

Integrated Green Spaces in Urban Areas - A case study of inner Brisbane



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Integrated Green Spaces in Urban Areas

- A case study of inner Brisbane

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PREFACE

“Life is what happens to you while you’re busy making other plans”

John Lennon, “Beautiful Boy”

A journey in how we perceive and experience our outdoor environment, as well as a personal journey about my own experiences...

Wishing you a pleasant reading and hoping you will get inspired to further engagement about the field of urban and environmental planning and the challenges within.

There are many I want to thanks who have supported, encouraged, helped and inspired me along the way on my Master Thesis.

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ABSTRACT

The review of Integrated green spaces in urban areas – A case study of inner Brisbane highlight the significance of addressing characteristics, qualities and landscape values in our outdoor environment. The importance of green spaces to the wellbeing of people in the city and the ecological, social and cultural values they carry are widely recognised in the field of urban and regional planning. At the same time population growth, climate change and urban development put planners and scientists in a challenging position where new solutions must be put on the agenda in order to accomplish sustainability. Open space strategies, collaboration between stakeholders, public participation, learn from earlier failings and a “value-led” approach facilitate the managing of open space.

Brisbane is located in the fastest growing metropolitan region in Australia. The city's open space landscapes offer cultural, geographical, recreational, social and scenic amenity assets, which make a major contribution to the regions identity they a wide world known for. Landscape values within open space highly improve liveability and quality of life for all residents. The operated case study of two parks in inner Brisbane, South Bank Parklands and the City Botanic Gardens show the wide range of different characteristics included in the design. The qualities and the characteristics found in landscapes, parks and gardens are essential for the usage and the attractiveness. By addressing perceived dimensions in green spaces, strengths, weaknesses, opportunities and threats can be further evaluated. Only an integrated and well-designed open space system can meet the needs of a growing and changing community.

SAMMANFATTNING

Arbetet ”Integrated grönstruktur i urbana områden - en fallstudie över centrala Brisbane” betona vikten av att kartlägga karakterer, kvaliteter och landskapvärdet i vår utedräkt. Fördelarna med att integrera grönstruktur i stadsmiljöer för vårt välbefinnand och de ekologiska, sociala och kulturella värderingar de bär är allmänt erkända inom urban och regional planering. Befolkningsstillsväxt, klimatförändringar och urbanisering sätter planerare och forskare i en utmanande position där nya lösningar måste sättas på dagordningen för att åstadkomma hållbarhet. Tydligt utvecklade strategier, samarbete mellan aktörer, allmänhetens deltagande och ett ”värde-baserat” beslutsfattande ger ökade positiva resultat för hantering av grönstrukturplanering.

Brisbane tillhör den snabbast växande storstadsregion i Australien. Stadens öppna landskap erbjuder kulturella, geografiska, sociala och rekreativa kvaliteter som bidrag till regionens välkända identitet. Landskapets värden inom grönstrukturen förbättrar livskvalitet för alla invånare. Den genomförda fallstudie av två parker i centrala Brisbane, South Bank Parklands och the City Botanic Gardens visar på flera olika karakterer i sin fysiska utformning. De kvaliteter och egenskaper som finns i landskapet, i våra parker och trädgårdar är väsentliga för användningen och attraktionskraften. Genom att kartlägga olika ”upplevelsevärden” i grönstrukturen så kan man få fram en analysbild av områdets styrkor, svagheter, möjligheter och hot. Endast en integrerad och väl utformad grönstruktur kan möta behoven hos ett växande och föränderligt samhälle.

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CHAPTER ONE - INTRODUCTION

Background

During my exchange year at Griffith University in 2009-2010 I studied several interesting courses within the field of urban and environmental planning, where discussions and tutorials were held by the Professors Darryl Low Choy, Neil Sipe, Lex Brown and Jago Dodson. Low Choy, who held the course: "Strategic Planning Studio", highlighted the importance of integrating "values-led" planning and "performance based" approaches in the planning processes (Low Choy, 2006; 2009; 2010), where improved knowledge of landscape values, Quality of Life and "sense of place" should be identified to guide current and future planning.

At that time I discovered an interest and a curiosity for further improvement within the subject and paid attention to how these values were integrated and evaluated in the green space network in inner Brisbane. A curiosity about open space strategies and how the physical design of green spaces in Brisbane are implemented to meet needs and requirements, was aroused. Since I was visiting the parks and gardens in Brisbane on a regular basis, I noticed that they were different from back home. I asked myself if the landscape values have been taken into account when managing green spaces in Brisbane and would it be possible to apply a very well-known Swedish method on an Australian site? What would the results show and would it be useful in further planning? After months of feeding those thoughts I decided to discuss my concerns with my Swedish supervisor, Mats Gyllin who gave courage and support to start my Master Thesis.

Even though needs and requirements differ among the countries, we are facing similar threats and challenges within the field of planning. Climate change, urban development and population growth are of global concern and must be managed by collaboration (IPCC, 2007). Brisbane is located in the fastest growing metropolitan region in Australia. Over the last five years (2006-2010), the population in the CBD has doubled ((b)www.abs.gov.au), and during a ten year period from 1991 to 2000, the population of

the South East Queensland region grew by 25 % (Low Choy, 2009). These statistics put planners in a challenging position.

The importance of green space and its contribution to our improved health and well-being are well defined in the literature (Grahn, 1992; Grahn & Stigsdotter, 2009). It is also widely argued that open space may safeguard community and landscape values, such as biodiversity, cultural heritage, social opportunities and scenic amenity assets, which highly improve quality of life and liveability (Low Choy, 2006, 2009). Thus, we learn very little about the qualities found in the urban green areas (Grahn et al., 2005).

Concepts & Definitions

Some concepts and definitions must be clarified for further understanding of the context throughout the thesis.

Green space

Refer to public accessible areas within open spaces that involve green elements which contribute to liveability and quality of life.

Landscape values

Several landscape values have been identified and recognised within the regional landscape, which significantly contribute to the economy and the liveability of the region, for example: biodiversity, landscape heritage, scenic amenity, outdoor recreation and rural production (SEQRP, 2009:56).

Liveability

Is well connected to quality of life and refers to attributes and values within the landscape that highly contribute to our preferred way of living.

Perceived dimensions

Refer to different landscape characteristics found in the natural (forest, rural land etc.) or the built (parks, gardens etc.) environments that give us certain experiences. In this thesis, several (1-8) characteristics will be further presented.

Scenic amenity

“Scenic amenity is the measure of a landscape’s scenic qualities, reflecting the psychological benefit that the community derives from viewing the region’s wide variety of landscapes. Scenic amenity is a function of scenic preference and visual exposure” (SEQRP, 2009:64).

Sense of place

Describes the affective bond between people and places. Geographers, architects and sociologists often see it as an attachment or a satisfaction with a spatial setting by an individual or a group (Alexander, 2008).

Sustainability:

There have been several different definitions of the concept “sustainability” throughout the years, where the definition from the Brundtland Commission is one of the most used: “Sustainability meets the needs of the present without compromising the ability of future generations to meet their own needs” (UN, 1987).

SWOT-analysis

A SWOT-analysis is a strategic planning method used to evaluate the Strengths, Weaknesses, Opportunities and Threats involved in a project or a site. The method will be used in my case study of green spaces in inner Brisbane.

Aim & Purpose

The purpose of this Master Thesis is mainly to:

- Highlight the importance of integrating green spaces in urban areas and the use values within. This will be accomplished by presenting discourses from readings, journals, articles and debates held at Griffith University and the Swedish University of Agriculture concerning use values, structure and physical design of green spaces.
- Address open space strategies and planning approaches within Brisbane and Queensland to be able to evaluate challenges and the causes within.
- Examine by case studies of green spaces in inner Brisbane, how and to which extend, perceived dimensions are included in physical design. Also by the same case studies evaluate the Strengths, Weaknesses, Opportunities and Treats within the sites.
- Map and address qualities and landscape values within open space that are of great significance and contribute to the regions liveability and quality of life.

My intension with this thesis is, by mapping and addressing strengths, weaknesses, opportunities and threats within green space, to guide future improvements at the on-going debate about green space and use values. Hopefully the results from the case study will give materials and basic data to continue the discussion and highlight the complexity and challenges within sustainable development and environmental planning.

Question at Issue

In this thesis I have founded the following questions to guide throughout the review:

- How are use values, structure and physical design of green spaces highlighted in the theoretical field of previous and present planning discourses?
- Which are the open space strategies and planning approaches within Brisbane and Queensland that will target threats and challenges within the region?
- Which and how are the perceived dimensions and the strengths, weaknesses, opportunities and threats included in the green spaces of inner Brisbane?
- Which are the qualities and landscape values to be found within green spaces in Brisbane and the SEQ region?

Delimitation

Due to the specified time frame and the certain amount of pages recommended for the thesis, I have chosen to focus on the central part of Brisbane regarding my case studies. Two parks, located at the Central Business District, will be further analysed and evaluated. But a wider discussion regarding qualities, landscape values and open space strategies within the South East Queensland region will be held as well. Since we are facing similar challenges wide world within the field of environmental planning, theories concerning structure and physical design of open space in general will be highlighted.

Method

I am introducing the subject of integrating green spaces in urban areas by a literature review where planning discourses and on-going debates are presented and highlighted. Regarding open space strategies and the planning approaches in Queensland, I visited Helen Favelle and Anton Trenorden at the Brisbane City Council, who provided me with very useful information.

The theoretical background and the information gathered are mainly obtained from literature, articles, journals and websites. Extensive discussions, tutorials and projects at Griffith University have contributed with important knowledge of urban and environmental planning, which highlighted different aspects of sustainable planning criteria.

My site analysis and the case study have been performed by several visits in the selected precincts, where information and basic data have been gathered. The material enabled further evaluations and the application of the two methods. The first method used is developed from a Swedish concept of perceived dimensions in the outdoor environment and refers to the experienced qualities within a specific site. In addition, a SWOT-analyse have been applied at the same precinct to evaluate strengths, weaknesses, opportunities and threats within the site. The methods will be further presented in following chapters.

CHAPTER TWO – GREEN SPACES IN URBAN AREAS

What is Green Space?

Open space is often described as any piece of land that is undeveloped and has no building structure on it (www.epa.gov). But since it is believed that piazzas, plazas, playing fields and urban squares often are contributing to improving public health and environmental quality of neighbourhood, it is often included in the definition as well (www.epa.gov). The term “green space” is a part of open space and serves to provide recreational opportunities to the society (Marilyn, 1975). Green space may consist of a broad range of landscape characters from highly maintained parks, gardens, avenues, playing fields and churchyards to natural landscape environments (Bucht & Persson, 1994; GIG, 2009). Water systems such as open water, rivers, streams and storm water systems are usually included in green space and are also referred to as the “blue structure” in the field of urban and regional planning (Bucht & Persson, 1994; Strategi Skåne, 2004). Another term that must be clarified is “green infrastructure” which is a network of multi-functional green space, both rural and urban, which underpins sustainability and increases quality of life with its natural and ecological processes (GIG, 2009). This is usually divided into areas (parks, gardens, squares etc.) and paths (streets, walkways, canals etc.), which may surround the built environment (Grönplan för Malmö, 2003). The network operates at all spatial scales from local neighbourhood, to sub-regional levels and larger sites in the wider countryside (GIG, 2009).

Generally, green spaces are accessible to the public, but are in some cases privately owned. Such places may include community gardens, institutional or corporate grounds and higher education campuses. Even though the public doesn't have total access to the urban green spaces, it's believed that such areas still provide aesthetical and psychological relief from urban development (Springgate, 2008).

