systems is an assessment of movement generators: facilities or nodes that attract people and therefore generate movement.

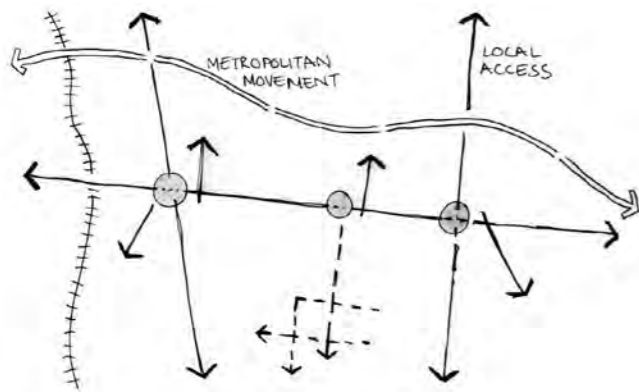


Figure 6.3.10 Hierarchy of Access (adapted from Dewar and Louw, 2003).

Rail

The rail system that services the study area is shown in figure 6.3.11. The Mitchells Plain/ Khayelitsha leg of the railway is not connected westerly to the Southern railway line, nor does the railway line offer efficient north-south linkages to the northern railway system in the Bellville area, resulting in significant detours when travelling to the economic node in Bellville.

The efficiency of the railway system is further undermined by the large distances between stations in the Mitchells Plain and Khayelitsha areas, where the distances between stations range between 2 to 2.5km, as opposed to the better serviced southern suburbs where the distances between stations do not exceed 1km. The combination of this with the extremely high densities in the metro south east means that the stations are extremely over-capacitated. The Nolongile rail station for example is one of the busiest in Cape Town and has an average of 14 566 boarding passengers per day, and in 2009 the demand for rail service in the Nolongile area was estimated to exceed capacity by an average of 67% (CoCT, 2009a).

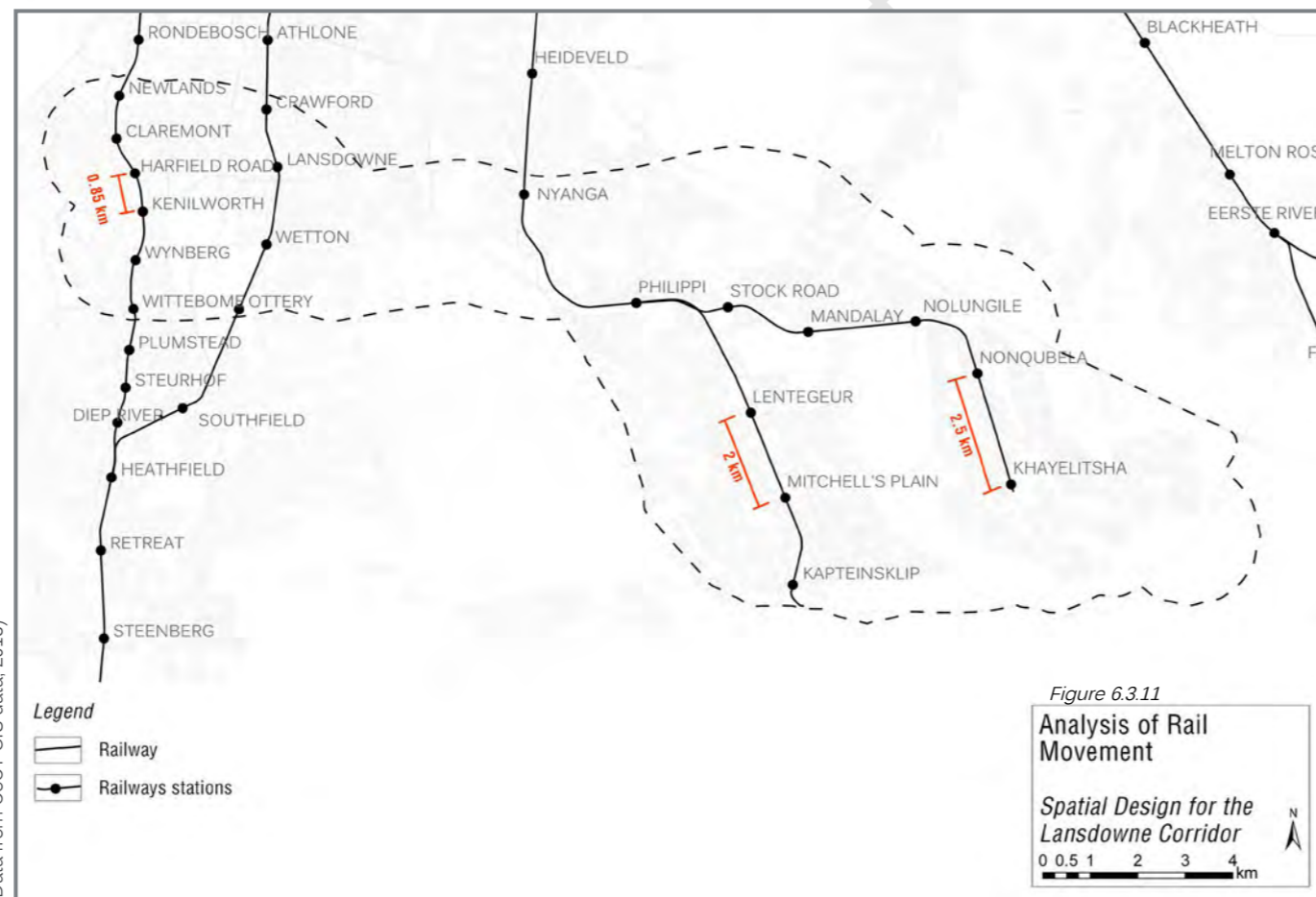


Figure 6.3.11 Analysis of Rail Movement Spatial Design for the Lansdowne Corridor

Box 1: Explanation of vehicular movement hierarchy

The vehicular movement structure within a city should cater for both mobility-based movement and accessibility based movement. Mobility-based movement is required to cross large distances efficiently and can also be classified as a limited access route, as less intersections along the route mean for a quicker journey in terms of vehicular transport. Accessibility-based movement systems prioritise the ease of access and choice of movement for pedestrians, and often consist of streets with a 'stop-start' nature.

Vehicular movement systems can therefore be classified hierarchically, in terms of the level of access they permit. Freeways and primary arterials are typically limited access routes, whereas more local streets with many intersections and interrupted movement flows are regarded as accessibility or activity routes.

An important aspect of such categorisations is the type of development that occurs along such routes. Limited access routes such as urban freeways do not permit direct access to abutting land uses. Rather, the high connectivity provided by direct freeway/expressway connections tends to attract manufacturing, warehousing, major retail and industrial land uses. Activity routes are characterised by strip and nodal urban development along sections of the route, and are generally supported by a mix of land uses and higher density urban development.



Example of Urban Freeway - M5 Cape Town

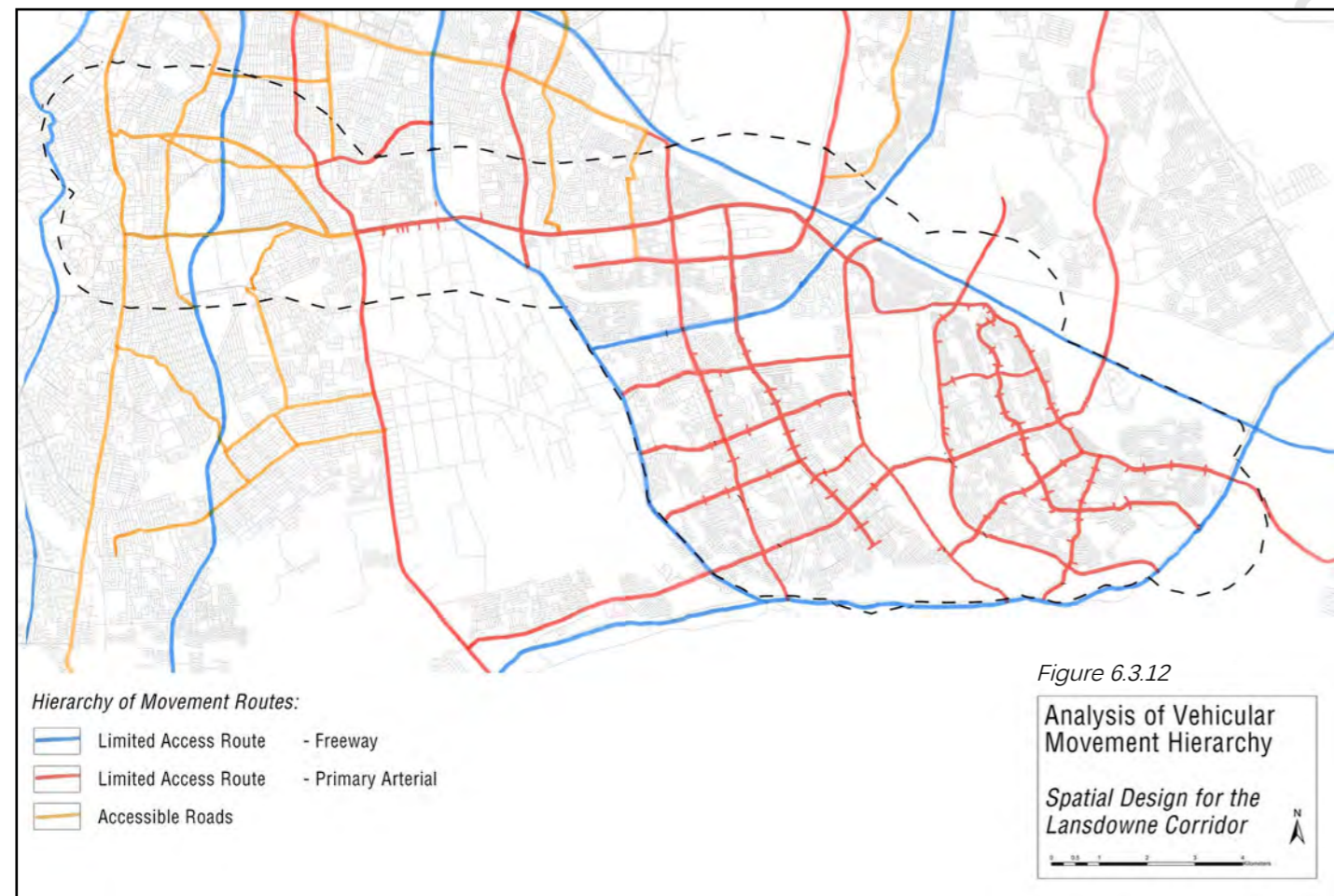


Example of Accessibility Route - Main Road Seapoint

Vehicular Movement

An analysis of the vehicular movement systems in the study area reveals a lack of movement hierarchy in the Mitchells Plain and Khayelitsha areas (shown in figure 6.3.12). These areas consist of movement that is exclusively mobility based, such as limited access roads and urban freeways.

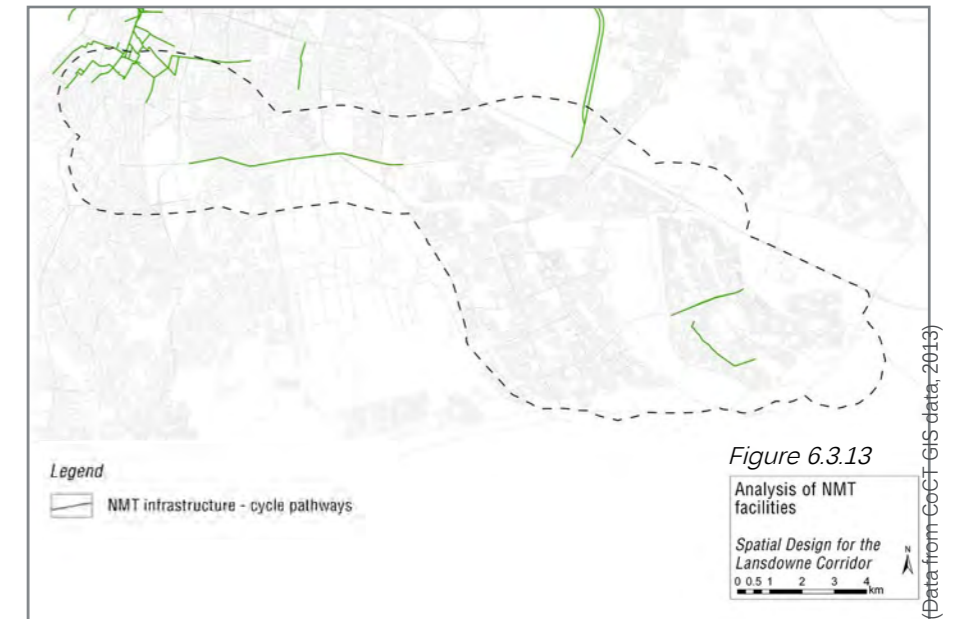
This means that land-uses associated with 'stop-start' movement, such as mixed uses and small scale businesses, are not present in these areas. Furthermore, due to the lack of intersections and stopping points on such roads mean that these limited access routes act as barriers, and serve to isolate the neighbourhoods that they enclose, and movement between neighbouring areas is difficult. The result then of a lack of any hierarchical movement system an urban environment whose street-scapes are completely devoid of any sense of place, and no legibility of the settlement as a whole is achieved.



Images of Eisleben Road and the R300 freeway, both in Mitchell's Plain are examples of the predominant limited access routes that characterise the suburbs in the metro southeast.

NMT movement

Pedestrian movement are a natural feature of most urban roads, however the poor conditions of roads in the metro southeast and the relatively high vehicular speed found on most roads do not contribute to a safe environment for non-motorised modes of transport. Furthermore, Public spaces that are linked or incorporated into NMT routes are often not sociable, are poorly maintained, suffer from the infiltration of crime and as a result, are seldom used (CoCT, 2009a). Although NMT is considered the lowest in terms of movement hierarchy, it is none the less an important link in the public transport trip, in terms of access to reach public transportation, and in Cape Town is often heavily utilised as currently the multi-modal connections between different modes of public transportation are not well integrated.



The formal NMT routes in the corridor are shown in figure 6.3.13. However, since 2010 the City has allocated a number of projects for the construction of roughly 400 km of walkways and cycle lanes. These include the Klipfontein Corridor NMT project that was initiated under the City-wide NMT programme

Movement Generators

It is estimated that in South African cities, schools account for over 50% of all vehicular movement (Behrens and Watson, 1996). The analysis of movement generators also display a system of hierarchy, as the higher order public facilities generate movement at the metropolitan scale. Lower order facilities however generate local movement and are usually accessed just by walking. Table 6.3.2 indicates the hierarchy of public facilities.

Figure 6.3.14 shows movement generators, in terms of the hierarchy of public facilities, where the clustering of public facilities is considered to be a substantial determinant of movement. The map shows that the southern portion of both Mitchells Plain and Khayelitsha lack both a hierarchy of movement generators and clustering of facilities. The implications of this is that there is a lack of specific and identifiable movement generators, and thus flows of people, that private investment or small scale enterprises can respond to.

Higher Order	Hospitals Tertiary Education Facilities Sports Stadiums
Middle Order	Secondary Schools Adult Learning Centres Clinics Sports Clubs Sports Fields Libraries Municipal Offices Post Offices Police Stations Fire Stations Information Centres
Middle/Lower Order	Primary Schools Playgrounds / Pocket parks Community Centres Religious Centres
Lower Order	Pre-Primary Schools
Mobile	Mobile Clinics Mobile Post Offices

Table 6.3.2 Hierarchy of public facilities (adapted from Behrens and Watson, 1996; CSIR, 2010)

6.3.3 Public facilities analysis

It is important when determining the demand for new facilities, that future growth is considered to ensure sustainability of the area. The study area has a population calculated at 1 133 000 people for the year 2011. Given the current growth rate of Cape Town at 2.57% (Stats SA, 2011), the area can be estimated to house 1 423 000 people by 2020.

The main concern when public services are evaluated, is the accessibility of the facilities. Accessibility is defined in terms in distances and travel time and also in terms of the capacity of the facilities themselves. Schools in the study area for example are located within acceptable walking distances for children, yet as all of the schools are over-capacity, it cannot be concluded that the area is adequately served by educational facilities.

Different facilities may have different criteria for evaluation. Some are purely on distance, others take population density into account in relation to the maximum capacity that a facility can cater for. As population density varies significantly, the

strains placed on public facilities varies according to their place in the corridor. Figure 6.3.15 shows that the highest population densities occur in the north-eastern portion of the study area, and thus would display the highest demand for public and social facilities.

certain areas would have to be developed to account for the projected population increases, as many parts of the study area are already at capacity at their present urban form. One suggested area would be the northern part of the Philippi Horticultural Area.

The analysis of public facilities looks at the demand and current distributions of facilities separately, to determine the inadequacies for each. They include: education, health, worship, exchange, recreation, social facilities and public services.

It must be noted that although norms and standards for the provision of facilities were taken into account, such standards were not always appropriate, as they mostly indicated minimum population thresholds for facilities, and no do stipulate the maximum capacities.

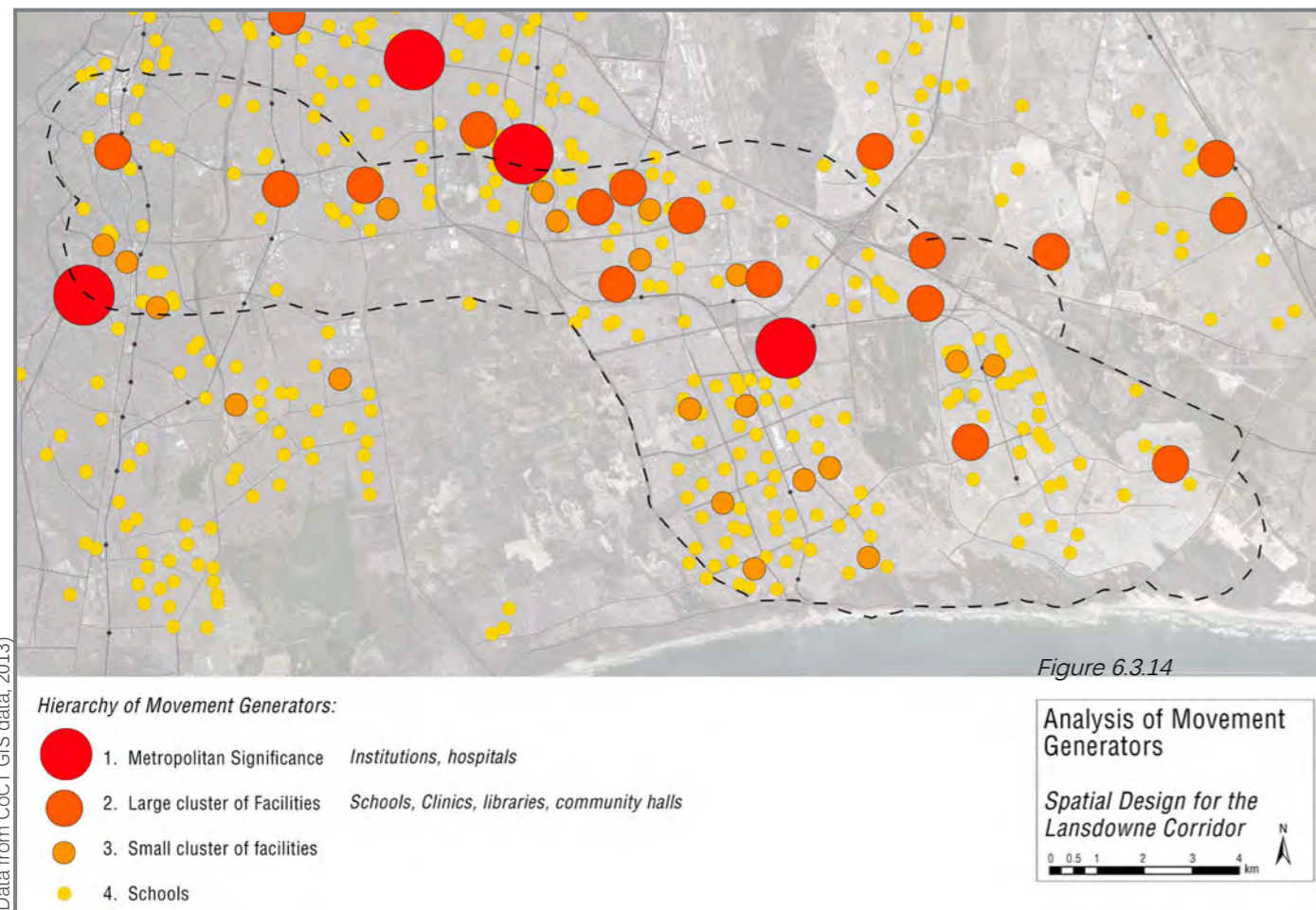
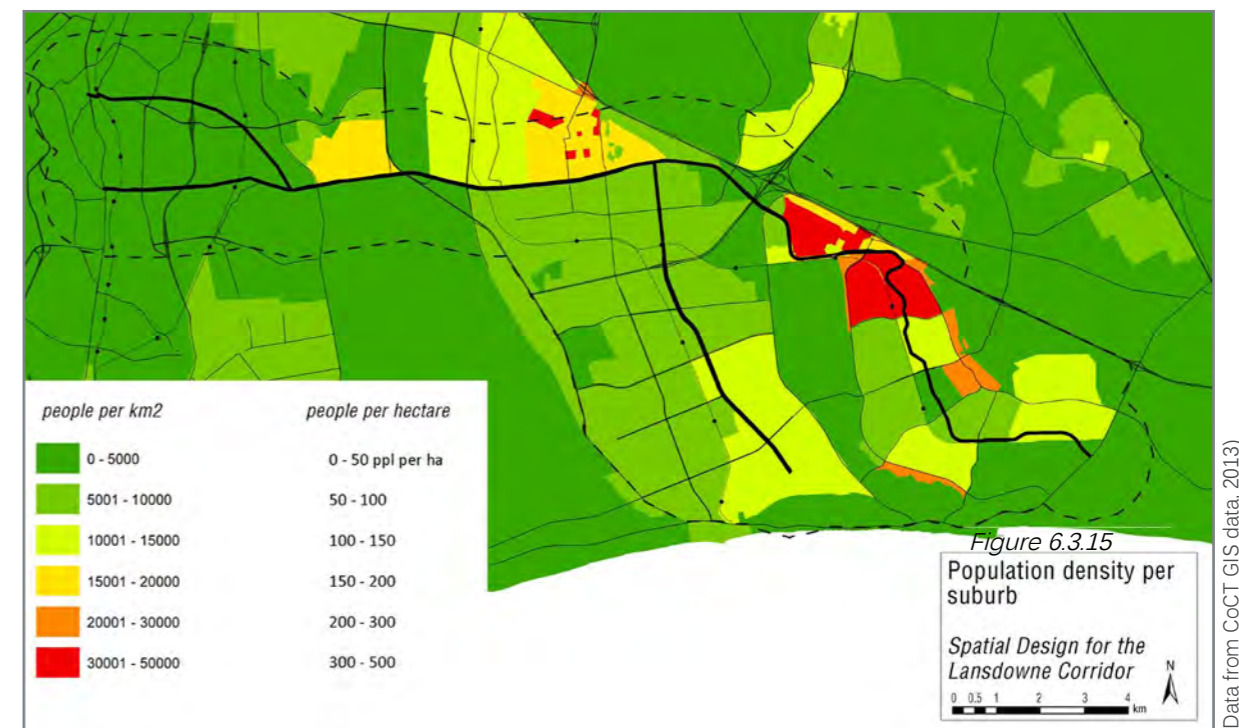


Figure 6.3.14



Health

The health standard of the corridor's population is extremely low, due both to the high prevalence of HIV and tuberculosis, and the sanitation problems associated with sub-standard living conditions. Furthermore, the growing aged population in Cape Town means increased demand for healthcare facilities (CoCT, 2006).

