

RECONNECTING ST.LUCIA TOWN AND THE LAKE

A SOCIO-ECONOMIC PROPOSAL

Submitted by : Johan van Rooyen

Mentor : Mr. Piet Vosloo

Study leader : Mr. Karel Bakker



Submitted in fulfillment of part of the requirements for the degree Magister in Landscape Architecture (Professional) in the Faculty of Engineering, Built Environment and Information Technology, University of Pretoria. November 2006.

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1 INTRODUCTION

“The greater St.Lucia Wetland Park is the only place on earth where the worlds oldest land mammal, the rhinoceros and the biggest terrestrial mammals, the elephant, share an ecosystem with the worlds oldest fish the coelacanth and the biggest marine mammal, the whale.” As former president Nelson Mandela himself put it during a speech marking the historic 2002 re-introduction of elephants to the Eastern shores of the Greater St.Lucia Wetland Park.

St.Lucia is a place of great natural beauty with World Heritage Site status, but it is also a place of other extremes such as abject poverty.

Socio-economical pressures are growing and new opportunities are being realized to ensure that advancements are being made towards putting an end to the paradox of human shortages amidst the abundance of nature.



1 Aerial photograph of St.Lucia town and estuary mouth, 2000

2 PROJECT OUTLINE

2.1 THE CURRENT SOCIO-ECONOMIC CRISIS AROUND ST.LUCIA

According to the South African portion of the Lubombo Spatial Development Initiative (LSDI), there is a population of approximately 500 000 people that suffer from socio-economic problems in the areas around St.Lucia, and that the region is one of the poorest areas in South Africa. Please refer to the comments on the LSDI, point 3.3.

Here follows a summary of the socio-economic profile as described by the LSDI (Lubombo Spatial Development Initiative, 2000: 33):

- The area has one of the greatest poverty gap levels, as well as some of the lowest literacy levels and highest unemployment levels in KwaZulu-Natal.
- Some 90% of rural households earn incomes of less than R800 per month.
- The region has the province's highest backlogs in housing, social infrastructure and community facilities.
- The area has major employment problems with 38% of the economically active population classified as unemployed.
- Residents say their major problems are a severe lack of transport, employment, schools and clean water.
- Rural areas are not well served and many have effectively been sealed off from their commercial potential because of remoteness and isolation.
- There are a number of major rivers, lakes and pans but the area suffers greatly during periods of drought. This, together with inadequate irrigation and reticulation systems, has caused rural residents to complain that their single biggest social need is for clean drinking water."

2.2 THE RESEARCH PROBLEM

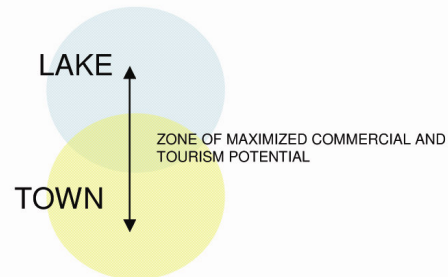
Reconnecting St.Lucia town and the Lake

The research problem is mainly a socio-economic problem set within the abundance of nature.

This thesis concludes, in points 4.7, that the dominant and current paradigm, for the South African context, concerned with altering the environment sees nature as a recourse that needs to be developed and managed to ensure the maximum benefit to humans over the maximum period of time.

This present day paradigm is made visible through current legislation, policies and initiatives that intend to guide the alterations and development of our landscape. The extent of the socio-economic paradigm is fully realized, in point 3, when the Coastal Management Policy and Lubombo Spatial Development Initiative are analyzed.

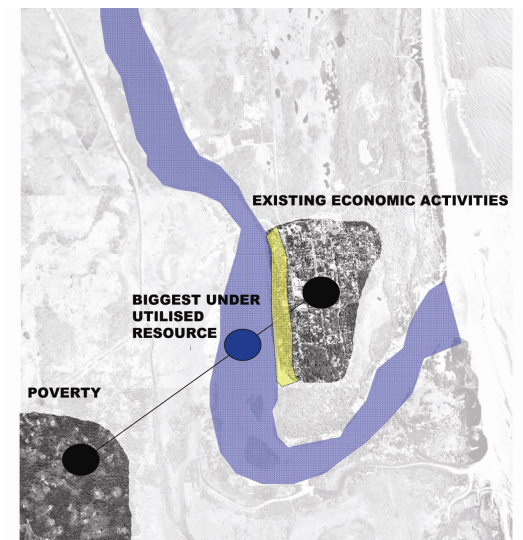
In order for the socio-economic paradigm to be successful, when applied to St.Lucia and its surrounding areas, the town of St.Lucia needs to be reconnected to the lake, Figure 2.



2 Diagram showing maximized socio-economic potential

When looking at the utilization potential of resources for socio-economic gain, in the St.Lucia area, The Greater St.Lucia Wetland Park only creates 350 direct jobs in tourism. This figure is alarmingly low considering that the park is 220 km long and one third the length of Kwa-Zulu Natal.

Lake St.Lucia is identified as the primary under utilized resource, the lake supporting little or no direct economic activity, except for four pleasure boat ride.



3 Aerial photograph showing an area, in yellow, where the potential for a socio-economic development scheme is maximized

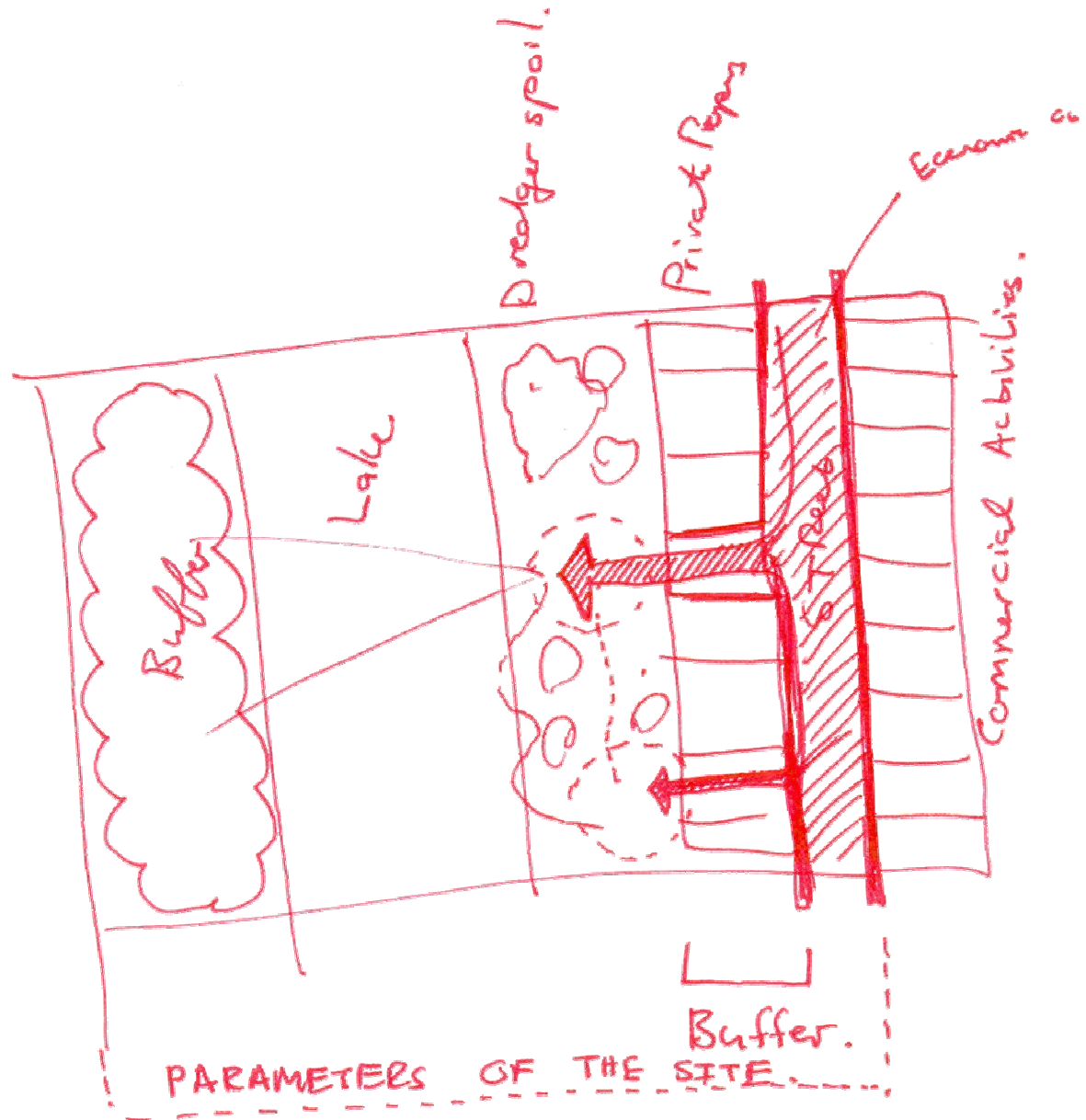
Figure 3 illustrates the socio-economic research problem: Considering the existing economic node created by St. Lucia town and its proximity to both the lake and Dukuduku informal settlement, the potential for development that could eradicate socio-economic problems are realized.

When the town and lake is reconnected a zone of maximized commercial and tourism potential becomes accessible.

This thesis researched the proposed connection and presents a concept of how such a link is envisioned, both functionally and architecturally,

The proposed connection, as illustrated by Figure 4, implies redesigning McKenzie Street, breaking through an existing barrier of privately owned hotels and dredger spoil vegetation, and establishing open spaces that would facilitate public access to the lake and the proposed eco tourism developments.

Also the long term economic sustainability of the proposed development is examined and certain visual buffers and no-construction zones are recommended.



4 Diagram illustrating the concept of the research problem

2.3 THE SITE



5 Diagram showing the detail research area

The site is situated on the Eastern shores of Lake St.Lucia in close proximity to the estuary mouth. This is a dynamic ecological area with a high biodiversity. Refer to section 5, which deals in detail with the environments within the study area.

The site is situated between the formal village of St.Lucia and the informal settlement of Dukuduku. The social and

economical imbalances of the two nodes are clearly visible in Figure 5, when looking at infrastructural patterning.

To the west is St.Lucia town and specifically McKenzi Street, the economical heart of the area. Refer to points 5.5 and 5.6 respectively.

In previous times the site was disturbed by the dumping of dredger spoil- dramatically changing the hydrology and gradients of the site. Refer to point 5.3.

As researched by this thesis in point 5.5.2 the lake and the town are separated by a buffer zone of privately owned hotels and accommodation resorts as well as the above mentioned dredger spoil.

To the west is the lake with beautiful vistas and sunsets over the western shores. Because of the buffer zone mentioned in the previous paragraph none of the economic activity in McKenzi Street makes use of this asset presented by the site.

This is a dynamic site that is characterized by contrasts and fluctuations: rich-poor, natural-urban, water-land, formal-informal, local-international, fresh-saline...

The site, although not always appearing to be, is a harsh environment for animals and plant: tidal currents, winds, large temperature fluctuations, varying saline concentrations and suspended sediments in the water, but because of the rich nutrient supplies, there are large rewards for the plants and animals that were able to overcome the problems that result from its unstable environment.

The same can be said for humans. If the local community is able, through research and design, to overcome what is currently being viewed as problems and successfully reconnect the town and lake, there will be huge social and economic reward.



2.4 THE CLIENT

2.4.1 The Greater St.Lucia Wetland Park Authority

The following is a short overview that explaining the structure of The Greater St Lucia Wetland Park Authority (GSLWPA) and its mandate.

The Greater St Lucia Wetland Park Authority was established following the regulations published in terms of the World Heritage Convention Act of 1999. With the dedicated national act, South Africa became only the second country to incorporate the World Heritage Convention into its domestic law. The legislation is unique because it ensures that the principals and values of the convention are given genuine application over South Africa's potential and inscribed World Heritage sites, but in a manner that is uniquely suited to South African conditions. By carefully balancing preservation and conservation with job and wealth creating economic development, it brings an integrated approach, which recognizes the value of our global assets and our people.

In terms of the Act, national government can, where appropriate, strengthen the powers of existing bodies to manage World Heritage Sites. Where conditions are particularly challenging it can however establish new institutions, called Authorities, to manage such sites. The national Minister of Environmental Affairs and Tourism – the Minister charged with responsibility in terms of the Act – considered St. Lucia to be such a special case that it became the first World Heritage Site to be entrusted to a dedicated Authority.

A Small board made up of suitably qualified representatives from government and civil society and chaired by Mavuso Msimang heads the Wetland Authority. Reporting to the national Minister of Environmental Affairs and Tourism, it is responsible for policy formulation and formal direction of the executive. In a first of conservation in South Africa, it includes local people and traditional leadership living in or adjacent to the park of national and universal significance who

suffered the disadvantages of apartheid are fully represented in the highest decision making body of the park. (Greater St.Lucia Wetland Park Authority Media Information Pack, 2006: 1)

2.4.2 Vision

According to Andrew Zaloumis, CEO for the GSLWPA, the Greater St.Lucia Wetland Park is run with a philosophy balancing the relationship between conservation and development with a genuine commitment to social equity and regional economic development. He explains that the one cannot succeed without the other, and that sustainable tourism underpins both.

“The most important is to ensure that progress continues to be made towards putting an end to the paradox of poverty amidst the plenty of nature. The St Lucia Wetlands is a World Heritage national park that is being made, in the true sense, open and available to local and international tourists. In short, government is putting in the money to make this a world-class destination.” (Greater St.Lucia-Wetland Park Authority Media Information Pack, 2006: 1)

2.4.3 The Brief

The Greater St.Lucia Wetland Park Authority recognizes its mistake of not identifying the town of St.Lucia as a lead project in the Lubombo Spatial Development Initiative Refer to point 3.3.2 and Figure 9 of this thesis.

The client wants to ensure that St.Lucia develops into a world class tourism destination. Making use of all of the opportunities presented to relieve poverty and social neglect.

The focus of the brief is the lands immediately around the lake, and the lake itself. This area is the biggest asset to the town and wetland park and has, up to now, been sparsely developed and have supported little to no economic activity.

The brief calls for reconnecting St.Lucia town with the Lake.

Considering the proximity of the town, the lake and Dukuduku informal settlement the focus of this development needs to be of a socio-economic nature and satisfy the objectives as stated by the Lubombo Spatial Development Initiative:

- Firstly, a commercial program that will create jobs, alleviate poverty and generate revenue from conservation whilst conserving the biodiversity.
- Secondly, to manage the parks eight ecosystems according to the standards set out by government and the Unesco's World Heritage Convention.
- Thirdly, to facilitate communities and land claimants participation in tourism and infrastructural development. This includes communities becoming equity partners in new tourism developments and suppliers of goods and services to lodges and park management.

(Lubombo Spatial Development Initiative, 2006: 3)

2.5 THE NEED FOR RESEARCH AND DESIGN

The urgency for landscape architectural research in the St.Lucia area becomes visible when the censures on government initiatives, guiding development in the region, are argued by this thesis. Refer to point 3.3.1 and 3.3.2.

The concerns raised become validated and amplified when the intended implementation of these initiatives are examined - please refer to point 3.4 for the criticism on the Inzingizi Infrastructural Development Project (IIDP) that is intended to guide The Greater St.Lucia Wetland Park's development over the next few years.

2.5.1 eKZNW Letter supporting research

To further stave the need for academic investigation, into landscape architecture, is a letter from the eKZNW Ecologist, Dr. Ricky Taylor, supporting the need for research and design for the St.Lucia region.

6 Letter of Support from eKZNW



EcoAdvice: Coastal Region
Private Bag X 01
St Lucia Estuary
3936

February 2, 2006

To whom it may concern

The need for landscape research and design in St Lucia

The town of St Lucia is unique in that it is an enclave within the Greater St Lucia Wetland Park which is a World Heritage Site. As such it is important that the town develops in such a way so that it blends in with the natural environment.

St Lucia is a town with an interesting historical context and a strong "sense of place". Many South Africans have come here in the past 70 to 80 years for fishing, and more recently for nature conservation holidays. Nowadays, there are new pressures on the town imposed by the local and international tourists attracted by the World Heritage Site status of the area. The nature of St Lucia is changing, and this needs to be guided so that it does not, with unguided development, lose its character to become a tacky tourist venue.

The discussions Johan van Rooyen has had with me encourage me that developments can take place where there is a closer merging of the urban and natural environments. We in the EKZNW see the need for the type of research and design that Johan proposes, and we encourage him to work in this area. The EKZNW are the conservation managers in the Greater St Lucia Wetland Park, and as such will be able to support his project with information and materials relating to the Park.

Sincerely

Ricky Taylor
Ecologist
Greater St Lucia Wetland Park: Coastal Areas
Phone 035 5901436
e-mail taylor@kznwildlife.com

P. O. Box 13053, Cascades. 3202. KwaZulu-Natal South Africa. Tel: +27 33 845 1999. Fax: +27 33 845 1699.

Reservations Tel: +27 33 845 1000. Fax: +27 33 845 1001. Email: bookings@kznwildlife.com

Website: www.kznwildlife.com

3 LEGISLATION, POLICIES AND INITIATIVES

There are two main documents dealing with legislation, policies and initiatives that need to be researched for the project set out in the project brief: The Coastal Management Policy (CMP) and the Lubombo Spatial Development Initiative (LSDI).

3.1 KEY PIECES OF LEGISLATION

Together the Coastal Management Policy (CMP) and the Lubombo Spatial Development Initiative (LSDI) encompasses all of the relevant legislations and macro frameworks needed to guide the proposed development.

The CMP and LSDI incorporate a combination of acts that have either environmental or human rights implication trying to relieve socio-economic pressures without exploiting the environment:

- Constitution Act (108 of 1996)
- Environment Conservation Act (73 of 1989)
- National Environmental Management Act (107 of 1998)
- Marine Living Resources Act (18 of 1998)
- World Heritage Convention Act (49 of 1999)
- Development Facilitation Act (67 of 1995) and provincial planning legislation KwaZulu-Natal Nature Conservation
- KwaZulu-Natal Heritage Act (10 of 1997)
- White Paper for Sustainable Coastal -Development in South Africa (2000) Spatial Planning and Land Use Management White Paper (2001)

- Protected Areas Bill (2003)
- Seashore Act (21 of 1935)
- Maritime Zones Act (15 of 1994)
- Municipal Systems Act (32 of 2000)
- Management Act (9 of 1997)
- Biodiversity Bill (2003)

The CMP also goes a step further than the individual acts and shows how the National White Paper for Sustainable Coastal Development has been adapted to provide a provincial policy that is specific to the coastal environments of KwaZulu-Natal.

Both the documents have a strong socio-economic perspective on the environment and how it may be developed.

3.2 COMMENTS ON THE CMP

The KwaZulu Natal CMP is a major shift in thinking about coastal development and management. The old paradigm of conservation at all cost approach is discarded.

Instead the document is driven by the challenges of transforming our society and economy. It contributes to achieving the Constitution's commitment to improving the quality of live of all citizens, while protecting the natural environment for the benefit of present and future generations.

This view strongly makes use of instrumental value theory (as discussed in point 4.1 , paragraph 4) and is shared by the LSDI as explained in point 3.3.

The document could be summarized by the following paragraph:

The goal of the CMP is to improve the quality of life of human communities, which depend on coastal resources, by implementing sustainable coastal development – involving a balance between material

prosperity, social development, cultural values, spiritual fulfillment and ecological integrity, in the interest of all citizens, while maintaining the biological diversity and productivity of coastal ecosystems involved.

Here follows a check list compiled from the CMP to help guide and evaluate the proposed development as described by the planning and design brief, point 2.4.3:

- Meaningful public participation
- Promote public awareness
- Promote integrated coastal planning
- Ensure public right of physical access to the environment
- Equitable access to opportunities
- Protect historical and cultural resources
- Promote long term viability of coastal economies
- Alleviate coastal poverty
- Maintain a balance between built, rural and wilderness areas
- To design in harmony with local and regional aesthetics
- Plan to avoid increasing the incidence of natural disasters
- to protect the regenerative capacity of coastal ecosystem
- Rehabilitate damaged habitats

3.3 COMMENTS ON THE LSDI

The Lubombo SDI is a macro scale planning and development strategy that puts major emphasis on economic growth and social upliftment through the development of under utilizes natural resources and cultural potential, mapped out in Figure 8.

Just like the CMP this document draws strongly from instrumental value theory and explains it attitude toward conservation as follows:

“Red tape and environmental regulations can be used to block development. This is sometimes caused by a purist/overly protectionist approach to conservation. Sometimes conservation can ‘crowd out’ rather than attract outside investors. The SDI is working to achieve a healthy balance between the need to commercialize wildlife areas and environmental controls to protect conservation estates” (Lubombo Spatial Development Initiative, 2006: 39).



7 LSDI Logo

3.3.1 LSDI lack of defining Culture

The LSDI fails in clearly defining the cultural asset it wishes to develop. The fear in that culture is not defined as the specific cultures that are present or have historically shaped a specific location is very valid, especially when considering the importance placed on heritage in the St.Lucia area by the LSDI.

Showcasing the cultures specifically relevant to an area and highlighting the cultural uniqueness adds value to that specific location. On the other hand showcasing that same culture in a place not specifically relevant, could do just the opposite, and degrade the value of that location.

Not defining culture and heritage properly can present the opportunity to investors, looking to make quick money, to turn a location into a watered down cultural theme park with no true value. The integrity of “Cultural village” developments does not seem important to the LSDI it only sees cultural villages only as a low investment projects that will generate jobs in the area.

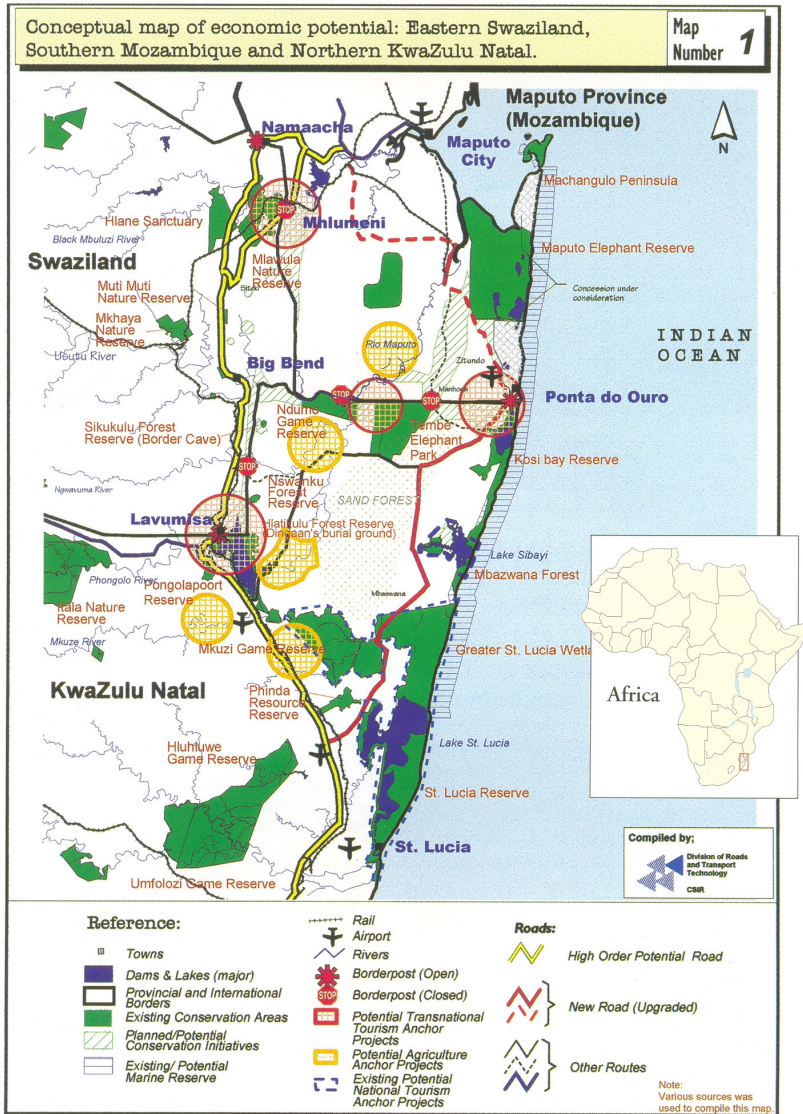
Please refer to the comments on the Inzingizi Infrastructural Development Project (IIDP), specifically point 3.4.2, dealing with proposed cultural theme parks in St.Lucia. The IIDP is an example of the dangerous consequences resulting from not defining culture.

