The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.

University of Cape Town

The Cape Flats Urban Park: Guidelines for Multifunctional Open Space Planning

Emily Herschell
HRSEMI001

November 2001

University of Cape Town

Thesis submitted in fulfillment of the degree of
Master in Philosophy of City and Regional Planning
University of Cape Town
South Africa

Abstract

Over time, the lack of coherent thought concerning the potential roles of urban open spaces has resulted in the necessity of urban management to become vigilant with regard to the collective aspects of city life. Urban open spaces are especially significant in this regard. In giving attention to the scale, continuity, distribution and status of public open space in Cape Town and indeed, in all South African urban centres, developing the role of public spaces in the lives of the urban poor is especially crucial.

This study examines the concept of the ability of multifunctional urban open space in playing the role of a socio-economic developmental tool. In this endeavor, two fundamental approaches are used. The first investigates the significance of open space and examines the history of open space and park development. Cases of successful park developments are presented so as to identify central conceptual ideas and certain key success factors. The second uses a local park proposal, the Cape Flats Urban Park, as an instrument with which to explore the concept. This involves integrating the notions of natural process needs and human needs so as to inform use. Accordingly, a natural systems analysis discovers the particular ecological needs of the area through factors of opportunity and constraint and a potential park user analysis discovers the characteristics and needs of human users, in order to discern what role the urban park could play in enabling socio-economic development and improving quality of life.

Consequently, resultant guidelines for planning successful multifunctional open spaces are summarised, and further considerations and guiding principles for multifunctional open space planning are presented. These insights are applied and determine broad distributional tendencies, which may assist towards the creation of a successful plan for the Cape Flats Urban Park and other open spaces.

The procedure in which these investigations were followed through was primarily through an extensive literature survey, supplemented by personal observation, map surveys and informal interviews.

The findings of this study endorse the proposal for a multifunctional Cape Flats Urban Park, as this park could play conservation, resource preservation, flood control, productive, economic, ceremonial, cultural, educational, health improving, recreational and community-building roles. As such, urban open spaces have the potential to become multifaceted resources, with both intangible and tangible benefits for nature and for people, all of which can improve the quality of life for city dwellers, by improving the quality of the environment in which they live.

University of Cape Town

Acknowledgements

First, I wish to sincerely thank my supervisor, Professor Dave Dewar of the School of Architecture and Planning at the University of Cape Town, whose kind and enlightening assistance and guidance proved to be absolutely invaluable in the completion of this study.

I am deeply indebted to the following people who patiently helped me on numerous occasions during the course of this project: Barrie Gasson, Barbara Southworth, Bernard Oberholzer, Farieda Kahn and Faisal Fakier.

I would also like to acknowledge my voluntary field assistants Riaan van Eeden, Garth Corbett and Robyn Tourle, to whom I am much obliged.

Finally, I would like to thank especially my mother, father and sister for their continual encouragement, support and interest throughout my studies.

University of Cape Town

Table of Contents

Page

University of Cape Town

University of Cape Town

List of Figures

Page

University of Cape Town

List of Tables

Page

University of Cape Town

List of Appendices

University of Cape Town

Section 1: Introduction

1.1 Past problems of urban open space planning

Much has been written on the subject of urban open space (Mumford, 1961; Jacobs, 1961; Seymour, 1969; Heckscher, 1977; Taylor, 1979; Crowhurst Lennard and Lennard, 1984; Altman and Zube, 1989; Carr *et al*, 1992; Fig, 1996; Kadungure, 1996). Urban open space can be described as any vegetated or green area within an urban environment such as nature reserves, private and public gardens, park areas, golf courses and other sports and recreational grounds, cultivated, derelict and undeveloped land and even roadsides, rail verges and transmission line servitudes. Open hard-surface areas (brown areas) such as plazas and other paved and concrete areas can also be considered as urban open space (Poynton and Roberts, 1985; Behrens, 1996).

Positively-made and celebrated public spaces within urban areas have been and continue to be the essential social infrastructure of successful urban environments. They are the places through which people actively experience the city and engage in its collective life (Dewar and Uytenbogaardt, 1991). They are the loci of entire communities' energies and resources. It goes without saying, therefore, that the manner in which public spaces are created, profoundly affects the performance and enjoyment of collective life (Dewar and Uytenbogaardt, 1991).

A feature, characteristic of twentieth century urban management in many cities, however, has been the neglect of quality public open space planning. This neglect may be partially attributed to the modernisation paradigm, which promoted the notions of the introverted 'neighbourhood unit' and suburbia: sprawling, discrete residential units, ideally surrounded by belts of open space, in which individual, single-storey dwellings had their own private gardens. The origins of this concept can be detected within the reactions to the environmental degradation and social atomisation, which accompanied the Industrial Revolution, notably in Britain and Western Europe (Dewar and Uytenbogaardt, 1991).

One central concern underpinning these models was the importance of contact with nature in the city. Supposedly, the private garden was meant to substitute for the city dwellers' contact and access with nature (Dewar and Uytenbogaardt, 1991). In practice, however, the continued indiscriminate development of suburbia caused fragmentation of the natural landscape, which formed residual, inaccessible islands of space in a sea of altered environments (Poynton and Roberts, 1985). Many of these islands of urban open space have been set out on land left over after planning, known as SLOAP (Space-Left-Over-After-Planning) and have practically no measure of usefulness to city dwellers or to nature itself, even if they do happen to be accessible (Poynton and Roberts, 1985; Behrens, 1996).

A further feature of the modern era which impacted upon open space planning was the emphasis on scientific planning and the standardisation of open spaces. Standards for open space - specific numerical indicators for adequate recreational public space provision - attempted to secure desirable and practical standards for parks and open space relative to user populations
(Pigram, 1983). For example, in terms of the Western Cape Regional Services Council standards, 0.4 hectares of land had to be set aside for playgrounds for each set of fifteen thousand residents (Dewar et al, 1990).

The application of common, inflexible standards across contrasting communities, unrelated to changing socio-economic profiles of potential users or to varying space needs for different recreational activities, was unrealistic. Mere figures have little to say about the form, quality and essential characteristics of public space. Consequently, this rigid adherence to uniformity has obscured the many possibilities for the innovative planning, management and design of open space (Pigram, 1983).

In South Africa, the planning of open spaces in cities has been enforced according to the precepts of apartheid. As such, the function and role of open space has been parochially viewed, as it merely formed 'buffers' – open spaces encircling non-white settlements - which would minimise inter-racial contact (Dewar and Uytenbogaardt, 1991).

University of Cape Town

Section 1: Introduction

1.1 Past problems of urban open space planning

Much has been written on the subject of urban open space (Mumford, 1961; Jacobs, 1961; Seymour, 1969; Heckscher, 1977; Taylor, 1979; Crowhurst Lennard and Lennard, 1984; Altman and Zube, 1989; Carr *et al*, 1992; Fig, 1996; Kadungure, 1996). Urban open space can be described as any vegetated or green area within an urban environment such as nature reserves, private and public gardens, park areas, golf courses and other sports and recreational grounds, cultivated, derelict and undeveloped land and even roadsides, rail verges and transmission line servitudes. Open hard-surface areas (brown areas) such as plazas and other paved and concrete areas can also be considered as urban open space (Poynton and Roberts, 1985; Behrens, 1996).

Positively-made and celebrated public spaces within urban areas have been and continue to be the essential social infrastructure of successful urban environments. They are the places through which people actively experience the city and engage in its collective life (Dewar and Uytenbogaardt, 1991). They are the loci of entire communities' energies and resources. It goes without saying, therefore, that the manner in which public spaces are created, profoundly affects the performance and enjoyment of collective life (Dewar and Uytenbogaardt, 1991).

A feature, characteristic of twentieth century urban management in many cities, however, has been the neglect of quality public open space planning. This neglect may be partially attributed to the modernisation paradigm, which promoted the notions of the introverted 'neighbourhood unit' and suburbia: sprawling, discrete residential units, ideally surrounded by belts of open space, in which individual, single-storey dwellings had their own private gardens. The origins of this concept can be detected within the reactions to the environmental degradation and social atomisation, which accompanied the Industrial Revolution, notably in Britain and Western Europe (Dewar and Uytenbogaardt, 1991).

One central concern underpinning these models was the importance of contact with nature in the city. Supposedly, the private garden was meant to substitute for the city dwellers' contact and access with nature (Dewar and Uytenbogaardt, 1991). In practice, however, the continued indiscriminate development of suburbia caused fragmentation of the natural landscape, which formed residual, inaccessible islands of space in a sea of altered environments (Poynton and Roberts, 1985). Many of these islands of urban open space have been set out on land left over after planning, known as SLOAP (Space-Left-Over-After-Planning) and have practically no measure of usefulness to city dwellers or to nature itself, even if they do happen to be accessible (Poynton and Roberts, 1985; Behrens, 1996).

A further feature of the modern era which impacted upon open space planning was the emphasis on scientific planning and the standardisation of open spaces. Standards for open space - specific numerical indicators for adequate recreational public space provision - attempted to secure desirable and practical standards for parks and open space relative to user populations
(Pigram, 1983). For example, in terms of the Western Cape Regional Services Council standards, 0.4 hectares of land had to be set aside for playgrounds for each set of fifteen thousand residents (Dewar et al, 1990).

The application of common, inflexible standards across contrasting communities, unrelated to changing socio-economic profiles of potential users or to varying space needs for different recreational activities, was unrealistic. Mere figures have little to say about the form, quality and essential characteristics of public space. Consequently, this rigid adherence to uniformity has obscured the many possibilities for the innovative planning, management and design of open space (Pigram, 1983).

In South Africa, the planning of open spaces in cities has been enforced according to the precepts of apartheid. As such, the function and role of open space has been parochially viewed, as it merely formed 'buffers' – open spaces encircling non-white settlements - which would minimise inter-racial contact (Dewar and Uytenbogaardt, 1991).

University of Cape Town

Many city authorities have lacked the imagination or the means to capitalise on the potential opportunities of neglected public open spaces. Wastage of land has occurred in the setting aside of open space for exclusive uses. Large areas of residual land await new or expanded facilities that in all probability will never materialise (Pigram, 1983; Dewar and Uytenbogaardt, 1991). Subsequently, isolated, underutilised, ill-maintained, inhospitable and hostile public open spaces, with unimaginative site design and inadequate equipment, prevail in sterile residential areas. They may have met the arbitrary space standards set, but they have done little to meet the requirements of neighbourhoods or nature in the city (Pigram, 1983).

1.2 Purpose of the study

There has generally been no coherent thought with regard to the potential roles of urban open spaces and an urgent requirement of urban management today is to focus attention on the collective dimensions of urban life. Particularly important in this are urban open spaces (Dewar and Uytenbogaardt, 1991).

The author believes that attention needs to be given to the scale, continuity, distribution and status of public open space in Cape Town and indeed, in all South African urban centres. Improving the role of public space in the lives of the urban poor is especially crucial. The private means of the majority of urban families, in developing contexts, are not sufficient to support houses which can adequately accommodate the full range of a family's needs, nor can a such a family afford to maintain private space. Public space becomes an important extension of the dwelling unit (Dewar and Uytenbogaardt, 1991).

Accordingly, this study will examine the way multifunctional urban open space can play the role of a socio-economic developmental tool. To investigate this fundamental issue, it will be necessary to review the significance of open space in general and examine the history of open space and park development. Cases of successful park developments will be presented so as to identify central conceptual ideas and certain key success factors.

A specific case study of a local park proposal, the Cape Flats Urban Park, will be used as the instrument with which to explore the theoretical concept that encountering nature within the city can actually mean the creation of a multifunctional, useful and developmental open space. The exploration will begin with a review of how planners have considered urban open spaces in Cape Town and this will explain how the Cape Flats Urban Park proposal originated and what the proposal encompasses.

This exploration will develop, as an integrated approach towards open space planning, which correspondingly, will be informed by both natural process and human needs. The following quotation encompasses the reason for this approach:

'The site is analyzed for its fitness for the purpose of the plan, and so it will be seen differently by people who are considering different uses for it. But the designer must also look at the site in its own right, as a living community of plants and animals (including human animals) – a community with its own interests that may, if ignored, respond in unsettling ways to any reorganization.'

(Kevin Lynch, 1984: 29)

As such, the approach of the study incorporates a natural systems analysis and a potential park user analysis of the proposed Cape Flats Urban Park, conducted in order to:

- discover the particular ecological needs of the area through factors of opportunity and constraint so as to inform site suitability
- examine the characteristics and needs of potential park users so as to discern what role this urban park would or could possibly play in improving the quality of their lives.

This will enable an overall understanding of what role the proposed Cape Flats Urban Park can potentially play in enhancing socio-economic development.

As a result of these investigations, considerations for multifunctional open space planning and guiding principles will be submitted. The study does not culminate in a plan: however, the insights gained

University of Cape Town

throughout will be applied, in order to determine broad distributional tendencies of activity which may assist towards the creation of a successful plan for the Cape Flats Urban Park.

The essential objective of the paper therefore, is to guide the thinking regarding the planning of urban open space proposals, in particular, the Cape Flats Urban Park, and perhaps other contextually similar proposals for parks, in the Cape Metropolitan Region and elsewhere.

The manner in which information for the purposes of this paper has been collected, is primarily through an extensive and comprehensive literature survey. This has, however, been complemented through personal observation recorded in photographs and in writing, map surveys and a number of informal interviews recorded as personal communication.

1.3 The structure of the paper

The following section, Section 2, will review the significance of open space in general and explore the history and precedent of the development of urban parks. Cases of successful park developments will also be presented. Section 3 will review how Cape Town has considered urban open spaces in planning and the origins of the Cape Flats Urban Park proposal will be described. Section 4 depicts the natural systems analysis of the site. Section 5 shows the outcomes of research on the characteristics and needs of the potential park users. Finally, Section 6 synthesises the implications of the previous sections' discussions, whereafter certain guiding principles and considerations for the planning and design of the Cape Flats Urban Park, and indeed any multifunctional open space, are submitted.

1.4 Limitations to the Study

The number of site visits to the area under study were regrettably limited due to the inherent dangers of the area. It is hoped that the interviews conducted with people possessing intimate knowledge of the study site and the extensive literature survey balance this deficiency.

University of Cape Town

Section 2: Significance of Open Space, History and Precedent of Parks: the Identification of Central Conceptual Ideas

This section investigates the way multifunctional urban open space can become a socio-economic developmental tool, by reviewing the significance of open space in general and examining the history of open space and park development. Cases of successful park developments are presented which identify central conceptual ideas and key success factors.

2.1 The significance of urban open space

Open space can have a diversity of integrated functions, which depend mainly on the *needs* of the surrounding communities and the *natural resources available* (Behrens, 1996).

Firstly, most, if not all, people would agree that a profound sense of personal satisfaction can be gained from experiencing the sensuous pleasures of nature (Morgan, 1991). Urban open space enables the urban dweller to escape and relax from the stresses of the city through providing outdoor active and passive recreation facilities and visual amenities. It has been demonstrated through research that nature provides the human mind with a restorative change of pace, and that simply looking at a plant can help reduce stress, fear, anger, lower blood pressure and even decrease muscle tension (Ulrich in Malakoff, 2001). Thus open space, which reduces the impact of the built environment, has certain psychological benefits for people (Behrens, 1996).

Open space also allows for social interaction and has previously been described as a 'public living room for the locality' (Morgan, 1991). For example, isolated mothers can perhaps meet others and escape the burdens of being cooped up with young children all day. Open spaces are regarded as particularly important for children. Safe, but challenging spaces can allow for adventure, exercise, play and development (Burgess, Harrison and Limb, 1988). It can perform an important educational role, as it offers opportunities to learn – to learn about people and culture, to learn about nature, even to learn about oneself. Related to this, is that open space can play a role in enhancing a sense of community (Morgan, 1991;Behrens, 1996).

As for city structure, the voids and spaces between land uses and buildings can add to the form, character and integration of urban areas. City identity and visual order can be created, places can be defined, buffers between conflicting land uses can be formed and even urban sprawl can be contained (Jarvis, 1993; Behrens, 1996). It has also been found that open space can induce new development and even generate improvements to existing properties nearby (Phillips, 2000). It should be noted here that for a livable environment, well-designed open space becomes even more necessary as residential densities increase (Jarvis, 1993).

In developing areas such as the Cape Flats, it is important to understand that open space can perform a very significant function. It can be used for managed resource production. People's basic needs for food and various other things can be complemented and even additional income can be generated, through, for example, urban agriculture based on sustainable farming methods (Behrens, 1996).

Finally, but of equal importance to the above-mentioned functions, urban open space benefits the environment itself. For example, conservation of the habitats of unique and rare fauna and flora in urban spaces, such as wetlands and migration corridors, maximises biological viability and consequently improves educational and scientific value (Poynton and Roberts, 1985). Open space can also reduce the formation of heat islands and attenuate air, water and noise pollution. It can also absorb water runoff from rainfall and help reduce the chances of flooding within urban areas (Poynton and Roberts, 1985). The latter is particularly relevant to the Cape Flats.

The identification and protection of natural sensitive areas within urban areas and the sustainable management of their inherent natural processes and resources is necessary for a number of reasons. Fundamentally however, if the needs and requirements of natural systems are not respected, ecological, and ultimately, societal collapse may result (City of Cape Town, 1999).

University of Cape Town

Urban open space is a multifaceted resource with both intangible and tangible benefits for people and nature, all of which can improve the quality of life for city dwellers.

2.2 History and precedent of parks: identification of central conceptual issues

The journey from idea to action can be treacherous. This section becomes particularly valuable when it is understood that one can successfully move from knowledge and ideas to action informed by theory and precedent. The aim of this subsection, therefore, is to tell the story of the evolution of urban parks and to explore a number of international and national case studies of successful urban parks. These studies have been selected as they are reasonably similar to the context in which the Cape Flats Urban Park finds itself. It should be remembered, however, that direct parallels should not be drawn, as every park development unique. It is hoped that if nothing else, this section will show that the Cape Flats Urban Park proposal is not impossible, but, in fact, quite feasible.

The first part of this subsection, therefore, summarily presents the story of the fascinating evolution of urban parks. Certain case studies of park developments and a graphic summary of innovative urban park ideas are then presented. Due to space limitations, many interesting details could not be included. It is thus strongly advocated that for a more comprehensive and engaging account of the development of urban parks, the reader should refer to Appendix 1, where an annotated recommended reading list has been compiled. It is an absolute necessity that anyone involved in park planning today should be familiar with the content of these books!

2.2.1 The Evolution of Urban Parks

There exists a substantial literature on urban parks. Many books and articles have been written on the historical development of urban parks (Chadwick, 1966; Browne and Whitaker, 1971; Newton, 1971; Laurie, 1975; Heckscher and Robinson, 1977; Turner, 1987; Cranz, 1997), particular eras of park development (Conway, 1989; Conway, 1991), famous parks and their design (Beckett and Dempster, 1989; Swerdlow, 1993), and compilations of urban park case studies (Garvin and Berens, 1997; Department of the Environment, 1987).

The concept of a garden from which people derived enjoyment perhaps originated in mythology, whereas principles informing layout and organisation seem to derive from ancient cultivation and irrigation practices (Laurie, 1975). In the ancient civilisations of Greece, a number of urban open spaces have always been traditional. These included the market place, gymnasia for athletes and sacred burial groves. However, no areas of public landscape were provided within the cities for unspecified recreation (Browne and Whitaker, 1971; Laurie, 1975).

In Rome, Julius Caeser (d. 44 BC) and later, certain other emperors, might have been the first to donate estates as public parks (Jellicoe and Jellicoe, 1975). The small scale of cities in medieval times meant that the countryside and fresh air were always readily available. Britain has a long tradition of open space, but no public parks in the sense of land owned by the public and designed for recreation (Turner, 1987). The earliest British municipal park dates from the early years of the seventeenth century, but their main development occurred during the nineteenth century (Chadwick, 1966; Conway, 1991). According to Turner, (1987) the first public park in Britain was the Terrace Garden in Gravesend, designed by John Claudius Loudon in 1835. Here, the park movement gathered pace between 1833 and 1845. It should be noted that the tradition of setting aside spaces for public use goes back a little further on the Continent, particularly so in Germany, where public gardens were in use before the close of the eighteenth century (Chadwick, 1966).

Cranz (1989; 1997) has classified the general history of the development of urban parks in terms of four models. Most, if not all of these characteristics will be recognised in most countries, but particularly so in the United States. Descriptions of these models follow.

University of Cape Town

2.2.1.1 The Pleasure Ground: circa 1850-1900

The word *parc* or *park* originally meant an enclosure containing animals for the hunt (Browne and Whitaker, 1971). The pleasure ground was typically a large park, located on the edge of a city, following the ideal of the pastoral landscape with buildings subordinate to the overall landscape (Cranz, 1997). During this era, parks were seen as a source of fresh air, a means of diffusing social tensions and a way of improving the physical and moral condition of the urban citizens (Heckscher and Robinson, 1977; Conway, 1989). Political and social roles were reflected in the plantings, the buildings, the statues and the activities permitted within the park (Conway, 1991).

Britain

John Claudius Loudon, an influential British landscape gardener, described these parks, in the first half of the nineteenth century, as 'enclosed spaces of considerable extent varied by wood, water, rocks, building and other objects', which were 'interspersed by roads and walks, grazed by sheep, deer and cattle, and without flowers or shrubs' (Conway, 1991: 11).

These large and landscaped parks were supposed to simulate nature in the countryside. Romantic ideals of naturalness and informality originated from the English landscape gardener, Lancelot Brown, and suggested meandering roads, gradual changes in grade, luxuriant, almost tropical planting, open meadows and permanence (Chadwick, 1966; Cranz, 1982). The design was not supposed to be as wildly stimulating as nature itself, but rather a design conceptually mid-way between the wildness of pure nature and the finite and civilised nature of a city (Cranz, 1997). The European pleasure gardens were thus designed according to three rules prescribing the relationship between nature and art. Firstly, the garden should orient itself to the image of nature. Secondly, in mirroring nature, it should be differentiated from the surrounding landscape and recognisable as something different. Thirdly, this difference should not be an unnatural contrast, but rather a heightening of nature in the image of nature and reason (Chadwick, 1966; Galen, 1982). This design was meant to allow a 'mental ' appreciation of the landscape, a kind of passive or contemplative recreation (Cranz, 1997).

In general, parks in Britain were created as isolated elements, lungs and oases of green, which contrasted with their urban surroundings (Conway, 1991). Pleasure gardens opened in London, and in fashionable resorts such as Bath during the eighteenth century and the first half of the nineteenth century. All were commercial ventures whose profits come from entrance fees (Turner, 1987; Conway, 1991). The most famous of all London pleasure gardens was Vauxhall Gardens (1661), and its attractions included theatres, walks and gardens, a grand moving panorama and twice-a-week chariot races (Conway, 1991).

Britain's royal parks are also well-known. Mumford in Turner (1987: 87), comments that the royal parks were 'perhaps the first baroque feature to be opened to the public and duly incorporated in the city'. A ready-made park system was provided for the British people by the opening of St. James' Park, Hyde Park, Green Park and Regents' Park (Chadwick, 1966). Hyde Park was opened to the public during the 1630s, and parts of Regent's Park were gradually made accessible to the public from 1841. Regent's park was designed by John Nash, in conjunction with housing in and around it, for the profitability of the development was as important as beauty, health and convenience (Laurie, 1975; Conway, 1991). St. James' Park, although a royal park, was designed from the first for public use (Chadwick, 1966). The royal park can be conceived as a deliberate work of art (Turner, 1987).

The intended social and moral improvement of the working classes became a problem. The pleasure gardens were located on the edge of cities and so the working class could not easily access them - they were far away and the transit ride there was expensive. The parks subsequently became 'playgrounds' for the wealthy (Cranz, 1997). The Industrial Revolution had created expanding industrial cities and the working conditions for the unhealthy working classes were poor. The rapidly increasing populations of people, in the compact, congested urban areas made the possibility of access to urban space even worse, and fewer opportunities for contact between the classes (and hence the

classes moral improvement) resulted (Browne and Whitaker, 1971; Conway, 1991; Heckscher and Robinson, 1977).

This was partly due to the fact that, for much of the nineteenth century, the British local authorities were severely inhibited by legislation governing the actions they could undertake. Poor working conditions motivated the passing of various acts of Parliament in Britain, which allowed for the use of public monies or taxes to create and maintain public parks (Chadwick, 1966; Browne and Whitaker, 1971; Laurie, 1975; Beckett and Dempster, 1989).

Birkenhead Park was opened to the public in 1847 (Conway, 1989; Beckett and Dempster, 1989). It was the first municipal park, acquired and maintained by the local authority out of public funds. The development of this park involved the first application to the British Parliament requesting the use of public funds and it was also the first to recoup the costs of park development successfully (Laurie, 1975; Conway, 1991). The park successfully raised the value of its surrounding land and this was a key factor in stimulating a period of park building in Britain (Laurie, 1975; Conway, 1991). Figure 1 shows the layout plan for this park.

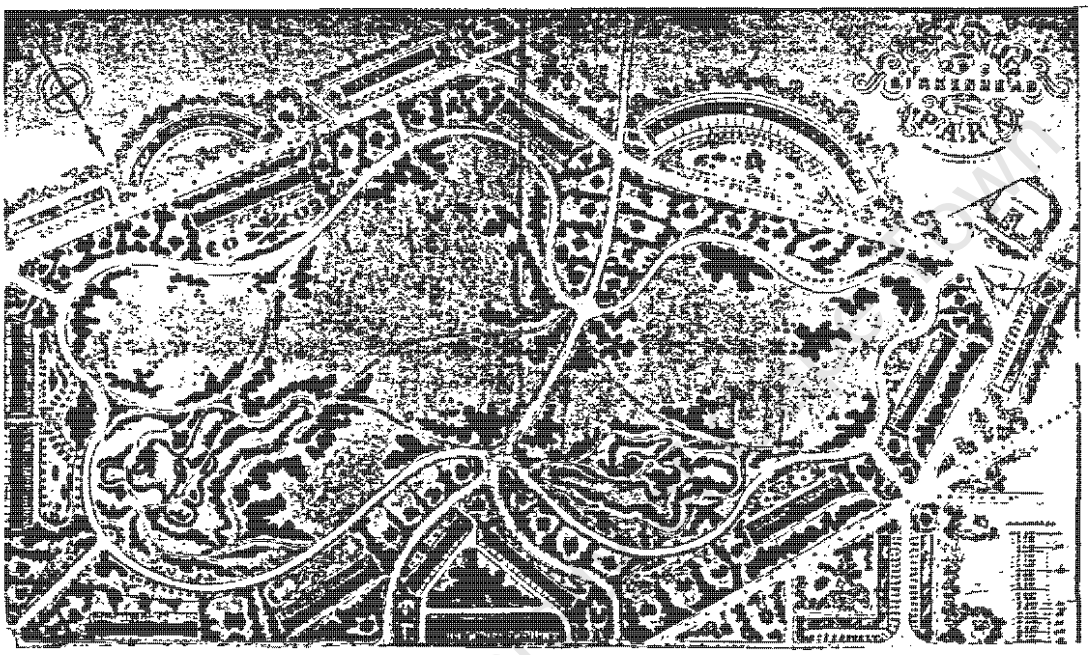


Figure 1: Layout plan for Birkenhead Park (c.1845). Note that the edges of the lakes are well planted so they are not obvious and that the footpaths around them vary in distance from the lakes' edges so that a variety of views are presented (Source: Conway: 1991).

The formality of design intrinsic to the gardens found in France had influenced British landscapes, although the English undulating countryside was inherently unsuited to them. The landscape garden in England, however, became a product of the Romantic movement (Browne and Whitaker, 1971; Laurie, 1975). Its form was based on direct observation of nature and the principles of painting. Surprise, variety, concealment, and the development of idyllic prospects – picturesqueness - were its goals (Chadwick, 1966; Laurie, 1975).

Many municipal parks in Britain were located in areas of heavy air pollution, which denatured plantings. Regardless, there were still great varieties of floral displays which attracted visitors. A great increase in new and exotic species from Australasia, North and South America and Asia encouraged the planting and showing of individual plants (Conway, 1991). Carpet-bedding and sculptural planting also remained popular in these parks, as figure 2 reveals. The construction of roads and walls were considered necessary evils to make parks usable. Buildings of one or two storeys could keep a low profile and their

architectural rustic and Victorian style gave way to Richardsonian Romanesque, which retained an informality and which complemented the landscape (Conway, 1991).

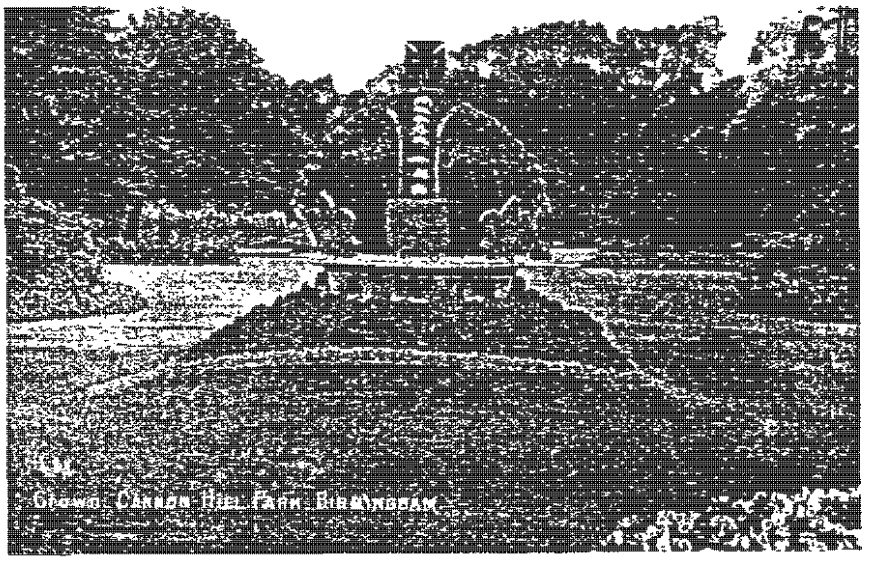


Figure 2: This tudor crown in Cannon Hill Park, Birmingham was done to commemorate the coronation of George V in 1911 (Source: Conway, 1991).

By 1898, Victoria Park, which served London's East End since 1845, had a variety of features including thirty-two cricket pitches, thirty-seven lawn tennis courts and four gymnasia. In 1849, bathing by men only was commonplace. In 1898, the swimming facilities were improved with concrete bottoms, diving boards and shelters. At the turn of the century, the park boasted animal and bird enclosures, sand-pits, paddling pools, ordinary and circular swings, seesaws and a sort of merry-go-round called the giant stride (Conway, 1991). No boating or swimming was allowed at Birkenhead Park, although skating and angling was permitted at certain times (Conway, 1991). This reflects a conflict of ideals at the time between either retreating to a tranquil natural place or a place for exercise (Conway, 1991).

United States of America

In the United States, the closest approximation to a public park was the embellished rural cemetery such as Greenwood in New York (Laurie, 1975). In due course, the romantic European landscape with its inherent functions, was imported into America in the 1860s by Frederick Law Olmsted and others (Laurie, 1975; Turner, 1987). The parks that the Americans built to improve their cities were in part derived from certain European examples. Frederick Law Olmsted had visited Birkenhead Park twice - in 1850 and 1859. The American parks were also developed from an anti-urban ideal that dwelt on the traditional prescription for relief from the evils of the city – to escape to the country (Cranz, 1982; Kent and Madden, 1998). Accordingly, the goal for the American pleasure ground was to heighten the idea of naturalness with forms suggested by nature, but not to rely on what nature actually provided (Galen, 1982).

The picturesque style - an appropriate compromise between pure wilderness and civilisation - was established and popularised by both Andrew Jackson Downing and Olmsted (Cranz, 1982; Conway,

University of Cape Town

1991). In this adoption of the informal and natural landscape design, which recognised the constraints and potentials of each site, the roots of a landscape philosophy held by Frederick Law Olmsted (the founder of landscape architecture) can be detected (Laurie, 1975). This philosophy involved viewing and designing the park *as a whole* (Newton, 1971; Jellicoe and Jellicoe, 1975).

Olmsted's first park design (with a partner - Calvert Vaux) resulted in the United States' first public park of 1858. Central Park was 843 acres and it was created as an isolated park (Laurie, 1975; Heckscher and Robinson, 1977; Conway, 1991). The picturesque style is visible in figure 3, which shows the lake and bow bridge in Central Park which was opened in 1860. Central Park gave momentum to the American urban parks movement. It is interesting to note that even at that time, if land that was considered better for economic uses, it would rarely be selected for a park. For example, Birkenhead Park lies upon poor quality land, Central Park' site lies upon the Manhattan Schist – the granite ridge of Manhattan Island. The Boston Parks system was created out of marshes (Laurie, 1975; Heckscher and Robinson, 1977; Newton, 1971; Jellicoe and Jellicoe, 1975; Swerdlow, 1993).

Figure 3: The lake and bow bridge in Central Park, opened in 1860 (Source: Swerdlow, 1993).

The pleasure ground characteristically separated its transportation systems – for example, carriageways were separated from pedestrian walks in Central Park. The European carriageways were also carried over promenades on causeways with high arches (Conway, 1991). Over- and underpasses were used to separate the pedestrians, horse riders, local and transversing traffic (Chadwick, 1966; Browne and Whitaker, 1971). The reasons for this included greater safety for pedestrians, continuity of traffic and greater comfort to people enjoying the park (Chadwick, 1966).

Artificial lakes were also designed and required sophisticated drainage systems to alleviate problems of seepage, evaporation and stagnant, redolent water. Trees were arranged in masses to create long vistas leading the eye into imaginary distances. Woods opened and closed around meadows, leading strollers forward (Chadwick, 1966; Cranz, 1982). Varieties of plantings screened the border of ugly urban surroundings. Mowed grass was basic to the pleasure ground, and was protected from trampling in parts. Irregular planting avoided the use of coloured foliage, as this, according to Olmsted, revealed the hand of man (Cranz, 1982).

Olmsted and Vaux made nearly fifty further parks in the United States including Prospect Park in Brooklyn (1866), Riverside Park in Chicago (1869), and Franklin Park and its original parkway system in Boston (Chadwick, 1966; Browne and Whitaker, 1971; Newton, 1971). The Boston parkway system became regarded as one of the most vital American contributions to nineteenth century park and town planning – a mutually supplementary series of parks widely dispersed throughout the metropolitan area and linked together by a system of connecting parkways (Chadwick, 1966). These parkways were conceived at one level as an agreeable way of getting from one park to another, but more subtly, they were seen as basic form-givers to an emerging city (Heckscher and Robinson, 1977).

The pleasure gardens were spontaneously active – sports were popular and the activities scheduled for the park were diverse. Unstructured activities included racing, polo-playing, circus shows, tennis, croquet, rowing, horseriding, walking, music, military maneuvers and mass meetings (Cranz, 1982). Any unruly behaviour or unseemly activity such as gambling, alcoholic drinks and carousing were strictly forbidden (Turner, 1987). Political and religious displays were also discouraged (Cranz, 1982).

It became extremely difficult to handle busy areas of the park in a way that would preserve the feeling of enclosure and increasingly the solution was to separate the sports areas (Conway, 1991). Indeed, throughout the whole pleasure garden period, a problem facing park designers was how to accommodate very large numbers of people and how to provide a variety of facilities without conflict between the various demands (Conway, 1989).

Parks were initiated by a variety of means in which central and local government, the speculator, the benefactor and the urban inhabitants played a role (Conway, 1989). Benefactors could best combine philanthropy with self-interest if they retained an interest in the land surrounding the park (Conway, 1989).

In sum, the pleasure garden movement developed out of concerns about public health, the morality of the people, the development of the Romantic movement and the improvement of real estate values and increased revenue for the city through higher taxes (Laurie, 1975; Heckscher and Robinson, 1977). The landscape design of the parks - informality, naturalism, Romanticism, and the picturesque - became the logical antithesis to urban conditions of the late eighteenth and early nineteenth centuries (Laurie, 1975). The picturesque ideals, which dominated park design for the last fifty years of the nineteenth century, have persisted, although site sizes and locations have changed (Cranz, 1982). The philosophy behind the pleasure garden was to emphasise quality of experience - quiet and serene visually and in terms of activity. It also meant to encourage family excursions and recreation (Cranz, 1982). Use was curtailed at nightfall and in rough weather. The buildings, planting, statues and fountains and the range of activities permitted in the parks reflected the changing social, moral, economic, and political concerns during this period (Cranz, 1982; Conway, 1991).

Towards the end of the century, it was increasingly recognised that large parks did not solve the problems of access to open space for those living in the densest urban areas (Conway, 1991). The Small Park Movement (1890-1900) was an effort to take the landscaping principles of these parks and translate them into smaller parks closer to the tenement districts where working people actually lived (Conway, 1989). This movement merged with the playground advocates who were trying to provide safe places for children to play off the streets (Newton, 1971; Shell, 1994). Combined, these two movements helped to create the second model of urban park development (Cranz, 1997).

2.2.1.2 The Reform Park: circa 1900-1930

With the turn of the century, matters took on a new light. Routine and dull office and factory work and the increase of leisure time in this period generated an acute demand for increasing recreational services. This new abundance of free time was perceived as a potential threat to society (Cranz, 1982). The keynote approach of reform parks was to therefore organise specialised activities, since urban park planners now considered the masses incapable of organising their own recreation (Heckscher and Robinson, 1977; Cranz, 1982; Turner, 1987). Park planners enumerated their accomplishments which included reducing class conflict, socialising immigrants, halting the spread of diseases and educating people so as to justify the unprecedented expenditure of public money (Cranz, 1997).

A new type of park resulted which segregated ages and sexes and which strongly focused on children. Reform playgrounds emerged which were parks for organised play and supervised games (Chadwick, 1966; Shell, 1994). Play leaders were entrusted with stimulating and controlling play. Municipal facilities, golf courses, tennis courts and stadiums were suddenly created .The characteristic pleasure ground activities such as boating and fishing disappeared (Cranz, 1982). The park for active rather than passive recreation was pioneered in Europe by the plan for Bos Park, Amsterdam, conceived in 1928, and begun by 1934 (Jellicoe and Jellicoe, 1975).

The focus on organised and intense physical activity led to a park's use at times when it would have previously gone unused and to the strict scheduling of its uses (Newton, 1971; Cranz, 1982; Turner, 1987). Year-round recreation increased the popularity of winter sports such as skating. Athletics, indoor and outdoor park gymnasiums, swimming baths (to encourage cleanliness), showers (for hygiene) were also popular. Parks were also used for folk and social dancing, play festivals and pageants, crafts, vegetable gardening (during the time of the First World War), public libraries, civic meetings, military presence, aquariums, lunchrooms and car rides. Park prohibitions were generally consistent with the previous era (Cranz, 1982).

The many immigrants to America resulted in this type of park reflecting an inherent desire to bring everybody together, so they would speak the same language, fill out government and other forms correctly (and so they would know what it meant to live in America) (Heckscher and Robinson, 1977; Cranz, 1997).

The scale of these parks and playgrounds, which were now closer to potential users than ever before, were determined by a number of standardised guidelines, for example, some planners concluded that for every thousand acres, there should be ten acres for playgrounds and squares and forty acres for large parks. A park was also usually located near cheap and quick transportation systems (Cranz, 1982).

Utility was a design priority and the overall layout was symmetrical and formal. Figure 4 shows Stanford Park in Chicago (c. 1915), where designers did not even attempt to screen out the industrial, commercial and residential buildings which typically surrounded the new, accessible park sites. It was usually divided into indoor (the field house) and outdoor areas, ringed by shrubbery and fences. Paths and roads were minimised. Views were no longer important and buildings and many varieties of playground equipment dominated the landscape. The architectural innovation of this period was the field house, which was the 'poor man's' clubhouse, and was usually located centrally in a park. Playground equipment such as jungle gyms and seesaws encouraged only the gross motor activities of children (Shell, 1994). Water

University of Cape Town

was used for practical reasons and the grounds were flat and covered by hard gravel or concrete surfaces. No illusion of the countryside existed here (Cranz, 1997).

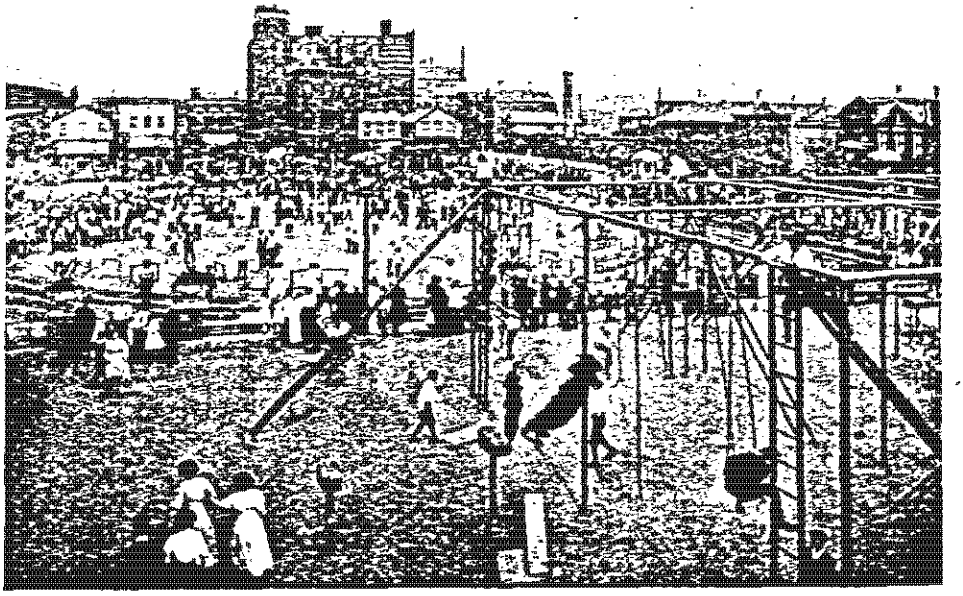


Figure 4: Stanford Park in Chicago (c. 1915) (Source: Cranz, 1982).

University of Cape Town

In sum, the quality of this particular era of park experience was noisy and organised, both visually and in terms of its activity. It was virtually antithetical to the pleasure ground experience (Cranz, 1982). The reform park offered city dwellers rigid leisure experiences and was characterised by Cranz (1982: 99) as an 'industrial, top-down style of leisure-time organisation'. These parks did spread quickly, however, play leaders could not keep pace and so this one, more beneficial element of park control was unfortunately lost. Eventually, the attempt to turn recreation into a form of community development by intensive and extensive programming was rejected (Cranz, 1982).

2.2.1.3 The Recreational Facility: circa 1930-1965

In 1930, a new era was ushered in when Robert Moses became commissioner of New York City's parks department. He aimed to make no more claims about what parks could accomplish with people, but rather to simply fulfill the mandate to provide a recreational service (Cranz, 1997). This era was named as such because 'recreation' emphasised activity and 'facility', an equally neutral and all-encompassing term, explained that this area was no longer really a park, in the sense of a large green area (Cranz, 1997).

Park planners no longer had to justify building parks – under the prevailing modernisation paradigm, recreation had been accepted as an essential of life, and so the underlying rationale for parks was often forgotten. Parks departments acknowledged their functions of meeting public demand for leisure activities and this led to an increased emphasis on the efficiency with which they could deliver services on demand. Systems thinking and bureacratisation prevailed. A general loss of interest in the purpose of parks ensued and simultaneous loss of authority and prestige, which was consequently reflected in lower park budgets (Cranz, 1982).

Budget cuts were further exacerbated by the Second World War. Cooperative ventures, park consolidation and liaisons with housing authorities were common during this period. The need for city planning, comprehensive studies and master plans was reiterated by parks spokesmen, and the development of planning standards continued as a preoccupation of park administrators. For example, the 1956 standards for California suggested that a city of one hundred thousand should have eight-hundred-and-eighty-three acres of city park, of which twenty-one would be needed for parking (Laurie, 1975). The inevitable result was that a smaller proportion of the recreation service actually focussed on the park user and his moral welfare (Laurie, 1975; Cranz, 1982).

The war also introduced new park activities which included first-aid classes and displays to promote patriotism. Day-care centres and nursery schools were set up. 'Victory gardening' began again as adults grew vegetables in parks (Conway, 1991). Sports became useful in a new way through 'physical fitness programs' (which were gymnastic exercises) and 'physical activity services' (such as boating and baseball). A war time urgency existed to condition the youth to a harder and more disciplined way of life. Community-wide events easily transformed into a new interest in large celebrations – parades, concerts and festivals. War hobbies and crafts (such as leather tooling and boondoggling) were promoted to release nervous tension. Teenagers were identified as important target markets for the first time during this era, and new 'rec' centres were created (Cranz, 1982).

After the war, however, even smaller parks were established. Schools and parks were sited adjacent to one another. A reason for this was the intense competition for urban space at this time. A new design ideal was the multiple-use facility. Annual reports described the number and types of these facilities in detail. The old park elements were standardised into a basic municipal package, and used repeatedly, without regard for local site conditions. Parts, materials and procedures were reduced to a minimum (Cranz, 1982).

Buildings of the recreational facility era were larger, more numerous and more various in function. Many non-recreational structures such as fire houses and navy control stations were included in park planning. Architectural styles were eclectic, materials modern. Recreation facility design was epitimised by the readily installable park bench. Fences and signs were prevalent due to less supervision. From about the 1950s, new colourful and technical playground equipment emerged which took on new shapes, was theme-based and was everywhere the same (Cranz, 1982; Shell, 1994). Figure 5 shows a treeless, fenced tarmac recreational facility in New York City towards the end of the era.

Figure 5: A tarmac recreational facility in New York City towards the end of the era
(Source: Cranz, 1982).

Overall, the recreational facility era was characterised by replacing the ideology of reform with one of meeting the demands of leisure. Facilities (and not space) were constructed simply to fulfill demand. Cranz (1997) notes that this period possessed little artistic vision, as there was little social vision and he makes a pertinent point that this may be why most people sometimes think parks are boring, as they have grown up in this period. At the end of this era, parks were deserted, unsafe, littered, had limited or no programming and were surrounded by busy streets and unwelcoming chain-link fences (Cranz, 1982).

Parks departments eventually tried to overcome the standardisation of play equipment by creating free-form, unbreakable play sculptures (Newton, 1971). This idea anticipated the thinking of the following era – versatility, spontaneity and openness of physical plan and programming, the encouragement of imaginative play (Cranz, 1982).

2.2.1.4 The Open Space System: Since 1965

The recreational facility era had provided facilities, but not open space. This new departure in park policy was a response to the so-called urban crises of this time (Cranz, 1982; Kent and Madden, 1998). It was realised that the city needed more from its parks than their previous society safety-valve function (Laurie, 1975). A balance between active and passive recreation was necessary. Imagery, inspiration and stimulation were needed. The new parks had to be more adventurous, colourful and seductive, and as such provide recreational experiences and not just recreational facilities (Laurie, 1975).

As such, open spaces in this period were seen as wide open areas which could permit a greater range of possible park activities. These urban spaces were not built up, but left open, bits and pieces of the city saved from the usual fate of urban land. Their fluidity allowed the park to flow into the city and the city into the park and were thus an essential part of the urban fabric (Chadwick, 1966). A new attitude that recreation was potentially everywhere emerged during the mid-1960s - the street, the rooftop, the waterfront, besides the park and the plaza (Cranz, 1997). It was perceived that all open space had potential recreation value, depending on the twist it was given (Cranz, 1997).

Newly permissive programming (and its publicity) was meant to shock the park as it was back into life. Dogs (and thus canine comfort stations), beer-drinking, feasting, dance and film, fashion shows, yoga and tai chi, controversial demonstrations were allowed (Heckscher and Robinson, 1977; Turner, 1987). Happenings were participatory, which seemed to guarantee experience (Cranz, 1982).

It has been during this period that segments of historical landscapes were deemed fit to be preserved for historical, educational and recreational reasons. This preservation affected the older parks as well. Ecology and preserving the balance of nature, paralleled this preservation of landmarks from the cultural past (Cranz, 1982).

Still, with the inherent competition for land, the open-space ideology had to rationalise the use of irregular, unusual and inexpensive areas hence the development of the vest-pocket park and the playlot. Ideally, they would be cast in a net over the whole city, integrating into a connected system of open spaces. A logical extension of distributing parks everywhere was to make them mobile, through the use of portable equipment – flexible, convertible and even disposable. Recreational space could be created everywhere without having to spend a cent (Cranz, 1982).

Adventure playgrounds had structures which could be created or destroyed, sand pits, benches, and equipment that was hard to vandalise. By the early 1970s, however, playground safety had become a concern. Some cities took action and installed forgiving surfaces beneath swings and climbers, but most cities did not. Wood gradually replaced metal for play apparatus during the 1980s, but the same play apparatus was still constructed (Shell, 1994).

Water was exploited in a more innovative way and waterfalls were used to dampen sound, cool the air and to attract people – a notable example being Paley Park in Manhattan (figure 6). Seating was designed so as to provide a choice of sitting alone or with others. Vegetation continued to be stripped for

University of Cape Town

easier maintenance and police surveillance. Fencing disappeared, as did billboards and buildings. Interest in architectural style focused on the renovation of landmark buildings (Cranz, 1982).