Table 6.3.3 explains the hierarchy of health facilities to address healthcare, along with their spatial requirements, and a calculation of the backlog of facilities that need to be addressed within the area given the current growth rate of Cape Town.

	Hierarchy	Distance	Compatibility	Location in Corridor	Est Min Pop	Size of Facility	Maximum Capacity	Current number	Demand 2011	Required 2011	Required 2020
Regional / District Hospital	higher			On major transport route with public transport stops	NA	NA	450 000 people	3	3	0	1
Community Hospital	middle	5 km			80 000 ppl	1.5 ha	80 000 people				
Day Hospital	middle	2 km		1-2 blocks from Activity St	10 000 ppl	0.5 ha	10 000 people				
Clinics	lower	1.5km used for this study area	Primary, Secondary and Tert school. Mobile Clinics, Playgrounds	Close to public transport stops, 1-2 blocks from Activity St	5000 ppl	0.2 ha	Between 5000 and 70000, but for this study area 30000 is considered average capacity	34	38	4	12
Mobile Clinics	mobile	1 km	local park, Comm centre, church		5000 ppl		5000 ppl				

Table 6.3.3 Hierarchy and spatial requirements of healthcare facilities (adapted from Behrens and Watson, 1996; and CSIR, 2010)

Hospitals

A public hospital, either district or regional, is a higher order healthcare facility which provides a more comprehensive range of services than a local clinic, including medical and surgical treatment for referrals from clinics. The population projections for the area would require one new hospital by 2020.

Clinics

Clinics are the first point of entry to access healthcare facilities, as patients are referred from clinics to higher order health facilities if necessary. It is thus extremely important that the study area is adequately served by clinics, and that they do not exceed a walking distance of 1.5 km.

The population threshold for Clinics ranges between 5 000 and 70000, with a typical threshold of 40000 people per clinic (WCG, 2010). As public clinics largely cater for the uninsured population, both the socio-economic class of an area and its disease profile will impact on usage rates and demand, and thus due to the high levels of poverty and high levels of diseases in the South-East, an average of 30000 people per clinic was chosen to assess the current demand for clinics in the study area.

The population projections reflect a current backlog of 4 clinics, which is expected to increase to 12 by 2020. The need for new clinic facilities could be addressed by investment in clinics, mobile

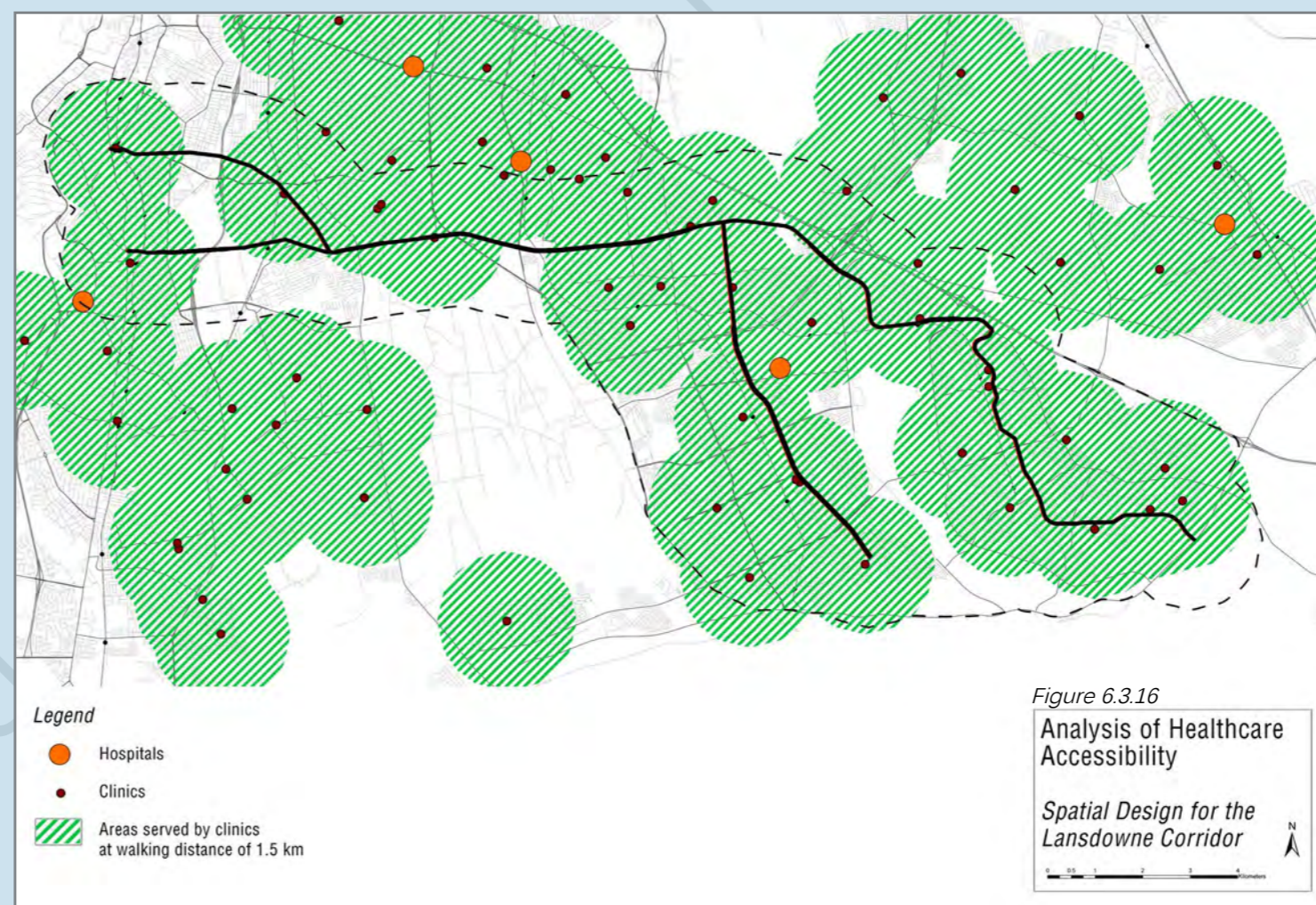


Figure 6.3.16
Analysis of Healthcare Accessibility
Spatial Design for the Lansdowne Corridor

(Data from CoCT GIS data, 2013)

facilities or with fewer strategic 'mega-clinics' which are able to serve a catchment area of 100 000 people (CSIR, 2000). However, when the spatial distribution of clinics is assessed (shown in figure 6.3.16)

there are areas within the corridor area that are not within 1.5km of clinics, and therefore cannot be considered to be adequately served by clinics.

Education

The most severe shortfalls of schools within the city of Cape Town occur in the South Eastern, Mitchells Plain/ Khayelitsha district. The shortfall in schooling is furthermore reflected in statistics on the area which show that the percent of primary school children unserved by local schools is 50.62% and the percent unserved for high school scholars is 39.61% (CSIR, 2010). The consequence of this is that around 20 000 scholars commute to the Southern Suburbs to attend school (DGRU, 2010:16), creating both a financial and time consuming cost, and furthermore entrenches economic polarisation. Thus the evaluation of educational facilities in the study area needs to take school capacity into account as well as accessibility based on walking distance.

Another spatial inefficiency associated with schools is the extensive allocation of vacant land to schools to be used as sports fields, due largely to unrealistic space standards. Such large areas are wasteful as they are often not maintained, and often exist in areas suffering from extreme residential overcrowding.

Tertiary Educational Facilities

The study area does not contain any tertiary educational facilities such as universities or technical colleges. The closest facilities are the University of Cape Town located west of the site and the University of the Western Cape to the north.

Type	Hierarchy	Distance	Compatibility	Location in Corridor	Est Min Pop	Size of Facility	Maximum Capacity	Requirements	Current number	Demand 2011	Required 2011	Required 2020
Tertiary Education	Higher			On major transport route with public transport stops	NA	NA						
Adult Learning Centre	Middle		Comm centre, Hall, school									
Secondary School	Middle	2.25 km	schools, adult learning centres, Libraries, community centres, sports fields	1-2 block from Activity route or on transport route with public transport stop	6000 - 10 000	Buildings: 2.6 ha Rec: 2 ha	1000 pupils	Secondary school learners are estimated at 8% of CT Population	66	91	25	47
Primary School	Lower	1.5 km	High School, Comm Hall, Playground, Park	Close to Public transport route, 1-2 blocks from Activity Route	3000 - 4000	Buildings: 1.4 ha Rec: 1 ha	800 pupils	Primary school learners are estimates at 14% of CT Population	148	198	50	101
Pre-Primary / Creche	Lower	0.75 km	Primary, Pre-Primary, Community Centres	walking distance from dwellings. On way to work. Shouldn't cross major streets.	5000 ppl		130 m2	Minimum threshold for Pre-primary schools is 5000 ppl (total population)	50.00	Not designed for as most are privately or informally provided, especially in this context		

Table 6.3.4 Hierarchy and spatial requirements of educational facilities (adapted from Behrens and Watson, 1996; and CSIR, 2010)

Secondary Schools

The age of secondary school learners is between 14 and 18 years old. However, the department of Education estimated that for the Western Cape there is a drop out rate of 35% for learners aged 16 to 18 years old (CSIR, 2006), which functions to lower the demand for secondary schooling. Thus secondary learners account for 8% of the city's population. It is this percentage, along with the maximum capacity of 1000 learners per secondary schools that was used to establish the demand for schools in the area. As table 6.3.4 shows, the current backlog in the area for secondary schools is 25, which is estimated to reach 47 by 2020.

All secondary school learners are able to reach secondary schools within a walking distance of 2.25 km, as seen in figure 6.3.17. However, when the capacities of the schools are taken into consideration there are many areas where learners are not adequately served by secondary schools, shown in figure 6.3.18. These unserved areas further correlate with the extremely high residential densities found in the study area.

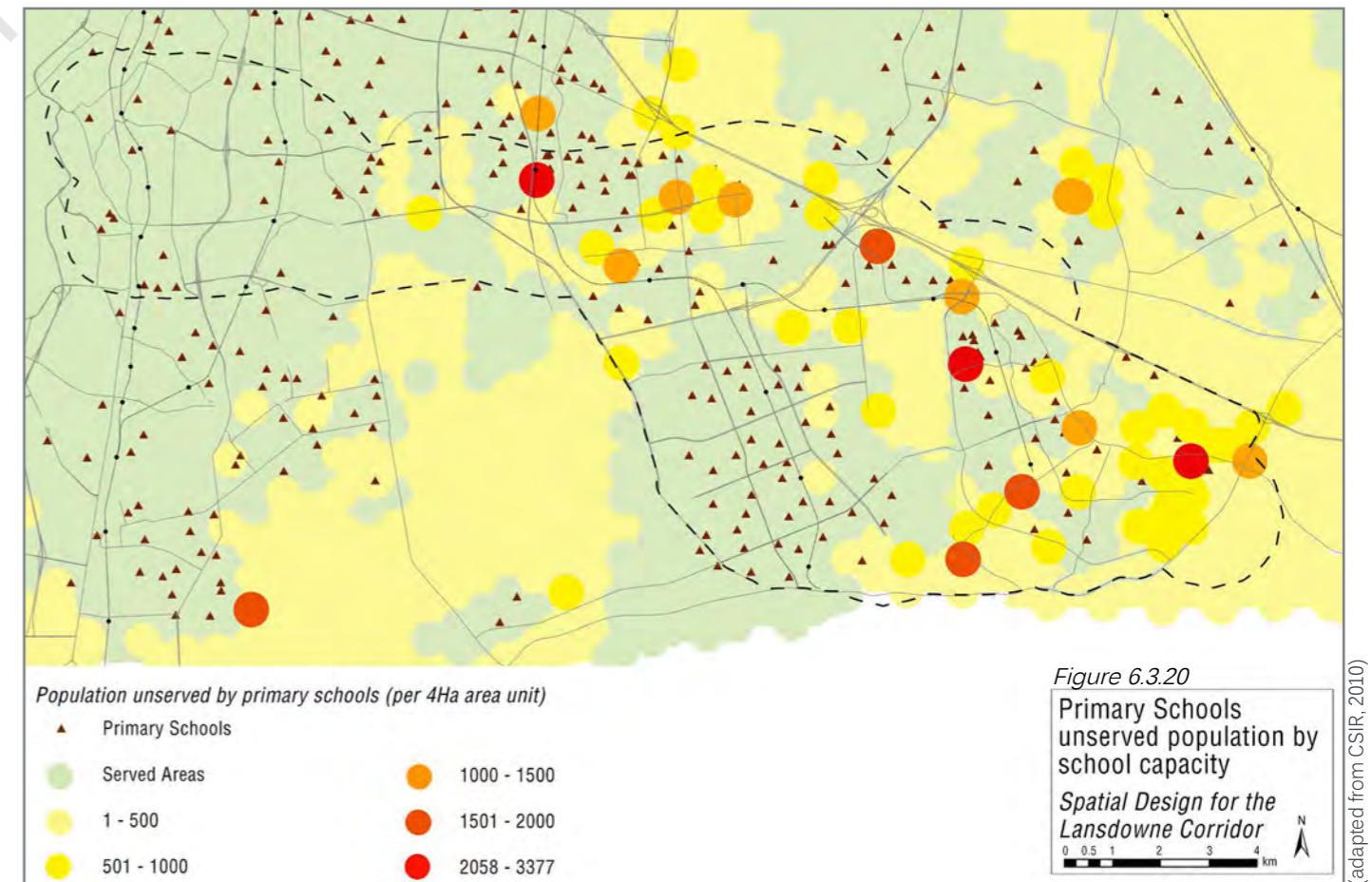
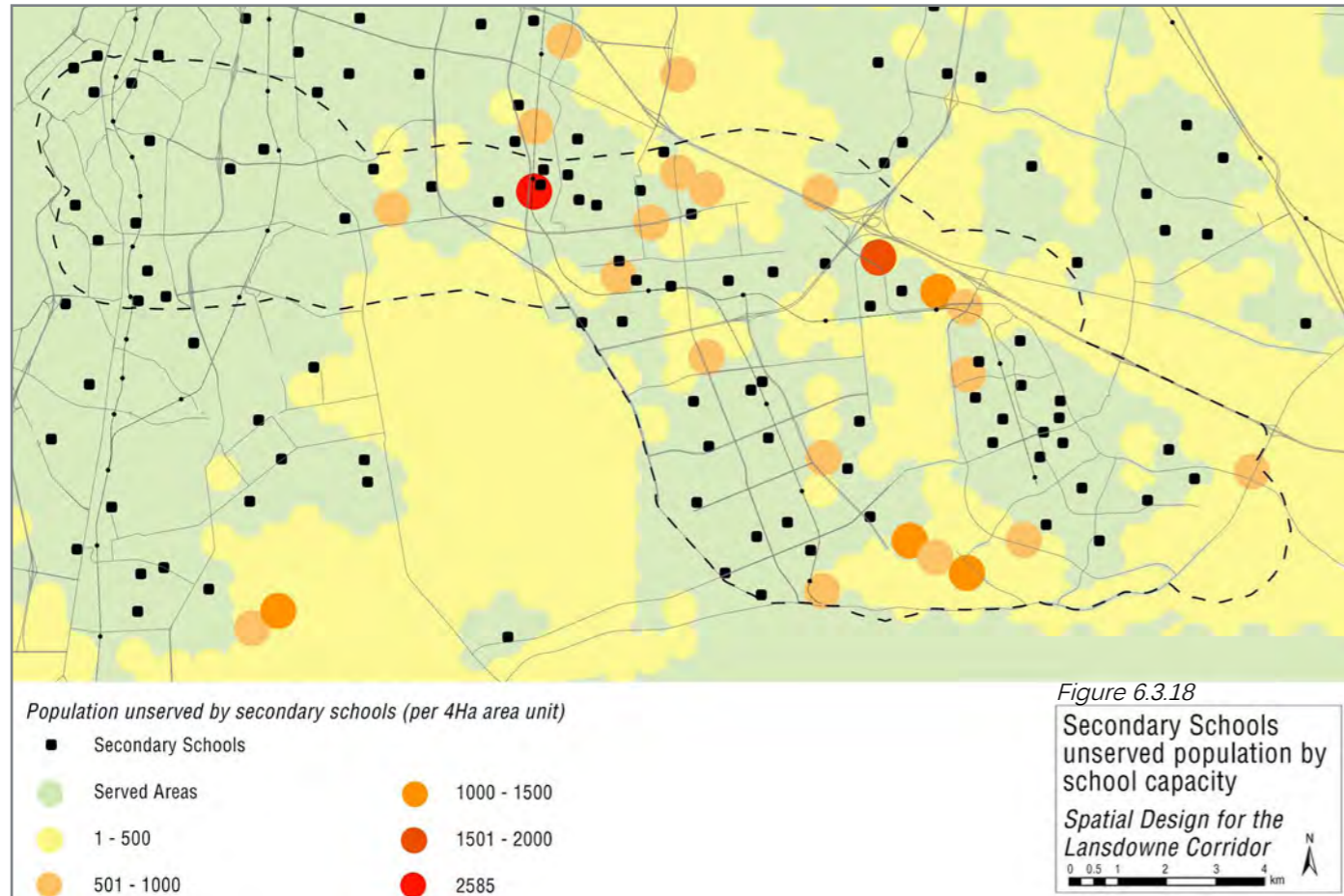
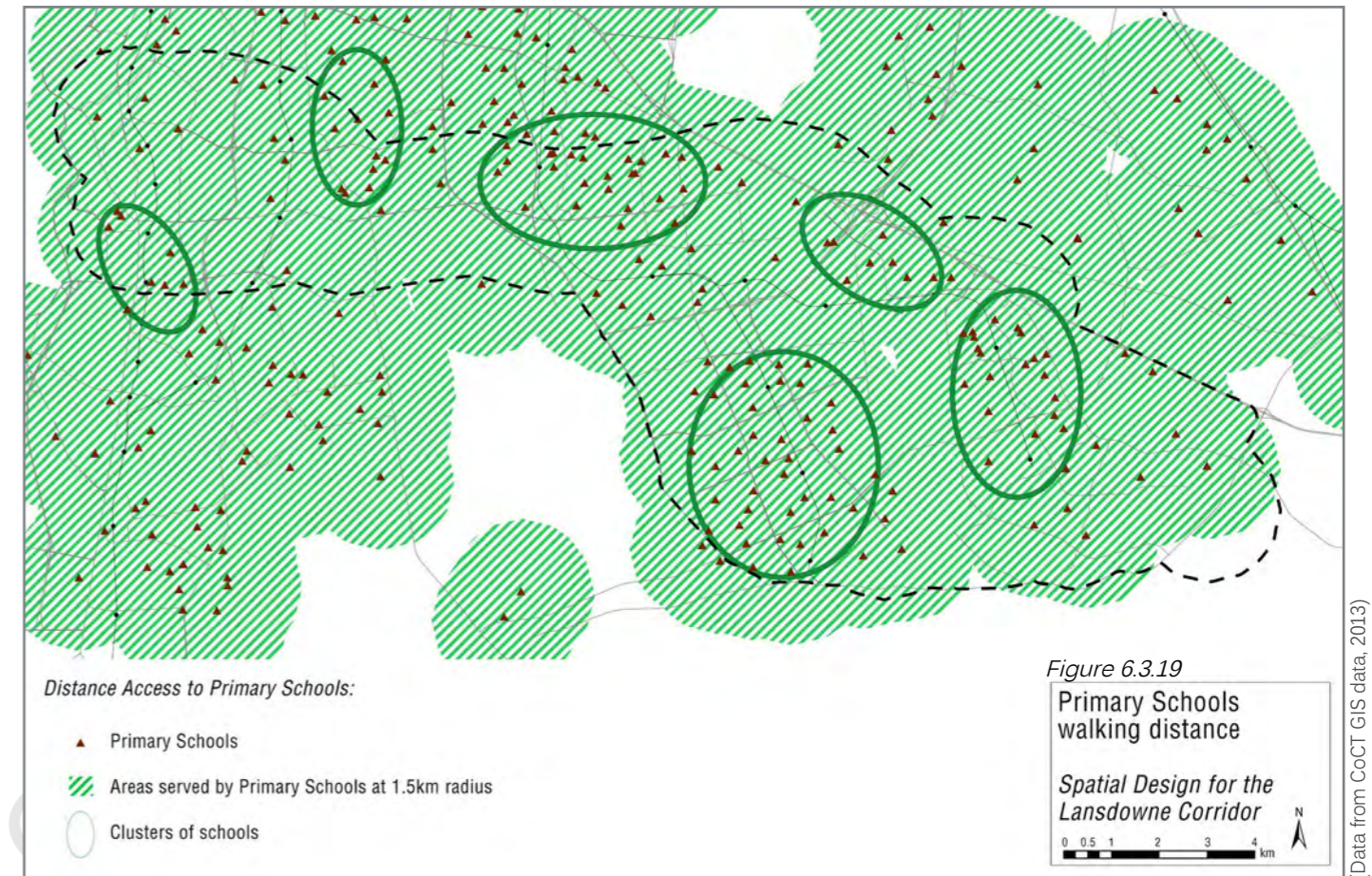
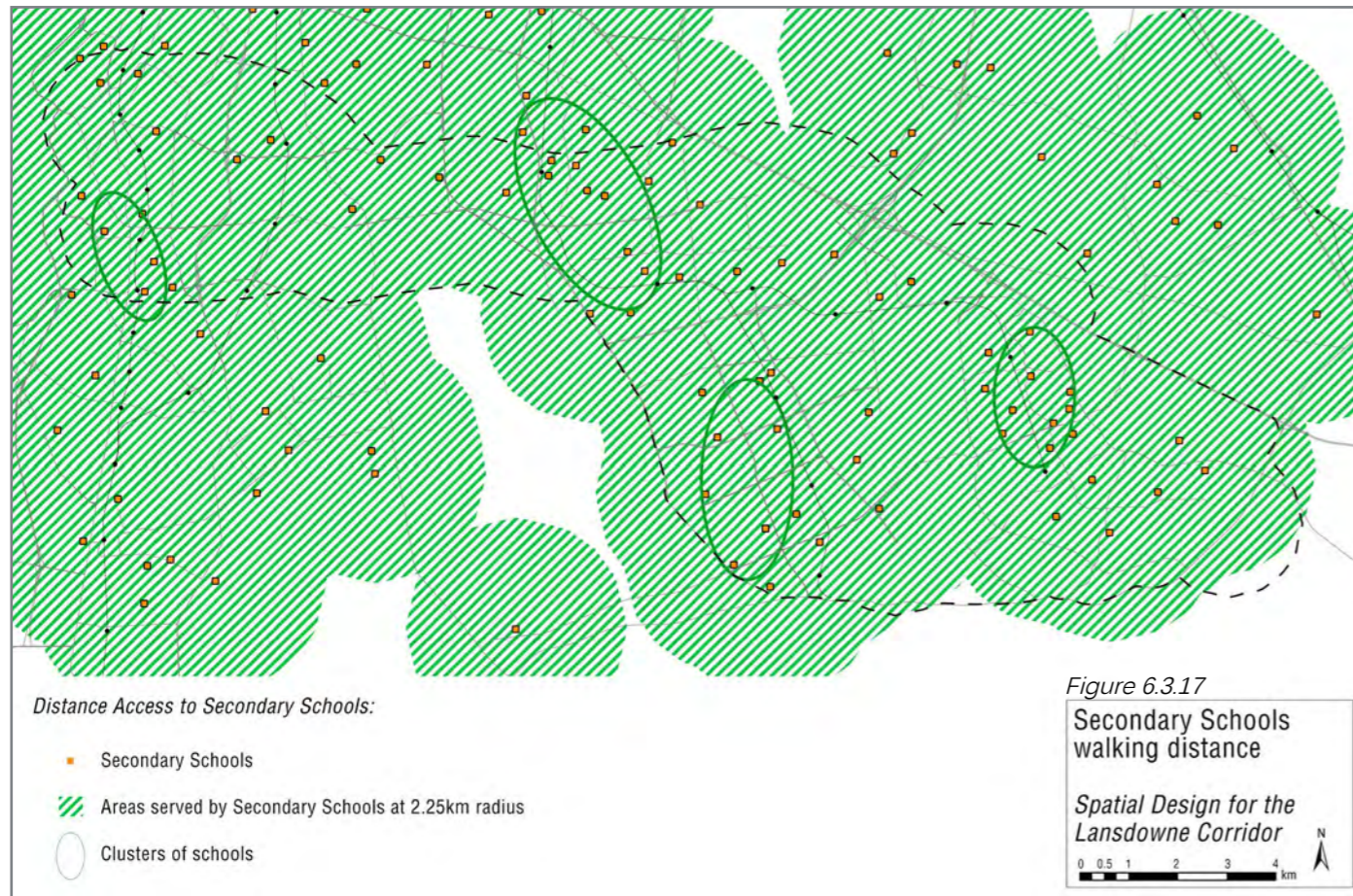
Primary Schools