3.3.2 Not recognizing St.Lucia town as a Lead Project

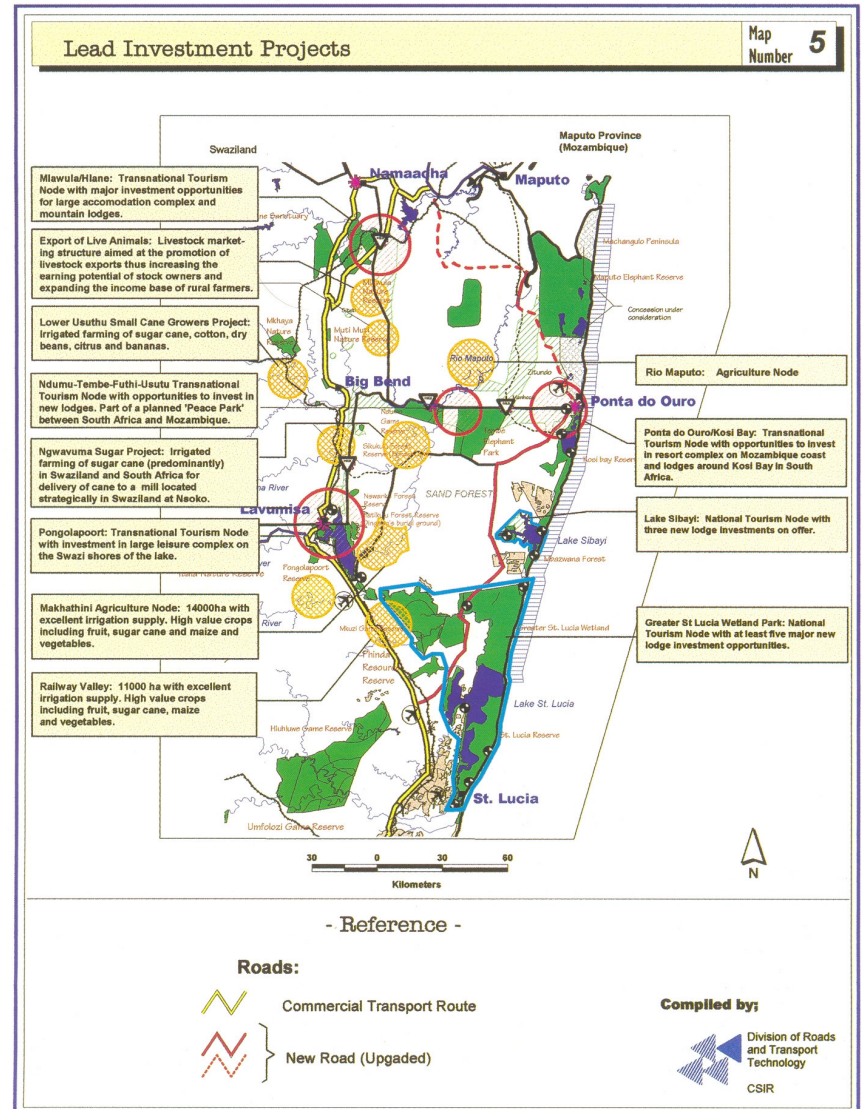
Please refer to figure 8. The LSDI recognizes the Greater St Lucia Wetland Park as an anchor project that will act as a catalyst for economic growth in north-east KwaZulu-Natal, yet it fails to recognize the importance and potential of the town itself.

The only reference to the town is a planned accommodation and cultural project at its entrance, known as the Gateway Cultural Project. Also “at its entrance” is vague and does not clarify where this development is envisioned to be or how it will function.

St.Lucia town is the commercial heart of the Greater St.Lucia Wetland Park and surrounding area. As discussed earlier, in point 2.1, the town’s proximity to the lake (the areas biggest assets that remain under utilized) and to Dukuduku Township makes it perfect “...to Generate economic growth by making use of the inherent but under-utilized potential of the area.”



8 LSDI Conceptual map of economical potential (Lubombo Spatial Development Initiative, 2006: 41)



9 LSDI Lead Investment Projects Map (Lubombo Spatial Development Initiative, 2006: 44)

3.4 COMMENTS ON THE INSINGIZE INFRASTRUCTURE DEVELOPMENT PROJECT

3.4.1 Introduction

The INSINGIZE INFRASTRUCTURE DEVELOPMENT PROJECT (IIDP) is a document put together for the Greater St. Lucia Wetland Park Authority (GSLWPA) by a multi-disciplinary team.

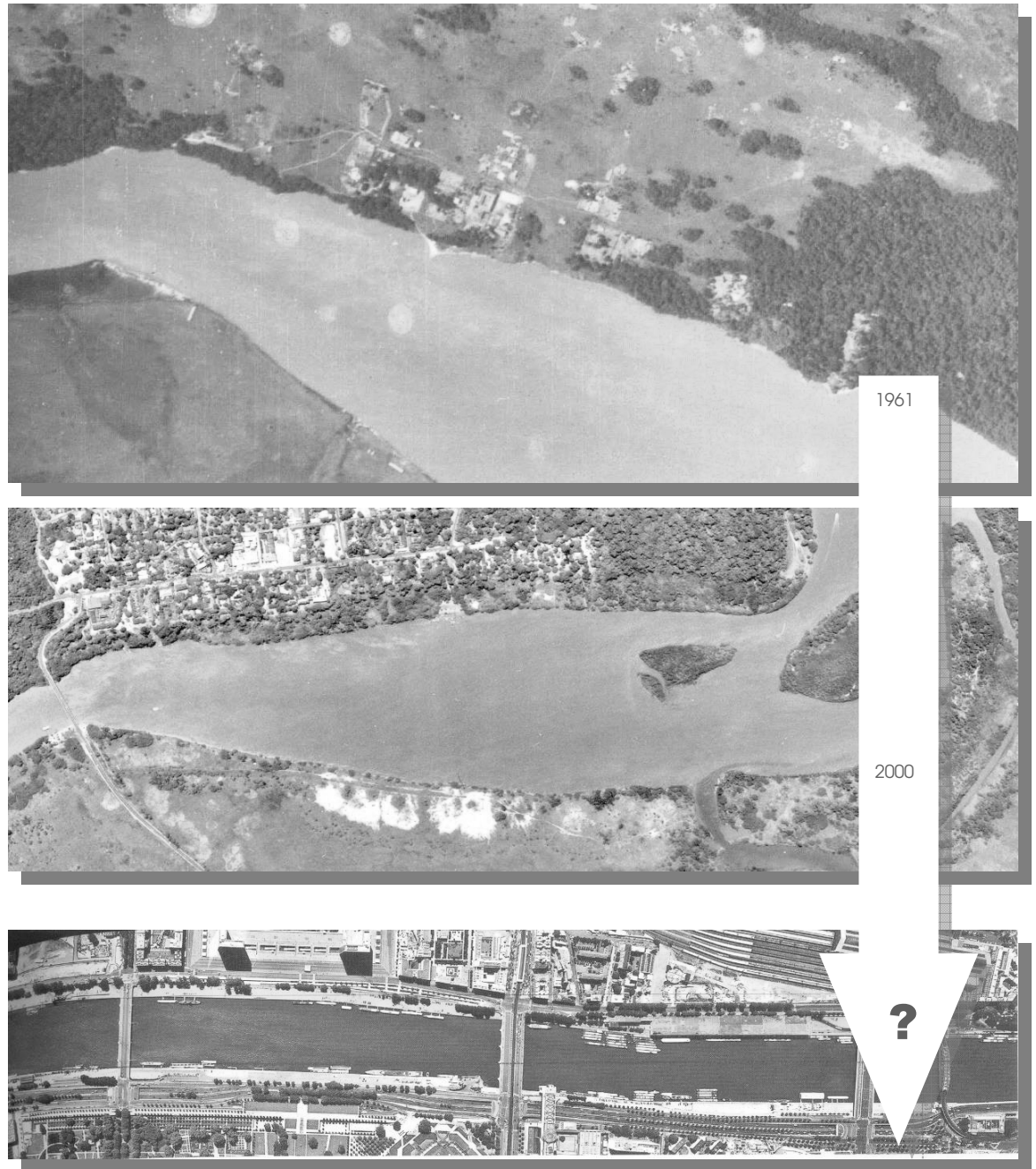
When asked about the IIDP, the only comment given by the GSLWPA is that it is a document intended to guide the parks development over the next few years.

After examining the IIDP it becomes clear that the document tries to interpret the development requirements and goals as set out by the Lubombo Spatial Development Initiative (LSDI), refer to point 3.3, by addressing socio-economic issues.



- 10 A bad interpretation of the Gateway Cultural Project, as proposed by the LSDI, with tacky signage that clearly was an afterthought (INSingizi Infrastructure Development Project, 2000: 12)

4 THEORY COMPONENT



13

Aerial photographs of St.Lucia documenting the urban development and asking the question of what future progress will bring about



14 Intact forested dunes at St.Lucia. They were threatened by mining as in Richards Bay



15 Dune mining activities at Richards Bay

4.1 ST.LUCIA: EXPLOIT, CONSERVE, REHABILITATE, DESIGN AND DEVELOP?

The debate around nature and development is especially relevant in St.Lucia considering its history of stopping dune mining and it being declared a world heritage site.

This theoretical component of this thesis asks the question of how much development equals exploitation. To answer this question this thesis takes into consideration South Africa's history of racial and economic discrimination, which led to the current hardships and poverty amidst the bounty of nature.

After the communities surrounding the St. Lucia site came together in the late 1980s and early 1990s in a remarkable movement to stave off the development of mining that

would have damaged the fragile ecosystems, the South African government made an unprecedented step to turn over the management of the park to a coalition of local people, companies, NGOs and government representatives – named the Greater St.Lucia Wetland Park Authority. It is the first time in the history of South African conservation that local people who suffered the disadvantages of apartheid are fully represented in the highest decision-making body of a major conservation area.

The park is now run with a new philosophy about the relationship between conservation and development: one cannot succeed without the other and sustainable tourism underpins both. (Media Information Pack, 2006: 1).

According to instrumental value theories only humans have intrinsic value (i.e. value in and of itself) while everything else only has value in so far as it serves human interests. This human-centered approach at best can lead to the protection of natural areas for consumptive use, while non-consumptive activities aimed at enjoying the recreational, aesthetic, or spiritual value of nature are allowed. At worst, it can lead to the position of those who see nature as nothing but a resource that should be maximally developed for human consumption. (Hattingh, 2000: 80)

Somewhere in between is the position of those who would rather like to see ecologically optimal development with a view to ensure that future generations can also satisfy their needs. Intrinsic value theories emphasize that human use-value could not be the only consideration in environmental decision-making. Some entities in nature, or nature as a

whole, or life in general should rather be respected for the value that it has in its own right, regardless of any use that humans can make of it (Hattingh, 2000: 80). Hattingh's argument is trying to prove that Intrinsic value is less human centered. His argument is ambiguous. De-emphasizing human use-value, but then states that life should be valued in its own right. Value is a relative concept generated and decided on by humans.

The many variations of radical value theories focus on the root causes of our environmental problems, and make proposals to overcome these causes through a radical transformation of our behavior, mindsets, notions of self and self-realization, social structures, institutions or decision making procedures. (Hattingh, 2000: 80) Deep ecology is an example of radical value theories and is explained in detail in *The Web of Life* (Capra, 1996: 3-17). In an article in *Rapport*, Prof. Johan Kemp states that humans are naive to think that we have an impact on earth and life - we are staring at short term changes. He states that the human species will become extinct and that the earth will continue to live peacefully (Kemp, 2005: 1).

Combinations of theories are being implemented in St.Lucia, a 'develop to conserve' approach. With new economical pressures one can just wonder how much development is going to be allowed and how much development equals exploitation. Also how do you decide what and where to conserve and what not?

Gardner states the following: "One controversial component of the Program (referring to the Lubombo Spatial Development Initiative) is the allocation of concessions in National Parks to private operators to build and operate tourism facilities on a long-term basis. According to the 2001 Government Yearbook; this is quite a radical departure from past policies where SANParks has traditionally both provided

and managed the accommodation. In terms of the concession contracts, the rights over a defined area of land are granted exclusively to the concessionaire until the termination or expiry of the 20-year contract. In return for this privilege, SANParks is guaranteed a total minimum income from the profits generated by each of the concessions for the 20-year period. At the higher end of the tariff scale, most of these concessions will only be accessible to international tourists and very wealthy South Africans.

The first concessions were awarded in the Kruger National Park in 2002. As a consequence, just less than 5% of the Park has already been allocated to private interests for exclusive use. An extra 570 kilometers of roads have been added to the Park to support these concessions, substantially enlarging the human footprint on the ecology. Concessions have also been awarded in many other National Parks and more are probably on the cards. Provincial authorities are now also following suit. According to the Wildlife and Environment Society of South Africa (WESSA) the Greater St Lucia Wetland Park Authority, in association with Ezemvelo KZN Wildlife, intends to squeeze 7200 permanent beds into concessions in the Greater St.Lucia Wetland Park. Many of these beds are in development nodes that are in ecologically sensitive areas. Seven thousand two hundred beds is a lot, considering St Lucia is only one tenth the size of the Kruger National Park, which has 4 200 permanent beds." (Gardner, 2000: 144)

Points 4.2 – 4.7 examine our changing position towards the environment and describe the current paradigm, which will dictate the boundaries of development and exploitation, as being anthropocentric and socio-economical of nature.

4.2 CHANGING PARADIGM

There has been a long tradition of environmentalist architecture, but currently it is very much to the fore in the thinking of many architects.

The destruction of nature has brought about a general feeling of anguish, which has made ecology a priority in the present-day world: environmental and social ecology, respect for and protection of our surroundings, development of things that will last, prevention rather than cure: these are problems that must be solved today by what is variously known as green, bio-climatic or ecological architecture. For the most part, these terms cover innovative technologies, recycled or adapted materials, and cheap methods of construction to suit the needs of the time.

"But this sort of progress does not clarify for us which nature we are to defend and how we are to defend it. What concept of nature do we actually have today? And what responsibilities can the architect imagine himself facing up to in a society that is evolving so fast?" (Brayer & Simonot, 2003: 10)

Several definitions for the word nature exist today, all with varied meaning. To create further confusion there are even more varied definitions for the words "environment" and "landscape" circulate academic literature.

The words "environment", "nature" and "landscape" are all used freely and with varied meanings by differently authors. This is mainly because of our changing understanding of nature and our relationship towards nature over the course of human history.

The changing paradigms, relevant etymology and interpretations (usage) of the above mentioned terms are discussed and documented by Makhzoumi (Makhzoumi & Pungetti, 1999: 1-14) and Capra (Capra, 1996: 17-50).

Because this is not the focus of this essay only a current and general definition of environment/nature will be given: According to Prof. Johan Hattingh, head of the unit for

Environmental Ethics, University of Stellenbosch, Environmental ethics is a sub-division of professional and applied ethics that concerns itself with the responsibilities that we as humans have in our interactions with the environment. Opinions differ as to how widely or narrowly the term "environment" should be interpreted, but a working consensus seems to have emerged around the notion of "objective encompassing nature", or "the biosphere".

From this broad perspective, the environment not only refers to living nature such as animals and plants, insects and microbes, but also the non-organic basis for life in general as well as the ecosystemic interactions between all of the above. (Hattingh, 2000: 80)

Many interpret the environment even wider, because humans are part of nature they imply that the systems humans create are also "natural", to include the built surroundings within which humans live, so that ethical concern for the environment is seen also to include consideration of the aesthetic, cultural historical and spiritual values that humans may attach to certain aspects of non-human nature. "...inclusive term that embraces wilderness, suburbia and city..." (Motloch, 2001: 3)



16 Green clay changing and molding as does our dominant paradigm and relationship towards the environment

There are many opposing and contradicting anthropocentric views on defining the environment– depending whether you look at the issue from a scientific, economic, social, political or moral perspective, all of which are legitimate.

Environmental ethics thus have to do with the duty of care that we have for the environment in an all-encompassing sense: the earth as a whole, or the whole of the community of life, including the ecosystemic and other processes (for instance the water cycle, the carbon cycle, the nitrogen cycle) that sustain this community of life. (Hattingh, 2000: 80)

The drastic mutations that have punctuated this short period in our history, a permanently changing environment, an ever increasing subservience to market forces - all of these underpin the general feeling that traditional attitudes and practices have become irrelevant, and now it is necessary to have a radical rethink if we are to meet the challenges of the modern world. (Brayer & Simonot, 2003: 10)

Within the circle of environmental ethics a wide range of different positions are taken up on the question of the nature and extent of our duty of care towards the community of life. Views also differ strongly on the reasons we have such a duty, for the sake of whom or what we should care about the environment, what exactly the objects of our concern should be, and how we should discharge our responsibilities. While some skeptics even go further and question whether we should morally care about the environment at all. (Hattingh, 2000: 80)

The answer to 'what develop and what conserve' thus lies within the dominate paradigm of the current time. To formulate the current paradigm we need to state both sides of the debate: Pro-conservation and Anti-conservation. Refer to points 4.3 and 4.4 respectively.



17 Preservation and Conservation: an abstract human concept (Casabella, Milan, no.411, March 1976)

4.3 PRO - CONSERVATION AND CRITICISM THEREOF

"The environmental crises of our day, ranging from the denuding of tropical forests, acid rain, air and water pollution, diminishing wilderness areas, the introduction of alien vegetation and green house warming, all have one thing in common - the human factor. A sobering thought. It is difficult to counter the argument that human beings are the most dominant and, as seen through human eyes, the most successful species on earth. Indeed, there is hardly a place on the face of our planet that we have not explored, settled, and altered in some way to satisfy our own ends and as the writer and scientist, E. O. Wilson puts it, 'we have become a geographical force more destructive than storms and droughts.' It is a fact that death and extinction is on the cards for all of the earth's species, but prior to the emergence of the human animal, nowhere in the evolutionary narrative does it show any one species having driven any other into extinction." (McMallum, 2000: 55)

"The Sixth Extinction of life is now- it is of our time. It began around 140 000 years ago and has been increasing in magnitude, exponentially, ever since. And we, every one of us - through our ignorance, our divisions, our political, philosophical and economic systems, our science and industry, our inventive genius and our exploding population - are its cause" (Anderson, 2000: 23).

"The exponentially increasing Sixth Extinction can be shown pretty convincingly to parallel humankind's headlong expansion in numbers from literally one of a kind some 140 000 years back to over six billion individuals today. And this population explosion can be inseparably tied to three successive, seminal communication revolutions: language, writing and printing. It is ironic that it is our sheer genius that is propelling us towards our pending demise." (Anderson, 2000: 23)



18 Humans fear nature but also fear its destruction

Lovelock argues against this. As seen in the above paragraphs, humans are being compared to a planetary disease. Lovelock uses the analogue of vaccination. The human infection could in the long run prepare our planet and make it stronger against more lethal "viruses" to come. This implies that the symptoms our planet is showing are only short term negative responses and nothing to be too concerned about. (Lovelock, 2000: 153)

According to Ashton, "Human intervention in the planetary balance is accelerating the tempo of extinction. We are unraveling the very fabric of our support system, by causing the extinction of thousands of species. Humanity faces two choices; either to indirectly cause our own extinction by the destruction of our support system, or to recognize our role in a Gaian system and reverse the impacts that we have on them. A more widespread acceptance of the Gaia Hypothesis will improve the prospects for the collective health of life on this planet". (Ashton, 2000: 100)

Ricky Taylor, ecologist for Ezemvelo KZN Wildlife, tries to answer the question in his publication, *The Greater St. Lucia Wetland Park*, in an article entitled, 'Why conserve St. Lucia':

"...In response to this question it should be realized that conservation is being carried out for the long-term benefit of the human society as a whole. The Natal Parks Board has the mandate to look after St Lucia with responsible care as this park is recognized as being an asset of national and international value. The need for conserving St Lucia has been recognized by successive governments over the past century, from the British Colonial Government to the present-day one. As the conservation assets of the country have dwindled, so the need has been recognized to add extra portions onto the total St Lucia area. The values of St Lucia to society can best be assessed within the context of the total natural environment. The International Union for Conservation of Nature and Natural Resources in its World Conservation Strategy has stressed the need to maintain what it terms "Life support systems". These are the habitats essential for human survival. They include the forests, the estuaries, the seas, and the wetlands. For each of these, critical minimum amounts are needed to purify the air we breathe, to provide clean water, and to ensure that we have fish to catch. To ensure a high quality of life it is necessary for development to go hand in hand with nature conservation. There is a need for industrial areas as well as wilderness, and for the whole range between these extremes. The St Lucia Wetland Park, well known for its natural beauty and ecological value, has been well chosen to be retained as a natural area to be left to function with minimal interference from man.

The economic benefits in conserving St Lucia spread like tendrils through the infrastructure of our society. There is a direct economy based on the use of the area by tourists and anglers, as well as the attraction of overseas tourism to this country, which increases foreign exchange.

every year, will turn this country into a sterile and unproductive wasteland unless people are taught to respect and look after their natural environment. St Lucia is a valuable area for environmental education - it is an outdoor classroom that can be used for formal and informal education, for young and old alike." (Taylor, 1991: 40)

None of the pro-conservation strategies that have been studied for this discourse preach "conservation at all cost". Capra groups all these paradigms under "Shallow ecology". These paradigms are anthropocentric or human-centered (Capra, 1997: 7).

In the words of James Lovelock: "...Environmentalists, churches, politicians, and science, all are concerned about the damage to the environment. But their concern is for the good of humankind. So deep is the introspection that even now, few apart from eccentrics really care about other living organisms..." (Lovelock, 2000: 15).

All the pro-conservation groups are trying to ensure/guarantee human existence. They conserve out of fear that if they do not, current human activities are going to destroy biodiversity and with it the human species. They conserve to preserve nature for the enjoyment of their future generations. Or they conserve because it has an economical advantage for them.

Whatever the human-centered reason for conservation is, it becomes apparent that conservation is a selective and random activity.

When we look at our process of deciding on which species we are to conserve and the ones we are going to leave up to fate, it becomes apparent how ridiculous it is. Currently we conserve species with dwindling populations. We conserve what we see and know about. Think of the BIG five.

"...but the fact is that that there is only one other extremely pertinent quality about life on Earth: it goes extinct. Quite regularly. For all the trouble they take to assemble and preserve themselves, species crumple and die remarkably routinely. And the more complex they get, the more quickly they appear to go extinct. Which is perhaps one reason why so much of life isn't terribly ambitious?" (Bryson, 2003: 298).



20 Conservation is a selective and random activity

Species maintaining global life are quite different from the Big Five. "The ocean algal ecosystem in the northern and southern arctic and temperate oceans is active chemically in pumping down carbon dioxide from the air...a significant climatic role is attributable to this... affects both carbon dioxide and clouds in the atmosphere..." (Lovelock, 2000: 50)

We almost randomly select species and areas to conserve. The environment is ever changing. We see the environment in terms of human time- in the case of St. Lucia, what now is forest was grassland only 100 years back. We are quick to protect and conserve our trees, but the trees are "unnatural", they are only there because humans have stopped the burning of the grasslands. These ideas and criticism of so called green and pro-conservation movements have led to a resent new paradigm- that of ecological skepticism.



19 Money is very green

There are also the indirect and difficult to quantify ecological benefits such as the improvement of fish prawn and crab catches up and down our coastline. The spiritual values, too cannot be quantified. Watching a sunrise from Charter's Creek - where the Eastern Shores dunes, silhouetted against a blazing sky, are reflected in the lake; hearing the territorial calling of fish eagles, the pounding of the waves on the Mission Rocks at high tide, the adrenal in-releasing snort of a black rhino in the wilderness area. These are all part of our heritage; part of a rapidly disappearing Africa which needs to be preserved for future~ generations. St Lucia is an area where visitors can learn to live in harmony with the natural environment. The population of South Africa, growing at 2.6%



4.4 ECOLOGICAL SKEPTICISMS

4.4.1 Introduction

"Over the past 500 million years, since complex life colonized the seas, then the continents, there have been five major global extinction events. For one or other reason - asteroid hits, vast volcanic activity, global CO2 poisoning, abrupt climatic change, and oceanic stagnation - perhaps 90 percent of all life forms (species) have gone extinct in a geological moment. The last such event, the fifth, was when the dinosaurs died out 65 million years ago". (Anderson, 2000: 23)

Compared to the destruction of species caused by natural forces, human intervention and pollution is nothing. If nature has and could at any time wipe out life as we know it, why care, why conserve at all? Some skeptics believe that human damage to the environment is either minimal or less important in its likely consequences than the benefits that damaging economic development brings, others believe that any significant future damage will be fixed by yet-to-be invented technology, while others believe that major elements of the environment are in fact improving over time. (Environmental Skepticism, Wikipedia, 2006)

The notion of asteroids hitting the Earth and causing mass global extinctions ignited something of a revolution in thinking about the history of life. Through the rest of the 1980's, extinctions and their causes became very lively science. The previous Big Five extinctions were dissected and debated at great length; and slowly the Sixth - ours - has become more tangibly defined (Anderson, 2000: 23). Only within the last decade, with the pair of books by Edward O. Wilson, "The Diversity of Life (1992) and Richard Leakey "The Sixth Extinction: Biodiversity and its Survival" (1995), has the term "the Sixth Extinction" begun to emerge in academic circles.



- 22 Destruction the constant denominator
- 22 Left A Factory polluting the air
- 22 Right A volcano polluting the air

Environmental skepticism is an umbrella term that describes those that believe certain claims put forward by environmentalists, particularly alarming claims, are exaggerated to some degree. Sometimes a view may be labeled as environmental skepticism when the term environmental cynicism may be more accurate. (Environmental Skepticism, Wikipedia, 2006)

Historically, a small number of extreme Environmental skeptics have been linked to the interests of large and polluting industries such as Rachael Carson's Silent Spring ("dilution is the solution to pollution"). It is also pointed out that the environmentalists also employ much of "science" which is spinned toward the political purpose of environmentalist group. (Environmental Skepticism, Wikipedia, 2006)

4.4.2 The Skeptical Environmentalist: Measuring the Real State of the World

The Skeptical Environmentalist (*TSE*) is a controversial book by political scientist Bjorn Lomborg, which argues that claims made about global warming, overpopulation, declining energy resources, deforestation, species loss, water shortages, and a variety of other global environmental issues are exaggerations and unsupported by a proper analysis of the relevant data.

The Skeptical Environmentalist challenges many popular examples of serious environmentalist concerns by assembling and interpreting data from a large number of sources, and suggests that, by presenting false claims, environmentalists cause resources to be diverted to environmental issues, when those resources could be better spent elsewhere. *TSE* cites some 3,000 individual references from primary and secondary material. Much of its methodology and integrity have been subject to criticism from scientists who argue that Lomborg has distorted the various fields of research he covers.