Green Space and Urban Form

Several planning theories have guided the discussion on how the modern city should be designed to improve living conditions. During the 20th century planners and architects as Le Corbusier, Lewis Mumford, Frank Lloyd Right and Ebenezer Howard had a significant role in promoting functional design and planning for automobile traffic, which was the subject of the debate at the time. The planner's models of the Radiant City, the Grid City, the Broadacre City and the Garden City are subject to and well connected to the era of Modernism, where Howard's Garden Cities of To-morrow (1902) is the prime advocate of green spaces (Skoniecki, 2010). He raised the concern about a growing population where urbanisation leads to a greater need of green spaces due to lack of space. To improve a higher quality of life he argues for suburbanisation, by escaping the polluted and dense city. This colonisation of rural land would also be economically more profitable, which was put into practice in the Garden City near London (Hall & Ward, 1998). Howard believed a self-sufficient metropolitan area with a concentric pattern including open spaces and boulevards, surrounded by a green belt would constrain sprawl (Godall, 1987). The principles of green belt planning and the Garden City model were followed worldwide by other cities, such as New Orleans, São Paulo, Melbourne and Adelaide (Hall & Ward, 1998). When discussing greenery and urban form, Howard's legacy is still today of great significant in designing metropolitan areas.



Img. 1: Urban structure in central Brisbane

The awareness of including environmental concerns in the planning debate was not presented until 50 years later. At the time when Ian McHarg's book *Design with Nature* was published in 1967, scientists had not yet discovered the environment issues regarding man's behaviour. The book certainly played a contributing role in emphasizing the knowledge of the environment in planning, which was earlier a totally applied socio-economic process. The experts were informed of physical processes and ecological science, but had not pointed out any interests in combining values with planning. Finally the lack of theories made it difficult to address the problem of human adaptations (McHarg, 1967).



Img. 2: View from Q1, the tallest residential building in the world, over Surfers Paradise.

Kevin Lynch, an American planner and author, examines in his book *The Image of the City* (1960), how users perceive the physical environment while navigating through urban areas. He argued influences on imageability such as social meaning of a site, its function, its history and even its name was of great importance in human behavior, and added environmental psychology into the field of urban planning (Lynch, 1960). The author claims "there seems to be a public image of any given city which is the overlap of many individual images" (Lynch, 1960:46). These images refer to five types of elements: paths, edges, districts, nodes and

landmarks which constitute a mental map of the city form. Lynch also had an idea of what he was calling a Good City Form, which in a smooth way integrates public and private spaces in order to improve social cohesion (Luymes, 1997). His engagement in segregation and planning issues are still of interest and a good starting point when discussing sprawl, green spaces and, social and environmental sustainability of urban areas.

Structure and Multifunction

Since more people are chosen to live in the city, the pressure on current open spaces is rising. The author Jane Jacobs (1961) claims that green spaces, in particular parks, are the most valuable, as they often stand in direct contrast to a very compact and busy city life. She argues that green areas provide the crowded city with certain functions, and agree with modernist planners who considered parks as "self-evident virtue" (Jacobs, 1961:99).



Img. 3: Kurilpa Bridge in front of Brisbane CBD.

In order to optimise the values within green space the interaction between urban and rural landscape would have to be substantial. Pincetl and Gearin (2005) support the theory of the importance of available and conveniently located parks. Furthermore they are moving from a tra-

ditional view of green spaces only as designated zones for nature and recreation in the city, to multiple-function zones where streets, sideways and paths form a network of accessibility (Jacobs, 1961). Multifunctionality is central to the concept of green infrastructure and refers to the wide range of functions it may offer. However, multifunctionality can apply to individual spots and routes, but it is not until the sites are connected that we achieve an optimal and fully multifunctional network of green infrastructure (GIG, 2009). To increase the attractiveness, green spaces should be well connected to each other, which will also form a better interaction between green areas and the built surroundings (Skoniecki, 2010).

Today planners discuss the synergy of city and countryside, rather than a strict separation between the notion of the two of them. "The grade between city and countryside is gradually levelling off by increasing mobility within the metropolitan region" (Kühn, 2003). The new and fast way of traveling across the landscape and within urban areas makes the landscape more dynamic, where urban and rural attributes are merged. The increasing demand for open space in urban areas due to urbanisation and development should be seen as an opportunity rather than a problem in urban and regional planning. Therefore we must seek solutions in new forms and spaces for future growth (Sieverts, 2003). Grahn and Sorte (1985) claim the importance of assessment and evaluation of usage before designing green structure and developing rural landscape.

The importance of Green Open Space in Urban Areas

Research has shown that there is a great need for environmental diversity, where the potential of green spaces is highlighted as a potential improvement of the quality of life for all citizens (Burgess et al., 1988). A broad structural range and a variation at different scales of green spaces in urban areas are important to satisfy different needs within the society (Berglund & Jergeby, 1998). Green spaces enhance the qualities of urban life and facilitate a variety of opportunities, social and cultural diversity and physical settings are highly valued (Burgess et al., 1988).

It is argued that regional landscape and open space provide metropolitan areas with a number of important activities, functions and ecosystem

services, including:

- Outdoor recreation areas for the urban population and tourists.
- Infrastructure corridors that facilitate the movement of energy and water to the urban areas.
- Natural resources for building and construction purposes.
- Open space that provides scenic amenity that contributes to regional landscape identity.
- Water catchments that safeguard urban water supplies.
- Farming lands that supply urban areas with food and farming production.
- Rural landscape that provides residential locations.

(Low Choy, 2004:12; 2009:2)



Img. 4: Royal Botanic Gardens in Sydney is popular for recreational and social activities.

Use values of Green Space

Today the importance of green spaces is widely recognised in the field of urban planning. (6) The green structure that combines green open spaces

provides several environmental, social, cultural and economic functions to the citizens (Skonieski; Bucht & Persson, 1994; Grönplan för Malmö, 2003). Green areas serve as environmental lungs, providing a refuge for wildlife species in environments that are otherwise dominated by urban development. It is argued that green structure in city environments has been developed primarily to provide opportunities for recreation, play, experiences, identity and culture for the residents. The motive for preserving nature for its own sake is generally secondary (Bucht & Persson, 1994).



Img. 5: Grey Headed Flying Foxes roosting in a tree in central Sydney.

The ecological functions within green spaces involve the whole system of plants, animals, soil and human activity (Bucht & Persson, 1994). An effectively linked green infrastructure facilitates the dispersal of different species within urban areas, which plays a crucial role for promoting biodiversity in the city. Spending time in parks and green areas increases knowledge and awareness of ecological systems and environmental issues. It creates a better understanding of how natural processes and urban development affect the green experiences in man's everyday life (Grönplan för Malmö, 2003). In addition to the ecological, recreational and aesthetical functions, green spaces have significant cultural and social values as well.

This is argued by Grahn and Sorte (1985) who claim that people have a physical and a psychological need for greenery, not only for outdoor activities, but also for spontaneous social contact. Regarding social factors, trees and plants interact with social qualities since green areas combine ecology with the social scope (Borgström, 2009). Outdoor environments work as social arenas where parks and green areas are essential in building social networks. Building for green spaces requires a good mix of different structure and environmental qualities, which must be well integrated with the built environment. To achieve a sustainable result, and "for more democratic planning of our cities", people's values, experiences, feelings and knowledge should be included in the planning processes of green infrastructure (Berglund & Jergeby, 1998).

Recreation and Health Effects

There is a strong relationship between accessibility/experience of greenery, and a high quality of life. Planners and experts today agree on the importance of green spaces for public health. Independent of its character, green areas may improve well-being, because of the recreational opportunities they provide for society. Grahn (1992) highlights the positive effects of green spaces such as stress relief, strengthened immune system, improved concentration and learning capacity. His research divides urban recreation into passive, active, emotional and creative, where active recreation includes physical activities and passivity entails being in and observing green environments, which also refers to the aesthetical values (Grahn, 1986). Grahn and Sorte (1985) found nature-style parks to be the most popular in general, while in urban areas there is a greater need for more dense green space networks to avoid long distances. The shorter distance to greenery, the more often we spend time using it, and the less stressed we become (Grahn & Stigsdotter, 2003).

It seems like different groups within the society take advantage of green areas at a different age and for different purpose in life (Grahn & Sorte, 1985). Access to green environment is shown to have a positive impact on children's physical movement skills, and provide them with possibilities of learning, playing and outdoor activities (Grönplan för Malmö, 2003; Grahn, 1986).

Activeness and passiveness

Grahn (1991b) argues that green spaces are mainly used for recreational purposes, in order to make a quicker recovery from a stressful life. It is not only being active in a green environment that generates positive health effects. Passiveness in green spaces may lead to lowered blood pressure, increased ability to concentrate and less production of stress hormones (Grahn & Stigsdotter, 2003).



Img. 6: Most parks offer both activeness and passiveness.

Grahn & Sorte (1986) mapped different types of parks depending on their qualities, characteristics and possible activities. They claimed that people are attracted to different characteristics depending on their well-being and state of mind. A park of a serene characteristic facilitates contemplation and reflections, which should appeal to stressed, depressed and introvert people (Grahn, 2005). In this type of condition peaceful activities such as promenades and readings are preferred. On the other hand, when feeling motivated, engaged and extrovert, physical and social activities in crowded amusement parks are more attractive (Grahn & Sorte, 1986). Green areas of serene characteristics are preferred by a majority of the population, which emphasises the importance of passive recreation for human health (Grahn, 1991b). Urban areas on the other hand require a lot of attention, which is perceived as exhausting and tiring. The great amount of information the busy city life provides us with, forces our

brains to work intensely to screen the impressions. This process requires energy, which may lead to headaches, irritation and depression (Kaplan, 1991).

Perceived Dimensions of Green Spaces

The design of and accessibility to green spaces are determined by the way we are using them. It seems that it is of great significance to have high quality green spaces within a two-minute-distance from our living environment (Grönplan för Malmö, 2003). Depending on the physical design, distinguishing quality and characteristics, activities may be encouraged or discouraged, which to a higher extent controls the usage. By having a wide range of different characteristics of green spaces, it facilitates the interaction of all citizens in urban recreational activities. However the challenge to activate a majority of the population is in direct proportion to maintaining general health conditions (Grahn, 1991b). If green spaces have the potential to be restorative environments, then we need to address and analyse the qualities of different characteristics. For better understanding we must improve our knowledge of how citizens experience and perceive urban green spaces (Grahn & Stigsdotter, 2009).

Patrik Grahn, a Swedish landscape architect, who is also a scientist within environmental psychology, has developed eight different Park Characteristics, which refer to the perceived dimensions of urban green spaces.

1. *Serene*

This is a place which expresses silence, serenity and peacefulness, a quiet place with no annoying sounds and distractions. May contain attributes such as wind breakers and easily accessible paths, where safety and opportunities to reflection and spirituality are appreciated. You can usually notice sounds of the blowing wind, singing birds and pouring rain. No litter, no noise and not too many people should be disturbing (Grahn & Stigsdotter, 2009; Grahn, 2005).

2. *Space*

The most distinct attributes for this characteristics are the notions of "being in another world" and to experience freedom and spaciousness. No

external influences from surrounding environments should be present. The green space consists of a cohesive structure, which facilitates contemplation and reflection (Grahn & Stigsdotter, 2009; Grahn, 2005).

3. *Nature*

The park characteristics of wilderness are associated with green environments that appear to have no or little human influences (Grahn 1991a). Native plants and animals dominate the experiences, where the interaction between humans and nature has its arena. The environment is usually made up of rocks, lichens and mosses and brings a relaxing and safe atmosphere. It gives the visitor a feeling of being in nature on its own condition, because of its dynamic and intrinsic vitality (Grahn & Stigsdotter, 2009; Grahn, 2005).