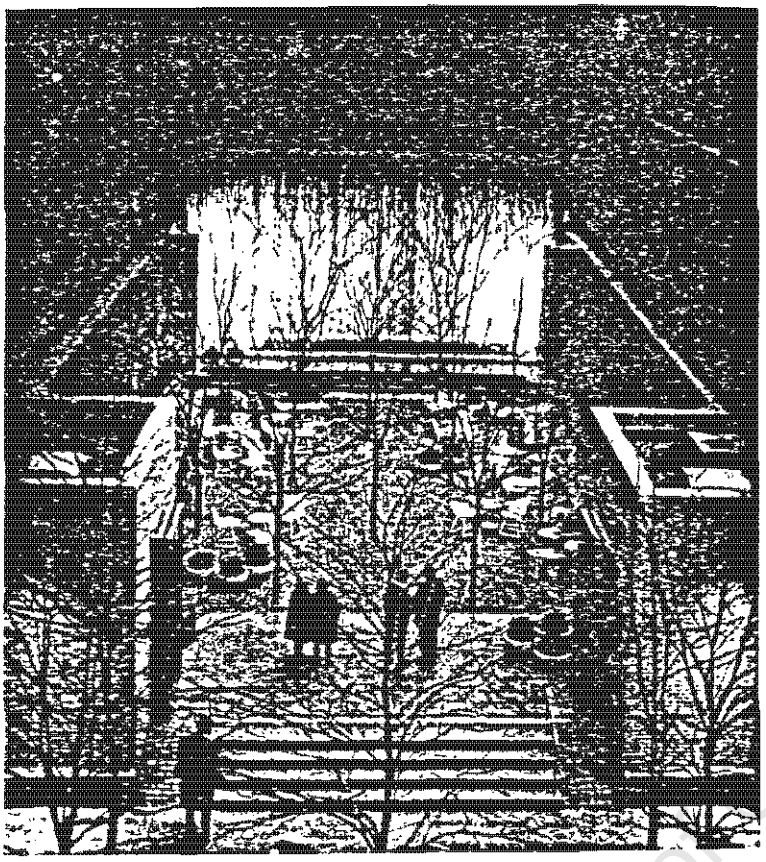


Figure 6: Photograph of Paley Park (1967), which can be viewed as the epitome of open-space mentality. This small oasis offers a visual and acoustic counterpoint to the city, without escaping the adjacent street (Source: Cranz (1982).

University of Cape Town

In its entirety, the open space system era involved the allowance of previously restricted activities in spaces that could be anywhere, direct participation with users, the provision of recreational experiences, preservation of landmarks and innovative design (Cranz, 1982).

In the 1970s, it was Stockholm, Amsterdam, Canberra and several cities in Switzerland and Germany, which began to understand the planning of parkland as an integral part of planning the total urban environment. Zurich's waterfront, Dusseldorf's management of its pedestrian/vehicle conflict, Stuttgart's Central Park and water-gardens are examples of this philosophy (Browne and Whitaker, 1971). The city green movement of the 1980s recognised that nature was all over the city, in a multitude of forms and that it could be used productively. These ecologically centred ideals were the beginnings of what drives park development today (Higgens, 1986).

2.3 Urban parks today

The previous exploration has revealed that since their inception, parks have been used as instruments of social and economic development. Today, some cities have examples of all of the aforementioned park types, others place more recent park types onto the edges of older ones and some parks show evidence of several coexisting park models (Cranz, 1982). Cranz, (1982: 138) concisely sums up the evolution of parks: 'If the pleasure ground had been a pious patriarch, the reform park a social worker, and the recreation facility a waitress or car mechanic, the subsequent park was something of a performance artist'. A visible trend within this historical account is that what happened in each of the parks reflected what was happening in society during each era (Conway, 1991).

The trend is no different today. In our present world, damage to the natural environment and the upliftment of the poor have become great issues of concern to many. Present park models thus focus on the potential to use parks to contribute to the effort of learning to live on the earth in a more sustainable way. It has also been realised that parks can begin to overcome an historic split between production of resources and consumption of resources by addressing the possibility of being productive in their own right (Cranz, 1997). To continue with Cranz's analogy, the park planner of the twenty-first century should be a socio-ecologist.

Parks seem able to successfully achieve this, if they incorporate multifunctional uses. Having reviewed park development across time, a collection of relatively recent international and national case studies and urban park ideas will be presented from which further lessons can be learnt. Key success factors are identified, which may inform successful park design and hence further the concept of the park as an instrument of development.

Note that the first park developments which are described are chiefly concerned with social upliftment, whereas the last few are concerned with both the natural environment and community needs and how the two can be met in supplementary and complementary ways. It is interesting to note that South Africa has achieved this (for example, see case study 2.3.1.6).

2.3.1 Urban park case studies

2.3.1.1 Britain: Windmill Hill City Farm, South Bristol (Source: Department of the Environment, 1987).
In an area of high unemployment and with few community facilities, this farm, one of the earliest examples of its type, offers something for everyone. In the ten years since its conception, it has transformed the local neighbourhood from a landscape of rubble and abandoned cars into a thriving community centre, used and valued by thousands of local people. In addition to substantial environmental improvement, much enthusiasm and involvement has been generated amongst residents. In terms of design, this relatively small site (1.8ha) has been used imaginatively to provide features that are interesting, and that are used by a wide range of people, from school children to pensioners.

Windmill Hill originated in 1976, when a group of local residents objected to the Bristol City Council's proposal to use the site as a high security lorry park. The idea of a city farm emerged, and the council agreed to lease the land at reduced cost for five years. Volunteers, who serve on a management committee through which the farms different users organise their activities, cleared the site, after which the needs of the locality were considered. The farms first activities included a summer play scheme for the local children and a community bus service provided through partnerships with local councils and a bus company.

The layout and activities of the farm have developed over a decade in response to local community needs. The philosophy behind the design and management of Windmill Hill has been to cater for and gain the support of a range of people in the community. The area has thus been designed for parents, young children, teenagers and the elderly. There has been no set pattern to the planning of the farm, but instead it has evolved and adapted to new demands over time.

University of Cape Town

In 1987, the area had a farmyard, allotment gardens with an ornamental pond, paddocks for grazing animals, an all weather sports pitch, play spaces for young children, an adventure ground and a nature reserve. New demands have allowed the development of raised flowerbeds for disabled and elderly gardeners, herb and butterfly gardens and a tree nursery.

The complex of buildings around the area include the barn (designed and built by local architectural students), a play centre, workshop, a craft and administration space, a café and dairy. Most of these buildings were constructed with unwanted, but usable building materials, which are collected and stored in a recycling yard.

The allotment gardens were let first to those who lived in nearby flats, but are also used regularly by patients from the nearby psychiatric hospital. The farm responds especially well to the needs of women for sociable and creative activity. Animal husbandry, horticultural and food processing skills, printing, spinning, weaving and woodwork are taught.

Windmill Hill is a working model of community resourcefulness. It makes productive use of wasteland, creates a green oasis in the city, offers recreational and educational experiences for all ages and reaches out in an innovative way to realise opportunities for community gain.

Key success factors:
- employment creation
- educational resource for all age groups
- effective use of old structures to create new facilities
- community involvement
- continual development

2.3.1.2 United States: The Elliott Donnelley Youth Centre Park, Bronzeville, Chicago (Source: Garvin and Berens, 1997).
This part of Chicago is best known as the site of the world's largest public housing complex – the infamous Robert Taylor homes. It is also infamous for being one of the most crime-ridden and impoverished communities in the United States.

For many years, a number of vacant building lots adjacent to this youth centre stood vacant, littered with rubble and debris. In 1993, through the efforts of centre staff and youth, local artists and a host of sponsors and volunteers, two of the lots were transformed into a colourful playground, sculpture park and community garden.

The vision for the park moved beyond the creation of just a community garden to encompass a recreational component for children, as residents in the area had reseñted the lack of recreational activities available to local children. It was further decided to include a landscaping component.

An aim was to instill in the children and residents a sense of community ownership. About twenty randomly chosen children aged five to thirteen were asked to draw what they felt the park should look like to help produce a vision for it and to help decide on playground equipment. The children even took part in the final selection of equipment.

Local residents and children were also closely involved in the planning and development of the landscaping portion of the park. More than one hundred local residents and children planted many of the trees, shrubs and flowers that now fill the park.

Artists used recycled materials and discarded objects found locally to create sculptures for the children' area. A large mural was restored and children participated actively in the stripping, sanding, carving and painting of a number of totem poles. The totem poles were carved from the trunks of large *ailanthus* trees, weed-like plants that grow wild on vacant land throughout Chicago. The artists left one of the

University of Cape Town

runks uncarved so environmentally aware visitors could see what the tree looked like before it was carved and so that certain visitors could leave their marks there, subtly discouraging vandalism elsewhere.

Balancing the uncertainty of funding, and keeping the process going so as to sustain the community's faith in the project, was the greatest challenge to the park creators. The enthusiasm the project generated amongst the children helped to keep the community focused on the project's ultimate completion.

The creation of the Elliott Donnelley Youth Centre Park increased local pride in art and gardening projects and has fostered a broader interest in Bronzeville. In addition, the creators believed that the children beneficially learnt to control their environment in that the park was not built for them but *by* them. The lesson in community ownership has carried over into the maintenance of the park. Small groups of children are responsible for weeding, picking up litter and sweeping.

Key success factors:
- participation and local ownership
- sponsorship
- meeting local needs by providing for productive uses and active and passive recreation
- securing ongoing funding
- community maintenance
- working with local social dynamics - using local artistic skills
  - focusing on children

2.3.1.3 Mexico: The floating gardens south of Mexico City (Source: Cranz, 1997).
These are five hundred year-old Aztec gardens that were built over a canal system. Soil was placed on mats in water so that the gardens would float. These were stabilised into areas surrounded by deep canals, which could then be farmed.

During the 1970s, the gardens were threatened by development. The Mexican government did not have the funds to preserve or maintain these gardens for the farmers. However, they did invest in improving access from the gardens to a market place, by constructing a better road. Farming suddenly became more profitable to the farmers, and so could decline selling their land for the purposes of development. Cranz (1997: 3) describes the area now as 'beautiful...historic preservation, economic development, and park and recreation development all in one'.

Key success factors:
- integration into the urban system
- creative use of resources
- *multifunctional use*
- preserving area of cultural significance

2.3.1.4 South America: Curitiba, Brazil (Source: Nicks, 1994).
The government of Curitiba realised that it had to enlarge its green public open space areas in order to address both escalating environmental pollution and engineering problems.

In the 1950s, increasing development pressure coupled with little or no development control, resulted in local river systems becoming polluted with sewage and litter. Large scale flooding also became a major problem as a result of urban encroachment into the flood plains. Long stretches of river were thus canalised in either the traditional open or closed channels and in places rivers were dredged. These actions merely displaced and compounded the flooding and associated problems downstream at enormous cost.

University of Cape Town

t was then proposed that an open space system around the rivers be created and restored so that flood control functions could be performed by parks. At the time, no funding was available for any large scale landscaping, tree planting or lake creation. This problem was solved by applying for Federal funds for flood control works and instead of usually using the money for concrete canals, it was used to build systems of small dams. Land subject to annual flooding was also expropriated.

Thus, beginning in 1971, a number of parks were created ranging in size from the Barrigui and the São Lourenço of one-and-a-half square kilometres to the Iguaçu Park – eight square kilometres. These parks contain a variety of land uses. For instance, Iguaçu Park contains a nautical park, an olympic rowing mile, a fishing area, public fruit orchards and a zoological garden. The channels within these parks function as flood control measures for the surrounding residential areas. The Iguaçu Park provides recreational amenity to the adjacent Boqueirao district, a large low-income area of about one hundred thousand people.

The Passaúna Park (six-and-a-half square kilometres), lies adjacent to Curitiba's industrial district, and was created to protect the headwaters of the Passaúna River, the lake of which provides one third of the city's water. This park contains environmental education centres, indigenous woodland, a number of wild animals and walking and fishing opportunities. Activities in other parks include horticulture, production of trees, shrubs and fruit trees such as those in Barreirinha Park.

In addition to the parks, environmental protection areas were declared to control development in the catchment areas. These areas include thirty-nine square kilometres around Iguaçu Park and forty-three square kilometres around Passaúna Park. Private land is included and owners are encouraged via fiscal incentives to comply with the environmental protection measures.

Overall, Curitiba seems to have mastered sustainable park creation, which meets the needs of both nature and its users.

Key success factors:
- using parks for water catchment management and flood control
- innovative sources of funding
- multifunctional use
- environmental education
- productive utilisation of resources

2.3.1.5 South Africa: Botshabelo Park, Orange Free State (Source: Sowman and Urquhart, 1998). Botshabelo is a sprawling township fifty-five kilometres south-east of Bloemfontein in the Orange Free State. This very degraded township, with minimal servicing had a bleak appearance and no trees. In 1992, residents of Section G in Botshabelo formed action groups to tackle the environmental problems facing them, and the Modulaqhowa Environmental Project was started.

One of the action groups, which involve more than six hundred people, transformed a derelict area into a green and productive park. Previously the area was eroded with many dongas, rusted car wrecks were everywhere and the dam wall was badly damaged. The dam was rebuilt, and piles of soil left over from scraping the bottom of the dam formed reed-covered islands. Both indigenous birds, such as red and gold bishop birds (*Euplectes orix, Euplectes afer* respectively), and domesticated geese now breed on these islands. Various types of poultry are reared in one area of the park. The car wrecks were either removed and sold as scrap metal, or converted into turkey pens. Stone bunds were built to stop sheet erosion and indigenous grasses and flowers re-established themselves. Many indigenous trees were also planted.

An important aspect of the success of this park is that the community retained ownership of its concerns, and was committed to making its own decisions and managing its own finances.

University of Cape Town

Key success factors:
- community ownership and involvement
- enabling productive use
- recycling
- using local resources
- indigenous vegetation
- developing skills

2.3.1.6 South Africa: Gillooly's Farm, Bedfordview, Gauteng (Source: Young, 1994a, 1994b).
Gillooly's Farm is located in the Jukskei River Valley at the junction of the eastern end of Linksfield ridge, a rocky terrain of considerable interest and conservation value. Gillooly's farm was a deteriorating park with a few trees, large expanses of lawn and dilapidated play equipment. This unprogrammed space was also an expense to the local municipality in terms of continuous mowing and removing exotic invasive vegetation. The ecology of the river valley had been profoundly affected by the impacts of urban development, which had caused low species diversity and an unstable riverine ecosystem. Heavy volumes of high velocity storm water had created deeply eroded, unstable banks. It had little recreational or ecological value and did not contribute to social or environmental enhancement.

In terms of design, a multifunctional approach was used. The park was to remain as a regional recreational facility, but its design was intended to increase biological diversity and its activities were meant to recognise social differences. The conservation and creative use of key natural elements, such as water, plants and wildlife, was proposed to re-establish a natural balance and enhance the area by improving its environment.

The park was laid out as a series of smaller spaces, all centred around the dam. The more intense and compatible recreation uses were located in an active recreation zone along the dam's waterfront area. These included a restaurant, a refreshment kiosk, walkway, terrace, a bandstand and restrooms. The parking area was connected to this zone. More passive recreational activities such as walking, birding and picnicking, take place closer to the ridge itself. A family golf-driving range was treated as a facility in its own right.

In terms of its natural systems, reed-beds function to filter the water as it enters the dam, which also acts to attenuate storm water. The dam was designed as an 'off stream' water feature and so its water quality remains acceptable for recreation and conservation purposes. The air and the microclimate of the park has also improved. Hence species diversity, especially of that of the waterfowl, has also increased substantially.

In terms of security, an important factor in this area, the park's main vehicular entrance is controlled with a security booth. Although access from the adjacent neighbourhood and the river and ridge trails is unrestricted for hikers and joggers, the area is patrolled on horseback by park rangers, who also live on the property.

This design seems to have responded to both an ecological philosophy and it has also taken into account community needs in an innovative and realistic manner, where a compatible variety of uses function in sync with the site. The planning, design and development of Gillooly's Farm illustrates a concern with productivity, environmental and social health and the efficient, wise use of land.

Key success factors:
- working with nature
- natural systems improvement
- use informed by nature
- sustainable water management
- addressing security

University of Cape Town

2.4 Urban parks: some further ideas

The literature shows that the possibilities for multifunctional open space within urban areas are immeasurable (Garvin and Berens, 1997; Shell, 1994; Coleman, 2001; Urban Parks Institute, 2001a, 2001b). The many illuminating case studies cannot all be included here, so the following is a summary table of some of the many resourceful ideas that have been implemented in urban parks across the world. It serves to further enhance one's perception of the potential of urban parks today.

Table 1: Summary table of innovative urban park ideas and their significance

PARK/COUNTRY	IDEAS AND BENEFITS	SOURCE
Central Park, Manhatten, United States	In a small playground area, 'children scramble up a jumble of rocks and logs to the top of a granite outcrop carved into a smooth spiral slide. They climb and climb again, the slip of mud and rock against their sneakers, climbers challenging a peak'. The landscape is thus used as a playground and nature forms the play element.	Shell, 1994: 2
Warrington, London, Britain	Formed teams of voluntary park rangers; anglers manage ponds, children maintain the park spaces and plant trees; build bird boxes and record the weather.	Nicholson-Lord, 1987
Covent Garden,London, Britain	In 1983, organised a 'Festival of Street Performers' in this public space, which allowed those who attended to share experiences and feel a sense of community; it also legitimised a phenomenon that had been developing informally.	Crowhurst Lennard and Lennard, 1984
Dufferin Grove Park, Toronto, Ontario, United States	A twenty by forty foot sandpit furnished loose poles, rope, shovels and other materials who build teepees, lean-to's, bridges and so on; restored oversized checkers board and children painted discs black and white which were cut from tree trunks.	Mason, 1998
China	Bamboo is grown for fans and toothpicks; flowers for medicinal herbs; harvest fish in ponds three times a year; grow trees which are selectively harvested. All generate revenue.	Cranz, 1997
Windmill Hill, Bristol, United Kingdom	A 'rumpus' area – a maze of soft, safe foam shapes enjoyed children, especially handicapped children.	Department of the Environment, 1987
Warrington Community Garden, West Philadelphia, United States	Contains a revenue-generating tree nursery, a tot lot, a small offstreet parking area and a badly needed daycare centre.	Garvin and Berens, 1997
Hua Mei Bird Garden, New York	This community garden has daily morning gatherings of Chinese men with	Urban Parks Institute,

University of Cape Town

City, United States	beautiful songbirds in bamboo cages.	2001a
Union Square Park, New York City, United States	Incorporated a farmer's market and a seasonal Christmas market so as to attract people, provide entrepreneurial opportunities and to give the community a valuable connection to the farms surrounding the city.	Kent and Madden, 1998
Natividad Creek Park, Salinas, California, United States	Children's discovery garden: meandering walks through low growing vegetation leading to many interpretive areas such as the aromatic herb garden; has view corridors for parents from adjacent picnic area; focuses on creative play and environmental education.	Lienk and Piper, 1997
Meridian Hill Park, Washington DC, United States	Adapted traditional Native American, African American, Latin American and European rituals into seasonal celebrations so as to honour different cultures and heritages; created a simple map, mascot (the earthworm) and motto for the park; planted memorial trees; used media to counteract decades of bad news with each new positive development.	Coleman, 2001
Bryant Park, New York City, United States	Introduced movable, folding chairs which provides the park user with a feeling of independence and comfort ; also a flexible means of increasing the capacity of the park	Garvin and Berens, 1997
Mill Race Park, Columbus, Indiana, United States	As the site is flooded annually, the parks rest rooms and other structures are raised off the ground; strong pathways constructed to resist scouring	Garvin and Berens, 1997
Forest of Dean, Border of Wales and Gloucestershire, Britain	Contains artworks and sculptures, which delight and entertain; plays an important role in art education and ecological awareness. Also encourages social and cultural consciousness of visitors.	Ross, 1996
Central Park, New York City, United States	Stock ponds with fish so as to provide for catch-and-release fishing; creates environmental awareness and is a popular sport.	Urban Parks Institute, 2001b
Playground for all children (PAC), in Corona Park, Queens, New York City, United States	Low basketball nets, and specially designed equipment that children without working legs can use; integrates children with and without special needs.	Shell, 1994
Riverside Skate Park, New York, United States	Designed and constructed by teenagers so as to create a sense of ownership, this park is a mecca for skateboarders and in-line skaters.	Urban Parks Institute, 2001a

University of Cape Town

2.5 Issues

This section has hopefully initiated and stimulated thinking around the possibilities of open space in urban areas. The typologies of parks described here show that generally, open spaces can be positive or negative. Case studies can offer many hopeful and instructive examples of how parks can be installed and revitalised within the urban fabric. Not suprisingly, many commonalities exist among various park development efforts. A pertinent key success factor seems to be the degree to which a site is 'owned' and valued by a community. However, it should be remembered that each city, each park site and their surrounding communities are absolutely unique in time and space and that the lessons learned and ideas gained from such case studies must be viewed within their specific context. As such, the proposed Cape Flats Urban Park must also be viewed within its own context.

Furthermore, the case studies are descriptions and not accounts of continuous monitoring over a longer period of time. It is not known whether these parks have continued to be effective urban parks. Olmsted (in Heckscher and Robinson, 1977: 172) himself admitted and warned that 'the park can easily become a nuisance and a curse to the city'. Moreover, the available literature also contains many descriptions and accounts of urban parks in Britain and the United States and many other developed countries. Similar amounts of work do not seem to have been executed on parks in developing countries, where ironically, parks may be the most needed. There seems to be a gap in the literature for long-term analyses of park development outcomes and for the development of parks in developing countries, which, if filled, can become another very important source of precedent for South African park evolvement.

In order to investigate the proposal that open spaces can aid social and economic development, this study will now continue with an exploration of how planners have considered urban open spaces in Cape Town, South Africa. This will enable the introduction of the conception and content of the Cape Flats Urban Park proposal.

University of Cape Town

Section 3: The Case of Cape Town

This section reviews how planners have considered urban open spaces in Cape Town. It begins with a general description of the city and its people, which focuses on the Cape Flats, the proposed location for a new urban park. The conception and proposals for this park are then introduced. This case study provides a platform, from which to investigate how urban open space can become an instrument of social and economic development.

3.1 Cape Town and the Cape Flats: the setting and situation

Figure 7 shows Cape Town to be located in the spectacular natural setting at the south-western tip of South Africa, within the Western Cape Province. Between the Peninsula Mountain Chain in the west and the Hottentots Holland Mountains some forty-five kilometres to the east, lie the sandy Cape Flats, the city's least hospitable area (Cape Town City Council, 1993).

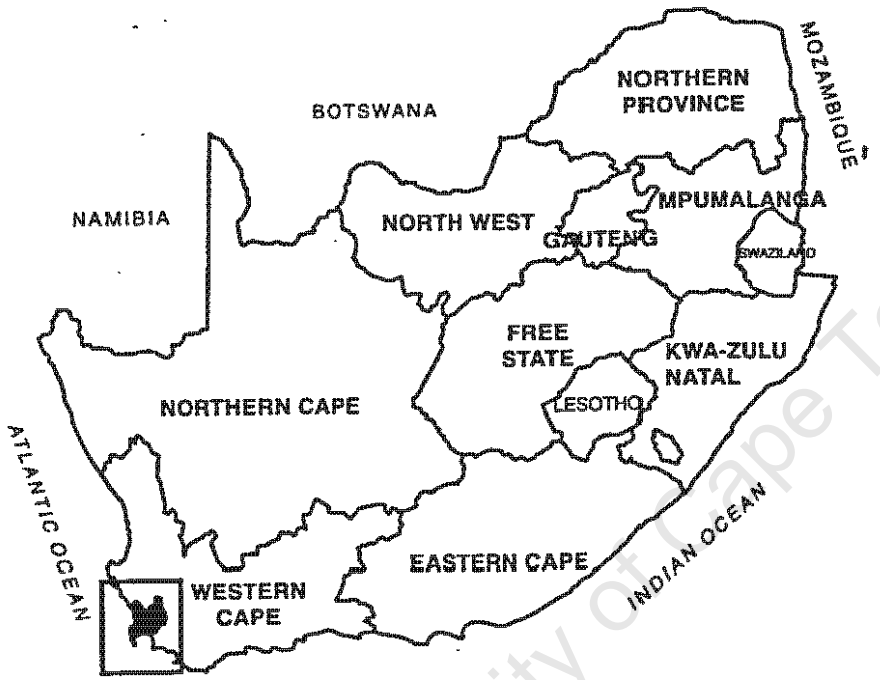


Figure 7: Cape Metropolitan Region within the Western Cape Province (Source: City of Cape Town, 1999a).

University of Cape Town

The settlement of Cape Town, since its inception, grew in a linear fashion in a southerly direction, from the sheltered Table Bay harbour, flanking the Peninsula Mountain Chain, to the second harbour at Simon's Town. Northern and western 'arms' of older urban development also extended and penetrated into the interior. The Cape Flats remained uninhabited (with the exception of vegetable farmers in the Philippi area), until the advent of racial segregation early in the last century. With the arrival of scientific planning and the 'neighbourhood unit' model, much of the subsequent development on the Cape Flats increasingly became a zone of lower income, public housing estates for non-white groups. Although highly planned, squatter settlements and informal shacks comprised a substantial portion of the housing (Awotona et al, 1995c).

Consequently, the general pattern of development of the Cape Flats has been one of large, mono-functional and geographically discrete 'neighbourhoods' designed primarily for vehicle-owners, and surrounded by vast, unintegrative open spaces often conceptualised as buffers rather than multifunctional urban open spaces (Japha and Hüchzermeyer, 1995).

The population densities of Cape Town are the highest in these townships and informal settlements of the Cape Flats, which house the majority of the city's poorer residents (Wilkinson, 2000). The quality of life for many of the people who live here is poor. The apartheid policies and practices of the past have formed a city structure which aggravates poverty and inequality, which is highly inconvenient for many, which uses resources inefficiently and which is environmentally sterile. Restructuring and renewal of the Cape Flats' townships are considered vital in order to address Cape Town's historical legacy of underdevelopment and deprivation (City of Cape Town, 1999).

3.2 Urban open space thinking

In Greater Cape Town, the development and distribution of open space has taken place, yet chiefly in an *ad hoc* manner. The Cape Flats in particular, has, as yet, no real linked system of open space (Cape Town City Engineer's Department, 1982; Cape Town City Council, 1993). It does have many 'empty' open spaces within and around the townships: however, these are undeveloped, unattractive, perilous, and serve little or no useful purpose (Cape Town City Council, 1993).

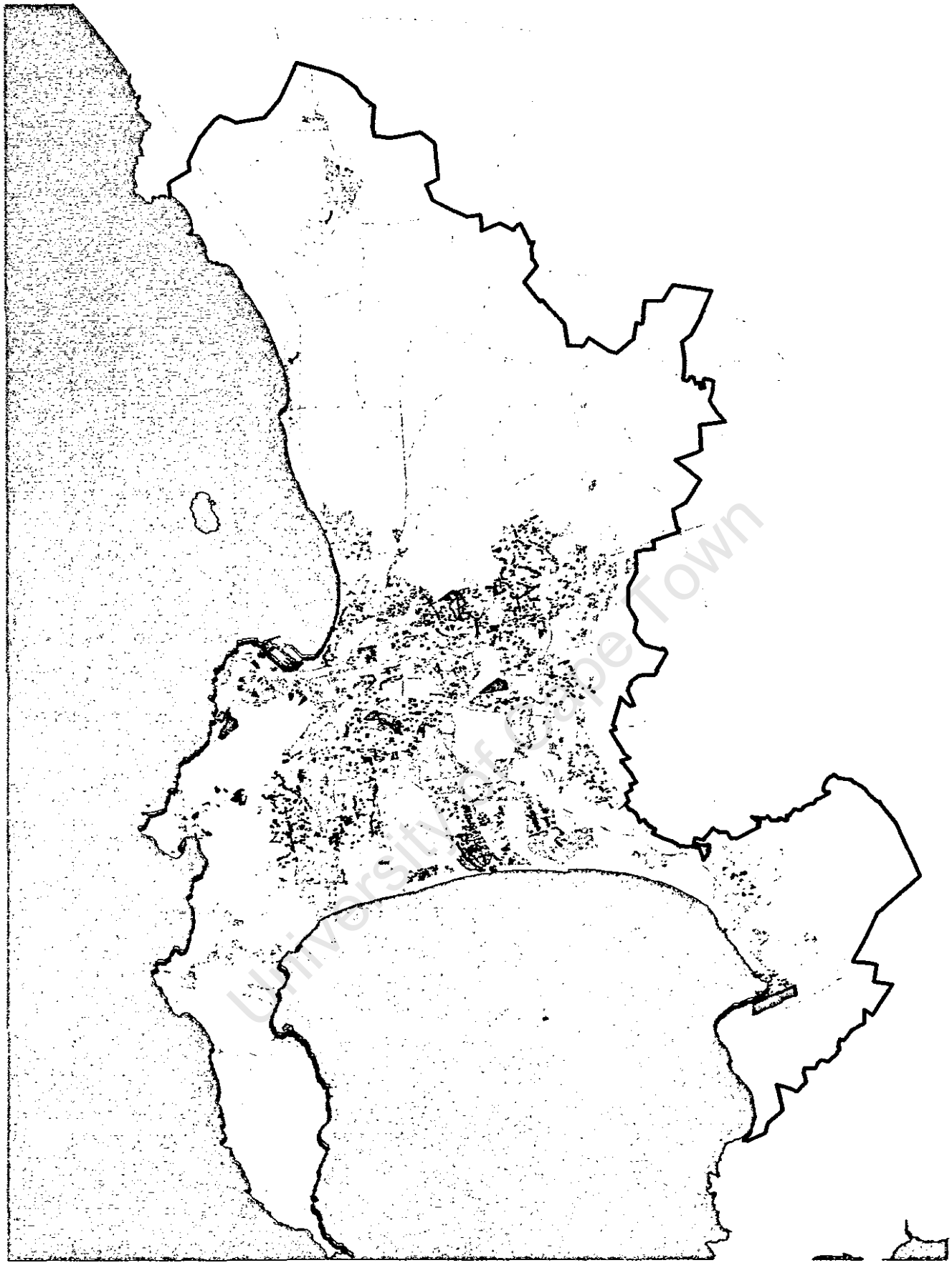
The spatial isolation of the poor communities residing in the Cape Flats is compounded by the location of the poor areas far away from areas of outstanding natural beauty. The best quality open spaces are located outside of townships and are not easily accessed by those living in the Cape Flats. This environmental marginalisation further reduces the quality of residential life and also limits involvement in tourism, a major growth sector of the city (Watson, 2000).

Figure 8 shows the current general distribution of open space in the Cape Metropolitan Region. Notable established parks include the Cape Peninsula National Park along the Cape Peninsula Mountain Chain, Kirstenbosch National Botanical Gardens adjacent to the suburbs of Newlands and Bishopscourt, and the Company Gardens in the city bowl (Cape Town City Council, 1993).

In 1982, an attempt to implement a long-term structure plan for the development of open space in Cape Town resulted in a report called *Greening the City: Open Space and Recreation plan for Cape Town*. The recommendations contained in this report were not realised. However, in 1996, the benefits of urban space within the urban environment of Cape Town received attention by key metropolitan stakeholders, government departments, local authorities, community representatives and the public, who were involved in a new spatial planning initiative. This culminated in the production of a technical report called the *Metropolitan Spatial Development Framework: A Guide for Spatial Development in the Cape Metropolitan Functional Region* (the MSDF).

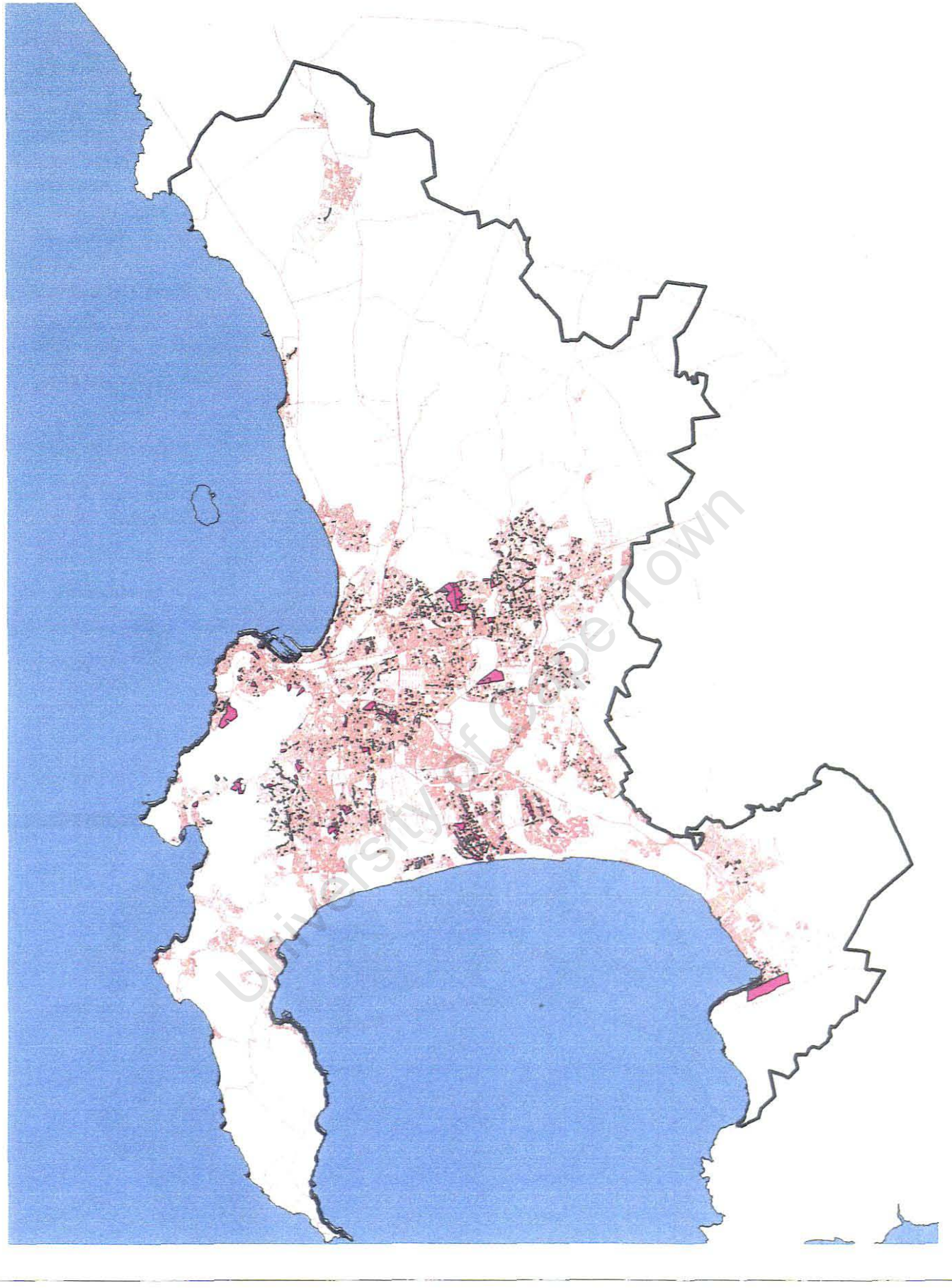
The MSDF originated in 1991, essentially as a result of the need to co-ordinate responses to planning and development in the Cape Metropolitan Region (CMR). The main purpose of this document was to guide the form and location of physical development in the CMR on a metropolitan scale in the long-term. It does so by adopting a number of principles, goals and spatial and non-spatial guidelines, which are meant to inform all planning and development in the CMR. The principles adopted were equality of opportunity, social justice, sustainable development and openness and accountability. The goals included, *inter alia*, equity and access, vitality and choice, prosperity, social well-being, uniqueness, adaptability, safety and efficiency. The spatial principles were, *inter alia*, the management of all urban resources to ensure sustainability in utilisation, the intensification of urban development within the existing urban areas, redressing imbalances in the location of urban services and employment opportunities and developing quality urban environments. The non-spatial principles comprised, *inter alia*, of ensuring people-driven development and co-ordinating spatial planning with economic and social development policy (Cape Metropolitan Council, 1996).

University of Cape Town



University of Cape Town

Figure 8: Map showing general distribution of open space in the Cape Metropolitan Region (Source: Milne, 2001).



University of Cape Town

Figure 8: Map showing general distribution of open space in the Cape Metropolitan Region (Source: Milne, 2001).

The actual purpose and importance of a planned open space system for Cape Town is elaborated further. A metropolitan open space system

- enhances the overall quality of life for urban dwellers;
- promotes general amenity and both active and passive recreation for the local population and for tourists;
- plays an important ecological role in that it provides species with habitats and hence protects biodiversity;
- promotes nature consciousness in people through direct contact and experience in nature – direct environmental education;
- has a potential role to play in advancing ecotourism and encouraging the cultivation of indigenous plant species for traditional plant use;
- can contribute to increasing the safety of urban areas by progressively bringing derelict and unprotected spaces into the system (Cape Metropolitan Council, 1996).

The MSDF goes on to emphasise that it is imperative that the siting of open space within Cape Town considers the benefits involved by creating a connected system of open space. Again, the enhancement of recreational and ecological potential encompasses such benefits. As such, local planners will need to carefully balance competing claims for land use against the community's long-term need for open space (Cape Metropolitan Council, 1996).

The MSDF's concept of MOSS laid the foundations for a more detailed open space proposal, which will be discussed in the following subsection.

3.3 The Origin of the Cape Flats Urban Park

The Planning and Development Directorate of the Planning and Economic Development Cluster of the Cape Town Municipality published the Draft Municipal Spatial Development Framework (the Muni-SDF) in 1999. Again, this propitious document sought to improve what has up until now been inconsistent and poor decision-making regarding the city's spatial development. The framework aims to guide and transform the city's structure and form, over time, into 'a city that works for all' – one that is efficient, equitable and integrated (City of Cape Town, 1999a: 2).

The Muni-SDF proposes green space as one of the main elements determining the public spatial framework (along with movement, urban public places and spaces, social facilities, economic infrastructure, publicly-assisted housing, utility services and emergency services). It emphasises green space and its quality (not just quantity) to be a non-elitist, fundamental part of the spatial structure of the city, and subsequently presents a set of underlying dimensions, which support this statement, and which recognises the significance of open space within Cape Town. Summarily, these include:

- *A psychological and social dimension* which accepts that human life is qualitatively affected by a sense of place. The natural environment provides an escape from fast-paced urban living and the quality of this environment contributes to the creation of a sense of dignity and pride of ownership.
- *A cultural dimension* which involves the recognition of the linkage between the characteristics of a place, peoples' activities in that place and the emergence of cultural expressions and forms. In Cape Town, the green system itself also accommodates certain cultural institutions and ceremonies.
- *A recreational dimension* which recognises of the need for people to escape, for active and passive recreation and for contact with nature.
- *An ecological dimension* where the natural environment and its processes provide the setting upon which, and the basic resources within which human life is led.
- *An economic and productive dimension* as the natural environment supports a vitally important tourism and agricultural industry in Cape Town. This in itself endorses the sustainable use of all natural resources. Moreover, a high-quality environment indirectly increases property values and generates economic opportunity (City of Cape Town, 1999a).

University of Cape Town

The Muni-SDF suggests a number of general principles, which support a sustainable view of the city's natural resource base. Firstly, the open space network must be seen as a permanent and integral part of the urban environment. Secondly, the promotion of a positive and enduring relationship between the built and natural environments must occur. This will have implications for many issues, for example, the way buildings respond to, and define open space, how open spaces can be used positively for human-based purposes and the integration of utility functions and natural systems. The third principle states that land with the best natural attributes and intrinsic quality should be left as open space. However, the approach to open space systems should be considered structurally and even creatively made where necessary. More importantly, the fourth principle suggests that open space should be treated as a coherent and continuous system, which requires large core conservation areas, the maximisation of landscape continuity (such as creating natural habitats within ecologically neglected open spaces) and system linearity (such as corridors on either side of a river) (City of Cape Town, 1999a).

Furthermore, potentially important non-renewable 'stock' resources (such as silica sand deposits found in areas of the Cape Flats) should not be destroyed or built over (Fabos, 1979: 28). Wherever possible, recycling and the productive use of waste products should be promoted and, finally, open space should be designed to fulfil as wide a range of functions as possible (City of Cape Town, 1999a).

The Muni-SDF describes four broadly-defined components which should contribute to a green open space system. A description of each follows.

- *Ecological conservation areas*: The conservation and management of resources within Cape Town fundamentally involves the protection, enhancement and rehabilitation of the city's key remaining natural resources and places. These include the mountain, the coast (such as the proposed False Bay Coastal Park), unique habitats (such as Edith Stephens Nature Reserve, Wolfgat Nature Reserve) and river systems. The framework applies a biosphere concept of core conservation areas, buffer areas and transition areas in order to balance the need to protect that which is of value as opposed to facilitating access at a level appropriate to the sensitivity of the area. Here, the framework proposes that ecologically significant areas along the False Bay coast, from Simonstown to Somerset West, be incorporated into a regional coastal park, of similar status as that of the Cape Peninsula National Park, and of sufficient size and depth to be ecologically sustainable. It also makes a preliminary identification of ecologically significant remnants, which should be incorporated as key components within the green web. Those relevant here are Edith Stephens Nature Reserve and Wolfgat Nature Reserve (refer to figure 10) (City of Cape Town, 1999a).

- *An interlinked green web*: Place and point-related conservation and created areas need to be incorporated into a structured web of green space throughout the city in order to promote biodiversity, access to green space, place-making and climate amelioration. Links can then establish themselves over time between protected natural areas, different types of open space and public facilities and amenities (City of Cape Town, 1999a).

- *Special public open space elements*: The creation or improvement of promenades, elevated walkways and platforms is proposed so as to provide opportunities to view the city, mountain and oceans. For example, the Philippi Memorial Park, a metropolitan cemetery and garden of remembrance, is proposed for the northern edge of the Philippi agricultural area (City of Cape Town, 1999a).

- *Created green precincts*: To improve people's access to nature, the creation of a hierarchy of new, equitably distributed places is proposed. These places, depicted in figure 11, include a regional system of urban agricultural complexes, which *inter alia* will provide a continuous, sustainable production of food for the city (such as the Philippi agricultural complex), more active recreational parks, collective sports facilities and multipurpose urban parks. The more active recreational parks would consist of collective sports facilities within a park, which is highly accessible and in close proximity to public interchange points. The creation of collective generic sports facilities would

University of Cape Town

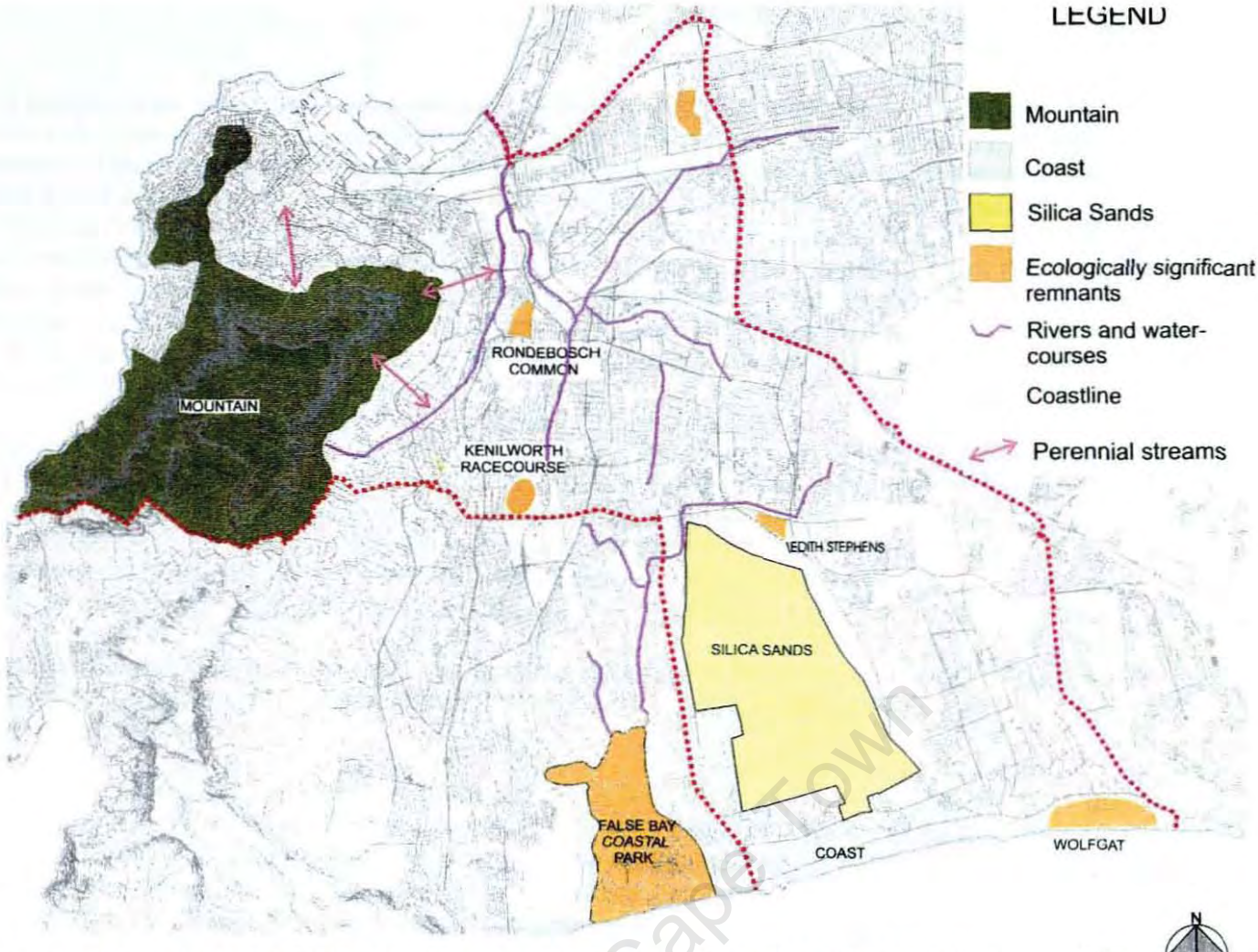


Figure 10: Ecologically significant remnant areas (Source: City of Cape Town, 1999a). NTS

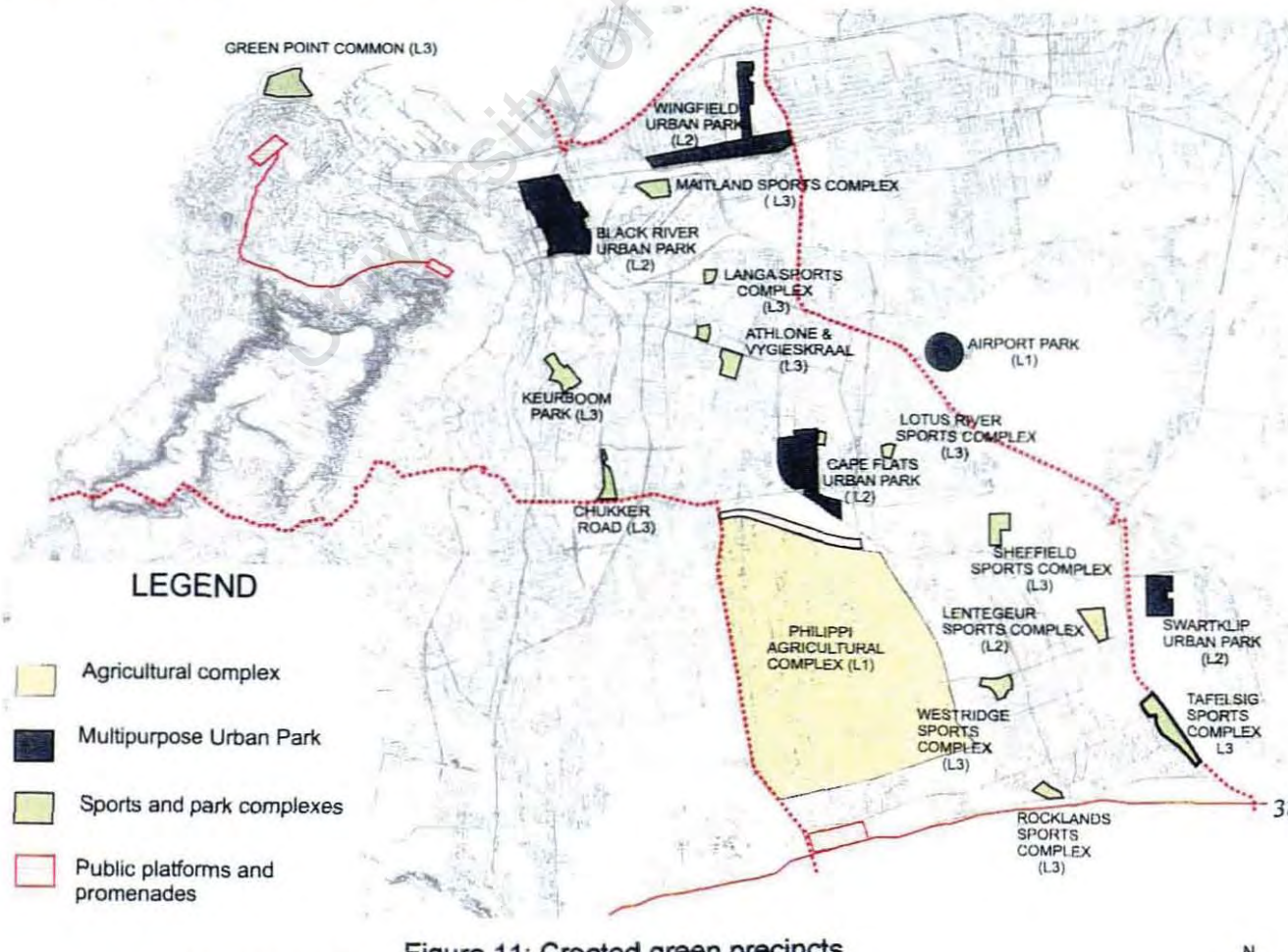


Figure 11: Created green precincts (Source: City of Cape Town, 1999a).

NTS

University of Cape Town

The multipurpose urban parks are envisaged by the Muni-SDF as productive and recreational resources. Preferably, they should be located adjacent to major transport interchange points and emerging urban centres, so as to improve the status and environmental quality of these areas. The stated function of these parks is to conserve and rehabilitate natural areas, to provide for active and passive recreation, production (such as urban agriculture, aquaculture, planting and harvesting of traditional medicines) and to accommodate areas for nurseries (especially for producing much needed trees for the Cape Flats). Storm water management is also possible. The parks could accommodate culturally-specific ceremonial activities (such as the Xhosa people's tradition of initiation). It is predicted that as the amenity value of the land gradually increases, investor confidence may likewise increase and attract high-yielding uses to the parks' edges (City of Cape Town, 1999a).