Lomborg implies that overly pessimistic claims are made and as a result bad policies are implemented. He cites accepted mainstream sources, like the US government and UN agencies. His preference is for global long-term data, as opposed to regional and short-term. (The Skeptical Environmentalist, Reference.com, 2006)

The book is arranged around four major themes:

1. Human prosperity from an economic and demographic point of view
2. Human prosperity from an ecological point of view
3. Pollution as a threat to human prosperity
4. Future threats to human prosperity

4.4.3 Human prosperity from an economic and demographic point of view

Lomborg analyses three major themes: life expectancy, food and hunger, and prosperity. He finds that, contrary to what is often claimed, life expectancy and health levels have dramatically improved over the past centuries, even though several regions of the world remain threatened, in particular by AIDS. Similarly, he dismisses Thomas Malthus's theory that the increase in the world's population will lead to widespread hunger. Lomborg shows on the contrary that food is widespread and the world's daily intake of calories is increasing steadily. Indeed, technological improvements in agriculture should help humankind eradicate hunger. However, Lomborg notes that Africa in particular still produces too little food, an effect he attributes to the continent's dismal economic and political systems. Concerning prosperity, Lomborg argues that wealth, as measured by GDP/head, should not be the only criterion to judge prosperity. Lomborg points to improvements in education, safety, leisure, and ever more widespread access to consumer goods as signs that prosperity is increasing in most parts of the world.

4.4.4 Human prosperity from an ecological point of view

In this section, Lomborg looks at the world's natural resources. First, he analyses food again, this time from an ecological point of view. Again, he notices that most food products are not threatened by human prosperity. Next, Lomborg looks at forests. He finds no indication of widespread deforestation, and notes that even the Amazon forest still retains more than 80% of its cover in 1978. Lomborg points out that deforestation is linked to poverty and poor economic conditions in the concerned countries, and proposes higher economic growth to tackle the problem of deforestation. Concerning energy, Lomborg notes that oil is not being depleted as fast as is claimed, and that improvements of technology will provide us with fossil fuels for a long time still. Lomborg also points out that many alternatives already exist, and that with time they will replace fossil fuels as our energy source. Concerning other resources, such as metals, Lomborg notes again that these are widely available and that we should not expect problems with. Water is another controversial topic. Lomborg notes that, contrarily to common thought, wars will probably not erupt because of water. He emphasizes the need for better water management as water is distributed unequally around the world. (The Skeptical Environmentalist, Reference.com, 2006)

4.4.5 Pollution as a threat to human prosperity

Lomborg looks at pollution from different angles. Concerning air pollution, Lomborg notes that it has steadily decreased in recent decades in rich countries. He finds that air pollution levels are highly linked to economic development, with moderately developed countries polluting most. Again, Lomborg argues that faster growth in emerging countries would help them reduce their air pollution levels. Concerning water pollution, Lomborg notes again that it is linked to economic development. He also notes that water pollution in major Western rivers have recovered quite fast after sewage systems became widespread. Concerning waste, Lomborg

notes once again that fears are overblown, as the entire waste produced by the United States of America in the 21st century could fit into a square whose side would be 28 sq. km, 0.009 % of the total surface of the United States (The Skeptical Environmentalist, Reference.com, 2006).

4.4.6 Future threats to human prosperity

Lomborg first looks at our fear of cancer especially linked to chemicals such as pesticides. He again notes a vast exaggeration in public perception, as alcohol and coffee are the foods that create by far the greatest risk of cancer, as opposed to vegetables which have been sprayed with pesticides. Lomborg also criticizes the exaggerated claims of a vertiginous decline in biodiversity, proposing a number of 0.7% of species extinct in 50 years. While this is still a problem, as Lomborg admits, it is not the catastrophe clamored by some. Global warming is another very popular subject at the moment. Lomborg first criticizes the models used by some scientists to evaluate global warming. Indeed, Lomborg argues that these models do not take enough into account future technological developments, and that some of them do not take into account that humankind can, through a number of measures such as taxation, reduce global warming in the future. Lomborg agrees that most of the data points to an increase in temperature, but disagrees on the measures proposed to counter global warming. He argues that the cost of cutting CO₂ emissions have to be compared to other costs, such as fighting poverty and aiding poor countries. Lomborg also points out that there are not only costs to global warming, but also benefits, as large parts of Russia and Canada, for instance, could be put to agricultural use, which would benefit those countries. He therefore asks for a global cost-benefit analysis to be made before deciding on the best measures to take. (The Skeptical Environmentalist, Reference.com, 2006)

4.4.7 Praise

Wikipedia reports that in spite of intense criticism in most of the scientific press, *TSE* generally received extremely positive reviews from the mainstream media, Wikipedia then proceeds to including the following (Environmental Skepticism, Wikipedia, 2006):

- *The Economist* – "This is one of the most valuable books on public policy - not merely environmental policy - to have been written for the intelligent general reader in the past ten years.... *The Skeptical Environmentalist* is a triumph."
- *New York Times* – "The primary target of the book, a substantial work of analysis with almost 3,000 footnotes, are statements made by environmental organizations like the Worldwatch Institute, the World Wildlife Fund and Greenpeace."
- *Wall Street Journal* – "...a superbly documented and readable book."
- *Washington Post* – "Bjorn Lomborg's good news about the environment is bad news for Green ideologues. His richly informative, lucid book is now the place from which environmental policy decisions must be argued. In fact, *The Skeptical Environmentalist* is the most significant work on the environment since the appearance of its polar opposite, Rachel Carson's *Silent Spring*, in 1962. It's a magnificent achievement."
- *Rolling Stone* – "Lomborg pulls off the remarkable feat of welding the techno-optimism of the Internet age with a lefty's concern for the fate of the planet."

The amount of TV, radio and press attention around the world was tremendous, and is perhaps best characterized by this statement (as excerpted in Lomborg/Cambridge University Press media clippings): <http://www.lomborg.com/books.htm>

"*The Skeptical Environmentalist* marks a critical environmental moment.... We can forget those dreary old idols: Paul Ehrlich,

Lester Brown with his Worldwatch Institute, Greenpeace and all the others. They have been exiled into the darkness. Eco-optimism can begin to rise over the Earth. After Lomborg, the environmental movement will begin to wither."

4.4.8 Longer-term impact of TSE

The *Skeptical Environmentalist* became a high-profile international bestseller. In 2005, the fourth year following its English-language publication, an informal survey of publicly accessible online sources indicates that *TSE* continues to be highly controversial. However, there is no obvious evidence of it having a major public impact on environmental issues, and in spite of intent of the author to "provide the best possible information about how things have progressed and are likely to develop in the future" and "leave to the individual reader the political judgment as to where we should focus our efforts", *TSE* currently appears on the reading list of a variety of university courses as recommended or required reading on subjects as diverse as biodiversity and eco-terrorism. (The *Skeptical Environmentalist*, Reference.com, 2006)

23

A graphic metaphor exploring the relationship between exploitation of nature and our own suicide.



4.5 ANTHROPOCENTRIC AND SHORT TERM IMPACT

"Perhaps an even more effective way of grasping our extreme recentness as a part of this 4.5-billion-year-old picture is to stretch your arms to their fullest extent and imagine that width as the entire history of the Earth. On this scale the distance from the fingertips of one hand to the wrist of the other is Precambrian. All complex life is in one hand, 'and in a single stroke with a medium-grained nail file you could eradicate human history..." (Bryson, 2003: 289)

Compared to the Earth's history our human existence is brief. And if one compares the number of species that have gone extinct because of human interference with the number of species that have gone extinct from non-human activities - one realizes how naive we are in thinking that we have a long term ecological impact on the environment. We have a short term ecological impact but in the history of life on Earth we have no impact, we almost don't exist.

"...Each of these massive transformations, as well as many smaller ones between and since, was dependent on that paradoxically important motor of progress: extinction. It is a curious fact that on Earth species death is, in the most literal sense, a way of life. No-one knows how many species of organisms have existed since life began. Thirty billion is a commonly cited figure, but the number has been put as high as four thousand billion. Whatever the actual total, 99.99 per cent of all species that have ever lived are no longer with us..." (Bryson, 2003: 302).

This implies that if we could conserve 100 per cent of nature, totally have no human impact on the environment, 99.99 per cent of all the species would go extinct nevertheless. The environment is ever changing. Conservation tries to stop that change by looking at nature through the human perception of time.

The conclusion can then be made that conservation, sustainability, and ecological landscape design are all anthropocentric and short term exercises dealing with the short term survival and well being of the human species.

This thesis proceeds, in the next section point 4.6, in proving the above conclusion incorrect. Environmental alteration is not an anthropocentric process. Nor is it primarily a physical activity.

As the next section will explain, environmental alteration is a metaphysical manifestation and merely a byproduct of memetic procreation strategies, enabled by random and spontaneous events much like genetic mutation and evolution.



24

The only constant of life is that it goes extinct

99.99%

4.6 EVOLUTION: FROM GENES TO MEMES

The beauty of the Gaia hypothesis is the manner in which existing, evolving and new information may be incorporated. Each detail can be shown or assumed to form an aspect or part of Gaia. We are constantly introduced to fresh and powerful ways of perceiving our role amongst all that surrounds and supports us.

The Gaia hypothesis was criticized by Richard Dawkins in his book *The Extended Phenotype*; therein he argues that Gaia could never exist because it would be impossible for genes to express themselves on a planetary scale (Dawkins, 1982). Lovelock reacts to that and proves that genes can express themselves globally in a chapter called "Gene, cell and planet" (Lovelock, 2000: 95)

This thesis presents and proves the theory that the evolutionary step preceding genes are represented by memes and that currently it is memes that are responsible for altering the physical environment, not humans.

The term meme refers to any piece of information transferable from one mind to another. Examples include thoughts, ideas, habits, song and dance. Different definitions of meme generally agree that a meme consists of some sort of self-propagating unit of cultural evolution having a resemblance to a gene (Meme, Wikipedia, 2006).

Memes have, as their fundamental property, evolution via natural selection in a way very similar to Charles Darwin's ideas concerning biological evolution, on the premise that replication, mutation, survival and competition influence them. For example, while one idea may become extinct, others will survive, spread and mutate – for better or worse – through modification. Not only the memes most beneficial to their hosts will necessarily survive; rather, memes supposedly spread by functioning as the most effective replicators, which allows for the possibility that successful memes prove detrimental to their hosts (Meme, Wikipedia, 2006).

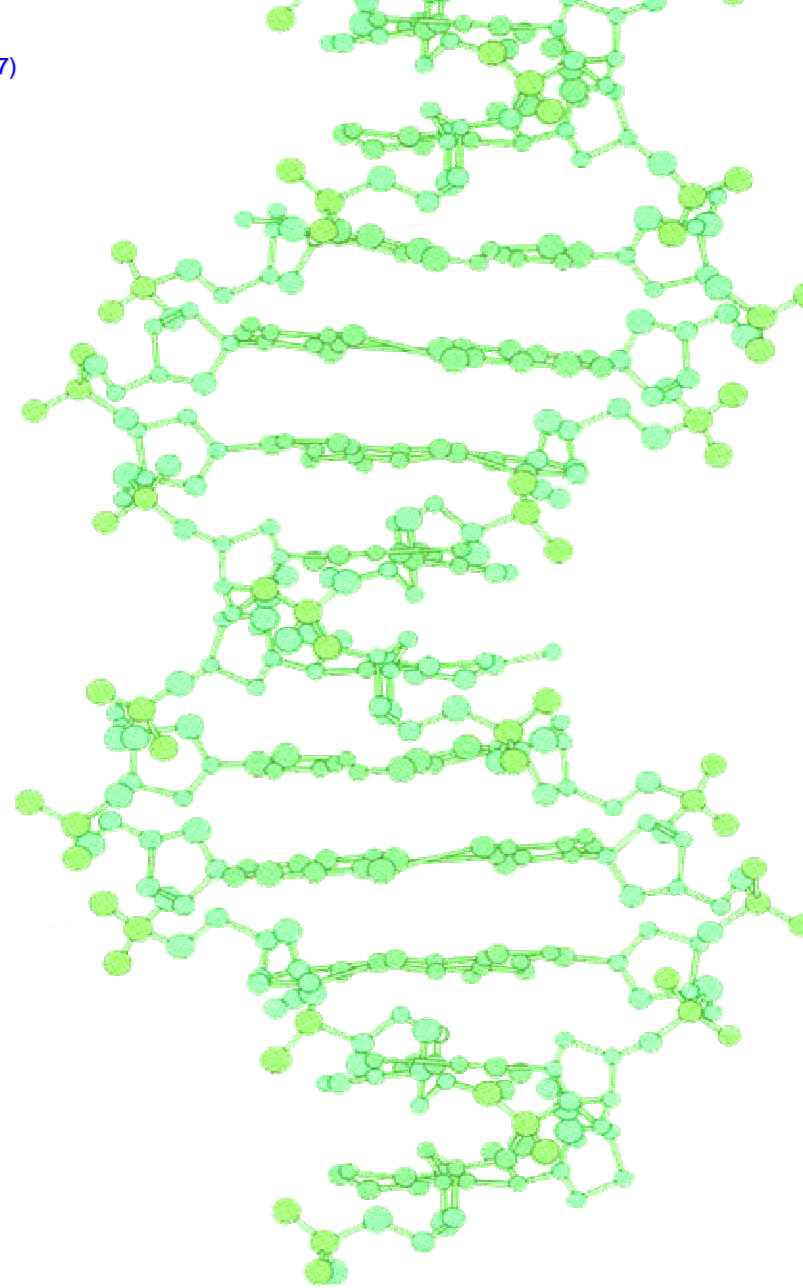
If we accept that Lovelock has proven that genes have the ability to express globally, then one can prove, with the following example, that memes, just like genes, have the ability to express on a planetary scale and that they are currently altering our physical environment.

When looking at the types of impacts that humans have had on the planet over the course of human history, we see that it relates to a dominant paradigm (a collection of ideas) of that specific time. Each distinct paradigm implied a different type of environmental alteration. Looking at the paradigms described in *The Web of Life* (Capra, 1997: 5-50) and the impact of those ideas on the environment, the human is the common denominator. It is the "ideas" or memes that reside within the human that evolves and shapes the environment differently. So it becomes apparent that it is not humans that are expressing themselves globally, but rather memes.

"...Human beings have never lived in harmony with nature. If they caused fewer disturbances in earlier times it is because of the smaller size of populations and the more primitive technology available..." (Hallam, 2004: 199).

The above statement can then be dismissed as being incorrect. 'Genetic human' lived in equilibrium with nature, as all other mammals, not having a negative global environmental impact, only a local and short term impact. 'Memetic humans' conversely challenge the natural equilibrium as a result of the memetic code's purpose to replicate above all cost, similar to computer viruses.

Memes are replicators and have as their prime goal to replicate and spread. This implies that the most successful memes are the ones inspiring their hosts to enable systems, connections and networks that in turn enable the memes primary function. This is manifested in the obsession of modern humans (highly infected with the latest memetic codes) to develop and to create networks enabling memetic



The Watson-Crick Model of DNA also representing a memetic network (Andersen, W. 1999. Genetics. London: Wadsworth Publishing Company)

outbreaks. Outstanding examples are: road network, airplanes routes and telecommunication network. Only now that memes have reached a stage that they are able to spread globally, through human constructed network, have humans started to have a global environmental impact, negative and lately starting to become more positive.

The relationship between genes and memes are of co-dependents and are either symbiotic or parasitic, depending on the environmental impact the memes survival mechanism demands. As said, "Not only the memes most beneficial to their hosts will necessarily survive."

Environmental alteration is not an anthropocentric process. Nor is it primarily a physical activity.

Our ethical sense of responsibility towards the environment is formed by the current and dominant, co-dependant group of memes (memeplex) or a paradigm.

The paradigm in turn is created by the random, non-linear replication of evolving and colliding memes.

This thesis proposes that memetic codes responsible for negative physical environment are weaker than codes that enable a positive environment for the carrier organism. This assumption is deduced from the observation that a self obstructing mechanism is implied in memes that enable harmful environments: when replication implies the motivation of the host organism to create detrimental physical environment, the code is imploding its own means of proliferation therefore defeating its own purpose.

Conversely, memes that manifest in enhanced physical environment enlarges their reproductive capacity, which in turn enhances the physical environment, creating an infinite loop.

Because the environmental enhancements only need to benefit the human species the paradigm might then be again considered to be anthropocentric. Refer to point 4.5. However the metaphysicality of the situation needs to be clearly understood.

It then follows that the likelihood of the current paradigm, dictating environmental development and alterations, being of a socio economic nature would be large. Please refer to the next section, point 4.7, wherein the theoretical aspects as discussed above are translated into practical guidelines for landscape design.

4.7 FROM THEORY TO CONCEPT

If one accepts that the metaphysical environment is the foremost shaper of the physical environment then the ecological footprint becomes the ecological shoe-print.



26 The shoe-print, as opposed to the ecological footprint, represents the theory that the metaphysical environment is altering the physical environment

Motloch in the section *Landscape Design as Memetics* (Motloch, 2001: 40) converts the theoretical aspect of memetics into practical guidelines for landscape design:

- Recognize the memes of your culture and other cultures.
- Appreciate memetic complexity.
- Envision desirable futures and design to influence others to pursue these futures.
- Recognize and respond to condition, integrate with system dynamics, apply principles, and pursue directions that simultaneously respond to ecological, physical, psychological, technological, political, and socioeconomic systems.
- Integrated management of diverse systems to promote natural and human physiological and psychological health.
- Pursue landscape management, planning and design that integrate into systems in dynamic equilibrium.
- Facilitate the emergence of more relevant management structures, planning strategies, and designs when systems are in dissipation.

Responding to the guidelines as set out by Motloch the following can be concluded:

Recognizing the memes of your cultures is especially relevant in the South African context- When one takes into account how South Africa survived a period of radical conflict and destabilization during colonialism and the apartheid era.

South Africa experienced racial and economic discrimination that led to extreme hardship and poverty amidst the plenty of nature.

It follows then that the dominant memes, currently altering the landscape in South Africa, are identified as being of socio-economic nature.

Considering the above mentioned socio-economic hardships, envisioning desirable futures for South African people becomes an automatic response.

The answer to the question asked by Brayer and Simonot, point 4.2, is that it is a socio-economic process that defines the South African concept of nature today and implies the

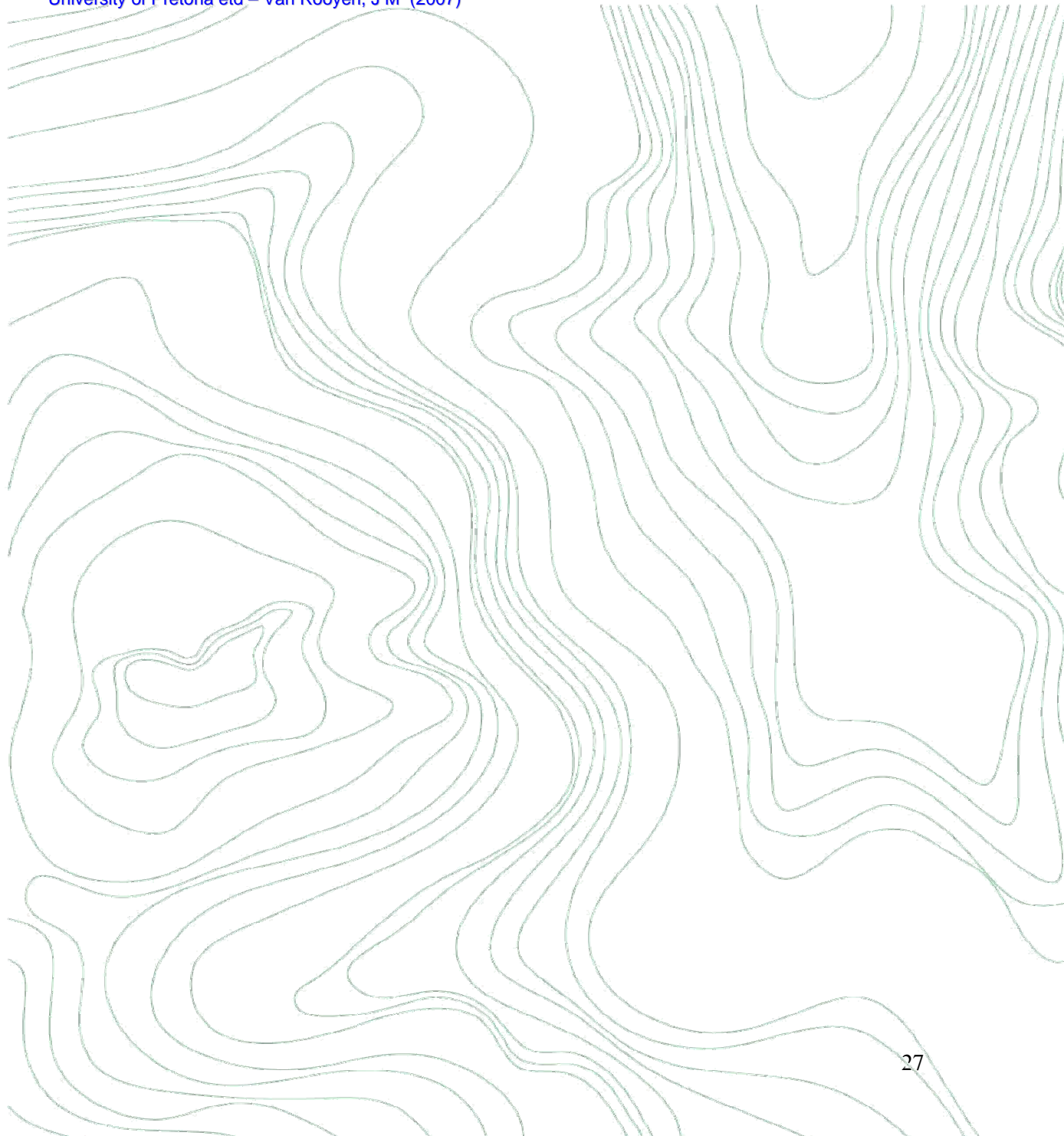
responsibilities of the architect towards the environment he is designing in.

Physical manifestations of current socio-economic memes are made visible through new legislation, policies and initiatives that dictate how the environment should be altered and developed. Examples of such documents, specifically relevant to the St.Lucia region are the *Coastal Management Policy* and the *Lubombo Spatial Development Initiative*. Please refer to point 3 of this thesis.

As predicted by Motloch, these documents respond to local conditions and integrate with system dynamics that simultaneously respond to ecological, physical, psychological, technological, political, and socio-economic systems.

This thesis concludes that the dominant paradigm of today can be described as socio-economical and that socio-economic development must be the main focus of any development or design.

It entails that material prosperity, cultural values and spiritual fulfillment has to be balanced with nature, and in so doing defining our concept of acceptable development and our perception of what ecological integrity is.



5 ENVIRONMENTS WITHIN THE STUDY AREA

5.1 THE EASTERN SHORES

5.1.1 East- West section of Ecological Experience

The landmass separating the lake and the ocean is referred to as the Eastern Shores.

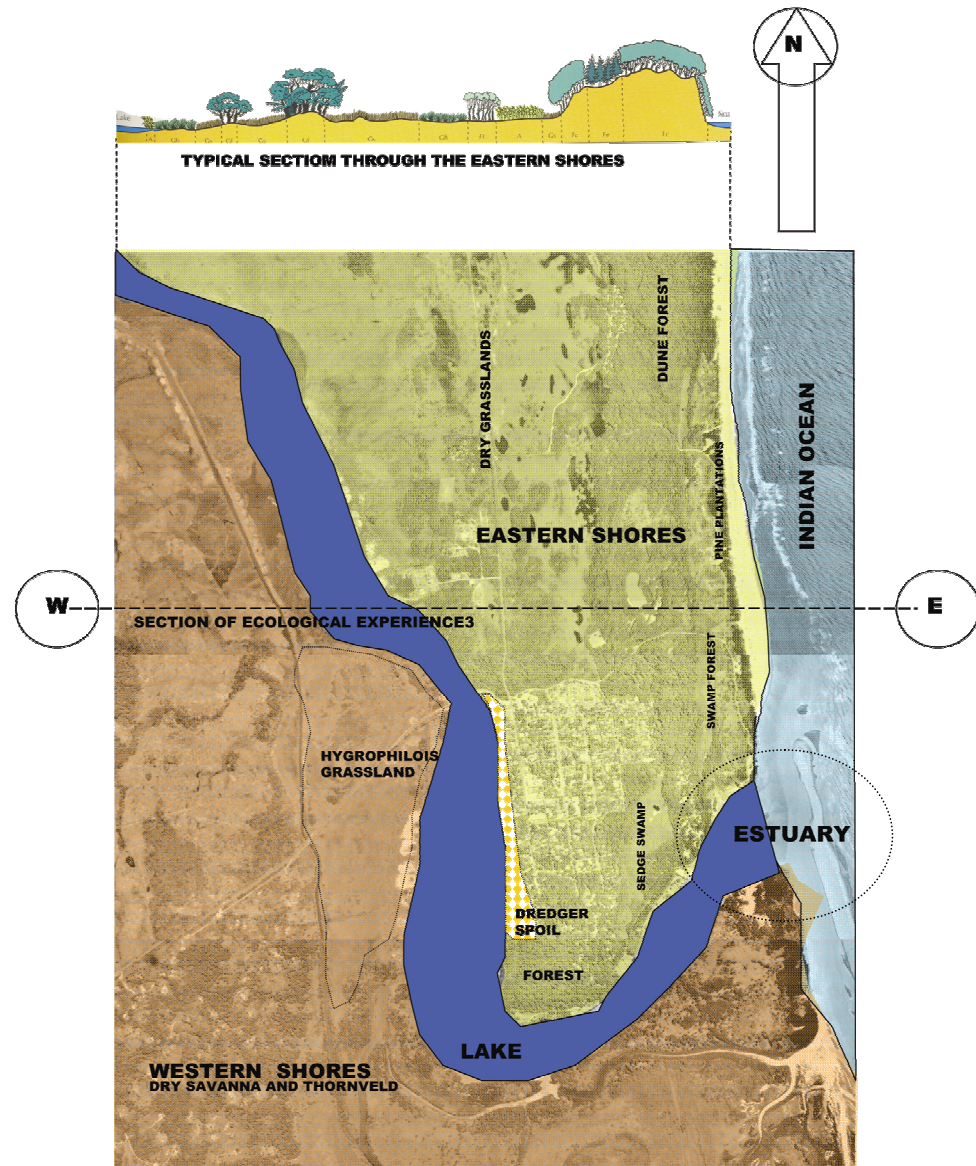
The Eastern Shores are made up of several distinct vegetation types, all arranged in a linear pattern running North-South and parallel to the landform.