4. *Rich in species*

This type of green space includes species diversity and mediates a notion of a great variety of flora and fauna, including flowers, berries, lichens, butterflies (Grahn & Stigsdotter, 2009). Adding water, dams and ponds, gives the characteristic a further dimension. This might also be associated with botanical gardens and the Garden of Eden (Grahn, 2005).



Img. 7: The Botanic Gardens in Gothenburg are rich in species.

5. *Refuge*

A place where people can relate to, and identify themselves, where the feeling of safety is highly important (Grahn & Stigsdotter, 2009). The structures are enclosed by bushes and higher vegetation, and encourage children to play games, have picnic and outdoor activities. Attributes such as swings, slides and small houses invite to active and passive games (Berggren-Bärring & Grahn, 1995).

6. *Cultural*

This characteristic is associated with human valuation and history, where a sense of belonging and identity are fulfilled. People have a desire of understanding their environment by identifying cultural and historical attributes. Such attributes may be human artifacts such as sculptures, fountains, statues, ponds etc. in both natural and cultural settings (Grahn & Stigsdotter, 2009). The place is of symbolic significance and impregnates historical and cultural footprint.

7. *Prospect*

The prospect dimension of perceived urban green spaces is associated with open fields, which are usually designed as well-cut grass surfaces. Except the grass lawn, the environmental may, for instance, consist of sitting facilities, public toilets, trees in rows as wind-breakers etc. Physical activities are the main accomplishment (Berggren-Bärring & Grahn, 1995).

8. *Social*

The social characteristic of a place encourages social activities and personal meetings, where activities such as dancing, playing and dining may take place (Grahn, 2005). Different variables of amusement are included, which demand benches, restrooms, well lit up and easily accessible paths to facilitate festivity. The placements of these green areas are usually located close to urban centres, since disturbance may occur (Berggren-Bärring & Grahn, 1995).

The research that addresses perceived dimensions of urban green spaces aims at guiding future planning processes. According to Berggren-Bärring and Grahn (1995) the more characteristics that are included in green

spaces, the more people benefit from its usage and the more popular the park becomes. Stähle (2005) highlights the importance of green spaces with high diversity, since good recreational conditions not only serve the individual, but also aid to improve quality of life within society.

The characteristic of Serene is the most preferred dimension in general, even for the most stressed and vulnerable (Grahn & Stigsdotter, 2009; Grahn, 2005). Serene satisfies several needs. Sometimes all eight of the dimensions are included, which attract a majority of the population. Culture, Prospect and Social were the least preferred, and Rich in species and Refuge were found in the middle, directly after Space and Nature (Grahn & Stigsdotter, 2009).

The perceived dimensions of urban green spaces involve experiences connected to expectations as well as fundamental reflexes (Grahn & Stigsdotter, 2009). It is notable that visitors can identify all characteristics in some of the green areas very strongly, while in other green spaces, few characteristics were found. When talking about wellbeing and health, we must address how green spaces are used and what kind of characteristics they contain.

The Idealistic Park

Gunnar Jarle Sorte (2005) discusses the notion of the Idealistic Park, which refers to eight different preferences: Comfort, Complexity, Entirety, Spatiality, Spiritedness, Sociality, Affection and Originality, and is determined for its attractiveness. Sorte argues, based on professor Küller's environmental theories about the eight preferences that the urban environment is a great source of experiences. Furthermore, the preferences should be a guiding principle in the modern debate of sustainable urban planning.

A variation of open space and disclosed structures enables retreat, to be able to see, without being seen. This aims to arouse curiosity. If there are disturbing elements to be found in the park, it will become less attractive. Prerequisites for social contacts and the notion of nursing care are also

determining factors for its attractiveness Sorte (2005).

Several scientists have developed theories about improving outdoor environment and which factors that should be included. Stephen and Rachel Kaplan, two scientists within environmental phycology, claim that green spaces must involve Complexity, Unity, Readability and Mystery, to make it beneficial in the most profitable way (Kaplan et al., 1998). The research is also undertaken by professor Sorte, who supports the model in his acknowledgement about the Idealistic Park.

CHAPTER THREE – BACKGROUND AND VALUES OF GREEN SPACE IN BRISBANE

The History of Town Planning in Brisbane

The establishment of the Greater Brisbane

Before European settlers occupied the area today known as Brisbane, two aboriginal tribes inhabited the region. They roamed a large area that included rainforest, coastal land, swamps, lagoons, flatland- and grasslands (Gregory, 1996).

Transportation of convicts from Britain in 1788 was the starting point for "white" Australia. For at least fifty thousand years prior British settlement, one million aborigines lived as hunters across the continent (Sandercock, 1990). During the nineteenth century the industry of maritime trades, mining, wool and gold posed the main economic activities of Australian cities in the British colonial empire, which were controlled and financed directly from Britain. At that time, deportation of convicts had ended, and free settlers entered the area of South East Queensland. The first City Plan of Brisbane Town was established in the end of 1840 by the Australian explorer Robert Dixon, but it was not until 1925 that Brisbane was created, after twenty smaller authorities and shires were amalgamated (Low Choy, 2009).

After Brisbanes establishment, awareness of and a will to include open space concept in recreational purposes were expressed in the city plan. William Jolly, the first mayor of Brisbane acknowledged "the need for the provision of adequate parks and public reserves" and spoke in terms of "breathing spaces for the city" (Low Choy, 2009:5). This was a time when administration, political and social changes in Australia was caught up in the debate, and highly influenced the town planning discussion (Minnery, 2004). The approach of 'greater cities', as in Greater Brisbane, was guided by Garden City ideas, where communities intended to be self-contained, surrounded by greenbelts, which turned out to be largely unsuccessful. Minnery (2004) argues this is mainly due to the very low state population

living in its capital city.

Town planning movement

Later on the concept of Town Planning Movement grew stronger, which was seen as a tool for "comprehensiveness, co-operation and the public interest" (Minnery, 2004:5). However, even though town planning was amongst the reasons given for development of Greater Brisbane, planning for serving the needs of Brisbane's population by efficient land use development was advocated. Planning turned from being an 'idea' phase to a 'legislative' phase concerning zoning, subdivision and control. The need for controlling planning policies, led to the first statutory town-planning scheme, which was undertaken by the Brisbane City Council in 1965 (Low Choy, 2009).

Current planning approach

Despite steady growth, Brisbane was suffering infrastructure problems in the late 50's. In the Brisbane transportation study report, future public transport needs were calculated up until the year 2000. The report was of great significance since the automobile had now become well integrated in everyday life (Low Choy, 2009).

After years of economic difficulties during the 70's to mid-80's, due to changing international circumstances and little growth in the private sector, planning issues the last decades have adopted the sustainable development approach (Sandercock, 1990). This aims to addressing strengths, weaknesses, opportunities and threats, for current and future needs within the SEQ region (Low Choy, 2006). Since then, several documents and program initiatives have been developed to facilitate and guide the planning process and its outcomes.

Brisbane – A Metropolitan City in Australia

Brisbane is located in the south-east corner of the state of Queensland, and is included in the fastest growing metropolitan region in Australia. (Low Choy, 2006) The central parts around Brisbane encompasses a

population of over 2 million people (in March 2011), which makes it the third most populous city in the country ((a)www.abs.gov.au). Brisbane is also known as the River City, since the urban area extends in all directions along the Brisbane River, from Caboolture in the north to Beenleigh in the south, and across to Ipswich in the south. The CBD (Central Business District) stands on the original site of European settlement and is located inside a curved segment of the Brisbane River. Since the river crisscrosses the metropolitan area, the city has suffered three major floods since colonisation (Feb 1893, Jan 1974, Jan 2011) (Gunn, 1978).



Img. 8: The Australian continent

Brisbane is a hilly city with a grid street system in the CBD, named after female members of the British Royal Family in one direction (Ann, Margaret, Mary etc), and perpendicular to those streets, named after male members (Edward, William, Albert, George etc). Mount Coot-tha is the highest point of Brisbane (300 m) and is followed by Mount Gravatt, Toohey Mountain and Enoggera Hill, where White Hill, Highgate Hill and Stephens Mountains are the lowest rises (Gregory, 2007).

Over the last five years (2006-2010), the population in the CBD has doubled ((b)www.abs.gov.au), and during a ten-year period from 1991 to 2000, the population of the South East Queensland region grew by 25 % (Low Choy, 2009). The high Quality of Life and its positive landscape attributes has been the most important factors to attract both national and international migrants, which put the “region under pressure” (Low Choy,

2009:4). The population growth since the early 70’s has led to a high-density housing approach typically through multi-residence accommodation. Before then the architectural style known as Queenslander was dominating in the inner city suburbs (www.traditionalqueenslanders.com).

An attractive city

The humid subtropical climate with hot and humid summers and dry, mild winters makes it perfect for outdoor recreational assets all the year around. Topography and latitude have contributed to the rich biodiversity of the region, with the area occupying a transition zone between tropical and temperate zones supporting an abundance of species and habitats (SEQRP, 2009:58).



Img. 9: The famous beaches at Surfers Paradise outside Brisbane.

Based on the mild climate, beaches and associated leisure pursuits such as surfing, swimming, hiking and diving are of great significance for the Australian lifestyle. Leisure has become part of the area's cultural identity, with green space and beach assets, of the Brisbane tourism promotion capturing an early expression of the perceived attractiveness and vitality of both the beach and hinterland landscapes (GCCC, 2007:14).

The Brisbane central business district offers a rich social life when it comes to cafes and restaurants. Many of these places have taken advan-

tage of the mild climate and provide guests with outdoor eating facilities. However, if you want to chill out, relax or have a barbecue, there are places to be found as well, which are of great significance in maintaining the Australian lifestyle ((a)www.brisbane-australia.com).



Img. 10: The Brisbane skyline at night.

Quality of Life and Liveability

There are many values and qualities to be found in the regional landscape that contribute significantly to the economy and the welfare of the region. According to the South East Queensland Regional Plan (SEQRP, 2009:56) these values may include biodiversity, rural production, scenic amenity, landscape heritage (both indigenous and non-indigenous) and outdoor recreation. It is widely argued that landscape attributes contribute to a region's identity and 'sense of place', which in a larger context is mainly due to a functional open space system (Low Choy, 2009). Preservation of regional open space seeks to improve Quality of Life (QoL) and increase liveability within community. However, in times of rabid population growth and change, the relationship between QoL and regional open space will become even more important.

Professor Darryl Low Choy (2009) at the Griffith University claims the QoL and liveability of a region only can be safeguarded if it is supported

and managed by a regional landscape framework. In order to protect rural landscape, the framework should address functions and activities that might have negative impacts on such values. Regarding the connection between open space and QoL, Low Choy (2009) observes: "the community places value on landscape attributes such as scenery (or nature conservation or outdoor recreation opportunities) that are derived from the open space that constitutes the regional landscape. These values determine the QoL that residents enjoy which in turn contributes to the achievement of liveability objectives that the community seeks for the region" (as cited by Low Choy in 2004:13).



Img. 11: Surfing is an essential part of the Australian lifestyle.

Landscape Values

As mentioned, open space makes a significant contribution to the identity and QoL of a region. Landscape values and attributes are often to be found within the open space system. These positive values attract interstate migrants, which is the main factor of the growth. Housing demands, due to this population growth, has resulted in urban sprawl and loss of open space, since residents move outwards from the urban centres. This has led to wide challenges for the area, which makes SEQ a 'region under pressure' putting at risk the very unique environmental and landscape attributes (Low Choy, 2009:4).

