RESTORATIVE ENVIRONMENTS WITHIN URBAN SETTINGS

The Case of Nairobi Central Business District

Master of Architecture Thesis

By

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DECLARATION

This is my original work and to the best of my knowledge has not been presented for the award of a degree in this or any other university.

Signed:_____DATE: _____

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DEDICATION

To my dear wife Mercy. Without her help and encouragement it simply never would have been.

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TABLE OF CONTENTS

LIST OF ACRONYMS

ART – Attention Restoration Theory

CBD –Central Business District

DAF – Didected Attentional Fatigue

EBD – Evidence based design

EEA – European Environment Agency

GoK –Government of Kenya

PFA – Perceptual Fluency Account

PSR – Perceived Restorative Scale

SRT – Stress recovery theory

UN –United Nations

UNDESA – United Nations Department of Economic and Social Affairs

UNDP –United Nations Development Program

UNEP –United Nations Environmental Program

UON – University of Nairobi

WHO – World Health Organization

LIST OF FIGURES

ABSTRACT

Cities are often described as vibrant and exciting, fast paced and bustling environments. Cities should therefore also have deliberately designated and designed spaces to renew and recover resources that have become depleted in facing the requirements of daily life. This thesis grows out of a shared global concern that our cities are having an impact on our health and wellbeing, more so, with the majority of the world's growing population living and moving into cities; thus, the necessity for restorative environments within urban settings.

There is a growing body of research looking at how different environments can affect people's health and well-being and enhance or hinder their activity. Researchers in this field, commonly called "environmental design research", have for a long time acknowledged that the challenge has always been the translation of their their findings into formats that are acknowledged and applicable by urban design practitioners.

This thesis provides a summary of what has happened in this area of research. It then discusses central concepts in restorative environment research focusing on the two theories, the psycho-evolutionary theory and the attention restoration theory.

The thesis seeks to arrive at an understanding and critical appreciation for research on people's interactions with environments. There is also a critical evaluation of the strengths and deficiencies in Nairobi's Central Business District's key public open spaces focusing on their restorative qualities. The study then concludes with recommendations on strategies and approaches that use insights and knowledge from environmental psychology to inform the design of more psychologically and physiologically restorative urban environments.

CHAPTER 1: INTRODUCTION

1.1 Background

As cities have grown and evolved over time the health of their populations has also changed. In the beginning of the 20th century, infectious diseases linked with increasing populations afflicted cities. Millions of people were killed by typhus, influenza, and tuberculosis because of improper sanitation and poor living environments (Rosen, 1993).

The world's population in urban areas is growing, and a United Nations Population Division study on urban population growth extrapolates that, while slightly below half of the world 's population currently lives in urban areas, almost two-thirds of the world 's population will actually live in urban areas over the next 30 years (UNDP, 2011). This population growth will mainly happen in less wealthy regions of the world with Africa and Asia experiencing the most rapid pace of growth. North America and Europe are deemed the most urbanized countries, but the amount of urban inhabitants in the least urbanized zone in Asia (1.4 billion) is now higher than the number in urban residents in North America and Europe combined in 2000 (1.2 billion). (Proshansky, 1970).

This data shows the significance of considering urban places as critical sites both for enquiry and action in relation to health and well-being. The restoration of environment will become more significant as increasing urban densification is a reality. We are affected by the choices we make such as choice of colour, shapes, lighting and materials.

Studying how environments and their design affect people's health, well-being and behaviour is increasingly becoming a keen area of research. Researchers in this field, commonly called 'environmental design research', have acknowledged that urban environments are often not completely responsive to individuals' behaviours and requirements, that these individuals require opportunities to restore depleted psychological and physiological resources due to this lack of compatibility (Marsella, 1998). Figuring out how to curb the effects on health by city life is increasingly becoming a major public policy issue.

To characterize and understand the nature of restorative environments within urban settings, an in-depth discourse on urbanity is required. The discussions presented in this thesis set off

from the assumption that there is a common understanding of what an urban area is. There is still no consensus on how to define "urban environment". According to social scientists, the definition usually denotes a region with grater population density as opposed to its neighboring areas. An metropolitan region consists of a city with a high population density, with a minimum population of 50,000 residents, according to Sandro & David, 2005.

There are different definitions available in different countries. The lack of consistency and varying definitions reveal the fact that the nature of urbanity and its build up is of a dynamic nature. A basic set of characteristics (though not exclusive) exist as regards density of population, heterogeneity, distance from other such densities and centres. In order to effectively study urban environments and their effects on health and well-being of its dwellers, urbanization as a process and urban environments as the object are concepts that need to be correlated and understood.