Therefore by cutting an East-West section perpendicular to the landform a line of ecological experience is formed.

This line will cut through fourteen distinct vegetation types, as discussed in Taylor (1991:21), and take a visitor on an educational journey from the lake habitat to the open ocean in approximately 1500 meters.

5.1.2 Sunrise – Sunset

This Eastern Shores allows for breathtaking vantage points to watch the sun rise over the Indian Ocean in the East and sunsets over the lake in the west.



5.1.3 Estuary Mouth and Maphelane

The estuary, as described by Taylor (1992:32), is a connection between the lake and ocean. It is an ecologically diverse area playing a role in the reproduction of several species of fish and other animals. From here one also has an outstanding view of Maphelane to the south. It is the second highest vegetated dune in the southern hemisphere. The estuary could also act as a connection between St.Lucia and Maphelane for visitors.

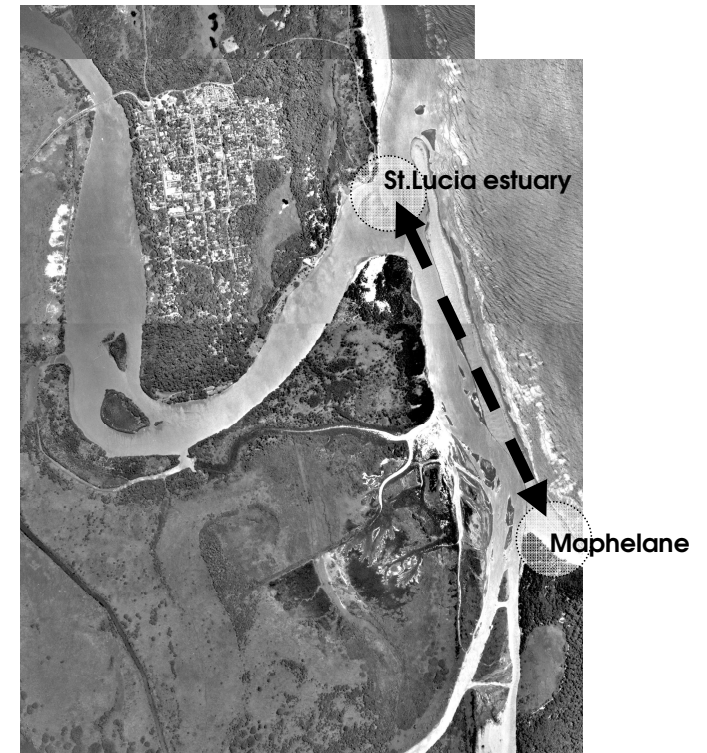
Maphelane is currently only accessible by vehicle and implies a 100 km detour of badly maintained road. A pleasure boat connection will enable visitors to reach Maphelane within ten minutes.

At the moment only KwaZulu-Natal Wildlife staff members are transported by boat to Maphelane. The tourism implications of the above mentioned connection is illustrated in the proposed St.Lucia Development Framework, point 6.



28

KZNW staff members travel by boat from the St.Lucia Estuary to Maphelane. This could become an important tourist connection



29

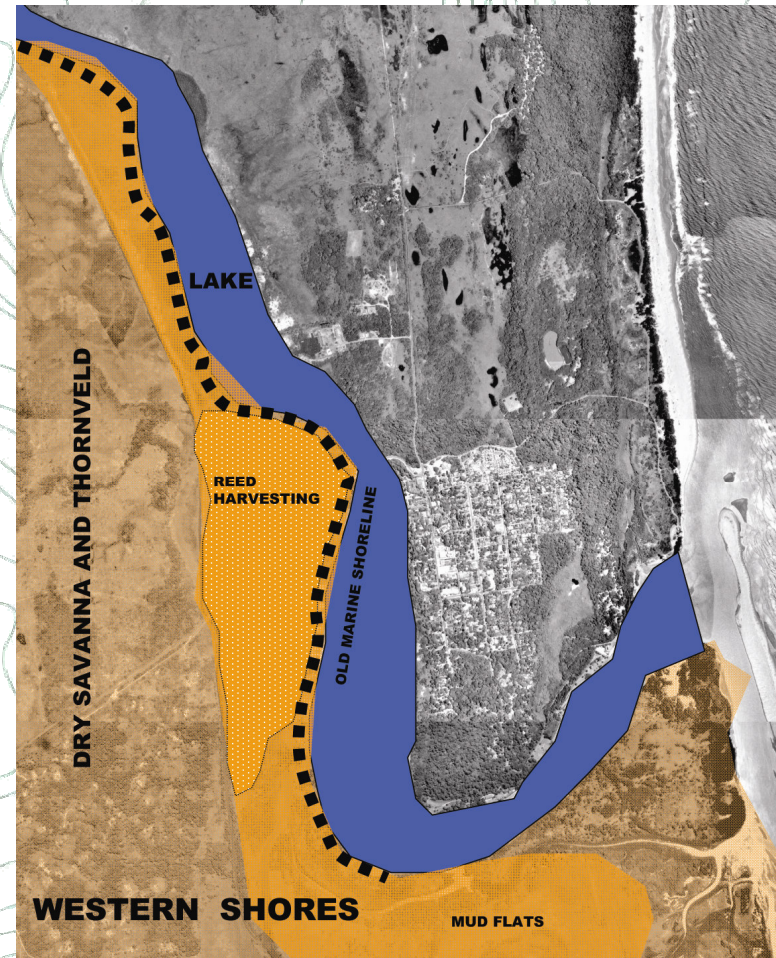
Arial photograph showing St.Lucia Estuary in relation to Maphelane and the proposed connection

5.2 THE WESTERN SHORES

This area has a much earlier origins than that of the rest of St.Lucia. It was the marine shoreline prior to the formation of the lake system. Please refer to point 5.5.1.1 for the geomorphologic explanation.

The Western Shores consist mainly of savanna and thornveld.

On the edge of the lake are the periodically flooded mudflats, the short lawns of salt-resistant grasses and taller stands of reeds and sedges. *Juncus kraussii* (Ncema grass) is a renewable resource harvested by the local Zulu people every spring.



30

Diagram showing the Western Shores consisting out of dry savanna, thornveld, mud flats and reed beds

30

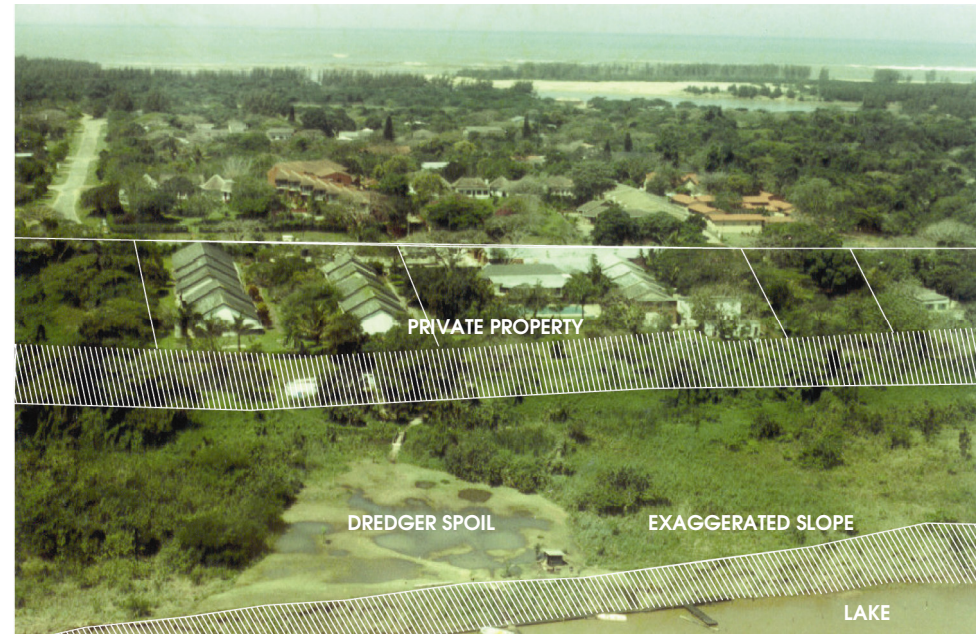


31 Mudflats of the Western Shores.



32 Woman harvesting Ncema in spring (Taylor, 1991, 40).

5.3 DREDGER SPOIL



In 1940 a project was launched to dredge out the sediments silting up the lake. The dredger spoil was dumped on the eastern side of the lake shore. To fully understand the extent of the dredging activities please refer to the aerial photographs, Figure 50, point 5.5.1.3 documenting the development of St.Lucia.

33

Dredger spoil on the banks of the Eastern Shores, approximately 1950's

This changed the profile and hydrology of the land from gradually sloping to a much steeper slope as seen in Figure 34.

34

Dredger spoil on the banks of the Eastern Shores showing vegetation growth, approximately 1960's

Also the grassland covering these slopes were destroyed and replaced by a swamp like microclimate.

As a result of the fertile dredger spoil, the low water table and the year round warm climate, woody plants and trees quickly took over the dredger spoil and turned the area into a dense swamp forest. Refer to Figure 35.

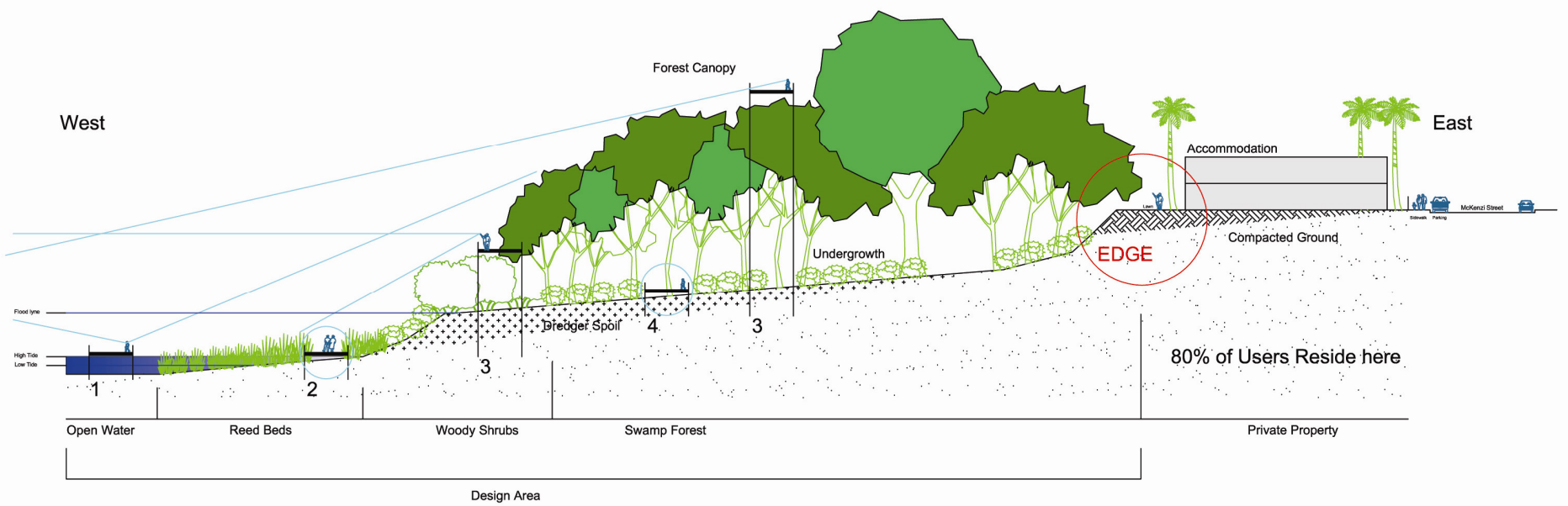
The newly formed vegetation screen, steeper slopes and swamp like conditions formed a buffer zone between the lake and the town. The buffer zone is discussed in point 5.5.3 of this thesis.

Figure 36 is a typical section through the dredger spoil area with the current vegetation cover. Four habitats are indicated that could be utilized for eco-tourism development.

35 Swamp forest covering the dredger spoil and visually screening off the town, 2006. Compare the vegetation cover to Figure 34



36 Typical profile through dredger spoil (Eastern shores) with the new habitat



Typical Section Between Lake and Private Property

5.4 THE LAKE

The lake has a surface area of 350 km². Although this is very large, its average depth is less than one meter.

The lake is a tidal system connected to the sea. Because of the tidal factor and shallowness of the lake the turbulent energy of the waves cannot be avoided when combined with strong winds.

Lake water level can range from about 40 cm below that of mean sea level in extreme droughts to over 50 cm above during wet periods. The wind factor can push the water to such an extent that water levels can change by more than 50cm over a period of half a day when a north wind changes to a south wind.

The study area of this thesis is situated in a high tidal fluctuation zone due to the proximity of the area to the estuary mouth. The difference between low and high tide can vary as much as 1, 5 meters, taking into account the effect of winds.

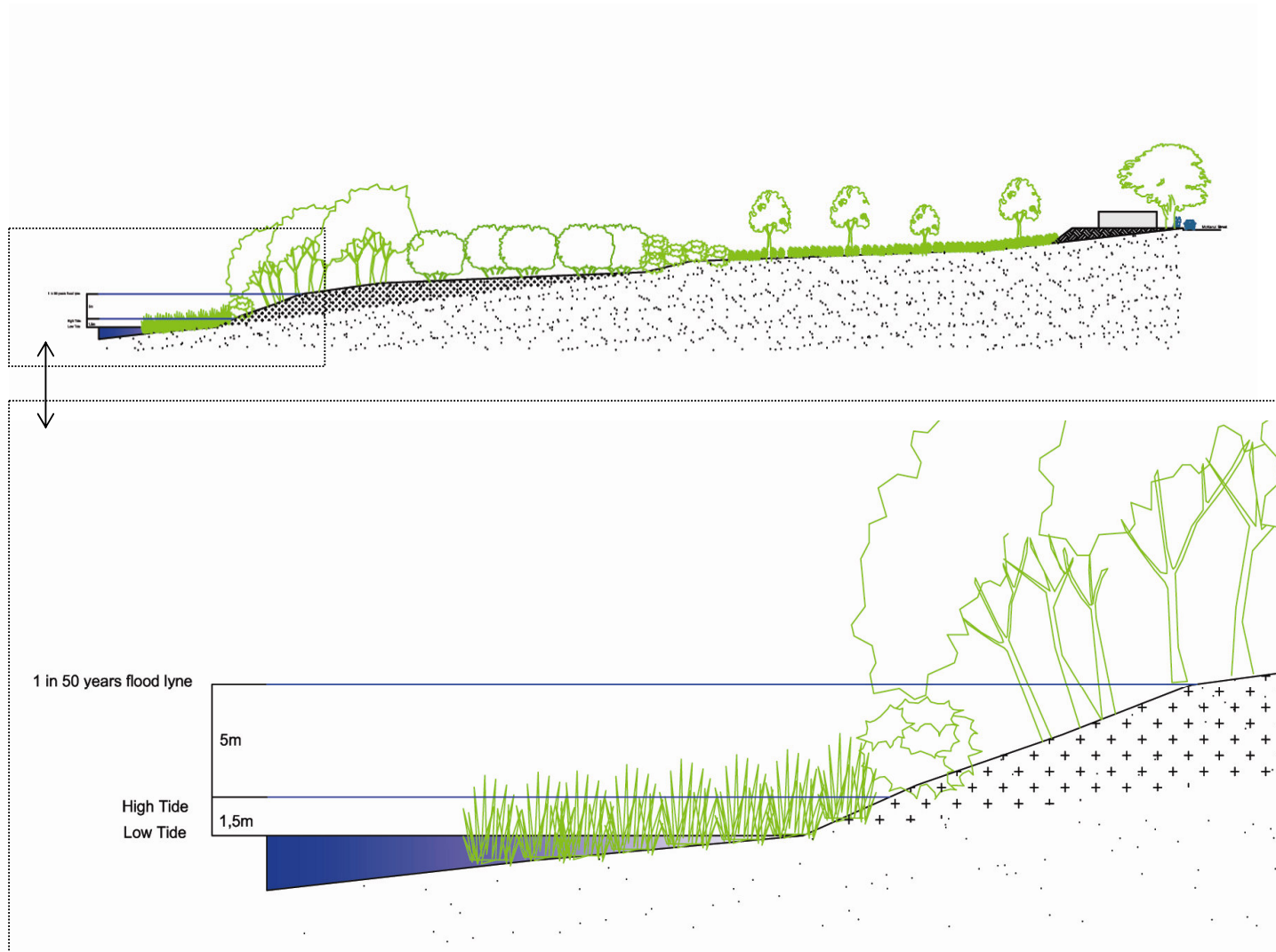
The 1 in 50 year flood line is situated 5m above that of high tide. Please refer to Figure 38.

The lake has salinity concentrations which range from that of completely fresh water to that which, at times, is three times more saline than the sea.

The lake bed of the Eastern Shores generally has a sandy texture. This is in contrast to the Western Shore that has a fine-grained mud consistency. Please refer to point 5.5.1.1 explaining the formation of St.Lucia.



37 The Lake and views to the south as seen from the St.Lucia bridge



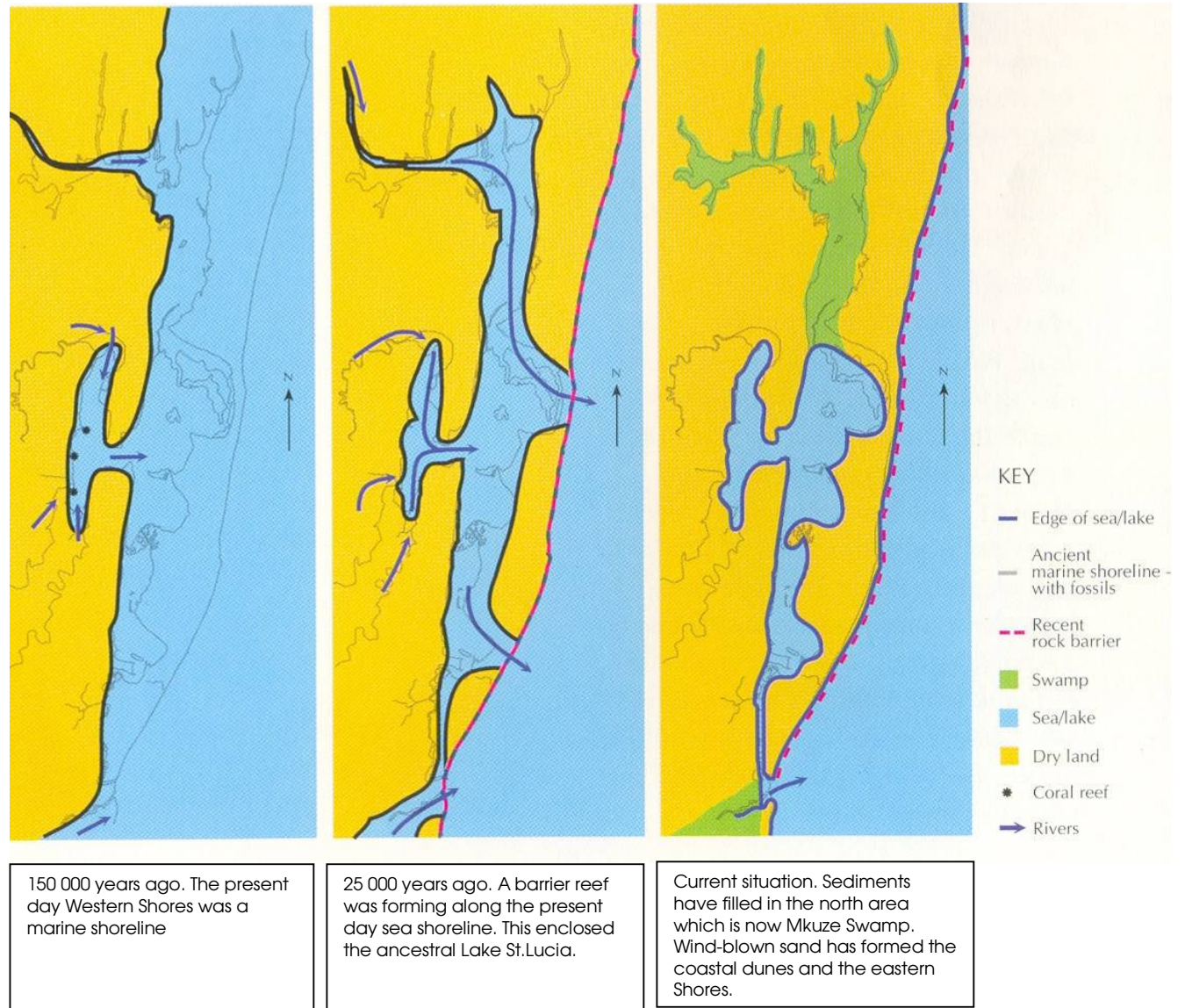
38 Figure illustrating the impact of tidal water levels and the 1 in 50 year flood line on the study area

5.5 ST.LUCIA TOWN

5.5.1 Historical development and background

5.5.1.1 The geological formation of St.Lucia

The landmass that St.Lucia town is situated on was created during two stages:
 The first of these occurred in the Cretaceous era when what we now know as the Western Shores was a marine environment.
 The second stage of formation is a result of changing sea levels caused by various ice ages.
 Please refer to *The Origins of St.Lucia – A story of sea level changes, fossils and floods* (Taylor, 1991: 6)



5.5.1.2 The old St.Lucia

St.Lucia a hundred years ago was not one that embraced conservation. It was a place that had abundant natural resources for humans to exploit. Please refer to Figures 40 - 48.



41 Hunted pelican and crocodile (Bird, private collection)



43 Culling crocodile (Bird, private collection)



46 Women with caught crocodile (Bird, Private collection)



44 Recreational shark fishing (Bird, private collection)



47 "Percy sizing shot crocodile"(Bird, private collection)



42 "The mornings catch" (Bird, private collection)



45 Skinning crocodile (Bird, private collection)



48 Crocodile hunting party (Bird, private collection)

Within 10 years of the first fishing camp being erected, St. Lucia became a popular fishing destination that attracted fishermen from all over South Africa for cheap holidays.

Figure 48 was taken in the mid 1970's at the Estuary Mouth.

The result of Figure 48 was the town's economy being based on fishermen and local holiday makers. The urban design and development reflects this when taking into account McKenzie Street's proximity to the lake and that the predominant landuse was holiday accommodation. Please refer to point 5.5.1.3 for an aerial photograph documentation of St. Lucia towns development.

The only design consideration for any development was to be cheap and to accommodate as many fishermen as possible. No consideration was given to maintaining public access to the lake.

As more and more development took place private accommodation facilities started to create a buffer between the lake and the rest of the town, supporting the socio-economic problems we are facing now.



48 Fishing at the Estuary Mouth 1976

5.5.1.3 Photo documentation of the town's development
1937 - 2006



49 St.Lucia 1937. Before dredging activities in the lake









53 Aerial view of St.Lucia 1937



54 Aerial view of St.Lucia 1981.



1956 (Brits, private collection)



1972 (Williams, private collection)



2006

55 The development of McKenzie Street

5.5.1.4 CHANGING CONTEXT

“St Lucia is a town with an interesting historical context and a strong “sense of place”. Many South Africans have come here in the past 70 to 80 years for fishing, and more recently for nature conservation holidays. Nowadays, there are new pressures on the town imposed by the local and international tourists attracted by the World Heritage Site status of the area. The nature of St Lucia is changing, and this needs to be guided so that it does not, with unguided development, lose its character to become a tacky tourist venue.” (Taylor, 2006, Letter of Support)

5.5.1.4.1 World Heritage Status

With the community succeeding in stopping the proposed dune mining scheme, The Greater St.Lucia Wetland Park achieved World Heritage Site status.

This meant that St.Lucia now not only attracted fishermen, but a visitor that wanted to experience nature in a different way.

This opened up a new range of possible economic opportunities for the whole community.

This also meant that business owners, residents and visitors alike were encouraged to re evaluate their position towards nature.

5.5.1.4.2 Beach Driving Ban

Beach driving was a major role player in the local economy of St.Lucia. It was a privilege and luxury South African fishermen and 4x4 enthusiasts were prepared to spend a lot of money on.

When beach driving was banned in 2000, St.Lucia lost ninety percent of its target market with huge economic implication.

Business owners were forced to start and cater for a new target market. This target market was foreign tourists, interested in eco- tourism activities.

This implies that the infrastructure created to cater for cheap fishing holidays now does not suite the new context.

Compare Figure 56, showing the current situation regarding beach driving and fishing with Figure 48, to fully understand the changed context.