Any part of land may integrate one or more values into the landscape. Highly valued landscape areas in-corporate several values and attributes, which gives the SEQ region its well-known reputation (SEQRP, 2009:56). South East Regional Plan brings up key values, which are supported and protected in the region, including:

Biodiversity

The landscape values of biodiversity are often easy to measure and can be classified by the regional economy and environment. Single value landscape areas of great significance are identified as: "Networks of wildlife habitats and connecting biodiversity corridors designed and managed to sustain significant biodiversity values at regional and local scales" (SEQRP, 2009:58).



Img. 12: Native plant in the City Botanic Gardens, Brisbane.

The policy within SEQRP intends to protect landscape by ensuring "development and other land use activities do not cause any loss or degradation of areas with significant biodiversity values and that the overall biodiversity values of the region are enhanced over the longer term to support regional sustainability" (SEQRP, 2009:48).

Rural production

Rural landscapes do not only provide agriculture, grazing, forestry and fishing opportunities for human use, they also include natural and economic resources. This creates rural landscapes that contain a wide range of aesthetic and cultural attributes connected to scenic amenity and landscape heritage (SEQRP, 2009:56).

Natural resources such as land, fresh and marine water, forests, minerals, air, native animals and plants, provide the people of the SEQ region with key ecosystem services (SEQRP, 2009:67).

Scenic amenity

Scenic amenity is a function of what we experience by visual exposure and "is the measure of a landscape's scenic qualities, reflecting the psychological benefit that the community derives from viewing the region's wide variety of landscapes" (SEQRP, 2009:64). Scenic amenity qualities within the SEQ's beaches, oceans, ranges, mountains, parks and forests are some of the assets for identifying the region.



Img. 13: Beautiful view over Springbrook National Park, Queensland.

These scenic amenity attributes attract tourists from across the world and provide local residents with recreational opportunities. Values of scenic amenity significance can be identified and evaluated by existing regional methodologies (SEQRP, 2009:58).

Landscape heritage

The regional landscape and its urban footprint are highly valued when it comes to cultural and indigenous significance. Landscape heritage consists of non-indigenous and indigenous cultural values, which could be found in architecture, crafts, arts, design, festivals and leisure (SEQRP, 2009:83). These values may also be expressed in landscape attributes such as open spaces, facilities and infrastructure, which represent culture heritage.



Img. 14: Discussing how to use a Boomerang with an aborigine.

In order to establish a sustainable landscape heritage approach, Low Choy et al. (2010) argue that indigenous values need to be incorporated and identified in the regional planning processes. The findings from their pilot study (2010) that showed that is possible to articulate and identify indigenous landscape values, which turned out to have a significant contribution to the planning process of the SEQ region (Low Choy et al., 2010).

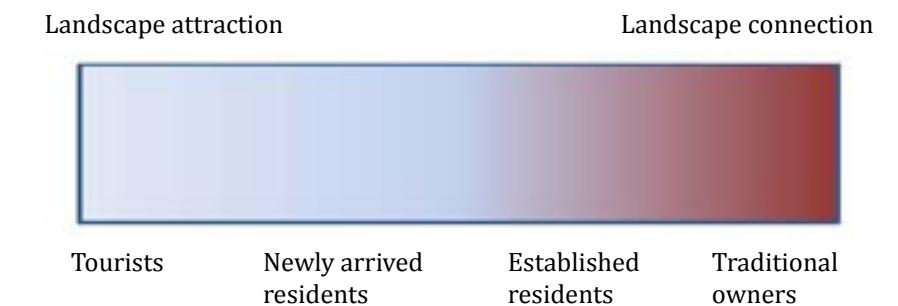
Outdoor recreation

An integrated network of open space and urban areas facilitate public recreation (Low Choy, 2009) and contribute to improving social, health, economic, tourism, cultural and environmental outcomes (SEQRP, 2009:66). According to SEQRP there is a state-wide target to protect 50 per cent more land for public recreational activities by 2020, which will be achieved by developing a regional inventory of land for nature conservation and public recreation (SEQRP, 2009:66).

Landscape Connection and Attraction

When planning for sustainable development stakeholders need to be involved in the processes, and considerations such as demographic, interests, needs, cultural and social background must be addressed. Stedman (2003) has identified a theoretical distinction between landscape values and people's connection/attraction to the regional site they are situated in. According to Stedman, planners have to be aware of the differences in these values when looking at the issue of capturing a 'sense of place' and the identity of the landscape. The relationship between people and a place is often described as a bond, an unconscious state, where you are not always aware of the affection to the place until the site is threatened by changes. "It is crucial that we understand the importance of meanings and how they may change in response to physical landscape change" (Stedman, 2003:682).

Fig. 1: Landscape attraction and connection spectrum:



The stakeholders and their relationship to the landscape are represented in a spectrum, which illustrated the importance of recognizing the contribution and depth of attachment for various groups in the region. Stedman (2003) has found that while the level of connection and attraction vary, all stakeholders have environmental thresholds over which their connection and attraction decrease. For example, an indigenous group may lose their food connection to a polluted water area; similarly a tourist may not be attracted to the same water area due to the polluted beach. Awareness of this spectrum and of stakeholders' different relationships to the landscape is essential in landscape heritage planning (Corlett et al., 2010).

CHAPTER FOUR - OPEN SPACE STRATEGY IN BRISBANE

Factors Affecting Green Space Use

Solutions based upon the supply of a wide variety of different types of green space appearances increase the possibility for an efficient and active recreational use in urban areas. In lower density cities, parks and gardens are dominating features in the open space system, while compact cities suffer greater challenges in providing green space opportunities. When designing green spaces we also need to account for socio-demographic characteristics, recreational trends and lifestyle preferences in our attempt to satisfy current and future public needs (Byrne & Sipe, 2010).

Since people are different in age, sex, race, ethnicity, education, income levels, disability and physical fitness, they have different needs and therefore normally want to use green space opportunities for different purposes (Coen & Ross, 2006). Physical characteristics, existing facilities, accessibility, cultural differences and safety are factors that greatly influence public use.

Different research have pointed out that people with little or no private space, who are children or retired, with low income levels or are unemployed, or who are recent immigrants, have a greater need for public access to parks and recreational opportunities. If we are to assume urban growth patterns in general, a higher number of recent immigrants with young families, more residents who are retired or young couples with younger children, and newly graduated students are to be expected in the Brisbane CBD (Byrne & Sipe, 2010).

Some theorists argue that urban residents seek to more frequently use parks and green spaces in their neighbourhood, due to loss of private backyards (Searle, 2007). It is claimed that residents will compensate poor green space access by using public parks more often, which is referred to as the 'Compensation Hypothesis' (Maat & de Vries, 2006). However, recent research suggests that we cannot assume urban residents necessarily will use neighbourhood parks more frequently just because they live in denser environments (Maat & de Vries, 2006). Actually, it is notable, city dwellers seek to escape urban surroundings and prefer leisure activities and recreational experiences in the

countryside (Byrne et al., 2010; Maat & Vries, 2006). Byrne et al. (2010) argue that there are several important factors to be considered when planning for public green spaces.

- Different urban residents have different needs, and will therefore use green space opportunities in different ways.
- Planners need to be aware of how to integrate green spaces with existing built environment, since historical sites may have another use and function in the past, which attracted another target group.
- To optimize the usage, urban green spaces must be easy to get to, be safe and contain a high level of environmental qualities (different structures, tree canopies, shade possibilities, rain shelters, seating, barbecue facilities etc.) to meet public needs (Byrne et al., 2010).

Aesthetics

As discussed in previous chapters, the variety of open and disclosed structure and the emotions experienced from different design is decision making, rather than the aesthetics itself (Kaplan et al., 1998; Sorte, 2005). However, studies have found that a majority of green space users prefer a natural landscape environment, where a serene atmosphere could be experienced (Grahn & Stigdotter, 2009). It is argued that some users do not even need direct access to parks and green areas to benefit from their presence. The recreational opportunities from visualising and by passive activities are not to be underestimated (Grahn, 1991b).



Img. 15: View over Brisbane CBD.

Cultural differences

Many Australian cities consist of relatively high levels of cultural diversity, thus green spaces are probably used very differently. Brisbane and SEQ region attracts many cultures, for several reasons, and have a population where more than 20 per cent were born overseas (www.shelteroffshore.com). Immigrants bring new demands and challenges upon green space systems (Byrne & Sipe, 2010).

Accessibility

Factors that may affect usage of green spaces are where potential users live, their attitudes toward leisure and nature, if and how they have access to public transport, the amount of time for recreational activities, fear of crime, poor information, distance to parks, costs and crowding (Byrne & Sipe, 2010).

Standard approach and needs-based assessments

The standard approach has since the early twentieth century guided the minimum acceptable green space allocations for urban residents. Initially when standard approaches were introduced to the planning discourses, the Americans claimed that no resident should have more than 400 meters to parks and green spaces. Later on the standards were modified and referred to acres per residents. Australian cities were at the first decades of the twentieth century following the concept of the United Kingdom. In Queensland they accepted the standard of 4-5 ha per 1,000 residents (Byrne & Sipe, 2010). Since the 70s the standard approach has received criticism for not taking quality parks, heterogeneous structure and availability into account. Unnecessarily long walking distances obstruct the use and make green spaces less attractive (Bangs & Mahler, 1970). In the inner Brisbane the green space standard being used is 'one hectare per 1000 residents', which is significantly lower compared to other international open space standards and also below the 'two hectares per 1000 residents' minimum standard from the BCC's City Plan (Byrne & Sipe, 2010).

Table 1: Comparison of international and Australian park standards:

Place	Year	Size of Public Green Space	Population	Distance
United States	1970s	10 acre/ 4 ha	1,000	400 m
United Kingdom	1920s	6 acre/ 2.4 ha	1,000	Unspecified
United Kingdom	1950s	4 acre/ 1.6 ha	1,000	800 m
Australia	1940s	7 acre/3 ha	1,000	Unspecified
Queensland	Present	4-5 ha	1,000	Unspecified
Brisbane CBD	Present	1 ha	1,000	Unspecified

(Byrne & Sipe, 2010:21)

A more current and beneficial model than the standards approach is the needs-based assessment, "which considers the socio-demographic and bio-physical characteristics of areas for which parks are needed, or where park facilities will be upgraded" (Byrne & Sipe, 2010:23). This has emerged as a preferred tool to support sustainable green space network.

The Planning Structure

Brisbane City belongs to the Commonwealth of Australia, which is a constitutional monarchy with Queen Elizabeth II as its apex as the Queen of Australia and the United Kingdom of Great Britain. The Governmental system constitutes three tiers of bureaucracy: Federal Government, State Government and the Local Government (www.gg.gov.au). The three levels of government co-operate to ensure and facilitate the Australian democracy. The Federal Government is responsible for national security, general taxation, major infrastructure, defence and welfare. The Federals also provide funding to both state and local government (www.qld.gov.au). The state government is represented by the Governors, who rule the state parliament, which retain all residual powers including those over police, hospitals, schools and local government ((b)[www.brisbane-australia.com](http://brisbane-australia.com)). The local government is responsible for city matters,

making decisions at a local scale, concerning roads, public transport and libraries, which in Brisbane is controlled by a single local government entity, the (BCC) Brisbane City Council.

Town planning matters in Queensland are devolved to local government but under state government legislation. The establishment of Greater Brisbane occurred through state government action, but with active local government support, which gives local government great political power (Minnery, 2004).