The age of primary school learners is between 6 and 13 years old, and accounts for 14% of the cities total populations (CSIR, 2006). It is this percentage, along with the maximum capacity of 800 learners per primary school that was used to establish the demand for schools in the area. As table 6.3.4 shows, the current backlog in the area for secondary schools is 50, which is estimated to reach 101 schools by 2020.

All learners are able to reach secondary schools within a walking distance of 1.5 km, as seen in figure 6.3.19, however figure 6.3.20 indicates that there are many areas where learners are not adequately served due to limited capacities.

Pre-Primary Schools

The distribution of pre-primary schools has not been analysed, as many of these facilities are either privately or informally provided.



Exchange

Exchange and retail activities display a hierarchy that varies in terms of convenience. Wholesale activities are concerned with the sale of large quantities at reduced prices; retail outlets acquire products from wholesalers and distribute them directly to consumers. However, in developing countries, informal trade represents the highest form of convenience, as they are often located at highly convenient intersections, such as transport interchanges, and thrive off of very high passing foot traffic.

This requires that for informal trade to perform well it should be accessible to wholesale activities and markets for the traders to acquire goods, yet still be located in areas that are highly accessible to passing pedestrians.

The informal trading sector in Cape Town accounts for 12% of the city's economy and employs 18% of its economically active residents (CoCT, 2013a). A survey of the informal trading sector in Cape Town in 2002 reported that 42% of traders had chosen to work in the informal sector as a result of unemployment, indicating its ability to absorb the unemployed.

The high levels of informality in the study area are accompanied by high levels of informal trade. The problems associated with informal trade in Cape Town are largely to do with the preparation of food, especially raw meat. The informal slaughtering of animals and handling of raw meat poses a health risk to those who consume it.

The areas of concern are the lack of inspection of slaughtered carcasses to ensure that they are free of diseases and parasites. Furthermore, the lack of clean surfaces and the nature of informal trade means that contaminated meat can contaminate other meat when it is on display for sale (CoCT, 2013b). Furthermore, improper slaughtering of animals that occurs on the street edge results in the waste often entering the storm-water system and may contaminate rivers and those who live downstream.

Other factors that constrain the profitability of informal trade is the accessibility of traders to wholesale outlets and wholesale markets. The relationship between informal trade and fresh produce is explained in box 2.

Box 2: The role of wholesale markets: The distribution of fresh produce

The provision of fresh produce markets allows for equal trade opportunities for large scale, commercialised producers and smallholder farmers producing small quantities of produce (Chikazunga et al, 2008). However, smallholder farmers often find it difficult to supply these markets because of lack of quality and sustainable volumes. There is thus a need for cooperatives to assist farmers in terms of enabling effective participation of smallholders in the fresh produce market systems.

Figure 6.3.21 shows the supply-chain of fresh produce, from farmers to informal traders. Informal traders generally prefer to obtain produce from fresh produce markets rather than farms as the markets are generally located closer to the locations where they sell. This infers a much greater convenience factor and

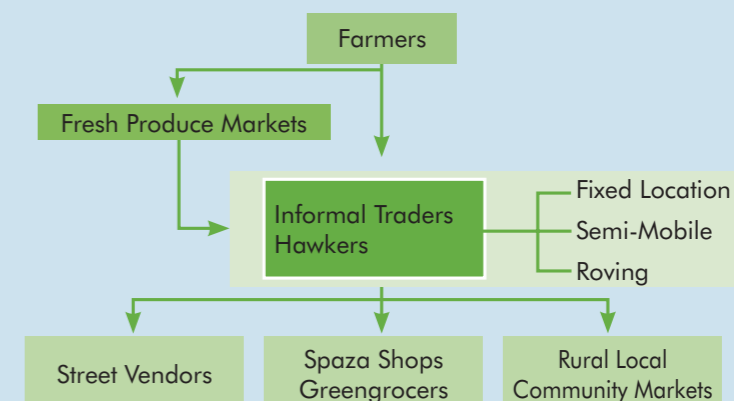
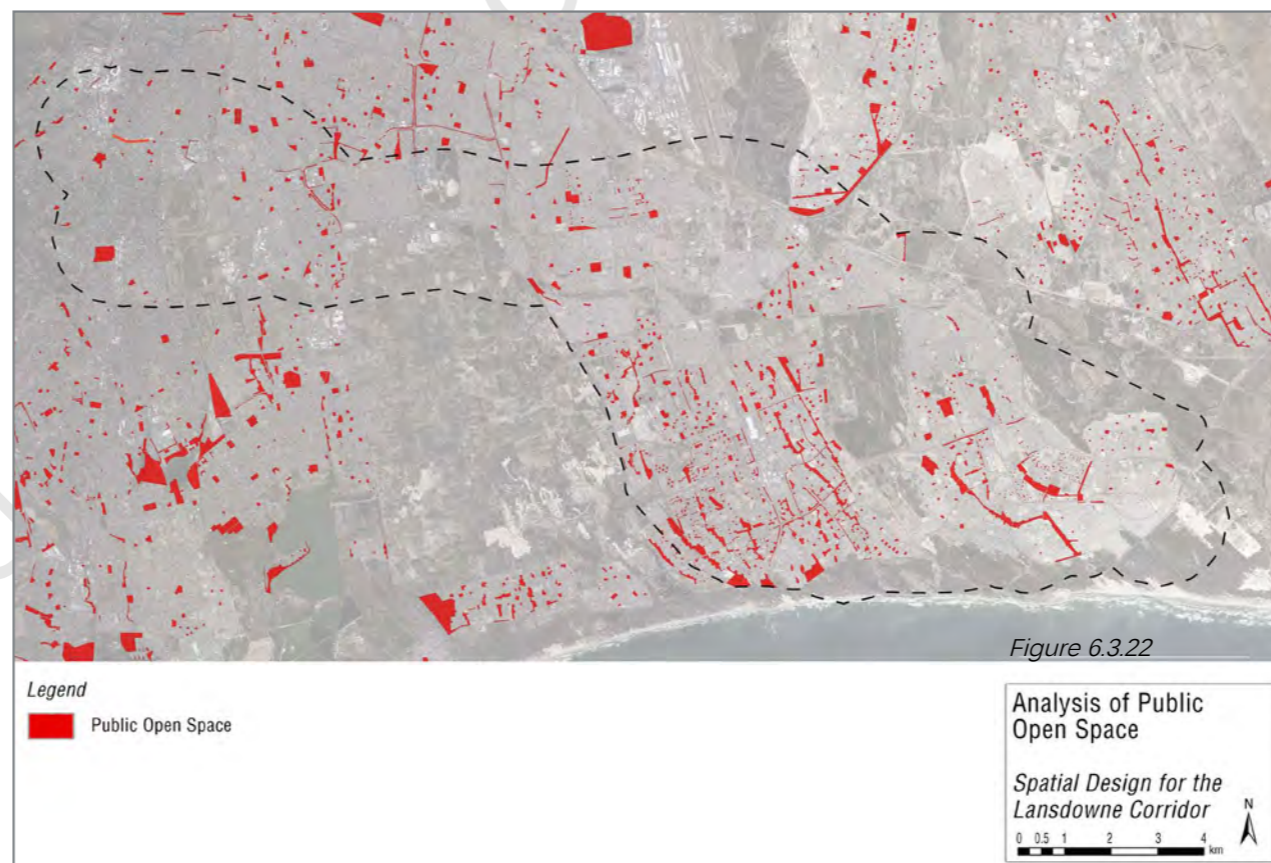


Figure 6.3.21 Supply relationship of fresh produce in terms of informal trade (Chikazunga et al, 2008)

increased profits due to the lowering of transportation costs (ibid). Furthermore, smaller satellite markets bring the produce closer to the smaller businesses and informal traders thereby reducing transport costs to them.



Public Open Space

Figure 6.3.22 shows the distribution of hard public open space within the study area, showing the largely inadequate provision. Given the especially high population densities within the study area and the small living quarters they inhabit, the provision of public open space is an important space for social gatherings and activities to occur. Furthermore, the quality of the open space is universally poor within the Cape Flats area, and thus does not contribute to the social needs of those in the area.

Passive Recreation

District Parks

District parks are defined as landscaped open spaces with recreational facilities which serve the needs of several surrounding local communities or suburbs (CSIR, 2006). District parks are generally multifunctional and can include sports facilities, playing areas and natural landscape features. For every 0.2ha of a district park, 1 000 people are served (CSIR, 2006).

To ascertain demand for district parks, an average of a 10 hectares for 50 000 people was used. Figure 6.3.23 shows the areas which do not have adequate access to district parks, in terms of both capacity of existing parks and a maximum travel time of 30 minutes to access such parks via public transport. The largest deficit occurs in the eastern portion of the study area, not including the suburbs within Mitchells Plain.

There currently exist 6 district parks within the study area, although the standard of 10 hectares per 50 000 people would require 22 district parks, indicating a current deficit of 16 parks which could be projected to increase to 22 in 2020 (shown in table 6.3.5). However, given the severe shortage of open space within the study area, the creation of fewer yet larger parks would be most appropriate.

Furthermore, the importance of district parks increases in very dense areas, as such large spaces provide relief from such congested areas, and can add to the character of placeless areas by providing a natural landmark.

Community Parks

Community parks are defined as landscaped open spaces with recreational facilities which serves the needs of the immediate local community or neighbourhood. They can include passive and active recreation areas, small-scale informal sports facilities, kick-about areas and playgrounds.

Community parks can form an important part of an open space network and can be connected by NMT routes. The role of community parks increases in higher density neighbourhoods, where smaller living quarters means an increased demand for open spaces of relief.

Type	Hierarchy	Distance	Compatibility	Location in Corridor	Est Min Pop	Size of facility	Requirements	current number	Required Demand 2011	Required 2011	Required 2020
District Parks	higher		clustering includes public pools, sports stadia and fields	Located along or near to a major transport route. Accessible by foot, bicycle and public transport.	0.2 Ha for 1000 ppl. Ave of 10 Ha for district park for 50 000 ppl	10 Ha Ave	10 Ha per 50 000 people	6	22	6 to 16	12 to 22
Community Parks	middle	1000m		Linked with parkways / Green corridors or POS, Play areas at entrance to parks but not at busy roads			Requirements according to distance				
Pocket Parks	lower	300 - 700m		Schools, higher density residential, breaks from offices							

Table 6.3.5 Hierarchy and spatial requirements of passive recreational facilities (adapted from Behrens and Watson, 1996; CSIR, 2010)

Accessibility to community parks is measured in distances, and should not exceed 1km walking distance (Behrens and Watson, 1996). Figure 6.3.24 shows the location of community parks and the areas they serve based on this standard. The map shows a deficit in the Khayelitsha area for community parks.

Pocket Parks

Pocket parks can be defined as a local social recreational lot that is grassed and often has recreational equipment for children and benches (WCG, undated). The design, layout and landscaping of pocket parks is critical to ensure maximum surveillance from adjacent properties and public rights of way, and should ideally be located adjacent to a medium to high density development that fronts onto the park such that it can become a safe play and relaxation space for all people.

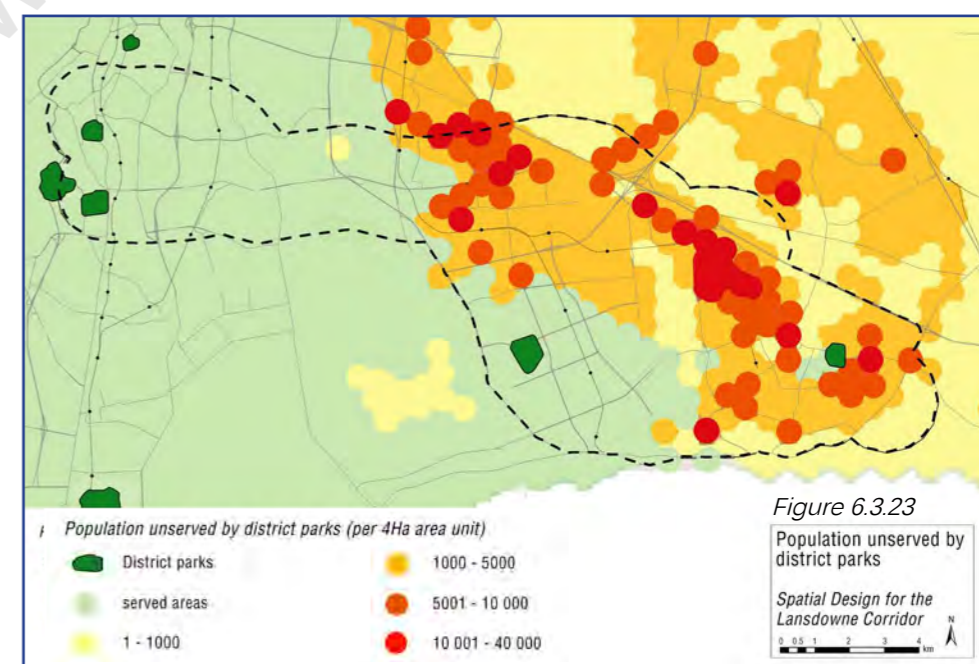


Figure 6.3.23

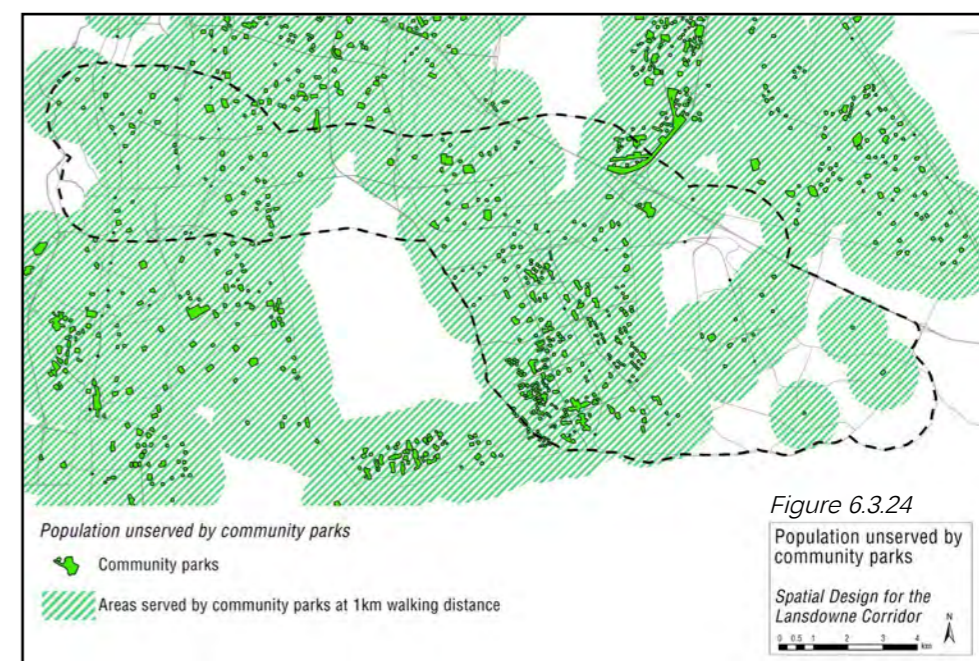


Figure 6.3.24

Active Recreation

Sports Stadiums

A stadium is a venue which is designed to accommodate outdoor sports, concerts and similar events consisting of a large field that is either partly or entirely surrounded by a structure that provides spectators with an area to sit and view the event (WCG, undated).

Figure 6.3.25 shows that most of the eastern portion of the study area does not have adequate access to a sport stadium, if a travel time of 15 minutes and a catchment area of 300 000 people per stadium is used (CSIR, 2006). The analysis requires 1 new sports stadium to service the population by 2020, shown in table 6.3.6.

Type	Hierarchy	Distance	Compatibility	Location in Corridor	Est Min Pop	Size of facility	Requirements	current number	Demand 2011	Required 2011	Required 2020
Sports Stadiums	higher			On major transport route with public transport stops	1 per 300 000 people		1 per 300 000	3 in proximity	3 to 4	0	1
Sports Fields	middle	300m from schools, 500m-1.5km from other facilities	Community centres, sports clubs, schools	Schools, Sports clubs, Competitive sportsfields located close to public transport services	Neighbourhood 3000, community 15000, district 60 000, metro 120 000	0.56 ha req for 1000 people				200 ha or 2 km2 for 373 000 unserved pop (incl school fields)	
Swimming Pools	middle				1 per 60 000		1 per 60 000	10 in proximity	18	8	12
Indoor Sports Clubs	middle		Community centres, sports clubs, schools		1 per 300 000 people		1 per 300 000	6	3 to 4	0.00	0.00

Table 6.3.6 Hierarchy and spatial requirements of active recreational facilities (adapted from Behrens and Watson, 1996; CSIR, 2010)

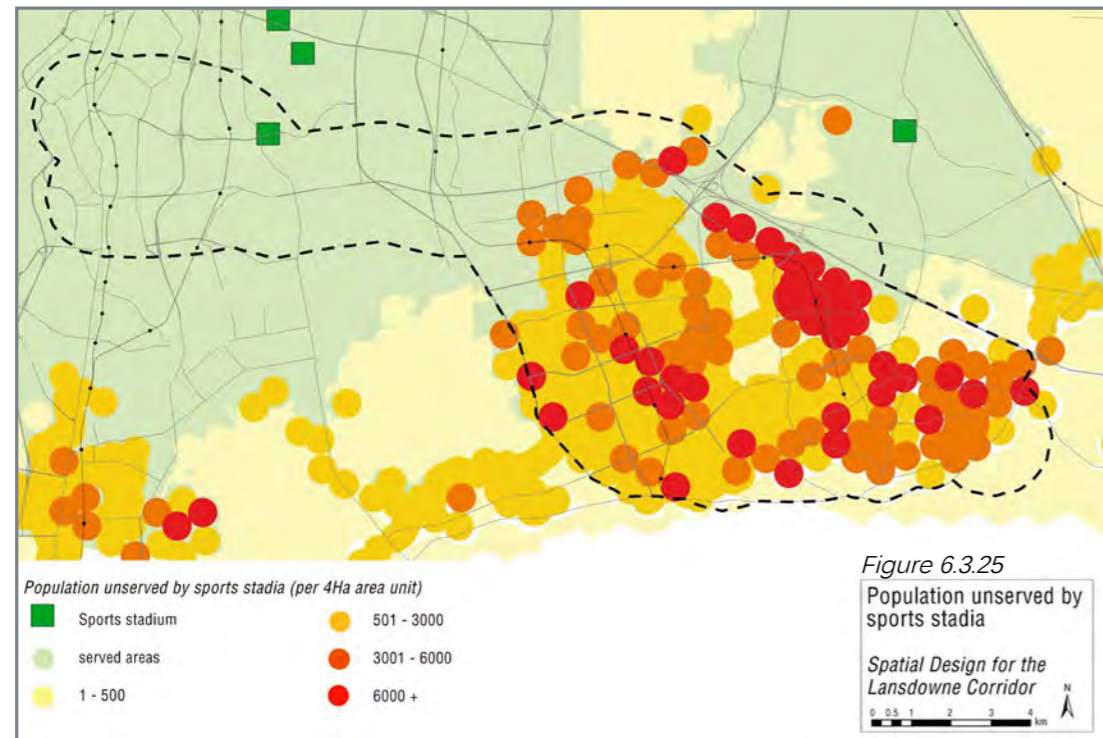


Figure 6.3.25

Population unserved by sports stadia

Spatial Design for the Lansdowne Corridor

(adapted from CSIR, 2010)

Sports fields

Sports fields can be defined as a formal or informal sporting recreation area which is open to the use of the surrounding community for the playing of sports. It is often used for both school recreation and sports and after-hours recreational programmes. The competitiveness of the sports played will determine its location in terms of accessibility.