56 Fishing at the Estuary Mouth, December 2006.
(Compare this photo to Figure 48)

5.5.1.4.3 Foreign Tourism

Achieving World Heritage Site status meant that St.Lucia, rapidly, became a global destination attracting a variety of people.

Combining the World Heritage status with the beach driving ban and it becomes easy to understand that for a few years St.Lucia was almost entirely dependant on the new foreign tourism market for economic survival.

Businesses were forced to adapt to the changing context as a matter of continued existence. St.Lucia is competing against global destinations bringing with it new needs and pressures.

The lake that the town had turned it back to through previous planning and development and which was only utilized for recreational fishing was now looked at as a major asset in eco- tourism, catering to the need of the new type of visitor.

5.5.1.4.4 Current response to changing context

St.Lucia is a town situated within the Greater St.Lucia Wetland Park and is currently undergoing changes in response to the changing economical and social conditions.

The town is under pressure to sustain the local community and without guidance could very easily change into a "Tacky" tourist destination. (Taylor, 2006, Letter of support)

This concern is realized when the current response to the changing context is examined: Old establishment and businesses that used to cater to the outdated context are applying 'cheap camouflaging' to themselves in response to the changing needs. A "Las Vegas" style advertisement approach is being implemented without really addressing the socio-economic problems St.Lucia town is facing. This further strengthens the existing buffer between the town and the surrounding natural splendors through wildly colored signage, shallow ecological interpretations and exotic palm trees, further damaging the already wounded image of St.Lucia town.

Figure 57 is not the perceived image of a village situated within a World Heritage Site. Major economical opportunities are being overlooked and the local community is not benefiting



58 Ostentatious signage with pictures of animals



57 Not the image of a world class destination

5.5.3 DEVELOPMENT OF THE BUFFER SEPARATING TOWN AND LAKE

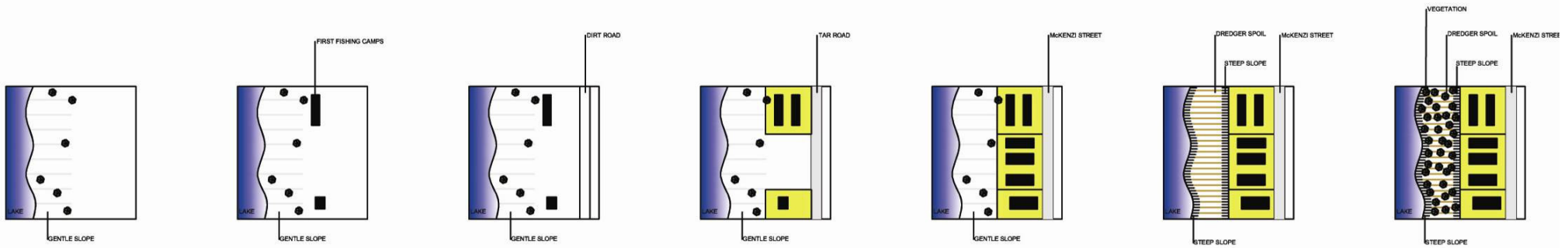


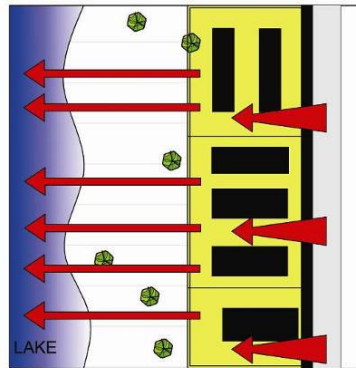
Figure 60 illustrates the development of the buffer that separates St.Lucia town from the lake.

The first buildings erected in St.Lucia were primitive fishing camps. They were placed in close proximity to the lake, just above the gradually sloping lake shore.

As news of the excellent fishing conditions spread more and more fishing camps were constructed. It was not long before these fishing camps turned into the first hotels catering to the need of exploiting fishermen.

The development of St.Lucia formalized with the addition of a road, McKenzi Street, and services being provided for the private property.

The rest of the town was connected to the lake, visually and other wise, because the private development were of such a nature that they were not dense but rather scattered over the landscape. Also the gaps in between the



60 Diagram showing the stages of the buffer development and current controlled access to the lake

property made it easy to filter through to the edge of the lake.

As time progressed the private developments became denser and brought with them walls and fences.

Access to the lake became more difficult for people not renting accommodation within the buffer.

The next stage in the development of the buffer was the dumping of dredger spoil all along the shore line. This resulted in the loss of the gradually sloping lake shore, covered in grassland, and replaced it with steep slopes and a swamp like base.

The exaggerated slopes and dredger spoil made access to the lake uncomfortable or impossible for pedestrians. The only way to access the lake from the private property was to construct elevated pathways and jetty structures.

The swamp like micro climate provided excellent conditions for plant to establish and was soon populated by woody plant and trees.

The tree screen and shrub undergrowth completely blocked the view of the lake and completed the total separation of the lake from the town.



5.5.4 Current Entrance

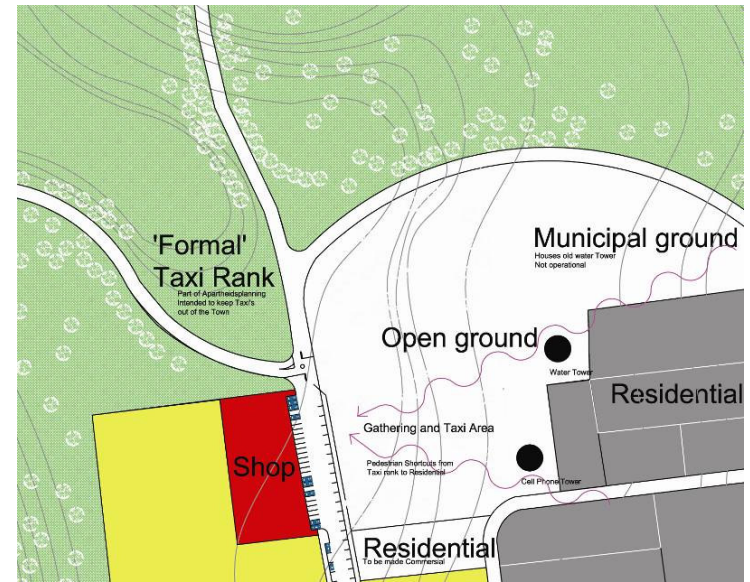
62 Photo of the entrance to St.Lucia town

Although the LSDI fails to recognize St.Lucia town as a lead project, refer to point 3.3.2, it does mention a potential projects involving the entrance of the town.

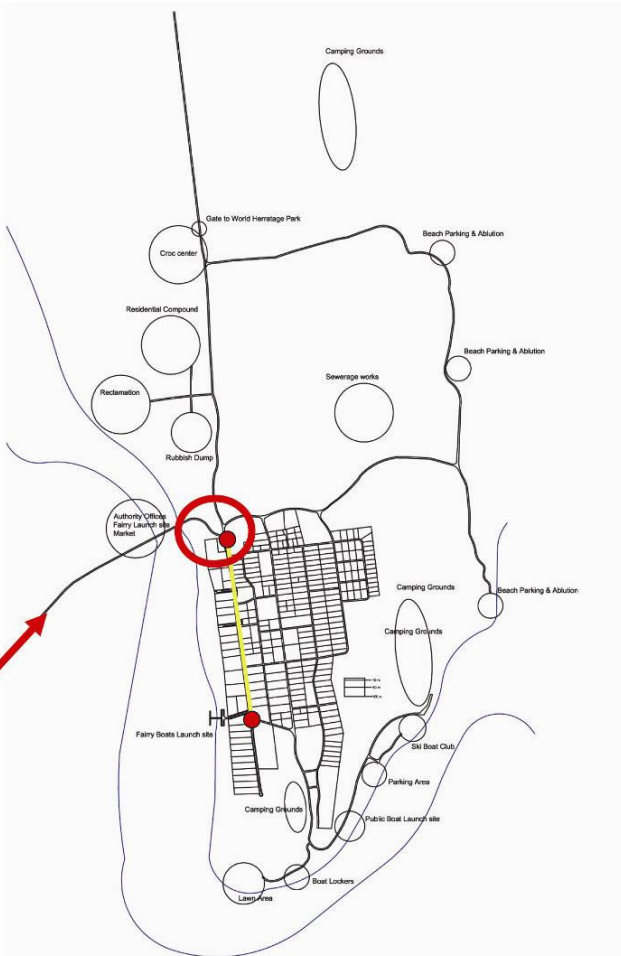
When taking into account that the only route to gain access to the Eastern Shores section of *The Greater St.Lucia Wetland Park* (GSWP) is through St.Lucia town it becomes clear that the entrance shown in figure 61 is not only the entrance to the town, but also the entrance to the GSWP. This emphasizes the importance of the entrance considering the GSWP is the anchor project within the LSDI to catalyze sustained economic growth within the whole north-east section of KwaZulu-Natal.

The LSDI describes the entrance as follows: "...an accommodation and cultural project at the entrance to St Lucia town, known as the Gateway Project. It is designed to provide significant benefits to rural residents." (Lubombo Spatial Development Initiative, 2006, 23)

The entrance also has specific value for this thesis considering its proximity and potential influence on the study area.

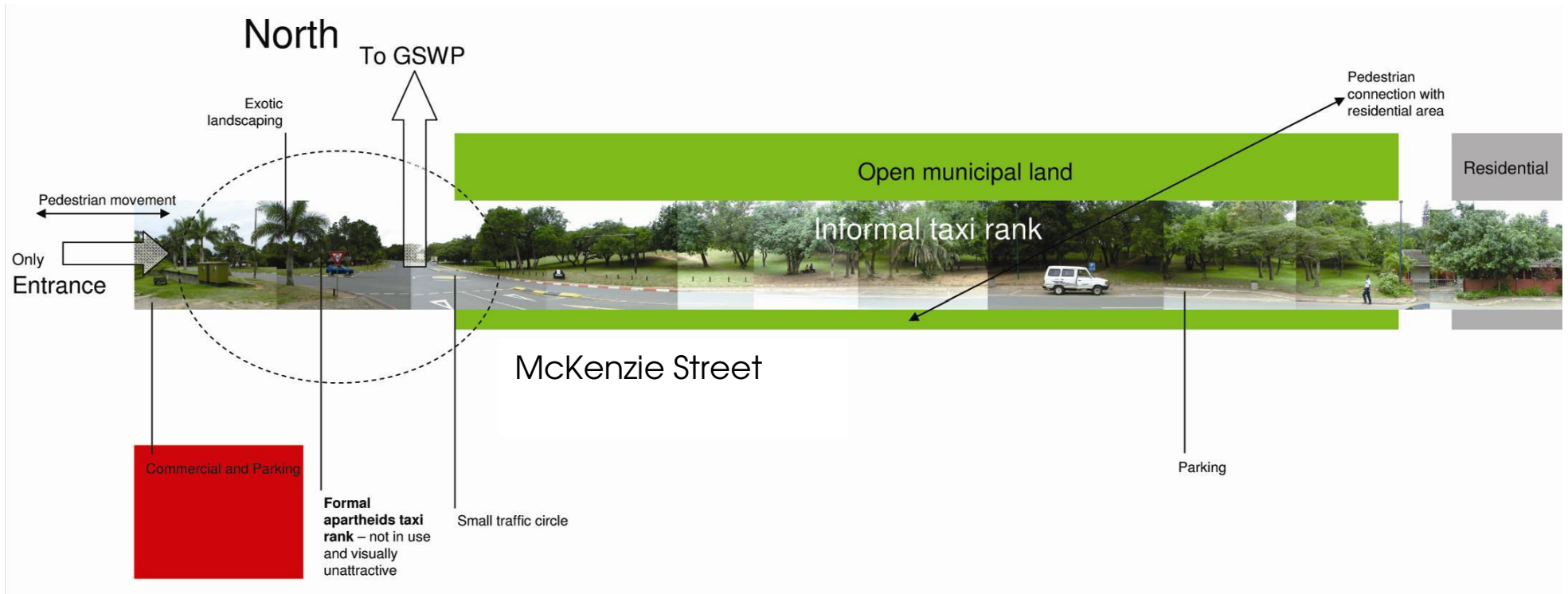


63 Plan of the entrance to St.Lucia town

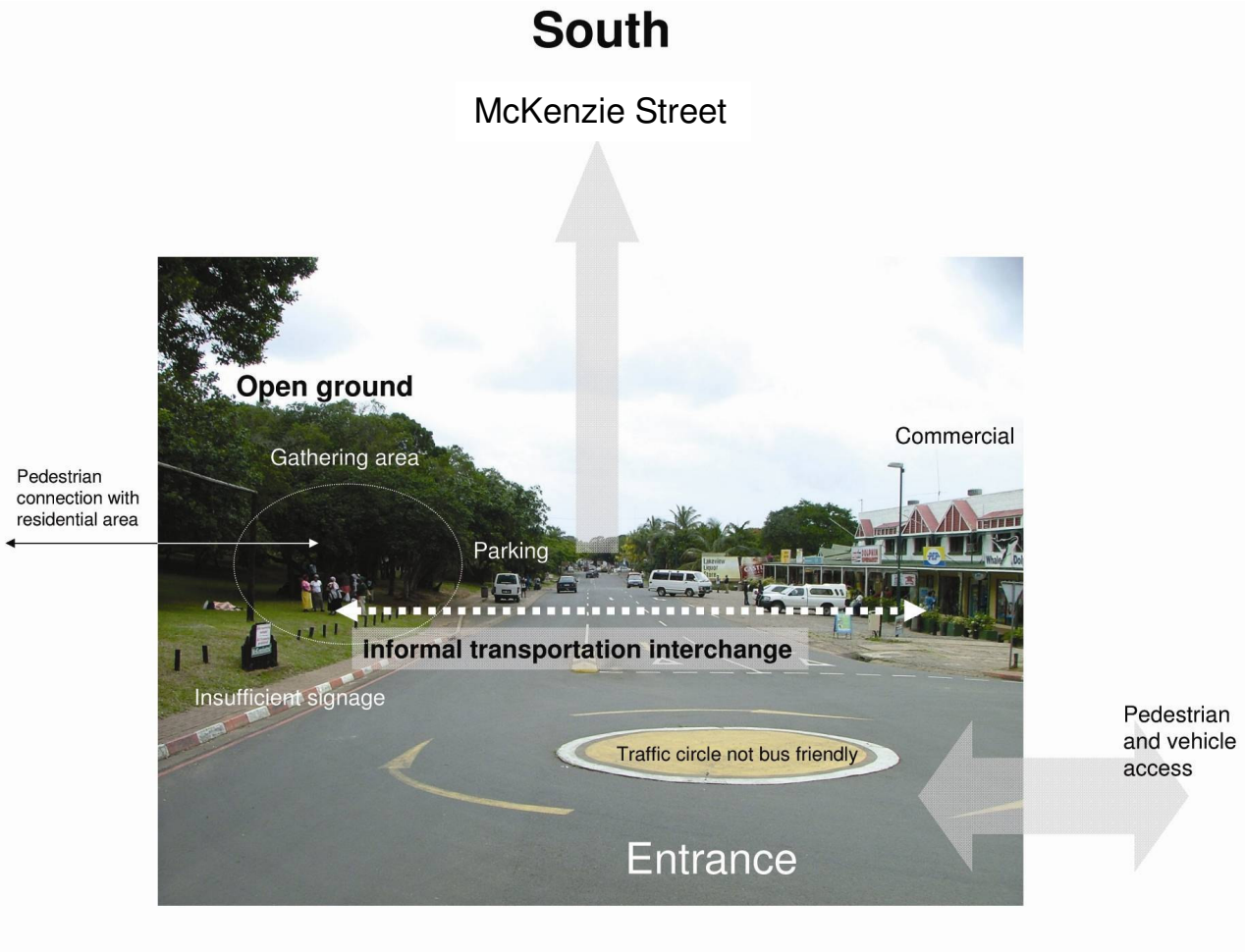


61 Diagram showing the single entrance point to St.Lucia. Also that the urban energy is held between two small traffic circles

5.5.5 Entrance analysis



64 Diagram analyzing the existing conditions of the entrance to St.Lucia



As illustrated in Figures 64 and 65 there is only one access road leading into St. Lucia town. The road is not only used by vehicles but by a large number of pedestrians moving between St. Lucia and Dukuduku.

The Entrance is used as a transportation interchange, especially for minibus taxis. The formal taxi rank is abandoned - It is not integrated into the urban fabric, constructed in the apartheid era, and was intended to keep taxis out of St. Lucia.

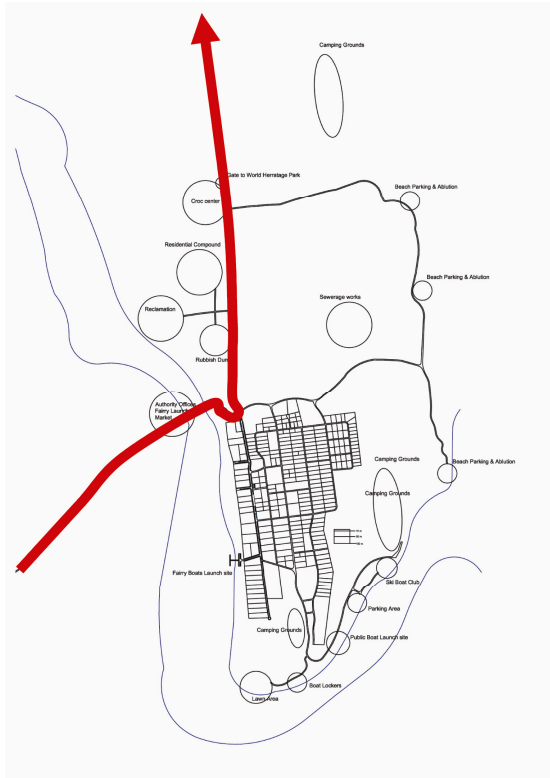
An informal taxi rank developed under the trees on a piece of municipal open ground. This area functions well. It is located across from a supermarket and pedestrians can easily filter through into the residential area via footpaths.

The landscaping consists of exotic palm species, insufficient signage and a traffic circle that is not bus friendly.

65 Diagram analyzing the existing conditions of the entrance to St. Lucia

5.5.6 Entrance concept

To GSWP

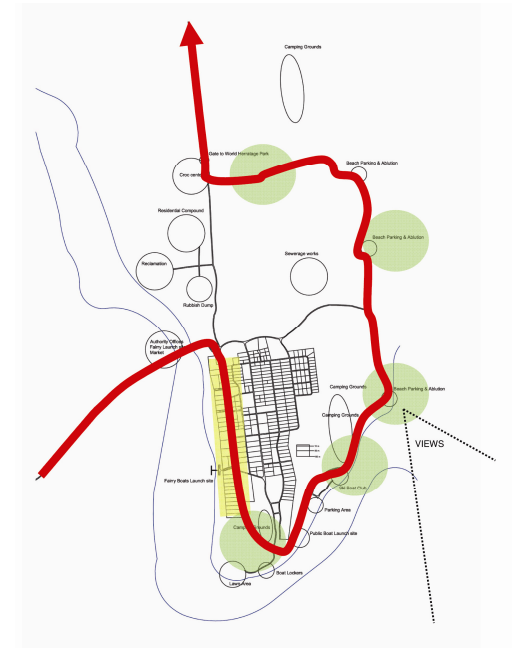


If the Gateway Project as mentioned in the LSDI is implemented without recognizing the development proposed by this thesis, the scenario illustrated in Figure 66 will develop, ignoring existing development potential within the town.

If however the whole town is perceived as being the gateway and the existing development potential is incorporated within a holistic framework, the scenario illustrated in Figure 67 will develop.

The model presented by Figure 67 maximizes the opportunities for economic growth and social development for the whole community. This model creates an 'entrance route' that takes the visitor, via all St.Lucia has to offer, to the GSWP. The 'entrance route' concept creates opportunities for eco-tourism projects to develop and attach themselves to the route. In so doing merging the natural and urban environment and reconnecting the town with nature.

To GSWP



66 Non-integrated approach to the entrance of St.Lucia

67 Holistic interpretation of the Gateway Project exploiting the development opportunities presented within the town



68 Proposed new entrance development. Compare with the current situation in Figure 63

Figure 68 proposes an intervention at the beginning of the 'entrance route'. A much bigger traffic circle that is bus friendly will regulate traffic and direct visitors. The circle respects pedestrians and their movement towards the beach and McKenzie Street. The open ground houses a tourist information center and a connection to the lake. A parking area acts as a taxi transportation interchange and respects the movement towards the shop and residential area

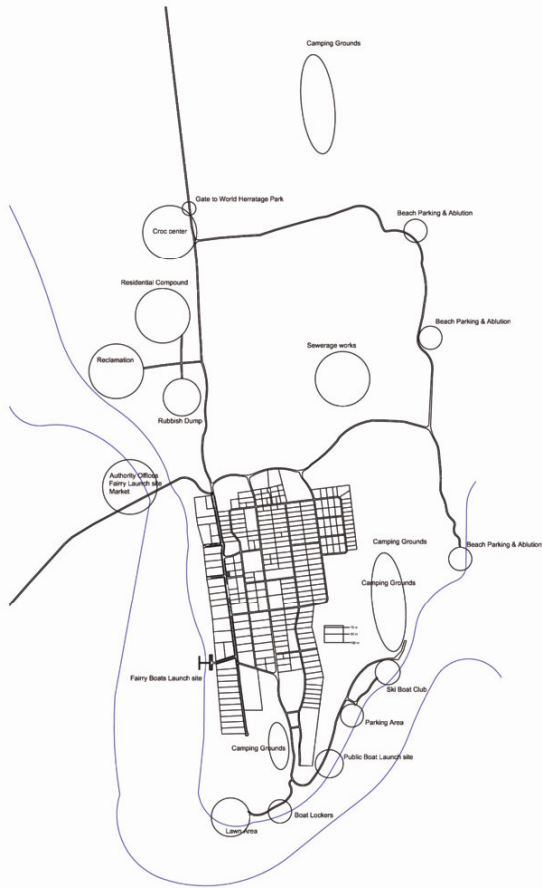
5.5.7 Proposed road connections

To execute the concept of St. Lucia town being the entrance to the GSWP the road network needs to be adjusted.

These adjustments are mainly two connections that will complete a double loop road network.

Currently the urban energy is held between two small traffic circles in McKenzie Street. Completing the double loop road network, as illustrated in Figures 69 to 71, will extend the energy generated by the commercial activities and circulate it in an eight pattern.

This will enable eco-tourism development to form along this route and in so doing help to reconnect the town with nature.



69 Diagram showing the road infrastructure of St.Lucia town with the municipal property boundaries



70 Gaps in the road network, creating problems with the energy flow within the urban fabric



71 Diagram showing the proposed road connections completing the double loop road network, in so doing extending the energy generated by McKenzi Street and circulating it in an eight pattern

5.6 McKenzie Street

5.6.1 Analysis of current situation

McKenzie Street runs north-south parallel to the lake. The street is one kilometer long with small traffic circles at both ends.

Figure 72 shows a typical view down McKenzie Street: The two traffic lanes are each 3, 5 meters wide with parallel parking bays and pedestrian walkways on both sides of the road. Together the parking bays, pedestrian walkway and a small landscape area make up the road reserve.

The average width of the road reserves is twenty-two meters.

McKenzie Street is relatively direct and vehicles tend to speed. To control speeding pedestrian crossings occur every 300m in the form of speed-bumps, see Figure 75. To make them more visible road marking have been applied to the road.

Signage is not regulated and is wildly colored and varied. Refer to point 5.5.1.4.4

The combination of signage, road markings and varied landscaping contribute to the visual clutter of the street.

The vegetation is mainly exotic, consisting of palms species and *Delonix regia* (Flamboyant tree).

Parking in McKenzie Street is directly from the road. This strategy seems affective considering that eighty percent of McKenzie Street is accommodation establishment with off street parking.



72 Typical view of McKenzie Street looking south.



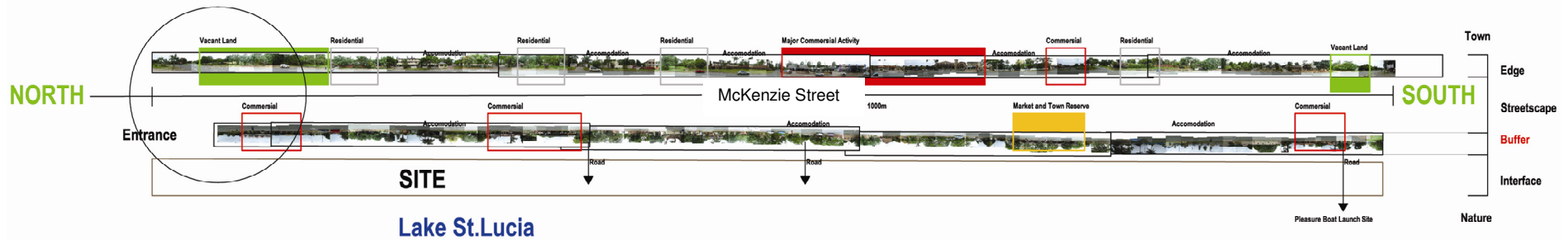
73 Visual clutter due to signage, road markings and exotic planting

75 Speed-bump pedestrian crossing



74 Exotic planting

76 View to the north. Easter sidewalk has a slopes



77 Functioning of McKenzie Street

Figure 77 analyses the functioning of McKenzie Street. The Diagram identifies current land use of the street, as well as opportunities to break through the privately owned accommodation buffer and reconnect the town and the lake.