Plans, Programs and Policies

There are several plans, programs and policies within regional planning that guide and provide framework for the Queensland government, which helps the SEQ meet the challenge associated with population growth, climate change and economic development. “Regional plans operate in conjunction with other statutory planning tools, including state planning policies, local government planning schemes, state planning regulatory provisions and development assessment processes” (www.dlgp.qld.gov.au). Planning strategies have sought to minimise urban sprawl by using urban footprints, landscape values, growth management boundaries, urban consolidation and other measures in the regional planning approach (Byrne et al., 2010).

The Sustainable Planning Act 2009 (SPA) “...forms the foundation of Queensland’s planning and development assessment legislation. The purpose of SPA is to balance community well-being, economic development and the protection of the natural environment by providing a framework for managing growth and change within the State” (www.derm.qld.gov.au). As a result of extensive consultation and planning reform, the SPA replaced the Integrated Planning Act 1997 (IPA) in 18th of December 2009 as a legally bounded document.

Regional policies and program initiatives were in response to rapidly changing growth and the effects it caused. The South East Queensland Regional Plan (SEQRP) is the Queensland Government’s document for smart growth, which promotes sustainability by compact settlement, reduced car use, congestion and climate change. The SEQRP is a statutory instrument, which seek to protect the regional landscape, rural production and non-urban values from

inappropriate urban and rural residential development (Low Choy, 2009). The plan is a step towards planning for a better future that will shape SEQ over the next 20 years (SEQRP, 2009:1). The plan seeks to protect more than 80 per cent of the region from urbanisation by containing development within an Urban Footprint delineated for future and current growth (Kennedy, 2010).

Open Space Strategy

Brisbane has an extensive network of open spaces that greatly contributes to its reputation as a green and attractive city in Australia. In response to current and future challenges, as will be further discussed in the following chapter, the Brisbane City Council (local government) has developed an Open Space Strategy. The strategy aims to establish a plan for how to protect, develop and manage open spaces in Brisbane, where he Council has addressed four key elements:

1. Protection of existing open space, including:
 - Support regional integration of open space initiatives.
 - Greater collaboration between state and federal government to protect government- owned land.
 - More efficient public influence over privately owned open space.
 - Ensure we will be able to keep existing open spaces for current and future threats
2. Initiatives to better link and consolidate key open spaces, including:
 - Corridors of great ecological significance.
 - Pathways throughout Brisbane.
 - Creation of new public space.
 - Essential tree cover along roads, parks and other public spaces.
3. Better managing open spaces, including:
 - Strengthened and integrated values associated with open spaces.
 - Ensure multiple use of open space, since a wide range of needs, present and future, must be considered.

- Establish equitable standards of open space across Brisbane.

4. Closer involvement of community, including:

- Encourage community involvement and public participation.
- Open space programs that respond to community needs.
- Greater opportunities for Indigenous values and needs.

(BCC, 2006)

Future Threats and Challenges

The positive landscape attributes and the unique lifestyle that contribute to the region's sense of place and liveability are threatened. Climate change, population growth and urban development are some of the challengers that we as planners must face in order to maintain landscape values in South East Queensland. The statutory document SEQRP 2009-2031 was produced in response to these challenges, in which previous regional scale initiatives had failed or met limited success (Low Choy, 2009). Based on its history "community engagement through collaborative planning is the only feasible landscape management paradigm capable of successfully addressing the urban growth challenges facing South East Queensland and safeguarding its regional landscape values in their entirety" (Low Choy, 2009:1). Regarding implementation processes, the author highlight the positive outcomes that might occur from the SEQRP, if the lessons are to be learnt from the past.

As mentioned there are several immediate threats to SEQ's identity, in which development of a strategy to meet challenges within the SEQ region is demanded. These challenges might include:

- Develop an Open Space Strategy, which should facilitate the open space landscape.
- Involve and evaluate stakeholders in the planning debate.
- Full community engagement by a voluntary collaborative process of public participation and community development in all stages.
- Minimise and manage negative non-planning influences from communication of the regional landscape initiatives to freehold landowners.

- Gain support from politicians, industry and business community, where the media should have an important role to produce positive outcomes.
- Convert planning goals and concepts into successfully planning outcomes.
- Improve integration between state and local government.
- Learn from earlier failings

(BBC, 2006; SEQRP, 2009:11-12; Low Choy, 2009).

These discussed challenges are mainly concerning planning strategies and institutional arrangements, but as the community is growing/changing new solutions regarding physical design, availability and allocation of green spaces must be found. We need to redefine our design of green spaces and retrofit our park system across the Brisbane city landscape.

Recreational areas in Brisbane have traditionally been provided for passive recreation (Low Choy, 2006). It is essential that future parks are able to meet upcoming trends and needs since future needs may not be the same as current needs. The Brisbane areas that are already short of parklands, such as the inner north and south, are the ones that are expected to have the greatest development pressure (BCC, 2006). Green spaces are largely located in the western and eastern suburbs of the city and have long distances to future activity centres, which is a major challenge for urban planners.



Img. 16: A worker clean up the damages from the floods in Brisbane 2011.

Many of the immigrants in Brisbane and its environs come from cities with higher densities, where public green spaces have a higher level of environmental qualities (Byrne & Sipe, 2010). A wide range of open space opportunities needs to be integrated and supported in the green space system including pockets parks, community gardens, iconic city parks and larger civic plazas. Such a system should be flexible and respond to a changing and growing community. Some functions of such a system could be to:

- Provide versatile spaces for future needs.
- Deliver generous spatial parks since green spaces provide 'free' ecosystem services to the community, including cooling effect, carbon sink, reducing pollution and intercepting storm water.
- Ensure that green spaces offer informal services to the city, such as dance classes, sports events, weekend markets and food vending.
- Allow smaller intimate spaces for contemplation and relaxation.
- Place commercial activities next to open spaces, which not only provide economic benefits to city life, it also improve safety and vitality to such places.
- Improve accessibility by locate future parks within short travel distances, and by reducing physical and mental barriers in the landscape.
- Encourage new design solutions for green spaces such as green roofs, green walls, community gardens and open storm water systems.

(BCC, 2006; Byrne & Sipe, 2010; Low Choy, 2006)

Climate change

Experts now agree that the Earth's climate is experiencing a warming effect likely caused by the effects of human behaviour. The International Panel on Climate Change (IPCC) predicts that climate change will cause increased temperature in the atmosphere which will have direct impacts on our living conditions. Climatological research claims that warmer climate, as a response to atmospheric greenhouse gas and aerosol accumulation is to be expected. McMichael et al (2006) argue that changed climate patterns will include increasing global rainfall, more severe precipitation and flooding, with some land areas becoming drier. The variability in climate due to climate changes is also expected to increase. Further to this, recent research seeks to find a more comprehensive connection between sea surface temperature, thermocline depths

and the characteristics of cyclones and tropical storms (McMichael et al, 2006). Furthermore, concerning Queensland, the Office of Climate Change forecasts the number of days over 35°C will double by the year 2030, and floods and storms will occur more frequently and with greater severity.

Since 1994 strategies for sustainable development have guided the planning in Queensland and its legislative instruments such as Environmental Protection Act 1994, Integrated Planning Act 1997 and Water Act 2000. In the Queensland government's vision for 2020, Toward Q2: Tomorrow's Queensland, they have set out a target to reduce the carbon footprint in Queensland by one-third by 2020. This will be supported by statewide and national initiatives, climate change strategies and the Australian Reduction Scheme (SEQRP, 2009:39). Future development in the SEQ region is expected to include the following strategies or characteristics to achieve sustainable outcomes:

- Consolidation and compact urban form.
- Easily access to opens space, services and activity centers.
- Well-designed buildings adapted to climate conditions that reduce energy and facilitate environment-friendly cooling and heating system.
- Improve and increase recycling and re-use of natural resources
- Reduce energy and water use, and reduce waste and pollution.
- Encourage and manage energy from renewable sources.
- Protect and support biodiversity, open space, scenic amenity that are included in the cultural and landscape heritage.

(Kennedy, 2010; SEQRP, 2009:40)



Img. 17: Climate changes are a major threat to our reefs and underwater environments.

CAPTER FIVE – CASE STUDY AND ANALYSES OF GREEN SPACES IN INNER BRISBANE

Definition of Perceived Dimensions of Urban Green Space

There are several different definitions of Perceived dimensions or of Nature characteristics to be found in the literature and in the on-going debate. Boverket, the Swedish National Board of Housing, Building and Planning present in their report from 2007: Perceived Dimensions in the Landscape (Landskapets Upplevelsevärden –vilka är de och var finns de?), four different perceived dimensions, Serene & Biodiversity, Nature, Recovery opportunity, Safety & proper, which have been developed from 15 characteristics. The aim with the study was to evaluate which qualities/characteristics people preferred in their outdoor environment.

Stockholm's County for Traffic and Regional Planning (SCTR) has in one of their projects developed seven different perceived dimensions from the theories of Professor Patrik Grahn, which have been discussed in a previous chapter. The method was mainly developed to guide and support the planning of resort regions and wider landscape areas, and seek to meet the needs and demands from users in the area, from a recreational and social perspective.

The definition of Perceived dimensions which I have chosen to use in my case study is mainly based upon the research from Grahn, but with some guidance from the SCTR's method. The method is developed to meet the needs and requirements of Brisbane and is therefore adapted from the SEQ region's conditions (The method will be further presented later on). The final definition of perceived dimensions, used in my case study, has been developed as followed:

Perceived dimensions from the theories of Grahn:

1. Serene
2. Space
3. Nature

4. Rich in species
5. Refuge
6. Cultural
7. Prospect
8. Social

(Berggren-Bärring & Grahn, 1995; Grahn, 2005; Stigsdotter & Grahn, 2009)

Perceived dimensions from the SCTR's report:

1. Wild
2. Nature
3. Space
4. Rich in species & Educational
5. Cultural
6. Activity & Challenge
7. Service & Social

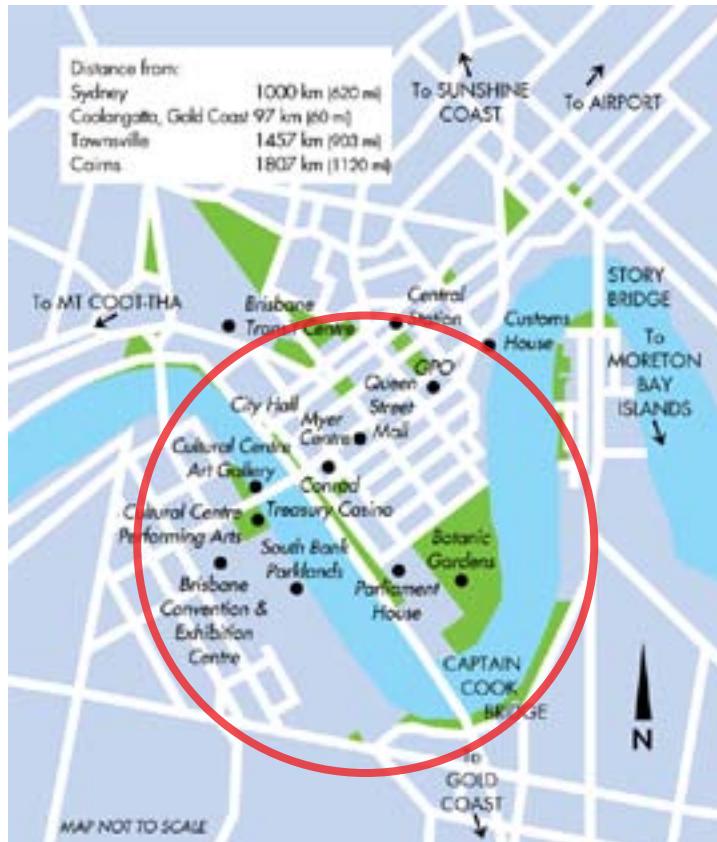
(SCTR, 2004:12-13)

My working definitions of perceived dimensions:

1. Serene
2. Space & scenic amenity
3. Nature & native plants
4. Rich in species & educational
5. Refuge & activity
6. Cultural & historical
7. Social, service & facility

Study Area

The study area covers the inner 3 kilometres of Brisbane City and includes the South Bank Parklands and the City Botanic Gardens.