According to (Marsella, 1998), Urban health can be described as the health of a people that live and work in close proximity to each other, typically in a city or town, with generally the same environmental conditions. It is useful, therefore, when taking account of urban health, to contemplate urbanization and urbanity as complementary aspects that together shape health. Urbanization describes to the transformation in density, size, and heterogeneity of cities (Marsella, 1998). Simply put, urbanization can be defined as the process that shapes the growth and emergence or decline of cities.

Urbanity and urbanization are complementary concepts. Urbanity can be described as the effect of living in urban regions at a given point in time. In an examination of urban versus rural zones, Andrulis instituted the term urban health penalty, which alludes to a more prominent commonness of medical issues and hazard factors in urban zones (Andrulis, 1997). Urbanity therefore alludes to the presence of conditions that are specific to urban territories or not present in an a more prominent degree than in non-urban zones. For instance, the significant industrial pollution and contamination in certain urban areas and the higher prevalence of respiratory complications in these urban communities are two highlights of urbanity. Motor vehicles causing injuries to pedestrians, homicide and substance abuse are altogether highlights of urbanity, conditions that are more typical in urban zones than in non-urban territories.

A sustained transformation of the global population into urban dwellers has been experienced in the 21st century. The urban population has grown from less than 30% in 1950 to more than 47% in 2000. Largely urbanized nations such as those in Europe, North America, Latin America and the Caribbean have 75 % of their populations living in cities. The United Nations report on Global Human Settlements of 2013 confirms Africa as the fastest urbanizing continent.

In 1980, just 28 % of the African population lived in urban areas. Be that as it may, in 2006 the number rose to 37 %. In Kenya, back to back census reports show dynamic growth of the urban population which is ascribed to natural population growth, rural to urban relocation, the deluge of displaced people and settlers from neighbouring nations (Goldsmith 1997 and Sirola 2001).

Nairobi is by far the most populous city in Kenya. In Africa, Nairobi is considered as one of the fastest growing cities, characterised by a growing population and increasing business and industrial activities.   It is located at an elevation of 1,680 meters, and has an area of 689 square kilometres. The city serves as Kenya's economic, tourism and administrative centre, providing a home for a large number of businesses and manufacturers.

Nairobi was once a popular and a healthy place to live and was also called the "Green City in the Sun". Forests, labyrinthine riverine ecosystems, and wetlands made its landscape unique. The area had marshy wetlands, abundant wildlife the forest groves of the Kitengela Corridor and the Athi-Kapiti plains.

Nairobi's expansion has come to the detriment of the natural habitat. Urban sprawl and the development of roads and other infrastructure has prompted the diminishing of woodlands and other natural zones. Coffee plantations replaced the receding forest cover and afterward, the need for nourishment of the growing population prompted the change of land in the city's outer edges to other agrarian uses. These were further compromised by urban growth. The resultant urban environment has been one that lacks a sense of security, community and belonging, which are pertinent to psychic development of man.

The C.B.D of Nairobi was planned to cater in fullness of time for a population of 250,000. Only a small percentage of this population was envisaged to visit the C.B.D. With the same infrastructural facilities meant for 250,000 people, the population has grown to 1,400,000 with no access restrictions to the C.B.D, as was the case in the colonial times.

The influx of human populations into urban places was restricted to those who had gainful employment skills during the colonial period. Accordingly, the Africans who were the first to be brought into contact directly with the modern labour market in these places were seen as a prosperous and progressive people by the rural dwellers. After independence in 1963, this created a strong desire almost most youngsters to migrate to the city (Obudho, 1976, Machooka, 1996; Obudho, 1982). This trend has continued to date, resulting in an influx of people into the city in search of opportunities. Due to these reasons the city is facing continuous urban growth resulting to urban sprawl.

On the other hand, the number of vehicles planned for the C.B.D. was 30,000. This has increased tenfold to 300,000 without increasing the roads to the same traffic intensity. As per KNBS, (2007) reports in 2006, 817 new vehicles were registered in Kenya. Additionally, in that same year the number of private cars had increased to approximately a million in Nairobi (Ryu, 2006). Little wonder today, the transport sector in Kenya is said to account for nationally 65 per cent of the fossil fuels is consumed and to release greater than 65 per cent of the carbon dioxide (NEMA, 2003). Lack of vehicles maintenance and traffic congestion is critical elements in the air pollution problems in urban areas. Most vehicles do not conform to permissible emission limits. Air pollution from vehicles, industries and open burning of wastes in our cities and towns cause's serious effects on human health and environment. For instance, the problems associated with air pollution are commonly eye diseases, asthma, respiratory ailments, lung cancer and conjunctivitis, particularly affecting the young and the elderly. (UNEP/WHO, 1996).

Nairobi experiences an acute pedestrian-vehicular conflict especially in the CBD contributed by the street design and rapid urbanization of Nairobi. The pedestrian tends to get pushed under or over roads or squeezed on the edges.