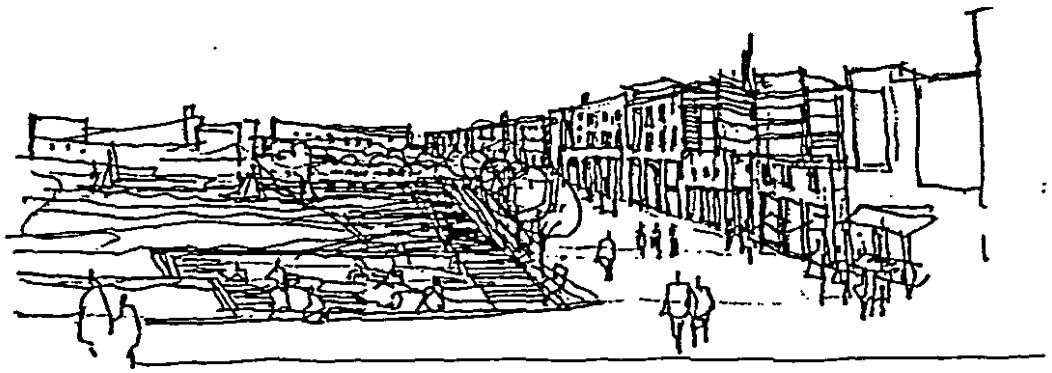
Principles to be noted in the design of these parks are described in the Muni-SDF. Multifunctionality is emphasised, that is, the accommodation of as wide a range as possible of potential recreational, educational, social and productive activities. Hence, the parks should be associated with social facilities and defined by intensively developed edges with development facing onto the open spaces. These developments should be compatible wherever possible. And finally, the parks should incorporate and reinforce ecologically sensitive areas (City of Cape Town, 1999a).

Four specific urban parks are in fact proposed, the locations of which are portrayed in figure 11. These are Wingfield Park, the Black River Urban Park, Swartklip Park and the Cape Flats Urban Park (City of Cape Town, 1999a).

3.3 Proposal for the Cape Flats Urban Park

The functions that the Cape Flats Urban Park should fulfill have been indicated by a number of sources. The Cape Town Municipality (1997) suggested in the spatial plan for the Wetton-Lansdowne corridor that the study site should be redeveloped in order to achieve integration between Hanover Park and Manenberg and to expand the recreational and environmental potential in the area. It was further proposed that this area could become an important regional recreational and open space area.

In the Local Area Spatial Development Framework for Hanover Park and Sand Industria, the City of Cape Town (2000a) gave a more detailed indication for the role of the new Cape Flats Urban Park. That is, that it should have a strong recreational, sports and environmental focus. The recreation element would include water sports, walking, nature appreciation, bird watching, picnics, sports fields and formal park grounds. The educational element would include an agricultural college, an environmental training centre. The southern part of Sand Industria was seen as suitable for water sports and nature-oriented recreation, while the northern part was seen as suitable for the development of a more formal park and sports centre. A public promenade adjacent to a mixed use environment (retail, offices, residential) would be developed along the eastern edge of Sand Industria. Figure 12 shows a conceptual drawing of this idea. Private and/or public housing and a lower-order taxi or bus stop were also proposed for the study site (City of Cape Town, 2000a).



The Urban Park: Waterfront Edge:
Alongside the eastern edge to the Urban Park, a public promenade for pedestrians, facing onto the waterfront is proposed. A integrated mixed use environment, with ground floor level retail served from a protected colonnaded arcade, and distributed components of the tertiary educational centre's campus, mixed with residential and offices forms the urban environment. The water body allows for recreational activity and water sports such as wind surfing and canoeing will be encouraged. The shores will be developed as a treed promenade within a rehabilitated indigenous natural environment.

Figure 12: Conceptual drawing and description of the Cape Flats Urban Park (City of Cape Town, 2000a).

It has also been proposed that the Edith Stephens Wetland Park (figure 13), which is incorporated into the study site, should cater for environmental education, conservation and flood attenuation. Amenities would include *inter alia*, bird watching, boating, picnicking and walking trails. A nursery retail outlet and an area for the cultivation of traditional medicinal plants were among the suggestions. A seasonal (summer) initiation site was also intended for this portion of the study site (Burgess, 2000).

The spatial development framework report for the Lansdowne Road Industrial Area has planned a wetland water treatment system for the smaller south-west portion of the study site as portrayed in figure 14 (Settlement Planning Services, 2001).

It has already been mentioned that at the metropolitan scale, the Muni-SDF proposed that any ecologically significant remnants of space (such as Edith Stevens Nature Reserve) along the False Bay Coast should be incorporated into a regional False Bay Coastal Park. Hence, the suggestion to extend a corridor of green space from the Cape Flats Urban Park along the eastern edge of the Philippi agricultural area to the proposed False Bay Coastal Park (refer ahead to figure 20) (Dewar, pers. comm.).

It has also been observed that at present, the growing settlements of Nyanga, Browns Farm and Mitchell's Plain to the east of the proposed green corridor, pose a threat to the existence of the only real agricultural area within the CMR, which is located to the west of the proposed corridor. It is believed that this link (of transitional land uses) may provide the necessary barrier to any urban intrusion (Southworth, pers. comm.).

It has been further suggested that part of this area between Vanguard Drive and Weltevreden Road, may accommodate a substantial and landscaped elevated terrace, constructed with views of the sea and mountain for the purpose of a new metropolitan cemetery and garden of remembrance (Dewar, pers.comm.). Refer to figure 15 for the conceptual drawing of this.

3.5 Synopsis

The manner in which planners have considered urban open spaces in Cape Town has been reviewed and the conception and content of the Cape Flats Urban Park proposal has been introduced. The examination has shown that the thinking involved with regards to the planning of open spaces, is indeed in line with applying open space as an instrument of social and economic development.

However, as yet, this thinking has not been translated into practice. In this light, the purpose of studying the Cape Flats Urban Park in more detail, becomes clearer: it may give direction to the actual planning of this multifunctional urban park, which will be successful, because it will provide for social and economic development.

The following section, reveals the first part of an integrative approach of park development, as informed by both natural process and human need. A natural systems analysis of the Cape Flats Urban Park is presented, which aims to discover the particular ecological needs of the area through factors of opportunity and constraint, so as to inform site suitability, and hence enable an overall understanding of what roles the proposed Cape Flats Urban Park can potentially play in enhancing socio-economic development.

University of Cape Town

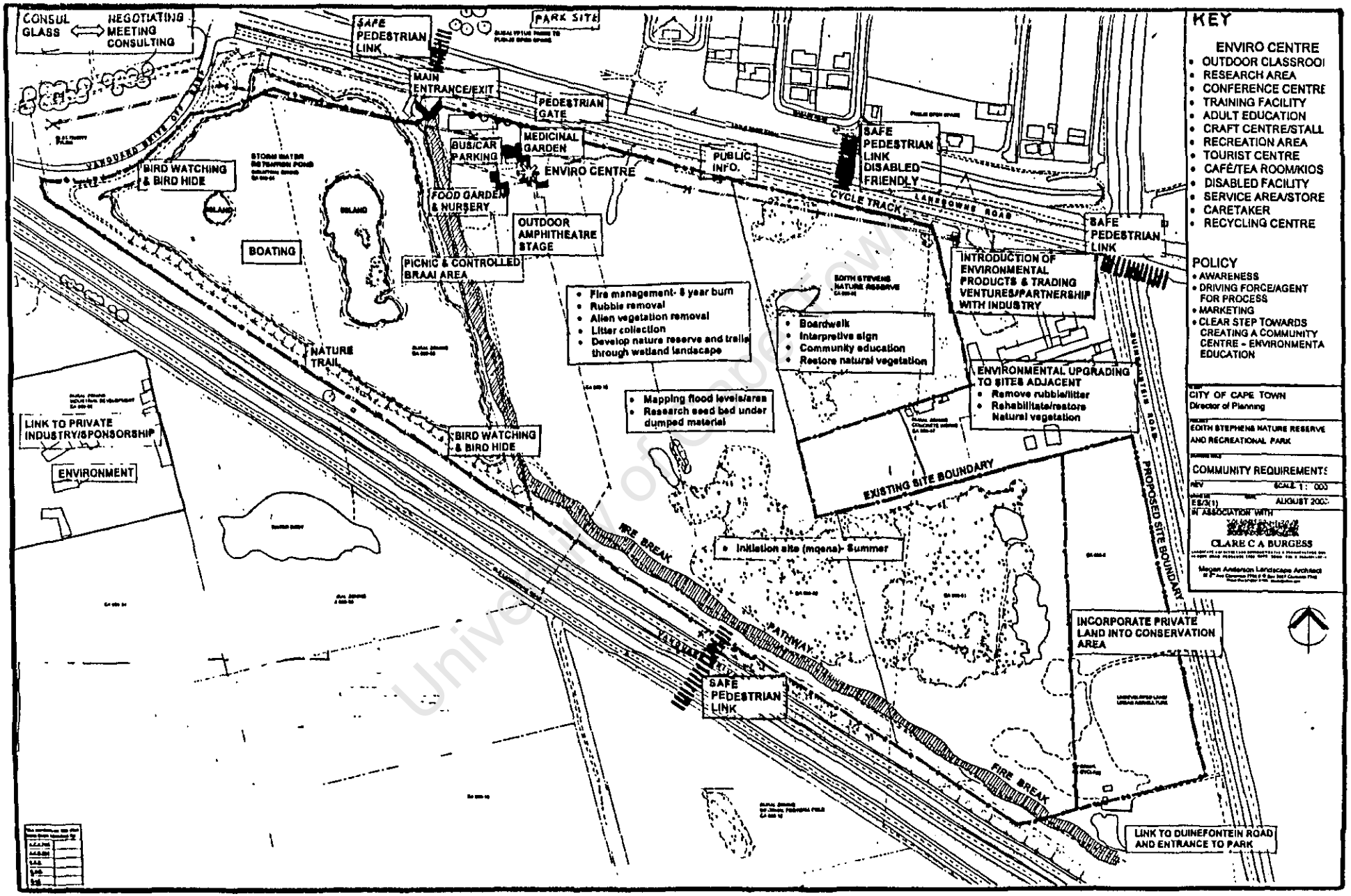


Figure 13: Proposals for Edith Stephens Wetland Park (Source: Sandra Hustwick).

University of Cape Town

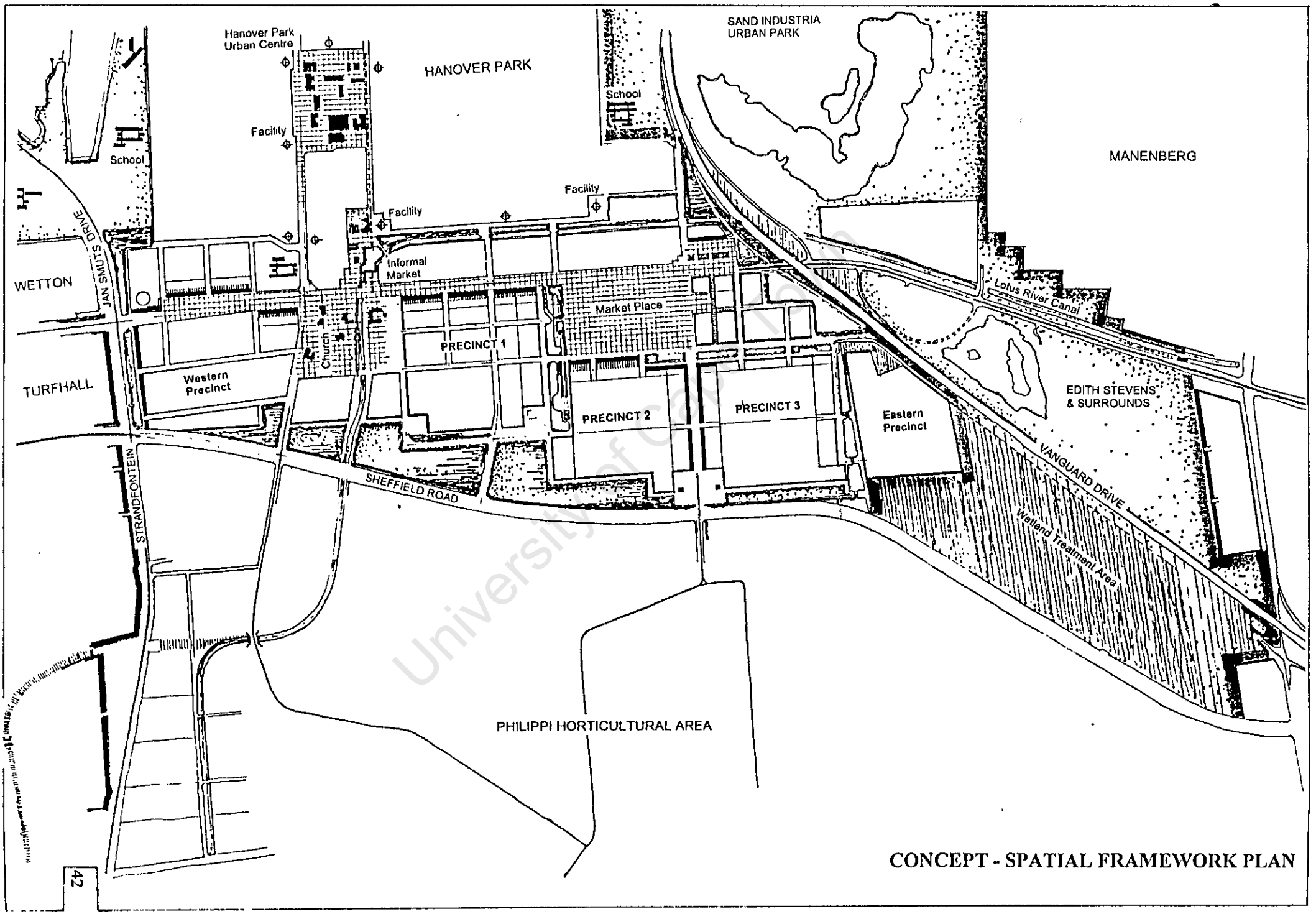


Figure 14: The wetland water treatment system for the smaller south-west portion of the study site (Source: Settlement Planning Services, 2001).

Figure 15: A conceptual drawing of the new metropolitan cemetery and garden of remembrance: a landscaped elevated terrace built over time with building rubble covered in sand and soil (Source: City of Cape Town, 1999b).

University of Cape Town

Section 4: Natural Systems Analysis

This section begins the case study of the Cape Flats Urban Park: the instrument with which to explore the theoretical concept that encountering nature within the city can actually mean the creation of a multifunctional, useful and developmental open space. It includes what may be called an integrated approach, informed by both natural process and human needs.

First, the context and location of the site is outlined. Following this will be the micro- and macro-scale analysis of the study site's natural systems: its topography, geology, soils, climate, hydrology and flora and fauna, and an evaluation of the constraints and opportunities specifically inherent in the study site. The purpose of this analysis is to ultimately discern the needs of nature so as to inform what potential roles and functions the area could play in enhancing socio-economic development.

At this point, an intrinsic question should be asked: in the case of the proposed Cape Flats Urban Park, it is essential that both natural process and human needs are accommodated, should natural process needs perhaps receive greater priority than human needs or vice versa? The natural systems analysis assists in clarifying this issue.

4.1 The study site: location and context

The Cape Flats Urban Park is located approximately fourteen kilometres from the city centre of Cape Town on the Cape Flats, at the intersection of Vanguard Drive and Lansdowne Road (Campbell, Gubb and Moll, 1980) (figure 16). It is surrounded by low cost and middle income residential areas (Hanover Park to the east and Manenberg to the west), agricultural areas and industrial areas.

The Muni-SDF describes the Cape Flats Urban Park, as incorporating the area known as Sand Industria, the Edith Stephens Nature Reserve and the adjacent retention pond, several areas of surrounding underutilised school land, land targeted for a proposed new metropolitan cemetery and a proposed wetland treatment area. Figure 17 shows an aerial view of the site itself and figure 18 shows that its road structure divides the area into three main portions (City of Cape Town, 1999a; City of Cape Town, 1999b).

Sand Industria is located in the north-eastern quadrant of the Lansdowne Road/Vanguard Drive intersection and covers an area of approximately one hundred hectares. The underutilised school land surrounds this area on its north, east and west sides. The area itself is currently used for the mining of high grade silica, for glass production and is in private ownership. (City of Cape Town, 2000). It should be noted in terms of the National Environmental Management Act 107 of 1998 (S28), any person who has caused significant degradation of the environment is required to take reasonable measures so as to minimise or rectify such degradation of the environment. It thus follows that the mining company is required to rehabilitate the area, and in doing so, the development of a park should be possible.

Edith Stephens Wetland Park is located in the south-eastern portion of the study area and comprises twenty-eight hectares of semi-natural open land and seasonal wetlands. It includes the storm water detention pond covering about seven hectares to the west, a small protected area measuring only three-and-a half hectares to the east, which is administered by the National Botanical Gardens. This is known as the Edith Stephens Nature Reserve (Burgess, 2000; Helme and Maze, 2000). The rest of the area consists of approximately eighteen hectares of low-lying seasonal wetland used as informal detention ponds, and disused farm and wasteland used for dumping rubble and waste. The Cape Town City Council are the main landowners (Burgess, 2000; Settlement Planning Services, 2001).

University of Cape Town

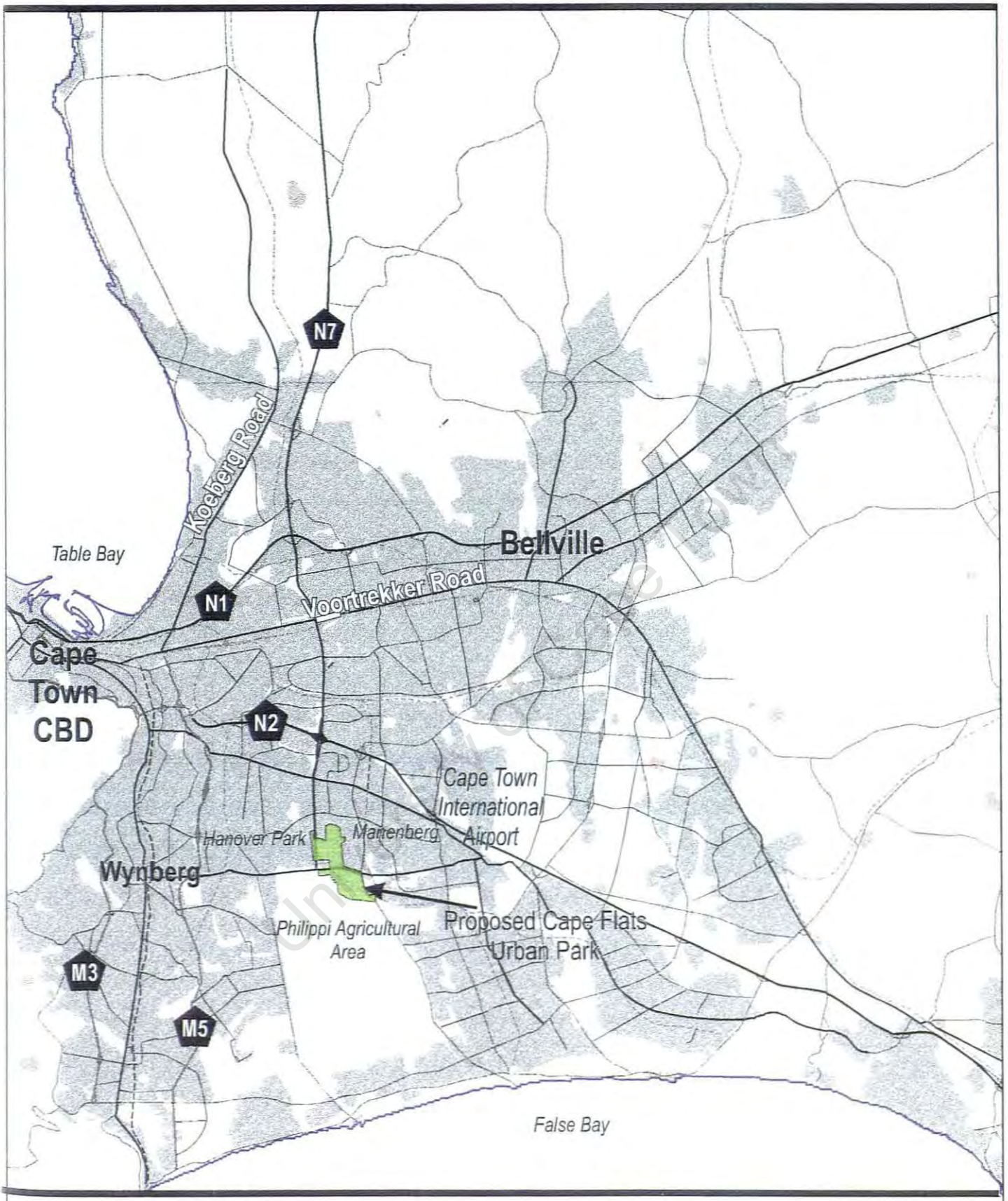


Figure 16:	The location of the proposed Cape Flats Urban Park in the Cape Metropolitan Region.	N
Not to Scale		

Figure 17: An aerial view of the proposed Cape Flats Urban Park.

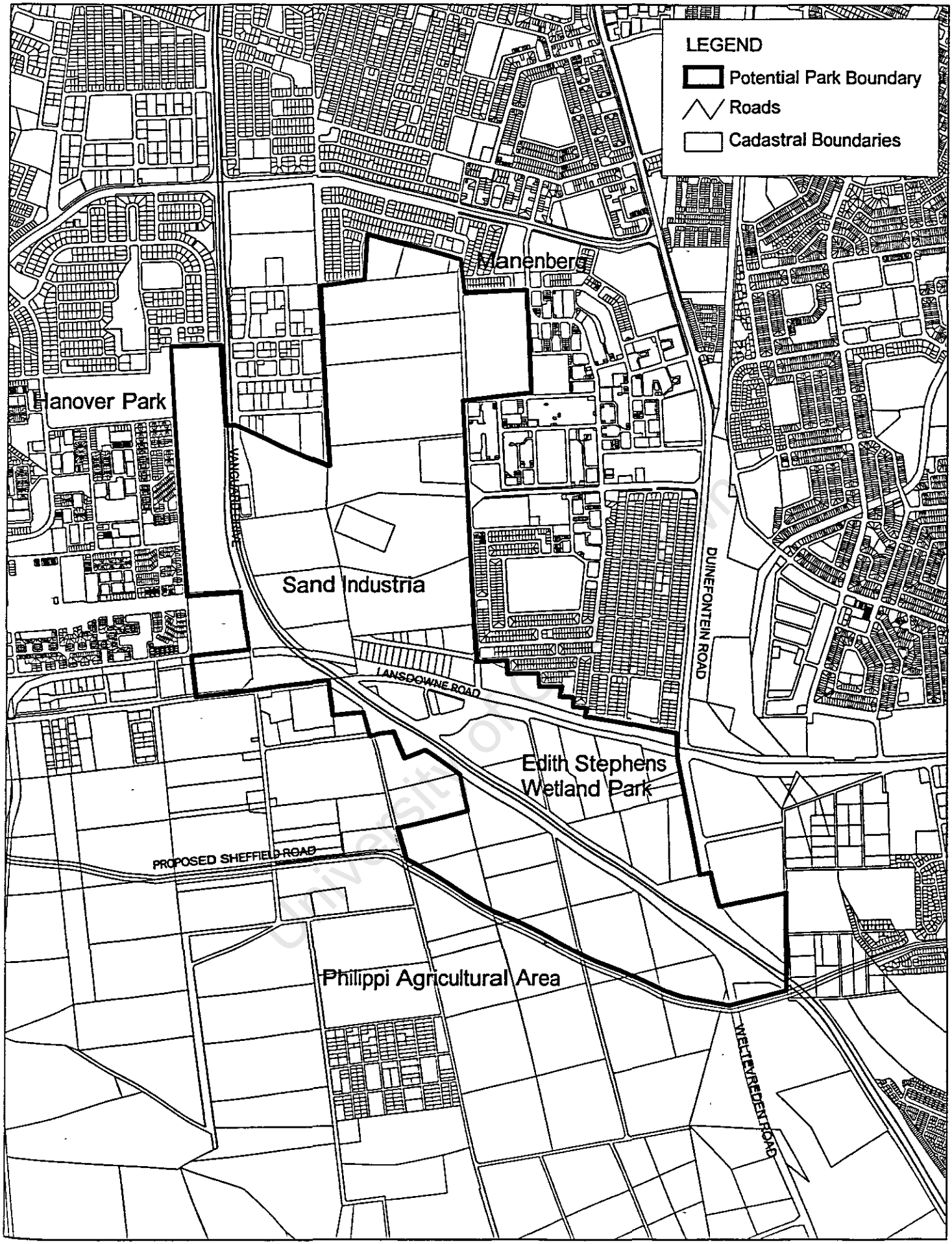


Figure 18:	The Cape Flats Urban Park. Note the road structure divides the area into three main portions. Also note that this is the intended boundary only.
1:20000	

The third portion of the park is located in the south-west portion of the study site. Contrary to the Muni-SDF's description of the Cape Flats Urban Park, it is now thought that only a small part of this area, which lies to the north of the proposed alignment of the new Sheffield Road extension in the Philippi agricultural area, will be incorporated into the park (Settlement Planning Services, 2001; Southworth, pers.comm.). Figure 19 is a photograph of this area. Note that the Sheffield Road extension is to provide a mobility route, which will complement the Lansdowne Road corridor (Cape Metropolitan Council, 1998). This small section of the proposed park lies adjacent to Vanguard Drive and its intended function is that of a wetland treatment system. The area is mostly in private ownership (Environmental Partnership, 2001).

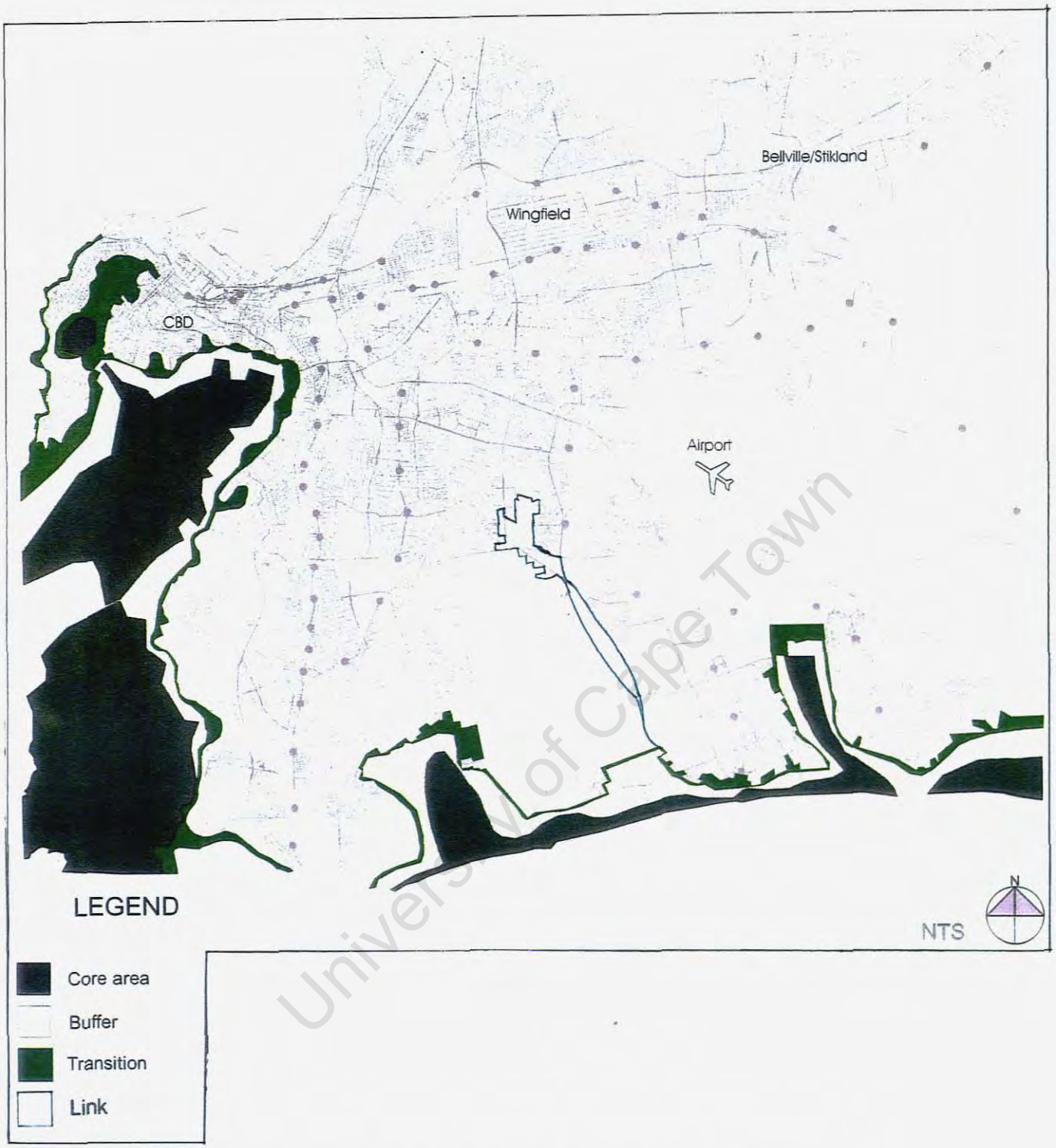
Figure 19: Photograph of a farm in the Philippi agricultural area.

University

The total area of the study site at the local scale, therefore, including the several areas of underutilised school land, covers 287 hectares.

At the metropolitan scale, it is intended that the park be linked to the proposed False Bay Coastal Park via a strip of land to the south-east, which is located between Vanguard Drive and Weltevreden Road. This is depicted in figure 20.

Appendix 2 of the paper includes a sequence of orthophoto maps depicting the study site from north to south and Appendix 3 contains the zoning and land use maps for the study site.



University of Cape Town

Figure 20: Map showing the proposed link or biological corridor which connects the Cape Flats Urban Park to the False Bay coastal area. This would form part of the Muni-SDF's biosphere concept (Source: City of Cape Town, 1999a).

4.2 Natural systems

This section is an enquiry into the given form of the site, that is, its natural identity. It is necessary to understand the Cape Metropolitan Region as a form derived in the first instance from a certain geological and biological evolution, which exists as a sum of natural processes and which has been adapted to by its human inhabitants. It is then possible to discern the role of what may seem to be an insignificant site, as part of an important and valuable expression, which has elements that can both exercise constraints or, proffer opportunities for human uses.

This type of enquiry, described by McHarg (1969) in *Design with Nature* as the ecological method, recognises that nature performs work for man without his investment, and that such work does represent a value. For example, certain areas and natural processes, such as floodplains, are inhospitable to man, so these should be prohibited or regulated to ensure public safety. He suggests further that land reserved for open space in the metropolitan region should be derived from natural-process lands which are intrinsically suitable for 'green' purposes and that the distribution of open space should respond to natural process. In terms of distribution, it is interesting to note that McHarg (1969) believed that as the area of a circle grows with the square of the radius, large open space increments can exist within the perimeter without major increase to the radius: that is, open spaces can be accommodated within a city's defined edge.

The overarching principle here is that of sustainable development, which has been defined as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (World Commission on Environment and Development, 1987). It thus incorporates the requirement of a careful environmental assessment of the whole of the designated area so as to ensure the suitability of land for development and to minimise and mitigate any adverse impacts (Westmacott and Blandford, 1980). It should also highlight which natural resources need to be conserved so as to protect the regenerative capabilities of the natural processes in the area.

The integration of design with living processes implies consideration for maintaining and enhancing species diversity, minimising resource depletion, preserving nutrient and water cycles, maintaining habitat quality and attending to all the other preconditions of human and ecosystem health (Westmacott and Blandford, 1980; Spirn, 1984). The end point should be a landscape with inherent ecological functions, which simultaneously meet the needs of both people and nature.

It must be noted here that although the literature for this section was irregular and in the form of specific studies, the best data available has been used to describe the study site and provide an overall impression of the site's natural systems.

4.2.1 Topography and geology

The study site is situated on the low-lying, relatively level Cape Flats Coastal Plain no higher than 30m above mean sea level (City of Cape Town, 2001; Environmental Partnership, 2001). The landscape is young and unformed with few physical features. Fluvial and marine erosion has shaped the topography of deeply weathered Malmesbury Group and Cape Granite bedrock (Wright and Conrad, 1995).

Figure 21 shows that the site itself is underlain by bedrock composed of the Malmesbury Rock Group types comprising greywhacke, shale, mudrock and sandstone, covered by late tertiary to recent Sandveld Group sediments (Wright and Conrad, 1995; Cape Metropolitan Council, 1999). Four sedimentary formations have been identified in this area. The Witsand Formation, is composed of dune sands made up of very fine to very coarse sands containing a high proportion of calcareous, shelly material. The calcareous deposits have been formed through a process of calcification which has occurred during the evaporation of calcium-rich ground water, which has been derived from the underlying calcareous sediments (Cape Metropolitan Council, 1999).

The Langebaan Formation is made up of very fine to fine calcareous material including calcretised sands and calcrete. Lime deposits are found within this formation, although in the area of the study site, the

University of Cape Town

lime-rich bed is only a few metres thick and consists of an upper, hard, densely cemented zone of 250 to 350 millimetres, resting on soft, yellow calcrete, which grades into calcareous sand, the lime content of which gradually decreases with depth (Wright and Conrad, 1995).

The Springfontein Formation is composed of fine to medium-grained silica sands. Thin calcareous clay and peat lenses may be present locally within this formation (Wright and Conrad, 1995). Finally, the Elandsfontein Formation consists of angular, gravelly quartzite sands with intercalcated organic peaty material (Environmental Partnership, 2001).

It is important to note that the sands in the area of Sand Industria have attained an unusual degree of purity (99.5 percent silicon oxide) and hence, are currently mined for the manufacture of high quality colourless glass.

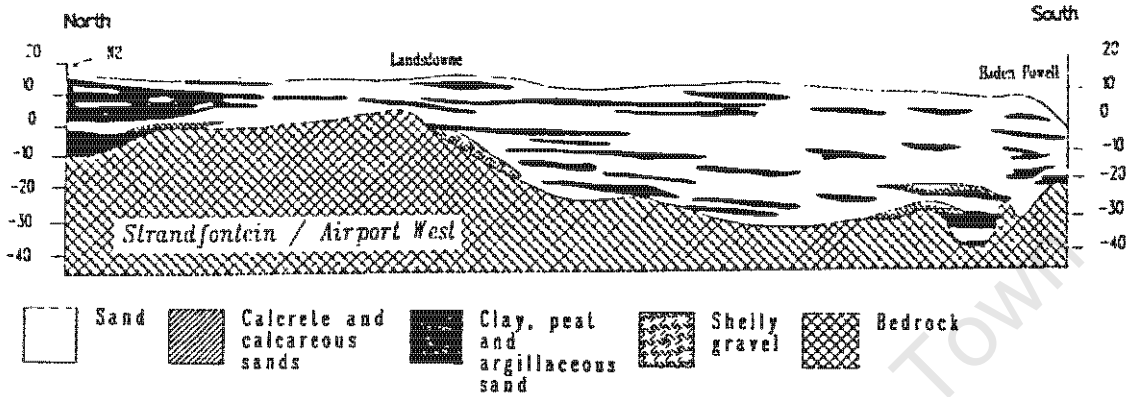


Figure 21: Cross-section showing the geology of the Cape Flats (Source: Wright and Conrad, 1995).

University of Cape Town

4.2.2 Soils

Generally, the soils of the study site consist of the deep, uniform Cape Flats sedimentary deposits, which are composed of mainly wind-blown (aeolian) light grey sands of high silica content (Cape Metropolitan Council, 1999). The soils are young with little profile development or soil structure and relatively infertile as a result of a low organic content. In summer the soils tend to become dry and hard and in winter the soils of low-lying areas are waterlogged (Campbell, Gubb and Moll, 1980).

Figure 22 shows that Sand Industria and the northern section of the Philippi agricultural area is covered by surface soils composed of thick quartz soils comprised of thick quartz sands with organic layers, belonging to the Springfontein Formation. These acid sands are underlain by more quartz sands layered with clay and organic, peaty material varying in thickness from millimeters to a few metres. These soils are considered to be part of the underlying Elandsfontein Formation (Cape Town Municipality, 1997; Environmental Partnership, 2001).

Edith Stephens Wetland Park in the south-east portion of the study site lies adjacent to the transition line between quartz (silica) sands of the Springfontein Formation in the west and the calcareous, calcretised sands and calcrete of the Langebaan Formation to the east. It is thus partially covered by surface soils consisting of mixed silica and calcareous sands cemented to varying degrees with patchy thin impermeable calcrete layers (Cape Town Municipality, 1997; Environmental Partnership, 2001). The sands are deep white to grey and are probably slightly acidic in the wettest areas, and slightly alkaline in the drier areas. There is no outcropping rock (Helme and Maze, 2000).

The strip of land which is intended to connect the study site to the proposed False Bay Coastal Park consists calcareous sands (Low and McDowell, 1990).

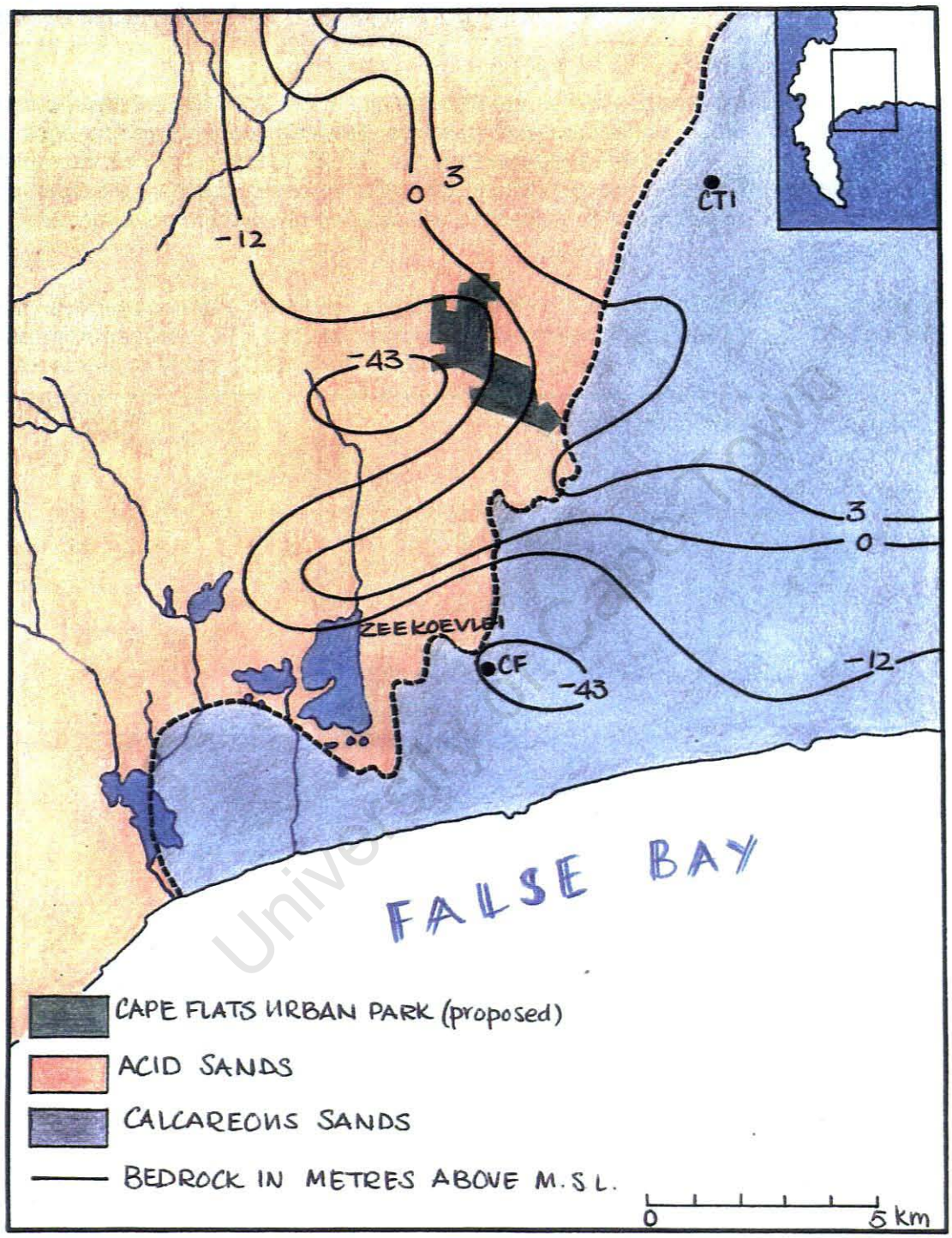


Figure 22: Study site: Soils (Source: Gasson, B, University of Cape Town).

4.2.3 Climate

At the macro-level, the Cape Flats and indeed, the Cape Metropolitan Region, is situated within a Mediterranean climatic region which experiences cool, wet winters from about April to October and hot, dry summers from about November to March. Winter is characterised by prevailing north-westerly winds which bring rain, low temperatures and localised flooding on the Cape Flats. Summer is generally hot and dry with high velocity, high frequency south-easterly (onshore) winds, which are salt-laden (figure 23) (Campbell, Gubb and Moll, 1980; Burgess, 2000; Environmental Partnership, 2001). Temperature inversions do occur, particularly in winter and fog is a common phenomenon (Cape Metropolitan Council, 1999).

At the micro-level, the site itself lies within the cold humid winter zone (figure 24) and the warm, very dry summer zone and experiences generally southerly katabatic winds (figure 25). The mean annual temperature on the Cape Flats is 16.1°C with an average range of 10°C (figure 26). Temperatures tend to be moderated as a result of the low altitude and proximity to the sea. The temperature regime prevents the formation of frost and reduces the probability of hail in the area (Environmental Partnership, 2001).

The yearly average rainfall for the site is approximately 600mm, most of which is experienced during the wet winter months (figure 27). Only ten percent of this mean annual rain falls in the four driest months, that is, December to March (Campbell, Gubb and Moll, 1980).

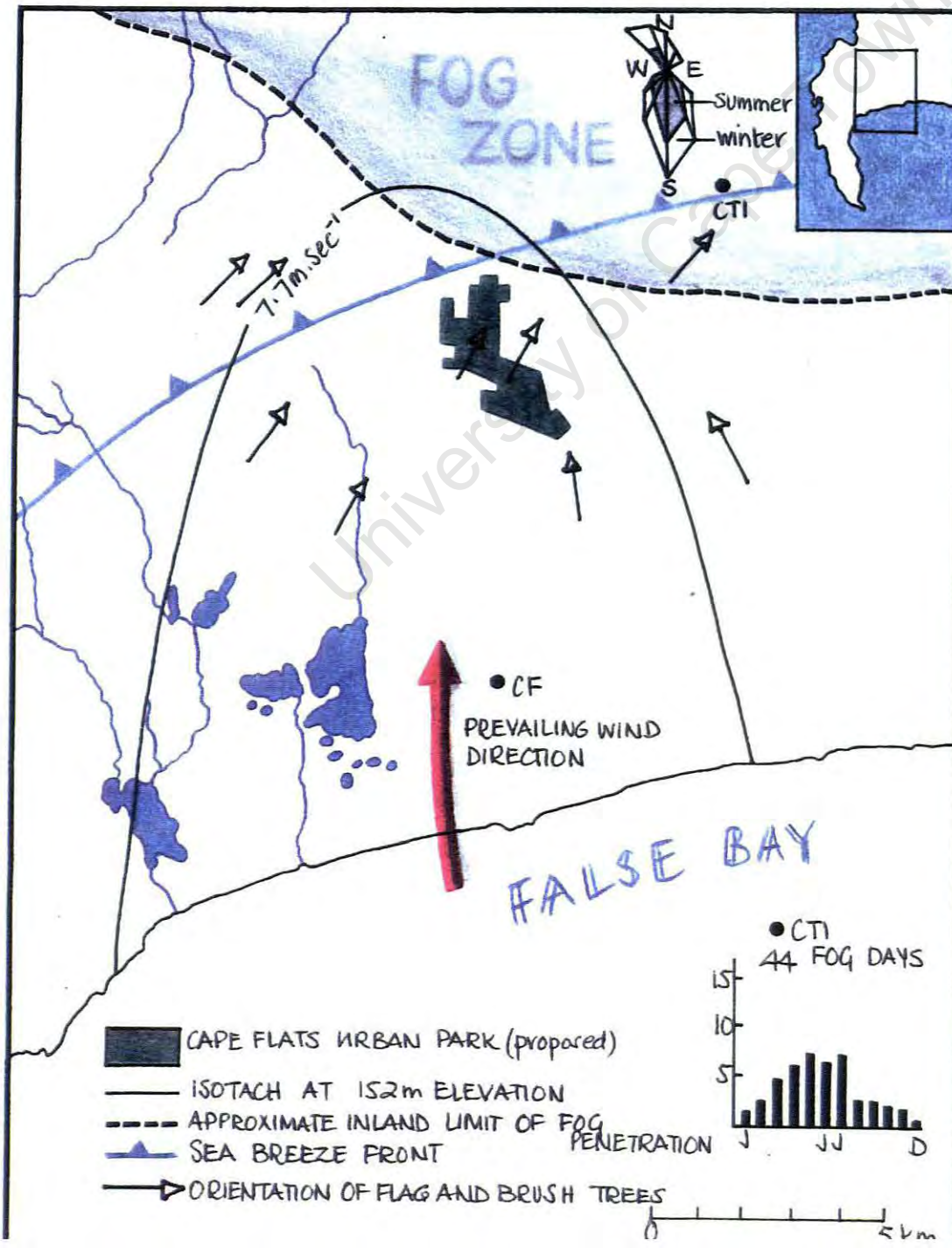


Figure 23: Study site: Prevailing winds and fog (Source: Gasson, B, University of Cape Town)

University of Cape Town

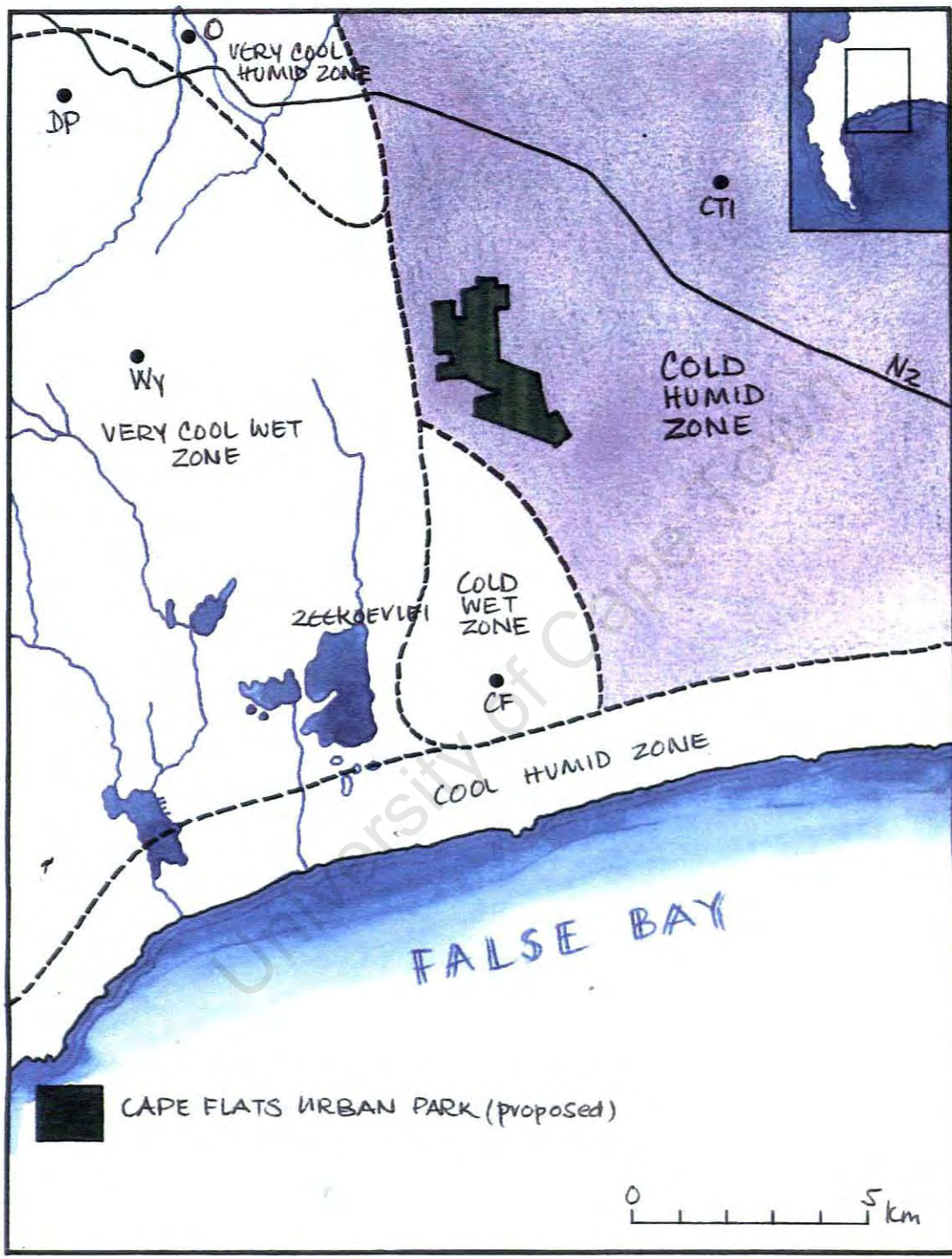


Figure 24: Study site: climate: winter (Source: Gasson, B, University of Cape Town).