Img. 18: The case study area of Brisbane.

My choice of green spaces for further analyses in the case study resulted in South Bank Parklands and the City Botanic Gardens due to their attractiveness that for various reasons reflecting values that contribute to the Australian lifestyle. My choice is mainly based upon:

- the central location, which make the parks not only attractive but also exposed to several challenges and threats
- the accessibility
- the large area that offers recreational, social, cultural and historical opportunities
- the ability to meet the needs from the users/visitors
- understandings why and how they attract different stakeholders
- different structure, design and physical asset
- my good knowledge of the parks by visit them almost every day for a whole year

Material and basic data

The review has included several field studies and observations during my year 2009/2010 in Brisbane. Between February and March in 2011 I went back to Brisbane in order to extend and deepen my knowledge about the chosen parks and green spaces in Brisbane in general. The material and basic data has been collected by numerous observation regarding usage, design, structure, physical assets, facilities, accessibility, location, geographical and cultural conditions, needs, prerequisites and stakeholders, which form the base for implemented analysis (SWOT and Perceived dimensions). Furthermore, performed observations of this character are classified as and titled a qualitative analysis.

Contributory information and knowledge about the planning tools, institutional arrangements and the plans, programs and policies that support environmental planning in South East Queensland, have been obtained from several courses and tutorials at Griffith University. By discussion with senior planner Helen Favelle and landscape architect Anton Trenor-den at the Brisbane City Council I have been given an introduction about challenges of green spaces in the inner Brisbane, which have aroused an interest for further readings. In addition to the field studies, material for the review was sourced from an extensive search of literature, articles and journals found on the web or at different libraries.

All gathered information about the specific parks and the planning concerns within the field of green spaces have been evaluated and analysed in the two different methods, whose results is showed in the following case study.

The Methods, Scope and Purpose of the Review

Perceived dimensions-analysis

In some places in Sweden it is sometimes common to value a landscape or a green space area from a recreational or a social perspective when planning for outdoor environments (SCTR, 2004). At those times, Perceived dimensions may be a useful method to address important characteristics within an area. The method used in this case study consists of seven different perceived dimensions, which have been developed from the SCTR's report and from Grahn's theories. The two parks have been evaluated and analysed from different criteria fulfilled within every perceived dimension. The criteria and the perceived dimensions have been adapted and modified to fit the Australian conditions, needs and requirements, which makes it possible to apply the method on the selected parks (for the full report see: Rapport 4:2001 Regionplane- och trafikkontoret). The aim of the method is to address possible perceived dimensions within a certain area, what you experience when you enter a park or a green space. The more characteristics that are included in the park and the more you perceive, the more benefited you are from the visit (Berggren-Bärring & Grahn, 1995). The perceived dimensions are developed to fit green spaces within urban areas, and are not only applicable on rural landscape areas, as the original purpose of the SCTR report. There is no order of priority between the perceived dimensions, and no characteristics are more valuable than the other. The method seeks to include and address several aspects of values which may be useful in future environmental planning guidelines.

The different perceived dimensions and the wide range of criteria that are used in the case study are presented as following:

Table 2: Perceived dimensions and its criteria.

Perceived dimensions	Type of Nature/ Characteristics	Activity	Expected experience
1. Serene	Silence and care, natural sound (water, wind, birds etc.) no disturbing elements	Relaxation, contemplation, reading, walking	Peaceful, calm
2. Space & scenic amenity	Open areas, beautiful views, rural landscape, look out points	Picnic, walking, playing, socialise	Satisfied, relaxed, devoted
3. Nature & native plants	Native plants, forest, no litter or disturbing noise	(Hiking), running, bird watching, Riding, biking	Relaxed, calm
4. Rich in species & educational	High biodiversity, easy accessible	Walking, educate, school tutorials, relaxation	Curious, learning
5. Refuge & activity	Playgrounds, opened and closed structure, bushes and trees	Picnic, playing games	Identity, safety
6. Cultural & historical	Built environment, historical places, interesting old features	Educate, entertain	Outgoing, fascinated, engaged
7. Social, service & facility	Well-cut grassed areas, open field, benches, toilets, shades	Barbeque, picnic, sports	Community, engaged, social, active

(Modified from SCTR, 2004; Grahn et al., 2005; Grahn & Stigsdotter, 2009)

SWOT-analysis

A SWOT-analysis is a strategic method used to evaluate the Strengths, Weaknesses, Opportunities and Threats involved in a project or in this case, a site or park area. It was originally developed to analyse business venture, by Albert Humphrey, who led a convention at Stanford University during the 60s (www.isu.edu).

SWOT ANALYSIS



Img. 19: A SWOT-analysis consists of Strengths, Weaknesses, Opportunities and Threats.

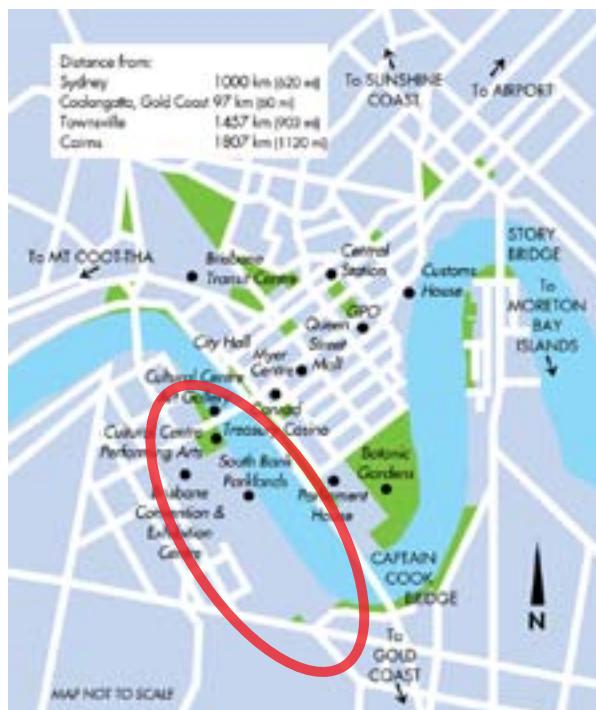
In addition to the first method (perceived dimensions) I have chosen to complete the method by applying a SWOT-analysis. The strengths within the park refer to the perceived dimensions included and found from the first method/analysis. Weaknesses within the park refer to perceived dimensions the site did not fulfil or was short of. Regarding opportunities these seek to open a dialogue concerning possible improvements or new solutions for maintaining the attractiveness of the precinct. The threats

within the park refer to challenges, future and present, which endanger and put the regions values, liveability and QoL at a risk. Hopefully the results from these methods will give materials and basic data to continue the debate about sustainable development within environmental regional planning. Other planning criteria such as availability, size, noise, variation, litter, distance etc., have been taken into account and are further analysed in the SWOT-method.

South Bank Parklands

Overview

South Bank Parklands are located at the district of South Bank, directly opposite the Central Business District (CBD) and reaches along the southern side of the Brisbane River. The parklands are connected to the city by the Goodwill Bridge at the south and by the Victoria Bridge at the northern end.



Img. 20: The South Bank Parkland location in Brisbane.

History

Originally South Bank was a meeting place for indigenous groups. But since the district was discovered by European settlement in 1840s, South Bank became an important business center of Brisbane. The major flood in 1893 forced the CBD to change location to the northern side of the river. Since then, South Bank has been an area for cultural activities where markets, theatres and performing art are sited (www.southbankcorporation.com.au). In The decision to stage World Expo 88 at South Bank in 1988, made Brisbane a world class city (BCC, 2005). The six months international event, which was themed 'Leisure in the Age of Technology', attracted over 18 million people (www.southbankcorporation.com.au). After the World Expo 88 was held, the government intended to develop the site for commercial business, but the public saw its potential as public space and lobbied for the site to be redeveloped as public parkland. In 1992 the South Bank Parklands were opened (BCC, 2005).

Structure and physical design

The parklands consist of 17 hectares public land and are approximately visited by 11,000,000 people annually (www.southbankcorporation.com.au). The area is very popular and regularly host festivals, markets and events. It also provides a variety of recreation opportunities that connect cafes, restaurants, art galleries, music stages and university campuses. The parklands offer a long walking trail and riverside promenade with a beautiful view over Brisbane River and the CBD. The promenade also provides the visitors with a stunning walk along the Grand Bougainvillea Arbour.

In more detail the parklands feature:

- The 'Streets Beach', which is a man-made beach with lifeguard crew.
- Mixed nature of rainforest, water and grassed areas with picnic and barbecue facilities.
- A long riverfront promenade with a Grand Bougainvillea Arbour.
- More than twenty cafes and restaurants.
- Suncorp Piazza

- The Nepal Peace Pagoda
- Tourists attractions, such as the Wheel of Brisbane.
- A waterpark for children.
- Queensland Conservatorium of Music
- Brisbane Convention & Exhibitions Centre.
- Griffith University



Img. 21: The Bougainvillea Grand Arbour.

South Bank Parklands hold several features that facilitate convenience such as benches, bins, shelters from sun and rain, fresh water taps, public slot telephones, evening and night streetlights and an information desk (South Bank Visitor Center).

Accessibility

The South Bank Parklands can be accessed via the Goodwill Bridge, which is a pedestrian and cycling bridge linking South Bank to the city center and was opened in 2001 (BCC, 2005). If you are on the opposite side of the CBD you can cross the Victoria Bridge to access the northern side of the parklands precinct. A walk from Kangaroo Point takes you via the Riverwalk to the southern parts of South Bank. The site has good access to public transportation and can be reached by bus from Culture Centre Busway and South Bank Busway, and by train from South Brisbane Railway Station and South Bank Railway Station, all within walking distance.

If you are entering the parklands by car there are underground carpark to be accessed via Grey Street and contain more than 800 car parking spaces ((a)www.visitsouthbank.com.au).



Img. 22: Overview over the parklands.

When the first CityCat services opened in 1996, the possibility to reach the parkland from the riverside highly increased the accessibility of the site. The CityCat and the Cityferry stops at several terminals along the Brisbane River, and are operated by the Brisbane City Council ((a)www.brisbane.qld.gov.au).

When in South Bank Parklands there is a well-integrated walking trail for pedestrians, such as Clem Jones promenade and Grey Street, which offer a vibrant and commercial strip. By bicycle you may access the site by several entrances and where tracks such as Clem Jones Promenade, the Boardwalk, Suncorp Piazza, Little Stanley Street and Staley Street Plaza, facilitate your travel through the parklands. Brisbane Riverwalk connects more than 20 kilometers of tracks, pathways, roads, bridges and riversides along the Brisbane River (BCC, 2005).

To facilitate disabled groups the parklands are equipped with disabled parking bays, located near lifts. There are several services provided for

visitors including, wheelchairs and strollers, which are available for hire from the South Bank Visitor Center. Most of the public toilets are also provided with handicap toilets ((b)www.visitsouthbank.com.au).

The vision of connecting South Bank to the city center came to fruition in 2005, when South Bank Parklands was recognized as a part of the core of Brisbane city in the Draft City Centre Master Plan submitted by the Brisbane City Council (www.southbankcorporation.com.au).