Changes inland use pattern – specifically the change of use of buildings from office spaces and large shops to the very dense stalls occasion higher populations within the CBD. With land increasingly becoming an acutely scarce resource landowners are ensuring that this resource is utilized optimally to enjoy maximum output.

Motor vehicles are heavily contributing to the city's noise pollution levels. More recently the upsurge of the number of motorcycles moving within the CBD is also a major contributor of noise. Other sources of noise include aircraft, industries, construction sites and the mushrooming commercial stall outlets especially on the northeastern edge of the CBD along Moi Avenue and Tom Mboya streets. These may result in health complications including high blood pressure, mental stress, deafness, exhaustion, and ill humor.

The Synergies among these factors generate environmental stress. These urban stressors at play within Nairobi's CBD are a serious health hazard because they affect people physically, psychologically, and socially.

1.2 Problem statement

The growth of Kenya's economy and population from both immigration and natural growth are gradually increasing the size of the city. A significant number of people from satellite towns like Thika, Naivasha, Ngong, and Machakos travel into Nairobi every day for work or to deliver goods and supplies. Such movement accounts for an additional half-million people to the population of the city.

Although Nairobi has long been recognized like "the Green city under the sun", its increase in density has posed a serious problem. There is a clear inclination towards a continued dense arrangement in the future, as is the case in other cities worldwide. Poor and inappropriate city planning, rural to urban migration coupled with high natural birth rates are factors that collaborate to continually apply pressure on the quality of the city's environment. We must therefore re- think the urban framework in anticipation of the challenges that these unpleasant conditions will pose to urban lifestyle.

Nairobi's C.B.D suffers a shortage of adequately and appropriately designed restorative urban spaces to relieve the tension resulting from urban density. In addition, some of the existing spaces that could be potentially of restorative value are poorly designed as most of them lack the infrastructure to support cognitive respite.

1.3 Aims and Objectives

This research seeks:

i. To gain an understanding on the constructs of restorative environments and the role they play in the urban.
ii. To understand strategies and approaches that use insights and knowledge from restorative environments theories to inform the design of more psychologically and physiologically restorative urban environments.
iii. To evaluate the strengths and deficiencies in Nairobi's Central Business District's key public open spaces focusing on their restorative qualities and thereafter develop possible remedies to the shortcomings and propose possible future guidelines for the city and other urban areas in the country.

1.4 Research Questions

This research is based on the Qualitative aspects of urban open space. The research questions will set out the criteria to be examined as follows:

    i.   What are Restorative Environments and why do we need them in the urban context?

    ii.   What determines the quality of Restorative Environments?

    iii.   What are the restorative urban open spaces in the context of Nairobi's C.B.D, and how does their design or lack of it determine their quality in terms of encouraging or frustrating the constructs of restoration?

1.5 Significance of the study

This research seeks to capture the emerging reality of the effects, both physiological and psychological, that the urban setting has on the dweller and the need for a restoration mechanism through architecture.

When empirical research on people's interactions with environments successfully interfaces with architecture, spaces are built that mirror occupants' behavioural tendencies and enhance their daily experience. This will not only reduce stress and prolong satisfaction of occupants, but also stimulate procedural improvements and save undue criticism and time in future projects.

The information, ideas and observations derived from this research will be integral in formulating a set of principles for the development of restorative environments and perhaps the improvement of the already existing Public Open Spaces. These can be applied to a number of key sites in the Nairobi CBD.

1.6 Assumptions

The study is based on the following assumptions:

i. Urban open spaces have greater potential to offer restoration than any other setting therefore they are a get away from the fast everyday city life.

ii. All urban open spaces under study are frequented and used by the city residents.

1.7 Scope and limitations

The concepts considered in this thesis are mainly regulated by two theories, each with its own perspective of the nature and construct of restoration. The Stress recovery theory (SRT: Ulrich, 1983; Ulrich et al., 1991) and The Attention Restoration Theory (ART: Kaplan, 1995; Kaplan & Kaplan, 1989). The thesis also discusses the agreements of SRT and ART (Kaplan, 1995; Ulrich et al., 1991), generally the two theories are considered as complementary perspectives that concentrate on different views of restoration.

Geographically, the research limited itself to the Central Business District as defined by the City's Zoning laws. This is the region defined by University Way to the North, Moi Avenue to the East, Haile Se-lassie Avenue to the South and Uhuru Highway to the West. The parks (Central and Uhuru Park) which lie on the margin of the CBD along Uhuru Highway and are also used by the same users as in the CBD's open spaces, were not covered in this study as their size was too big and stretched too far from the C.B.D to be considered a part of it.