5.6.2 DEVELOPMENT GUIDELINES

5.6.2.1 RESIDENTIAL PROPERTY

There are privately owned residential properties in McKenzie Street. They need to be converted into commercial properties. They can form part of a chain of catalyst projects within McKenzie Street to encourage and guide urban transformation, economic growth and social upliftment.

5.6.2.2 OPEN LAND

There are two parcels of open land at both end of McKenzie Street. It is important that they be developed responsibly within an urban framework. The biggest of these sites are located at the entrance of St.Lucia. Please refer to point 5.5.4 – 7 dealing with the entrance concept.

5.6.2.3 SIGNAGE

The signage needs to be standardized and contribute to the visual continuity of McKenzie Street.

5.6.2.4 WALKWAYS

Walkways need to be made bigger. Pedestrian crossings could be incorporated with the speed bumps with less road markings to elevate visual clutter.

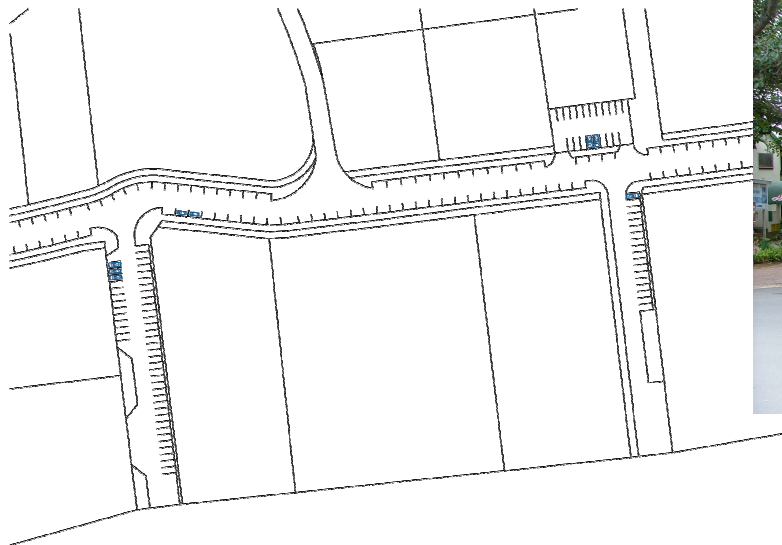
5.6.2.5 PLANTING

Planting needs to be indigenous. Due to the harsh sun and humidity more shade providing trees need to be planted along McKenzie Street. The planting pallet should be restricted and form continuity between the varied building form and styles.

5.6.3 BREAKING THE BUFFER

5.6.3.1 Road Reserves

Please refer to Figure 78, 79 and 80. There are two road reserves left open to serve as connection between the town and the Lake. Currently they are being used as parking. The accommodation establishments bordering the reserves do their best to hide these connections in an effort to provide exclusive access to their client. The road reserves need to be opened up and form part of the strategy to connect the town and the lake



78 Plan of road reserve



79 Road reserve used as parking by the neighboring hotels and not providing access to the lake



80 Road reserve camouflaged as private property and not connecting the town and the lake

5.6.3.2 Market and town Reserve

The Market and town reserve provides a site to redevelop and reconnect the town and the lake. The site is scarcely developed, but plays an important social and economic role for the local community. Please refer to Figures 81. The site is situated in the middle of McKenzie Street and the only infrastructure is an open market building.



81 The Market as viewed from McKenzie Street

5.6.3.3 Ferry Boat launch site

Currently it is the only site that provides a physical and visual connection to the lake.

The infrastructure on the site consists of a tar parking lot, ablution building and jetty.

It is a popular spot for both locals and tourists to enjoy the spectacular sunset over the lake

When analyzing Figure 82 the importance of the Western Shores as a visual buffer becomes apparent. For any eco-tourism development on the Eastern Shores to succeed it is important to create the illusion of unspoilt nature by keeping the Western Shore undeveloped. Please refer to point 7 for the visual assessment.



82 The Ferry Boat launch site. The photo shows how important it is to establish a visual buffer on the Western Shore

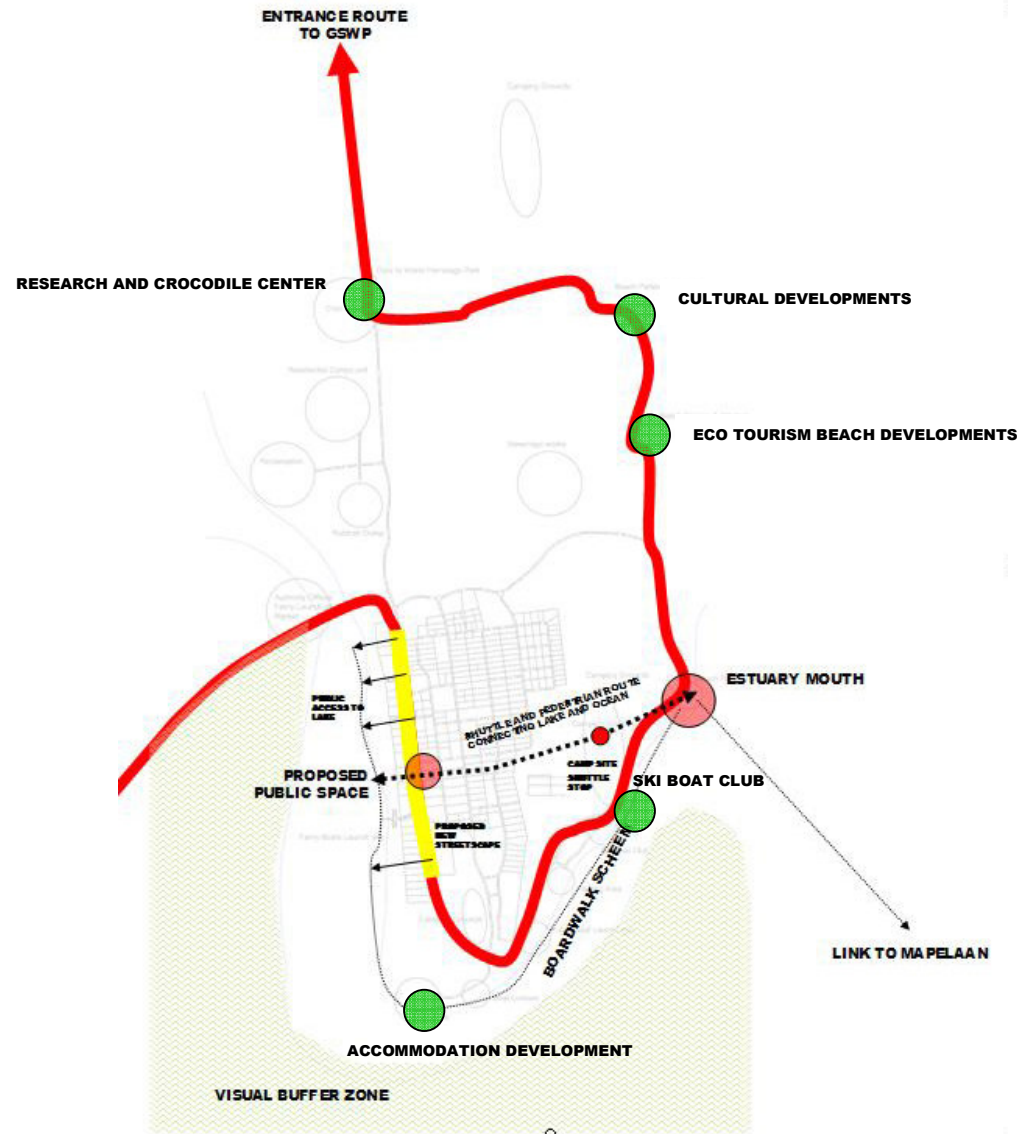
6 ST.LUCIA DEVELOPMENT FRAMEWORK

Considering all the information, in point 5, dealing with both the urban and natural systems influencing the study area, a development framework was set up for St.Lucia.

Please refer to figure 83.

The main purpose of the development framework is to guide future development and to ensure that the developments function in such a way that the town is reconnected with the lake and all the surrounding natural environments. By reconnecting the town to its natural surroundings the potential to relieve socio-economic pressures is maximized.

By reconnecting the systems of both the urban and natural environments one forces the new hybrid developments to respond to their specific context and ensure their sustainable character.



83 The proposed development framework for St.Lucia village

6.1 Integration of Entrance route and other concepts

The Entrance concept has already been explained in point 5.5.6. It identifies St.Lucia as a LEAD project within the LSDI and visualizes St.Lucia village as an “entrance route” to the GSWP. The route connects all of the ecologically important sites and provides the structure for eco-tourism and cultural developments to attach themselves to.

These eco-tourism and cultural developments creates nodes where the entrance route, boulevard or boardwalk meet.

Figure 83 shows how the concept is integrated with both the East-West Boulevard and the Boardwalk scheme.

On route to the GSWP busses could drop visitors off at the Proposed Public Space and collect them at the Estuary Mouth before departing to the GSWP. This gives visitors the chance to spend money in St.Lucia while exploring the cultural heritage and natural habitats with either the Boulevard scheme (75 minute walk) or East-West Boulevard (32 minute walk).

6.2 The East-West Boulevard

The model, represented in figure 83, combines the need to connect the town and the lake with the economic opportunity of showcasing St.Lucia’s unique habitats, as described in point 5.5.1 Ecological section of experience, to create the East-West Boulevard.

The East-West Boulevard is represented by a dotted line in figure 83. It is both a pedestrian and shuttle route connecting the lake with the Estuary Mouth and ocean.

The boulevard is 1, 5 km long. Assuming that the average person walks 2, 8 km/h it would take 32 minutes to complete on foot and only 3 minutes by shuttle traveling 40 km/h.

Currently the fastest route to connect the lake and the ocean is 3, 2 km.

To the West the boulevard terminates in the middle of McKenzie Street at a proposed public open space, providing access and views of the lake. The location is central and convenient and will benefit the accommodation establishment in McKenzie Street. Visitors will be able to leave their vehicles either at their place of accommodation or in McKenzie Street and catch a shuttle to the beach. McKenzie Street provides safe parking, a welcomed alternative to the parking at the beach that is hidden behind the dunes and unsafe.

The East-West Boulevard enables convenient pedestrian movement throughout the whole village. Another example of this is the camping site that is located uncomfortably at the outskirts of the urban fabric; the boulevard connects the available economic and social activities of St.Lucia with the camp site without losing the “rural” feeling and eliminates the need to depend on vehicles for transport.

To the East the boulevard terminates at the Estuary Mouth, an excellent vantage point when taking in sunrises over the Indian Ocean. This also is an important point that connects St.Lucia to Maphelane. The proposed tourism link will stimulate socio-economic growth as described by this thesis. This site calls for the development of a shuttle stop, restaurant and boat transportation platform.

The boulevard becomes Dolphin Street towards the east, entering the urban environment. Here the boulevard will take on the form of a normal two way street with the sidewalk forming pedestrian walkways planted with trees. To the west, at the end of Dolphin Street, the boulevard will become a raised linear platform through swamps and swamp forest.

6.3 Boardwalk

As discussed in point 2.2, the lake is identified as the primary resources in the St.Lucia area but has supported little to no direct economic activity.

The Boardwalk scheme will function as a platform connecting the town and lake and provide the structure for eco-tourism

development to access the lake. The boardwalk will host the following functions:

Bird viewing platforms and bird hides

Fairy boat launch sites

Canoe launch site

Anchoring and access to floating Bed and Breakfast rafts

Platforms for sundowners with bars and snackbars

Tidal and educational platforms

The Boardwalk scheme will stretch from the bridge all the way to the estuary. This proposed route is 3,5 km long and provides for a 75 minutes walk from McKenzie Street to the Beach.

The boardwalk will be accessed mainly from the commercial and accommodation establishments in McKenzie Street.

6.4 Maintaining the Western Shores as a buffer zone

As figure 82, point 5.6.3.3, illustrated it is critically important for any lakeside development in the study area for the Western shores be respected and maintained as a visual buffer/backdrop.

This point is further explained with the visual assessment in point 7.

Also point 5.2, with figures 31 and 32, illustrated the importance of the Western Shores both as a geomorphologic site but also as a site with cultural importance.

By combining the need for cultural use and the need for a visual backdrop a 'no construction' buffer area is formed. This buffer area will protect the reed beds for managed annual harvesting and provide a visual backdrop with integrity at the same time.

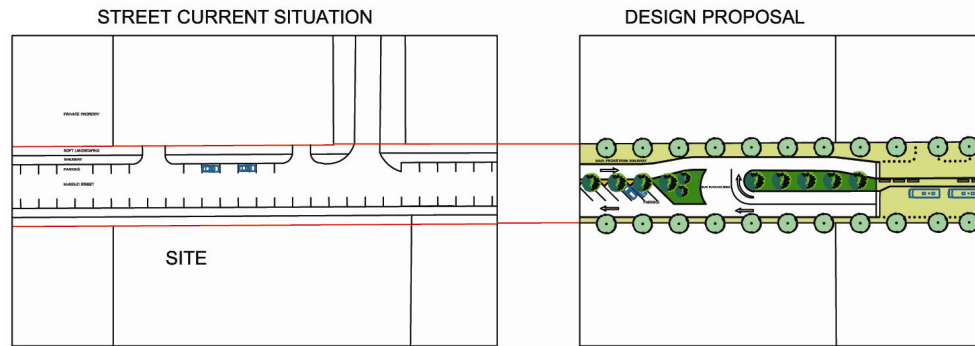
6.5 Proposed new streetscape

For the proposed reconnection of the lake and town to be successful, McKenzie Street needs to be redesigned.

The current McKenzie Street situation is discussed in point 5.6.. The total width of the road reserve is 22 meters.

Figure 77, point 5.6.1 makes it possible to analyze which portions of McKenzie Street are predominantly commercial and to pin point these commercial hotspots.

The proposed design for the new McKenzie Street takes this into account. The proposal has a main pedestrian walkway either on the East or West side reacting to commercial activity.



84 Left : McKenzie Street as it is currently
Right: The proposed new McKenzie Street

The conventional two way road is split into two one ways, one going north and the other south. This allows for an island in the middle that functions either as parking or transportation interchanges.

Pedestrian crossings are wide paved areas providing easy and safe crossing of the busy street without having to step over any curbs.

This design allows for more trees to be planted. The trees will help in defining McKenzie Street, providing shade, visual continuity and making the street more legible.

Bus and vehicle turning areas are present every 100 meters implying that the street functions as a series of warped traffic circles.

6.6 Framework assessment check list

Point 3.2 provided a check list to help evaluate proposed developments. This check list can be applied to both larger scale frameworks and detail design. Here follows the above mentioned check list with comment on how successfully the proposed development framework measures up to it:

6.6.1 Meaningful public participation:

This thesis did not have a public participation component. Yet the product it produces is a proposal meant to be put on the table for public discussion and input before implementation can be considered. Public participation will come to the foreground even more when the specific eco-tourism development are decided on and their impact on people, businesses and the environment can be predicted.

6.6.2 Promote public awareness

All of the component of the development framework reacts to their specific context. The East-West Boulevard for example acts as a fast pedestrian connection, yet at the same time educates the public by showcases the unique habitats of St.Lucia. This scheme succeeds because it combines functional necessities that the public is certain to use and combines these necessities with education experiences to promote public awareness in an exiting and functional way.

6.6.3 Promote integrated coastal planning

The development framework proposes an integrated approach to tourism, conservation and socio-economic pressures. St.Lucia is not seen as an entity on its own with defined boundaries. An example of this is Maphelane being integrated into the framework because of the tourism, marketing and economic benefits.

6.6.4 Ensure public right of physical access to the environment

This development framework has as a top priority public right of physical access to the environment. The working title of this thesis is 'Reconnecting the town and lake' and proposes to break the accommodation buffer that only allows access to the lake to a privileged few.

6.6.5 Equitable access to opportunities

This thesis defines the problem as a socio-economical problem. It has as its goal equitable access to opportunities. Both the local community and established business will benefit from implementing the proposed development framework.

6.6.6 Protect historical and cultural resources

The development framework recognizes the Western Shores as a cultural and geomorphologic resource and aims to protect it. It also produced a strategy to motivate protecting the cultural and historical resource by ensuring economic and social gain if it is protected.

6.6.7 Promote long term viability of coastal economies

This thesis defines the problem as a socio-economical problem and is programmed to promote long term viability of St.Lucia's economy via passive development rather than dune mining.

6.6.8 Alleviate coastal poverty

This thesis defines the problem as a socio-economical problem and is programmed to alleviate poverty by proposing eco-tourism development that the local community will own and work at.

6.6.9 Maintain a balance between built, rural and wilderness areas

The development framework is programmed in such a way that it recognizes and encourages tourism developments that reconnect the urban and natural environment. By reconnecting the systems of both the urban and natural environments one forces the new hybrid developments to respond to their specific context and ensure their sustainable character. By condensing development of the existing town one ensures a healthy balance between urban and wilderness areas.

6.6.10 Design in harmony with local and regional aesthetics

This point will specifically be dealt with in the detail design phase. Refer to point 8.

6.6.11 Plan to avoid increasing the incidence of natural disasters

Developments are placed behind the flood lines of the lake as far as possible.

6.6.12 Protect the regenerative capacity of coastal ecosystem

This proposed development framework is at a meso scale. It manages the renewable reed bed resources of the Western Shores.

6.6.13 Rehabilitate damaged habitats

This development framework does not have a rehabilitation component, but encourages it as far as possible.

6.6.14 Assessment conclusion

The proposed development framework is evaluated as successful by this thesis. The framework scores eleven out of thirteen when measured against the CMP check list. With room to improve in the public participation and rehabilitation sections.

7. VISUAL IMPACT ASSESSMENT

7.1 Introduction

As concluded in the theoretic component of this thesis, point 4, conservation, sustainability and ecological landscape design are all anthropocentric and short term exercises dealing with the temporary survival and well being of the human species.

If the above is accepted then the same is true for visual impact assessments.

In the case of St.Lucia, visual impact assessments are anthropocentric exercises measuring the impact of the appearance of the socio economic situation, manifesting in proposed developments, against the predetermined, assumed, projected media image, mental picture or perception of what a world heritage site should look like.

This can be illustrated by the following example:

The current dredger spoil vegetation, refer to point 5.3 and 5.5.3, within the study area is perceived and accepted to be the natural and untouched vegetation. Over time people have formed a psychological bond with the visually attractive, but totally disturbed, swamp forest. This disturbed vegetation is protected because of a visual perception.

Currently this disturbed piece of land, covered in indigenous but unnatural vegetation, performs a crucial visual function that most people are ignorant of – it acts as a screen, buffering off unappealing views of human activities toward the town. The dredger spoil vegetation actually protects the visual character of the lake from an aesthetic point of view. Refer to figure 85.

On the other hand rehabilitating the lake shore to its former grassland condition, will protect the visual authenticity of the lake from an ecological point of view.

The question of what then has the least negative visual impact, a disturbed screen of indigenous vegetation or a rehabilitated grassland can only be answered through debate once a context specific framework, defining boundaries, is in place where types of views (e.g. Ecological view, aesthetical view) are given a hierarchal importance.

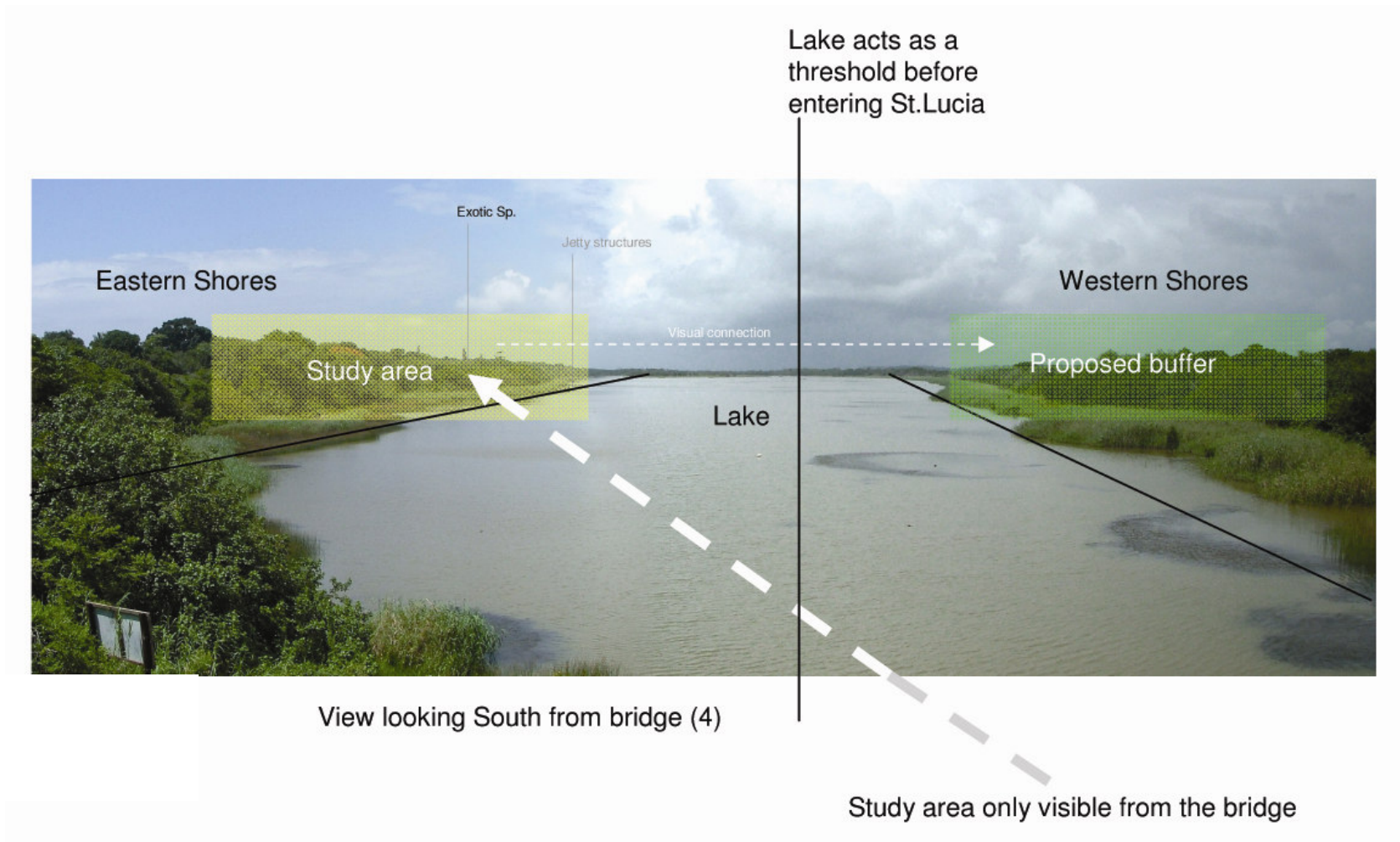
7.2 Defining boundaries

Defining the boundaries that determine the extent of a visual impact needs to be made specific to the socio-economic paradigm. Boundaries are not site specific and also can't be defined as, "as far as the eye can see". The visual impact of environmental and development decisions stretches just as far as the socio-economic impact of that proposed development. The anthropocentric measured visual impact (conservation, be it visual conservation, is also an anthropocentric approach, see point 4.3) of a development that will alleviate socio-economic pressures will appear much less against the visual impact of suffering people.

All of the above arguments are perception driven. This thesis will only present the scientifically measured impact. This chapter will examine both the visual impact of the proposed development on its surroundings as well as the possible future visual impact of the surroundings on the proposed development. Please refer to Figure 86.



85 Photo showing the dredger spoil vegetation screening off unappealing human activities



86 Diagram analyzing the parameters of the visual impact

7.3 Visual impacts of the development

7.3.1 Impacted areas

Figure 87 illustrates the “as far as the eye can see” approach and shows, in red, the areas that will visually be impacted by the proposed development.