Img. 23: The Streets Beach.

Perceived Dimensions

The openness and wide grassed areas contribute to an opportunity for different recreational and social activities which attract a wide range of people. The precinct includes many arranged activity assets such as the Streets Beach, the children's water world, the Grand Arbour, barbecue facilities, caf  es and restaurants. The full service equipment makes the South Bank Parklands an important and much appreciated social meeting point, where the central, easily accessible location further contribute to its popularity.

Concerning the perceived dimensions in the park, the site clearly offers Space & Scenic amenity, Refuge & Activity, Prospect, and Social, Service & Facility assets. What the precinct is deficient in is the possibility to experience serenity and escape a busy city life, full of noise, traffic and interferences.

However, you may find intimate, small private spaces in the parklands, but the presence of disturbances are always around the corner to remind you of a stressful and busy life in the city.



Img. 24: The Brisbane Wheel by night.

As discussed earlier, Grahn (1995) argues that Serene is the most preferred dimension in general, especially for the most stressed and vulnerable persons, and highlights the importance of passiveness in green spaces for a quicker recovery from a stressful life. Therefore, activity, social and cultural opportunities are not what you prefer if you are feeling stressed and suffer from mental illness. According to Grahn and Stigsdotter (2009) Culture, Prospect and Social were the least preferred dimensions, which is very notable since the parklands include these characteristics very strongly. So, is this area less popular than other parks which meet the requirement of several more of the dimensions? One possible explanation may be that the South Bank Parklands attract a different group of visitors that only do random short stays in the park for a special occasion, such as children, students and tourists. The site may appeal to motivated, engaged and extroverted people since the parklands offer social and physical assets. If you go out seeking for a quiet and peaceful moment you might chose to visit another park, since people are attracted to different characteristics depending on their well-being and state of mind (Grahn & Sorte, 1986).

Table 3: The result of perceived dimensions found in the South Bank Parklands:

Perceived Dimensions	South Bank Parklands
1. Serene	
2. Space & scenic amenity	X
3. Nature & native plants	(X)
4. Rich in species & educational	
5. Refuge & activity	X
6. Cultural & historical	(X)
7. Social, service & facility	X

X = Criteria fulfilled

(X) = Criteria partly fulfilled

Strength, Weakness, Opportunity and Threat (SWOT) of South Bank Parklands

The SWOT-analyse is based on the values, prerequisites, background of the SEQ region, and those perceived dimensions that have been discussed and evaluated during this rapport.

Strength

Most of the strengths that are to be found in the South Bank Parklands contribute to improve liveability and Quality of Life in Brisbane and in the SEQ region, which are facilitated by:

- A large parkland area that contributes to high biodiversity, (compared to urban areas) scenic amenity and outdoor recreation opportunities for tourists and the urban population.
- Different cultural, recreational and social assets, which attract a wide range of people, and may include activities such as markets, food vend-

ing, sports events, performing art, running, promenades, barbecues and sunbathing.

- The subtropical Streets Beach and barbecue opportunities facilitate the Australian lifestyle, which not only appeal to visitors and tourists, but also attract Brisbane residents, since the site works as a social meeting point. This is especially appreciated during the very hot summer months.
- The long riverside walk and the Bougainvillea Grand Arbour not only offer a stunning scenic amenity over the waterways and the CBD the paths connect sites and support movement between South Bank and the city.
- The precinct has excellent access to public transportation and in most places good connectivity to the Brisbane River
- Street lights at the evening hours and during nighttime together with the supplies of restaurants, caf  es and cultural activities contribute to a vibrant city.
- The South Bank site encourages disabled groups (physical, intellectual or psychological impairment) to visit the parklands by supporting a wide range of facilities.
- What South Bank Parklands do exceptionally well is offer a diversity of smaller intimate spaces for different activities. The notion of almost being in a private sphere bring an additional dimension to the precinct.

Weakness

The weaknesses found in the parklands are based on the analyses of perceived dimensions and from previous readings, experiences and dialogues, and refer to the shortcomings and may include:

- Even though the parklands offer several intimate spaces, few of them contribute to the parklands serenity. It is hard and sometimes even impossible to escape the busy city for relaxation and contemplation. The noise that is constantly present from traffic, children, the Beach and from all the different activities in the site remains us of its central location.
- Daily and seasonal variations concerning use and experiences.
- Improved historical connection and attachment to the genuine landscape that reminds us of the appearance of aboriginal tribes that once

lived in the area. This might be expressed in an educational purpose in order to improve the knowledge/awareness of indigenous values of the region.

- The site has in different matters been referred to as the 'Hall of Shame' for displacing original residents (Byrne & Sipe, 2010:30). The South Bank Parklands have been criticised for mainly being a tourist place rather than a local area for urban residents.
- Shelters from the sun and rain, are generally good, but might be improved at some places, especially in connection to the Victorian Bridge whose location is extremely exposed for wind, sun and rain.
- Even though the precinct has excellent access to public transportation, City Cat and City Ferry services could have been extended during evening hours for a more vibrant and active city. Good connectivity to Brisbane River and improved numerous water activities optimise the unique location of the parklands.
- The plantations and its arrangements are very similar in its characteristics with few variations. The vegetation mainly consists of well-cut grassed areas with elements of different trees, bed and border plants and with the Bougainvillea Arbour reaching along the central part of the parklands.

Opportunity

The following opportunities within the South Bank precinct are concerning future possible improvements according to existing conditions, values, needs and lifestyle, including:

- Design for new types of spaces where new solutions must be integrated in existing green spaces for example green walls, green roofs, community gardens, open storm water management systems. Initial this could have been presented in an exhibition from Griffith University (GU) or Queensland University of Technology (QUT) where planners and architects demonstrate their ideas and visions.
- Following the example of the new Citycat (2011), Spirit of Brisbane, with improved fuel efficiency, reduced engine exhaust and noise emissions, all CityCat and City Ferry services should be transformed to meet the Bris-

bane City Council's target for smaller carbon footprint ((a)www.brisbane.qld.gov.au).

- Based on the environmental subtropical conditions a greater section of forest with native species could have been integrated to the current physical design of the park, which would educate people in Australian wildlife.
- In a better and more efficient way use the environmental and geographical prerequisite such as heat, sun radiation and precipitation for solar cells, open storm water system and increased vegetation structure. A proactive approach facilitates climate change mitigation and adaptation strategies whilst protecting the landscape values and heritage of the SEQ region (Corlett et al., 2010).
- The parkland should offer more free, or subsidised, outdoor informal services and programmed activities such as dance classes, tai chi, zumba or yoga.

Threat

There are several threats to be found that endanger the liveability and Quality of Life within the SEQ regional landscape, including:

- Population growth and urban development need to be sustainable since it not always seek to capture future needs and requirements.
- To extensive migration (domestic and international) with no or little connection and attraction to the landscape and its sense of place.
- The location of South Bank Parklands next to the Brisbane River makes it exposed to floods and rising sea level, due to climate changes, which the city of Brisbane have experienced several times and as recently as in January 2011. Increased levels of greenhouse gas emissions in our atmosphere highly contribute to climate changes (IPCC, 2007). New conditions, in terms of increased precipitation and warmth, result in improved plant growth, which put native species in a challenging position.
- Inefficient planning structure and inadequate strategies with no or little communication between stakeholders make the planning outcomes inappropriate and unsustainable.
- The popularity of the parklands with more than 11,000,000 visitors each year brings significant stress factors and tensions to the site caused

City Botanic Gardens



Img. 25: The City Botanic Gardens location in Brisbane.

Overview

The riverside City Botanic Gardens are the original botanic gardens in Brisbane and should not be mistaken for as the Brisbane Botanic Gardens in Mount Coot-tha, located 7 kilometers from the Central Business District. City Botanic Gardens (CBG) run along Alice Street at the northern side and border the riverside at the eastern and southern side of the city center ((b) www.brisbane.qld.gov.au). The newer Botanic Gardens in Mount Coot-tha had its original site at the Gardens Point (where the City Botanic Gardens are located today) but could not be further expanded and was subjected to several floods during the years (Hogan, 1982).

History

The City Botanic Gardens are the oldest park in Brisbane and were established by former convicts in 1825 who planted food crops to feed the prison colony. The original botanic reserve is included in the first native plants collection in Queensland (www.queenslandholidays.com.au). The park officially opened in 1855 by the garden's curator Walter Hill, who started an active planting program, including:

- Introducing exotic crops and plants such as pineapples, mangoes, paw-paws, sugar cane, tobacco, ginger, coffee, nuts and grape wines to the garden in order to evaluate their suitability for a subtropical climate.
- Establishing ornamental plant collections in the park to delight the visitors.



Img. 26: The Brisbane skyline from the gardens.

In 1958 the City Botanic Gardens were remodelled and the zoo was removed. Thirty years later major redevelopment started and the information center, the Mangrove Boardwalk and the Riverstage were established. At that time the former curator's residence was rebuilt into a restaurant ((b) www.brisbane.qld.gov.au).

Several artists have contributed to the high heritage dignity of the park, by their creation of artistic features. The CBG is argued to be one of the most important non-indigenous cultural sites in Queensland and is recognized for its high historical values. In addition to the plant collection there are a large number of historical and cultural heritage features (www.brisbane-livingheritage.com).

Structure and physical design

The gardens cover a 20 hectares large site of plant collections, early heritage species and present day exotic and native plantings (Murray, 2009).

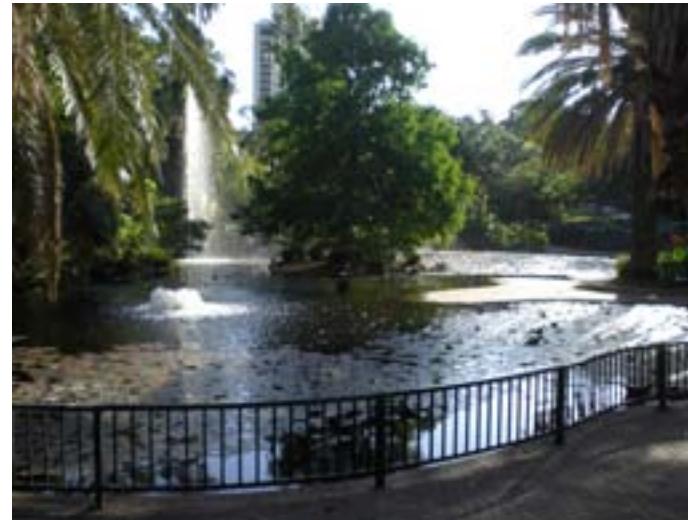


Img. 27: The river walk.

The precinct offer open grassed picnic areas and a stunning promenade along the Brisbane River from the intersection of Edward Street and Alice Street through the Mangrove Boardwalk to the northern part of Goodwill Bridge. Concerts, exhibitions, family festival and shows at the Riverstage and the main Rotunda are annually included in the City Botanic Gardens. Features and attractions contribute to the park's popularity, including :

- Anzac pines and conifers
- Bamboo Grove that consists of 23 species
- Children's Playground
- City Gardens Café and Restaurant

- Jemmy Morrill and the Brogas sculpture
- Mangrove Boardwalk, a 380 meters long walk that floats on mud.
- Ornamental ponds, which was a part of the Gardens original natural creek system
- Riverwalk along the Brisbane River.
- The Riverstage and the Rotunda
- Walter Hill Fountain
- Weeping Fig Avenue



Img. 28: Water Hill Fountain.