The analysis of sports fields considers school fields in terms of calculating the current provision of sports fields in the area. Figure 6.3.26 shows that the middle section of the corridor area and the suburbs of Khayelitsha are the worst served by sports fields.

To address the projected demand for the population in 2020, 200 hectares of sports fields are required (including school fields), using the current standard of 0.56 hectares per 1000 people. Given the severe lack of space in the corridor area, addressing this backlog would be difficult.

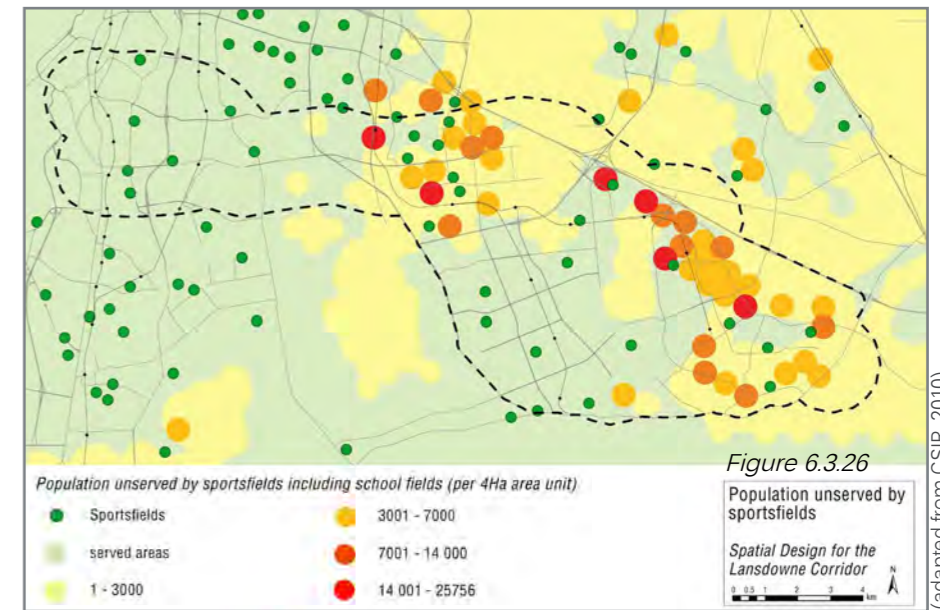


Figure 6.3.26

Population unserved by sportsfields

Spatial Design for the Lansdowne Corridor

(adapted from CSIR, 2010)

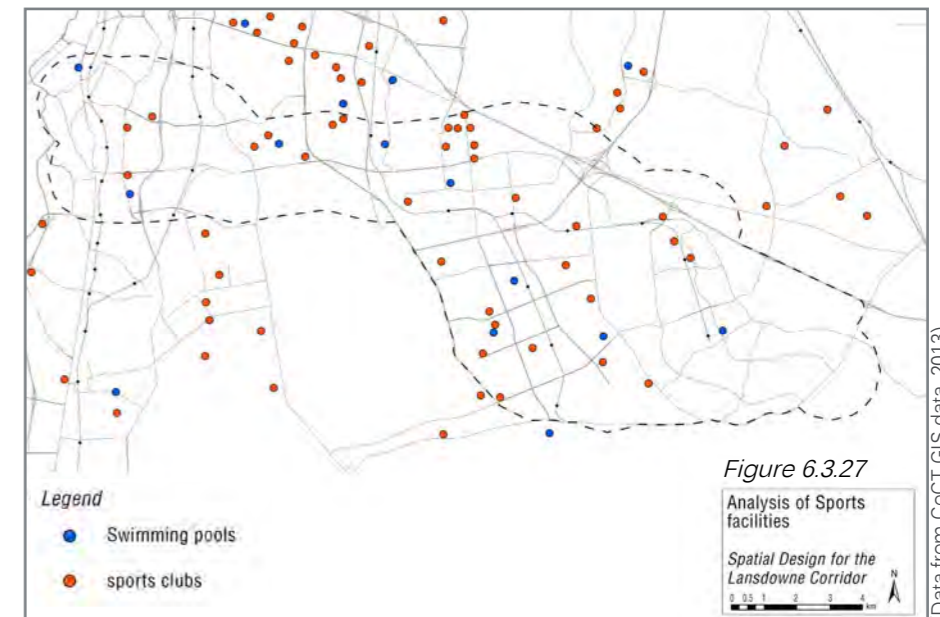


Figure 6.3.27

Analysis of Sports facilities

Spatial Design for the Lansdowne Corridor

(Data from CoCT GIS data, 2013)

Social facilities

Social facilities include community facilities from community halls to civic centres, libraries and places of worship. The hierarchy of the facilities and their spatial requirements are listed in the table below:

Type	Hierarchy	Distance	Compatibility	Location in Corridor	Population Threshold	Size of Facility	Requirements	current number	Demand 2011	Required 2011	Required 2020
Civic Centre	higher			Highly accessible	200 000 ppl		One per 200 000 people	4	5	1	3
Community Centre	higher	1.5-2.25km, or 5 min from Pub T stop	Parks, Libraries, Playgrounds, Schools, clinics	Preferably on main thoroughfare with public transport stops, on Activity Route	10000 ppl for Community Halls, up to 60 000 for higher order Community centres	5000 m2	One serves between 10 000 and 60 000 people, so use average of 40 000	31	28	0	4
Library	middle	1.5-2.25km, or 5 min from Public Transport stop	Schools, Comm Halls	Preferably on main thoroughfare with public transport stops, on Activity Route	5000 - 50 000	130 m2	Serve between 17 500 (local Library) to 100 000 (regional) ppl	9 Regional 13 Local (serves 1127 500 ppl)	0	0	3 regional
Worship	Lower	1.5km	Playgrounds, Comm centres, Halls	Within Walking dist from dwellings	2000 ppl	150 m2					

Table 6.3.7 Hierarchy and spatial requirements of social facilities (adapted from Behrens and Watson, 1996; CSIR, 2010)

Civic Centres

Civic centres represent the highest order of community centres and often contain other services such as municipal offices. The threshold standards require one civic centre per 200 000 people (CSIR, 2006), which indicates a current backlog of 1 civic centre in the study area, which is projected to increase to 3 by 2020. Figure 6.3.28 shows the areas that are unserved by civic centres, according to capacity and a maximum of 15 minutes travel time by public transport, indicating that the eastern portion of the study area suffers from the poorest access to a civic centre.

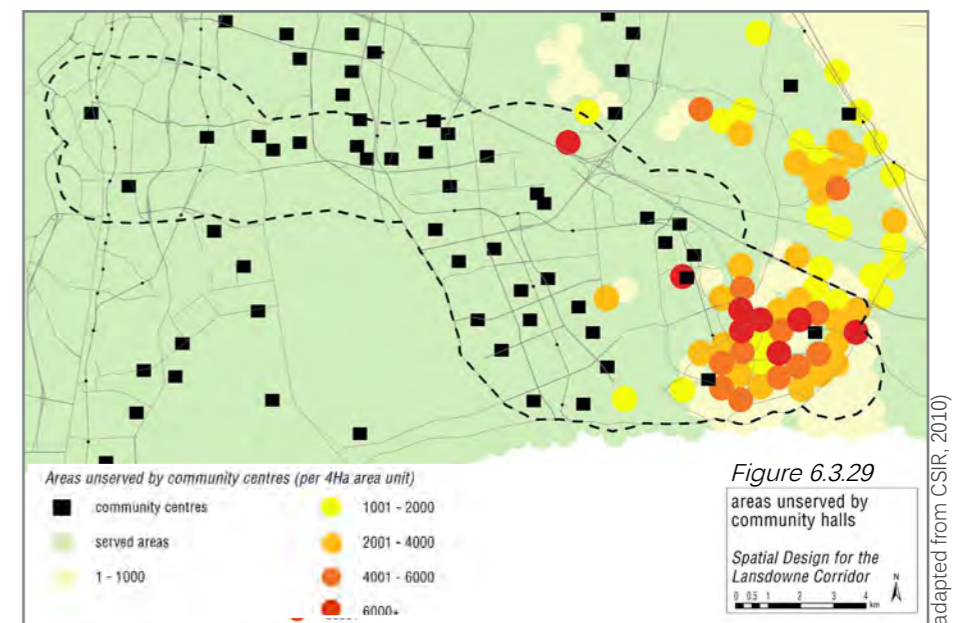
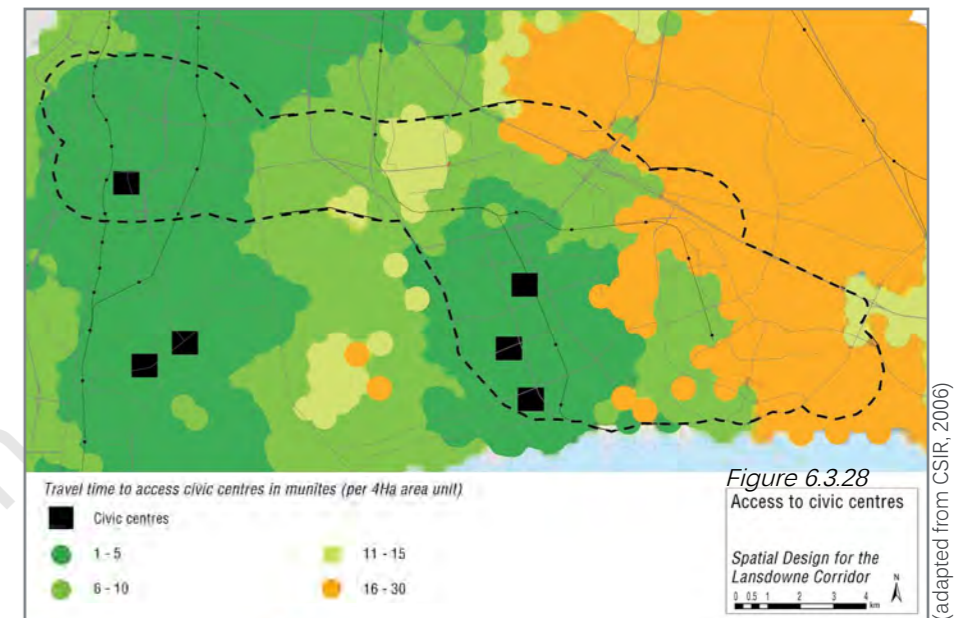
Community Centres

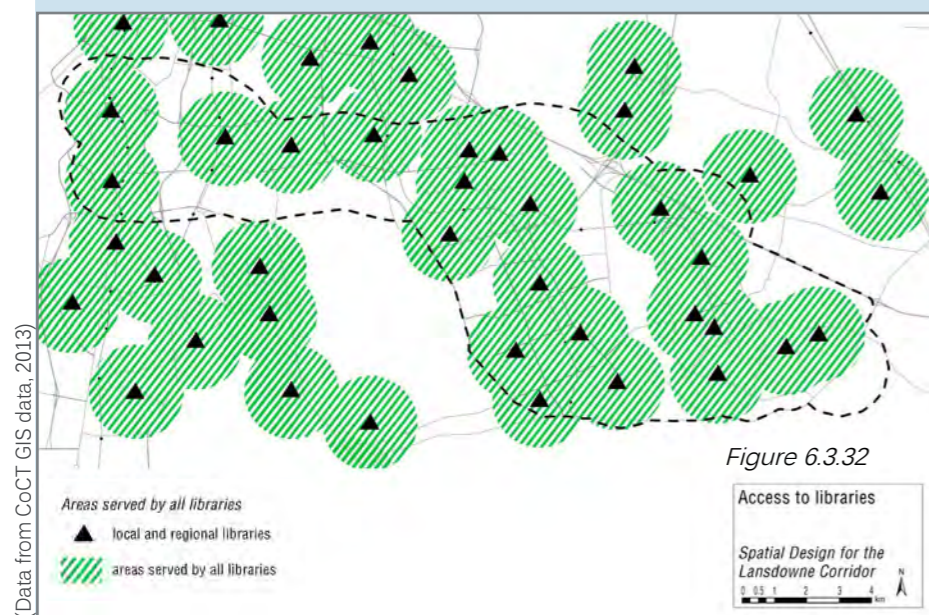
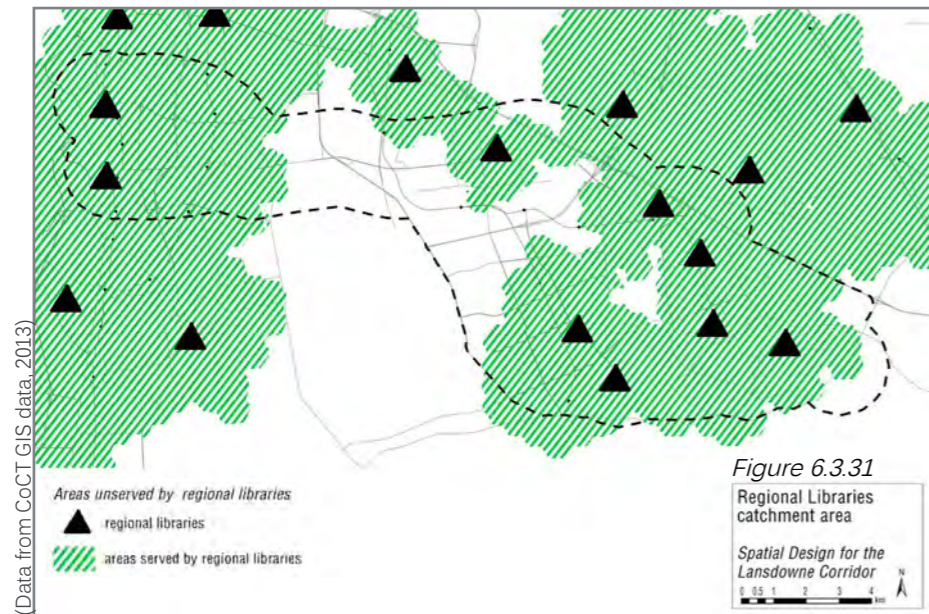
A community hall or centre can be described as a facility that is designed to be used for meetings or gatherings or group activities that relate to the needs and functions of the community immediately surrounding it. A community hall should ideally be the most centrally located facility in a neighbourhood and be clustered with supporting facilities as shown in table 6.3.7.

Community Centres in Cape Town have a range of service capacities ranging from providing for 10 000 residents (Grade E centres) to 60 000 residents (Grade A centres), at an average threshold capacity of 21 500 people per community centre. When calculating the demand for community centres at the average of 21 500 people per facility there is currently no deficit. However when proximity is taken into account it can be seen that the southern portion of Khayelitsha does not have adequate access to community centres (figure 6.3.29).

Places of Worship

The analysis shows the distribution of places of worship. The analysis shows a lack in such facilities in the north-eastern portion of the study area, although such facilities may be provided informally.





Libraries

Regional Libraries

Regional libraries are the highest order and serve a number of communities. Regional libraries serve up to 100 000 people, and there are currently 9 that are located in the study area.

There is currently no deficit in regional libraries in terms of the total demand for the study area. However the distribution of regional libraries shows that some areas are inadequately served due to their already reached capacities (shown in figure 6.3.31), most notably the central portion of the study area.

Local libraries

Local libraries have a service capacity derived from their floor space, ranging from 17 500 to 100 000 people (CSIR, 2010). It should be noted that regional and local libraries are not mutually exclusive. Some libraries operate as both local and regional facilities, and thus both were analysed in terms of their accessibility at a maximum walking distance of 1.5km. The analysis shows a general demand for more libraries within the study area (shown in figure 6.3.32).

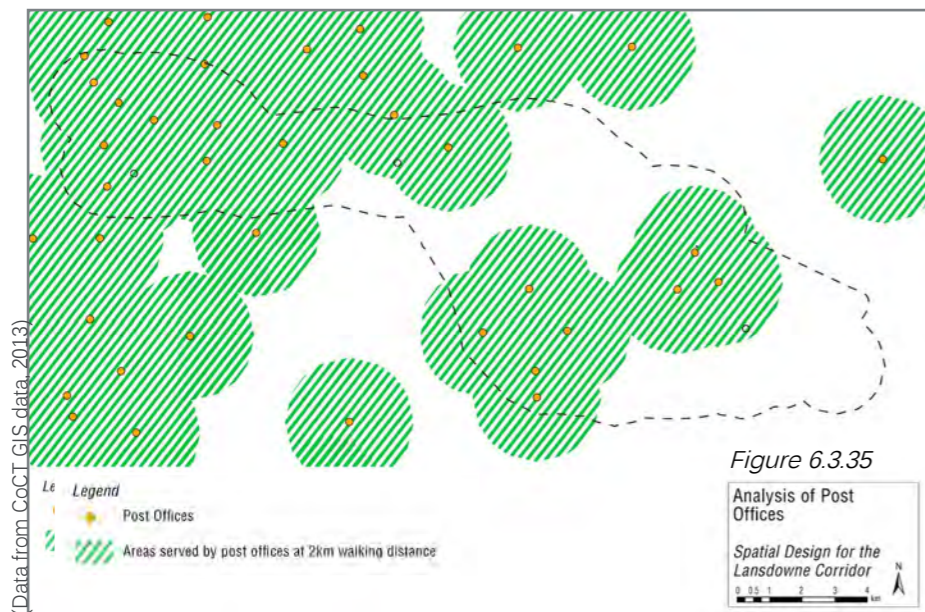
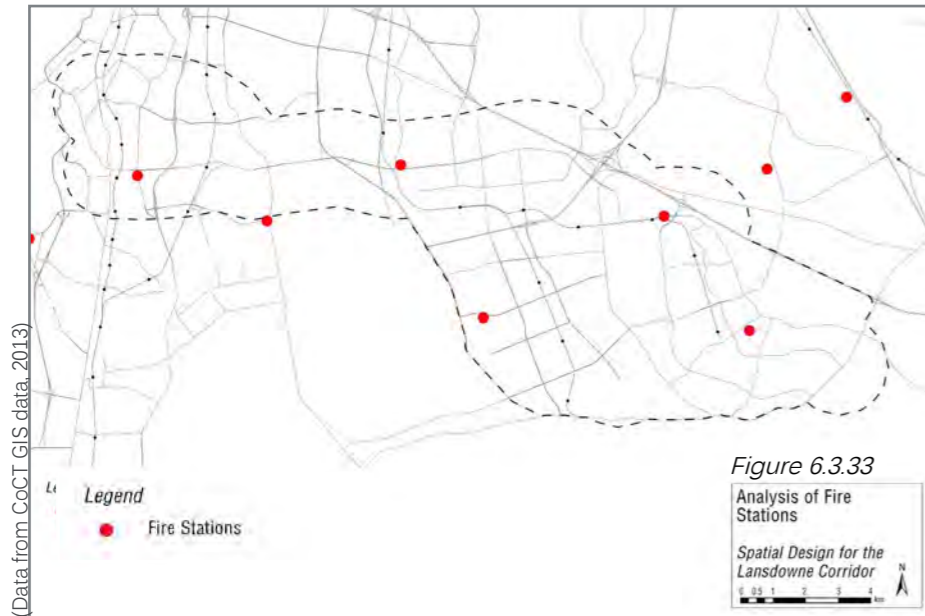
Public service facilities

Figures 6.3.33 to 6.3.35 show the distribution of fire stations, police stations and post-offices respectively. It can be seen that most public facilities are not adequately accessible by the public in terms of walking distance. Furthermore, the high levels of crime due to gang violence, and the predominance of petroleum fires due the many dwellings without electricity, demands a higher number of fire and police stations in the area.

Table 6.3.8 shows the spatial requirements for public services in the study area.