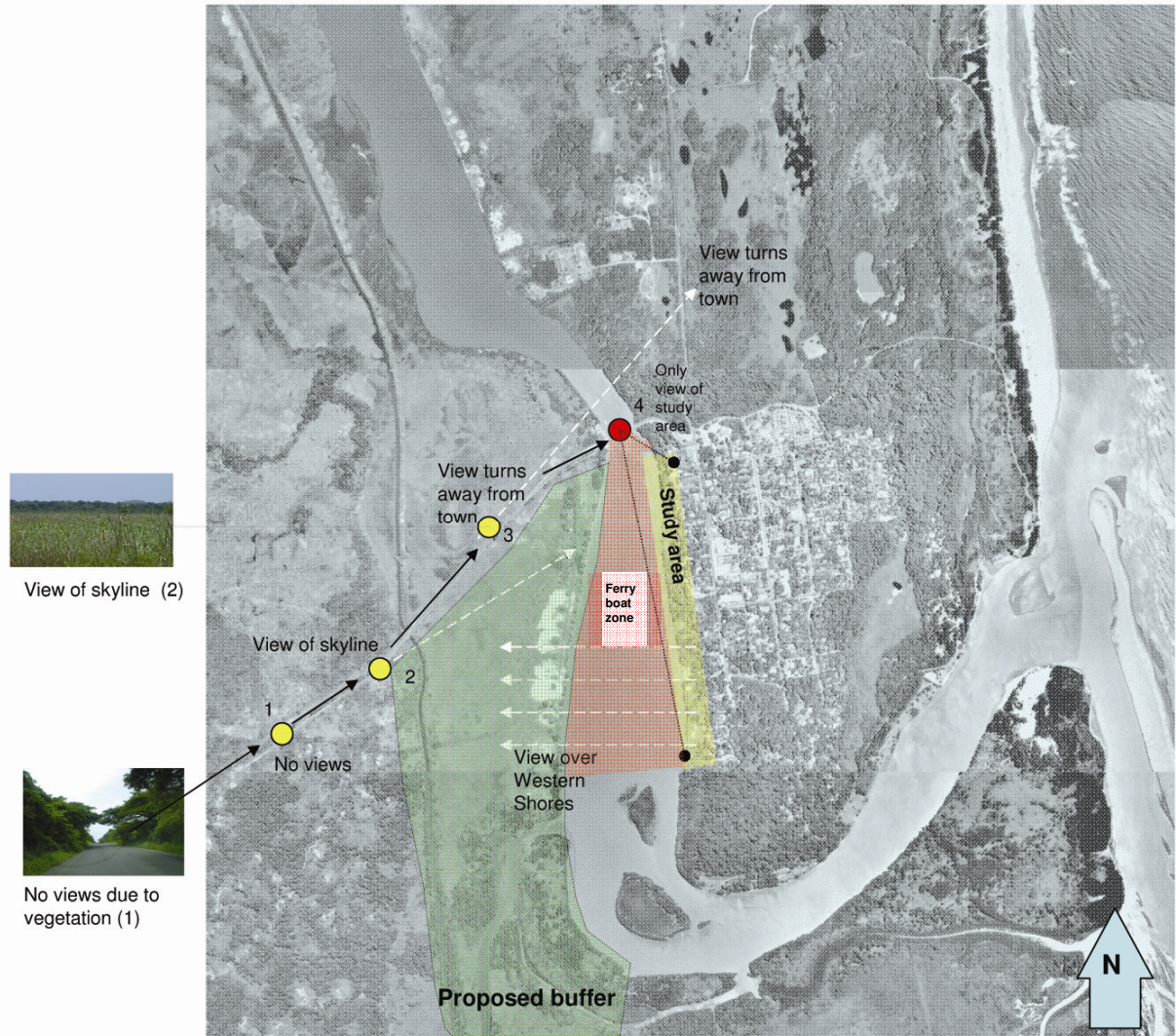
As one nears St.Lucia via the R618, the only access road, you have no view of the lake or proposed development due to the forest vegetation. Refer to Figure 87, area indicator 1.

Due to the downhill, break in vegetation cover and the low lying Western Shores Mud Flats the skyline of St.Lucia becomes visible. The lake and the proposed development are not visible. Refer to Figure 87, area indicator 2.

At area indicator 3, of Figure 87, the orientation of the road focuses the visitor’s views completely away from the town and any possible visual impacts the design might include.

It is only at area indicator 4, of Figure 87, the bridge, that the proposed development becomes visible. Please also refer to Figure 92 - 94.

Only pedestrians and vehicles crossing St.Lucia Bridge as well as three pleasure boats, which have concessions to operate south of the bridge, will be impacted visually by the proposed design.



87 Aerial photo mapping areas, in red, that will be visually affected by the proposed design



7.3.2 Existing visual impacts

Figure 88 analyses the skyline above the proposed development and comments that the town has already scarred the profile of the forest canopy that creates the skyline. Roof structures, cell - and water tower and exotic plant species protrude from the natural profile.

Figure 89 and Figure 90 shows other existing visual impacts adjacent to the proposed development. Jetty structures, cleared swamp forest and a parking area are all visible.

The bridge, which acts as the platform enabling views of the proposed development, is a visual impact in itself already altering the environment, Figure 91.

View of St.Lucia skyline (2)

Due to downhill, break in tree cover and low lying mud flats the skyline becomes visible



Cell phone tower

Exotic Sp.

Water tower

Roof structures

88 Analysis of St.Lucia skyline



89 Jetty structure visually intrudes onto the lake



90 Vegetation removed for a lawn area visually scarring the edge of the lake

7.3.4 Bridge containing the visual impact

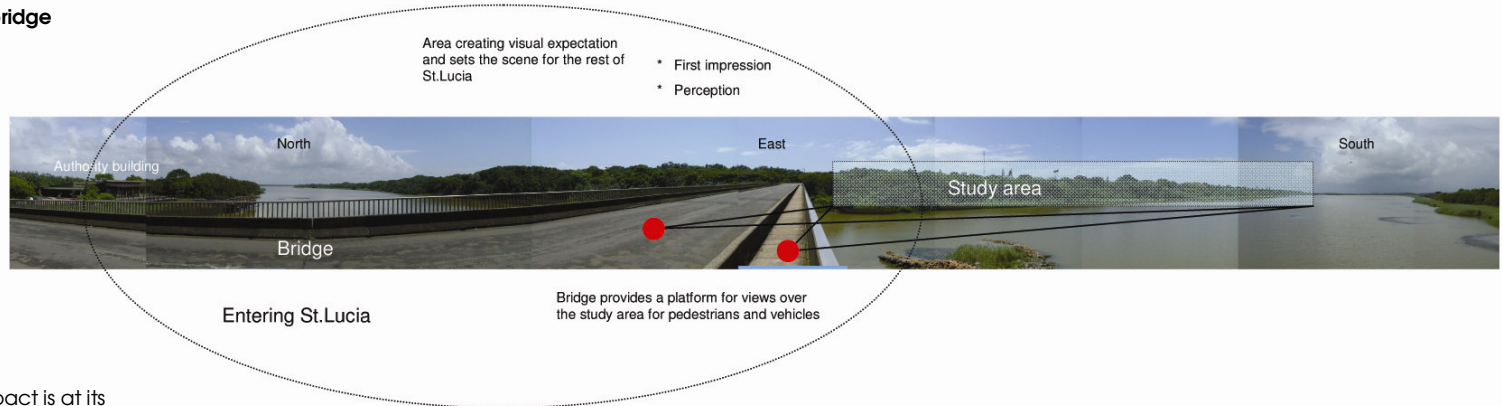
Figure 91, shows the bridge as viewed from the lake and the Authority jetty towards the South. The bridge screens off the views of the proposed development and contains the visual impact.

From the bridge northwards the proposed development will not have a visual impact, as mapped on the aerial photograph of figure 87.



91 View looking South towards St.Lucia Bridge from Authority jetty. Proposed development is not visible due to the bridge visually screening off the site

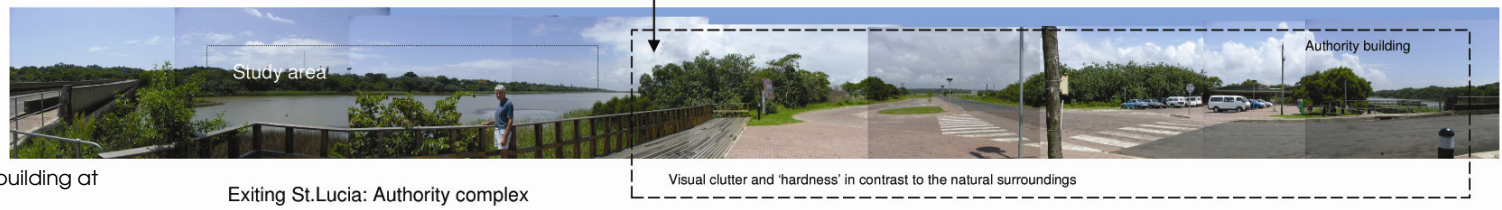
7.3.5 The visual impact as viewed from the bridge



92 Bridge area is where the visual impact is at its greatest



93 Current visuals as seen whilst leaving St.Lucia



94 Panorama taken at the Authority building at the bridge

As illustrated the visual impact is at its greatest as viewed from the St.Lucia Bridge. It is the only entrance point into St.Lucia town and both visitors and residence alike are forced to go through this point.

As shown by Figure 92 the bridge area carries significant visual importance. The lake acts as a threshold, signaling arrival, creating expectation and forms the visitor's first and last impressions of St.Lucia.

Please refer to Figure 95, a representation of the proposed development, as viewed from the bridge. Because of the angle of viewing from the bridge, the vegetation buffer (Point 8.4.1), and the existing swamp forest – only the boardwalk and the viewing platform will be visible from the bridge.



95 Representation of what the visual impact of the proposed development will amount to as viewed from the bridge

7.4 Possible future visual impact on the development and proposed buffers

Please refer to point 6.4, maintaining the Western Shore as a buffer zone, and figures 82, 86, 87.

As seen from Figures 85 to 95, the study area and Western Shore are visually connected. The Western Shore forms the unspoilt backdrop for views, from the study area across the open waters of the lake. This view currently is authentic and free of any visible human structures and interventions. This unspoilt view is a resource that the proposed St. Lucia Development Framework intends to utilize as an economic generator through eco tourism.

When looking at the aerial photograph, Figure 87, it is clear that the proximity of the approaching Dukuduku Township and its socio-economic problems is threatening the Western Shores as a visual resource. It is ironic that the Western shores hold such an important key to socio-economic relief for Dukuduku.

As explained in point 6.4 and figure 87 a visual buffer zone is proposed for the Western Shores ensuring the long term viability of any eco-tourism developments.

7.5 Conclusion

As stated in the introduction this thesis can only present the scientifically measurable visual data concerning the visual alterations of a proposed design. These measurements are then placed within a framework that evaluates whether the visual impact is acceptable or not.

This thesis concludes that the proposed development will only visually impact on 100 meters of bridge and 1000 meters of ferry boat route. Refer to point 7.3.1 and figure 87.

The impact will be the greatest on the bridge area as discussed in point 7.3.5.

It has been illustrated that only the boardwalk and viewing platform will be visible from the bridge, point 7.3.5 paragraph 3.

As will be discussed later in this thesis, in point 8 - detail design, the placement of the boardwalk at the edge of the existing reed beds and the proposed construction are done to minimize the visual impact on the surrounding.

Also it was noted in points 7.3.2 that the Eastern Shores, where the proposed boardwalk will be located, has already been visually scarred.

Also the proposed development has the Western Shore as a buffer area. This visual strategy clusters eco-development and restricts them to the Eastern Shores. In so doing the visual ecological integrity of the lake is maintained.

This thesis concludes by putting the above information within a framework - defined as the current socio-economic paradigm, that the proposed development has no significant negative visual impact.

Within the socio-economic paradigm the proposed development is labeled as improving the present visual state of affairs.

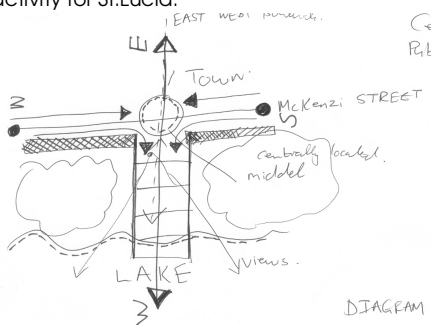
8 DETAIL DESIGN

8.1 PROPOSED PUBLIC OPEN SPACE TO CONNECT TOWN AND LAKE

Please refer to Figure 83, for the location of the Public Open Space Project within the proposed St.Lucia development framework.

The Public Open Space Project is a catalyst project in breaking down the physical and socio-economic barriers between Lake St.Lucia and St.Lucia town.

The proposed Public Open Space Project is located in the middle of McKenzie Street where the envisioned East-West Boulevard will intersect. Please refer to point 5.6.3.2 and Figures 96. This is an important site within the urban fabric of St.Lucia town both from an infrastructural, economic and social point of view. The proposed St.Lucia Development Framework recognizes this and advises to develop this site as the heart of activity for St.Lucia.



96 Diagram explaining the centrality of the site

8.2 CONCEPTS

8.2.1 Principal concept

The initial concept of reconnecting the town and the lake, in order to relieve socio-economic pressures, as stated in point 2.1, is pulled through to detail design level.

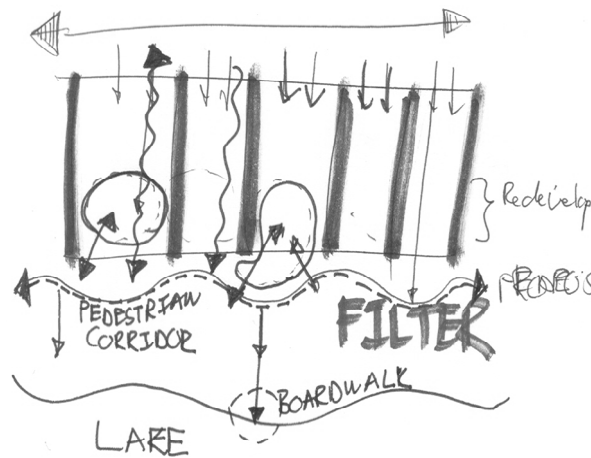
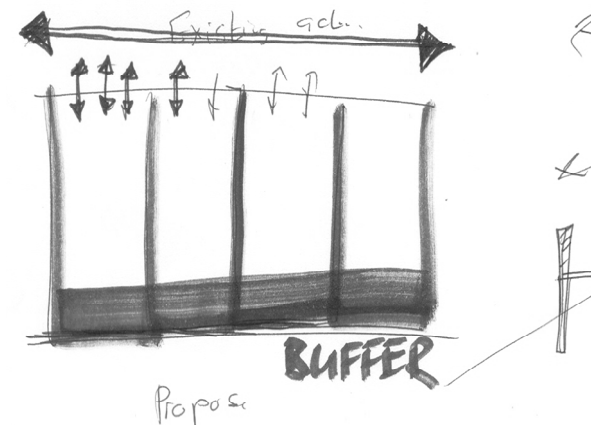
Please refer to the plan, Figure 112, and the section, Figure 113 illustrating the design concept.

The concept of the Public Open Space Project was to create a visual and physical connection between the lake and McKenzie Street. This implied a design intervention that would break through the buffer zone, formed by both the wall of hotels and private property, denying public access, and the dredger spoil vegetation, blocking views of the lake.

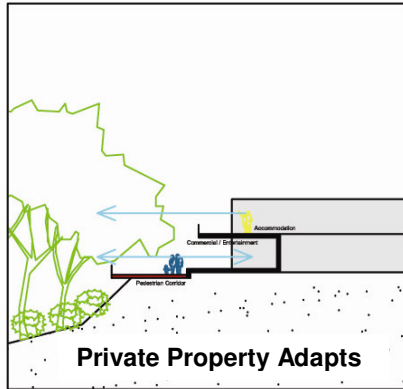
The concept manifested in a series of outdoor platforms connected with ramps to provide unhindered access to the lake while providing commercial edges to pull the economic activities down toward the waters edge. By doing this one is able to utilize the eco-tourism potential presented by the lake and relieve socio-economic pressures.

8.2.2 Catalyst concept

The Public Open Space Project is a catalyst project within the proposed St.Lucia Development Framework and strives not only to develop new businesses but to give the already established businesses the opportunity to benefit economically by embracing the suggested changes. This is done by proposing a pedestrian boulevard running parallel to McKenzie Street on the western side of the buffer property. The private establishments are encouraged to redevelop themselves over time. Giving them the opportunity to expand and develop commercial eco-tourism activities that can link to the lake and Public Open Space Project. Please refer to Figures 97, 98 and 99, illustrating the pedestrian boulevard's relationship, regarding privacy and views, towards the existing resorts and hotels.



97 Diagram explaining the catalytic nature of the proposed Public Open Space Project in changing the existing buffer into a filter.

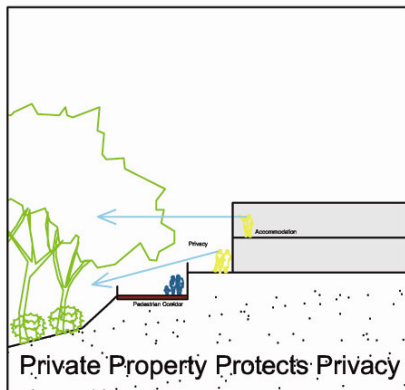


98 Diagram explaining the relationship between the proposed pedestrian corridor and private property that wished to adapt and redevelop

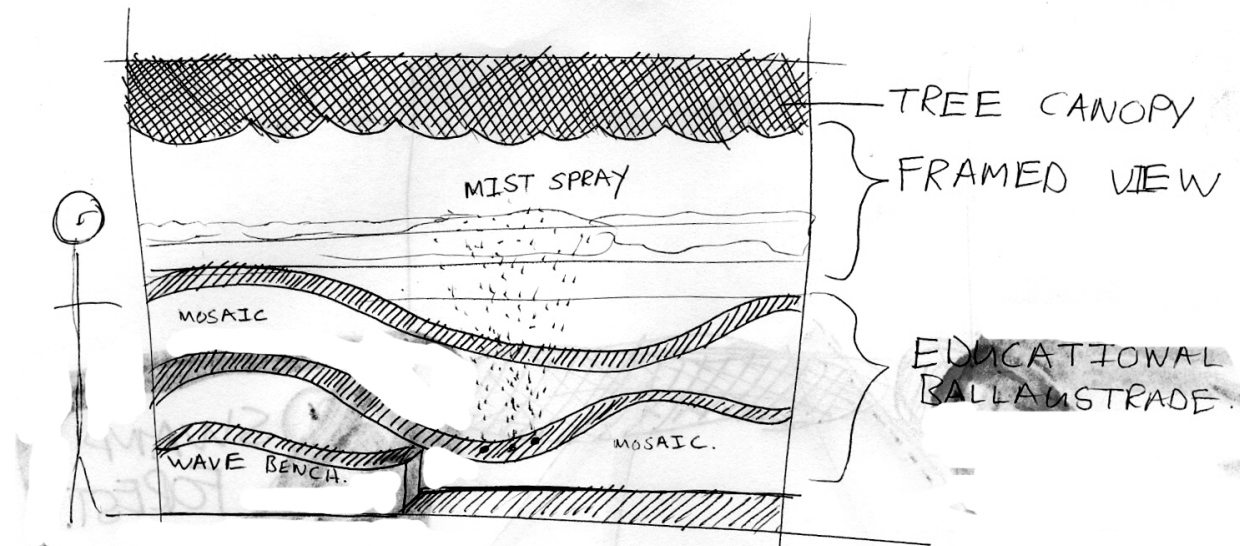
8.2.3 Narrative concept

Except for the functional aspect touched on in the above paragraphs the Public Open Space Project's concept must also include a narrative component, refer to Figure 100. This Narrative must entertain and educate visitors while providing the visitor with a unique spatial experience. The design of the Public Open Space Project draws its narrative from the unique natural processes and combinations of habitats present in the surrounding landscape.

The Greater St.Lucia Wetland Park is made up of five distinct ecosystems, each with its own characteristic features: the marine ecosystem, the dune forest, the lake, the fresh water swamps and the grasslands. Each ecosystem functions relatively independently, yet on a large scale they are all interlinked. Each of the five ecosystems warrants conserving in its own right, but the fact that they all occur in one area makes St.Lucia a world class destination. The visitor needs to be made aware of this diversity and sample the experience of each ecosystem in some way through the architectural design of the project.



99 Diagram explaining the relationship between the proposed pedestrian corridor and private property wishing to protect their privacy and not redevelop.



100 Vignette showing functional elements like a bench and balustrade telling a landscape story about oceans, dunes and forests

It can't be stressed enough that the narrative does not imply trying to recreate or mimic nature. It implies an abstract interpretation or reaction to the distinct ecosystems that inspiration is drawn from.

In the case of this specific design where two of the five habitats, namely the lake and swamp forest, are present on the site, it could imply only to create simple viewing platforms, that does not compete with the natural beauty in any way, allowing the visitor to interact with that environment be it only through sight, sound and smell.

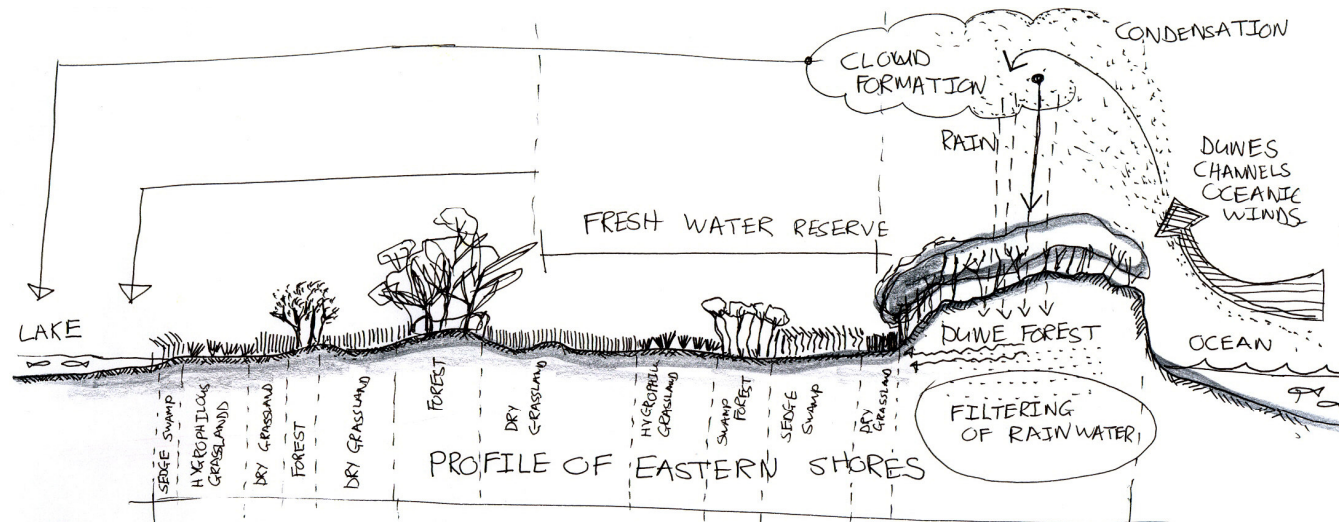
The other habitats like the ocean and dune forests that are not present on site could be architecturally interpreted in a stronger manner.

Please refer to Figure 101 explaining the role that dune forests play in maintaining the fresh water balance of the lake. Now compare Figure 100 with Figure 102, which shows the functional considerations of the first platform bordering McKenzie Street.

Please acknowledge the following information about the first platform as illustrated in Figure 101:

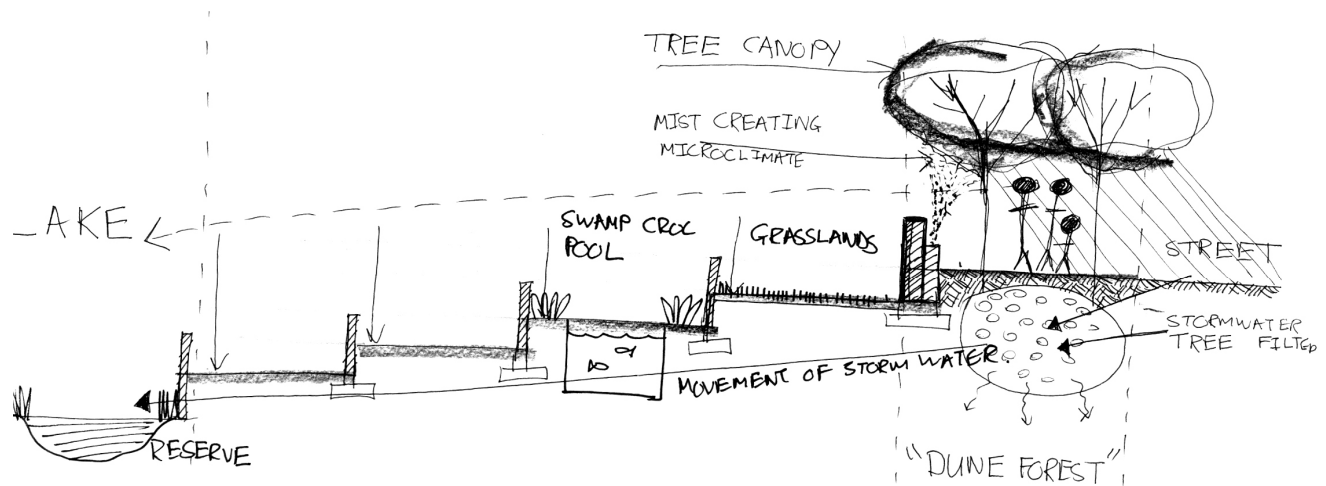
- The platform is the highest point in The Public Open Space Project.
- A good view of the lake is obtained from the platform.
- The platform is the only platform where a dense tree canopy can be placed without ignoring the principal concept and blocking the view of the lake.
- The platform is the entrance to the site and the termination point of the proposed East-West Boulevard, implying that a comfortable micro climate be created there for visitors.
- Functional element like a balustrade, benches and a drinking fountain are required in the space.

When the functional requirements of the first platform are creatively combined with the above mentioned narrative a strong spatial experience is generated, and in so doing place is created opposed to space.



• PROCESS REGULATING THE SALINE MICRO CLIMATE OF THE LAKE

101 Diagram explaining the role dune forests play in maintaining the fresh water balance of the lake



102 Diagram illustrating the functional considerations of the first platform and how the functional elements are manipulated to accommodate a narrative

8.3 Functional considerations

The design of the platforms took into account that it requires to be robust and simple, both to withstand the harsh climate, endure the wear and tear of being a public space and to ensure that local labor could be used in the construction thereof.

8.3.1 Visual connection with the lake

As explained throughout this document establishing a visual connection with the lake is of foremost importance. As explained in point 8.2.1, the concept of connecting the town and lake was interpreted as a series of outdoor platforms. It follows then that the views from the first and last platform be considered carefully.

The first platform bordering McKenzie Street is the highest point in the design and obtaining a good view of the lake is not difficult, once the view obstructing dredger spoil vegetation is removed.

This also implies a design constraint in that trees and buildings can only be placed at the edges of the design.

The same visual constraint is placed on all other design elements. Please refer to point 8.3.5, dealing with functional elements like balustrades and how they are designed to ensure the best possible visual connection from the platform to the lake.