University of Cape Town

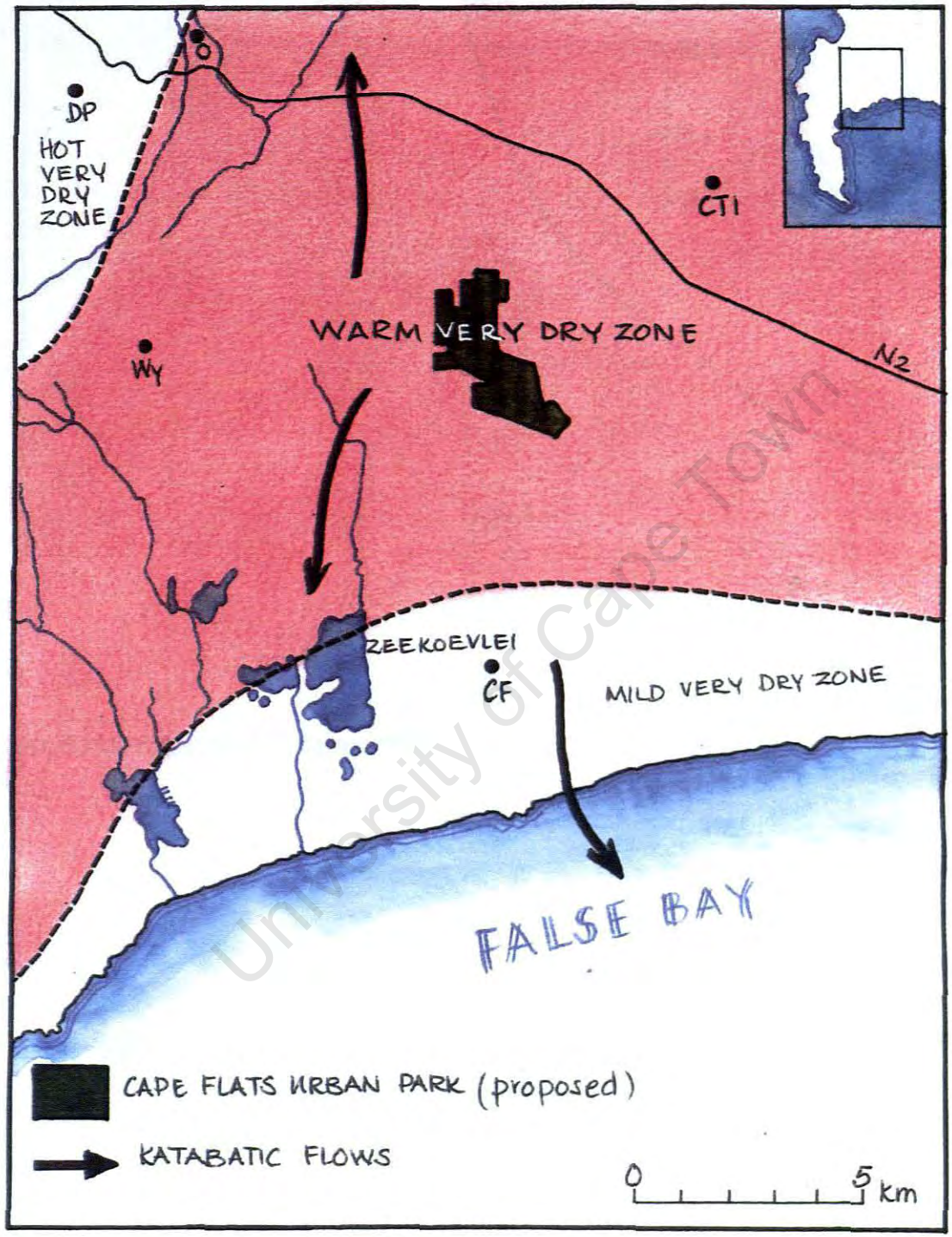


Figure 25: Study site: climate: summer (Source: Gasson, B, University of Cape Town).

University of Cape Town

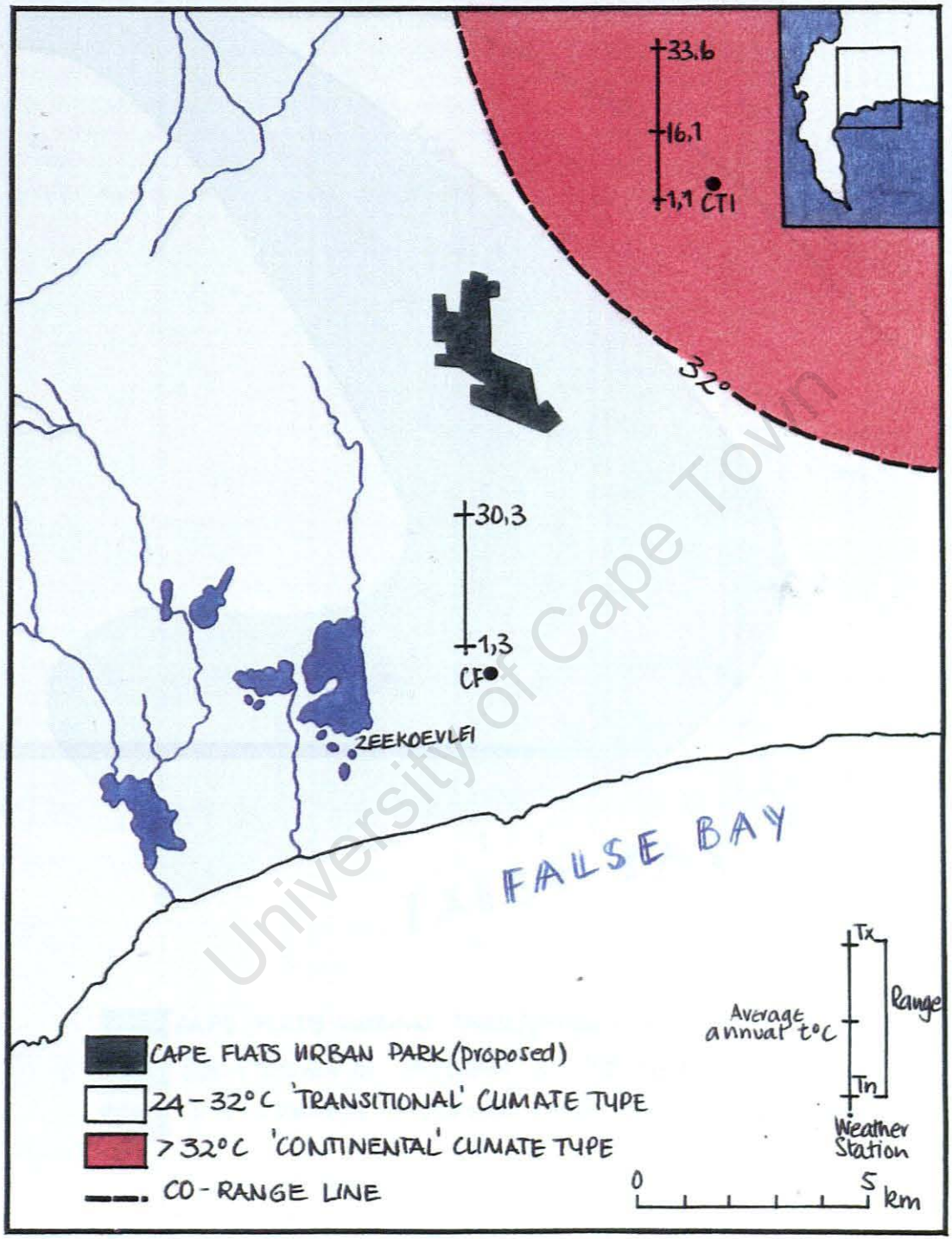


Figure 26: Study site: Temperature range (Source: Gasson, B, University of Cape Town).

University of Cape Town

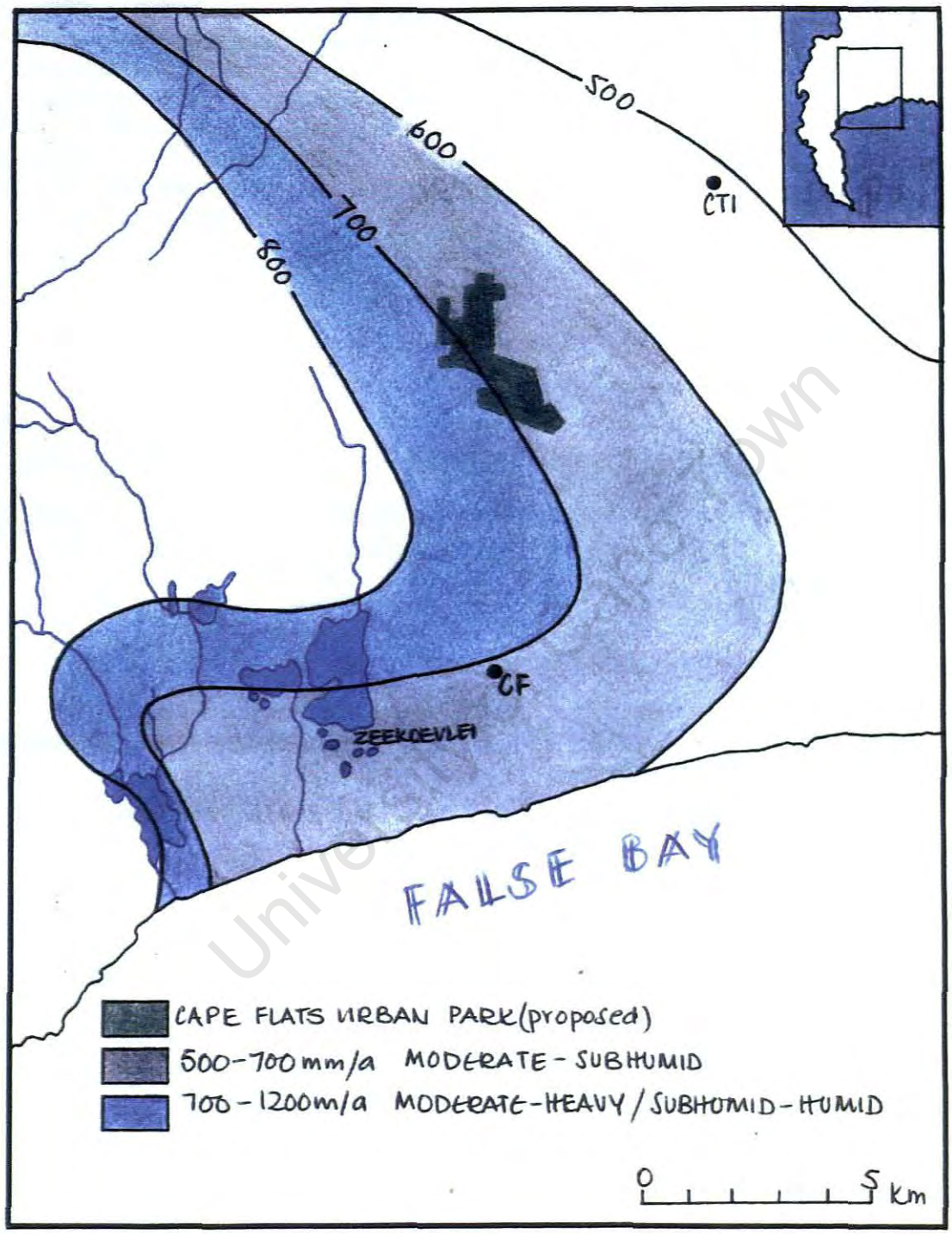


Figure 27: Study site: Rainfall (Source: Gasson, B, University of Cape Town).

University of Cape Town

4.2.4 Hydrology

At the micro-scale, the Lotus River canal and its related storm water detention pond, the seasonal wetland areas and the presence of a perched water table on the impermeable calcrete layers, concurrently influence the site's hydrology (Environmental Partnership, 2001).

The water table is particularly shallow at approximately 1.5 meters. Due to the study area's flat topography, the high water table, the calcrete and granite layers, mining activity, agriculture, catchment hardening, the hard surface of the canal itself and the modification and redirection of surface run-off, large portions of the study site are prone to flooding and surface ponding. See figure 28. The above activities have disturbed and reworked the upper one metre of soil across the entire site, which has resulted in a poorly drained landscape (Cape Town Municipality, 1997; City of Cape Town, 2000; Settlement Planning Services, 2001; Environmental Partnership, 2001). Evidence of the ineffective drainage may be seen within the study site (Sand Industria), where several perennial and seasonal wetlands with good water quality and wetland vegetation are located (City of Cape Town, 2000; Environmental Partnership, 2001).

Figure 28: Photograph showing flooding and surface ponding in the area of the study site.

Figure 29: Photograph of the detention pond within Edith Stephens Wetland Park.

University of Cape Town

The Lotus River Canal is not a natural water course as it was excavated approximately forty years ago to accommodate increased runoff from storm water and to reduce the water table in that area of the Cape Flats. It now forms the main storm water disposal system in the area (Settlement Planning Services, 2001). The canal flows south along the eastern part of the study site until it reaches Lansdowne Road, where it then flows west and parallel to Lansdowne Road. It crosses the study site and once again flows south through the Philippi agricultural area to False Bay when it reaches Hanover Park Drive (City of Cape Town, 2000). The lack of different habitats and the inflow of storm water, sewage and litter causes the water in the canal to be of poor quality with high nutrient levels (Cape Town Municipality, 1997).

Besides the natural seasonal wetland areas, such as those found within the Edith Stephens Wetland Park, which can be between 0.1 and 0.5 metres deep in winter, there is the artificial wetland system within the Sand Industria section of the study area, which is artificially maintained by dredging activities (Burgess, 2000). Due to its isolation from the Lotus River Canal, water in this system is of good quality (Cape Town Municipality, 1997). There is also another small artificial wetland system which was constructed during the construction of Vanguard Drive, located to the southwest of the Silica Sands site. (City of Cape Town, 2000).

The 1:50 year flood line has been determined for the Edith Stephens Wetland Park and according to Burgess (2000), inundates over seventy-five percent of its area. The detention pond in the Edith Stephens Wetland Park was formerly a vlei and has been excavated to 17.3 metres above sea level, which is 1.2 metres below the summer water table of 18.5 metres above sea level (Burgess, 2000). It provides a permanent body for wildlife and increases the site's storage capacity. The permanent depth of 1.2 metres aims to prevent excessive reed growth which could choke the pond. It is connected to the Lotus River Canal by a large culvert (Burgess, 2000). Figure 29 is a photograph of the detention pond within Edith Stephens Wetland Park.

The macro-scale influences on the hydrology of the site include the low-lying sandy Cape Flats coastal plain and the Cape Flats aquifer (Environmental Partnership, 2001). This aquifer represents an important geohydrological resource, which may potentially be exploited as a municipal water supply. It is also an important environmental agent in that its groundwater supported baseflow keeps rivers flowing, supports wetlands and dilutes effluents (Wright, 1999). As urban growth and social upliftment programmes have resulted in dramatic increases in the demand for potable water, it is thought necessary to briefly extrapolate here on the aquifer and its status (Wright and Conrad, 1995).

The Cape Flats aquifer consists of Cenozoic deposits underlain by essentially impervious Malmesbury Shales or Cape Granite. The Sandveld Group deposits constitute what is known as the Cape Flats aquifer. The aquifer is regionally unconfined and it only starts to disappear against 'impermeable' boundaries in the east, west and north, while the southern boundary is defined by the False Bay coastline, from Muizenberg to Macasser (see figure 30). The bedrock is generally regarded as an impervious basement (Wright and Conrad, 1995; Wright, 1999; Cape Metropolitan Council, 1999).

The Witsand and Springfontein Formations constitute the major groundwater target and their characteristics ensure an above-average hydraulic conductivity. In comparison, the calcareous and calcrete layers of the Langebaan Formation act as a barrier or aquitard to the free flow of groundwater and have a lower hydraulic conductivity (Wright and Conrad, 1995).

The groundwater flow in the region of the study site is generally south towards False Bay, although south of the N2 highway, flow is either west towards Zeekoeivlei or south towards Monwabisi (Wright and Conrad, 1995).

University of Cape Town

The Lotus River Canal is not a natural water course as it was excavated approximately forty years ago to accommodate increased runoff from storm water and to reduce the water table in that area of the Cape Flats. It now forms the main storm water disposal system in the area (Settlement Planning Services, 2001). The canal flows south along the eastern part of the study site until it reaches Lansdowne Road, where it then flows west and parallel to Lansdowne Road. It crosses the study site and once again flows south through the Philippi agricultural area to False Bay when it reaches Hanover Park Drive (City of Cape Town, 2000). The lack of different habitats and the inflow of storm water, sewage and litter causes the water in the canal to be of poor quality with high nutrient levels (Cape Town Municipality, 1997).

Besides the natural seasonal wetland areas, such as those found within the Edith Stephens Wetland Park, which can be between 0.1 and 0.5 metres deep in winter, there is the artificial wetland system within the Sand Industria section of the study area, which is artificially maintained by dredging activities (Burgess, 2000). Due to its isolation from the Lotus River Canal, water in this system is of good quality (Cape Town Municipality, 1997). There is also another small artificial wetland system which was constructed during the construction of Vanguard Drive, located to the southwest of the Silica Sands site. (City of Cape Town, 2000).

The 1:50 year flood line has been determined for the Edith Stephens Wetland Park and according to Burgess (2000), inundates over seventy-five percent of its area. The detention pond in the Edith Stephens Wetland Park was formerly a vlei and has been excavated to 17.3 metres above sea level, which is 1.2 metres below the summer water table of 18.5 metres above sea level (Burgess, 2000). It provides a permanent body for wildlife and increases the site's storage capacity. The permanent depth of 1.2 metres aims to prevent excessive reed growth which could choke the pond. It is connected to the Lotus River Canal by a large culvert (Burgess, 2000). Figure 29 is a photograph of the detention pond within Edith Stephens Wetland Park.

The macro-scale influences on the hydrology of the site include the low-lying sandy Cape Flats coastal plain and the Cape Flats aquifer (Environmental Partnership, 2001). This aquifer represents an important geohydrological resource, which may potentially be exploited as a municipal water supply. It is also an important environmental agent in that its groundwater supported baseflow keeps rivers flowing, supports wetlands and dilutes effluents (Wright, 1999). As urban growth and social upliftment programmes have resulted in dramatic increases in the demand for potable water, it is thought necessary to briefly extrapolate here on the aquifer and its status (Wright and Conrad, 1995).

The Cape Flats aquifer consists of Cenozoic deposits underlain by essentially impervious Malmesbury Shales or Cape Granite. The Sandveld Group deposits constitute what is known as the Cape Flats aquifer. The aquifer is regionally unconfined and it only starts to disappear against 'impermeable' boundaries in the east, west and north, while the southern boundary is defined by the False Bay coastline, from Muizenberg to Macasser (see figure 30). The bedrock is generally regarded as an impervious basement (Wright and Conrad, 1995; Wright, 1999; Cape Metropolitan Council, 1999).

The Witsand and Springfontein Formations constitute the major groundwater target and their characteristics ensure an above-average hydraulic conductivity. In comparison, the calcareous and calcrete layers of the Langebaan Formation act as a barrier or aquitard to the free flow of groundwater and have a lower hydraulic conductivity (Wright and Conrad, 1995).

The groundwater flow in the region of the study site is generally south towards False Bay, although south of the N2 highway, flow is either west towards Zeekoeivlei or south towards Monwabisi (Wright and Conrad, 1995).

University of Cape Town

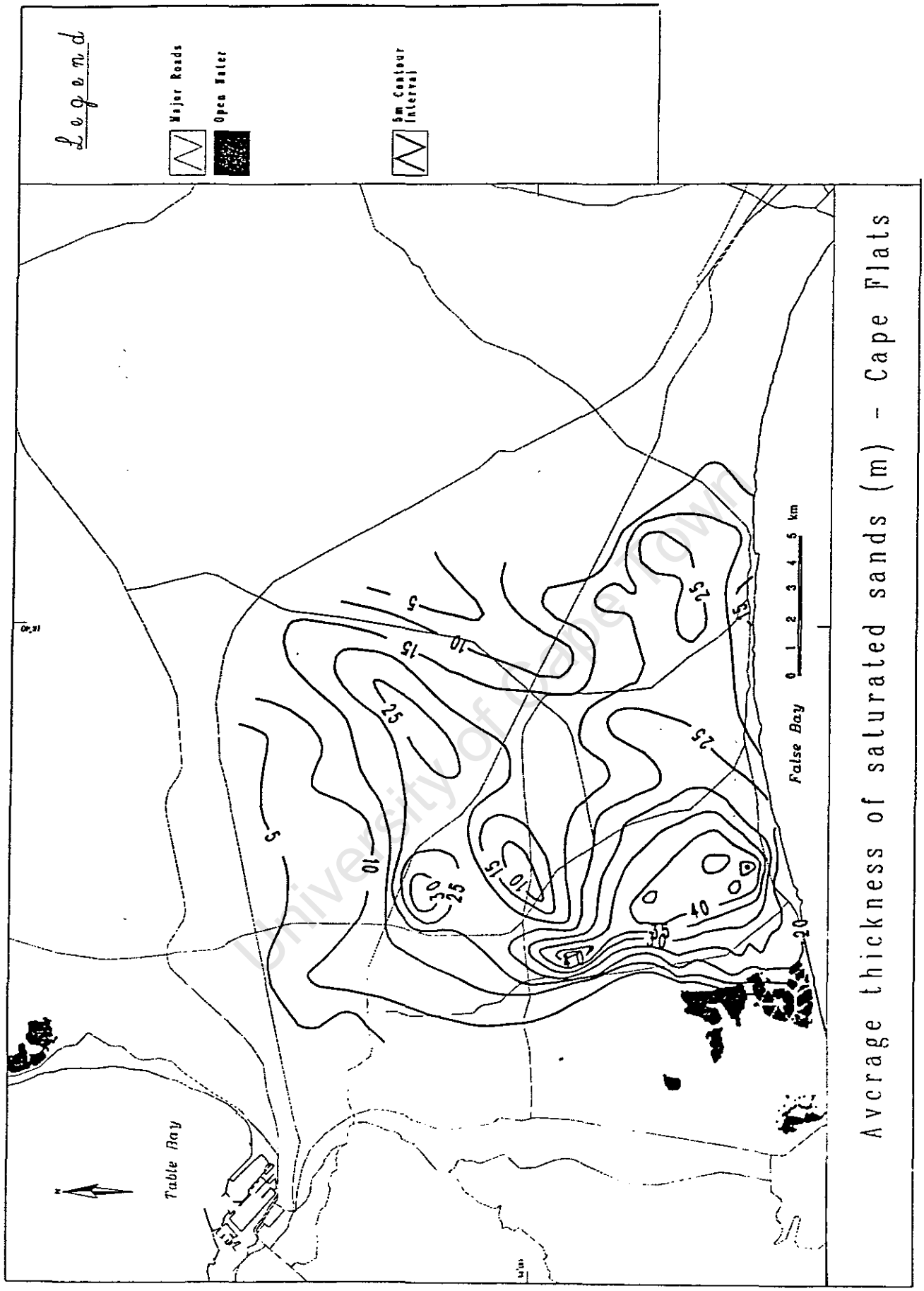


Figure 30: Map showing the average thickness (m) of saturated sands on the Cape Flats, which indicates the location of the aquifer, which is regionally unconfined (Source: Wright and Conrad, 1995).

University of Cape Town

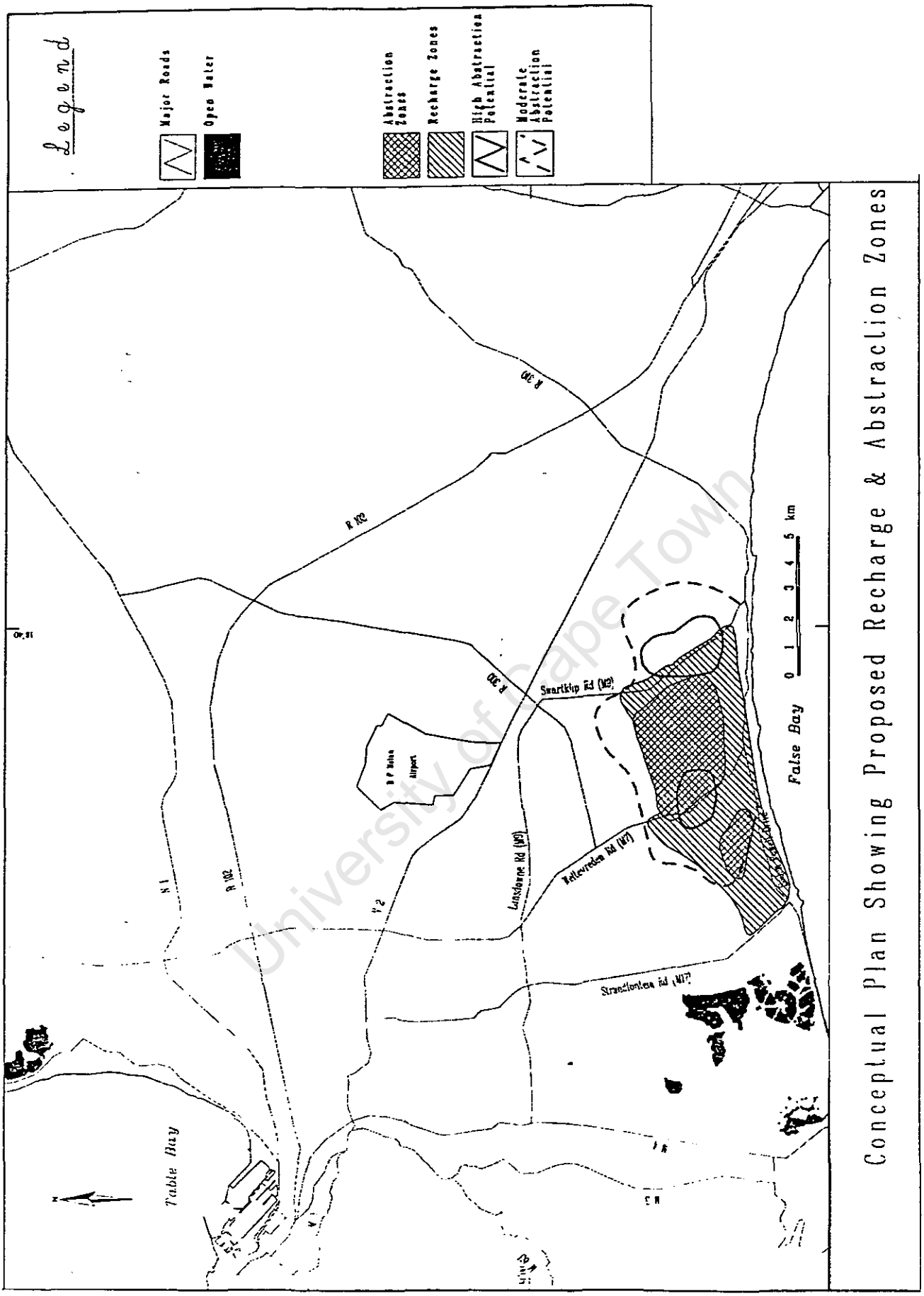


Figure 31: Map showing a conceptual plan of proposed recharge and abstraction zones (Source: Wright and Conrad, 1995).

University of Cape Town

The aquifer is charged principally from precipitation and the recharge from surface water bodies is small, especially if the base of ponds are sealed by mud and clay deposition (Wright and Conrad, 1995).

The quality of groundwater in the main part of the aquifer has a fairly low salinity, although this increases towards the periphery. The highest concentrations of salt are found within the vicinity of the study site and this has been shown to be a direct result of irrigation practices (Bertram (1989) in Wright and Conrad, 1995). A remarkable characteristic of the aquifer's water quality is its relatively high temporary hardness (Wright and Conrad, 1995).

Groundwater is currently being abstracted for mainly irrigation purposes. In order for this resource to be viable, abstraction should not exceed average recharge. Recharging the aquifer is thus very important. Artificial recharge augments the natural recharge, which permits increased abstraction, and it also prevents more saline water from entering into the groundwater. An issue relevant to this study is whether or not there is sufficient undeveloped land upon which recharge could take place (Wright and Conrad, 1995). If abstraction is concentrated in optimally placed well fields, with artificially recharged wastewater both supplementing natural recharge (and hence increasing available yield) and forming a hydrological barrier against contamination from adjacent pollution sources, a maximum volume of water can be abstracted, without any long-term detrimental impact on the resource (Wright and Conrad, 1995). Refer to figure 32 for the conceptual plan showing proposed recharge and abstraction zones.

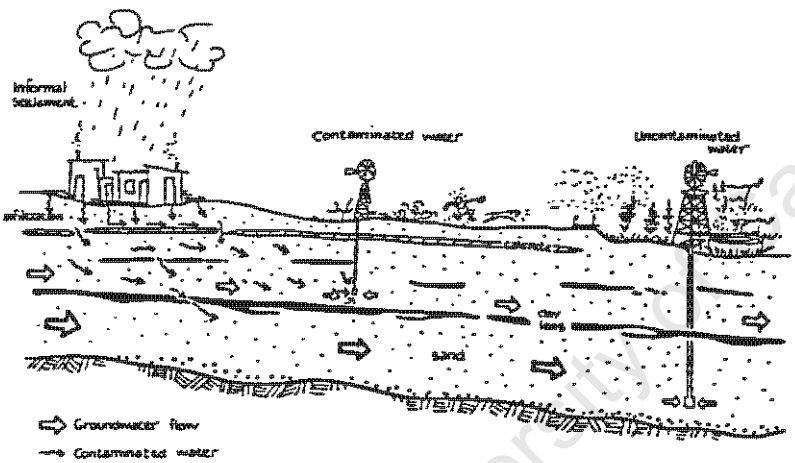


Figure 32: Sketch depicting a conceptual model for the Cape Flats unconfined sandy aquifer (Source: Wright and Conrad, 1995).

University of Cape Town

The Cape Flats aquifer is, in fact, difficult to exploit as its most productive parts lie directly under a wastewater treatment works and a solid waste disposal site. There are also a number of other pollution sources. High risk sources include the aforementioned wastewater treatment works and solid waste disposal site, a power station, industry, commerce and intensive agriculture. Low to medium risk sources include the lower to middle income residential areas, which often contain squatter communities. It has been shown that the upper section of the aquifer becomes contaminated in areas associated with shacks, as depicted in figure 32 (Wright and Conrad, 1995; Wright, 1999). There is evidence, however, that the contaminated water does not penetrate below the calcrete horizons, although there is a strong possibility that it would be drawn down after large scale abstraction. The aquifer is vulnerable to pollution because of its sandy, unconfined nature and because of the water table's proximity to the surface. It is already polluted or contaminated locally (see conceptual model for an unconfined sandy aquifer as typically found along the Cape coastal zone) (Wright and Conrad, 1995; Wright, 1999).

The Cape Flats aquifer remains a viable 'flow' resource notwithstanding urbanisation and groundwater pollution (Fabos, 1979:28). Wright and Conrad (1995) suggest that 15 to 20 x 10^6 m^3 could be abstracted annually and fed into the metropolitan supply system at a unit cost of R0, 22/ m^3. This could be increased through artificial recharge of treated wastewater and storm water runoff. The water quality would be as such that minimal treatment would be necessary (Wright and Conrad, 1995; Wright, 1999).

Appendix 3 is a collection of maps which show further information regarding the Cape Flats aquifer.

Figure 33 depicts influencing hydrological characteristics of the site on the Cape Flats.

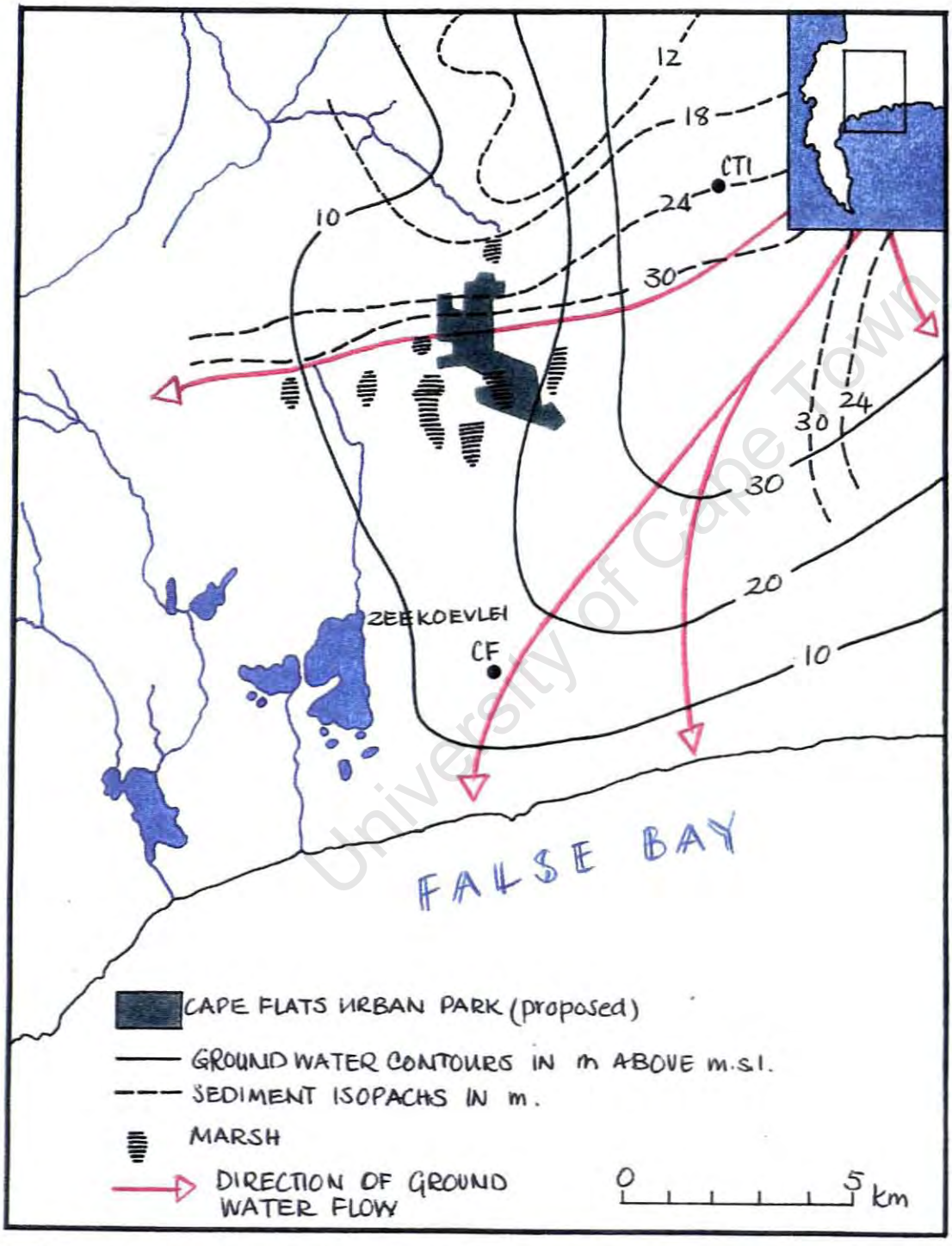


Figure 33: Study site: Hydrology (Source: Gasson, B, University of Cape Town).

University of Cape Town

4.2.5 Flora and Fauna

Flora

The study site forms part of the Cape Floristic Region, which is recognised as one of the world's six floral kingdoms and has the highest known incidence of local plant endemism in the world (Cowling *et al*, 1992; Privett, 1998). Two indigenous vegetation types are found on the site. Figure 34 depicts a broad distribution of these fynbos communities. Firstly, Sandplain Fynbos occurs on fairly settled and leached acid sands and includes members of the typically Cape Ericaceae and Proteaceae families. Secondly, South Coast Strandveld is a colonising flora on recent calcareous, alkaline dunes and includes succulent and broad-leafed shrubs and spinescent species (Low and McDowell, 1990).

The flora in this area has adapted well to the soil and climatic conditions found here, yet it remains sensitive to human disturbance. The site's vegetation has been seriously degraded due to residential development, alien vegetation infestation, dumping, infilling, mining and agricultural development. However, despite these disturbances a number of priority areas, such as the Edith Stephens Nature Reserve, have been identified as having moderate to high conservation potential as a result of the presence of red data species and high biodiversity levels (Cape Town Municipality, 1997). 'Red data' species include rare, endangered or otherwise threatened plant species as defined by Hall and Veldhuis (1985).

The area of the site known as the Edith Stephens Wetland Park is a critically rare, largely undamaged example of a typical Cape Flats seasonal wetland, a habitat once widespread on the Cape Flats (Helme and Maze, 2000). The reserve within it, was established to protect the seasonally inundated Sand Plain Fynbos and the high diversity of indigenous vegetation species found there (City of Cape Town, 2000). The reserve is best known for the occurrence of *Isoetes capensis var. stephensenii* (Cape Quillwort), a very scarce semi-aquatic, primitive relative of the ferns as well as a large colony of the now rare Cape Flats lachenalia (*Lachenalia arbuthnotiae* and *Lachenalia reflexa*)(Campbell, Gubb and Moll, 1980; Low and McDowell, 1990).

It should be noted that the high frequency of fire across the study site, often once every year, has resulted in present plant communities which consist of species adapted to frequent fire regimes (Burgess, 2000). No further species loss should be expected as result of this type of disturbance (Low and McDowell, 1990).

The most updated plant species list for the site listed 84 indigenous species and 35 alien species (Helme and Maze, 2000). Seven of these species are sufficiently rare to be listed in the Red Data Book (RDB), although it should be noted that one of them is an alga (*Hydrodictyon africanum*) which is a plant category not currently listed in the RDB. Table 1 shows the conservation status of the eight rare plants recorded from Edith Stephens Nature Reserve which are of sufficient conservation concern to be potentially listed in the RDB. (Helme and Maze, 2000). This is an exceptionally high figure for such a small area and confirms the conservation importance of the site. The high diversity may be due in part to the presence of the surrounding larger semi-natural area, which would help reduce the chances of local species extinction. Note that 'endangered' indicates the highest category of threat.

University of Cape Town

Table 2: Table showing the conservation status of the eight rare plants recorded from Edith Stephens Nature Reserve which are of sufficient conservation concern to be potentially listed in the RDB (Helme and Maze, 2000).

SPECIES	RED BOOK DATA STATUS
Isoetes capensis var. stephensenii	Indeterminate
Hydrodictyon africanum	Not listed as this is an alga
Gladiolus quadrangulus	Endangered
Lachenalia arbuthnotiae	Not listed; probably endangered
Lachenalia reflexa	Not listed; probably indeterminate
Ischyrolepis sabulosus	Endangered
Lampranthus reptans	Endangered
Cotula vulgaris	Not listed; probably indeterminate

Two main plant communities are present on this site and the vegetation pattern of the area is directly related to its topography (Burgess, 2000). Seasonal wetland on acid sands is the first and more important plant community. This is directly the result of the habitat's increasing rarity (Helme and Maze, 2000). The high water table on this site can be seen as possibly the critical determinant of botanical community structure. Very slight changes in soil moisture (the degree of saturation or period of inundation) are the most important factors which determining the makeup of the botanical communities on this site. These differences are in turn, most often the result of the very small differences in topography and elevation (0.1m may make a substantial difference), with higher parts obviously being better drained. In local and regional terms all parts of this habitat are of a very high conservation significance (Campbell, Gubb and Moll, 1980; Helme and Maze, 2000).

The second plant community consists of thicket on well-drained sands. These communities are restricted to areas of increased elevation (Helme and Maze, 2000). The too frequent fires have resulted in very few species surviving in this habitat, and it is likely that some species have become locally extinct as a result. If the most natural indigenous plant communities are to be conserved, an interval between fires of at least eight years is required (Burgess, 2000). The conservation significance of these drier areas is relatively lower than the seasonal wet areas (Helme and Maze, 2000).

The detention pond within Edith Stephens Wetland Park contains small quantities of *Cladophora* algae and indicates high nitrogen levels in the water. There is also extensive weed growth of Duck weed and *Ceratophyllum* (Hornwort) on the surface of the pond. There are small areas of Papyrus reed and *Typha capensis* (Bulrush) present along pond edges (Burgess, 2000).

In the south-western portion of the study site, urbanisation and the degradation of the natural environment has displaced much of the natural flora in favour of alien species. There are lower levels of floral diversity here, although Sandplain Fynbos and the South Coast Strandveld Fynbos communities have been identified. These communities are, however, degraded and there is evidence of high levels of alien infestation. For example, a problem exists with the extensive infestations of the alien European grasses *Bromus diandrus* (Langnaaldbromus) and *Lolium multiflorum* (Italian rye grass) (Low and McDowell, 1990). Exotic *Acacia* species and Port Jackson (*Acacia saligna*) are also present over most of the study site. The area has a poor species diversity and is therefore only of medium conservation value (Cape Metropolitan Council, 1999; Burgess, 2000; Environmental Partnership, 2001).

University of Cape Town

The lack of floral diversity in this area is further compounded because the Lotus River Canal has no link to the earth below. This has resulted in a decrease in the ability to support riverine species (Environmental Partnership, 2001).

The only area which supports palustrine reed beds, is in the small artificial wetland located in the southwest of the Sand Industria portion of the study site. This area, however, is considered to be of low conservation value (City of Cape Town, 2000)

The strip of land which is intended to connect the study site to the proposed False Bay Coastal Park consists mainly of the veld type Strandveld. Its species richness is high and is of medium conservation value. No threatened species have been observed in this area, but *Euphorbia marlothania* is a vulnerable species and may be found in certain parts (Low and McDowell, 1990).

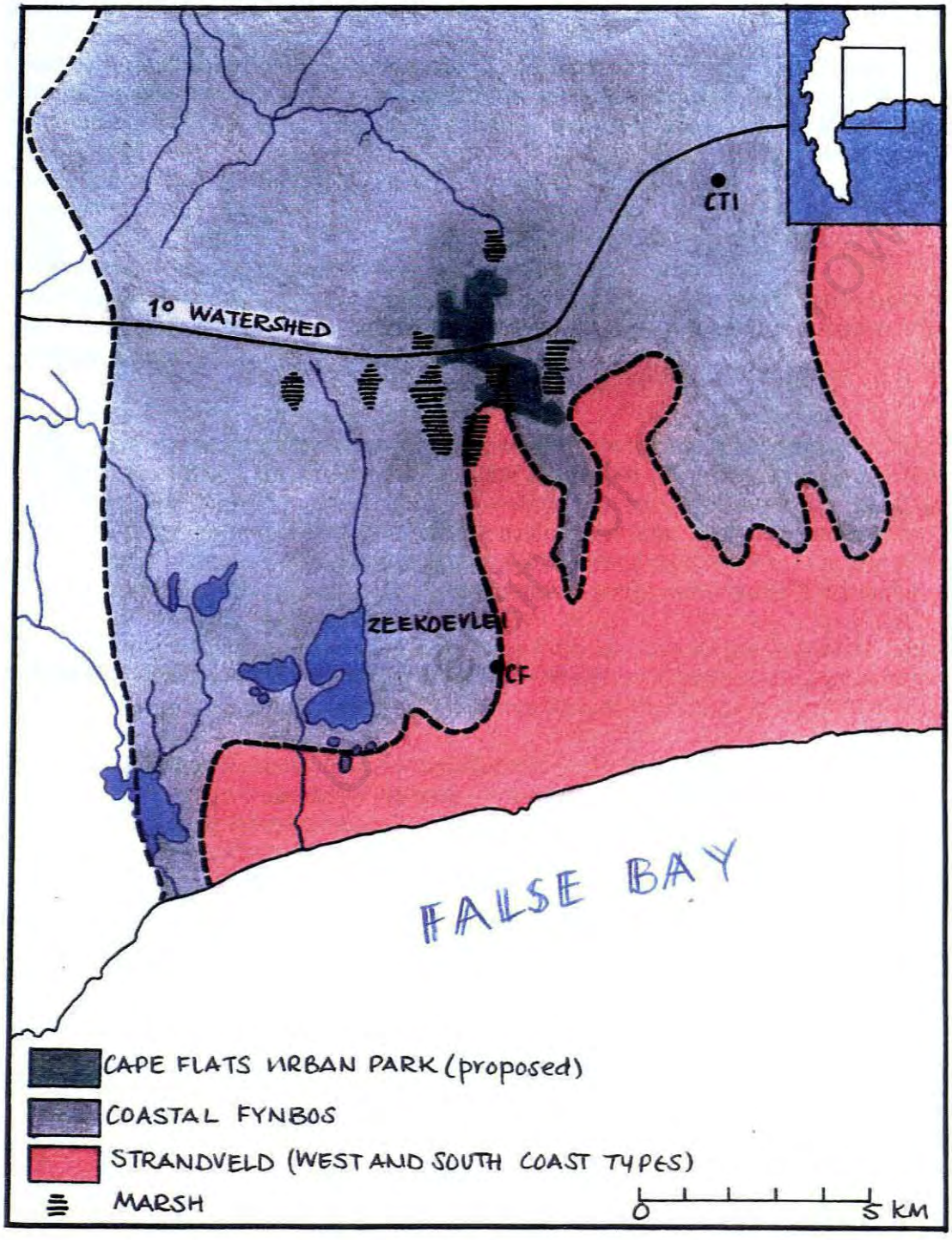


Figure 34: Map showing the distribution of fynbos communities (Source: Gasson, B, University of Cape Town).

Fauna
No rare or sensitive species are found within the study site. High levels of alien vegetation have resulted in the area being unable to support much reptilian, amphibian or mammalian life of conservation significance. This has been compounded by the pressure from urban development, mining and agriculture, which has degraded the natural environment and contributed to the area's inability to support a wide range of indigenous fauna (Environmental Partnership, 2001).

The area does however, support five amphibian species of frog (*Rana*) and toad (*Bufo*), seven reptiles including the Common Molesnake (*Psuedaspis cana*), the Cape Cobra (*Naja nivea*) and the Cape Puffadder (*Bitis arietans*). Various small mammals present include the Striped Fieldmouse (*Rhabdomys pumilio*), the Cape Golden Mole (*Chrysochlorus asiatica*) and the Cape Dune Molerat (*Bathyergus suillus*) (Burgess, 2000).

Besides terrestrial and aquatic fauna, the presence of wetland and vleis, have provided for a diverse community of avifauna, some species of which are nationally common, but locally rare. See figure 30: common sight on site visits. Over thirty species have been recorded and these include migratory waders. The more common species are Cattle Egrets (*Bubulcus ibis*)(breeding), Moorhens (*Gallinula chloropus*), Grey Herons (*Ardea cinerea*) and Black-shouldered Kites (*Elanus caeruleus*) (Environmental Partnership, 2001; Burgess, 2000).

4.3 Natural systems' opportunities and constraints
The following is a description of the study site's main opportunities and constraints for sustainable human use, which have arisen as a consequence of the site's inherent natural systems. A summary of these results are depicted in Table 2.

Constraints:
Firstly, geotechnical investigations have shown that the founding conditions for the construction of buildings over most of the area (especially the southwest quadrant) are only suitable for one to two storey residential buildings and industrial buildings with foundation loads of less than 100kPa. A smaller section in the southeast of this area may be suitable for taller buildings and greater loads. In addition, the shallow water table also has implications for the founding conditions for the construction of buildings. Dewatering would need to occur during any excavation (Environmental Partnership, 2001).

The existence within the site of the Cape Dune molerat (*Bathyergus suillus*) is significant. This species thrives in degraded environments, and, as such, there are important structural implications for roads and buildings due to the burrowing activities associated with these moles (Environmental Partnership, 2001).

The macro- and microscale climatic conditions in this particular area combined with the area's flat topography, the high water table, calcrete and granite layers, and urban development creates conditions conducive to an increased probability of flooding during winter months. Wind erosion during the summer months is also prevalent (Environmental Partnership, 2001). Wind-blown dust and sand causes an unpleasant environment in which to live and can damage both plants and property (Westmacott and Blandford, 1980). The presence of sandy soils and wind are also limiting conditions for tree planting (Cape Town City Engineer's Department, 1982).

The Lotus River Canal's aesthetic, recreational and conservation potential is impaired by poor water quality, stagnant water and large quantities of algae, high litter accumulation, raw sewerage deposits and unpleasant odours (City of Cape Town, 2000). The Lotus River Canal, with its poor water quality and high nutrient levels, poses a serious health hazard to the adjacent residential areas and also impacts negatively on ecosystems downstream such as Zeekoeivlei (Cape Town Municipality, 1997). It also creates a barrier to human and animal movement (Settlement Planning Services, 2001). More importantly, it is running at capacity and cannot accept any further increases in peak flood flow (Settlement Planning Services, 2001).

University of Cape Town

There is also a shortage of detention pond areas in the south-west portion of the study site and the construction of the proposed Sheffield road will exacerbate this problem by further increasing the volume and rate of runoff (Cape Metropolitan Council, 1998).

The availability of water is a limiting factor for irrigation in the summer months and thus water conservation, especially in winter, is necessary.

Campbell, Gubb and Moll (1980) and Low and McDowell (1990) have identified that the main long-term threat to the area is the loss of control on the quality and quantity of water in the area. For example, a permanent reduction in the level of the relatively high water table would spell disaster for those important natural communities that are dependent on the temporary wetland conditions. Antithetically, however, changes in the natural nutrient status which may arise through a greater inflow of storm water, could become a pollution problem. Other sources of pollution include irrigation, which may result in an increase in the concentration of salts in the soil, which eventually becomes too toxic for plant growth. Pollution of ground water by sewage effluent is also a critical issue (Westmacott and Blandford, 1980).

Again, health risks occur when high winter rainfall causes the groundwater level to rise to such an extent that the surface ponding occurs in the lower-lying areas. Storm water drainage is inadequate and pollution and contamination of surface water including the Lotus River Canal, often as a result of inadequate sanitation and agricultural activities, aggravates the health situation. Shacks located in the more informal areas suffer from damp and even flooded floors (Westmacott and Blandford, 1980; Wright, 1999; Settlement Planning Services, 2001).

The too frequent fires across the area have resulted in very few plant species surviving. Frequent fires degrade the natural environment (exposed soils and wind conditions will assist the process of soil erosion) and contribute to the area's inability to support a wide range of indigenous fauna (Environmental Partnership, 2001).