Table 6.3.8 Hierarchy and spatial requirements of public facilities (adapted from Behrens and Watson, 1996; CSIR, 2010)

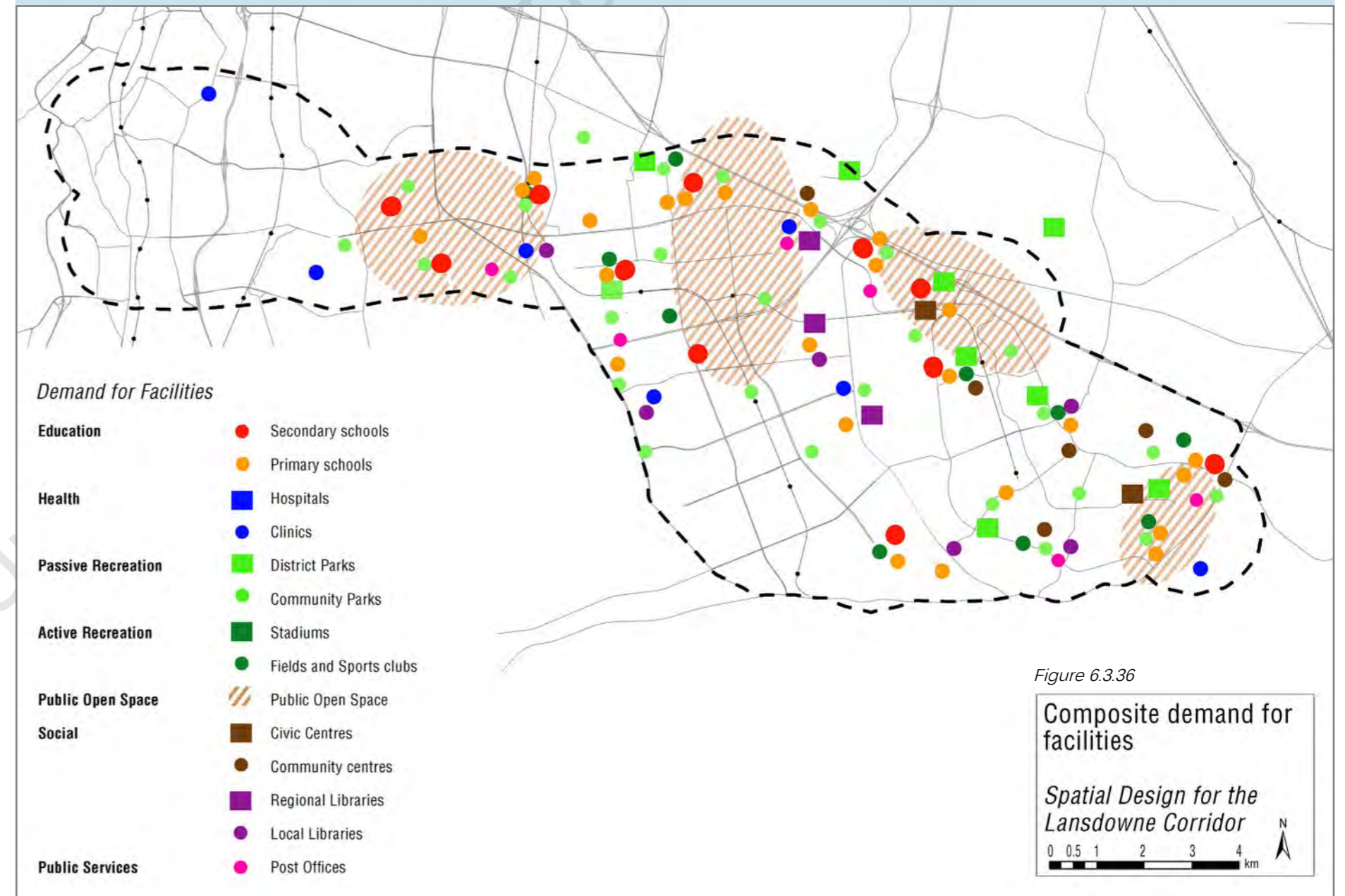
Type	Hierarchy	Distance	Compatibility	Location in Corridor	Population Threshold	Size of Facility	current number	Required 2011	Required 2020
Police Stations	Higher	1.5 km		Located on main thoroughfare	25 000 ppl minimum population per facility	0.1-1 ha	10		N/A as threshold only accounts for minimum population in order to justify facilities
Fire Stations	Higher			Intersection of higher order multifunctional routes and primary distributors	60000 ppl	1.2 ha	6		N/A as threshold only accounts for minimum population in order to justify facilities
Business Service Centres	Lower								
Community Info	Middle	1 km		On busy intersections on Activity Route	22 000 ppl	100 m2			
Post Office	Middle	2 km		Along Activity routes and accessible to Public Transport stops	11 000 ppl	500 m2	18		N/A as threshold only accounts for minimum population in order to justify facilities
Municipal Offices /pay points	Middle			High Exposure and Easily Accessible by Public Transport	50 000 ppl	3000 m2			



Composite Informants for facilities

The analysis of facilities shows a severe lack in almost all public facilities, the demand for which is shown in figure 6.36 below. The analysis has shown that lack of access to public and social facilities is not constrained by walking distance, but most often is due to capacity constraints.

The composite demand map shows that the highest demand for facilities generally corresponds with the highest levels of population density in the area, which consists mainly of the eastern and north-eastern parts of the study area.



Chapter 7 Corridor Concept

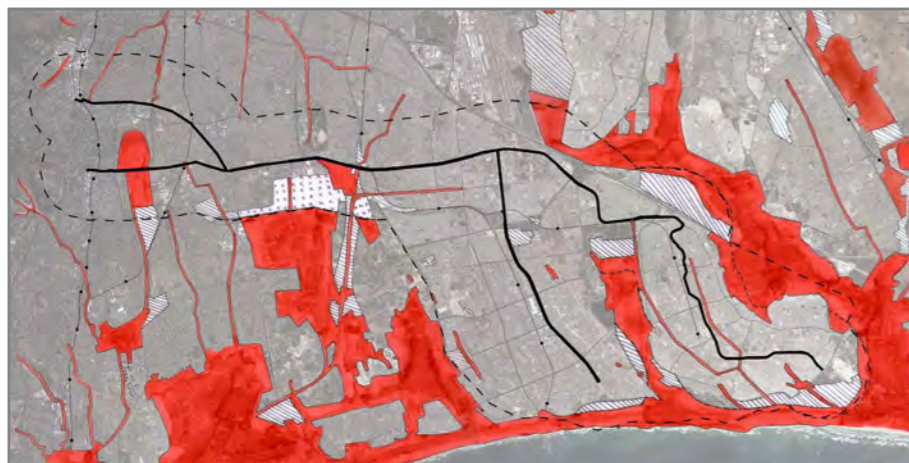


Figure 7.1 Biophysical constraints



Figure 7.2 Movement constraints

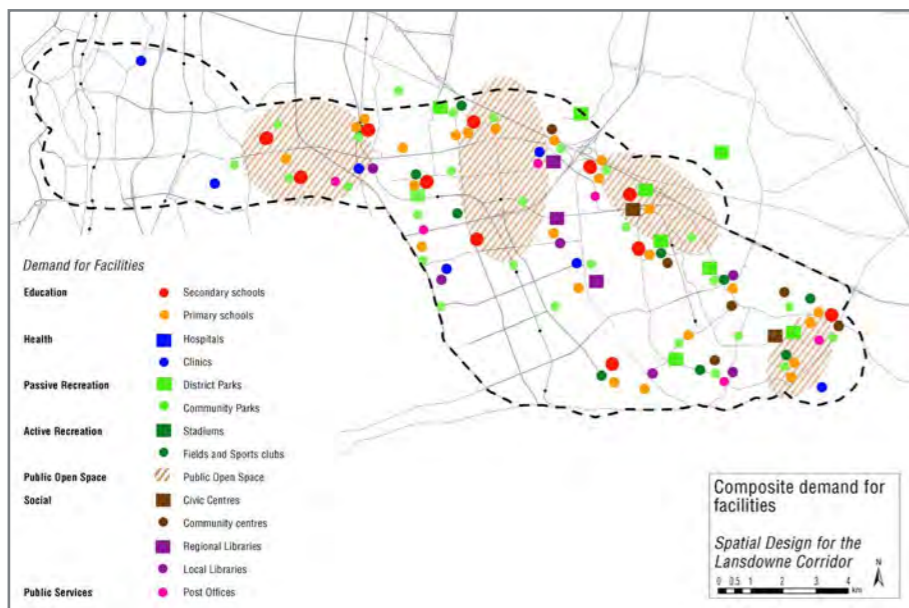


Figure 7.3 Demand for facilities

The constraints and opportunities maps (figures 7.1 to 7.3) illustrate a number of realities that will serve to inform how to intensify urban development in the study area.

These are combined in the concept map below (figure 7.5). The concept proposes the establishment of a hierarchy of systems with the intention of creating an intensity of movement within the corridor. This is important as the movement generated will support the conditions for a large variety of urban activities to occur.

The following sections will explain how the design of the different elements within the corridor will help to achieve these conditions.

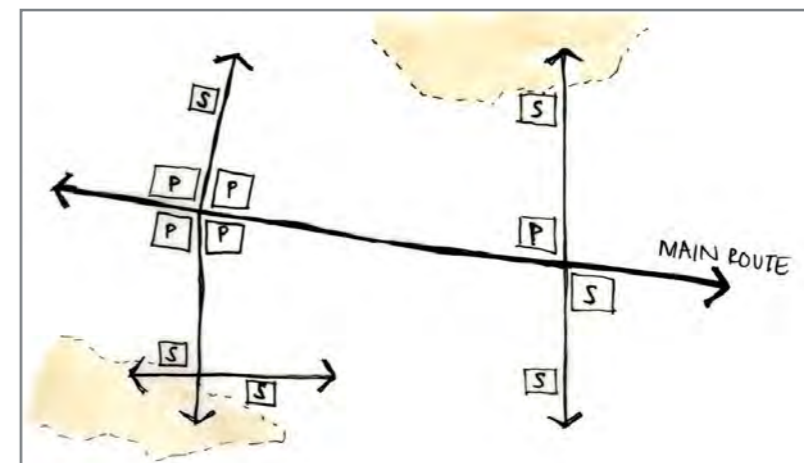


Figure 7.4 Diagram showing relationship between primary and secondary movement generators (Dewar et al, 2004)

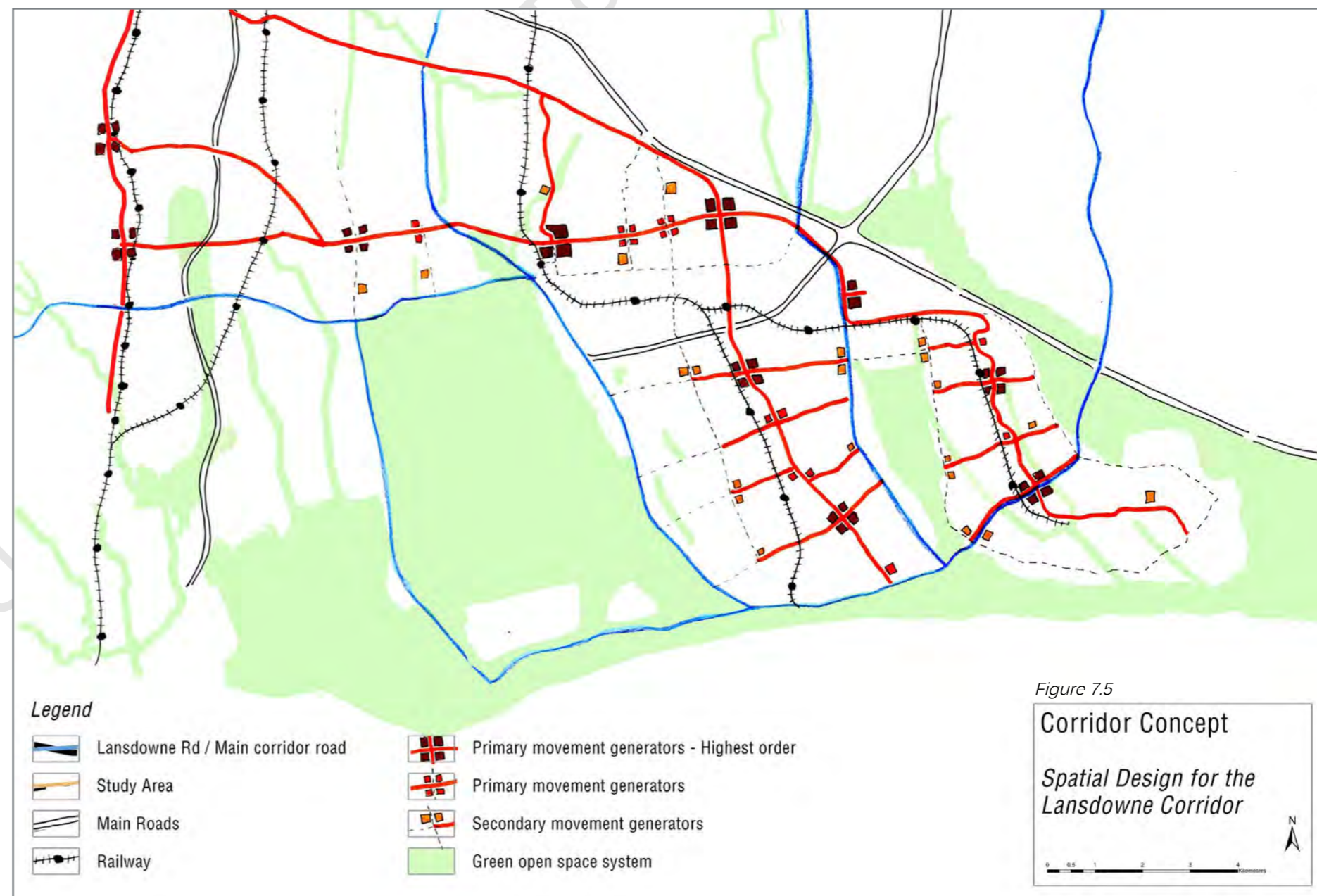


Figure 7.5

Corridor Concept
*Spatial Design for the
Lansdowne Corridor*

The concept unpacked:

1. Conservation of green space as structuring element
2. Hierarchy of movement systems
3. An approach to settlement design
4. Public open space and informal trade
5. Desired urban intensity
6. Indications of land-use
7. Height policy
8. Plan for the corridor and identification of precinct

7.1 Conservation of open space as structuring element

The concept for the study area begins with the designation of green open spaces as the structuring system for the intensification of development. The biophysical constraints map seen in section 5.3.1 designates where development is restricted.

As the biophysical analysis revealed excess water and flooding to be one of the largest constraints in the area, the design of a canal system to drain water away from the urban areas incorporated with areas of significant biodiversity, which together suggest a structure for an open space system. The designation of man-made green areas, such as passive and active recreation facilities thus corresponds to the open space system, as seen in figure 7.1.1. This concept addresses the backlog for recreational facilities and requires that all facilities are accessible within the current standards, such as community parks located within 1km walking distance.

The open space system is also required to be well integrated into the public transportation system of the corridor area, to make the change between different modes of transport efficient and pleasant. The open space system is then built upon to locate public facilities, as they all have different demands in terms of open space requirements.

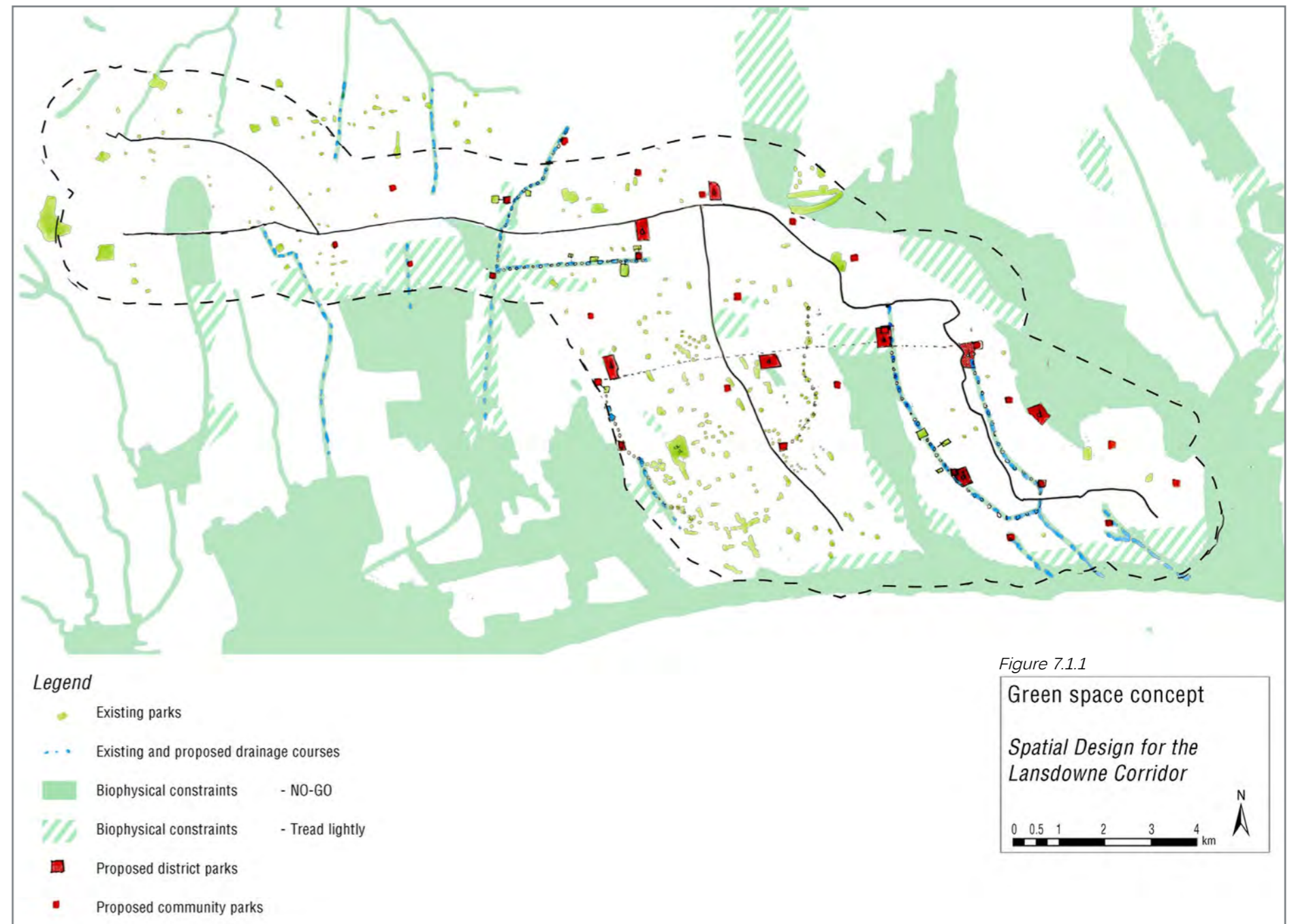
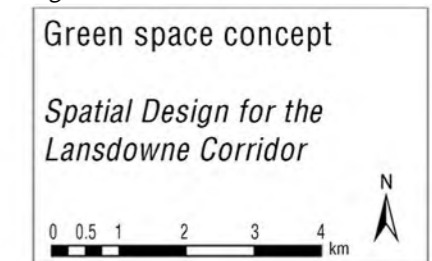
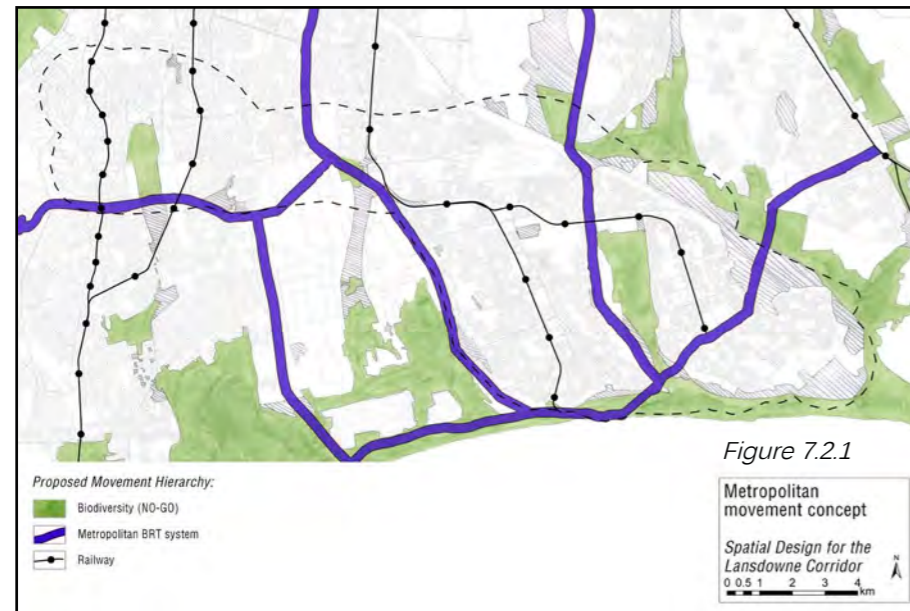


Figure 7.1.1



7.2 Hierarchy of Movement systems

The movement concept for the study area defines a hierarchy of movement within the corridor area, with the intention of contributing to greater spatial integration between the currently isolated areas, where interaction and the sharing of facilities can be easily attained due to greater permeability of the system.



Adapted from the metropolitan movement concept arrived at in Chapter 5.2, the BRT system intends to promote north-south linkages between the study area and the economic activity in the north, act as a barrier to green spaces to ensure the protection of designated valuable areas, and to increase the efficiency of the rail system by joining the segmented sections of the railway (figure 7.2.1). This would require strategic road extensions and construction of a new railway station in Philippi east.