There are several cultural and recreational activities offered in the park. Free guided walks are available twice a day from Monday to Saturday, led by experienced volunteer guides (www.queenslandholidays.com.au). Self-guided walks enable exploration at your own pace, including free map and a brochure. Several facilities make you visit at the City Botanic Gardens more convenience and offer shaded areas, public toilets and toilets for disabled groups, limited car parking spaces, wheelchair access, picnic tables and seats, public water taps, café and restaurant and a playground for children. In additional to the Garden's facilities, there are 10 outdoor booking areas which are available for hire and offer settings for wedding and special occasions ((b)www.brisbane.qld.gov.au).

Accessibility

If walking to the City Botanic Gardens there are three entrances (Parliament House entrance, intersection of Alice and Edward Street and the Goodwill Bridge) from where you may access the gardens. The gardens reaches from Alice Street at the Gardens Point and from George to Edward Street at the Brisbane River. Opposite the River you will find the Parliament House and the Queensland University of Technology, which will guide you in a 10-15 minutes walk from the Central Business District. From the southern side of the city you may reach the site via Goodwill Bridge which was opened in 2001 and is the first pedestrian-only bridge, linking the CBD to the South Bank (BCC, 2005). CityCat and City Ferry services enable access from the riverside at the wharves of Gardens Point and Eagle Station.



Img. 29: The Goodwill Bridge give you access to the gardens from the southern side of the city.

By bus, there are free options in terms of the Loop buses which are offered by the Brisbane City Council and stop at Alice and George Street. The Council's bikeway map facilitate your planning route where several bike tracks are pointed out at your services ((b)www.brisbane.qld.gov.au). Independent of your choice of transportation to the gardens, when there, the gardens are open 24 hours a day with pathways lit at all hours.

Except from the Parliament House entrance, disabled groups have access to all gates in the gardens and most areas are designed for frail or a disability. There are toilets and car parking spaces for disabled groups available next to and around the gardens (www.queenslandholidays.com.au).

Perceived Dimensions

All of the chosen dimensions from this method are more or less implemented in the City Botanic Gardens. According to Berggren-Bärring and Grahn (1995) the more dimensions that are included in the park, the more people are benefit from its usage and the more popular the site become. The precinct especially offers qualities of a Serene, Space & Scenic amenity, Rich in species characteristics, where a variation of open space and disclosed structure enable retreat and personal space. It seems like the gardens attract a wider range of visitors compared to the South Bank Parklands, including a majority of the Brisbane residents. The easy access to the site and the several characteristics fulfilled, appeal city employees and office workers from the Central Business District, who gladly enjoy a short stay during lunch time. The deisgn and the accessibility to green spaces are determined by the way we are using them.

Rich in species and Nature, which are followed by Serene in its popularity, give the park dynamic and also arouse curiosity that contribute to a site's attractiveness according to Sorte (2005). Native and exotic species dominate the experiences and bring a relaxing and safe atmosphere.

The gardens seek to be a genuine and peaceful site, where less space has been given for services and facilities, and where plant collections, ornamental ponds, sculptures and fountains have been given space to reflect its historical and cultural background.

Table 4: The result of perceived dimensions found in the City Botanic Gardens:

Perceived Dimensions	City Botanic Gardens
1. Serene	X
2. Space & scenic amenity	X
3. Nature & native plants	X
4. Rich in species & educational	(X)
5. Refuge & activity	(X)
6. Cultural & historical	X
7. Social, service & facility	(X)

X = Criteria fulfilled

(X) = Criteria partly fulfilled

Strength, Weakness, Opportunity and Threat (SWOT) of City Botanic Gardens

The SWOT-analyse is based on the values, prerequisites, background of the SEQ region, and those perceived dimensions that have been discussed and evaluated during this rapport. The City Botanic Gardens are the green space from the case study that covers most of the perceived dimensions within its range, which makes it highly valuable for the Brisbane residents.

Strength

Most of the strengths that are to be found in the City Botanic Gardens contribute to improve liveability and Quality of Life in Brisbane and in the SEQ region, which are facilitated by:

- A large parkland area that contribute to high biodiversity, (compared to urban areas) scenic amenity and outdoor recreation opportunities for tourists and the urban population.

- Easy access for pedestrian, cyclists and disabled groups, both by having several entrances as well as easy facilitated paths throughout the gardens. CityCat and City ferry services provide visitors with opportunities to reach the site by the riverside.

- The very central location at the CBD attracts local business and office workers and invite visitors to spontaneous recreational attendances, an opportunity for relaxation and contemplation or just a desire to escape a busy street life.

- The site's genuinely with its historical values facilitated by several free guided tours.

- The large garden area includes a great amount of plant collections, native, exotic, mature and recently planted species, which could be used in an educational purpose for residents and tourists. The plantings are benefited from the subtropical climate where the species are a part of the Australian cultural heritage and must not be overseen. The interaction of plants creates a dynamic between closure and openness.

- The wide range of different facilities such as benches, seats, water taps, cafes, restaurants, shaded spots, day and night street lights and public toilets make the gardens a popular social meeting point. The opportunity to hire certain areas for wedding and special occasions also contributes to its affection.

- Large grassed areas offer organised, state-provided or spontaneous recreational and social activities.

- Several concerts and shows which are held at the Riverstage add national and international cultural attraction to the gardens, where the annual appearance of the Lord Major's Christmas Carols at Christmas time, contribute to the gardens local cultural dignity.

Weakness

The weaknesses found in the City Botanic Gardens are based on the analyses of perceived dimensions and from previous readings, experiences and dialogues, and refer to the shortcomings and may include:

- Even though the gardens consist of impressive plant collections for public access, educational opportunities could have been more extensive.

Many residents and tourists have an interest in learning about native and foreign species since it highly contribute to the qualities and values of the gardens and to the unique region of South East Queensland. As a planner and landscape architect I would have wished for that most of the plants were tagged with its botanic name, its origin, its age and its English name. Very few of the species have that kind of information and an improvement should be implemented.

- During my year in Brisbane I never heard of any free guided or self-guided tours in the gardens. Neither was I familiar with activities such as bird watching and bicycle hiring ((b)www.brisbane.qld.gov.au). The information to the public about recreational and social activities in the gardens would improve the attractiveness of the park.
- During hot summer days, especially for runners and actives people more public water taps are needed in the gardens.
- A small kiosk would have given you opportunities to buy an ice-cream or drinks, which should be located at the northern part of the gardens, close to the CBD, in case the restaurant is closed.

Opportunity

The following opportunities within the City Botanic Gardens are concerning future possible improvements according to existing conditions, values, needs and lifestyle, including:

- Even though the Botanic Gardens at Mount Coot-tha consist of many traditional characteristics, should some special features such as a bonsai house, herb garden, Japanese garden, mini zoo or a glass house for butterfly species, be offered in the City Botanic Garden's supply to satisfy city visitors.
- In Sweden for example dead trees in parks and gardens are highly valued for its biological diversity and are often left at the site to protect and keep native species (lichens, mosses, insects) survive at their original conditions. After trees have been taken down they are put down on the ground to cause less damage. This also gives children in the gardens a great opportunity to play games and for social activities.
- More and easily accessed information about public activities in the gardens are needed where notice boards could be put out at every entrance

to inform visitors.

- Research has shown mangrove plants have an exceptional ability to store carbon, which make them an important tool in combating climate change (Alongi, 2007). Mangroves grow in saline inter-tidal waters where other species cannot survive. One opportunity to reduce the impacts of climate change and extreme weather events is to establish more mangrove areas, such as the Mangrove Boardwalk in the City Botanic Gardens.

Threat

There are several threats to be found that endanger the liveability and Quality of Life within the SEQ regional landscape, such as the City Botanic Gardens, including:

- Urbanisation and population growth from surrounded areas put the gardens in a challenging position.
- The gardens location at the Central Business District gives unappreciated effects such as noise, exhausts, litter, dog dirt and stress/tension from daily activities.
- Impacts from climate change mainly in terms of sea-level rising and floods, which have been the hard case several times since the opening in 1855 ((b)www.brisbane.qld.gov.au). Changing weather conditions due to climate change highly affect the species and the plant collections in the garden which will face an uncertain future.

Critic of Method

The method has its origin in Swedish planning theories and is based upon characteristics of the Swedish landscape. Even though the method has been applied on other nationalities and are very well modified to adapt to the Australian conditions, some difficulties in transforming the definitions and the perceived conditions might occur. The case study is mainly based upon my own observations and experiences from the parks, highly influenced from literatures, articles, journals and discussions during my time at the Griffith University. However, the basic data might therefore be criticised for being outside the preferences of a scientific disquisitions.

CONCLUSIONS

During the years, several planning theories have been presented and guided the discussion on how the modern city should be designed to improve living conditions. Since the world's population increase and more people are choosing a life in cities, the pressure on current open space is rising. Scientists and planners have put forward different principles of green space planning, which in most cases seek to achieve sustainable development. Solutions in new forms and spaces for future growth must be found, where consolidation and high dense structure is widely argued. Community gardens, green roofs and walls, and open storm water management are seen as future solutions for improving social, environmental and recreational conditions.

It is widely argued that green spaces make a significant contribution to our well-being and social life. Open space and greenery gives the landscape its unique characteristics and sense of place which greatly improve liveability and quality of life. When it comes to Queensland and Brisbane, the region's geographical, cultural and historical values rely on its open attractive landscape assets. Brisbane is an attractive city, known for its beaches, leisure pursuits and cultural identity. To managing and protecting those landscape values, several documents, policies, programs and plans have been developed. Even though they highlight and bring up the awareness of integrating landscape values in green spaces, few solutions for improvements are suggested. Open space strategies for protecting existing open space, improving managing and linking key open spaces, are very well defined, but without giving any deeper solutions to improved landscape value management. I agree with Professor Low Choy that a "value-led" approach must guide open space strategies, where collaboration, public participation and an open dialogue between stakeholders are essential.

The qualities and the unique sense of place that could be found in the Australian landscape are highly implemented in the green spaces of Brisbane. The parks and gardens within the inner Brisbane reflect the promoted lifestyle and offer a wide range of social, cultural and recreational opportunities. Regarding my case study, South Bank Parkland and the City

Botanic Gardens were both very popular and well attended. Their different strengths were possible to address because of the applied method of Perceived dimensions. Sites that offer different characteristics also give different perceived dimensions to the visitor. Several positive experiences in a park, means several strengths fulfilled, which also make the site most popular. Green spaces attract a wide range of people depending on its different qualities and assets. Even so, the awareness of how and why green spaces are more popular than others is crucial for the opportunity to meet the needs for future generations. When designing for urban green spaces, residential need and geographical conditions, such as shade structures, tree canopies, rain shelters, functional seating and barbecue facilities features must be calculated for.

Positive perceived dimensions are facilitated by a well physical designed environment. However, when designing for attractive and useful green space the physical structure are important, but perceived dimensions of our outdoor environment must be calculated for as well. Design solutions and structural forms are irrelevant if the experiences from the greenery have a negative impact. Therefore qualities and characteristics those contribute to positive experiences need to be addressed and further integrated in green spaces.

The results regarding weaknesses found in the two parks indicate the absence of perceived dimensions. Weaknesses found in South Bank Parklands were mainly the lack of serenity, where cultural and social assets attracted the outgoing, active and extroverted visitor. The poor supply of accessible information and services were the main weaknesses in the City Botanic Gardens.

Threats and challenges within the parks were addressed by the SWOT-analysis, and from reviewed literature. In a global world we are put at similar risks where climate change, urbanisation and population growth are challenges every continent must cope with. Most of the threats and challenges within the region are also concerning the two evaluated parks from the case study, where flooding and sea-level rise were believed as the major threats, due to its close location to the Brisbane River.

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