A major problem in parts of the study site, is the presence of exotic vegetation such as the heavy infestation of alien grasses in the south-west portion. Another problem is that of the trampling of the natural vegetation (Cape Town City Council, 1993).

Scenery can be seen as a resource much like any other resource, such as minerals, soil or water, and as with any resource, it has a scarcity value (Oberholzer, 1994). Clearly, the very level and flat topography of the Cape Flats offers no real opportunity for visual amenity. The prevalence of illegal rubble dumping aggravates this (Cape Town City Council, 1993).

The division of the study site by the intersecting of Vanguard Drive and Lansdowne Road is not conducive to general ecosystem well-being. Roads are subject to regular human disturbance and commonly serve as barriers that subdivide population of species into metapopulations. Roads also act as conduits for mainly disturbance tolerant species, cause soil erosion and sedimentation and are sources of exotic species (Dramstad, Olsen and Forman, 1996).

The mining of sand has meant that areas near or on the site have been levelled where there were once sand dunes and natural vegetation has been destroyed. This has resulted in exposed, eroded areas due to strong winds and a lack of vegetation (Cape Metropolitan Council, 1999). These impacts are not confined to the sand mines themselves. The effect of the fierce and continuous wind action on the loosening sand is not only damaging to the remaining vegetation in the area but it is also deleteriously affecting the produce of vegetable farms in the area, particularly to sensitive crops such as cauliflower (Low and McDowell, 1990).

The conservation value of the Edith Stephens Nature Reserve is decreased by its small size. The lack of control over the quantity and quality of much-needed water that enters the reserve and the probable lack of long-term viability of its populations due to island effects aggravates this. Its value is further decreased

University of Cape Town

by the dominance and spread of introduced plant species, frequent fires, the dense human population surrounding the reserve and subsequent disturbance of local flora and fauna by its inhabitants. These factors are conducive only to an unnatural state of the plant communities (Campbell, Gubb and Moll, 1980; Low and McDowell, 1990).

Opportunities:
The agricultural potential of the area has been assessed and the bulk of soils covering the southwest portion of the study site area consist of dry, acidic sands of generally low to medium potential (Environmental Partnership, 2001). Their horticultural worth, can however, be enhanced by fertiliser application and better drainage. There seems to be no significant difference in agricultural potential in the hydromorphic soils with darker organic contents, found in relation to historic and remnant wetland areas (Environmental Partnership, 2001).

An opportunity exists in the fact that the study site is underlain by an extensive sand resource. The presence of pure silica sand (used for glass making, calcrete (used for making cement and aggregate) and calcareous sand (used as building sand) has resulted in mainly the north-east portion of the study site currently being affected by mineral and mining rights (Cape Town Municipality,

The Lotus River Canal provides a structuring element and continuous ecological route with the potential to incorporate it into the urban fabric as an open space system (City of Cape Town, 2000b).

Water is available in the winter months, and as such does not constitute an important limiting factor for the reasonable intensification of agriculture in the area, especially if urban wastewater is recycled. It is often possible to utilise a low-cost biological method of treatment to accomplish this, such as an artificial wetland (Westmacott and Blandford, 1980).

The separation of the artificial wetland system in the north-east portion of the study site (Sand Industria) from the Lotus River Canal, means that the water there is of a better quality to sustain wetland habitats. The Cape Town Municipality (1997) has suggested that the potential to rehabilitate this area as a wetland is relatively high.

The hydrology of the area is conducive to the creation of a storm water overflow point and storm water management as opposed to storm water disposal. This can improve water quality and prevent flooding (Campbell, Gubb and Moll, 1980; Low and McDowell, 1990). It is also important to recognise the opportunity or role the study site may have in acting as a recharge area, especially in winter, for the underlying Cape Flats aquifer.

Agricultural activities in the south-west portion of the study site at present, do sustain a diversity of waterfowl species, primarily in winter, when poor drainage results in an abundance of water bodies (City of Cape Town, 2000). The artificial wetland system within the Sand Industria section of the study area also provides an invaluable habitat for birds. Considering the study site's indigenous vegetation, rare plant species, amphibian complement, its reptiles and rodents associated with wetland areas and a number of interesting wetland birds, the area has conservation and amenity, educational and even tourism potential. (Campbell, Gubb and Moll, 1980; City of Cape Town, 2000).

The area can offer a soft, low maintenance edge of indigenous vegetation to the surrounding urban areas (Low and McDowell, 1990; City of Cape Town, 2000b). This may improve the area's visual amenity.

The road edges make fire control and fire fighting easier, as access is better and the clear boundaries will act as firebreaks (Burgess, 2000).

University of Cape Town

At a metropolitan scale, the area of land which is intended to link Cape Flats Urban Park to the proposed False Bay Coastal Park will form an ecological corridor which will promote and sustain biodiversity and it will minimise the threat of urban intrusion into the Philippi agricultural area.

Table 3: Summary table depicting the study site's main opportunities and constraints for sustainable human use, which have arisen as a consequence of the site's inherent natural systems.

CONSTRAINTS	OPPORTUNITIES
Founding conditions only suitable for one to two storey buildings or foundation loads less than 100kPa	Agricultural and sand mining potential exists across the study area.
Construction of buildings and roads affected by shallow water table and Cape Dune Molerat	Water is locally available in the winter months.
The loss of natural vegetation through mining activities together with strong winds has caused erosion and damaged agricultural produce.	The water quality in the Sand Industria area is good and thus should be able to sustain wetlands. This also increases the potential for recreation in this area.
Windy and sandy conditions aggravate erosion, especially in summer. This creates unpleasant living conditions.	Wetlands, artificial or natural, can reduce water pollution.
Flooding is prevalent in winter although water is scarce in summer. Again, this is conducive to unpleasant living conditions.	The area's hydrological and edaphic characteristics indicate the area's high potential for a storm water overflow point and water storage area.
The Lotus River Canal is functioning at capacity and transports water of poor quality which constitutes a health hazard and which impacts upon ecosystems. It also forms a barrier to movement.	The Lotus River Canal forms a continuous route for a possible open space system and an ecological corridor.
Pollution and greater inflows of storm water implies a potential loss of control of the quality and quantity of water in the area.	The study area has potential to become a winter aquifer recharge area.
The high frequency of fire has changed the vegetation composition.	Roads make the area accessible which is favorable when fighting fires.
Infestations of exotic vegetation exist. Trampling and disturbance of natural vegetation also occurs.	The area provides an invaluable habitat for fauna, avifauna and flora, including rare and vulnerable plant species.
No existing opportunity for visual amenity.	The area has potential value in terms of pure conservation, amenity and education and tourism.
Decreasing conservation value of Edith Stephens Nature Reserve due to its small size and other natural process disturbances.	The possibility exists for the establishment of an ecological corridor to increase the study site's biodiversity and to form a barrier to urban intrusion into the adjacent agricultural area.
The study site is divided and its parts isolated by intersecting roads. This form of fragmentation can be deleterious to natural ecosystems.	The study site can offer a soft, low maintenance edge of indigenous vegetation, creating possible visual enclosure to the surrounding dense urban settlements.

University of Cape Town

4.4 Natural systems: implications and considerations for the establishment of the Cape Flats Urban Park

A number of relevant values identified in an Environmental Evaluation of the Cape Metropolitan Area (Cape Town City Council, 1993) included the identification and wise management of *inter alia*, the following:

- primary resources such as water, soils and mineral deposits crucial to development;
- protective resources such as vegetation which, *inter alia*, stabilises soil and prevents its erosion;
- wetlands, which prevent coastal and inland flooding and
- natural resources and natural systems which are important to natural ecosystem functioning and maintenance of biodiversity.

If the establishment of the Cape Flats Urban Park recognises the functioning of the area's natural systems and processes, it could play a considerable role in fulfilling both nature's and people's survival requirements, and subsequently maintaining the long-term sustainability of the area.

At the metropolitan scale and from a biogeographical perspective, the contribution that this area of open space could make is significant. Connecting the study site via a green corridor to the proposed False Bay Coastal Park will create an ecological or species movement/migratory/dispersal corridor and it will create plant and animal habitats. The linear linkage and continuity of open space areas is valuable to ecosystem resilience. This combined 'inter-island' (Poynton and Roberts, 1985:34) linear linkage and subsequent continuity of open space makes the system more ecologically valuable than the sum of its individual, more isolated spaces, the latter of which according to Poynton and Roberts (1985), is to be avoided (Cape Town City Engineer's Department, 1982). Figures 35a, b and c are graphics which illustrate this point. The main benefit of allowing species movement is the enhancement of biodiversity, which occurs because the larger areas sustain the genetic and species diversity of the smaller areas through the linkage (Durban Parks Department, 1994; Spirn, 1984; Hough, 1995).

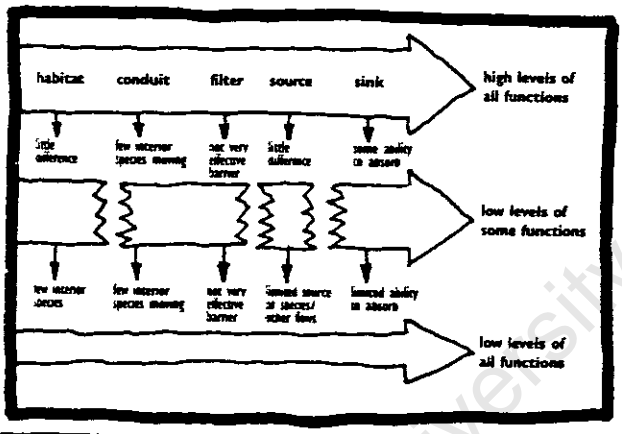


Figure 35a: Width and connectivity are the primary controls on the functions of corridors (Source: Dramstad, Olsen and Forman, 1996).

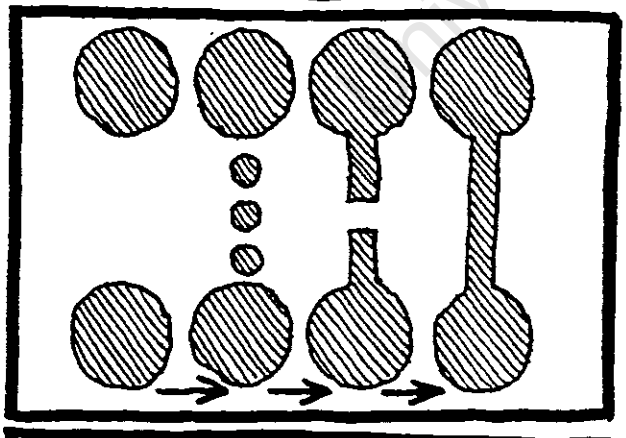


Figure 35b: A row of stepping stones (small patches) is intermediate in connectivity between a corridor and no corridor, and hence intermediate in providing for movement of interior species between patches (Source: Dramstad, Olsen and Forman, 1996).

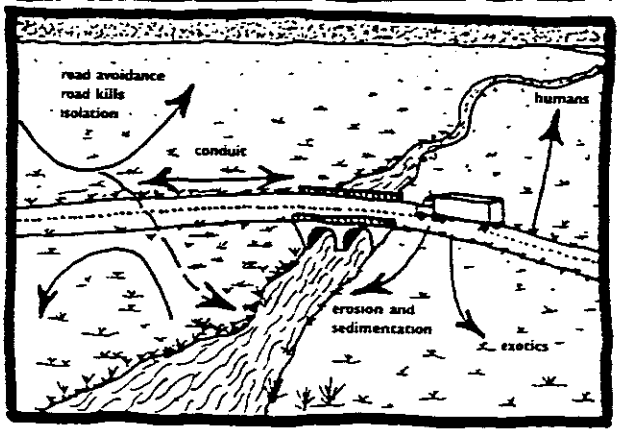


Figure 35c: Road corridors are completely connected, relatively straight and subject to regular human disturbance. Therefore they commonly serve as barriers that subdivide populations of species into metapopulations; conduits mainly for disturbance tolerant species; and sources of erosion, sedimentation and exotic species (Source: Dramstad, Olsen and Forman, 1996).

University of Cape Town

It should be noted that soil degradation and salinisation can occur through the application of irrigation water. This is particularly relevant to the agricultural potential of the study site and important factors which should be considered are the salinity of irrigation water, rates of evaporation and the availability of water. If enough water can be applied without causing drainage problems, excess salts can be flushed out (Westmacott and Blandford, 1980).

At a more local scale, the Lotus River Canal also forms a smaller biological corridor in the study area and it also forms an integral part of the area's storm water management system, which should be one of the primary reasons for the establishment of the Cape Flats Urban Park. It is recommended that this canal be upgraded so as accommodate a greater capacity and to enhance the latter functions (City of Cape Town, 2000b). Well-designed storm water management works can prevent loss of life, reduce damage to property, prevent land and watercourse erosion, protect water resources from pollution and preserve natural water courses and their ecosystems (Spirn, 1984; Committee of Urban Transport Authorities, 1991; Durban Parks Department, 1994).

The study site has been described as lying in a flood plain. Restricting development here is consistent with the above objective of protecting life and property against flooding. The areas within the study site that are particularly susceptible to flooding, should be taken into account at the earliest stages of planning and attention must be given to measures to delay and reduce runoff and increase infiltration. Behrens (1996a), the Committee of Urban Transport Authorities (1991) and Westmacott and Blandford (1980) agree that the preferred land use in this case would be private or public open space. This is partly because any construction within the flood plain fringe, which constitutes an obstruction, will increase the width of the flood zone (Committee of Urban Transport Authorities, 1991).

It is also important to note that flood lines cannot always be determined precisely, nor are they stable since upstream and downstream changes in land utilization may alter their position. It is recommended that an absolute minimum of forty-six metres from the centre line on each side of water bodies be maintained as a buffer during any development of the area (Westmacott and Blandford, 1980). Applying the precautionary principle is advisable when deciding upon suitable land use (Behrens, 1996a). It must be realised that floods are a natural phenomenon and will continue to occur.

The artificial and natural wetlands, seasonal surface ponds and the storm water detention pond located within the study site, also play important roles in storm water management. Firstly, water storage areas such as the aforementioned water bodies, attenuate the rate of storm water runoff and hence prevent flooding (Committee of Urban Transport Authorities, 1991). Consequently, through storage, the quality of this runoff water can be enhanced, streamflow and therefore downstream erosion can be controlled and specific habitats can be created for aquatic and terrestrial species (Spirn, 1984). Changes in water quality and nutrient status of the seasonal wetlands and ponds, especially in Edith Stephens Wetland Park, needs to be continuously monitored in terms of its effects on flora and fauna (Burgess, 2000).

The wetland areas in particular are also extremely efficient at removing water contaminants such as excess nutrients, bacteria and viruses. Pollutant retention occurs through the natural processes of dispersal (through evaporation, sedimentation and adsorption where dissolved pollutants adhere to suspended solids and settle out) and fine particle filtration and uptake through vegetation and soils (Hough, 1995; Department of Natural Resources and Environment *et al*, 1999). The functions of ponds (which are relatively deep open water bodies) and wetland areas (which are usually ephemeral shallow water bodies) within a constructed wetland system and its associated vegetation types are extrapolated further in Tables 3 and 4. Detention ponds for the area are being designed as dry ponds which will remain empty for most of the year and so can therefore serve as public or private open space and can be used for recreational purposes (Cape Metropolitan Council, 1999).

It is important to note that groundwater quality can affect the water quality and processes of the water storage areas in terms of sedimentation and vegetation growth (Department of Natural Resources and Environment *et al*, 1999).

Table 4: Table showing principal pollutant removal functions of pond and wetland areas within an artificial or natural wetland system (Department of Natural Resources and Environment *et al*, 1999).

POND FUNCTIONS	WETLAND FUNCTIONS
Traps 'readily settlable' solids: pond areas generally trap solids down to coarse and medium silt size range. Sedimentation is further enhanced by the edge macrophytes (aquatic plants).	Traps dissolved pollutants: this is primarily achieved by adsorption and biofilm growth on macrophytes.
Traps adsorbed pollutants: silt particles trapped in the pond system may also retain adsorbed pollutants.	Traps fine suspended solids: by enhanced sedimentation within the wetlands' densely vegetated, shallow waters.
Provides hydrologic and hydraulic management: pond area buffer and distribute water movements within the wetland system.	Transforms organic components: reduces the biological availability of organic material.
Provides sediment aeration: edge macrophytes aerate sediments.	Encourages biofilm growth: vegetation and other surfaces provide a substrate for biofilm growth which enhances sediment retention.
	Provides plant litter zones: wetland provide an area for macrophyte plant litter to accumulate.

Table 5: Table showing the treatment functions of vegetation in an artificial or natural wetland system (Department of Natural Resources and Environment *et al*, 1999).

VEGETATION FUNCTIONS	
Baseflow conditions	Storm event flow
Nutrient conversion: wetland vegetation acts as substrata for epiphytes, which are plants which use other plants as a supporting base. Epiphytes convert soluble nutrients into particulate organic material, which can settle out and enter the sediment layer.	Promotes even distribution of flows: vegetation spreads the flow across a wide surface area.
Nutrient consolidation: nutrients trapped in the sediments are progressively taken up into the macrophyte biomass.	Promotes sedimentation of larger particles: by decreasing flow velocities through even flow distribution.
Organic sediment and peat development: macrophyte debris provides a source of particulate biomass, which is returned to the wetland sediment and results in the development of organic sediment and peats.	Improves retention of smaller particles: plant surfaces provide a greater area for adhesion of smaller particles.
	Protects sediments and banks from erosion: plants and their root systems hold sediments together and prevent scour.
	Increases the system hydrualic roughness: helps attenuate destructive storm flows.

University of Cape Town

The quality of the 'first flush' in urban storm water runoff is often comparable to the quality of raw domestic sewage (Committee of Urban Transport Authorities, 1991; Marsh, 1998). Sources of water pollutants include wet and dry atmospheric fallout, erosion of catchment materials, transported materials such as litter, even water-borne bacteria and viruses present as a result of inadequate or no sanitation. Water quality and stream flow should be monitored in order to assess the effectiveness of measures to minimise runoff pollution by sediments, fertilisers and agricultural wastes. The immediate effects of this pollution is the depletion of dissolved oxygen, which is harmful to aquatic life. The longer-term effects include nutrient enrichment, which eventually leads to eutrophication and associated problems of periodic blooms of nuisance algae, de-oxygenation and even fish kills (Committee of Urban Transport Authorities, 1991; Marsh, 1998). In addition, mosquitoes proliferate in stagnant shallow water, usually less than 40cm deep.

Groundwater contamination from the aforementioned water pollutant sources is also a risk in the area. However, a storm water drainage system designed to drain any excessive groundwater so as to control the high water table and seasonal flooding may contain the upper, contaminated groundwater from polluting the lower aquifer (Wright, 1999). It is therefore recommended that the quality of the Cape Flats Aquifer be protected by creating biological filters -wetland treatment systems - to purify polluted water run off before it recharges the aquifer (Settlement Planning Services, 2001).

Note that contamination of the aquifer is only a major problem in those areas where it constitutes a resource and that it is proposed that this particular open space may be able to act as a smaller winter aquifer recharge area. The protection of potable groundwater and the protection of the natural process of local recharge to an aquifer remains important and local groundwater resources should be classified according to the South African Aquifer System Management Classification System (figure 36) prior to any landuse planning decision made (Westmacott and Blandford, 1980; Parsons, 1995). Storm water which is retained in this area will still contribute to the restoration of the hydrological balance in the area and can even help to ameliorate hot summer temperatures through the cooling effects of evaporation (Spirn, 1984).

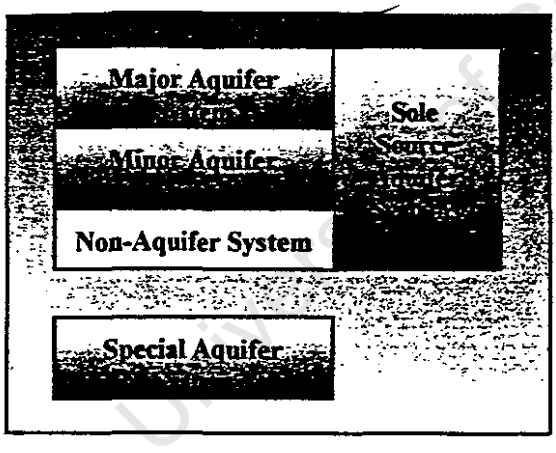


Figure 36: Aquifer System Classification System (Source: Parsons, 1995).

Definitions of Aquifer System Management classes.

Sole Source Aquifer System	An aquifer which is used to supply 50 % or more of domestic water for a given area, and for which there are no reasonably available alternative sources should the aquifer be impacted upon or depleted. Aquifer yields and natural water quality are immaterial.
Major Aquifer System	Highly permeable formations, usually with a known or probable presence of significant fracturing. They may be highly productive and able to support large abstractions for public supply and other purposes. Water quality is generally very good (less than 150 mS/m).
Minor Aquifer System	These can be fractured or potentially fractured rocks which do not have a high primary permeability, or other formations of variable permeability. Aquifer extent may be limited and water quality variable. Although these aquifers seldom produce large quantities of water, they
Non-Aquifer System	These are formations with negligible permeability that are generally regarded as not containing groundwater in exploitable quantities. Water quality may also be such that it renders the aquifer as unusable. However, groundwater flow through such rocks, although
Special Aquifer System	An aquifer designated as such by the Minister of Water Affairs, after due process.

The vegetation in the Cape Flats Urban Park would also be able to ameliorate windy conditions by providing shelter and hot microclimates by providing shade (Westmacott and Blandford, 1980). Vegetation in general can screen certain land use activities and features, abate noise and separate conflicting land uses. Vegetation can also minimise air pollution, as plants, to a certain extent, can absorb gaseous pollutants (such as carbon dioxide, ozone and sulphur dioxide). Plants are even more effective in trapping large air-borne particles (such as sand or dust) moving laterally within several metres above the ground (Behrens, 1996a; Marsh, 1998). Areas of particular nuisance in terms of windblown dust and sand should be identified and ameliorated using vegetation belts. Sand mine operators are required to revegetate exposed sand pits with suitable plant species (Low and McDowell, 1990). Every effort should be made to protect existing vegetated areas on the study site as plants can also cool the air via evapotranspiration, give direction to breezes, reduce the glare of the sun and build up a good soil resource (Westmacott and Blandford, 1980; Spirn, 1984).

This description of the study area's landscape and its natural processes has shown that certain constraints and opportunities produce critical ecological considerations, which need to be taken into account when planning any development. Fundamental restrictions on site development were listed in the Environmental Evaluation of the Cape Metropolitan Area (Cape Town City Council, 1993). Here, it was recommended that no development should occur on glass sand resources or even potential glass sand deposits. It should not occur on potential agricultural lands (that is, moderate to high potential agricultural soils) or even large areas with better quality soils. Areas which contain productive and/or tourism potential should also be protected. Areas within the 1:50 year flood line, water bodies, or areas identified as part of the Metropolitan Open Space System proposal are also not suitable to development.

If the above stipulations are understood as a general land use suitability guide and in consideration of the study site's natural systems and processes, it can be established that the area of the study site is most suited to public open space use and no or minimal development. The area has already been identified for limited development mainly due to its conservation value (Environmental Partnership, 2001).

The management and conservation of remnant open space areas is challenging. Figure 37 in fact shows reserve shapes and relative locations that are best for conservation purposes. Low (2000) considers that in order for remnants to function at their peak, these areas should be as large as possible, round and connected and should have specific management approaches to ensure their ongoing viability. At present, the study site of the proposed Cape Flats Urban Park does not, as yet, seem to reflect any of these characteristics.

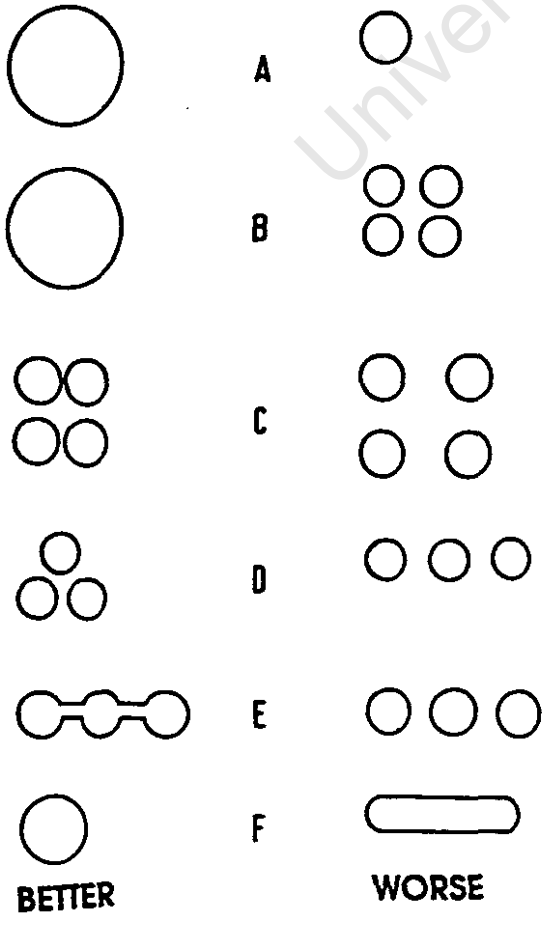


Figure 37: Conceptual diagram showing reserve shapes and relative locations that are best for conservation purposes (Source: Durban Parks Department, 1994

University of Cape Town

4.5 Synopsis

This section has analysed the study site's natural systems and processes so as to distinguish particular needs of nature, and to delineate relevant informants, for deciding upon potential roles and functions the site could play in enhancing socio-economic development. It seems that, if measures to mitigate natural process constraints and opportunities are included when planning the site, encountering nature within the city can actually mean the creation of a multifunctional, useful and sustainable open space.

The question posed at the beginning of this section can also be answered: although the entire area of the study site is suited to public open space, this space is not best suited to pure conservation, with the exception of the Edith Stephens Nature Reserve. In other words, exclusively satisfying the ecological needs of the area should not be deemed a priority, as a result of already degraded natural systems.

The site is however, suited to natural process functions which include storm water management, climate amelioration, air, water and noise pollution abatement and as a potential aquifer recharge area. Note that these functions focus on accommodating human needs. The study site also forms an important part of the MSDF's and the Muni-SDF's Metropolitan Open Space System and created green precincts respectively. It is suggested that as these functions are implemented and maintained, species diversity will increase and the importance and relevance of fulfilling nature's needs may once again need to be considered.

The next section now turns to the second part of the study's approach in discerning what potential roles a park could play, in accommodating socio-economic development: that is, how do human needs inform the developmental uses of the park?

University of Cape Town

Section 5: Potential Park User Requirements

In examining the way multifunctional urban open space can play the role of a socio-economic developmental tool, the proposal for the Cape Flats Urban Park is being used to develop, an approach towards open space planning, which is informed by both natural process and human needs.

Precedent has shown that open spaces can have both positive and negative influences on its users. A critical success factor, which has been identified, is the degree to which open space or parks are 'owned' and valued by the communities they serve. Central to this, in turn, is the degree to which it meets the real needs of these communities. This section, therefore, aims to outline how human needs can become the informants of open space use, by discerning the characteristics and needs of potential park users, so as to deduce what beneficial roles an urban park would or could possibly play in improving socio-economic development.

Lynch (1984: 67) classified potential users as 'all those who may interact with the place in any way, live in it, work in it, pass through it, repair it, control it, profit from it, suffer from it, even dream about it'.

To begin with, certain demographic and socio-economic characteristics of the neighbourhoods and residential areas immediately surrounding the proposed park site will be presented. Following this, a brief investigation will be presented in terms of what recreational facilities and what amenities, which may be complementary to urban open space, are currently available in the area. The attributes of open space in these areas will also be examined. These explorations should provide at least a general indication of the surrounding residents' quality of life. It should also provide an idea of what amenities are needed, if any, in the residential areas surrounding the proposed park.

Based on this, certain universal and locally-specific needs of these communities and potential park users will be explored, and a number of potential roles that the park could play will be discussed. Finally, this section will consider social constraints or threats that may endanger the positive establishment of a park.

5.1 Potential park users: demographic and socio-economic characteristics

Figure 38 shows the residential areas surrounding the proposed Cape Flats Urban Park. Hanover Park and Pinati lie to the west, Newfields to the north-west and Primrose Park to the north. Manenberg, Guguletu and Nyanga are all situated to the east of the site, with Manenberg lying directly adjacent to the proposed park. The residential areas which surround the southern part of the proposed park include Browns Farm to the east and the Philippi Agricultural Area lies to the south and west.

Note that the following information is general and not necessarily directly comparative, as it was derived from a number of different sources. Nevertheless, it still serves to give a general impression of the quality of life of the residents in the relevant areas. Where possible, data has been compiled in tables for each area, and a general overview of the information is presented in a summary table below.

University of Cape Town

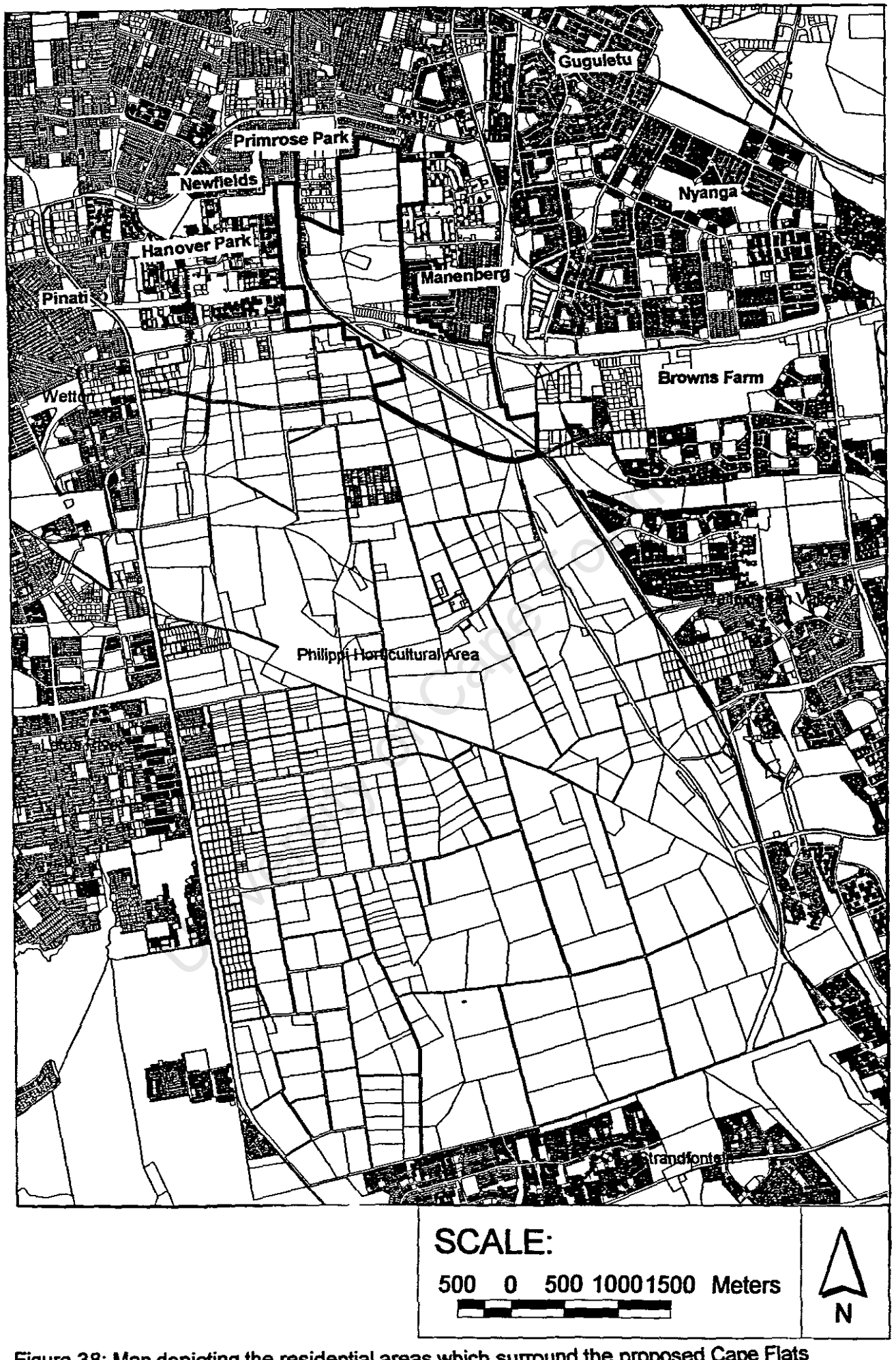


Figure 38: Map depicting the residential areas which surround the proposed Cape Flats Urban Park.

5.1.1 West and North: Hanover Park, Pinati, Newfields and Primrose Park
The total population of this area is in the order of 40 350 persons (Census 1996). Approximately 74% of the total population (29 650 persons) reside in Hanover Park, 12% (5 000) in Pinati, 10% (3 950) in Newfields, and 4% (1 750) in Primrose Park (City of Cape Town, 2000a). The total population of these areas displays a normal gender distribution with approximately 52% females and 48% males. A high percentage - 41% - of the population is under twenty years of age. Hanover Park has 43% of persons under the age of twenty (City of Cape Town, 2000a).

Approximately 7% of the people in these areas have a disability. The predominant disabilities are sight and physical disorders (City of Cape Town, 2000a).

The average household size in Hanover Park is 5,22 persons, 4, 73 persons in Primrose park, 4,52 persons in Newfields and 4.26 persons in Pinati (City of Cape Town, 2000a).

Approximately 16 000 persons in these areas are economically active, which means those people who are older than eighteen, younger than sixty-five and are able and willing to work. Of the total economically active population, 23% are presently unemployed and 77% are employed. Unemployment is the highest in Hanover Park with 26% (City of Cape Town, 2000a). The majority of workers are employed in non-skilled occupations, trades, or work for plant or mechanical operations (City of Cape Town, 2000a).

Table 6: West and North Employment status amongst persons aged 18-65 (Source: City of Cape Town, 2000a).

Total population	40 350
Economically active of total population	16 000
Employed of economically active population	12 320
Unemployed of economically active population	3680

Approximately 20% of the total number of households (8 100) in these areas earn no income. Less than R6 000 per annum is earned by 8%, 10% earn between R6 001 to R12000, 14% earn between R12 001 to R18 000, 19% between R18 001 and R30 000 and 11% earn between R30 001 and R42 000 (City of Cape Town, 2000a). Only 18% of households earn in excess of R42 000 per annum (City of Cape Town, 2000a).

Table 7: West and North: Household income per annum (number of households) (Source: City of Cape Town, 2000a).

Total number of households	8 100
None	1 620
< R6 000	648
R6 001 - R12000	810
R12 001 - R18 000	1 134
R18 001 - R30 000	1 539
R30 001 - R42 000	891
> R42 000	1 458

In terms of education levels, around 14% of the total adult population has had no schooling, 35% completed primary school and 47%, secondary school. The remaining 4% have a tertiary qualification. Approximately, 24% of the total population are fulltime scholars or students (City of Cape Town, 2000a).

University of Cape Town

In terms of religion, approximately 40% of the population are Muslim, 40% Christian, 10% other religions (including Hinduism and Judaism) and 10 % are classified as not being religious (City of Cape Town, 2000a).

In terms of housing types 41% of dwelling units are flats, 29% are houses on separate stands, and 17% are semi-detaches/cluster houses. A significant percentage of households (10%) reside in backyard rooms or shacks (City of Cape Town, 2000a). In Hanover Park specifically, flats (55%) and semi-detached units (16%) predominate, with relatively few (17%) houses on separate stands (City of Cape Town, 2000a)

5.1.2 East: Manenberg, Guguletu and Nyanga
The total population in Manenburg is approximately 45 086, of which there are slightly more females than males. A significant percentage, 36%, are below the age of 15 and above the age of 70. Furthermore, there are a number of people living with disabilities – of the total population, 629 persons have a physical disibility, 525 are without sight and 330 have a mental disability (City of Cape Town, 2000b).

There are roughly 8 967 households in this area and the average household size consists of 5 persons. Approximately 37% of the total population are economically active, and 70% of this population are employed in formal or informal occupations, which include mostly elementary occupations, craft and related trade workers and plant and machine operators and assemblers. 30% of the total economically active population are unemployed (Census 1996 in City of Cape Town, 2000b).

Table 8: Manenberg: Employment status amongst persons aged 18-65 (Source: City of Cape Town, 2000b).

Total population	45 068
Economically active of total population	16 887
Employed of economically active population	11 768
Unemployed of economically active population	5 066

The average household monthly income is between R1 500-R2 500 (Census 1996 in City of Cape Town, 2000b).

The highest education level for most residents (17 126 of the total population) in this area is secondary school level.

In terms of religion, of which there are many types, most residents are Muslim faith or belong to various Apostolistic churches (15 838 and 5 393 of the total population respectively).

The total estimated population in Guguletu is 76 162, of which there are slightly more females than males. A significant percentage of the total, 29%, are below the age of fifteen and above the age of seventy. The number of residents with disabilities include 2 739 with a sight disability, 1 138 with a physical disability and 553 with a hearing disability (City of Cape Town, 2000b).

The number of households in this area is 17 876 and the average household size is 4-6 persons. 44% persons of the total population are economically active, of which 20 029 (59%) are employed formally or informally These occupations chiefly include non-skilled occupations, service workers, shops or market sales workers; craft and related trade workers and a few professionals (Census 1996 in City of Cape Town, 2000b).

University of Cape Town

Table 9: Guguletu: Employment status amongst persons aged 18-65 (Source: City of Cape Town, 2000b).

Total population	76 162
Economically active of total population	33 753
Employed of economically active population	20 029
Unemployed of economically active population	13 839

The average household monthly income lies between R1 000-R1 500 (Census 1996 in City of Cape Town, 2000b).

The highest education level for most residents in this area is secondary school level (38 201 of the total population) (City of Cape Town, 2000b).

A wide variety of religions exist. However, most persons seem to be Methodist (14 913 of the total population) or they belong to Apostolistic churches (8 356 of the total population) (City of Cape Town, 2000b).

In Nyanga, the total population is estimated to be 24 003, with a per capita monthly income of R286 (1996 Census). The average household size is largest in the formal houses (4.9) and lowest in hostels (3). Overcrowding is most severe in backyard shacks, with an average occupation of 2.7 persons per room, followed by hostels with 2.6 per room. The average number of people per room in free-standing shacks was 1.8, while the average for formal housing was 1.2 (Awotona *et al*, 1995c).

Education levels are highest in the formal housing areas, followed by hostels and lowest in the backyard shacks (Awotona *et al*, 1995c).

5.1.3 South: Browns Farm and the Philippi Agricultural Area

Browns Farm has a total estimated population of 44 404 (51% female and 49% male), of which 47% are between the ages of fifteen and thirty-four. Of the total population, the majority of people are African/black (97%) and the most common language spoken is Xhosa (95%) (Census, 1996).

Of the total population, 47% are economically active. 57% of the economically active population are employed and 43% are unemployed. The most common occupations held by those working include mostly informal and elementary occupations (47%), craft and related trade workers (20%) and service workers, shop and market sales workers (12%) (Census, 1996).

Table 10: Browns Farm: Employment status amongst persons age 18-65 (Source: Census, 1996).

Total population	44 404
Economically active of total population	21 026
Employed of economically active population	12 019
Unemployed of economically active population	9 007

A large proportion of the earning population (43%) earn less than R1 000 per month and the per capita monthly income is R317 (Census, 1996).

The majority of the population (34%) left school between grades 8 and 11 and 14% have had no schooling (Census, 1996).

The most common dwelling type is the informal dwelling or shack (91%) (Census, 1996).

University of Cape Town

It is interesting to note that most commonly used fuel type for lighting (67% of the total number of households) is paraffin (Census, 1996).

The area north of the proposed Sheffield Road, within the Philippi Agricultural Area, has a total population of 1 509, of which 52% are male and 48% are female. Of the total population 52% are economically active with the majority having occupations in industry (Environmental Partnership, 2001).

The ethnic composition of this population is 16% black, 64% coloured, 17% white, 1% Indian or Asian and the remaining 2% were unspecified (Environmental Partnership, 2001).

In terms of education, the vast majority (87%) of the adult population living here did not complete secondary school (Environmental Partnership, 2001).

The Philippi Agricultural Area, in general, has a total estimated population of 4364 and is characterised by a young demographic profile, and the predominance of farm workers and their families. In terms of education status 74% of the population left school between grades 3 and 11, with only 18% being illiterate (City of Cape Town, 2000d). This illiteracy is chiefly a characteristic of the farm workers in this area (City of Cape Town, 2000d).

The majority of this population is economically active and of this economically active population, most persons are employed (City of Cape Town, 2000d).

A low economic status is reflected in low monthly household incomes, where 58% earn less than R1 000 per month and 18% earn between R1 001 and R2 500 per month. In total, 62% earn less than R18 000 per annum and 16% of the total population earn between R18 001 and R42 000 per annum (City of Cape Town, 2000d).

The housing shortage in the area is reflected by the existence of shacks, either in backyards or in informal settlements , as well as the use of tents/caravans, which are usually severely overcrowded. Existing housing tends to be in poor condition (City of Cape Town, 2000d).

The above information is summarised in the following table.

University of Cape Town

Table 11: Table showing general demographic and socio-economic characteristics of the residential areas which surround the proposed park site. Note that the column labeled west includes Hanover Park, Pinati, Newfields and Primrose Park.
(Sources: Awotona *et al*, 1995c; Census, 1996; City of Cape Town, 2000a; City of Cape Town, 2000b; City of Cape Town, 2000d).

	West	Manen-berg	Guguletu	Nyanga	Browns Farm	PAA
Total population	40 350	45 068	76 162	24 003	44 404	4 364
< 20 years of age (%)	41	43	37		47(15-34 years)	
Average household size	4	5	3.3			
Disability (% of total population)	7	5	7.7			
Religion (% of total population)	40% Muslim 40% Christian	35 % Muslim	Methodist			
Highest education level (% of total population)	High school 47%	High school 38%	High school 50%		High school 34%	Primary school
Economically active (% of total population)	40	37	26		68	66
Unemployed as % of economically active population	23	70	59		29	29
Average income (per month)	R1500-R2500 per month	R1500-R2500 per month	R1000-R1500 per month	Per capita R286 per month	Per capita R317 per month	< R1000 per month

University of Cape Town

5.1.4 Synopsis

In general, it is evident that the underlying feature of the residential areas surrounding the proposed site is one of frightful poverty. No one socio-economic indicator can describe poverty – they are all related and cumulative. Fast-growing, large populations consist mainly of children and young people. Youngsters who depend on their parents, inadvertently decrease household resources. There is a housing shortage – many people live in flats or shacks, and overcrowding is prevalent. Not many people are educated, probably because they cannot afford it. Serious social problems exist, such as gangsterism and high levels of crime (see 5.x). The majority of these residents are unemployed or earn an insufficient income. For example, Gophe (2001b) describes Bonginkosi Fadane, 34, who earns R150 a week working eleven hours a day and struggles to provide food for his wife and five children, let alone buying clothes or sending them to school.

The quality of life for most, if not all, of these residents is terrible. The poverty of the Cape Flats is partially due Cape Town's historical legacy of underdevelopment and deprivation and restructuring and renewal has become vital. One dimension of such renewal is the Cape Flats Urban Park. The development of a multifunctional urban park is validated – it may play a role in helping to lift the poor out of the perpetual cycle of poverty.

5.2 Open space attributes, recreational facilities and complementary open space amenities currently available to potential park users

Figure 39 depicts the general recreational facilities and complementary open space amenities currently available to potential park users in the residential areas adjacent to the proposed park site. Note that a complementary open space amenity is classified here as an amenity which enhances and influences the use of public space, such as a community hall which lies adjacent to a park. This occurs as public spaces 'are inextricably interrelated with the activities which surround them' (Dewar and Uytenbogaardt, 1991: 56).

University of Cape Town

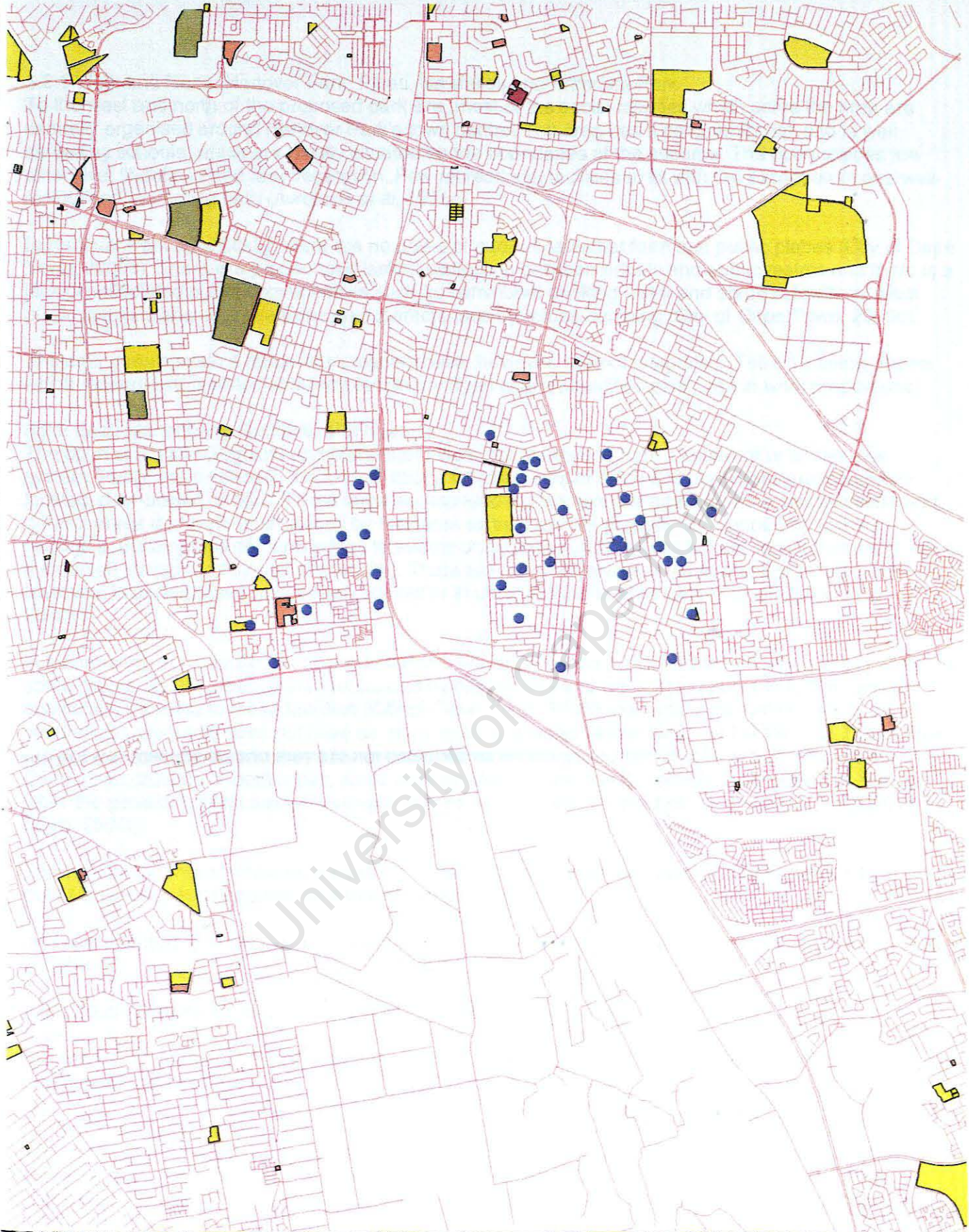


Figure 39: Map showing the general recreational facilities and complementary open space amenities available to potential park users in the residential areas adjacent to the proposed park site (Milne, 2001).

University of Cape Town

5.2.1 West and North: Hanover Park, Pinati, Newfields and Primrose Park
To the west and north of the proposed park site, most of the social facilities which serve the area are centrally organised around Hanover Park's town centre. The area has a community hall and is well served by schools, which are mostly situated on the boundaries of the suburbs. The open spaces are extensive, ill-defined and lack vegetation. Few recreational facilities exist with the exception of one well-maintained swimming bath (Awotona *et al*, 1995c).

In Hanover Park specifically, there are no areas of public space that form true public places (City of Cape Town, 2000c). There is a pronounced lack of distinction between private and public realms and there is a lack of associated public conveniences such as communal drinking water and ablution facilities. Most public space is shared by vehicles and characterised by refuse dumping (City of Cape Town, 2000c).

The area does contain a range of elements: these, however, are not integrated. Table 12 below shows which recreational facilities and complementary open space amenities exist, and in what proportions.

5.2.2 East: Manenberg, Guguletu and Nyanga
The open spaces in Guguletu and Manenberg were not planned to form a coherent or continuous system. Public open space in the form of sports facilities, school fields and play areas are incorrectly located, over-scaled or both. These large spaces tend to fragment the urban fabric creating unsafe and derelict areas that cannot be policed by residents as they are not properly surrounded by active frontages. Buildings do not form edges to streets or enclose public spaces but are located centrally within their erven surrounded by security fencing. There are many instances of wasted space along road reserves, in underutilised public open spaces or in undeveloped land parcels (City of Cape Town, 2000b).

In Manenberg, in particular, many public spaces are large, vacant, underutilised and thus unprotected. In some places, sports grounds are surrounded by high fences and walls which serve to further limit the community's access to these facilities (City of Cape Town, 2000b, personal observation, 2001). In comparison, Guguletu does not have as many open spaces as Manenberg, yet the few that it does have are not well maintained and they are not designed as an integrated part of total environment (City of Cape Town, 2000b). In both areas, some semi-private or even public realms are controlled by gangs, while the general public uses semi-private spaces, such as school grounds, as shortcuts (City of Cape Town, 2000b).

Table 12 below shows which recreational facilities and complementary open space amenities exist in both Manenberg and Guguletu, and in what proportions.

In Nyanga, public facilities are also located centrally and the types and proportion of these are depicted in Table 12.

5.2.3 South: Browns Farm and the Philippi Agricultural Area
Browns Farm
Browns Farm, a larger informal settlement, is served by one municipal clinic and a school. There are no formal open spaces here at all.