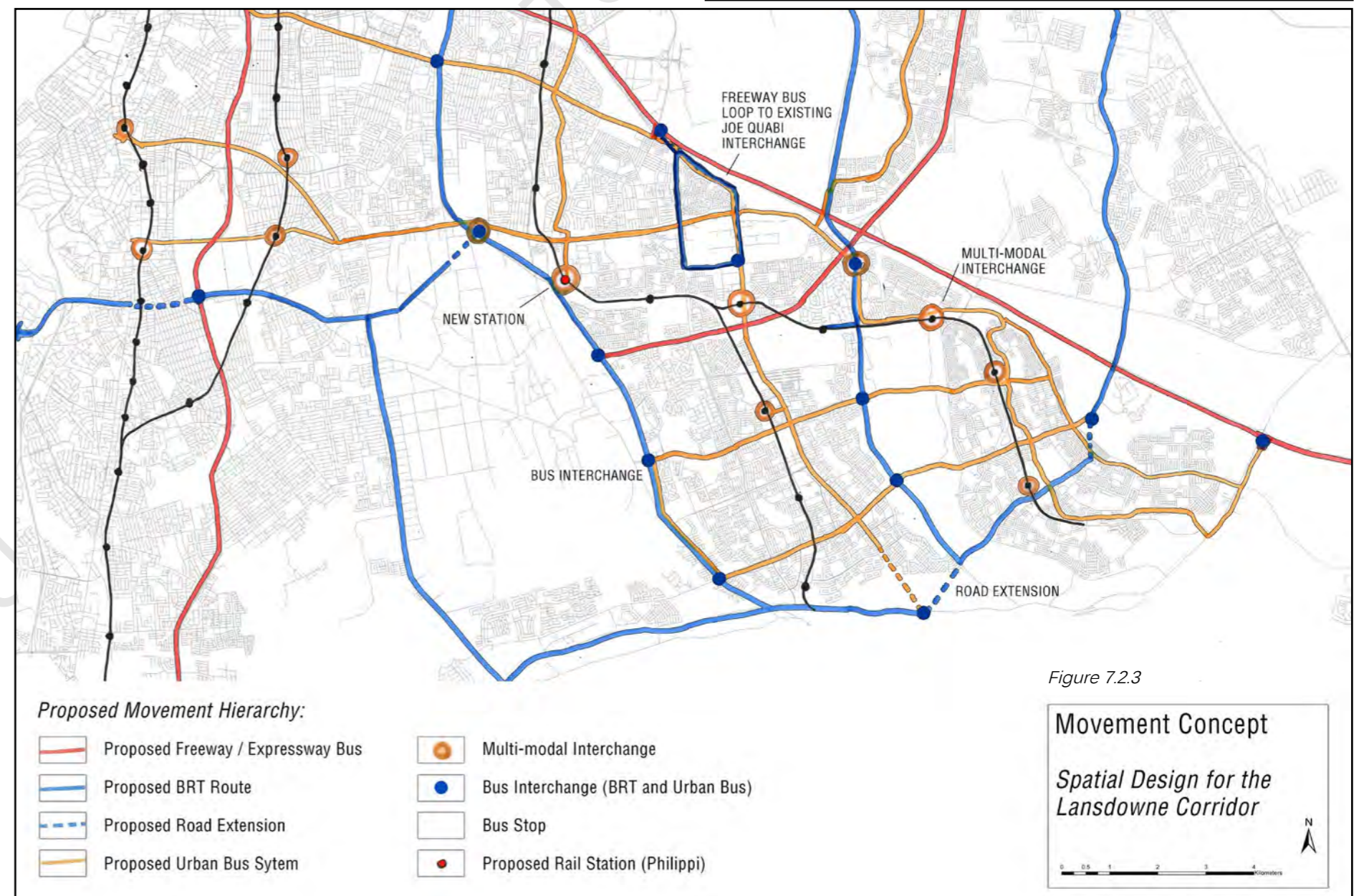
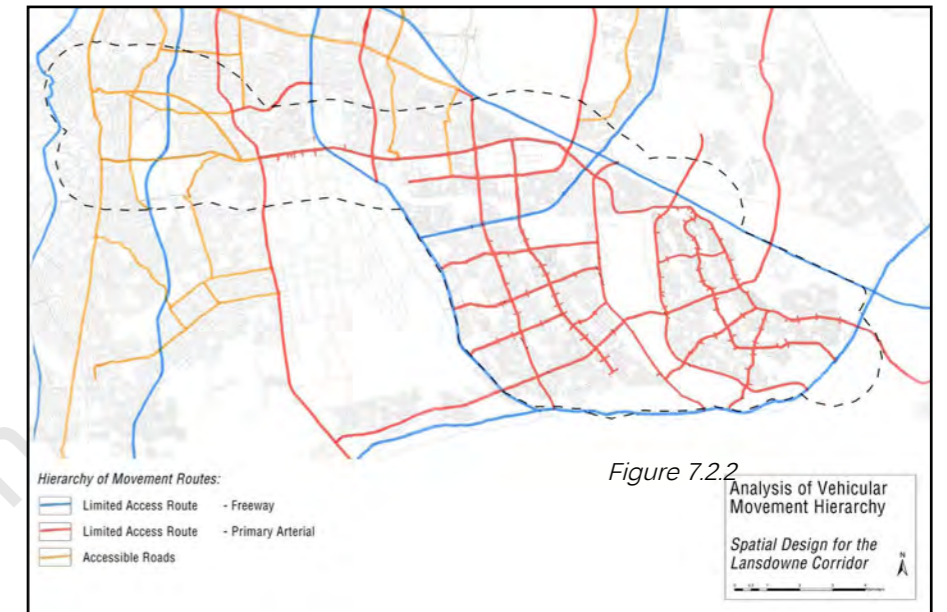
The concept of a greater hierarchy of movement systems (shown in figure 7.2.3) will be enforced through the use of a supporting hierarchical bus system. The BRT system will operate on the mobility based routes and travel large distances. The Urban bus system however will utilise the accessible roads and activity routes, will stop frequently and operate in loops.

For the system as a whole to run efficiently, integration between different modes of transportation (from rail to BRT or BRT to urban

bus) must be convenient for the user. This would thus require investment in multimodal interchanges at key locations. Aside from increasing convenience and ease for the passengers, the greater foot traffic experienced at such interchanges is conducive to retail activity, both formal and informal.

Requirements:

- Strategic Road Extensions
- New Rail Station in Philippi
- Hierarchy of Bus systems
- Investment in multi-modal transport interchanges



7.3 An approach to settlement design: Public facilities

The analysis has shown a severe lack in public and social facilities, especially in the most eastern portions of the study area. However, the lack of access to facilities is most often not distance related, as most facilities are located within their respective walking distances. Rather, the lack of access to social facilities is due to the maximum capacities having already been reached. This requires that investment in such facilities to address backlogs does not require further dispersal of public facilities in order to increase their exposure to the unserved population.

An alternative approach would be to rather direct investment and further development of such facilities to correspond with the current location of existing facilities to create clusters of facilities. A multi-purpose facility cluster is a multifaceted facility that locates a range of services such as social services, health, recreation and economic activity in one area (CSIR, 2000). Such clusters are furthermore often associated with a structural element of an urban settlement, such as public transport interchanges or public squares. Such clusters generally house facilities that are of similar hierarchy, and thus should be located according to the appropriate movement hierarchy. Clusters of facilities can also be homogenous, and consist of a range of facilities that address a specific service need, such as health or education.

The clustering of public facilities has a number of benefits that are suited to the development of the study area:

- The clustering of facilities results in a more efficient use of utilities and services
- Convenience is increased for the user, as many tasks can be accomplished within a single journey, resulting in decreasing both time and monetary costs
- Multipurpose facilities are less vulnerable to fall into disrepair, as it makes the implementation of a management body and a maintenance plan more feasible.
- The varying types of uses means that there is activity present at all times of the day, increasing the perception of safety in the area due to 'eyes on the street'

However, the most important reason for the clustering of facilities is to establish a pattern and hierarchy of movement generators within the study area, with the intention of establishing highly utilised movement routes which private investment and small scale economic opportunity can respond to.

The areas with highest demand for facilities (shown in figure 6.3.35), along with the proposed movement system and green system will then inform the location of certain clusters of facilities, as certain facilities require different exposures to movement and open space requirements. The design thus then locates clusters of facilities along with investment in the required public space according to these informants and according to the backlog of facilities within the study area.

primary movement generators

Higher order facilities that attract the largest amounts of movement should be located on the activity spine to afford such facilities the highest accessibility, and to attract the maximum amounts of movement along the spine.

The analysis revealed the need for 1 hospital, 1 sports stadium, 3 civic centres, 4 community halls and 3 regional libraries to service the study area's projected population in 2020.

Requirements::

- Higher order facilities should occur on the activity spine, preferably at intersections with other main roads
- Their placement in proximity of transportation interchanges increases their accessibility
- Require associated public space, which can serve as social spaces and can cater for informal trade



The idea of the multipurpose centre as deployed by the Cato Manor Development Association (CMDA) promotes the clustering of community facilities into social facility precincts, which allows for fully integrated and functional schools to be built in areas with limited land availability and to make efficient use of limited resources (Ferguson et al., 2004:105). These combine the specific social facilities, thereby reducing development and running costs while increasing the accessibility and levels of utilisation of the facilities (cmda.org). This allows the efficient use of available amenities and the opportunity of scales of economy in functioning so that combinations of primary and high school may be served by sharing facilities such as libraries community halls and sports fields.

Secondary movement generators

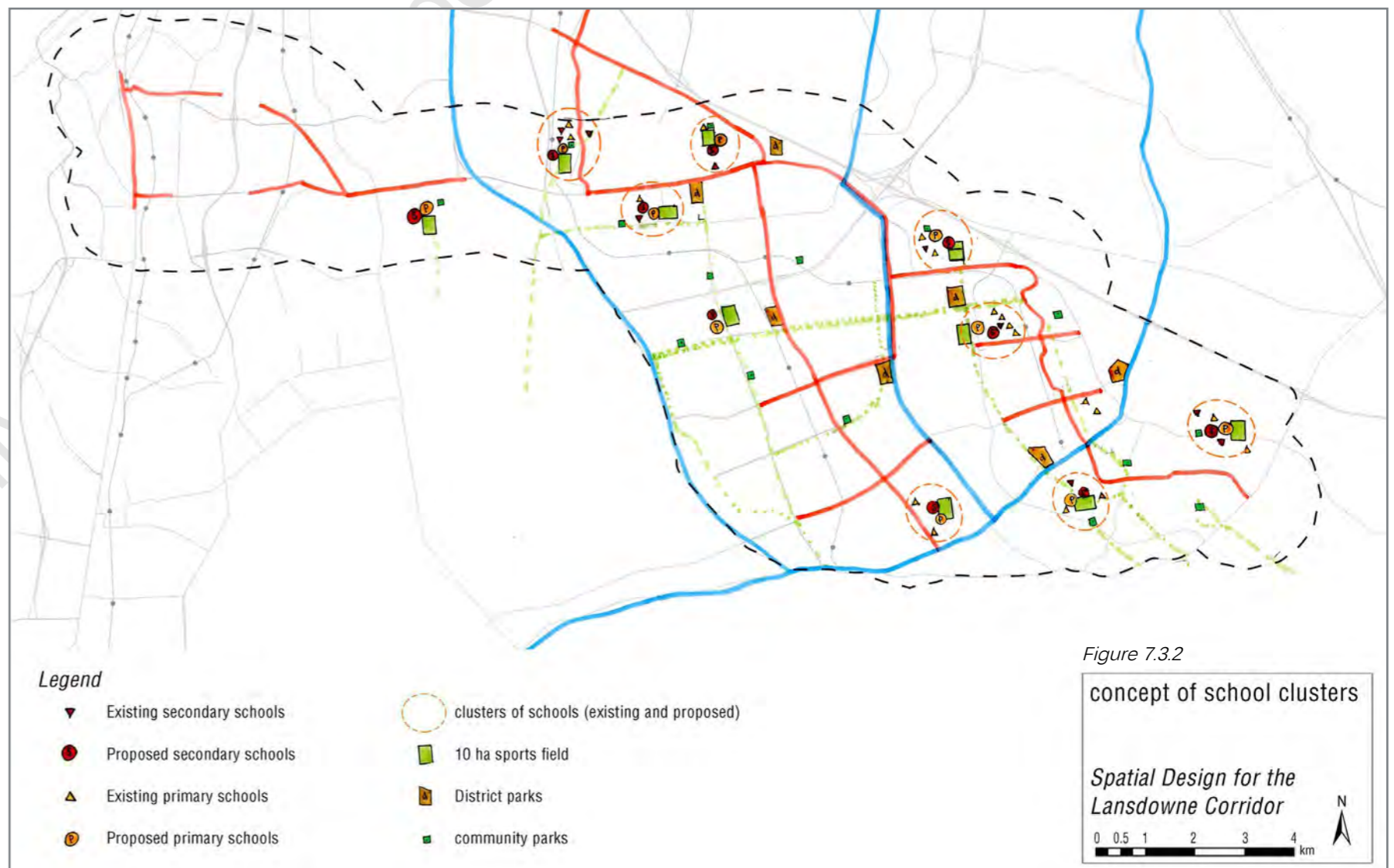
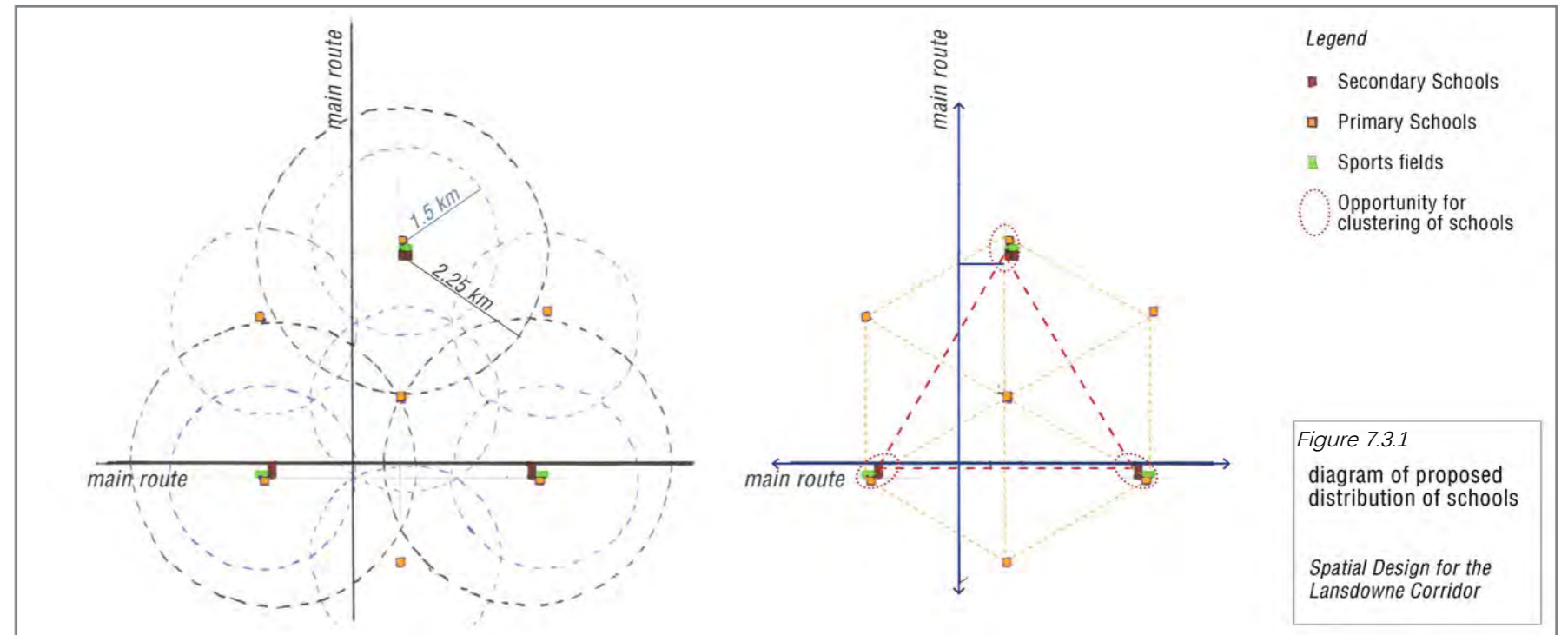
The design of such clusters begins with educational facilities as the starting point, as schools account for a large amount of metropolitan movement, and are the facility that displays the highest backlog. Furthermore, the location of schools is related to the green open space system, as learners utilise fields and parks, and make use of NMT routes to get to school.

Figure 7.3.1 shows a diagram of how both secondary and primary schools can be located in order to allow for the maximum amount of clustering, which also motivates for the sharing of other facilities such as sports fields and school halls. As schools in the study area are already accessible by walking, the concept proposes clustering many of the same type of educational facilities, to form educational campus's. Given that the projected demand is 47 secondary schools and 101 primary schools for the study area in 2020, Schools should be clustered with a ratio of 1 secondary school and 2 primary schools.

The design proposes the development of 10 key educational campus's throughout the study area, each consisting of 3 secondary schools and 6 primary schools. The development of schools in this manner can allow for a significant decrease in overall space requirements, as fewer fields and school halls would be necessary. This approach however does require that current standards for school sizes and facilities will have to be reassessed in order to allow the implementation of facilities due to the lack of vacant land in the area. These clusters should be located one to two blocks from the main activity spine, as schools represent secondary movement generators, and be clustered with existing schools. Such clusters should also have their own associated public open space to act as a transitional space between the schools and the roadway.

The clustering of educational facilities should occur with other compatible middle order facilities, such as clinics, libraries and community centres. The inclusion of clinics would help to ensure that school children had a better standard of healthcare as procedures such as inoculations and health awareness could be integrated into the school system. Furthermore, the school forecourt could be the site of mobile facilities such as mobile clinics and libraries if necessary.

The clustering of schools with libraries and community centres would establish these campus's as learning hubs that catered for the whole population, rather than just school learners. This would require that the schools be used in the evenings for adult classes.



7.4. Desired urban intensity

Figure 7.4.1 shows a map of the proposed urban intensities in the study area. It identifies the particular types of spatial conditions that require design attention, which are required to signify a change in the intensity of development as one moves along the corridor area.

The elements requiring design are explained below:

Gateway Signifies an entrance into the corridor area from the metropolitan / sub-metropolitan point of view.

The design criteria of gateways require placemaking elements that signify a change in the nature of the urban environment. This can be done through the use of tall buildings with minimal road set-back lines, planting to create canopies and strategic paving to direct pedestrian movement. These elements all function to define the space and create a sense of arrival.

Pinch Point refers to the narrowing of an intersection to signify the change in the nature of the roadway from vehicular priority to prioritising pedestrian movement, and thus functions to slow down vehicular traffic.

pinch points must be of the scale that is immediately noticeable, especially to motorists. This can be achieved by using defining walls or planting to signify entrance, or by changing the surface of the roadway to signify a change.

Activity strip refers to a linear zone of mixed-uses that consist of commercial activities, with the small scale economic enterprises occurring on the ground floor. As this type of activity attracts large volumes of people, pedestrian movement and vehicular movement should be kept separate.

The design thus requires large pavements to accommodate high volumes of pedestrian movement and informal trade in some areas. Planting also helps to direct pedestrian movement and the canopy formed by the trees help to enclose the pedestrian space from above. Furthermore, traffic lights and pedestrian crossings are important to increase pedestrian safety.

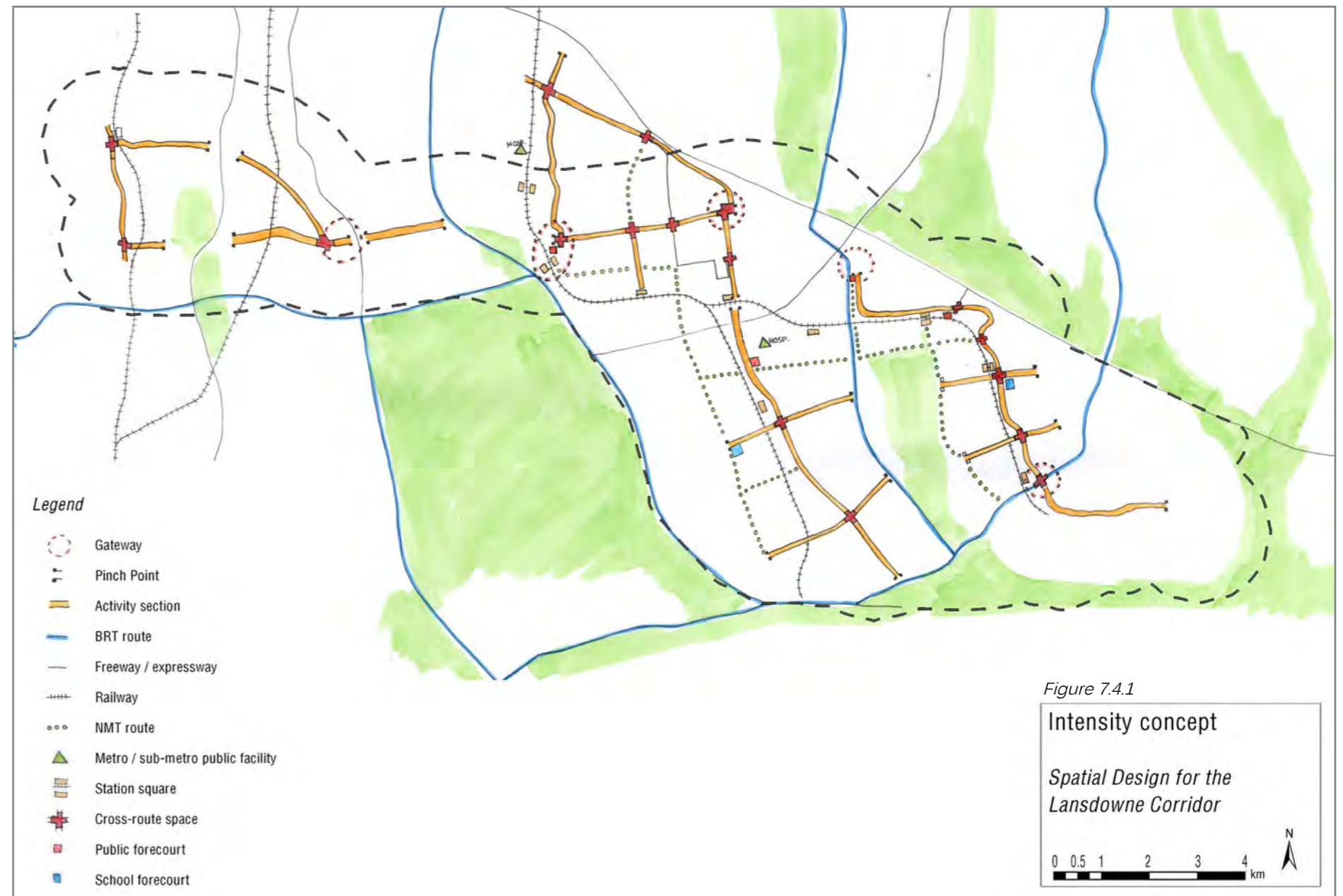
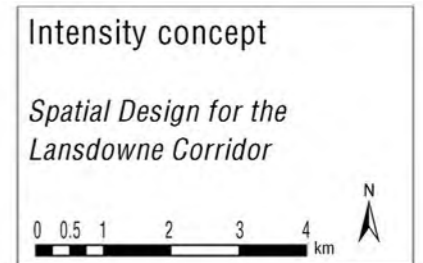


Figure 7.4.1



BRT route is primarily mobility based, yet where the BRT overlaps with the activity section, the BRT lanes must be kept separate from pedestrian movement.

Cross-route space occurs at intersections of main routes with the corridor route. The design of the space contributes to the legibility of the corridor, as they define pick up places and social spaces.

Interchanges Signify the interconnections between different modes of public transportation

The station square and public forecourts make up the public open space system which is explained in more detail in the following section.

7.5 Public Open Space

The high densities present in the study area and the resultant reduction in the size of private space make the availability and quality of the public space of extreme importance. Hard open spaces provide access to public facilities and transport, not only via walkways and pavements, but also as places for waiting and socialising. The public space system proposed consists of different types of public space according to the hierarchy and nature of the facilities they serve.

They consist of:

- Transport interchange forecourt
- Market Square
- Civic building forecourt
- School forecourt
- Informal light-industrial use

Transport interchange / station forecourt

The public open space associated with transport interchanges and especially at rail stations are especially conducive to informal trade, due to the high levels of passing foot traffic. Such spaces thus require areas of canopy where traders can cluster under, which can be achieved by the use of trees. Planting in such areas also helps to signify movement and will help to draw people to the traders.