To obtain views from the last platform was more problematic. If the last platform was placed at ground level the remaining area between the platform and lake would have to be completely bare of tall marsh grasses, shrubs and trees to allow for views. It followed that the platform be elevated. Please refer to point 8.3.2 and point 8.3.8 highlighting the advantages of the platform being elevated for services and safety respectively.

Please refer to point 8.4, dealing with the height of planting and views.

8.3.2 SLOPES AND PLATFORMS

The site has a varying slope dropping down 16,5 meters from McKenzie Street to low tide water level. As explained the concept of connecting the town and lake was interpreted as a series of outdoor platforms and ramps, negotiating the slope and providing unhindered physical and visual access to the lake.

Ramps with a slope of 1:12 would be the main circulation element connecting consecutive platforms and extending the proposed East-West Boulevard through the public open space towards the lake.

The first platform bordering McKenzie Street was envisioned as an extension of the streetscape. The platform had to be level with the proposed pedestrian crossing and thus had a fixed height, implying that ground filling would be necessary.

The last platform as explained in point 8.3.1 needed to be elevated to a yet undetermined height. After considering where to locate services and parking and how to balance cut and fill groundworks, it became clear that elevating the platform by 3 meters would be ideal. It would allow for a basement level that could house parking and the bulk of the services, refer to point 8.3.4.

Please refer to point 8.3.8, for reason involving safety, motivating why the platforms needs to be elevated.

The height of each consecutive platform had to be dropped by 1 meter to connect the first and last platforms. Also by doing this the height of the basement level fluctuates and increases from 3 to 5 meters. This allows a truck loading bays to be relocated to the basement. Freeing up space on the first platform and ensuring a seamless extension of the streetscape.

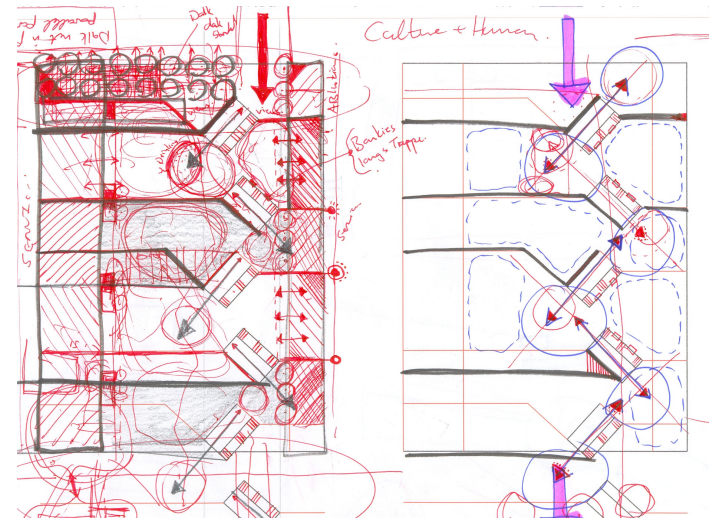
The proposed design balances cut and fill groundworks: with half of the design being on compacted fill and the other half a 'roof garden' with an excavated basement.

8.3.3 Ramps

Ramps with a slope of 1:12 would be the main circulation element connecting consecutive platforms. The ramps would each be 12 meters long to connect to the next platform.

The ramps would also provide service access for vehicles and would be constructed to engineer's specifications. Removable bollards at the entrance of the site would allow vehicle access to the first platform.

Please refer to figure 103, showing that the ramps are placed in a zigzag pattern, slowing down pedestrian movement while orientating visitors to alternating sides of the commercial edges and ensuring that no "economic dead spots" occur. The ramps also create smaller spaces within the boundaries of each platform. This allows for the commercial establishments to claim ownership of varying sized outdoor spaces.



103 Ramps function as the main circulation element and forms the structure of the design

8.3.4 Services

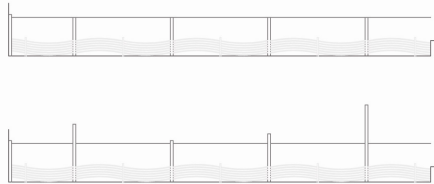
The bulk of the services are located in the basement level. Access to the basement level is attained via a one way road, 4 meter wide, with a service walkway on one side. Trucks, with a maximum length of 14 meters, are accommodated for by the generous bends, gradient of 1:12 and 5 meter height of the basement level.

The design allows for 97 parking bays, a pump- and store room respectively and a service courtyard for the restaurant. The courtyard is accessed through the basement parking and allows easy entrance to medium sized service vehicles.

Service vehicles can also gain direct access to the platform terraces by means of the ramps, refer to point 8.3.3.

8.3.5 Balustrades

Balustrades are designed so that they present maximum transparency without losing their robustness. The balustrade on the crocodile viewing platform needed extra attention to ensure that it enables views to the lake whilst providing maximum protection from people falling into the water. Two meter high mesh sheets are tensioned between columns of different height, visually dissolving the plane presented by the safety mesh. Because of the additional height of the columns, the mesh screen appears shorter and perceived to be visually less obtrusive. Please refer to Figure 104.



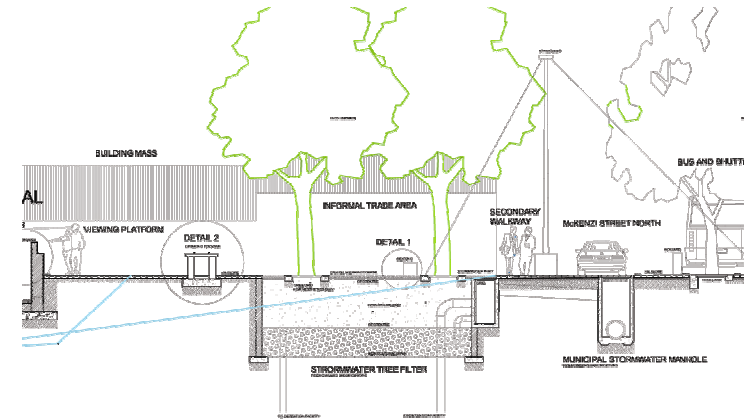
105 Balustrade to give maximum protection and transparency. The second balustrade dissolves the visual plane by projecting columns

Also the columns of the safety mesh screen are placed behind the columns of the hand balustrade to minimize the visual mass and solidity of the screen.

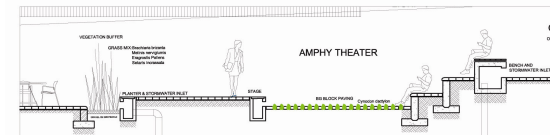
Viewed from the highest first platform a person of average height would view the lake without any horizontal obstructions.

8.3.6 Stormwater system with detention pond

As far possible stormwater systems were integrated throughout the designs, please refer to Figures 105 and 106.



106 Section through stormwater tree filter



107 Section through stormwater inlets designed to function as seating or to passively irrigate vegetation in planters

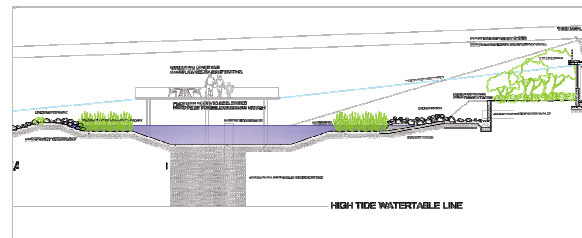
The system was designed to first irrigate planting, before damming up excess runoff in the, on site, detention facility. If the precipitation is too great for the detention facility to handle, runoff is lead into municipal stormwater or drains into the lake via an agricultural drain. If a surge of runoff is experienced that is too great for the agricultural drain to



104 Basement parking, services and restaurant courtyard

handle an emergency overflow channels into the lake exists. The channel is reinforced with renomatresses and planted to minimize the erosive qualities of runoff and keep the lake free of sediments.

Both the inlet and outlet of the detention pond, as per figure 107, is hidden out of view underneath the pedestrian bridge and its landing.



108 Section through detention facility showing the inlet, outlet and overflow

The form of the detention pond was determined by the slope of the land and can be described as a stretched oval shape.

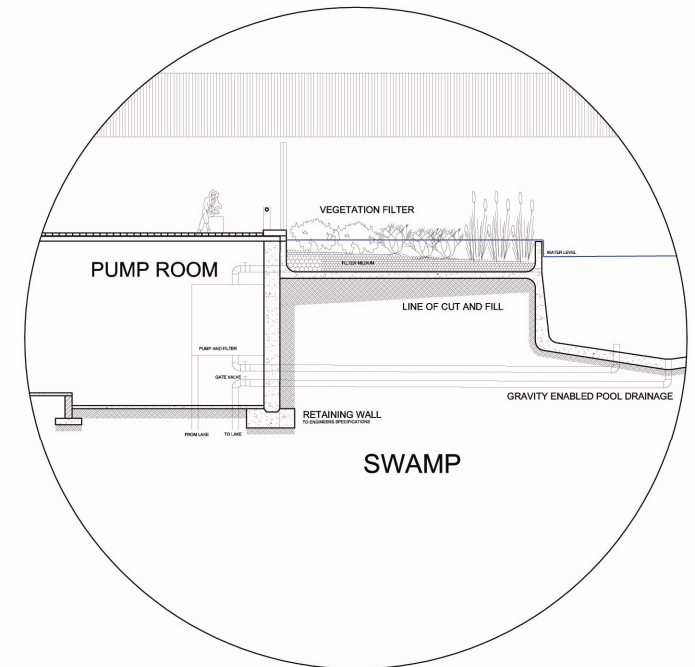
Please refer to point 8.4.4, dealing with the planting design in and around the detention facility. The majority of marsh and water plants are placed on the western edge of the pond. As figure 107 illustrates, the eastern edge is blocked from view by the shrub buffer, described in point 8.4.5. On the western edge the plants are displayed optimally from the viewing platform.

8.3.7 Crocodile diving pool and platform

Crocodile diving is an eco-tourism activity attracting a lot of attention and gaining popularity with eco-thrill seekers. Unfortunately crocodile diving is not possible in the waters of Lake St.Lucia considering the poor visibility and shallowness.

The Public Open Space Project proposes a crocodile diving pool as a feature that will provide visitors with entertainment and stimulate economic activity throughout the project.

Please refer to Figure 108. The services for such a pool will be located in the basement, in the pump room. Water will be pumped into the pool directly from the lake. It will be circulated and filtered through artificial and vegetation filters. Water will be replaced and drained by gravity directly into the detention pond.



109 Section through crocodile diving pond showing the services

Please refer to Figure 109 for the design considerations of such a pool:

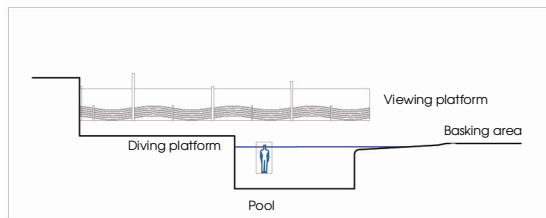
The crocodile viewing platform is ideally situated, with a height vantage, to offer spectators maximum exposure of a dive.

The safety and balustrade considerations have already been discussed in point 8.3.5.

The pool requires a depth of at least 3 meters deep to enable the cage to be comfortably submerged.

The edges of the pool also need careful consideration. The pool and its necessities are placed in such a manner that the platform that the cage is suspended from is isolated from the crocodile basking area. The edge of this platform is raised above water level and forms a right angle. This is done to discourage the crocodiles from going onto the platform were divers enter the cage. The opposite is true for the edge of the pool bordering the crocodile basking area. The edge mimics the gradual slope of a natural pond and provides a transitional zone between wet and dry. This enables the crocodiles to comfortably enter and exit the pool.

The basking area needs to be designed so that it has the maximum amount of sunlight. With the pool being on the southern side of a building it can't be placed in the buildings shadow and needs to be placed accordingly.



110 Line drawing through crocodile diving pond showing the different edges

8.3.8 Safety

Another reason for elevating viewing platforms and walkways is safety. One should remember that the site is located within a world heritage site, adjacent to a lake, with live animals like hippos and crocodiles. These animals are more than likely to make use of the detention pond – especially when the estuary is closed and salt concentrations in the lake rise. Elevated platform with balustrades are a safety requirement

8.4 PLANTING PALLET AND PLANTING DESIGN

The planting palette proposed for this scheme draws mostly from the indigenous swamp forest species that occurs on the site and around Lake St.Lucia. The rare, scattered patches of swamp forest are only found in this part of South Africa, near the coast. They are found where the water table is high and only plants tolerating the waterlogged conditions survive. Characteristic species of swamp forest are:

Barringtonia racemosa :

Small to medium sized tree (4-10m) found fringing coastal swamp forest, estuaries and rivers. A beautiful and decorative tree. Flowering from July to October. Carpets of white flowers float in water beneath the trees in estuaries and in swamps forests. The tree grows well in both wet and dry conditions. The flowers have an unpleasant scent.

Cassipourea gummiflua :

Medium sized to tall tree (4-12m). Flowers from December to April, and attract bees and ants.

Ficus sur :

Tall tree (10- 35 m). Attract birds. Beautiful flush of shiny coppery new leaves in spring.

Macaranga capensis :

Medium to tall deciduous tree (10 -25m)

Rauvolfia caffra

Medium to tall deciduous tree (7 -15m) Scented flowers from October to March. Attracts butterflies, monkeys and bushbabies. A quick growing tree.

Scolopia stolzii :

Small to medium sized tree (3 -15m). Sweetly scented flowers from April to September.

Syzigium cordatum

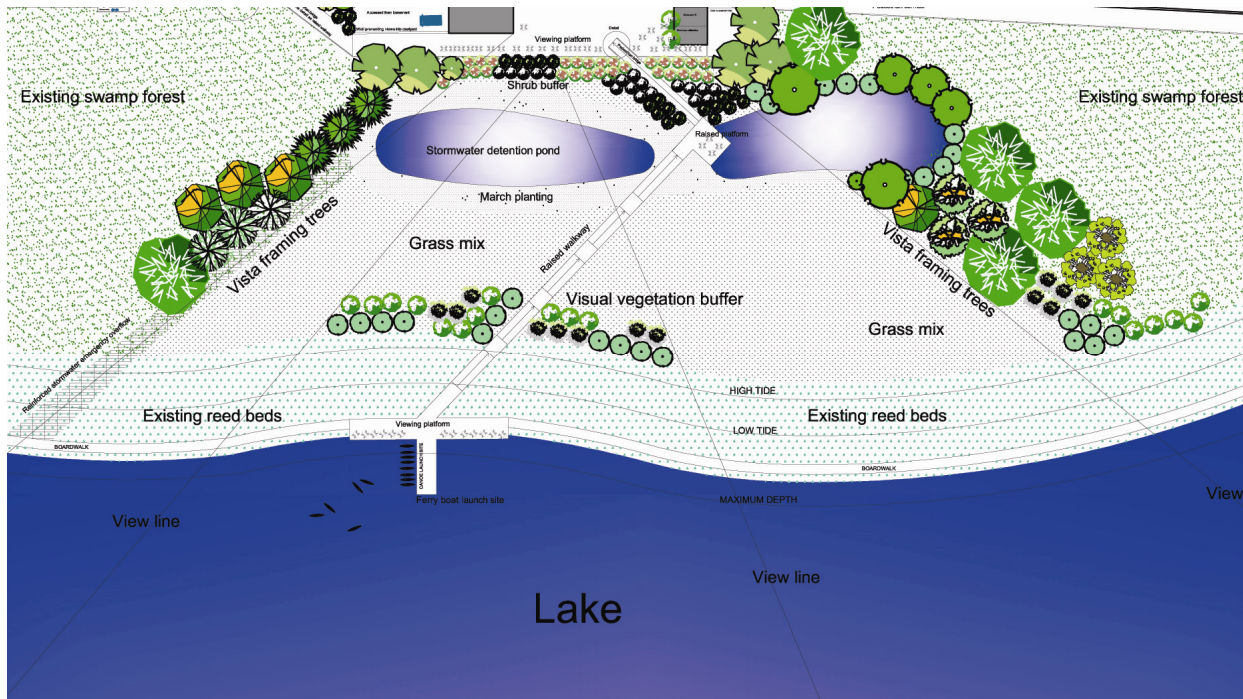
Medium sized evergreen tree (5 -12m). Lovely shape, decorative grey green leaves, white flowers and purple fruit.

Voacanga thouarsii

Medium to large tree (7-15m). Flowers from August to March and has a strong scent.

The planting design developed mostly out of the functional considerations for creating views that would visually link the lake and town. This implies that the height of the trees and shrubs are very important and are used to create visual buffers or frame vistas. The planting design calls for indigenous plants to create a height maintained vegetation area between the lake and the proposed development. Figure 110 shows the five functional planting zones that make up the planting design, namely:

- Visual vegetation buffer
- Vista framing trees
- Grass mix with indigenous flowers
- Existing reed beds and march planting
- Shrub buffer



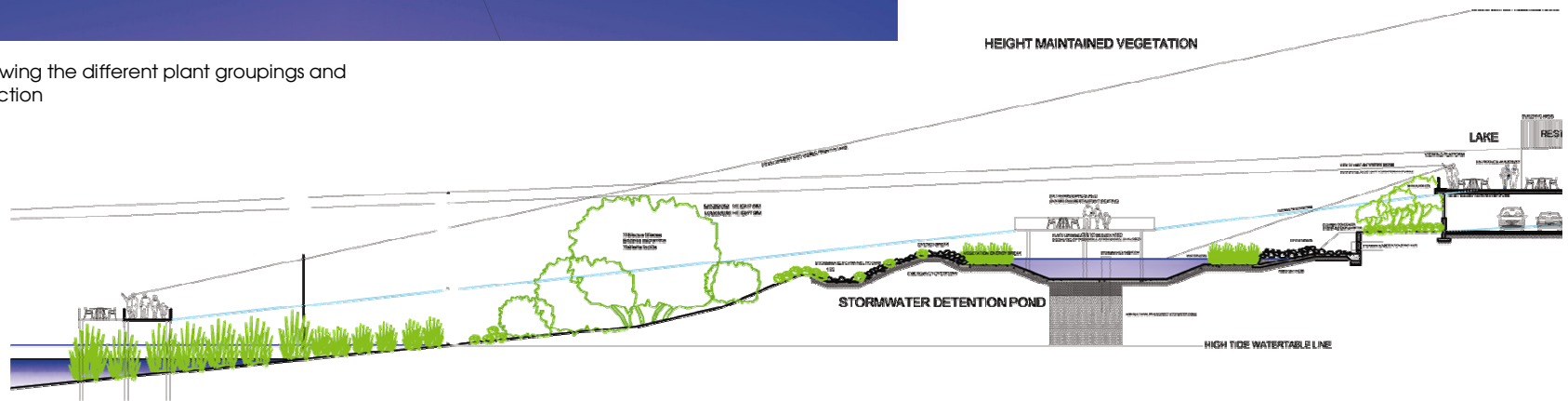
111 Plan showing the different plant groupings and their function

8.4.1 Visual vegetation buffer

The landscape design calls for a vegetation screen, between 6 and 9 meters tall, located close to the high water mark. Please refer to Figure 111 showing a section through the proposed design and illustrates the functioning of the buffer screen. If the screen is lower than 6 meters the proposed boardwalk and jetty structure will become visible from the viewing platform. If the screen is higher than 9 meters the view over the open water of the lake becomes smaller. Species used for the buffer are all dense shrubs that flower and attract animals while able to withstand the harsh fluctuating conditions of the lake.

Species used: *Hibiscus tiliacea*
Bridelia micrantha
Halleria lucida

The shrubs will be planted in random clumps tightly next to each other mimicking their natural growing pattern, blending in seamlessly with the natural vegetation.



112 Section showing the different plant groupings and their function

8.4.2 Vista framing Trees

The existing swamp forest creates the edges of the 'height maintained vegetation'. The height of these edges frames the view over the lake towards the Western Shores beautifully. The beauty of these existing edges will be amplified by ensuring that the characteristic swamp forest species are present.

The species are:

Barringtonia racemosa
Cassipourea gummiflua
Ficus sur
Macaranga capensis
Rauvolfia caffra
Scolopia stolzii
Syzigium cordatum
Voacanga thouarsii

The proposed clustering of the above mentioned species as in Figure 110 is meant to blend in with the existing vegetation but is not at all a random process. Rather the process is determined by functional and aesthetic considerations. For example, the decorative *Barringtonia racemosa* whose white flowers float in the water of estuaries and detention facilities can't be placed directly next to the viewing platform and restaurant because of its unpleasant scent. *Voacanga thouarsii* on the other hand flowers and has a strong perfume and can be located close to the viewing platform. The flowers of *Cassipourea gummiflua* attracts masses of bees and ants and will be better if placed further away from the proposed development.

8.4.3 Grass mix with indigenous flowers

Point 5.3, dealing with the dredger spoil, explained that the original slope of the lake shore and the natural grassland covering was completely destroyed by dredging activities and gradually changed into indigenous swamp forest. In order to create a visual connection between the town and lake it is important to rehabilitate the area between the lake and the proposed development as in Figure 110 and Figure 111.

The proposed grass mix consists of the following species:

Cymbopogon validus
Hyparrhenia hirta
Melinis nervigulumis
Setaria megephylla
Stenotaphrum secundatum
Hyperthelia dissoluta.
Dactyloctenium geminateum
Digitaria eriantha

It is important to remember that the process of decomposing plant material is enhanced, due to the humidity, and that veldgrass in St. Lucia does not require burning. Veldgrass is rather burned to keep woody plants from tacking over. Because this is a maintained landscape where people will constantly remove woody plant, burning still will not be required.

The above mentioned grass species can easily be harvested from surrounding farmland and be planted in clusters on site.

The following flowers and bulbs can be planted in patches, of the same specie, within the grassland. A consideration when choosing wild flowers is to remember that some plants need burning to induce flowering, these plants are not suited for this planting pallet. It is important that they are grouped in clusters and not randomly scattered throughout the design. The reason being that the impacts indigenous flowers can have often gets lost visually, if they are not grouped properly. Rather they must be patches of color that switch themselves on and off within the veldgrass mix. The indigenous flowers are:

Kniphofia coddiana
Kniphofia gracillis
Scadoxus puriceus
Cyrtanthus sanguineus
Crocoshmia aurea
Cladiolus dalenii
Indigofera hedyantha
Leonotis intermedia
Tecoma capensis
Trachyandra asperata
Crassula pellucida subsp. Brachypetala
Bulbine abyssinica

Crytanthus bevilflorus
Hypoxis angustifolia
Eulophia speciosa
Brunsvigia natalensis
Crinum delagoense

8.4.4 Existing reed beds and marsh planting around detention facility

The following plants are present in the existing reed beds:

Typha capensis
Cyperus denudathus
Cyperus prolifer
Cyperus obtusiflorus
Schoenoplectus scirpoideus
Juncus krausii

They will be planted around the detention facility on the western banks. The western bank is best viewed from the viewing platform as illustrated by Figure 111. Between them the following flowering species will be planted:

Kniphofia laxiflora
Zantedeschia aethiopica
Gladiolus papilio

8.4.5 Shrub buffer

When looking back from the lake towards the proposed development, one would get a clear view of the unattractive basement parking. The view needs to be buffered off with a vegetation screen that can't grow taller than 3 meters, or be made up of species that will allow for periodical pruning. Because of the proximity of the shrub buffer to the viewing

platform decorative species that are attractive in leaf, fruit, flower and perfume would be ideal.

The shrub screen would be made up of the following plant:

Gardenia thunbergia:

Heavily perfumed attractive flowers

Antidesma venosum:

Very tasty fruit popular with people

Erythrococca berberidea:

The large Hairtail butterfly (Anthene lemons) breeds on the leaves of this plant.

8.4.6 Streetscape trees

Albizia adianthifolia is suggested to be used at the sides of McKenzie Street. The tree will define the edges and provide visual continuity.

Ekebergia capensis is suggested to be planted on the islands separating McKenzie Street north and south. It is a excellent tree for roadsides.

8.4.7 Platform tree

Ziziphus mucronata is used on all the platforms, except the first, because of its attractive form and importance in Zulu culture.

Trichilia emetica is used on the first platform because of its dense, spreading crown. The tree canopy will frame views of the lake as in Figure 100.

8.5 Conclusion

This thesis started by asking the question of what responsibilities an architect has towards nature and how much development equals exploitation, point 4.1 and 4.2.

This thesis recognized the socio-economic pressures on St.Lucia, and the environment in general, and suggested that the answer lies within the framework of the current paradigm, point 1 and 2.

In point 4, this thesis realized that the only responsibility an architect faces towards the environment is to ensure that he or she maximizes infection potential of the latest memes concerned with the alteration of the physical environment.

This faze of infection can be seen or formalized as gathering information, looking at codes, analyzing patterns and understanding paradigms of the area. Conceptualization and design thereafter is an automatic and random process based upon mutation and evolution of memes and memetic reproductive mechanisms.

Design in general can be seen as planned coincidence, but where the chance of the coincidence happening is maximized to such an extent that the odds of a design not realizing is omissible.

Another way of looking at any design is that it is the manifestation of a memplex, whether it is in the form of text, plan or image.

This thesis focused on the connection between the town and lake and presents a concept of how such a link is envisioned, both functionally and architecturally. After reading point 4.5 – 4.7 one realizes that this thesis is also a metaphysical connection between authorities, municipalities and private land owner.

This is because the thesis can be viewed as a memplex with the potential to infect the reader and be spread by him or her. In other word this thesis is much like a virus, or rather a digital vaccination.

This digital code 'vaccinates' developers against memes that cause negative physical environments. Our vaccination, this thesis, is also engineered to be contagious by illustrating the long term viability and benefits to developers, residents and local people of St.Lucia.



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