Philippi Agricultural Area
The question of open space is not a real issue in this area, as most of the land is used for farming. However, the only facilities that exist here are a police station, a municipal clinic, one place of worship and a post office (City of Cape Town, 2000d; Environmental Partnership, 2001; personal observation, 2001).

Retirees have to share homes with families or leave the area entirely if they do not have family connections (City of Cape Town, 2000d). Six private pre-school facilities with transport provision do

University of Cape Town

operate here. Students usually attend schools in the surrounding areas (Environmental Partnership, 2001).

Table 12: Comparative table showing recreational facilities and complementary open space amenities, which exist in the residential areas surrounding the proposed park site. Note that the column labeled west includes Hanover Park, Pinati, Newfields and Primrose Park.
(Sources: City of Cape Town, 2000a; The City of Cape Town, 2000b; Awotona *et al*, 1996; Environmental Partnership, 2001).

Facility	West	Manenburg and Guguletu	Nyanga	Browns Farm	Philippi Agricultural Area
Primary school	7	9	8		
Secondary school	3	1	2	1	
Day hospital	1				
Clinic	1		3	1	1
Community halls/multi-purpose centres	3	13	3		
Crèches	6	7	7		
Library	1		1		
Post office	1		1		1
Police station	1		1		1
Centre for disabled		1			
Old age homes	3		1		
Places of worship	13		14		1
Youth centre		2			
Indoor sports facility		1			
Swimming pool	1	2			
Cemetery		1	1		
Playing fields/ netball courts/ playground	Scattered	6	3		

University of Cape Town

5.2.4 Synopsis
It is evident that the problem is not that there has been no investment in these areas, but that the investment has catered largely for formal and limited purpose needs. Facilities are not integrated, but scattered over space as free-standing events. No special public places or spaces exist. This has not facilitated a positive effect on the quality of the spatial environment.

5.3 Quality of life, facility and open space needs

Poverty and unemployment are inherent attributes of these residential areas. There are a number of common characteristics which depict the lifestyle people living in the areas adjacent to the proposed park site, and indeed, of many people who live in most of the areas on the Cape Flats. These characteristics include travelling long distances to work, working long hours and returning home late. Many homes do not have electricity and home comforts are rare. Societal indicators of stress, such as ill-health and crime, are high (Dewar and Uytenbogaardt, 1991; Morris, 1992).

Hanover Park, a representative area on the west side of the proposed park site, was founded in 1972, and developed as a direct result of apartheid planning. The early residents were predominantly coloured people who were removed under the Group Areas Act of 1952, from District Six, Mowbray and Wynberg. Today, Hanover Park remains a working class area, characterised by a lack of quality facilities such as housing, lighting, recreation, public transport, drainage and other infrastructural services (City of Cape Town, 2000a).

Poor environmental conditions encourage continuing problems relating to pollution and litter control. Gangsterism remains rife in the area, fuelled by the tendency of children to leave school prematurely and by a lack of employment opportunities (City of Cape Town, 2000a). The City of Cape Town (2000a) describes the landscape of this area as being defined by elements of cultural insignificance, as opposed to spaces worthy of cultural acclaim. Hanover Park has a high crime rate, a result of a combination of factors. The most important of these, however, are the generally low levels of education, income and employment, together with a poorly performing urban environment and a lack of recreational facilities.

Hanover Park is thus a high-density, low-income, economically depressed and neglected area and as such the quality of life for the community is dismal. The City of Cape Town (2000a) specifically states a number of environmental factors which contribute to the poor quality of life. These include the abundance of large tracts of vacant land, the lack of landscaped recreational areas or parks, the lack of maintenance of both the built environment and vacant land, inadequate storm water disposal, an inadequate interface between the public and private realms and a dysfunctional relationship between buildings, open space and circulation routes.

In Manenburg, the greatest problems which have been identified are security, social problems, unemployment and housing. The quality of life for most residents is also poor. An assessment of community needs conducted in 1997 ascertained that most residents prioritised acquiring facilities for the aged, whereas sport and recreation facilities were a second priority. The latter is explained by the community's concern with keeping the youth occupied, so as to prevent them from getting involved in gang-related activities (City of Cape Town, 2000b).

In Guguletu, the same assessment of community needs identified housing, social problems, lack of health facilities, and unemployment as the greatest problems. Again, the quality of life for most residents living in this area is poor. Guguletu residents identified housing as a key priority for the development of the community (Community Needs Assessment in City of Cape Town, 2000b).

Public facilities are distributed throughout both Manenberg and Guguletu without any logical pattern of facilities clustering together at the most accessible points, such as public interchange points. This distribution makes it very difficult for facilities to be shared by different functions and it limits convenient access. In Manenburg, the high crime rate has caused facilities to be fenced in and access to be controlled. The facilities cannot, therefore, perform their proper function of communal social spaces (City of Cape Town, 2000b).

Nyanga has grown piecemeal since 1946 and has no clear integrating physical planning concept. This has only supplemented the residents already barren quality of life (Awotona *et al*, 1995c; Awotona *et al*,

1996). Public facilities are located centrally. There exists a wide range of facilities, but according to Awotona *et al* (1995c), these have not been provided in sufficient numbers and are in a state of neglect.

An even more desolate quality of life seems to be experienced by the inhabitants of the Philippi Agricultural Area. Here, it should be noted that poor health conditions in this area are associated with the appalling living and sanitation conditions, particularly in the informal settlements and rental accommodation units on the farms. The area has the highest rate of Foetal Alcoholic Syndrome, which is caused by drinking alcohol during pregnancy, in the city. According to Bamford (2001), 15% of the 160 children who attend Philippi's Children's Centre are diagnosed with this syndrome. This occurrence is very high compared to a worldwide rate of 0.4%. Clinic staff also report high levels of illness, such as tuberculosis, respiratory problems and other infectious diseases (City of Cape Town, 2000d; Bamford, 2001).

The elderly sector of this population has no access to care facilities or retirement homes. No crèches, primary or secondary schools, adult or agri-training/educational facilities exist. There are also no facilities for children, community centres or sport fields (City of Cape Town, 2000d).

At the beginning of this paper, it was noted that the poor quality of housing in these areas causes people to spend large amounts of time in public environments. As these residential areas lack good quality public places and open spaces, no dignity is given to peoples' activities, which take place in them. These generally extensive, ill-defined, badly located open spaces contribute little to making a high quality environment and often only add an associated feeling of hostility to the area. There is no clear distinction between the public, semi-private or private realms. As such, open spaces cannot be used optimally, to the best benefit of all in the community (Dewar and Uytenbogaardt, 1991; City of Cape Town, 2000b).

Here, it should be noted that there are other recreational facilities and open spaces on the Cape Flats, but these are remote and far from the areas under discussion. This is significant, as few people own private transport and few can afford public transport costs. Many people are dependent on movement by foot. Examples of these recreational areas include the Monwabisi coastal resort, which is located far from the proposed park site, to the south of Khayalitsha. Monwabisi is generally only well used by the southern residents of Khayalitsha, for whom the resort is within walking distance, although a bus service improves access during the festive season. Furthermore, the Driftsands Nature Reserve is located between Crossroads, Khayalitsha, Blue Downs, Mfuleni and Cape Town International. Wolfgat Nature Reserve is also a recreational area which is located to the south of Mitchells Plain and Khayalitsha, on the False Bay coast. A survey was conducted in 1994 to discover the opinions of Mitchells Plain residents of this area, and interestingly, it was found that even the adjacent residents to this recreational area were ignorant of it and lacked information regarding it (Kahn, 1994).

Two principle issues and needs have become apparent throughout this subsection. The first issue is that the quality of life for the people living in the areas surrounding the site for the proposed park is dismal, poor and negative. Quality of life needs to be enhanced. The second issue is that some recreational facilities and open spaces do exist in the residential areas surrounding the proposed park site. However, there is a need for more, better maintained and accessible recreational facilities, a wider range of these facilities and a need for safer and comfortable public open spaces. The fulfillment of the latter needs with the development of a park may indeed trigger at least the partial realisation of the former need.

5.4 Universal and locally-specific human needs in open space

5.4.1 Universal needs

'City dwellers everywhere seem to have a desire, indeed a basic need, for the diversity, sociability, and communality made possible by being in public' (Crowhurst Lennard and Lennard, 1984: 11).

Human well-being is generated by the satisfaction of human needs which, in turn, leads to a better quality of life or higher state of welfare (Butler-Adam, 1980). Researchers have classified human needs, such as the taxonomy of need proposed by Maslow in 1954. He argues that needs are arranged

hierarchically, ranging from low level needs to higher level needs. The model is hierarchical in that lower needs have to be satisfied before higher ones may come into being. This is an oversimplification of reality, but such a classification offers further understanding of human needs (Butler-Adam, 1980; Veal, 1994).

People do need public places and spaces. Heckscher (in Crowhurst Lennard and Lennard, 1984: 2) states that 'there must be open spaces that provide a fitting stage for the drama of daily life'. Throughout time, green open spaces and public places have also served to soften the harshness of the urban scene and simultaneously make the lives of urban dwellers everywhere slightly more tolerable.

Human beings require and depend on contact with other human beings and
public places offer the setting and opportunities for informal and unplanned meetings of friends, neighbours, colleagues, and acquaintances of all kinds. For many persons, such contact would be difficult or even impossible were it not for usable public places (Crowhurst Lennard and Lennard, 1984).

Crowhurst Lennard and Lennard (1984) describe a further, more intangible benefit of being in public. Public places promote significant conversation with others and expose one to multiple perspectives on persons and issues. This can serve to expand one's point of reference and it tends to exercise a civilising influence on the relations among persons. That is, in bringing together diverse kinds of persons in interacting public places, common attitudes and conduct can be promoted. This is supported through evidence in a 1978 study of community facilities in Hanover Park. Here, it was observed that facility users on the whole lived in tidier and cleaner homes than did non-users of the same areas. In addition, users, were more sensitive to the needs of the community and were articulate in verbalising those needs. Parks and other public spaces can thus mirror a particular society's values and can sustain communal values (Crowhurst Lennard and Lennard, 1984; Carr *et al*, 1992).

A vast majority of people go to parks and open spaces for peace and quiet. Natural surroundings of grass, trees and water provide a haven from surrounding turmoil. Natural open spaces furnish relaxation, diversion and even personal development (Brown and Whitaker, 1971). This passive engagement is a human need. A further need of human functioning is active engagement, which represents a more direct experience with a place and the people within it. While some persons seek out settings in which to relax, others require more physical and social challenges, which could include shopping, playing sports or socialising (Carr *et al*, 1992). Brightbill (in Seeley, 1973) noted certain practical advantages of both. These included physical development, coordination and physical health, assistance towards personal safety (for example, swimming), encouraging an appreciation of the outdoors and promoting mental stability by providing a change of pace.

Neither a well-designed stage set, nor a fine open space will come to life without a diverse cast of actors engaged in a variety of personal, social and cultural scenarios (Crowhurst Lennard and Lennard, 1984). The following briefly explores timeless needs of a number of categories of people in terms of open space. The most pertinent needs of young children, teenagers, adults, the disabled and the elderly in general will be investigated. This should serve to further inform potential uses of a park, which will help facilitate a positive quality of life for all users.

Young children and parents

In parks, the provision of play equipment and space for exercise is important, but the encouragement of more than simply motor activities is also necessary - (Moore in Shell, 1994). Continuous play structures are popular and are seen all over South Africa. Indeed, these structures do encourage socialisation. However, equipment for active play seems to be all that people are interested in, even though these structures do not serve the creative needs of children (Shell, 1994). Ideally a child's play space should never be finished, it should be in a constant state of change as young children have a way of creating their own worlds. Children enjoy parks in which nothing cannot be touched, changed or controlled by them (Goltsman in Shell, 1994; Shell, 1994).

The idea that creative play fulfills a vital need in children has been advanced by theorists for more than a century. The importance of play must not be underestimated, nor considered as discretionary rather than as essential to child development (Shell, 1994). Children need opportunity and challenge and Hart (in Shell, 1994) believes that if children have water, sand and loose bits to play with, they will use these as tools of communication and interaction. However, loose materials require storage and challenge requires supervision. And these are the two things that public play areas lack (Frost in Shell, 1994).

Besides providing equipment, natural open spaces too, can provide children with opportunities for exploration, independence, uninhibited behaviour and spontaneity (Harrison and Burgess, 1989). This is important, especially when young children are increasingly exposed to an ever more materialistic world, and opportunities for imaginative play are lessening. Providing these opportunities in spaces where adults are nearby seems to offer the 'adventure in safety' that parents seem to seek for their children (Jacobs, 1961; Harrison and Burgess, 1989).

It is also important to note that small children and their parents experience a sense of freedom in the increased accessibility and safety of spaces when vehicles are removed or at least restricted from an area (Crowhurst Lennard and Lennard, 1984). Children, therefore, need diverse and challenging, yet secure and supportive open spaces.

In a poignant, yet enlightening study of the children of Canaansland in 2000, a squatter camp in Johannesburg, a participatory research team assessed the children's needs, so as to recommend how their situation could be improved. The realistic results are thought to be particularly appropriate to the present study.

Sessions of group drawings with the children collectively revealed a neighbourhood in which facilities for children were all within walking distance of their homes, so that they and their parents could access them easily. These facilities included soccer and netball fields, a park with swings, merry-go-round and a slide, a swimming pool, public toilets and taps, quiet places to rest near a safe play space and traffic-free areas. Safety seemed to be important and the girls disclosed that they were sometimes verbally abused, kicked or slapped by passersby who objected to them taking up pavement space. The children's drawings also indicated that they noticed and appreciated trees, grassy areas and flowers. Children also spoke of playing under the trees and sitting in the shade in the hot weather (Swart-Kruger, 2000).

On-site observations and walks with the children revealed that they visited places without the knowledge of their parents or custodians and that they preferred the nearby park with slides, swings, merry-go-round, seesaw and other facilities as opposed to the park with 'just grass' (Swart-Kruger, 2000: 44).

In addition, dependence on free energy resources meant that children had to do their homework preferably outside before nightfall, yet there was no specific place where this could be done without interruption and constant noise (Swart-Kruger, 2000).

Parents were asked to identify facilities they thought would be important to improve the lives of their children. These included a place to play that was not too close to the road, things to play with, like soccer balls and netballs, activities such as karate and tennis, a crèche, large playing fields, first-aid lessons and a library (Swart-Kruger, 2000).

In another assessment of the five structured playgrounds of Hanover Park, conducted in 1978, it was observed that children hurt themselves as a result of falling onto hard tarmac. The sandy areas of the playgrounds were also breeding grounds for 'scabies', a mite that burrows under one's skin and causes itching and possibly infection. The parks were littered with broken glass. Due to a lack of supervision and no alternative outlets for teenage children, their free time was spent intimidating the younger ones (Bloch and Snitcher, 1978).

University of Cape Town

Teenagers and young adults
Most teenagers are interested in sports and entertainment, they want places to court, to socialise and places to lie about in. They need separate, yet integrated areas within a park, such as 'kickabout' areas, where they can follow their own pursuits, but with a degree of supervision (Browne and Whitaker, 1971).

Mention should be made, however, that public spaces can become sites of conflict between young people and other groups in the community. Reactions to the presence of young people in public places by other groups in the community can range from disquiet and apprehension through to suspicion and even hostility, and ultimately, to certain sections of the community avoiding these locations. The young people in turn argue that they are harassed by police and that they have nowhere else to go, that they have a right to be there and that they are often not doing anything criminal (Crime Prevention Unit, 1999).

Adults and families
To families and men and women, parks and open spaces that are conducive to jogging, walking, picnicking, braaing, sitting and talking are good places (Browne and Whitaker, 1971). Playgrounds are important meeting places for children and so could be social meeting places for mothers and fathers, if proper amenities were provided for them. Comfortable places to sit would not only encourage an outing for parents but would also facilitate supervision reducing children's fights and accidents (Bloch and Snitcher, 1978)

Women usually feel more restricted in open spaces than men. At certain times of the day, any open landscape can be felt to be threatening. Feeling secure in a space is highly important and should be provided for (Harrison and Burgess, 1989).

The elderly and the disabled
The elderly want easily accessible open spaces where they can sit, talk and watch younger people and their activities (Browne and Whitaker, 1971). The elderly also need to be able to get to these spaces, preferably by way of traffic-free routes, as this can reduce the psychological barriers to being in public for the elderly, whose physical mobility is often limited and who are discomforted by the threatening presence of fast moving vehicles.

Note figure 40 which reveals the entrance to Edith Stephens Nature Reserve. Located on Lansdowne Road, this busy dual-carriageway characterise most of the roads surrounding the proposed park. Would a small child, elderly or even disabled person be able to cross this road easily to gain access to the park? It is thought not: however, a system of pedestrian bridges linking the different sections of the park would make access much easier for all.

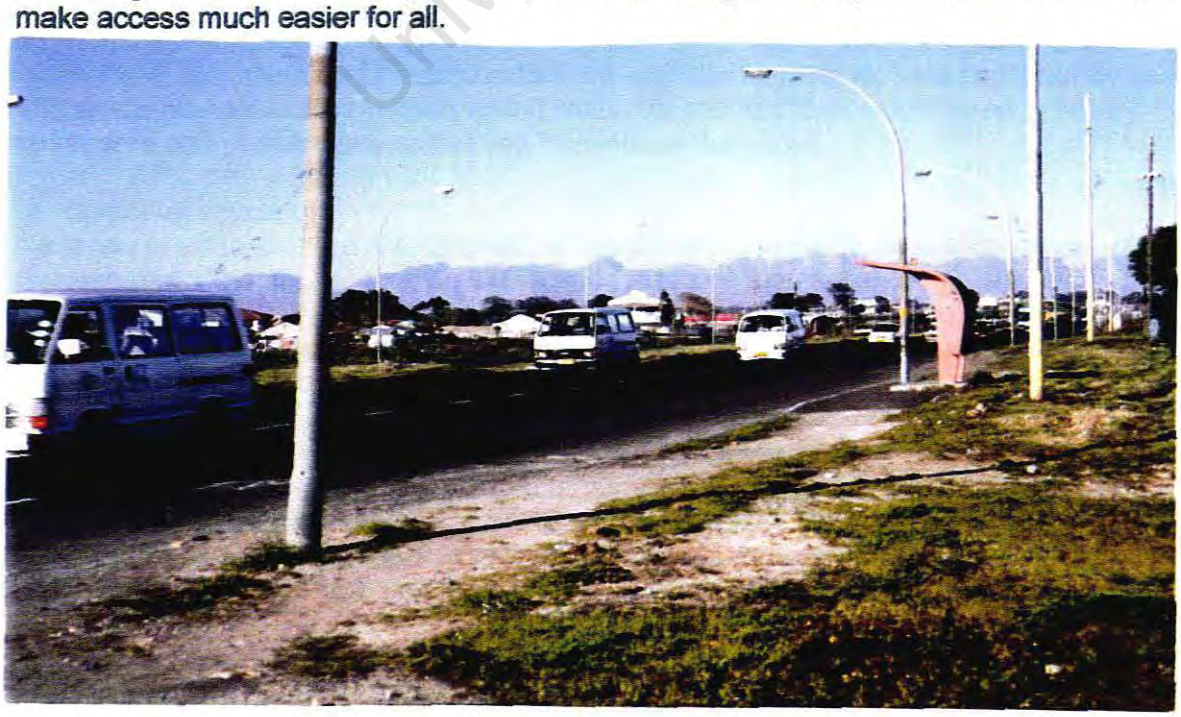


Figure 40: The entrance to Edith Stephens Nature Reserve: a busy dual-carriageway located on Lansdowne Road.

University of Cape Town

The greatest need of the disabled is often to be able to participate in full society. Wide, flat pathways, scented gardens, lower netball hoops, traffic-free areas and wheelchair ramps are some options which could fulfill their requirements. When accommodating special needs, it is important not to do so in a manner that further isolates and segregates this sector of society (Browne and Whitaker, 1971; Crowhurst Lennard and Lennard, 1984).

5.4.2 Locally-specific needs

The residents of the areas surrounding the site for the proposed park also have a number of needs, which are specific to their disadvantaged situation. These needs should inform and support the uses and roles of the open space, and hence further validate the argument for a park. Consequently, the role of the park should become developmental.

Income and employment: market places

Market places occur in public places and are complementary uses to open spaces, in that the one serves the other in terms of attracting visitors. Markets within the areas under discussion usually comprise trade in general commodities, fruit and vegetables, cooked and uncooked meat, small restaurants, bars and barber shops. There is also trade in clothes, shoe repairs, general commodities, clothing accessories, medicinal herbs and building materials (Awotona *et al*, 1996).

The number of entrepreneurs and informal traders are increasing as people turn to small-scale business as a way of coping with rising unemployment (Awotona *et al*, 1996). Public market structures that are serviced on a metered basis could create a vibrant market scene that can promote and enhance the possibility of earning an income, and provide the majority of people in the area access to products at lower prices (Dewar and Uytenbogaardt, 1991). Moreover, if these structures are placed at the distinct entrances or gateways of the park, they would further serve to entice people into it.

It has been observed that livestock and poultry are kept in pens on the street and slaughtered on the pavement on demand. Health hazards in this case are twofold, farmers bypass meat inspections by delivering straight to traders and standing water is splashed onto freshly slaughtered meat by passing traffic (Awotona *et al*, 1996; personal observation, 2001). Formal market places could curtail these hazards through access to electricity for refrigeration and built-up stalls.

If the park has a sufficient variety of uses, the chances are that it will attract large numbers of people and this should benefit traders, who would usually locate in areas of maximum exposure to pedestrian traffic. For example, if mothers and grandparents took, children to creative, safe playgrounds found within the park, where one could sit comfortably and watch their antics, they would need to pass through the market area and perhaps buy something from one of the stalls.

Environmental education

Low levels of education are characteristic of people who live in the residential areas surrounding the proposed park. The natural or even landscaped areas of a park can promote an appreciation of and interest in nature in both children and adults, which are essential for encouraging environmental education. The nearby schools could use the adjacent closest areas of the site (the edges of the park) for outdoor classrooms and nature study, so as to create an active and more interesting learning approach.

In line with how important the ownership of a public place can be, schools or pupils could 'adopt' areas of the park, in order to cultivate it, observe it or just care about it. Interactive and interpretive displays could benefit the whole community. The site could incorporate camping areas and trails for youth groups and scouts. Again, it is important to ensure access, perhaps through the use of pedestrian bridges over busy roads, so children's passage into the park is less intimidating.

University of Cape Town

Food and income: community gardens
Allotment gardens, containing vegetables and flowers can be a valuable asset to a community, and especially to flat dwellers. These gardens could similarly become edge uses, for two reasons: if high-density two to three storey dwellings surround the park, allotment garden 'owners' are in close proximity to their gardens and the height offers a degree of surveillance over the open spaces. These gardens could have comfortable benches and raised flowerbeds to accommodate the elderly and disabled. Playgrounds within or adjacent to community gardens would allow parents to keep an eye on their children, while still work in the garden. Similarly, 'kickabout' areas for older children placed within sight of these gardens could serve the same purpose.

Vegetables and flowers can be grown for profit, but vegetables can complement daily food intake and improve nutrition and health. Further benefits of such gardens include lower food prices, better access to produce, improved self-sufficiency and even attractive places for wedding photographs.

Moreover, gardening, according to its proponents, can provide people with a sense of purpose and accomplishment, a renewed sense of community and of pride, practical skills to tackle tougher challenges, hope and optimism (Garvin and Berens, 1997).

Admittedly, the microclimate and poor soil conditions characteristic of the Cape Flats can make cultivation difficult, but certainly not impossible. Inputs of compostable materials are needed and can be generated through recycling organic materials. Cultivation techniques should also be sustainable and suitable to site conditions (Gibbs, 2001). Collective rather than individual allotments have greater chances of success in situations where resources are low, and so community cooperation is important. Note that people cannot care for land, which does not, in a sense, belong to them (Nicholson-Lord, 1987).

Furthermore, community gardening has the potential to become an efficient tool in sustainability through the transformation of urban wastes into food and jobs, while saving natural resources and greatly improving the quality of the living environment (Gibbs, 2001)

Health and income: medicinal plants
The national importance of muthi plants should not be underestimated, for these herbs underpin a traditional health care system to which eighty percent of South Africans subscribe (Roff and Nonjinge, 1997). Furthermore, many medicinal plants are under serious threat from over-collection in the wild.

Cultivating traditional medicinal plants in nurseries or allotments would allow herbalists and other people in need to gather and sell plants for muti. This practice could also function as tourist and educational opportunities. For example, the Zulu muthi garden in the Natal National Botanical Garden is a 'living display' (complete with beehive-style healers hut) which informs visitors about traditional plant use and associated conservation issues. This garden is used as a resource for teaching traditional healers, who are required to grow their own herbs, taking pressure off the wild stocks (Roff and Nonjinge, 1997).

Kraals and commonage for livestock
Sheep, cattle and goats are often left unattended and many are seen wandering within areas. Figure 41 suggests that stray animals are both a major health hazard to and a major danger on the roads (Gophe, 2001a).

Kraal facilities could be incorporated into an area of the park, and animal owners taught how to manage and administer the kraal facilities themselves. This use would complement that of a nearby well-designed, hygienic market place where certified farmers could sell products like milk and meat. Hence, these kraals could be located in proximity to the edges and gateways of the park.

University of Cape Town

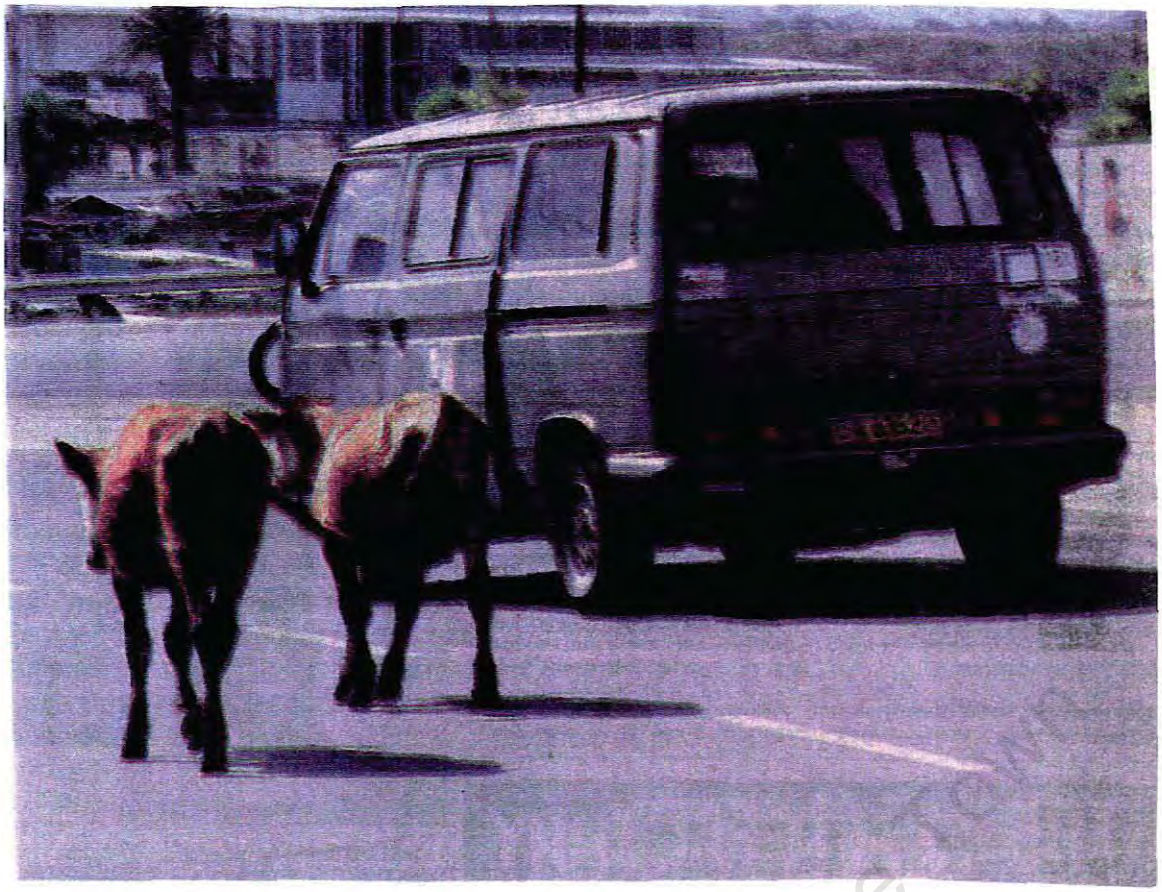


Figure 41: Young calves share road with a taxi (Source: Gophe, 2001a).

University of Cape Town

Fuel and income: woodlots and tree nurseries

The establishment of woodlots is a feasible use for the proposed park, especially when considering the situation of the poor. Using the introduced Port Jackson (*Acacia saligna*) in a controlled manner for example, would mean that wood for building material and fuel for cooking and warmth could be gathered. It is thought that this tree is infinitely useful, especially to the disadvantaged and Armstrong (1992) identifies further advantages for its cultivation. These include producing fruit and fodder – especially for goats, its persistence and longevity, ease of propagation, tolerance to drought, cold, depleted soils and waterlogging. It grows fast, fixes nitrogen, stabilises the soil, and stimulates understorey growth. This multipurpose tree could enable the poor to help themselves and make their lives more comfortable.

Tree nurseries, established in community gardens, can also provide income and even encourage tree planting. Trees suited to the conditions of the Cape Flats should generally be cultivated. Again, nurseries and woodlots would serve the community better, if located as close as possible to them on the edges of the park.

Cultural events: initiation sites

Initiation practices have developed over centuries and are necessary for the stability of community life (Pinnock, 1997). The intensity of the youth, it is believed, is captured in rituals of adolescent passage and the handing down of ancestral teachings, which teach and empower and protect social life from adolescent excesses. Young Xhosa men (the abakhwetha) in particular, undergo a passage to manhood, where they need to live in a small, domed grass hut, built for them in a secluded place far away from the community, for usually a month (Pinnock, 1997).

manhood, where they need to live in a small, domed grass hut, built for them in a secluded place far away from the community, for usually a month (Pinnock, 1997).

At present, there is no little or no access to suitable open space for initiation. The abakhwetha are forced to use bare fields, where they do not have the privacy they require (Ngutu, 1992). The proposed park could accommodate initiation rituals in the more private and isolated areas. Ideally, the centre of the park could provide enough privacy to serve this purpose. However, in this case, the centre of the park is either covered by water or is a busy road intersection. However, two or three private areas, surrounded by thick vegetation, could be provided within the centre of each of the three portions of the park. People may also feel an enhanced sense of respect for these areas.

Metropolitan cemetery and gardens of remembrance
Remembering people is particularly important to the surrounding communities.
It is acknowledged that the residential areas surrounding the proposed site for the park lacks a sufficient number of formal memorial parks or cemeteries (City of Cape Town, 1999b). This need can potentially form a complementary function to the park. Small cemeteries could be located within quietest areas of the park (centrally) and larger gardens of remembrance, in the very northern section of the link to the False Bay Coastal Park. The latter must be especially accessible to people on foot. Comfortable benches in the shade would, again, accommodate the needs of the elderly.

5.5 Multifaceted needs: multifunctional spaces
This section has shown how human need can suggest a multifunctional and useful role for the proposed Cape Flats Urban Park in residents' lives. It is evident that the particular needs of the residents who live in the surrounding areas of the proposed park site are multifaceted, yet chiefly developmental, as a result of the high levels of unemployment, low levels of income and education and the poor quality of the natural and built environments. A multifunctional urban park could fulfill a number of these developmental and universal needs, through incorporating complementary amenities to open space, as well as meeting the locally-specific needs of open space, for a variety of different people and their cultures.

It should be apparent that, especially by adding value to the park's edges and enabling a sense of ownership to the communities, this particular park can act as an instrument of renewal. It can enhance quality of life by improving the social and economic conditions of the people who use it.

It is recommended here that the overarching priority and function of this park should be that of a 'meeting needs' park - a park that will focus on enhancing the quality of life of its users. It should thus form a community asset, which is both safe to utilise and of which residents can be proud. The establishment of such an asset, however, is not easy. Certain social constraints, particular to the Cape Flats context, may negatively influence the development of such an asset.

5.6 Social constraints or threats to the establishment of a positive park
A multifunctional urban park can meet many of the needs of the people who use it. However, this target will not be free from effort. The following elaborates on two important issues, which must be acknowledged with regard to the Cape Flats Urban Park.

Gangs
The majority of the crimes which are committed on the Cape Flats are related to gangsterism. This phenomenon has resulted from a number of interrelated factors. Apartheid and its repressive legislation has contributed to gang formation, as has the breakdown of the extended family. Gangs replace the extended family and act as a support network for the youth (Daba, 1990; Murphy, 1991). Unemployment and idleness are further causal factors. When young people have nothing to do, they spend time with other youths and over time an identity develops associated with the clothes they wear and even the way they speak (Murphy, 1991). No young person wants to be alienated from their peers and will thus

University of Cape Town

endeavour to be accepted and gain security, even if it means going against family principles (Daba, 1990).

Young people also join gangs as a result of peer pressure or as a defense mechanism. Children left on their own in adultless communities are particularly vulnerable of being caught up in gang activities (Pinnock, 1997). Housing and overcrowding can also cause gang formation. In an analysis on how gangs perceive violence in South Africa, Murphy (1991) states that the majority of gang members interviewed lived in a house with at least twenty other people. Pinnock (1997) believes that in the absence of formal initiation to provide them with ritual pathways for becoming socially and emotionally active, young men invent rituals to fill the gap, but young men cannot initiate themselves.

The threat to the establishment of a park lies in the fact that gangs practice territoriality. Areas of land 'belong' to particular gangs and as such they can deny the right of access and use of this open space by others (Francis, 1989; Pinnock, 1997). Gang culture is characterised by violence as a tool for conflict resolution as opposed to negotiation (Murphy, 1991). Areas of the park may become areas which 'belong' to gangs and gang-related disputes over these areas will subsequently discourage park use by residents who fear for their safety.

Gang formation reflects broader societal disjunctions and it is certainly related to the economic, political and social conditions of the area. It has largely been communities themselves that have, in the past, successfully eliminated gangsterism through various organisations, street patrols and education (Daba, 1990). In this light, the proposed park, with its various facilities, may form an extra device to communities in the elimination of gangs, through encouraging young people to become involved in other purposeful activities, preferrably before they get caught up in a gang. It is believed that active engagement especially, can help to reduce self-destructive and anti-social behaviour. Moreover, the proposed park needs to be vigorously promoted by communities as neutral territory, which may be achieved by communities continuously and regularly using the park. The latter will of course depend on a number of factors such as design and the variety of facilities and activities the park offers.

Of course no one method can be used and any method that discourages gang formation may only have limited effects. However, any approach must be consistent in its implementation (Mamputa, 1990).

Land Invasion
Cape Town's urban growth is a product of both natural population growth within the urban area and rural-urban migration. Coupled with the city's severe housing shortage, any vacant land in the area is open to the risk of land invasion (Settlement Planning Services, 2001). Again, park design, park facilities and the frequency of park use are important aspects in eliminating this threat.

A common solution to both of these problems is based on ownership: if people 'own' and depend on an area in order to meet their needs, if they perceive it as valuable, so they will protect it.

5.7 Synopsis
The examination of natural process and human needs has shown that, through need informing use, multifunctional urban open space can play the role of a socio-economic developmental tool. The final section will provide a more detailed and comprehensive discussion of criteria and principle guidelines to direct thinking toward an appropriate plan for a multifunctional park.

University of Cape Town

Section 6: Towards Planning Sustainable Multifunctional Open Space

A detailed study of Cape Town's proposed Cape Flats Urban Park has provided the platform with which to demonstrate how the application of the concept of encountering nature within the city can actually mean the creation of a multifunctional, useful and sustainable open space. Within this section, certain criteria, and planning and design considerations will be summarised so as to assist the successful development of the Cape Flats Urban Park, and indeed, any multifunctional open space.

The paper has shown that the argument for a multipurpose park, outlined in the Muni-SDF, is validated. Reasons for this verification included the fact that this open space area lies within a flood plain, evident through the presence of numerous water bodies, it is located where glass sand resources are available and it is an area which has productive potential (such as agriculture and even tourism). Furthermore, the area forms part of the Metropolitan Open Space System (MOSS) and precedent has shown that many contextually similar parks and open space developments have and can work. The area is thus most suited to public open space and to minimal or no development.

6.1 Guidelines as indicated through history and precedent

For the designer and manager, knowledge of other spaces, past and present, provides information for shaping and managing new spaces. This information can be even more useful when the relationship between the design of the space and the public life of the time, in which it was created, is understood (Carr *et al*, 1992).

The history of urban parks reveals that not only have parks differed in size and type, but the design intentions and social purposes of parks have varied over time. Precedent initiated thought regarding the possibilities of open space in urban areas, and the proposal was located in typologies of open space over time in order so as to gain a better understanding of its potential role. It has identified some key success factors.

Success in this context is understood to be the achievement of a better quality of life for a wide range of open space users. Lessons for good practice can be learned through reiterating key success factors deduced from the case studies that were presented. Particularly relevant factors to creating successful open spaces in lower income areas are presented here.

Improving the quality of life for people by:

- meeting locally-specific needs
- productively using waste land and generating revenue
- providing recreational and educational experiences for all ages
- incorporating the needs of the elderly and disabled
- ensuring multifunctional uses
- creatively using local resources and recycling
- addressing security issues
- creating green oases to improve social and physical health
- providing education and life skills
- increasing local pride
- focusing on children

Improving the quality of nature and the environment by:

- integrating open space into urban open space system
- using open space to sustainably improve water catchment management
- working with nature – nature informing open space uses
- using indigenous vegetation
- improving ecosystem health

University of Cape Town

Notable key success factors which enabled making the park projects happen and last, involved:

- ongoing community participation and working with local social dynamics
- encouraging community ownership and involvement, through community decision making and community management of finances
- using the media to continuously promote all the good developments within the park
- securing ongoing funding from multiple sources

6.2 Guidelines as indicated from natural process needs

These criteria and guidelines for the successful development of the Cape Flats Urban Park were deduced through a natural systems analysis approach which further enabled a determination of the park's potential role. This approach involved recognising that if the establishment of the park respects and reinforces the area's natural systems and processes, it would play a considerable role in fulfilling the survival requirements, for both nature and the potential users and, consequently, the long-term sustainability of the area could be maintained. The concept of sustainability encompasses meeting the needs of the present, without lessening the ability of future generations to meet their own needs.

Suitable guidelines for the proposed park site were indicated using factors of natural process opportunity to overcome natural process constraint, offered by the site's inherent natural systems and particular ecological needs. These factors included:

Biodiversity:

- linking the site to other natural areas, on the metro-scale so as to make it more ecologically, scientifically and educationally valuable and enhance the site's biodiversity through the action of migration corridors; this link would form a natural barrier against urban intrusion into the valuable Philippi Agricultural Area

Storm water management:

- incorporating the site into a storm water management system through the use of wetland areas, seasonal surface ponds and storm water detention ponds, which would reduce pollution by removing water contaminants, improve water quality, habitat and thus species diversity, as well as attenuating the rate of storm water runoff and preventing flooding
- designing further detention ponds as dry detention ponds, which would serve as open space, a habitat source and recreational areas in the dry season
- providing an area for winter recharge of the underground aquifer, a potential water resource
- incorporating wetlands which act as biological filters (wetland treatment systems). This would also purify polluted storm water runoff, which would assist in restoring the underground aquifer
- a storm water management system would also restore the natural hydrological balance of the area and if paved areas are avoided and vegetation removal minimised, the natural drainage system would be further protected
- a storm water drainage system, designed to drain excessive groundwater so as to control the high water table and seasonal flooding would also prevent the upper potentially contaminated groundwater from polluting the lower aquifer

Climate amelioration:

- the presence of water bodies would ameliorate hot summer temperatures through the cooling effects of evaporation, are place-forming elements, create recreational and aesthetic improvements to a locality and inject diversity into the built fabric and can be used productively (for example, fish farming).
- the presence of existing vegetation (which should be kept where possible) and introducing indigenous vegetation and trees would ameliorate windy conditions if suitably oriented to the dominant wind directions, create shelter belts and reduce the impact of wind blown sand, provide shade in hot microclimates, cool the air through evapotranspiration, screen and separate conflicting land use activities and features, abate noise, reduce sun glare, minimise air pollution, conserve

University of Cape Town

habitat and build up good soil resource; trees would also ameliorate the serious lack of place-defining features in this area

Visual:
- creating a soft, low maintenance edge to the surrounding urban areas

It should be noted further that if development of facilities such as community centres are to take place within the park, development in areas of inherent natural hazard such as flood-prone areas (that is, within the 1:50 year flood line) should be prevented. Likewise, development in or near sensitive or productive ecological areas should not be allowed. In addition, procedures for the protection and restoration of natural systems during construction of possible facilities must be adopted (Oberholzer *et al*, 1984).

It was concluded that the exclusive satisfaction of the area's ecological needs should not be deemed a priority, as a result of already degraded systems. What must be recognised, however, is that in accommodating natural process needs, significant needs of the potential park users can be appeased and ultimately, the quality of life for many people can be improved.

The above factors incorporate the attributes of simple ecological design, which is when the practice of design is grounded in a rich understanding of ecology. Ecological design minimizes environmentally destructive impacts by integrating itself with living processes. This integration implies that the design respects species diversity, minimises resource depletion, preserves nutrient and water cycles, maintains habitat quality and attends to all the other preconditions of human and ecosystem health. It is the effective adaptation to and integration with nature's processes, which preserves ecological integrity (Cowen and van der Ryn, 1996).

The proposed park needs to include dimensions of sustainability, such as conservation measures (for example, recycling) which slow the rate at which nature is degraded, by allowing scarce resources to be stretched further. Regeneration in terms of recreating habitat, restoring water bodies to ecological productivity and renewing the soil will expand the local natural capital through the active restoration of degraded ecosystems and communities. Finally, stewardship, a particular quality of care, careful maintenance and continual reinvestment in our relations with other living creatures and with the landscape, will maintain local natural capital through spending frugally and investing wisely (Cowen and van der Ryn, 1996).

Ecological design must respond to the particularities of this place on the Cape Flats. It must integrate human purpose with nature's own flows, cycles and patterns. Designing with nature acknowledges that, in the long-term, the most ecologically benign solutions make the most active use of life's own patterns of health. An ongoing partnership with nature can benefits both people and ecosystems (Cowen and van der Ryn, 1996).

People's attraction to natural features supports public life (Spirn, 1984; Carr *et al*, 1992). This only emphasises the point further that nothing in the design of the proposed park should violate the wider integrities of nature.

6.3 Guidelines as indicated through human need

An analysis of local human needs discerned what further roles the proposed park would or could possibly play in improving the quality of life for the residents who live in the areas surrounding the park.

The needs of the locality are particular due to past discrimination which has supplemented conditions of poverty, unemployment, ill-health, lack of housing, high incidence of crime, stress and low levels of education. Life seems exceptionally hard for local communities and the poorly performing urban environment which lacks adequate facilities, open space and good environmental conditions only adds to making a poor quality of life even harder. This provides further validation in the argument for a park.

The lack of good public open spaces in these areas is significant. 'Positively made and celebrated public spaces are the essential social infrastructure of successful urban environments... While being important for all, the role of public spaces in the lives of the urban poor is critical'. Poor people cannot meet 'the full range of family needs through the individual dwelling unit. Public spaces however, can represent the foci of an entire community's energy and resources', as the space would act as an 'extension to the usually small private dwelling unit. As such it would house the informal and periodic activities which are so important in all aspects of public life' (Dewar and Uytenbogaardt, 1991: 56).

The analysis revealed that the surrounding communities badly need a better quality of life. To help achieve this, it was noted that better maintained, more accessible, wider ranges of recreational facilities and safer, more comfortable open spaces were needed.

Universal needs were considered. People of all ages and cultures need contact with other people, they need havens for peace, quiet and reflection, they need to take part in active engagement, such as creative yet safe play and sports. However, the particular locality under study also displayed a number of unique needs pertinent to their situation. Overall, the overarching need included the provision of elements that would aid economic development and social upliftment.

It was thought that to supplement income and to provide economic opportunity and employment, park activities and complementary amenities could include market place structures, community vegetable gardens, muthi gardens and woodlots. The use of these spaces productively would provide food for nutrition and food available locally at lower prices. The cultivation and subsequent availability of medicinal herbs would supplement incomes, improve health conditions and educate people regarding conservation. Additionally, natural open space areas within the proposed park would enable school children to learn about and appreciate nature in person.

At present, very few places or spaces seem to possess any cultural significance to the communities. Park space could accommodate cultural events, such as the Xhosa tradition of initiation and areas of cultural significance such as cemeteries and memorial gardens. These spaces should be related to, but not necessarily directly incorporated into the park for reasons of privacy and respect.

The social constraints and threats to successful park development should be identified and positively mitigated.

It is evident that the distinctive needs of the residents who live in the surrounding areas of the proposed park site are multifaceted, yet chiefly developmental. A multifunctional urban park could fulfill a number of these developmental and locally-specific needs, through incorporating complementary amenities to open space, as well as meeting the universal needs of a variety of different people and their cultures.

Diverse human needs have suggested that the proposed Cape Flats Urban Park could play a multifunctional and useful role in users' lives. It is recommended that the overarching priority and function of this park should be that of a 'meeting needs' park - a park that will only enhance the quality of life of its users. It should thus form a community asset, which is both safe to utilise and of which residents can be proud.

6.4 Guiding principles for designing multifunctionality

Good design and management are central to making good public places. A well-designed stage set can reinforces dramatic themes between performers and spectators (Gold, 1972). Frequency of use depends, in part, on the park's own design. Design can often signal behavioural rules of public spaces, communicating what is allowed and what is forbidden through fencing, gates, edges and surfaces – even a lack of amenities can communicate messages to users about the lack of hospitality of a place. On the other hand, a water feature that encourages touching, comfortable benches placed under trees which provide shade on a hot day, can invite use (Gold, 1972; Francis, 1989). Vital open spaces are created through use and use is encouraged by behaviour-based design. (Hayward, 1989).

University of Cape Town

A park can be viewed as a basic building block of an area, both spatially and developmentally. However, no general recipe for a good park, which offers such support, exists. Certain common characteristics and important can be found within good open spaces and these qualities may thus provide the ingredients to make a good park or open space. The following subsections elaborate on these often interrelated, sometimes conflicting qualities and offer guiding principles, which are recommended for consideration when planning multifunctional open spaces.

Ownership and control

Control is a mechanism by which people come to attach meaning to a space.
Ownership is a direct form of spatial control and allows users to appropriate or claim a space through reshaping or rearranging it in some way (Lynch in Francis, 1989). As a sense of ownership increases, owner responsibility and concern for the quality of the environment often increases. Ownership can be either real or symbolic. The latter is a more common way in which users feel part of a public space. This perceived ownership, however, can have both negative and positive consequences. It can lead to the exclusion of those who would like to use a space and hence its neglect, or it can invite people into it, through communicating a sense of sharing, hence nurturing user responsibility for it (Francis, 1989; Oberholzer, pers. comm.).

The users and their activities in public spaces should be balanced. It is possible to encourage diverse activities so that no one group dominates a space to the exclusion of the others. According to Lee (in Carr *et al*, 1992), the feeling of belonging among lower income groups in any public place is based on a knowledge of the place and its inhabitants. This form of spatial control, perceived ownership, is sometimes necessary, but a challenge exists in recognising where it can be desirable or where it unduly restricts the freedom of other groups (Carr *et al*, 1992).

Parks and open spaces should allow flexibility and provide opportunities. The use of innovative design ideas can allow people to directly shape and arrange the spaces that they use. For example, movable chairs allow people to exercise their jurisdiction over where the chair should be placed and hence they can feel that the space belongs to them (Crowhurst Lennard and Lennard, 1984). User satisfaction is largely determined by the ability to control the experience of a place and when the ability to control the environment is reduced or eliminated, as in the case of an overcrowded dwelling unit, negative experiences such as stress, anxiety or social withdrawal can increase (Francis, 1989).

Participation

Urban space need to be conceived and designed by those who are prepared to acknowledge and support communal and symbolic roles of open spaces play in people's lives (Harrison and Burgess, 1989). As such, to create and maintain a good working relationship between a space and its users, designers need to understand in advance the needs and expectations that potential users are likely to bring to the place. The more diverse the range of user groups, the more difficult it will be to develop appropriate criteria for design and management. By engaging in dialogue with a representative cross-section of users before, during and after the creation of a space, potential and existing conflicts among groups can begin to be addressed, resolved or managed (Carr *et al*, 1992).

Young people should be encouraged to participate in planning and managing events. Adult managers may then be less likely to stereotype young people either by activity, cultural background or gender (Crime Prevention Unit, 1999).Good practice should involve looking at the cause of antisocial behaviours and providing appropriate referrals and dealing with problems in a conciliatory manner, which is more effective than a confrontational approach (Crime Prevention Unit, 1999).

Direct participation in designing, building, and managing environments has been found to increase user satisfaction in a variety of spaces. In 1969, the American planner, Sherry Arnstein invented her ladder of citizen participation. Each rung on the ladder represented a different state in the ascent from a powerless and manipulated citizenry, through the 'tokenism' of consultation and placation to partnership, delegated

University of Cape Town

power and finally, citizen control. (Nicholson-Lord, 1987). According to Arnstein, 'citizen control' is the ultimate goal of participation. Participation without real control over decision-making can lead to decreased environmental equity (Hester in Francis, 1989). Real environmental control, then, implies a sharing of power (Pateman in Francis, 1989). Participation and thus control can be increased symbolically through 'Friends of the Park' groups and in real terms through ownership, if users own the park as a land trust (Francis, 1989).

When participants join together in a common effort, individual differences become negligible. Relentless outreach can be the key to building concentric circles of community that need to come together in a park. For example, the Friends of Meridian Hill crime patrol adopted a requirement that all say hello to everyone they meet. (Coleman, 2001).