The design of the public space must thus provide infrastructure to be used by informal traders, such as lock up and go facilities, and the relevant facilities such as sanitation facilities. Figure 7.5.1 shows an example of how the sanitation of informal meat trading can be improved, however the proper butchering of meat should occur at an abattoir.

Furthermore, as many informal traders procure their fresh produce in the farms in the PHA, investment in NMT infrastructure that links public transportation interchanges to the farming areas must occur to ensure a well-performing supply-chain between farmers and traders.

Market square

Public squares represent a dynamic open space, as their use can be flexible and can change from weekend markets and festivals as well as the temporary use of parking.

Civic building forecourt

Access to facilities such as public services and civic buildings are an important function of hard open space (Moughtin 1992, p 89). These spaces do not cater as much for informal trade, but rather are seen as a social space. Such spaces should thus include planting and benches or terraces that encourage moments of rest for passers-by. As the higher order facilities that these spaces serve are considered the 'heart' of the urban environment may benefit from elevation from the ground plane to signify their importance.

School forecourt

The school forecourt is an area where learners can congregate before the beginning of classes, and is important to ensure their safety as they do not congregate in the roadway. As the design proposes the clustering of many schools, the forecourt symbolises an entrance into the campus.

Informal light-industrial use

This hard public open space consists of a work-shop type public space for the creation of light industrial goods. The location of utilities and collective service points in proximity of public open spaces and markets and hard open spaces can create favourable conditions for small scale manufacturing and informal workshops (Watson and Behrens, 1996). Furthermore, as the success of informal activity is dependent on the passing foot traffic, such areas will be developed in proximity to transportation hubs, and in location of light-industrial uses.

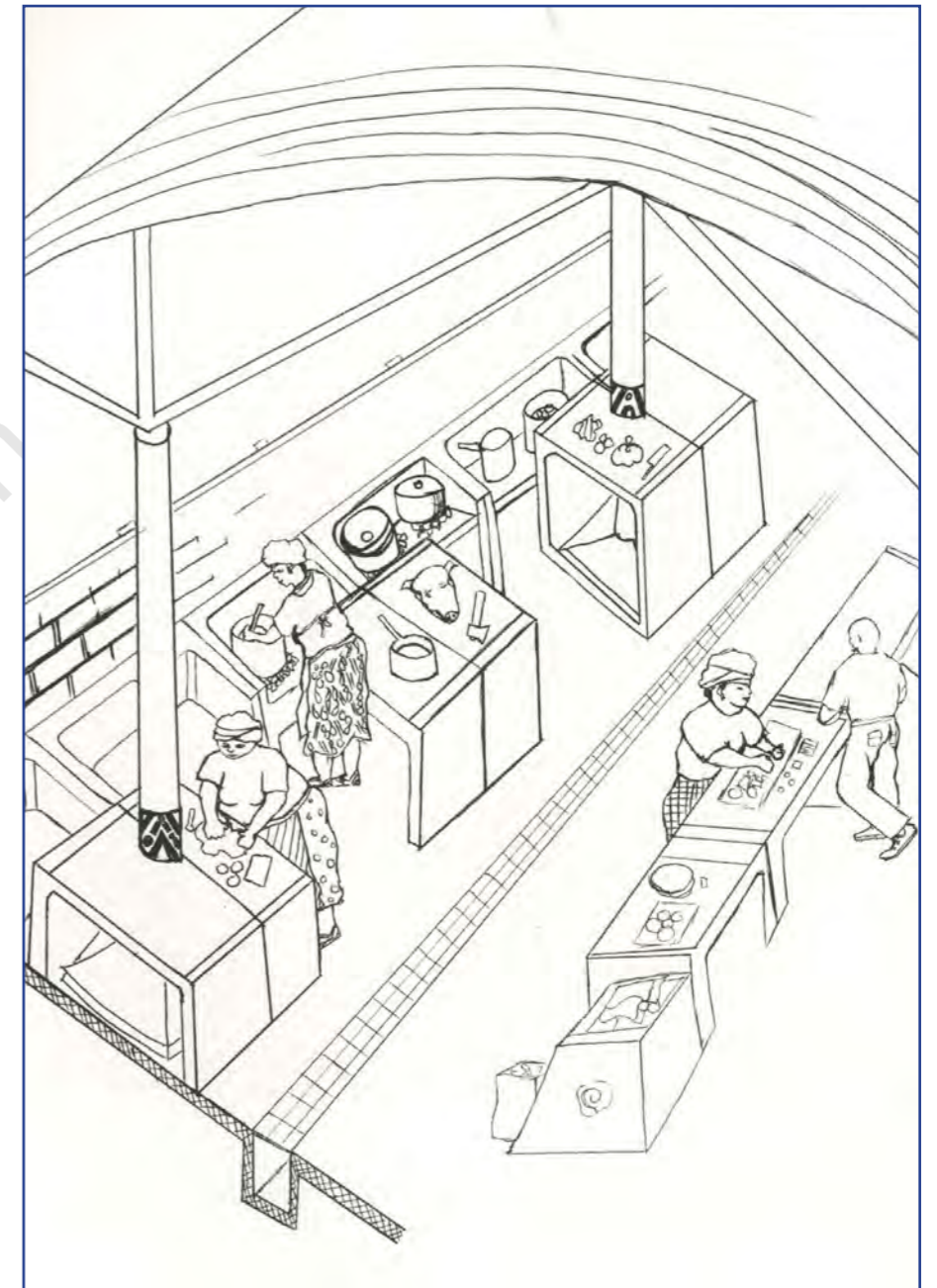


Figure 7.5.1 disposal of waste in the Bovine Head market in Warwick Junction in Durban (Dobson and Skinner, 2009).

7.6 Broad land-use indications

The aim of the land-use framework is to establish the most applicable land-uses that could respond to the high levels of movement generated by the proposal of clustering multiple public services together. The intention is to allow for the opportunity for small scale business and to promote adequate thresholds to increase the viability of public transport along the corridor. Figure 7.6.1 shows broad land-use guidelines, which consist of commercial, industrial, mixed use, housing, public facilities and environmental activities. As these just represent broad land-uses for the areas, only high-density residential is the only residential land-use identified at this scale.

Commercial Development

Primary Uses: Commercial Offices, Hotels and hospitality services, Conference facilities.

Industrial Development

Industrial Use 1

Primary uses: Heavy industrial uses (excluding innoxious emissions)

Industrial Use 2: Light Industrial

Primary uses: Industrial use that does not include noxious emissions.

The intention of the light industrial use is to promote the growth of small scale businesses, home industries and small scale manufacturing.

Mixed-use development

Primary uses: range of activities including residential, businesses, offices civic and social, educational and environmental uses but exclude industrial uses.

The mixed use zone requires that residential use is included to ensure that the area is populated at all times of the day. Retail activity will occur on the ground floor, which allows for the development of corner shops, and small scale business. The floors above generally consist of residential use, with some commercial activity, with small-scale working from home commercial activity permissible.

The relationship between informal trade and formal retail activities is often mutually beneficial, as they provide the consumer with a variety of options.

Informal trade also requires high pedestrian foot traffic to be successful, and thus their location around public transport interchanges is important.

Hard Public open space

Primary use: Contains Public transport interchange
Permissible uses: Informal trade

The provision of hard public open space plays an important role within the broad land-use areas, as the facilities and activities that surround public space can essentially determine how it will be used. Public open spaces, when located around retail and mixed use activities are a prime space for informal economic activity. Such activity is not just restricted to informal trade, but can consist of other small scale self-sustaining activity.

Public Facilities

The public facilities analysis revealed the largest backlog to be in the provision of schools in the corridor, and thus educational facilities account for the largest proportion of public facilities. Other activities include healthcare facilities, community facilities such as halls and libraries, and public services such as police stations and post offices.

High density residential

Primary use: Individual flats within 3 to 4 storey walk-ups.

This residential land-use will fulfil both the GAP housing and social rental housing needs. It is important to create a variety of forms for each, so as not to exclude anyone from the residential market, and to create choice and diversity within the area. This residential type also requires adequate recreational space to account for the smaller living quarters, and therefore is associated with parks and open spaces. The urban form of such areas is similar to that of the mixed use zones, and the placement of both uses next to each other will provide adequate densities to support the use of

public transport. Vacant land in the area has been chosen as the sites for strategic development of high density housing, where the land corresponds to NMT routes and community parks

Social Housing: Brickfields, Johannesburg

The Brickfields housing development in Newtown, Johannesburg consists of 345 units, in four-storey walk-ups and nine-storey tower blocks. The success of the development is attributable to the efficient management of the block by the Johannesburg Housing Company (JHC), as well as the array of social facilities it is close to as well as those it provides (such as crèches and playgrounds). The variety of different size units within the block, and the 'live and work' units, cater to a larger and more varied housing market (JHC, 2010).

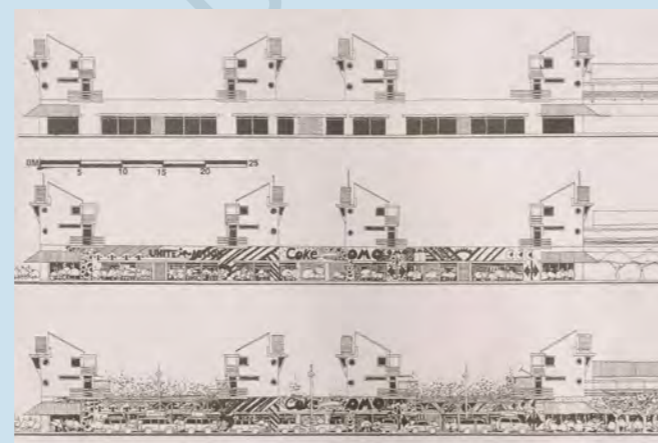
The variation of such dwelling unit sizes would help to create a more socially inclusive form of housing, as this typology enables a greater degree of choice and thus caters to a larger portion of the population.

Mixed Use: Housing and the Productive Landscape

Competition by Noero Wolff Architects

The housing competition had the aim "to correspond to the need for human dignity and facilitates and enriches the daily activity of human life" (Wilkinson, 1996: p43). The development consists of 118 different sized apartments, retail activities and public facilities, a food market and hydroponic greenhouses. Viewing the landscape as a productive resource meant that although the housing was initially built with low-cost materials, the income generated from the surrounding agricultural areas are intended to be invested back into the structures, making them more appealing for the rental market, and thus adding another dimension to the local income opportunities.

This shows how the built form is intended to change over time, as the commercial and retail activity, especially that located on the ground level in proximity to the market spaces, is intended to become more active over time.





Recreation

Active recreation consists of sports facilities and fields as well as any ancillary buildings. Passive recreation areas consist of parks and landscaped NMT routes that link up to public transport interchanges. Furthermore these areas should strive to provide additional habitats or links in the open space system and contribute to the management of stormwater control in the area.

Conservation and Agriculture

Specific sections of important biodiversity, as well as areas prone to flooding are designated conservation areas, the boundaries of which are programmed with activities that require a view.

The intention of the agricultural zone is to contribute the food security of the city as a whole, while at the same time creating sustainable livelihoods for those who subsist off the land.



7.7 Height Policy

Figure 7.7.1 shows a concept for the urban form of the study area in terms of building heights. The tallest buildings are to signify important intersections along the route, or to signify a gateway space upon entering the area, and are thus envisioned to be land-mark buildings.

The tall to medium height buildings serve to increase residential densities along the route, and are associated with recreational space.



Figure 7.8.1
Spatial plan for the corridor
Spatial Design for the Lansdowne Corridor

7.8 Corridor plan and identification of precinct area

Figure 7.8.1 shows the corridor plan, indicating where public investment should be targeted in order to promote intensification along the corridor spine.

Figure 7.8.1 also identifies the precinct area chosen for further design. This area was chosen as it is part of the route that joins the Mitchells Plain and Khayelitsha suburbs. The area also has amongst the highest densities in the corridor area, and thus represents a high demand for social and public services, including the need for a diversity of housing typologies.

The precinct was also chosen because of the existence of open land (shown in figure 7.8.2) which can be designed to accommodate higher residential densities than the current form of single-storey dwelling units in the area.

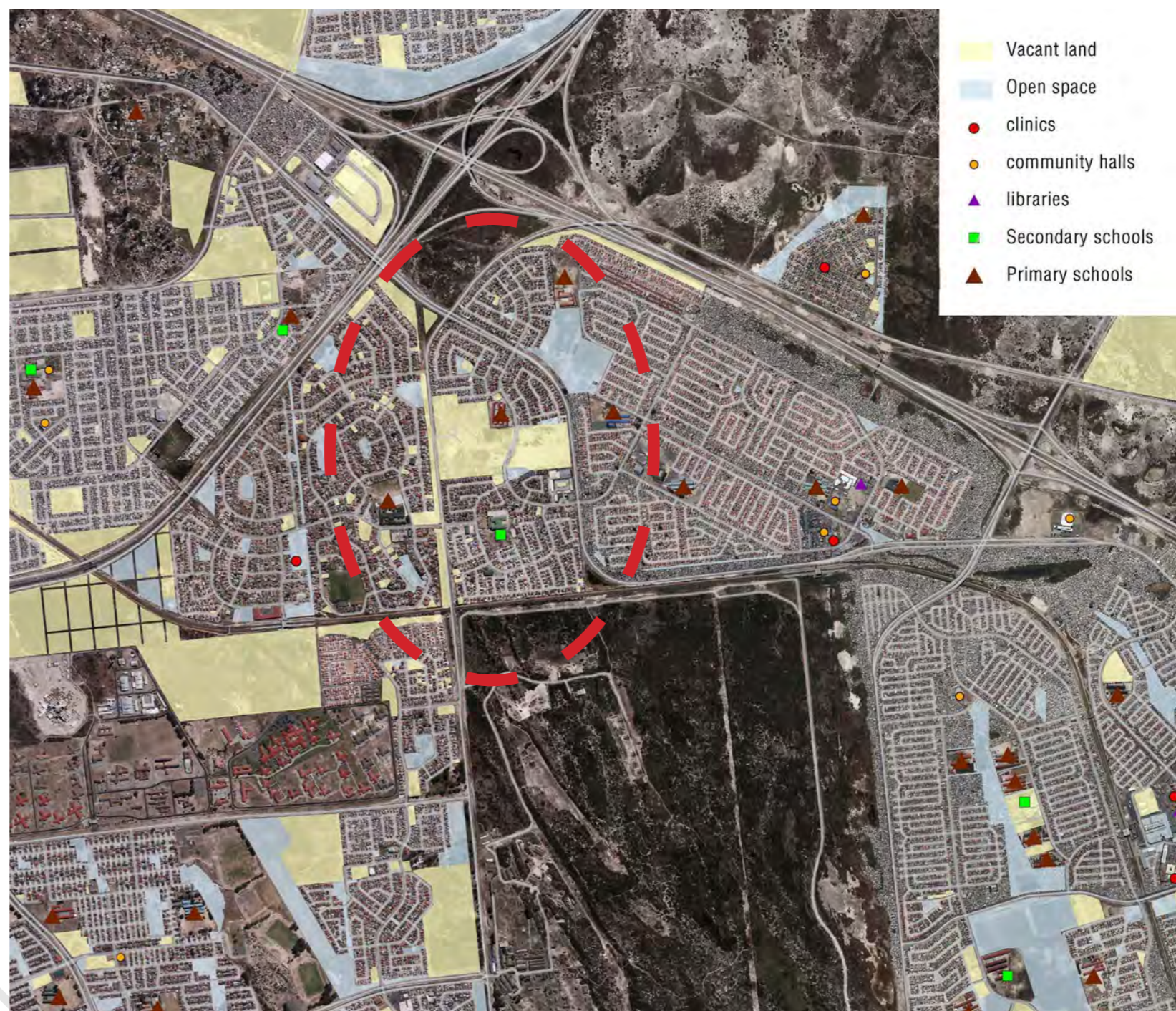


Figure 7.8.2 Available land in the area

Chapter 8 Precinct plan

The precinct chosen includes the suburbs of Washington Square and Tembani, and is located on the section of the corridor that joins Mitchells Plain and Khayelitsha. The site was chosen as a good example of how strategic infill development and planning can be used to restructure existing neighbourhoods to increase their integration and to achieve greater permeability.

The spatial design of this precinct hopes to illustrate a way in which existing neighbourhoods can be better integrated with their surroundings in order to achieve desirable urban conditions and the pre-conditions for small scale and self-generating business.

The principles utilised for the achievement of this include:

- Hierarchy of movement systems and their associated public spaces and facilities
- A greater degree of choice, in terms of residential typologies, tenure options and retail spaces
- Greater pedestrian permeability and integration with surrounding neighbourhoods

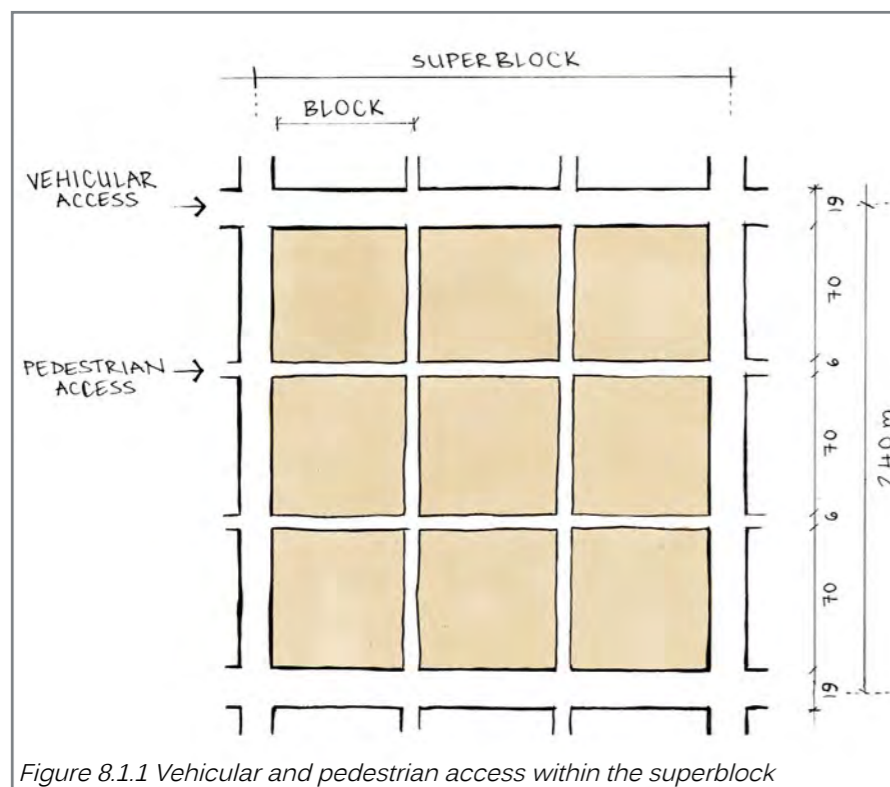


Figure 8.1.1 Vehicular and pedestrian access within the superblock

8.1 Layout Principles

Superblock, block and plot sizes

The geometry of the block and superblock, and their spatial arrangement is the main determinant of urban form, and can be appropriately augmented to cater for the expected land-use of the site, the creation of memorable spaces, and to optimise efficiencies of both pedestrian and vehicular movement.