Openness and enclosure

Openness is an important quality for a park, a place in which to look away from oneself, to experience a continuity of space and vastness, freedom of movement. It should be recognised that when placing facilities within a space, its area may become less open, but design can ensure that this openness does not necessarily disappear (Baljon, 1992).

However, Camillo Sitte in Crowhurst Lennard and Lennard (1984) emphasised the quality of enclosed space. Ideally, the place should be defined by buildings which front onto the space, forming walls which seem to support the sky. This quality of visual enclosure focuses attention on the people and events within the space (Crowhurst Lennard and Lennard, 1984; Cape Metropolitan Council, 2000).

Enclosure automatically improves the natural surveillance of an area, and openness allows one to see ahead (Cape Metropolitan Council, 2000). It might be agreed upon by some that a park in high crime areas would need to be policed day and night, and that any new park would be rendered meaningless, unless the issue of safety was addressed (Kahn, pers. comm.).

Safety can be thought of creatively in terms of design, and the designer is challenged to provide 'messages', which can lessen perceptions of risk. For example, facilities can function as security presence, visual connections and surveillance can be created between the inside of buildings and the surrounding park (Harrison and Burgess, 1989). Activities could be included so that community centres would need to open early in morning until late at night (Madden and Okazaki, 1992).

It has been mentioned that safety is a critical issue for women and the elderly in public. The ability to feel a sense of control over a space, to be able to see in, to escape easily, or to gain assistance in times of crises are examples of how a place can be made to feel more secure (Francis, 1989). Long-view distances, openness, clean grassy or enclosed areas, water and lighting are aspects of design that have been found to feel safer than densely vegetated, littered areas decorated by graffiti (Shroeder in Francis, 1989). A place should be opened up or enclosed as use and levels of safety dictate.

Access and linkage

A good place is easy to see and easy to get to as people can see that there is something to do there. The ease of access to the opportunities and facilities and their approachability which exist are important in inviting use (Crowhurst Lennard and Lennard, 1984; Baljon, 1992; Cape Metropolitan Council, 2000). Attention should be paid to designing park entrances, as these are the gateways which invite and celebrate arrival.

It will be ineffectual to create opportunities if access is limited to a confined number of people. In providing access, environmental injustice, which is inaccessibility, the exclusion or unequal distribution of resources or amenities, is undone (Crowhurst Lennard and Lennard, 1984). Thus, 'inherent in the concept of access are issues of equity. The primary deterrent to ease of access is the cost of overcoming the friction of distance to get to a place, and so the best option remains to design for people to gain access to most facilities on foot' (Dewar and Uytenbogaardt, 1991: 17).

Ease of access is also related to the pattern of connecting routes within the park. A clearly defined network of paths would minimise trampling of vegetation and consequent wind erosion. Main routes should generally allow focus on the more prominent connections, usually indicated by pedestrian desire lines (Oberholzer *et al*, 1984).

Baljon (1992) believes that a park should be not so much a lung as a heart, and in order to be so, the links with the surrounding area should be excellent. Linkage is important in creating a functional coherence between the inside and the outside of a public space. Note that straight pathways can imply travelling fast, whereas winding paths suggest a more leisurely and contemplative pace (Browne and Whitaker, 1971). Paths can also be used as structuring elements for the integration of facilities (Baljon, 1992). A park belt, such as that which the proposed Cape Flats Urban Park may form, should be linked by pedestrian bridges, which allow easy crossing of busy roads.

Access is also important if a place is going to mean something to users. Symbolic access involves the presence of cues in the form of people or design elements, suggesting who is and is not welcome in the space (Carr *et al*, 1992). In addition to providing physical, symbolic and social (that is, open to all types of users), access must also be visual. Visual access is critical (for women and the elderly especially) as it increases a person's sense of safety (Francis, 1989; Urban Parks Institute, 2001c).

Multifunctionality

Diverse, flexible spaces accommodating many compatible facilities, uses and amenities, yet the demands of any one activity will not be satisfied to the greatest extent possible, and certain conflicts may be generated. Overall, however, in terms of their contribution to the total environment, the performance of these spaces is superior to that of the more specialist elements and resources are optimally used. Furthermore, multifunctionality is essential for improving the economic climate, especially in lower income areas (Pigram, 1983; Dewar and Uytenbogaardt, 1991; Cape Metropolitan Council, 2000).

Open spaces should thus be made with a generosity and generality, which will enable them to accommodate a variety of demands. However, the nature and form of public facilities must be appropriate and compatible. Fitting facilities, therefore, are contextually specific and appropriateness is defined by the degree to which a facility meets real and widely perceived needs and to the degree that it is accessible. Facilities should not focus on single user groups or on single activities as activities that appeal to a variety of people should occur (Carr *et al*, 1992).

Facilities should be community magnets, places where people will sit and talk, get something to eat or play a game of soccer. When there are numerous collections of activities in which to participate, many different people can be attracted and the place becomes vibrant. These uses should also be regularly available and characterised by popular informality (Urban Parks Institute, 2001c).

Facilities and services should be located around public spaces, in order for the functions of those facilities to become prominent and so the facilities themselves can provide a sense of scale, definition and enclosure to the space. Furthermore, there should be a hierarchical correlation between the order of facility and the order of public space (Dewar and Uytenbogaardt, 1991). For example, a gradation of recreation areas from easily accessible intensive-use areas to more remote areas with minimal facilities could be provided, which provide a range of recreation experiences (Oberholzer *et al*, 1984).

The goal is to create a place with settings and activities and uses that collectively add up to something more than the sum of its often simple parts. A park can broaden our own capacity to imagine and create a better future. The key is to offer a rich variety of experiences that spark the imagination (Carr *et al*, 1992).

University of Cape Town

Integration, coherence, anchorage and sharing

The integration of functions will positively affect the performance of the functions themselves, as they tend to mutually support each other (Oberholzer *et al*, 1984). In positively performing urban areas, it is possible for poorer inhabitants to gain easy access to the opportunities and facilities and the consequent overlapping of disparate elements and activities can generate high levels of choice, service and reinforcement (Dewar and Uytenbogaardt, 1991). Moreover, integration promotes collective activities and contact and the places of greatest interaction within spaces will be the places of greatest opportunity (Dewar and Uytenbogaardt, 1991).

The manner in which functions within the park are combined and distributed and how they are connected to each other to form an internal functional coherence are important considerations. Functions should be concentrated together in order to guarantee areas sufficient animation, even during quieter periods. Main activities should also be dispersed so as to create a differentiated pattern of busy and quiet. The nodal concentration of the more intensively used facilities will avoid unnecessary intrusion into natural areas (Oberholzer *et al*, 1984). A further physical benefit of clustering facilities together is that the total impervious area is reduced and the chances of flooding lessened (Marsh, 1998). Connections of pathways should be organised in such a way as to enable visitors to go directly to the main facilities of the park, and also to enable them to wander (Baljon, 1992).

Mumford has said (in Heckscher and Robinson, 1977: 193) that 'park planning... cannot possibly stop at the edges of parks. Fringing land uses need to respond to the edges of parks in a compatible manner. Park uses should be brought right up to the edges and borders of big parks, and designed as links between the park and bordering streets, which may even increase use at night (Jacobs, 1961). This 'knitting in' of edge uses, for example, can be obtained by constructing small-scale 'kickabout' areas with benches adjacent to industrial development, which workers would enjoy during breaks. It should form a seam, not a barrier, a line of exchange along which two adjacent areas are knitted together (Lynch, 1960).

Coherence is the relation between a park's constituent elements. It concerns the clarity with which the parts of the park or open space form a logical whole, the degree to which main and side uses can be distinguished and the strength with which the parts of the park are joined. Two qualities of coherence are orientation and scale, and these are important to include within a design as a simple, readable orientation and well-proportioned space can be a considerable event (Baljon, 1992).

Anchoring implies that the spatial context of the park reveals its position in relation to the city and the spatial coherence between what lies inside and what lies outside. The visibleness and recognisability of prominent points, lines and edges makes orientation possible. The design of the edges determines how the park is embedded in the urban area, and it determines the nature of one's transition into the park (Baljon, 1992).

The actual resources available for the provision of public facilities in most cities cannot meet demand and so sharing is cardinal. Sharing can operate to the benefit of all users, as the encumbrance of maintenance is spread more widely. Furthermore, a variety of contacts and sociable interactions become inevitable in the shared use of facilities and services (Francis, 1989). Sharing limited resources or facilities can allow optimal use and provides the possibility of creating a different, yet dynamic park. Sharing also causes potentially positive relationships within 'families of facilities' (for example, the relationships between libraries and playing fields), as well as for people (for example, the desirability of especially parents for clinics, crèches and primary schools to be in close proximity in relation to each other (Dewar and Uytenbogaardt, 1991: 112; Madden and Okazaki, 1992).

Responsive, democratic and meaningful

Carr *et al* (1992) believe that valuable public spaces should be responsive, democratic and meaningful. Responsive spaces are designed and managed to serve the needs of their users. The primary and

University of Cape Town

timeless needs that people seek to satisfy in public spaces, which have been observed in this paper, are those of comfort, relaxation, active and passive engagement and discovery of self and others.

Democratic spaces protect the rights of all user groups, as they are accessible to all and provide freedom of action, although they also allow for temporary claim and ownership. They offer a sense of power and control limited only through the rights of others (Carr *et al*, 1992).

Meaningful spaces are those that allow people to make strong connections between the place, their personal lives and the larger world. They relate to a person's physical and social context. In these spaces, connections may be made to personal or group histories or futures, to cultures and to biological or psychological realities. Connections to places form through direct involvement in the functions that spaces could offer or through experiencing a special event in that place (Carr *et al*, 1992). A component of meaning is the concept of control or a person's ability to directly influence his own use and experience of a place (Carr and Lynch in Francis, 1989).

A continuously used open space, with its many memories can anchor one's sense of personal continuity in a rapidly changing world, and by the assemblage of overlapping memories of individual and shared experiences, a place becomes sacred to a community (Carr *et al*, 1992).

Comfort and Image

Comfort and hospitality are qualities that public places must provide, as comfort is a function of the length of time people are prepared to remain on the site. Basic needs for food, drink, shelter from the elements or for a place to rest all require a certain degree of comfort to be satisfied. The generally harsh climatic conditions of this area would need to be considered in the design of campsites and picnic areas. Small, sheltered areas with mounds and hollows can be created, trees should be planted for wind-shelter, shade and privacy, and covered walkways and benches can provide shelter form rain (Oberholzer *et al*, 1984).

Comfort can be provided by allowing choice. For example, certain types of benches should both encourage social interaction with other seated persons, while others should discourage it (Crowhurst Lennard and Lennard, 1984).

Ablution blocks are necessary for comfort, but are vulnerable to vandalism and, if isolated, can pose potential danger. Hence, the location of restrooms needs special consideration. Normally, this facility is carefully sited into the topography, and screened with vegetation, but in this situation safety should come first and it is recommended that ablutions are located within other facilities or adjacent to intensively-used areas (Oberholzer *et al*, 1984).

Comfort is physical, but it can involve social, and psychological comfort as well. When people can observe, meet and interact with others a sense of identity and belonging is found, a sense of absorption into urban life. If places of interaction are comfortable, processes of socialisation, people's sense of identity and the richness of urban experience is enhanced (Urban Parks Institute, 2001c).

Detail, such as contrast in textures, geometry or scene, can tantalise and objects such as community bulletin boards and movable chairs signal that someone took the time and energy to design amenities that welcome, intrigue or help (Browne and Whitaker, 1971). Allowing and inviting musicians and impromptu performers to entertain, can draw strangers. Hard, reflective and concave spaces would provide acoustic settings for their needs. Festivals and celebrations tend to focus participants on their shared pleasurable experiences, and create a sense of community (Crowhurst Lennard and Lennard, 1984).

Props make it possible for people to select specific locations that will support their personal agenda and the level of social involvement they desire. Low walls define boundaries, but can also be used as temporary resting places, a support to lean on or a surface for sitting or reclining. Steps offer

University of Cape Town

opportunities for sitting and lounging and may be designed in combination with trees so as to invite persons to sit in the shade. Upper levels allow actors to look down on a crowd and feel both separate from and yet part of the social scene (Crowhurst Lennard and Lennard, 1984).

Low and therefore unobtrusive signage should blend with the landscape and if located against a planting backdrop, would avoid silhouette effects on the skyline. Park furniture, however, should keep with the use and character of the area (Oberholzer *et al*, 1984). Image and reputation can shape visitor use, nearby neighbourhood investment and economic development (Urban Parks Institute, 2001c).

Central to the image of a park is its landscaping. However, it must be noted that sustainable landscape management should be practiced here, where, for example, informal planting of indigenous species that require little or no irrigation and fertilisers should take place. Many fragmented lawns and even flowerbeds should be avoided as these require excessive maintenance. It is important to retain as much of the existing vegetation as possible, especially in areas with wind-blown sand, and any new trees should be planted in dense clumps for mutual protection and optimum shelter effect. Artificial mounds and berms can add topographical interest, provide wind-shelter and screen unsightly structures (Oberholzer *et al*, 1984; Cape Metropolitan Council, 2000).

Change
Modification is the right to change a space to facilitate use, and as such it becomes an element of ownership and control. The ability of people to change or modify a public space is an important dimension of successful spaces. Personalisation of space, through grafitti for example, can also discourage use or result in negative perceptions by some (Pigram, 1983; Francis, 1989).

It is also important to incorporate the demographic and lifestyle changes of the locality that will occur in time. Amenities wear out, needs change and having the management flexibility to enact that change is what builds great public spaces (Project for Public Spaces, 2000). The ability of a place to evolve and adapt over time needs to be considered when designing public spaces.

6.5 Conclusion
'Every site has a long history that bears on its present. Every site will have a long future, over which the designer exerts only partial control. The new site form is one episode in a continuous interplay of space and people. Sooner or later, it will be succeeded by another cycle of adaption.'
(Kevin Lynch, 1984:12)
With regards to the Cape Flats Urban Park, it is hoped that the next cycle of adaptation will be renewal.

It is evident that urban open spaces have the potential to become multifaceted resources, with both intangible and tangible benefits for nature and for people, all of which can improve the quality of life for city dwellers, by improving the quality of the environment in which they live. The Cape Flats Park, in particular, has the potential to play conservation, resource preservation, flood control, productive, economic, ceremonial, cultural, educational, health improving, recreational and community-building and overall quality of life enhancement and renewal roles.

Precedent has shown that the approach of open space use being informed through human needs and natural process needs is not new – not even to South Africa. Nevertheless, open spaces are still proposed, implemented and assessed with assumptions about what should be done in them. Human and natural need and the many ways in which public places can function to serve these needs is not always addressed (Carr *et al*, 1992). This concept has been applied in this paper to demonstrate how a local multifunctional open space can be both developmental and sustainable, and to further the awareness of its possibilities.

When planning parks and open spaces, some further issues should be remembered. First, funding is not always the essential ingredient that separates the success stories from the failures. Equally important are a pride-instilling vision, and a commitment to involving park users in the creation and maintenance of

University of Pretoria

their park spaces (DeVita, 1997). If enough enthusiasm is generated for the project, cost will tend to be viewed more broadly and consequently, as not significant when compared to the benefits gained (Madden and Okazaki, 1992).

Second, urban parks should be community assets. As such, they must aim to reduce problems and not cause them. They must always be connected to their communities, and this connection begins by putting the park user and needs first. The park experience must be relevant to the lives and needs of the surrounding communities and it must enhance the livability of these communities.

Third, strong partnerships that exist between the public and the private sector is a common principle among cities where parks are flourishing (DeVita, 1997).

Fourth, the complexity of public space is such that one cannot expect to do everything right initially. The best spaces experiment with short-term improvements that can be tested and refined over many years. It will require patience and humility to experiment with new ideas, admit failures if they occur and try again (Gold, 1972).

Finally, it is never finished. By nature, good public places that respond to the needs, the opinions and the ongoing changes in the community require constant and flexible attention (Madden and Okazaki, 1992). The more successful the place is the more the success will feed upon itself. A great public open space will evolve and endure, well-loved by the people in its reach, adding joy and meaning to their lives.

Effective public spaces are extremely difficult to accomplish, as their complexity is rarely understood. Designs that relentlessly advance an abstract concept or a particular formal style can sometimes create a hostile environment (Carr *et al*, 1992). However, a design's capacity to solve problems is determined by its combination of strategies. Alone, they cannot succeed. Yet, combinations of design strategies should lead to successful multifunctional open spaces (Baljon, 1992).

This paper does not culminate in a solid plan or proposed design for a Cape Flats Urban Park. A plan could not be considered, because as precedent has shown, design should be a form of research which involves every potential park user. Gaining their inputs and ideas would be the first step to producing an effective and sustainable plan. However, insights gained from the foregoing sections can be applied in order to determine broader distributional tendencies for the park's identified potential roles, as indicated through precedent, through nature and its opportunities and constraints and through identified human needs. Figure 42 shows a conceptual diagram of the park in which the activities which tend toward privacy are centrally contained and protected by the activities which tend towards publicness, which are distributed on the park's edges. This pattern may indeed guide the navigation of planning and design for the Cape Flats Urban Park, and the paper's approach may direct planning and design when determining the role of open space anywhere.

Still, in the words of McNeil (1998: 8), the planners, designers and communities involved in this particular situation and study, should know that 'the vision of *what could be* should never succumb to the limits of what is'.

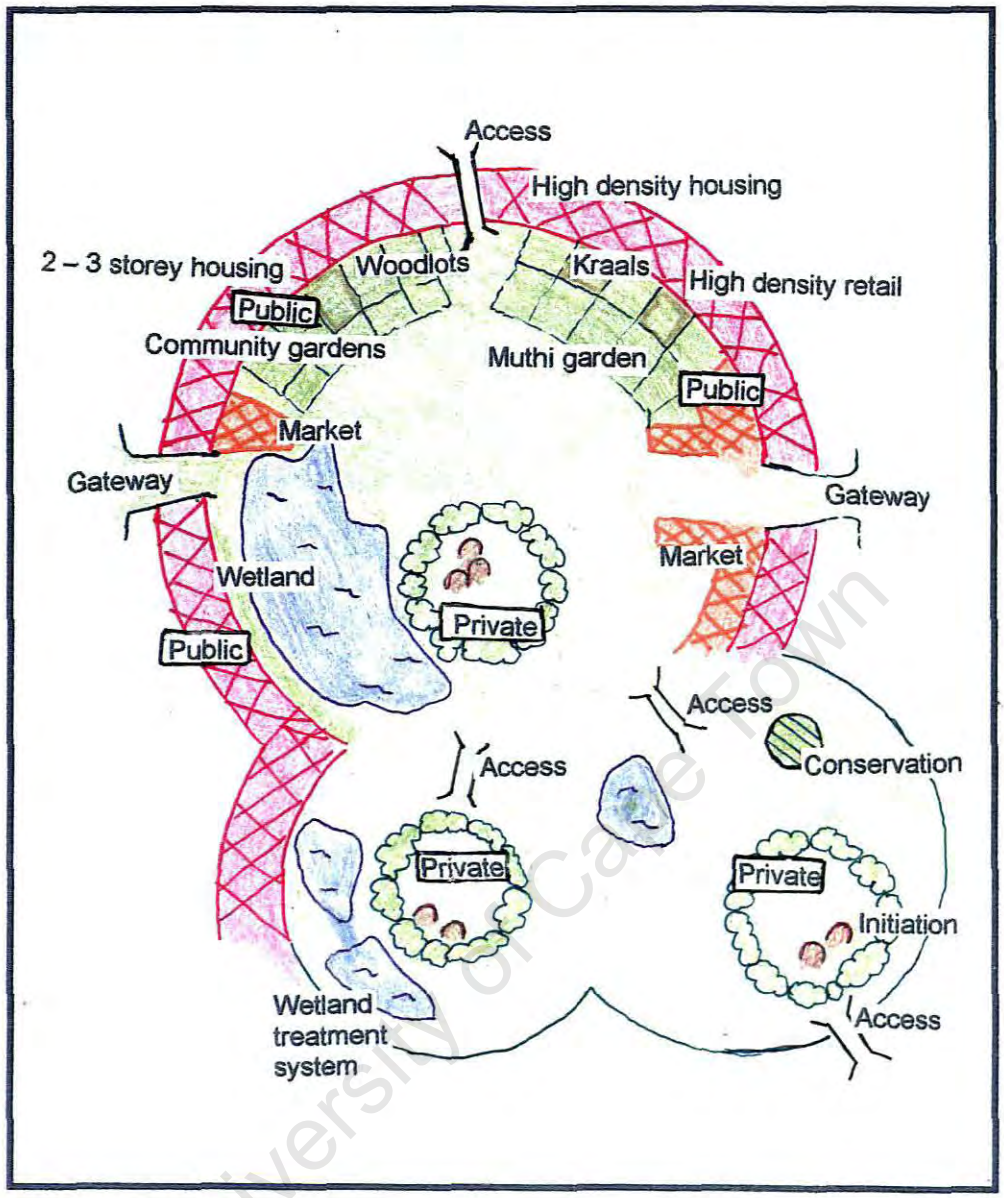


Figure 42: Conceptual diagram of the park in which the activities which tend toward privacy are centrally contained and protected by the activities which tend towards publicness, which are distributed on the park's edges.

University of Cape Town

References

Altman, I and Zube, E.H (eds). 1989. *Public Places and Spaces.* Plenum Press, New York. 316p.

Aranes, J. February 25, 1998. The Lords of Gangland: State has lost battle to control Cape Flats. *Cape Argus.*

Armstrong, G. 1992. A necessary evil? *Veld and Flora* **78** (1): 11-13.

Awotona, A; Briggs, M and Le Grange, L. 1995a. Working Paper 3: Approaches to human settlement development: implications for research into the upgrading of South African townships. ODA Research Scheme R6266. School of Architecture and Planning, University of Cape Town, Cape Town. 35p.

Awotona, A, Japha, D, Uduku, Hüchzermeyer, M. 1995b. Working Paper 8: Community-based strategies for local development: lessons for South Africa. ODA Research Scheme R6266. School of Architecture and Planning, University of Cape Town, Cape Town. 42p.

Awotona, A; Boberg, D; Hüchzermeyer, M; Japha, D; Prinsloo, I; Le Grange, L and Briggs, D. 1995c. Working Paper 9: Townships in Cape Town: case study area profiles. ODA Research Scheme R6266. School of Architecture and Planning, University of Cape Town, Cape Town. 181p.

Awotona, A, Boberg, D, Hüchzermeyer. M, Japha, D, Prinsloo, I, le Grange, L and Briggs, D. 1996. Working Paper 12: Townships in Cape Town: a pilot study of Nyanga, New Crossroads and KTC. ODA Research Scheme R6266. School of Architecture and Planning, University of Cape Town, Cape Town. 156p.

Baljon, L. 1992. *Designing Parks.* Architectura and Natura Press, Amsterdam. 322p.

Bamford, H. June 26, 2001. Despair of Philippi's forgotten People. *Cape Argus.*

Beckett, P and Dempster, P. November, 1989. Birkenhead Park. *Landscape Design.* 24-27.

Behrens, E. 1996a. Settlements under the Floodlines. *Muniviro* **13** (2): 9-11.

Behrens, E. 1996b. Urban Open Space: The Threatened Life Support of Cities. *Muniviro* **13** (2): 15-18.

Bloch, C and Snitcher, L. 1978. Working paper 13: An evaluation of community facilities in Hanover Park. Urban Problems Research Unit. University of Cape Town, Cape Town. 78p.

Bowan, J. 1998. The Chattanooga Riverpark: transforming a city and its economy. http://www.urbanparks.pps.org/topics/design/success_chattanooga. 3p.

Box and Harrison. 1993. Natural Spaces in Urban Places in: *Town and Country Planning* **62**(9): 231-235.

Browne, K and Whitaker, B. 1971. *Parks for People.* Seeley, Service and Co. Ltd, London. 144p.

Burgess, C. 2000. Draft report for Cape Town City Council: Edith Stephens Wetland Park. 17p.

Burgess, J, Harrison, C.M and Limb, M. December 1988. People, parks and the urban green: A Study of Popular Meanings and Values for Open Spaces in the City in: *Urban Studies* **25**(6) 455-473.

Burgess, J and Harrison, C.M. September 1989. Living spaces. *Landscape Design.* p14-16.

Butler-Adam, J.F. 1980. . Occasional paper 17: Recreation, society and space in South Africa: four papers. The Institute for Social and Economic Research. University of Durban-Westville, Durban. 65p.

University of Cape Town

Campbell, B; Gubb, A and Moll, E. 1980. The Vegetation of the Edith Stephens Cape Flats Flora Reserve. *Journal of South African Botany* **46**(4): 435-444.

Cape Metropolitan Council. 1996. Technical Report: Metropolitan Development Framework: A Guide for Spatial Development in the Cape Metropolitan Functional Region. Regional Planning. Edna-Griffiths, Cape Town. 107p.

Cape Metropolitan Council. 1998. Project 13.68: Draft Conceptual Planning Report: Cape Flats Freeway Extension: Princess Vlei Parkway to Vanguard Drive. Directorate Transport. 113p.

Cape Metropolitan Council. 1999. Final Conceptual Planning Report of Sheffield Road Volume 2, Book of Drawings. CAPMET Project 13.69: Old Strandfontein Road to Stock Road. VKE Engineers and Jakoet and Associates, Cape Town. 53p.

Cape Metropolitan Council. 1999. Conceptual Planning Report Volume 1: CAPMET Project 13.49.2: Conceptual Planning of Symphony Way Extension: Stock Road to the Stellenbosch Arterial Road. VKE Engineers and Jakoet and Associates, Cape Town. 22p.

Cape Metropolitan Council. 2000. MSDF Handbook: guidelines for the local interpretation and application of the MSDF principles and spatial concepts. Spatial Planning. Salamander Communications SA (Pty) Ltd, Cape Town. 78p.

Carr, S; Francis, M; Rivlin, L.G and Stone, A.M. 1992. *Public Space*. Cambridge University Press, USA. 400p.

Cape Town City Engineer's Department. 1982. Report number 214: Greening the City: Open Space and Recreation Plan for Cape Town. 76p.

Cape Town City Engineer's Department. 1984. Greening the City: Open Space and Recreation Plan for Cape Town - report upon comments made by interested organisations and individuals and amended recommendations. Town Planning Branch. 16p.

Cape Town City Council. 1993. The Environmental Evaluation for the Cape Metropolitan Area (CMA) Cape Town City Planner's Department. 34p.

Cape Town Municipality. 1997. Wetton-Lansdowne Corridor: The Spatial Plan for the Corridor. Cape Town Municipality, Cape Town. 70p.

Chadwick, G.F. 1966. *The Park and the Town: Public Landscape in the nineteenth and twentieth centuries*. The Architectural Press, London. 388p.

City of Cape Town. 1999a. *City of Cape Town: Municipal Spatial Development Framework*. Planning and Development Directorate and Planning and Economic Development Cluster. 126p.

City of Cape Town. 1999b. Urban Development Principles for the City of Cape Town: Building an Equitable City (draft). Image Mix, Cape Town. 24p.

City of Cape Town. 2000a. Executive Summary: Hanover Park and Sand Industria: Local Area Spatial Development Framework. Planning and Development Directorate. 44p.

City of Cape Town. 2000b. Final Report: Guguletu/Manenburg: Local Area Spatial Development Framework. Planning and Development Directorate. 132p.

University of Cape Town

City of Cape Town. 2000c. Final Report: Hanover Park and Sand Industria: Local Area Spatial Development Framework. Planning and Development Directorate. 33p.

City of Cape Town. 2000d. Report 1304/R2: Philippi Horticultural Area: Draft Management Plan. Planning and Development Directorate. 64p.

Coleman, S. 2001. Organising and programming across cultural boundaries: Twenty Strategies used by Friends of Meridian Hill. Project for Public Spaces, Inc. http://urbanparks.pps.org/topics/parkuse/coleman2. 3p.

Committee of Urban Transport Authorities, CSIR. 1991. Urban Transport Guidelines: Guidelines for Urban Stormwater Management. Scientia Publishing, Pretoria. 39p.

Conway, H. September, 1989. Victorian Parks: Part 1. *Landscape Design.* 21-23.

Conway, H. 1991. *People's Parks: The Design and Development of Victorian Parks in Britain.* Cambridge University Press, Cambridge. 287p.

Cowling, R (ed). 1992. *The Ecology of Fynbos: Nutrients, Fire and Diversity.* Oxford University Press, Cape Town. 411p.

Cowan, S and van der Ryn, S. 1996. *Ecological Design.* Island Press, Washington DC. 201p.

Cranz, G. 1982. The Politics of Park Design: A History of Urban Parks in America. The MIT Press, Massachusetts. 347p.

Cranz, G. 1997. Urban Parks of the Past and Future. Project for Public Spaces. http://www.urbanparks.pps.org/topics/whyneed/newvisions/futureparks. 3p.

Crime Prevention Unit, 1999. Negotiating young people's use of open space. Crime Prevention Unit, Attorney-General's Department. http://www.cpu.sa.gov.au/nacs_nypups.htm. 2p.

Crowhurst Lennard, S. H and Lennard, H. L. 1984. *Public Life in Urban Places.* Gondolier Press, New York. 74p.

Daba, L. 1990. Gangsterism in schools in black residential areas. Presentation to panel discussion on 'Gangs on the Cape Flats'. University of Cape Town, Cape Town. 3p.

Department of the Environment, Her Majesty's Stationery Office. 1987. *Greening City Sites: Good Practice in Urban Regeneration.* ECOTEC Research and Consulting Ltd, London. 127p.

Department of Natural Resources and Environment, Municipal Association of Victoria, Melbourne Water Corporation, Environmental Protection Authority. 1999. *Urban Stormwater: Best Practice Environmental Management Guidelines.* CSIRO Publishing, Australia. 268p.

DeVita, M.C. 1997. Places for people. http://www.urbanparks.pps.org/topics/whyneed/socbenefits/DeVitaTPL. 2p.

Dewar, D; Waton, V; Bassios, A and Dewar, N. 1990. Working paper 42: The Structure and Form of Cape Town: Its Origins, Influences and Performance. The Urban Problems Research Unit, Urban Foundation (Western Cape). 241p

Dewar, D and Uytenbogaardt, R.S. 1991. *South African Cities: A Manifesto for Change.* Urban Problems Research Unit, Univsersity of Cape Town. Mills Litho (Pty) Ltd, Cape Town. 113p.

University of Cape Town

Durban Parks Department, 1994. D'MOSS: Durban Metropolitan Open Space System. Report by the Director: Parks Department, Physical Environment Service Unit. Second Edition. 96p.

Dramstad, W. E, Olsen, J.D and Forman, R.T.T. 1996. *Landscape Ecology Principles in Landscape Architecture and Land-Use Planning.* Island Press, Harvard University Graduate School of Design and American Society of Landscape Architects, Washington. 80p.

Environmental Partnership, 2001. *Draft Strategic Environmental Assessment Report: Lansdowne Industrial Area.* Cape Town. 34p.

Fabos, J.Gy. 1979. *Planning the total Landscape: A Guide to Intelligent Land Use.* Westview Press, Colorado. 181p.

Fig, D. 1996. *The Right to Urban Open Space.* World Environment Day Symposium Proceedings. Urban Open Spaces: Space to Breathe. Society for Professional Engineers; Environmental Planning Professions Interdisciplinary Committee; Associated Scientific and Technical Societies of South Africa and the Habitat Council. 9p.

Francis, M. 1989. Control as a dimension of public-space quality *in:* Altman, I and Zube, E.H (eds). 1989. *Public Places and Spaces.* Plenum Press, New York. 316p.

Gasson, B. Collection of natural systems maps. School of Architecture and Planning, University of Cape Town.

Garvin, A and Berens, G (eds). 1997. *Urban parks and Open Space.* The Urban Land Institute, Washington DC. 217p.

Gibbs, D. 2001. Draft thesis document: Urban agriculture and co-operative farming: the Kewtown pilot project. School of Architecture and Planning, University of Cape Town. 47p.

Gold, S. November 1972. Nonuse of Neighbourhood Parks. *AIP Journal.* 369-377.

Gophe, M. April 26, 2001a. Plans for township kraals are back on track. *Cape Argus.*

Gophe, M. June 26, 2001b. Farm Workers feel helpless in face of low pay and abuse. *Cape Argus.*

Hall, A.V. and Veldhuis, H. 1985. South African Red Data Book: Plants – Fynbos and Karoo Biomes: a report for the Committee of Nature Conservation Research. Scientific Programmes Report Number 117. CSIR, Pretoria. 160p.

Hayward, J. 1989. Urban Parks *in:* Altman, I and Zube, E.H (eds). 1989. *Public Places and Spaces.* Plenum Press, New York. 316p.

Heckscher, A. 1977. *Open Spaces: The Life of American Cities.* Harper and Row Publishers Inc., New York. 386p.

Higgens, S. February, 1986. The City Green: Old Visions, New Twist. *Architect's Journal.* 28-36.

Hough, M. 1995. *Cities and Natural Process.* Routledge, London. 326p.

Hustwick, S. 2001. Environmental Planning Department, City of Cape Town.

University of Cape Town

Jacobs, J. 1961. *The Death and Life of Great American Cities*. Vintage Books, New York. 458p.

Japha, D and Hüchzermeyer, M. 1995. Working Paper 2: The history and development of townships in Cape Town 1920-1992. ODA Research Scheme R6266. School of Architecture and Planning, University of Cape Town, Cape Town. 55p.

Jarvis, F.D. 1993. *Site Planning and Community Design for Great Neighbourhoods*. Home Builder Press, Washington DC. 133p.

Jellicoe, G and Jellicoe, S. 1975. *The Landscape of Man: Shaping the Environment from Prehistory to the Present Day*. Thames and Hudson, London. 383p.

Kadungure, I.T. 1996. World Environment Day Symposium Proceedings: Urban Open Spaces - Space to Breathe. Urban Open Spaces: City Planning for the future. Society for Professional Engineers, Environmental Planning Professions Interdisciplinary Committee, Associated Scientific and Technical Societies of South Africa and the Habitat Council. 15p.

Kahn, F. 1994. Environmental Advisory Unit Report 02/94/04: Wolfgat Nature Reserve: A report on the opinions of visitors and Mitchells Plain Residents, University of Cape Town, Cape Town. 41p.

Kent, F and Madden, K. 1998. Creating Great Urban Parks. Project for Public Spaces, Inc. http://www.urbanparks.pps.org/topics/whyneed/newvisions/CreatingUrbanPark. 3p.

Laurie, M.1975. *An Introduction to Landscape Architecture*. American Elsevier Publishing Company Inc. New York. 214p.

Lienk, L and Piper, E. 1997. Creative Discovery Garden Flourishes in New Park: An Urban Parks Institute Success Story, East Salinas, California. Project for Public Spaces, Inc. http://urbanparks.pps.org/topics/whyneed/envbenefits/success_salinas. 2p.

Low, B and McDowell, C. 1990. *Conservation Priority Survey of the Cape Flats*. University of the Western Cape, Cape Town. 61p.

Low, B. 2000. Lecture Series ARP434F. Planning with Terrestrial Ecosystems. City and Regional Planning Programme, School of Architecture and Planning. University of Cape Town. 11p.

Lupton, M and Wolfson, T. 1994. Low-income housing, the environment and mining in South Africa *in:* Main, H and Williams, S (eds). 1994. *Environment and Housing in Third World Cities*. John Wiley and Sons Ltd, Britain. 265p.

Lynch, K. 1960. *The Image of the City*. The Technology Press and Harvard University Press, USA. 194pp.

Lynch, K. 1984. *Site Planning* (3rd Edition). MIT Press, Cambridge. 499p.

Madden, K and Okazaki, J. 1992. Parks as centres of community activity. http://urbanparks.pps.org/topics/programs/program_features/Parkcentre. 2p.

Malakoff, D. 2001. What Good is Community Greening? http://www.communitygarden.org/pubs/whatgood.html. 7p.

Mamputa, G. 1990. Gangs on the Cape Flats. Presentation to panel discussion on 'Gangs on the Cape Flats'. University of Cape Town, Cape Town. 6p.

University of Cape Town

Marsh, W.M. 1998. Landscape Planning: Environmental Applications. Wiley and Sons Inc, USA. 434p.

McHarg, I. L. 1969. *Design with Nature.* Natural History Press, New York. 197p.

McNeil, L.B.-1998. Action for change.
http://www.urbanparks.pps.org/topics/whyneed/newvisions/action_for_change. 8p.

Mercer, D. 1980. *In Pursuit of Leisure.* Sorrett Publishing, Australia. 101p.

Milne, D. 2001. Information services Department, Cape Metropolitan Administration.

Morgan, G. 1991. *A Strategic Approach to the Planning and Management of Parks and Open Spaces.* The Open Spaces Information Unit, Institute of Leisure and Amenity Management, UK. 21p

Morris, R. 1992. *Marketing to Black Townships: Practical Guidelines.* Juta and Co., Ltd, Cape Town. 116p.

Mumford, L. 1961. *The City in History: Its Origins, Its Transformations and Its Prospects.* Harcourt Brace Joranovich Publishers, USA. 657pp.

Mumford, L. 1961. Open Spaces *in:* Crowe, S (ed). 1961. Space for Living. Djambatan Publishing, Netherlands. 140p.

Murphy, M. 1991. Gang interpretations of violence: their perceptions of violence in South Africa and in the international community, and the relationships between the two. Presentation at 22nd Association for Sociology in South Africa Annual Conference, Cape Town. 23p.

National Environmental Management Act No. 107 of 1998. Republic of South Africa.

Newton, N.T. 1971. Design on the Land: The Development of Landscape Architecture. Oxford University Press, London. 714p.

Nguta, F. 1992. Khayalitsha residents' opinion on the need for natural open space and the future of Driftsands as a multiple-use area. National Botanical Institute. 26p.

Nicholson-Lord, D. 1987. *The Greening of the Cities.* Routledge-Kegan Paul Ltd, London. 270p.

Nicks, S, 1994. Report No. 2: Lessons: Curitiba and the Metro South East Plan. MLH Architects and Planners. 33p.

Oberholzer, B; Boddington, G and Grindley, J. 1984. Engineering design guidelines for coastal, urban, recreational and industrial development. (ARP474S: Natural Systems II course. School of Architecture and Planning, 2000). 10p.

Oberholzer, B. 1994. Unpublished CSIR workshop paper: Visual and Aesthetic Assessment Techniques in Integrated Environmental Management. (ARP474S: Natural Systems II course. School of Architecture and Planning, Sept 2000). 5p.

Parsons, R.P. 1995. Water Research Commission Report 77/95: A South African Aquifer System Management Classification. Water Research Commission, Pretoria. 16p.

Phillips, P.L. 2000. Issue Paper 7: Real Estate Impacts of Urban Parks. http://www.econres.com.html. 5p.

University of Cape Town

Pigram, J. 1983. *Outdoor Recreation and Resource Management.* Croom Helm Ltd, New York .262p.

Pinnock, 1997. *Gangs, Rituals and Rites of Passage.* African Sun Press, Cape Town. 100p.

Poynton, J.G and Roberts, D.C. January 1985. Urban Open Space Planning in South Africa: A biogeographical perspective in: *South African Journal of Science* **81**: 33-37.

Privett, S.D.J. 1998. Determinants of Pattern in Fynbos Vegetation: Physical Site Factors, Disturbance Regime, Species Attributes and Temporal Change. M.Sc. thesis, Department of Botany. University of Cape Town, Cape Town. 189p.

Project for Public Spaces, 2000. Eleven principles for transforming public spaces into great community places. http://www.pps.org/11steps.html. 3p.

Roff, J and Nonjinge, S. 1997. Conjuring up a Zulu muthi garden. *Veld and Flora* **83** (3): 72-73.

Ross, W. 1996. *Stand and Stare: Art in the Forest of Dean – Initiatives for South Africa. De Arte* **53**: 17-28.

Seeley, I.H. 1973. *Outdoor Recreation and the Urban Environment.* MacMillan Press Ltd, United Kingdom. 235pp.

Settlement Planning Services, 2001. Lansdowne Road Industrial Area: Spatial Development Framework. Report 1333/R1. 24p.

Seymour, W.N. 1969. *Small Urban Spaces: The Philosophy, Design, Sociology and Politics of Vest-Pocket Parks and Other Small Urban Spaces.* New York University Press, New York. 197p.

Sowman, M and Urquhart, P. 1998. *A Place Called Home: Environmental Issues and Low-Cost Housing.* University of Cape Town Press (Pty) Ltd, Cape Town. 192p.

Spirn, A. 1984. *The Granite Garden: Urban Nature and Human Design.* Basic Books Inc, New York. 334p.

Swart-Kruger, J (ed). 2000. Growing up in Canaansland: children's recommendations on improving a squatter camp environment. Human Sciences Research Council Publishers, Pretoria. 81p.

Swerdlow, J.L. 1993. Central Park. *National Geographic* **183**(5): 2-35.

Taylor, L (ed). 1979. *Urban Open Spaces.* The Smithsonian Institution's National Museum of Design, Cooper-Hewitt Museum. Academy Editions, London. 128p.

Turner, T. 1987. *Landscape Planning.* Nichols Publishing Company, New York. 213p.

Urban Parks Institute, 2001a. Parks, Plazas and Central Squares. http://www.urbanparks.pps.org/greatplaces/. 3p.

Urban Parks Institute, 2001b. Innovative Programs. http://www.urbanparks.pps.org/proggrams/. 2p.

Urban Parks Institute, 2001c. Good places. http://urbanparks.pps.org/topics/whyneed/newvisions/goodplaces. 3p.

Urban Problems Research Unit, University of Cape Town. Sept, 1978. An Evaluation of Community Facilities in Hanover Park. Working Paper 13. 78p.

University of Cape Town

Veal, A.J. 1994. *Leisure Policy and Planning*. Longman Group Ltd, UK. 221p.

Watson, V. 2000. Report to the Unicity Commission (Urban Development Trends and Issues): Urban Integration and the Cape Metropolitan Area. School of Architecture and Planning, University of Cape Town.16p.

Westmacott, R and Blandford, C. 1980. Environmental Evaluation and Design *in:* Turner, A (ed). 1980. *Cities of the Poor: Settlement Planning in Developing Countries.* Croom Helm Ltd, London. 316p.

Wilkinson, P. 2000. City Profile: Cape Town. *Cities* **17**(3): 195-205.

Wright, A and Conrad, J. 1995. Report No. 11/95: The Cape Flats Aquifer: Current Status. Groundwater Programme, Watertek, CSIR, Stellenbosch. 28p.

Wright, A. 1999. WRC Report No. 514/1/99: Groundwater Contamination as a result of Developing Urban Settlements. Report to the Water Research Commission by Cape Water Programme. Environmentek, CSIR. 54p.

Young, G. 1994a.Towards a model for an urban park – Urban Ecology and Sustainable Environments. Conference Paper: Urban Open Space - Potential for Productive Utilisation. Technikon Pretoria, Pretoria. 16p.

Young, G. 1994b. The Art of the 21st Century: Visions of the Urban Park and Other Urban Environs. Proceedings of World Environment Day Symposium: Art, Engineering, Science and the Environment. Society for Professional Engineers, Environmental Planning Professions Interdisciplinary Committee, Associated Scientific and Technical Societies of South Africa and the Habitat Council. Total South Africa (Pty) Ltd, Randburg. 11p.

University of Cape Town

Appendix 1: An annotated recommended reading list

Browne, K and Whitaker, B. 1971. *Parks for People.* Seeley, Service and Co. Ltd, London. 144p.
This short, illustrated book manages to include an encompassing evaluation of urban parks. It chiefly presents examples from Britain, as it explains the need for parks in the city, presents a brief history of the development of parks, recommends and describes interesting design techniques, explains the threats to parks (such as vandalism) and what counter-design measures exist for these. It continues to explore the issues of children, sport, rivers, canals and art in the park, and concludes that to satisfy as many people as possible, every kind of park will be needed.

Carr, S; Francis, M; Rivlin, L.G and Stone, A.M. 1992. *Public Space.* Cambridge University Press, USA. 400p.
This comprehensive and extremely interesting book reveals the way people actually use and value public space, focusing on the social basis for its design and management. The authors describe the history of public life and public space, certain social studies, and the book contains many illustrated case studies. The underlying argument is that users' essential needs, their spatial rights and the meanings they seek are the most important aspects which must guide public space design and management.

Chadwick, G.F. 1966. *The Park and the Town: Public Landscape in the nineteenth and twentieth centuries.* The Architectural Press, London. 388p.
This engaging book tells the story of the history of urban parks and their makers and designers. It describes the intricacies of both the English Landscape Movement and the American Park Movement, and contains many designs and photographs and descriptions of well-known and not so well-known urban parks, that have developed over time.

Coleman, S. 2001. Organising and Programming Across Cultural Boundaries: Twenty Strategies used by Friends of Meridian Hill. Project for Public Spaces, Inc.
http://urbanparks.pps.org/topics/parkuse/coleman2. 3p.
This short, very interesting article presents twenty strategies to organise and programme a park so as to reach across cultural boundaries and hence revitilise an area. It is thought that this is particularly relevant in the context of South Africa and that it may stimulate more ideas for urban park development in this country.

Cranz, G. 1982. The Politics of Park Design: A History of Urban Parks in America. The MIT Press, Massachusetts. 347p.
This illustrated book presents an interesting account of the history of urban park development in the United States. The author argues that the potentiality of parks to shape and reflect social values is not yet understood. The forces and politics that shaped and led the urban park movement are explained and descriptions of park users and the social benefits of parks are also given.

Crowhurst Lennard, S. H and Lennard, H. L. 1984. *Public Life in Urban Places.* Gondolier Press, New York. 74p.
This short, easy-to-read book essentially explains why people need and enjoy public places. It does this by describing people's experiences and feelings when in public. The public scenes described and photographed are chiefly in Europe, in plazas like Piazza del Campo (Siena) and Campo San Barnaba (Venice), however, parallels can be drawn to people's public lives in urban places everywhere.

Department of the Environment, Her Majesty's Stationery Office. 1987. *Greening City Sites: Good Practice in Urban Regeneration.* ECOTEC Research and Consulting Ltd, London. 127p.
This illustrated book comprehensively analyses park and open space development in Britain. It presents twenty-one case studies, and records their design features, their beneficiaries, exemplary practices and it also outlines costs involved. The book offers ideas on how to initiate urban space efforts, lessons for

University of Cape Town

good practice, how to maintain efforts and how to get the most from limited resources. Furthermore, it advises on design techniques and it emphasises the monitoring of open space achievements.

_Garvin, A and Berens, G (eds). 1997. *Urban parks and Open Space.* The Urban Land Institute, Washington·DC. 217p.
This easily readable, illustrated book, strengthens awareness of the many values that urban parks and open space add to cities. It also emphasises the importance of giving open space greater consideration in urban development and redevelopment plans. It advises public agencies how to make the most out of revitalising urban areas. Fifteen detailed case studies of urban parks and open spaces are objectively presented and assessed. These studies include unusual, innovative, high-profile and small neighbourhood projects in the United States.

Lienk, L and Piper, E. 1997. Creative Discovery Garden Flourishes in New Park: An Urban Parks Institute Success Story, East Salinas, California. Project for Public Spaces, Inc. http://urbanparks.pps.org/topics/whyneed/envbenefits/success_salinas. 2p.
This short and delightful article tells the story of how a discovery garden for young children in California was created. It outlines the background to the project, its sources of funding and describes the impacts it has had on children so far. For example, the park was open during construction and so children could contributed to its design all along. Further lessons learnt are also included.

Pinnock, 1997. *Gangs, Rituals and Rites of Passage.* African Sun Press, Cape Town. 100p.
This short, yet enlightening book explores the intricacies and relations between gangs, rituals and rites of passage. Certain rites of passage to adulthood are described and ganging as a rite of passage is explored. The importance between rituals and adolescents is noted and the author emphasises that an extensive re-evaluation of what our collective national culture should teach to children, is needed. This account furthers the understanding of gang formation.

Ross, W. 1996. Stand and Stare: Art in the Forest of Dean – Initiatives for South Africa. *De Arte* **53**: 17-28.
This illustrated article argues that artworks in the public domain should not be irrelevant to their situation. The author describes, in detail, an outdoor environment, where sculptures have been successfully placed and well received by visitors. The author asserts that artworks in public places can make evident the relationship between place, structure and the community and that a public area can be successfully constructed to the benefit of art, the environment and the people it serves.

Spirn, A. 1984. *The Granite Garden: Urban Nature and Human Design.* Basic Books Inc, New York. 334p.
This is one book that should be read if planning a sustainable open space. It begins with an historical account of how nature has been included in the urban environment. The author goes on to offer planning ideas applicable to every city, with regards to the exploitation of resources, soil management, water and flood management, plant and animal habitat creation. Illustrations and examples support the author's thesis of creating an urban ecosystem

Swart-Kruger, J (ed). 2000. Growing up in Canaansland: Children's Recommendation's on Improving a Squatter Camp Environment. Human Sciences Research Council Publishers, Pretoria. 81p.
This moving report makes one acutely aware of the fact of how hard life actually is for people who live in a squatter camp. The investigations conducted among these people show the meaning of squatter camps and evictions through the eyes of the children who live in them. The report notes that no matter what hardships have been experienced, the children remain hopeful.

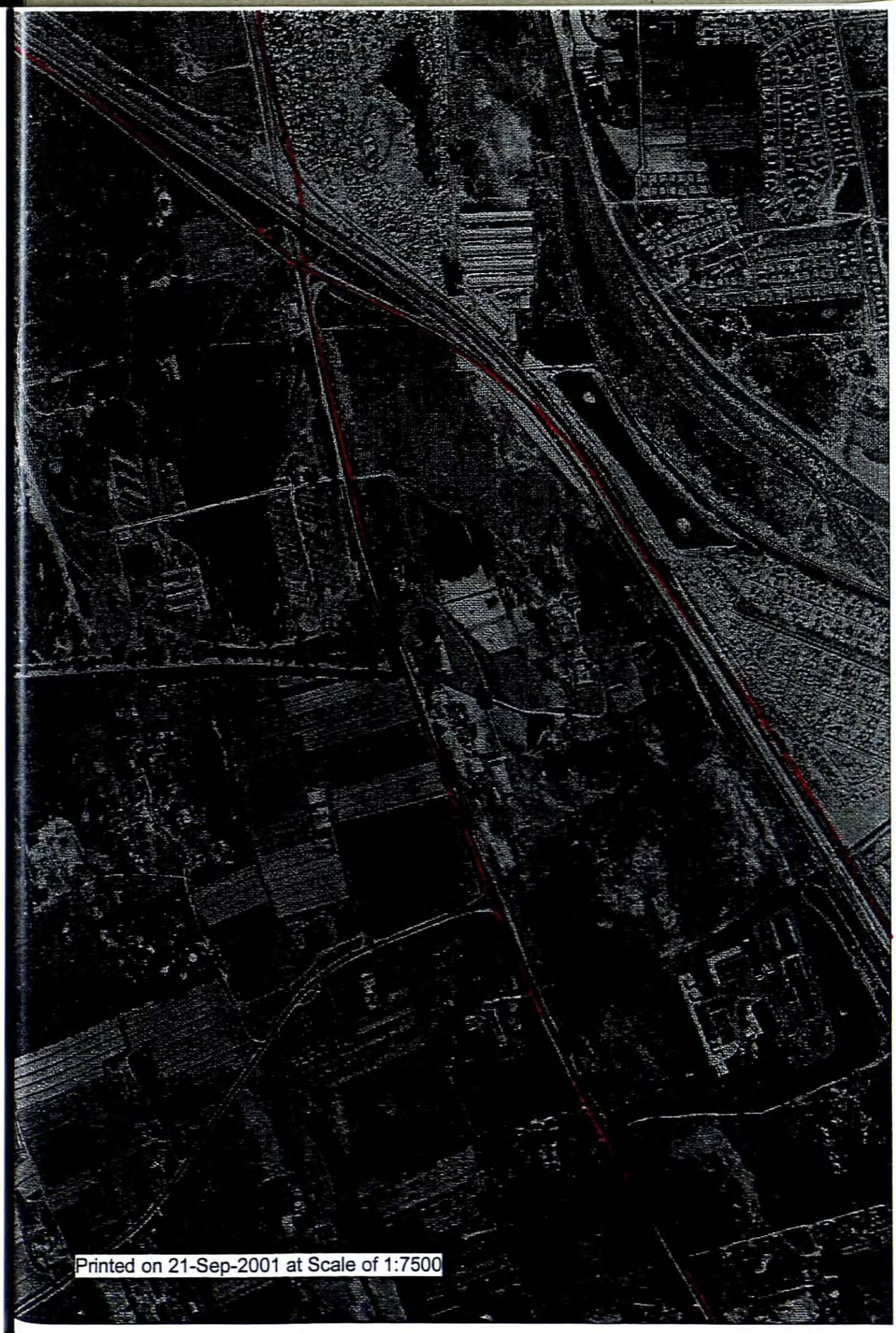
Swerdlow, J.L. 1993. Central Park. *National Geographic* **183**(5): 2-35.
This author of this article, which is accompanied by informative photographs, describes the evolution of Central Park in New York and tells a riveting story, which focuses especially on the people who use the park and how they use it almost one hundred and fifty years since its inception.

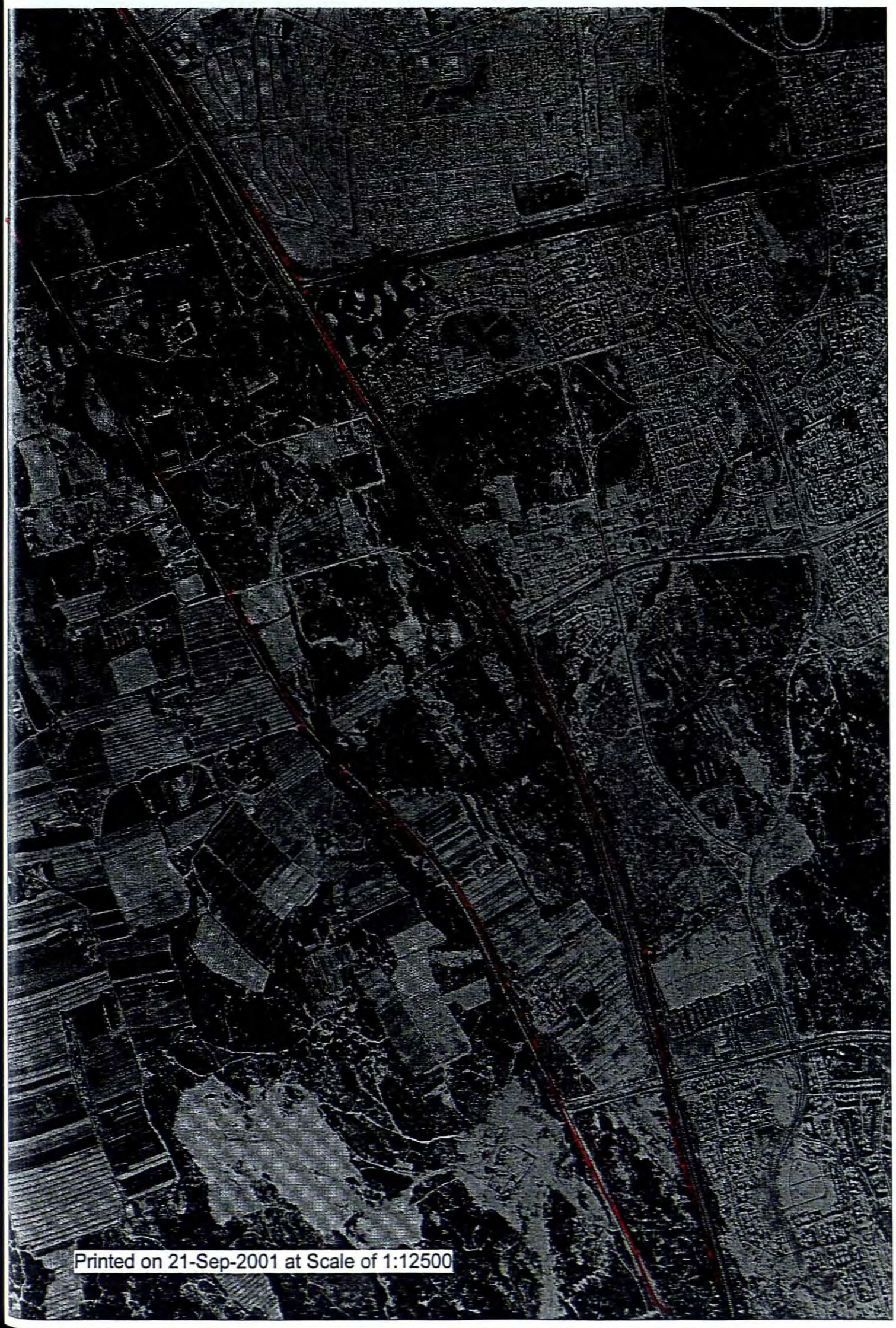
University of Cape Town

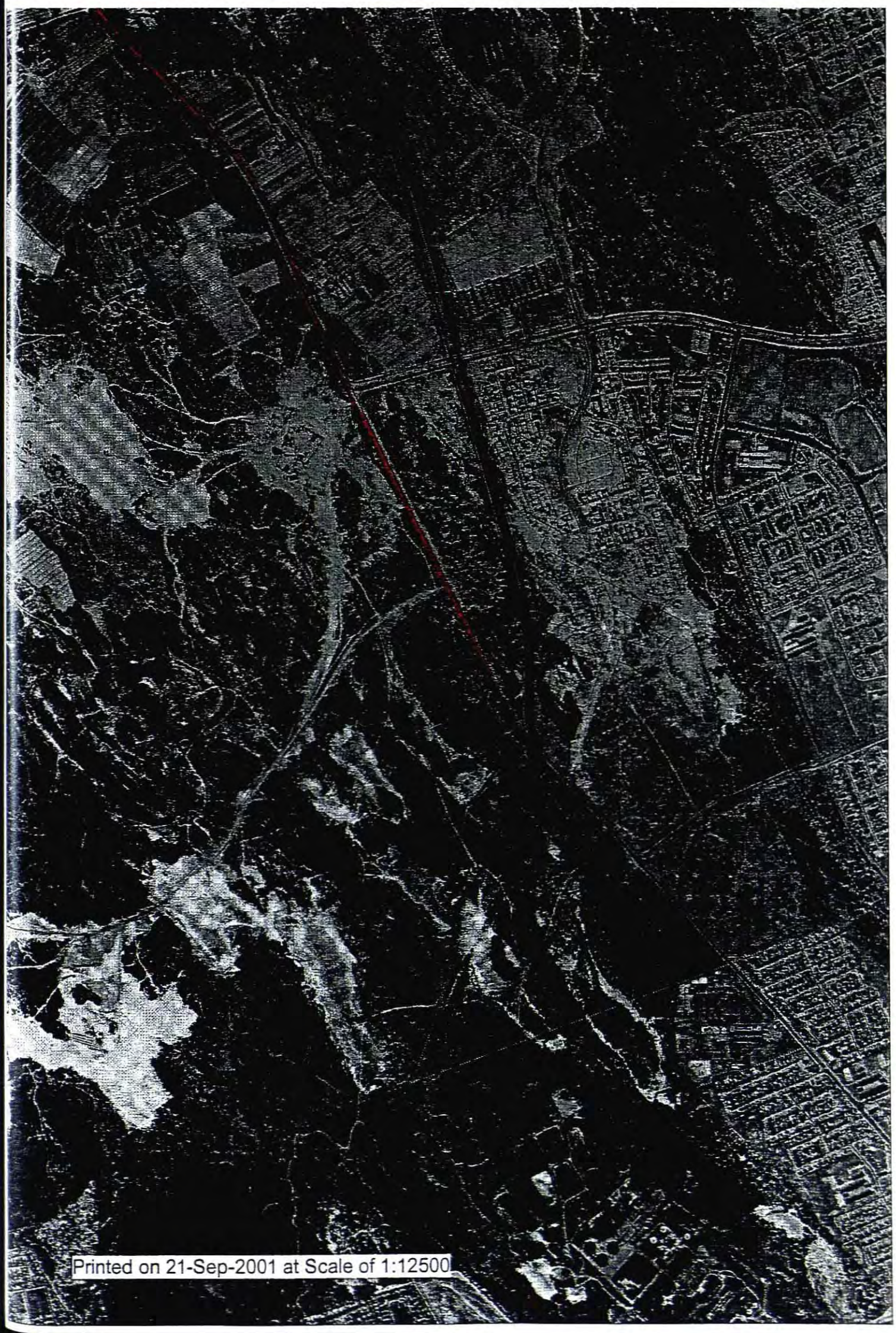
Taylor, L (ed). 1979. *Urban Open Spaces.* The Smithsonian Institution's National Museum of Design, Cooper-Hewitt Museum. Academy Editions, London. 128p.
This book is a very interesting amalgamation of a collection of short articles, written by open space planners such as August Heckscher, Stephen Carr, Kevin Lynch and William H. Whyte. The articles included, cover topics from freedom and control in open space to its management. There is even a guide to people-watching!

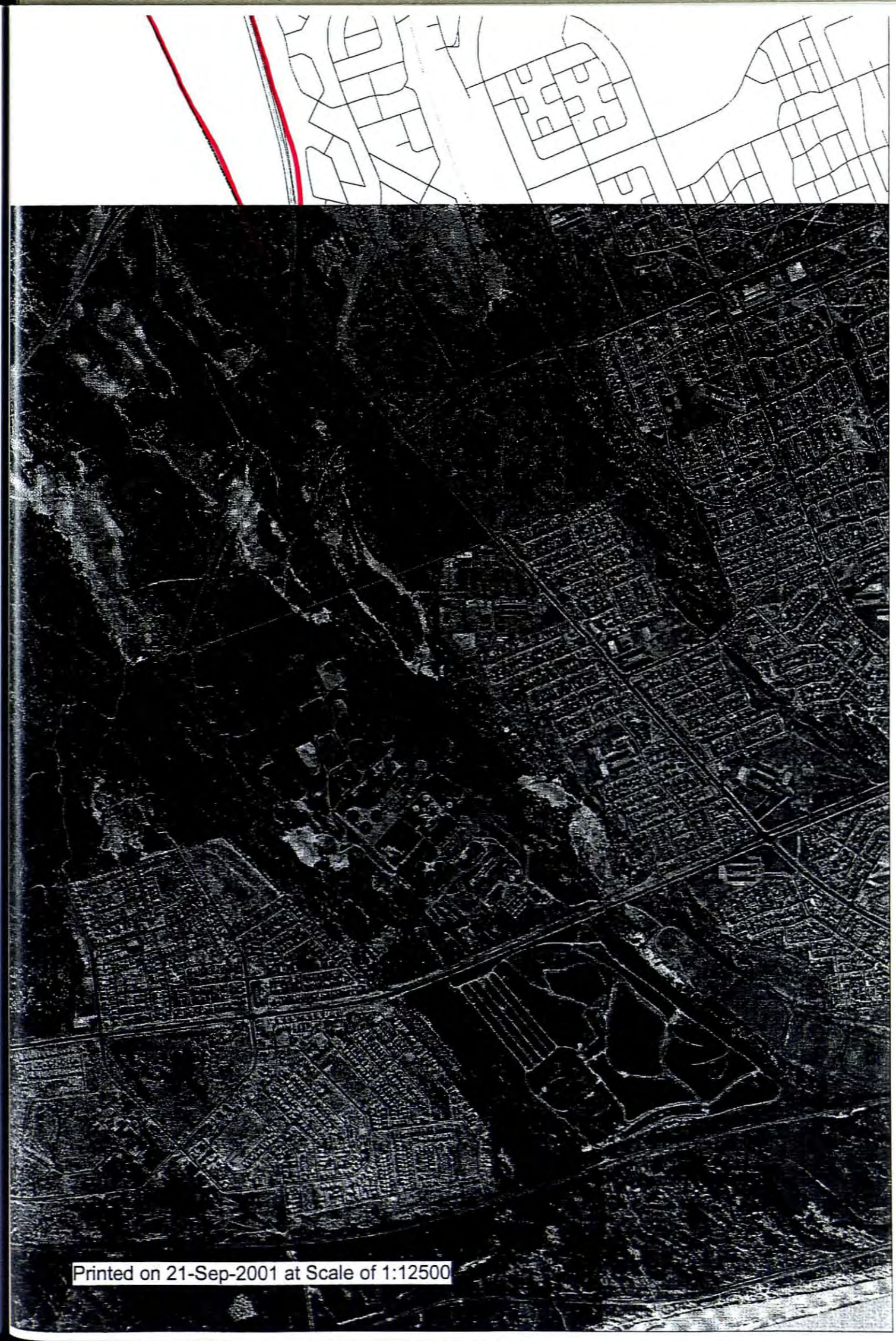
University of Cape Town

Appendix 2: A sequence of orthophoto maps depicting a general outline (in red) of the site and its link to the False Bay coastline (Source: Barbara Southworth, 2001).

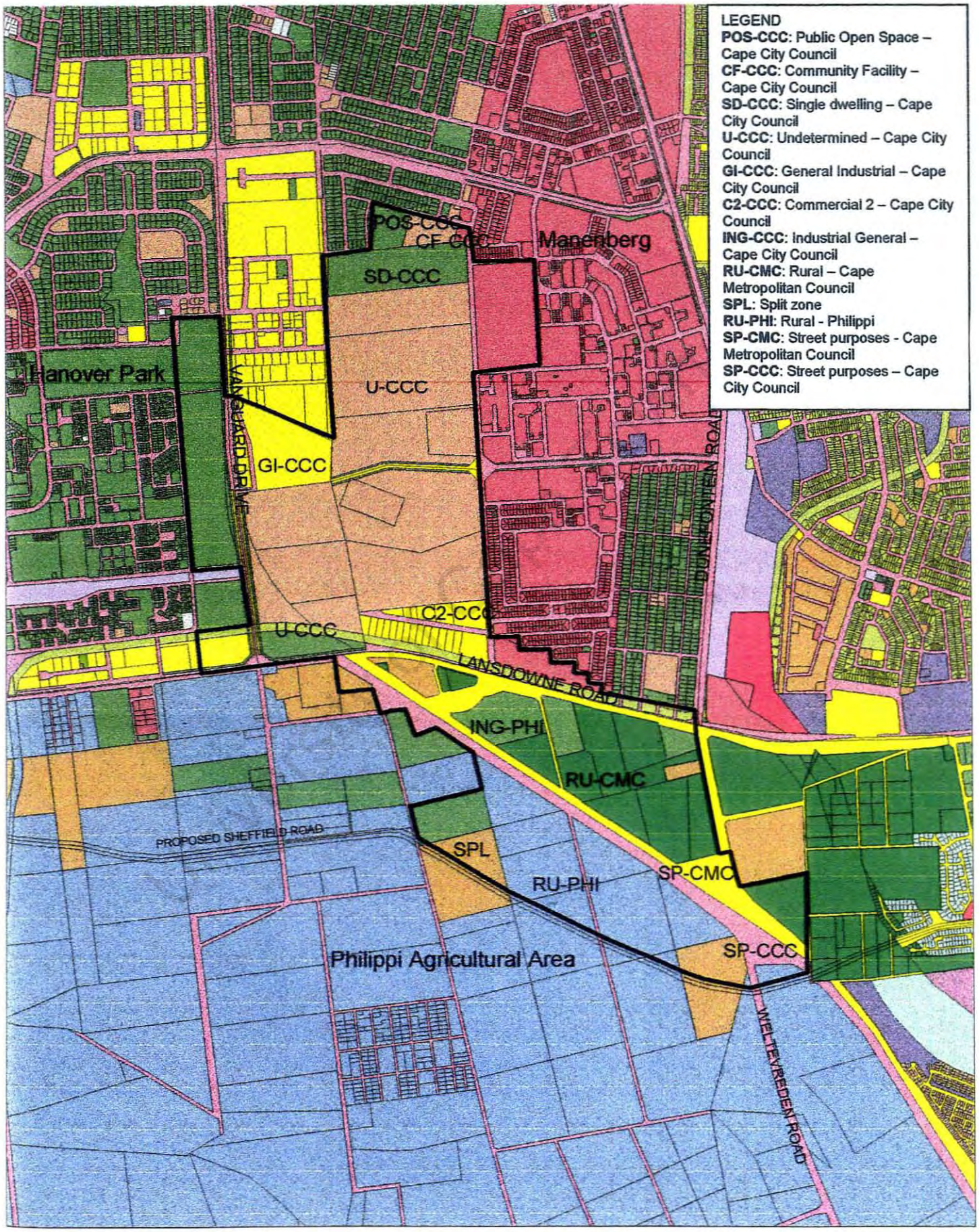

Printed on 21-Sep-2001 at Scale of 1:7500


Printed on 21-Sep-2001 at Scale of 1:12500


Printed on 21-Sep-2001 at Scale of 1:12500

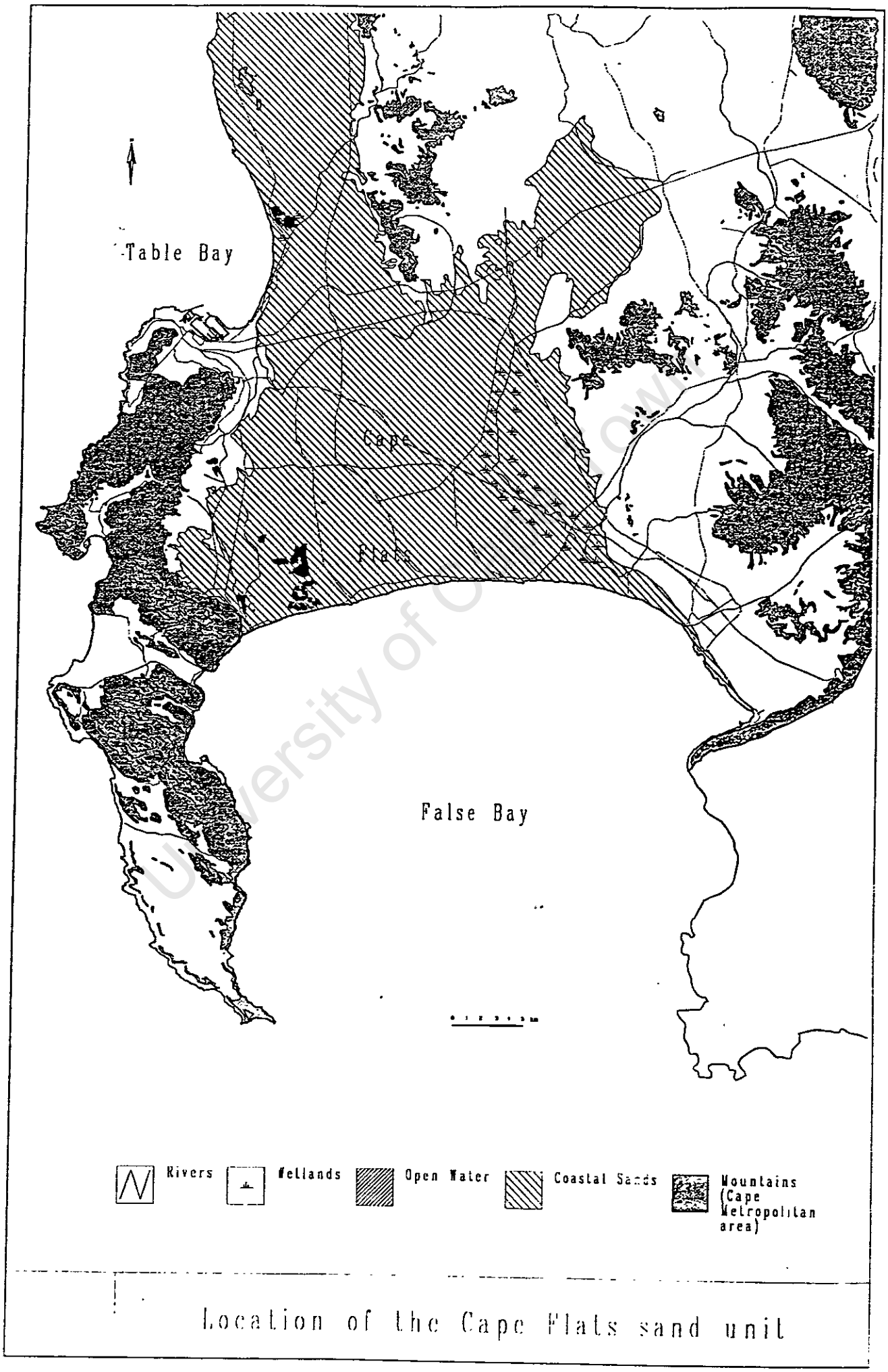

Printed on 21-Sep-2001 at Scale of 1:12500

Appendix 3: Zoning and land use maps for the study site



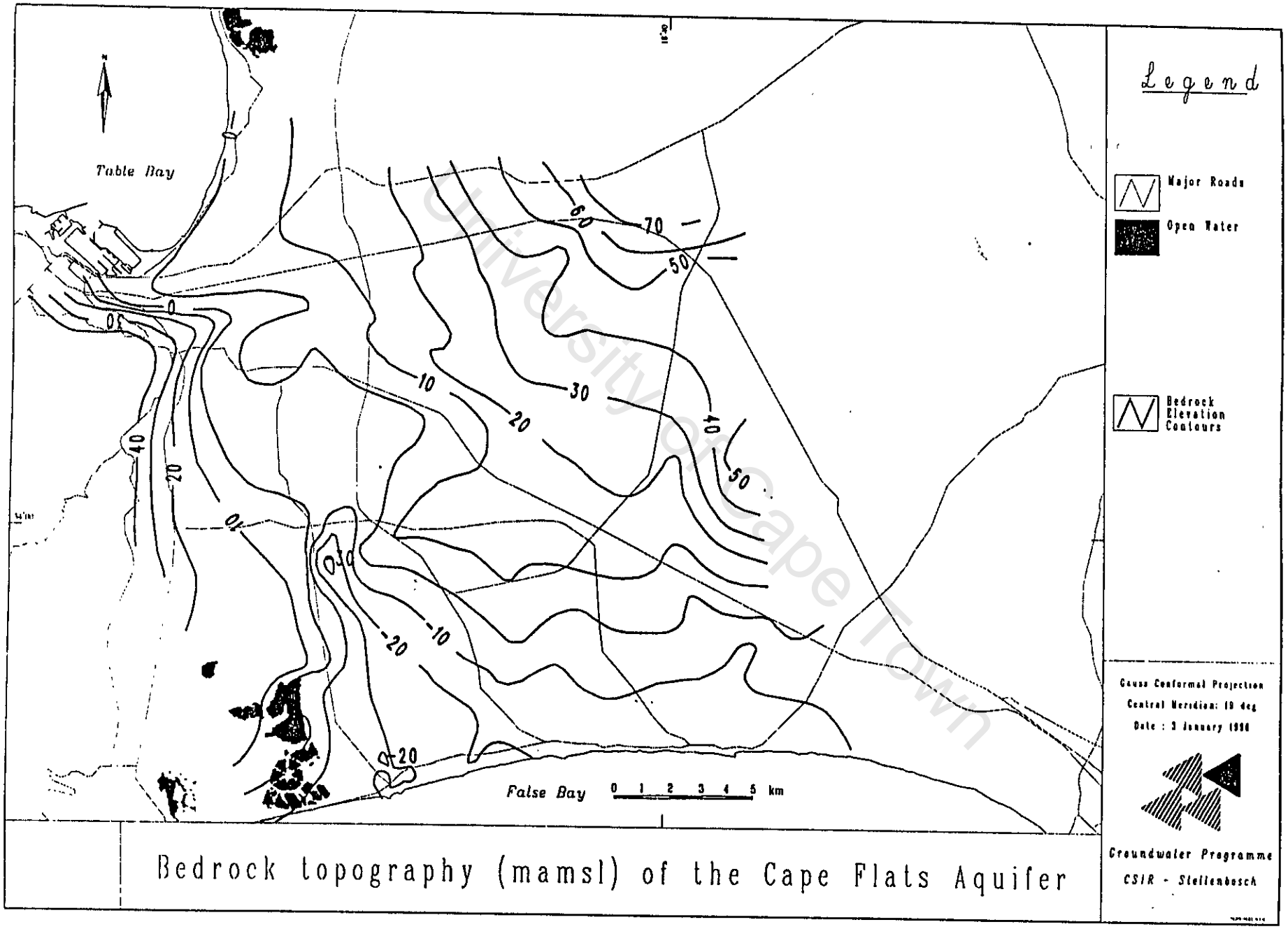
1:20000	Cape Flats Urban Park: Zoning	N

Appendix 4: **The Cape Flats aquifer: a collection of maps showing further information (Source: Wright and Conrad, 1995).**



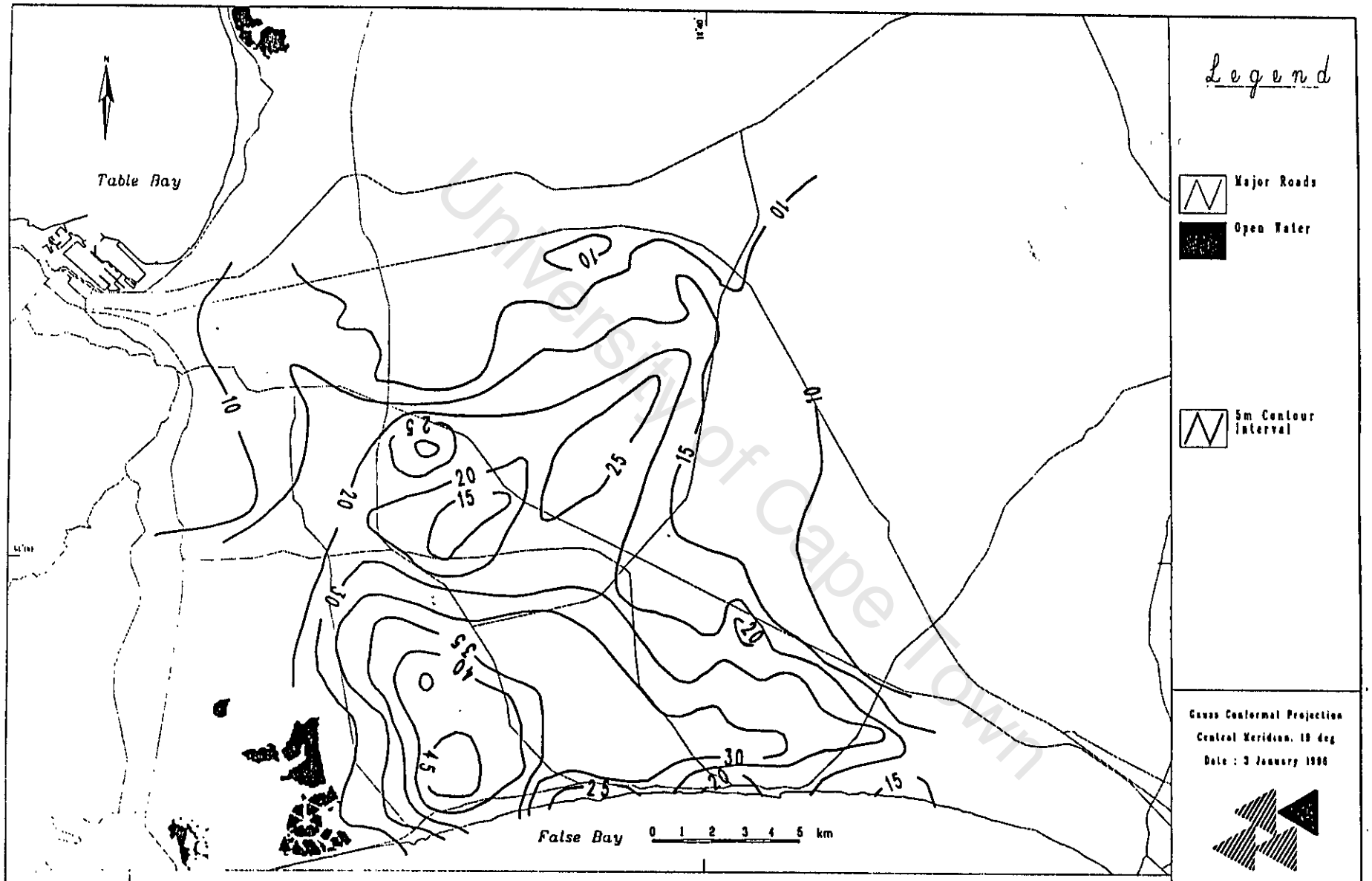
Location of the Cape Flats sand unit

University of Cape Town



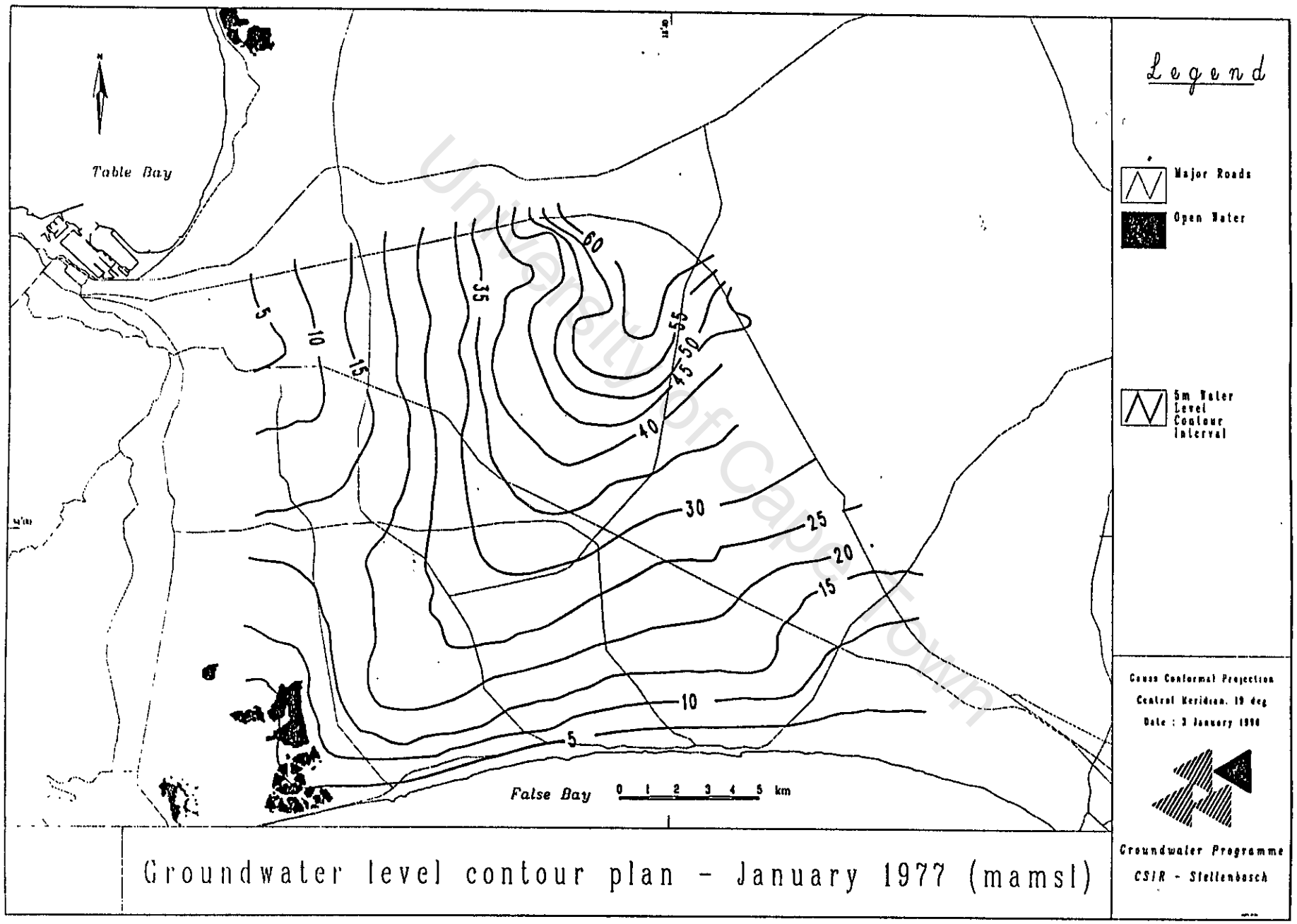
Bedrock topography (mamsl) of the Cape Flats Aquifer

University of Cape Town



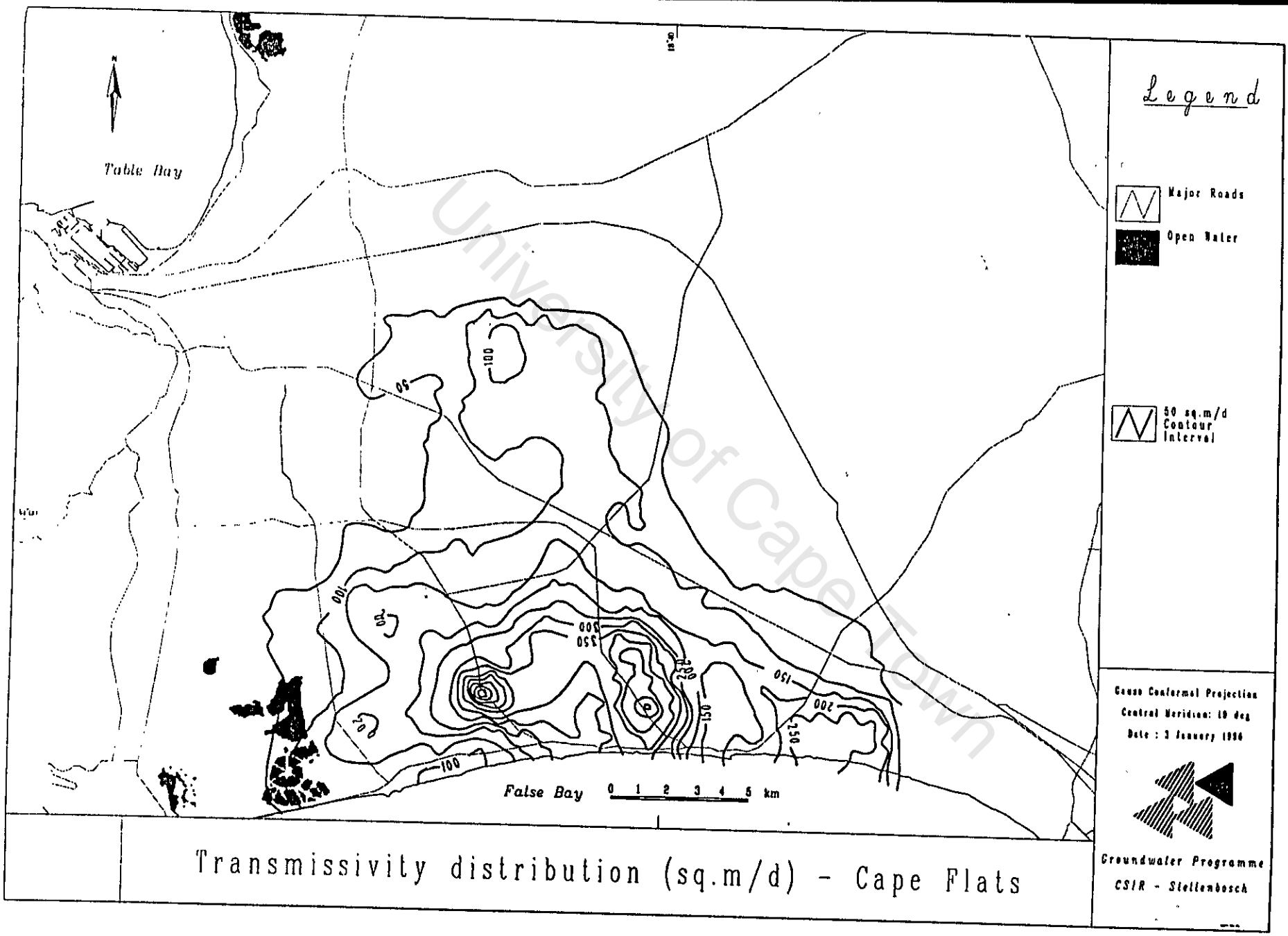
Average thickness (m) of the sand unit on the Cape Flats

University of Cape Town



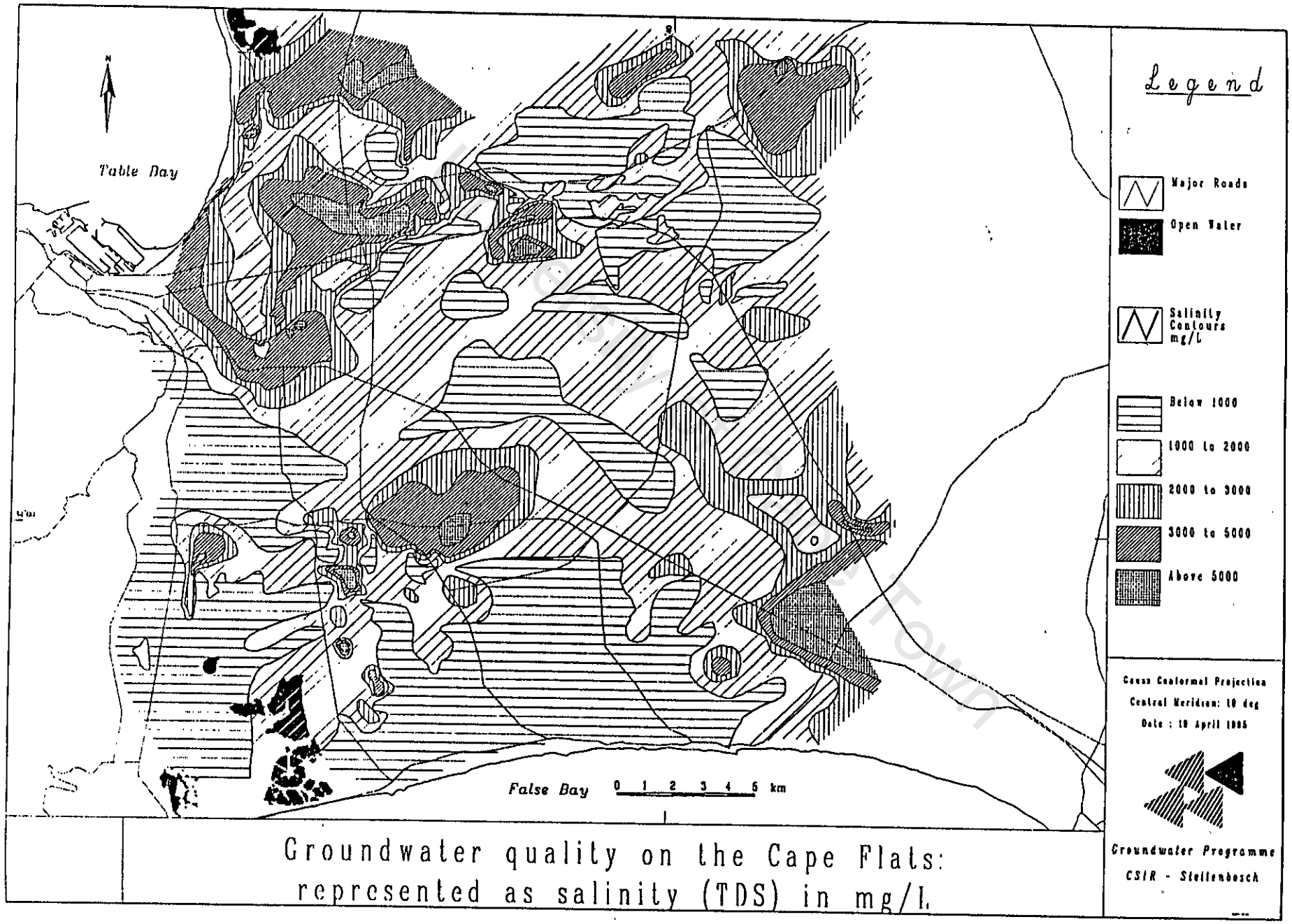
Groundwater level contour plan - January 1977 (mamsl)

University of Cape Town

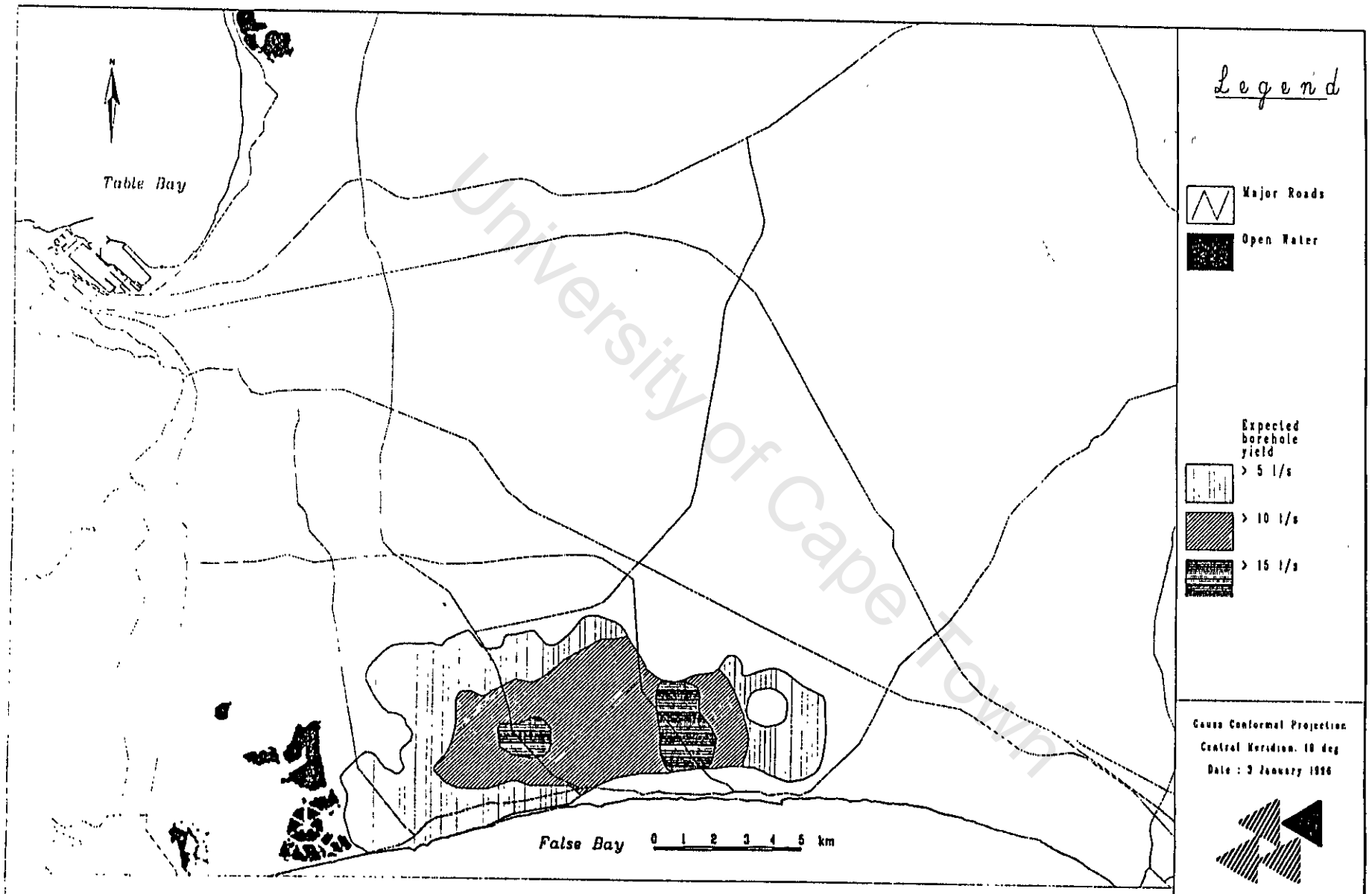


Transmissivity distribution (sq.m/d) - Cape Flats

University of Cape Town

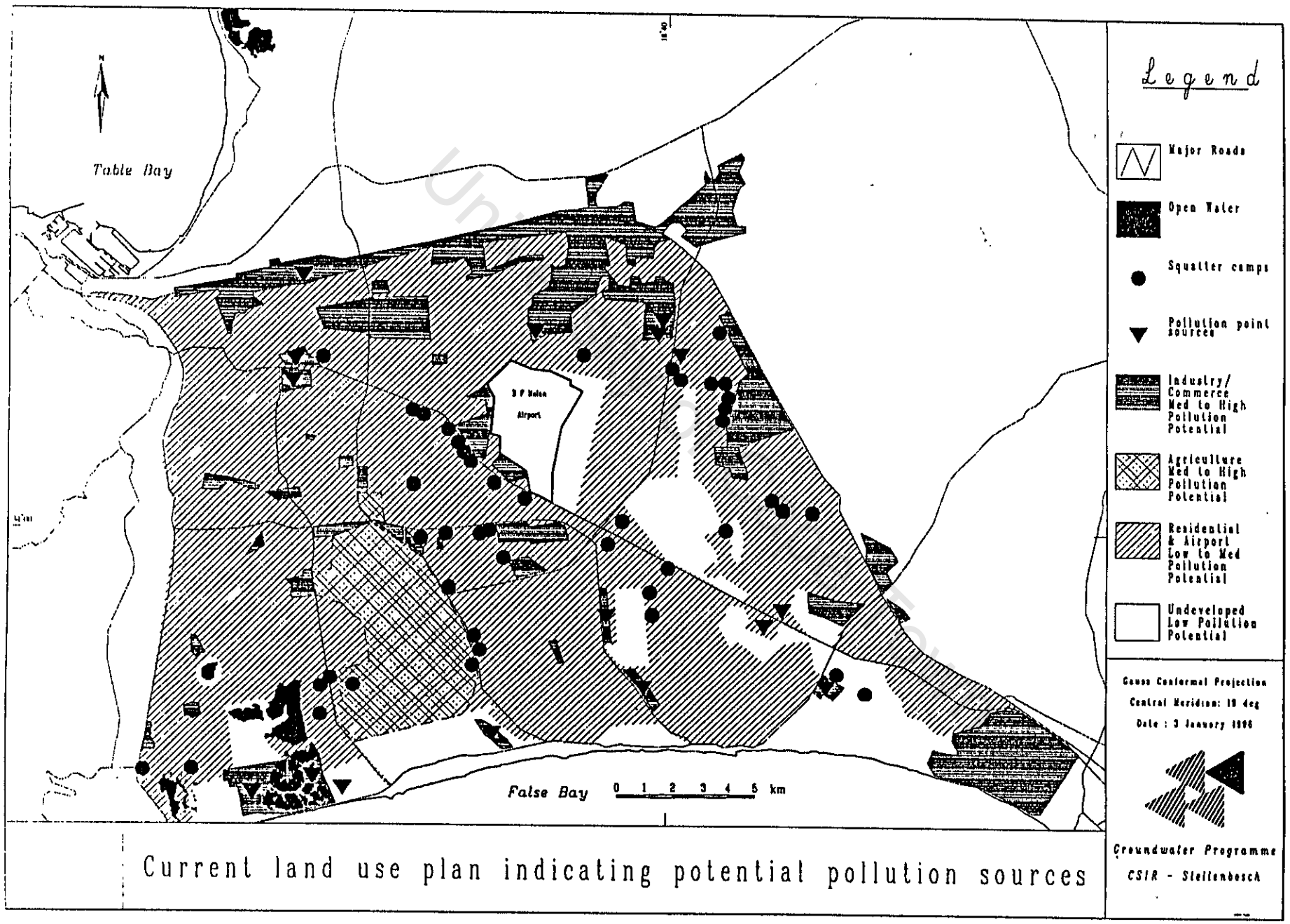


Groundwater quality on the Cape Flats:
represented as salinity (TDS) in mg/l



Plan indicating the areas most suitable for groundwater abstraction

University of Cape Town



Current land use plan indicating potential pollution sources