The creation of blocks and superblocks has an impact on the movement and circulation systems within the settlement. The superblock is scaled to vehicular movement, as it allows for a reduction in the number of intersections to facilitate optimum traffic movement along the length of the blocks. However, as the scale of such blocks severely prejudices pedestrian movement, it is desirable to split the superblock into walkable segments. The scaling down of large blocks is also beneficial in creating a sense of belonging, and safe walking conditions especially for children. Figure 8.1 shows the spatial arrangement between block and superblock if pedestrian accessibility and efficiency of vehicular movement are to be maximised. The arrangement of blocks and

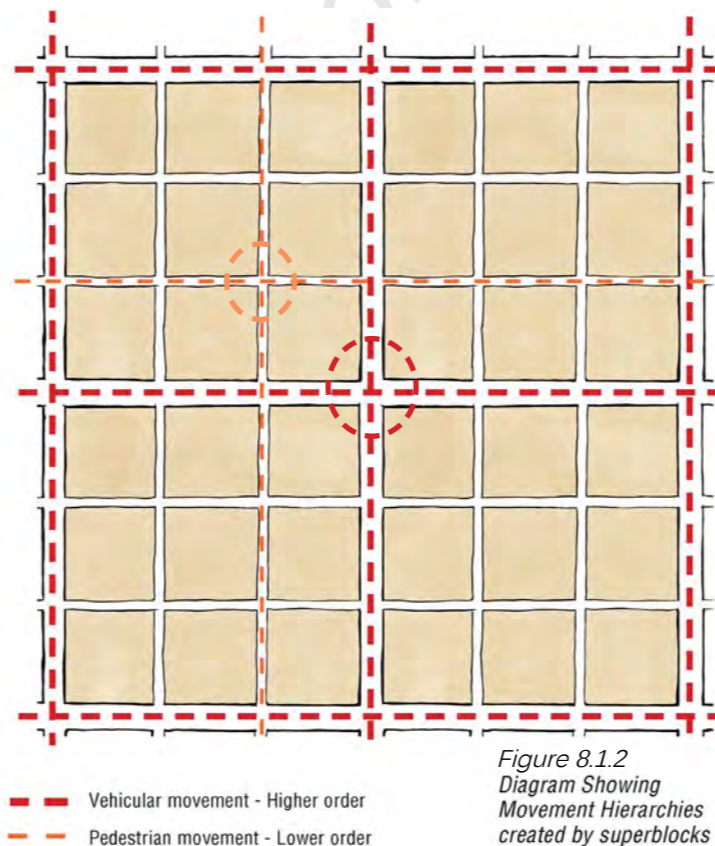


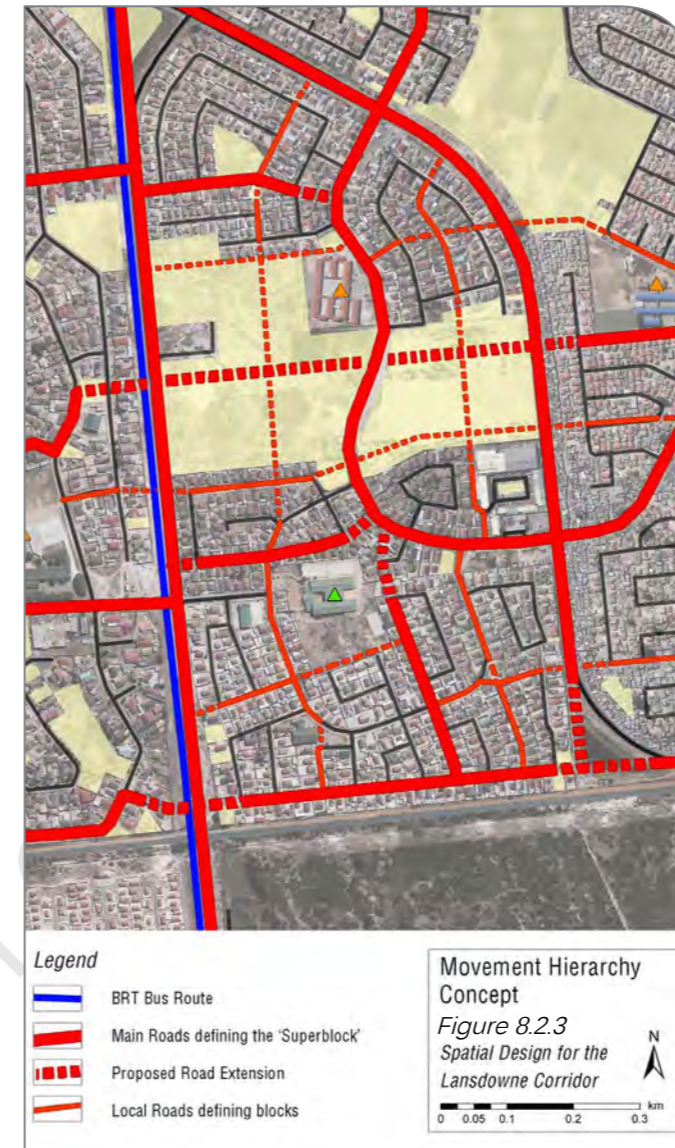
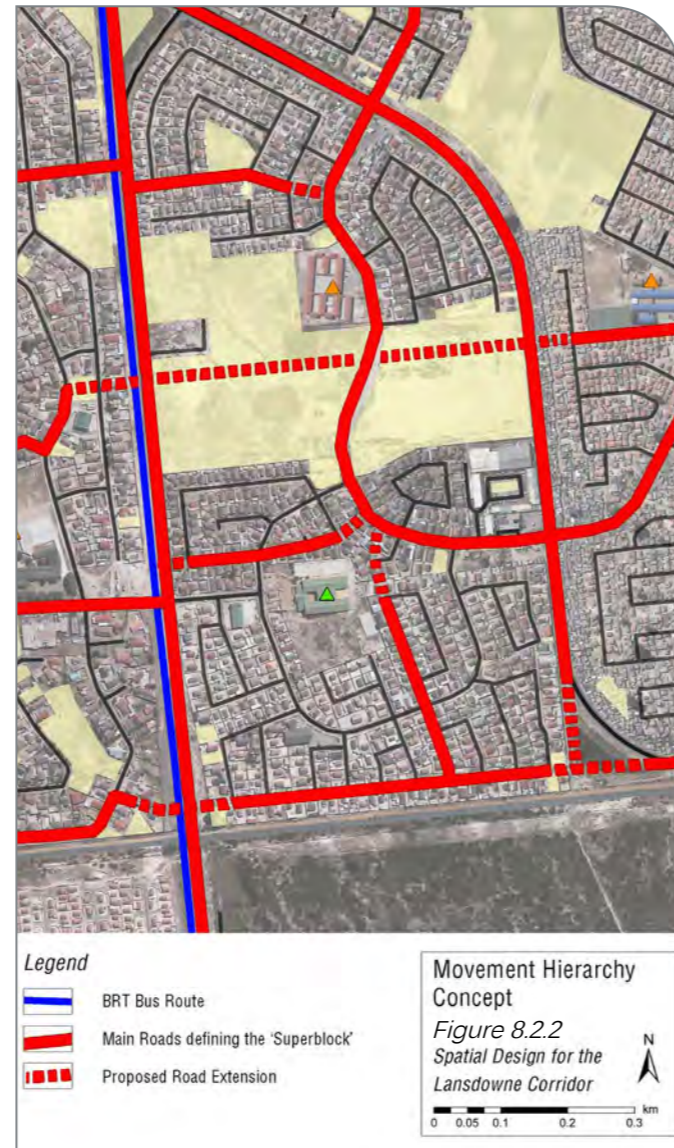
Figure 8.1.2
Diagram Showing
Movement Hierarchies
created by superblocks

superblocks also allow for different hierarchies of movement, as shown in figure 8.1.2. Furthermore, the figure shows the hierarchy of public spaces that are associated with the different movement systems.

8.2 Precinct Design

The design of the precinct area first began with the application of the block and superblock to the existing layout of the area, to establish a hierarchy of movement within the area, and to create a grid movement structure. In some areas some houses would require demolition to carry this out. This process is shown in figures 8.2.1 to 8.2.4.

Thereafter, a hierarchy of spaces can be identified which responds to the hierarchical movement systems. The hierarchy of public facilities was then planned according to these identified nodes.



images of vacant land and informal dwellings in the precinct area (Google, 2013)



Figure 8.2.5 shows the design of the precinct area and indications of broad land-uses. A 'civic heart' is located in the middle of the precinct, on the main movement axis. Due to the high residential densities in the area, the provision of social services and adequate public space is very important.

A mixed-use strip is then demarcated along the movement axis in order to benefit from the public transport route that uses the route, and from the movement generated from the higher order public facilities.

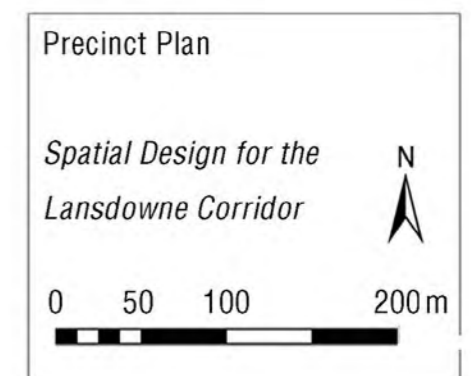
The existing school is clustered with a library, business centre and adult learning centre in order to create an educational campus.

The idea of a 'civic heart' is further adapted to where the lower order movement routes intersect, to establish a "community heart" within each superblock. These areas help to create a sense of place on the smaller scale, and house lower order public facilities such as community centres.

The variation in movement within the precinct demands that the nature of the streets differ according to the activity that they accommodate. Sections A, B and C indicate the spatial requirements for the different streets.

- Public facilities
- Mixed-use
- High density / social housing
- Infill housing
- Recreation

Figure 8.2.5



Section A-A:
Residential street

The design of residential pedestrian oriented streets requires that dwelling units be elevated from the street in order to create a much needed threshold space between the high residential density units and the public street.



Houses in the Bo-Kaap in Cape Town are elevated from the street, creating a semi-private space

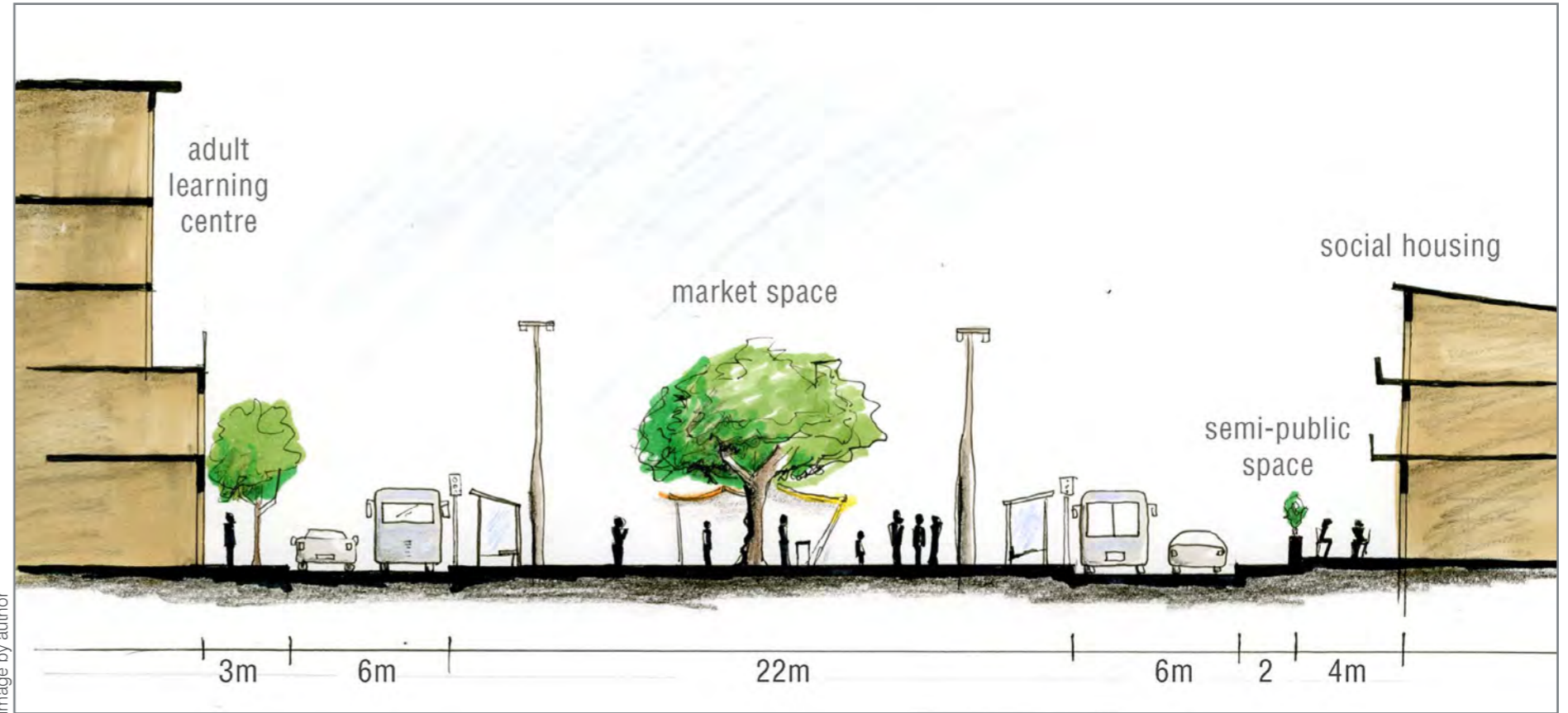
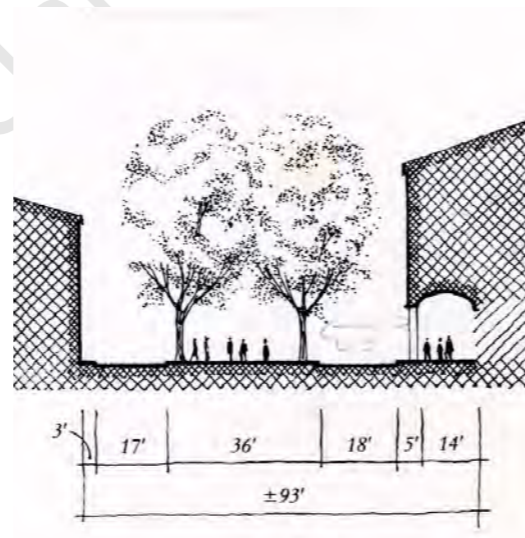


Figure 8.2.6:
Section B-B
Central promenade / market space

The central pedestrian island serves to split the vehicular traffic and to create a wide pedestrian space along the main civic avenue in the precinct area. Large trees create a 'canopy' over the space and serves to enclose the space, as well as it provides a comfortable area for informal traders to sell their goods.



The Ramblas in Barcelona has a central promenade which serves to separate vehicular movement and create a dynamic space which accommodates retail activities and restaurants, and is a significant tourist attraction.
(images: Jabobs, 2005)

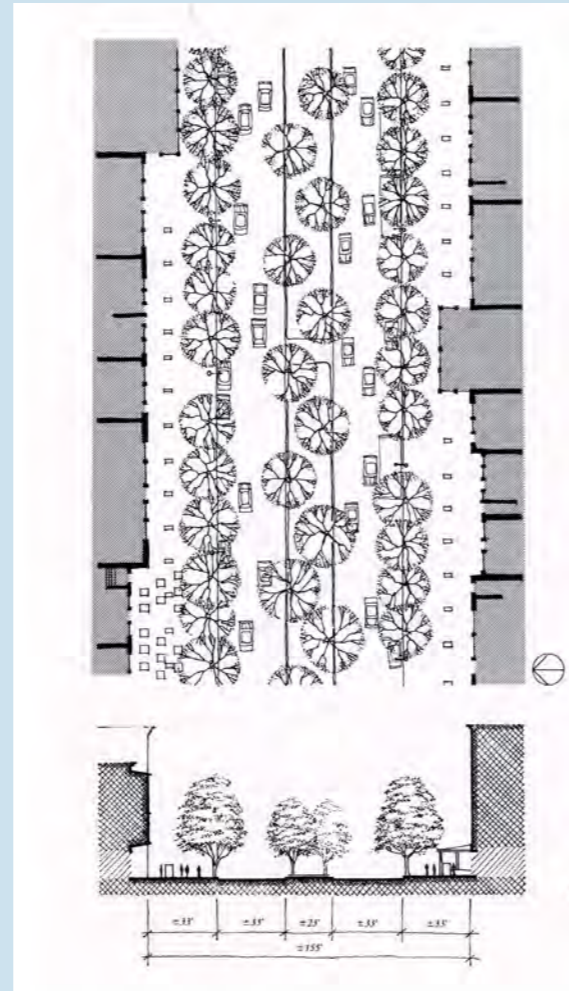


Figure 8.2.7
Section C-C:
Linear market space

This section of the street incorporates a linear informal market space that runs along the length of the street, and capitalises off the urban bus system that runs along this section of the road.

The building restrictions along the street will vary the build-to lines to create interest in the linear space, as was done in a commercial street in Berlin. The protruding elements help to slow pedestrian movement and create pockets of activity on an otherwise uninteresting street,

variation of building set-backs in Berlin (Jacobs, 1995)



Explanation of plot layouts and built form typologies

The variations of plot sizes are designed to increase the range of choices available to residents in the area, where some typologies are designed to encourage small scale businesses and working from home, if desirable. The explanations accompany the layout plan in figure 8.2.8.

1. Small plot typologies

These plot layouts represent the smallest plot size available (8m wide by 18m deep). The corner plots that define the blocks are bigger to better define the roadway between them. Consolidation of plots to form row houses are suggested to maximise the floor area of the dwelling units. Heights should not exceed 2 storeys

2. Medium density residential

Medium density residential typologies suitable here as they are adjacent to a community park, which will provide relief from the increased densities. Consolidation of plots is permissible, with the suggested typology being 3 to 4 storey walk-ups.

3. Pinch Point

The intention of a 'pinch point' is to announce the change in nature of a roadway from vehicular-based to one that prioritises pedestrian movement, and thus to slow down vehicular traffic.

The building typology should be splayed at the corner to signify arrival into the space, and the pedestrian walkway should protrude into the roadway.

4. Termination of view

Plots that occur at a T-junction are larger than the surrounding plots as they are the view point at the end of the road. For this reason, the buildings on such plots should be larger than neighbouring units

5. Corner building

Corner buildings in the precinct area are intended to enhance the pedestrian space at the intersections of two roads. The plan requires that the corners of such buildings be splayed, and that the corner units are preferably higher than the neighbouring plots to create a gateway where the roads meet. The creation of a corner building as a local landmark also is conducive to small enterprises such as a corner shop, and should have its entrance on the corner.

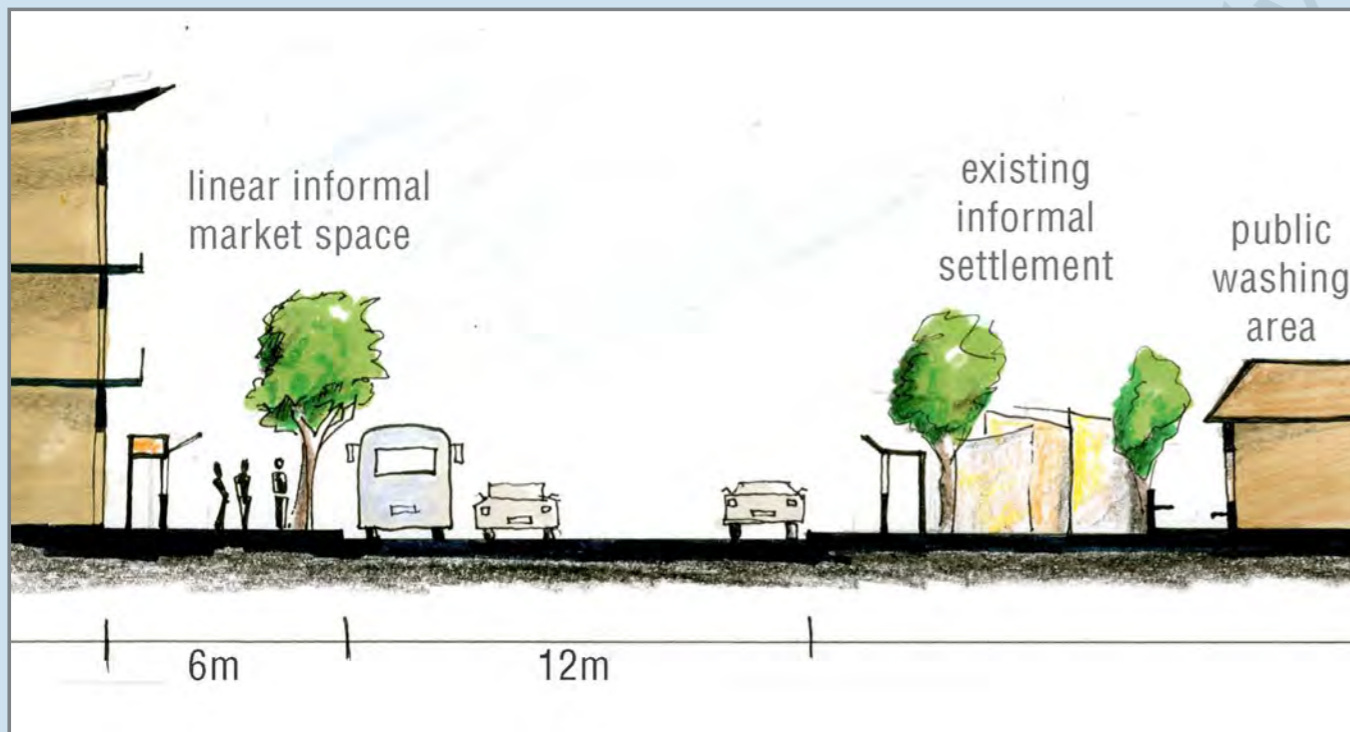


image by author



corner shop in the Bo-kaap, Cape Town



Figure 8.2.8

Precinct Plan: plot layouts

Spatial Design for the Lansdowne Corridor

0 50 100 m

N

Built form typologies:

- 1. Small plot typologies
- 2. Medium density residential
- 3. Pinch point
- 4. Termination of view
- 5. Corner building

Implementation

The implementation of the design proposal requires the use of an area-based management (ABM) body as a special purpose vehicle to facilitate and co-ordinate development. ABMs are well structured to address a combination of various development objectives, as they are able to co-ordinate various departments who otherwise operate in isolation from one another. In this way, ABMs represent a more holistic approach to implementation. This is why ABM is one such approach to integrated area development (IAD) as it not only planning for singular isolated sections of development such as industry or education but it is planning for all such activities which have the potential for development with in an area (Singh & Raj, 1978).

The use of an ABM to facilitate the development of the corridor area would require that they be granted a high degree of autonomy, which is often more likely if external funding can be acquired. By establishing ABMs as an independent facilitator, they are not as restricted by local government or departmental barriers (Turok, 2004), and thus can be more flexible and adaptable to unforeseen challenges. Furthermore, as they are bounded by a geographical site rather than a governance boundary, there focus can be seen to be well targeted to addressing location-specific goals. It is furthermore suggested that a mix of different funders is sought, to increase the autonomy of the ABM.

Partnerships and close relationships with the community have also been shown to foster a far more integrative programme which better meets the needs of the area which the special purpose agency should ultimately serve. This is supposedly a given advantage with ABM's due to their limited spatial scope and being on the 'ground level', however a bottom up institutional arrangement must be in place to support this.

The creation of a special-purpose body must also be accompanied by a limited time frame and an appropriate phasing plan. In relation to the design of the precinct area, the development should be phased as follows:

1. Establish the preconditions for metropolitan based movement

- This would first require the re-structuring of the BRT system to better integrate the corridor area with other areas within the city.
- Along with this should be the development of the large scale public institutions, such as the regional library and the civic centre, which also serve to attract metropolitan or sub-metropolitan movement.
- Investments in higher density social housing should also accompany these investments to ensure that adequate thresholds are met to sustain the BRT system.

2. Establish the preconditions for local movement.

The establishment of metropolitan significant investments would then support smaller scale local development.

- This would begin with the implementation of an urban bus system.
- Infrastructure for informal trade should accompany the investments in public transportation so that the opportunity to capitalise off of passing trade is not missed out on.
- Thereafter land can be subdivided and packaged for residential development.

This would require that the size of packages of land parcels be restricted, and that ownership of numerous land parcels is restricted. This ensures competitive pricing and affordability, and restricts excessive profit margins. This will also promote diversity of the urban form if not urban development is constructed by the same developer.

Exit strategy

An integral part of an efficient ABM is the inclusion of an exit strategy. The purpose of an exit strategy is to ensure that once the development of the area has been achieved, there still exists a management body to ensure that the area continues to be well maintained. The exit strategy will also appoint an independent body to manage the social housing projects in the area, as well as to manage the clusters of facilities under one care-taker or supervising body.

Concluding thoughts

This dissertation sought to understand how spatial interventions could be used to address social inequality in Cape Town. The theoretical framework that informed the direction of the plan required that the way to address the inequality of the past, and the issue of worsening poverty on the urban periphery, is through the management of urban growth.

Furthermore, vibrant urban activity and the conditions that nurture small-scale livelihood strategies are only possible when variety and intensity occur, which can only be achieved through the promotion of more compact and rich urban environments.

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