The research required the author to spend more time on the urban open spaces to be studied. Data was collected through observations, taking pictures, field sketches and structured interviews. It was likely that the users of these spaces would change their behavior in the event that they noticed they are being observed. This modified situation would affect the data collection process and consequently the findings since human behavior and activities are one of the elements investigated in the research. In order to counter that possible situation and to get unaltered results under the most natural conditions, it was necessary that the author uses a concealed camera to carry out his investigations. The author also identified key officials at the Nairobi City County offices to interview concerning the design and management of the key open spaces within the CBD.

1.7 Structure of the Thesis

This thesis is organized in six chapters. Chapter one begins with the introduction that offers a brief background, stating the problem at both the global and local scale. The lack of quality spaces for restoration within the C.B.D of Nairobi is introduced as the problem facing the city. In this regard, the research lays out its intention to explore the concept of restoration, define this concept both on the global & historical context and the local context (Nairobi) and showcase their importance in today's society. The need for this research is justified on the basis that a city of the size and prominence of Nairobi requires quality restorative spaces for its residents. The definition of what makes an urban space restorative or otherwise is to be derived from a synthesis of guidelines from a evaluative review of Literature in the area of environmental psychology. The chapter explains the aims and objectives of the research, the significance, hypothesis, the scope and limitations of the study and a definition of key concepts used.

Second chapter concerns itself with deciphering the urban way of life, the urban environment and its effect on an individual. The chapter also touches on the effect that the increasing separation from nature that aspects such as population pressure and how we are building now have on an individual. The chapter will also delve into the understanding of the environments that calm and have a buffer effect against the physiological and psychological effects of urbanity. Theories of restorative environments and the relationships between environments and health and well-being will be discussed compared and contrasted. A distil of experiential qualities from the restorative environment theories discussed is laid out. The chapter ends on a positive note looking at two international case studies of urban spaces designed for restoration.

Chapter three explains the methodology employed to investigate the restorative qualities of the key spaces in Nairobi's CBD, the analysis process and how conclusions were arrived at. It establishes why and how the investigation of restorative environments in the context of Nairobi's CBD is to be carried out. The why– the investigation would be done to establish how the city of Nairobi's open spaces fare in comparison to the synthesis of guidelines developed from literature review in Chapter Two. The how– through the case study method that was selected because it focuses on contemporary events and through purposive sampling, 3locations for study are identified. These are The Jeevanjee Gardens, Aga Khan Walk (and

the Sunken Car Park) and the August 7th Memorial Park. These are selected on the basis that they were all located within the study area and access to these spaces was largely unrestricted and open to the public. The study also sought to ensure validity by not focusing on one location to study. The research suggests how the collected data would be analysed in Chapter five so as to form an opinion on the restorative spaces within Nairobi's CBD.

Chapter four will focus on the case of Nairobi CBD. The historical beginnings and development of Nairobi is looked at through a study of several archival sources. A stock-take of what exists in the realm of restorative environments within Nairobi's CBD is done. The focus is then narrowed to three locations; The August 7th Memorial Park, The Jeevanjee Gardens and The Aga Khan walk as justified in the methodology chapter. These are deemed to be spaces that offer opportunities for restoration within the Nairobi Central Business District.

The study analysis and findings are presented in Chapter five. This chapter concerns on the real findings and examination of data from the survey done on the users sampled from the three spaces in scope. It interprets and explains the findings with regard to the study objectives.

Chapter six elaborates on the study's conclusions and recommendations obtained from the study. Fields for future research is also suggested. The document is concluded by a list of references and appendices that contain the fieldwork instruments.

1.8 Definition of key concepts

-Environmental psychology:

Environmental psychology is a field of research examining the interconnection between environments and human response and behaviour. As a field, it looks ate how and why our environments impacts us, how we can use that to find potential benefit, and what we can do to improve our association with our general surroundings.

-Environmental stressors:

These are conditions that cause undesirable discomfort, uncertainty, unpredictability and that over stimulate the senses. Some examples of environmental stressors are Noise and commotion, crowding, air quality, overly bright colours, too much light, and even insects.

-Restorative environments:

Environments and settings that trigger recovery from tension or chronic fatigue brought about by exposure to environmental stressors.

-Urban setting

Urban setting is an area characterized by greater population density and extensive human activity in contrast to its environs. These places can be towns, cities or conurbation. The term however excludes rural settlements (villages and hamlets).

-Preferred environments

These are environments that people seek out where they feel confident and comfortable where they can understand their environment while interacting with it.

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

This chapter concerns itself with deciphering the urban way of life, the urban environment and its effect on an individual. The chapter will critically look at the effect that the increasing separation from nature that aspects such as population pressure and how we are building now have on an individual. The chapter will also delve into the understanding of the environments that calm and have a buffer effect against the physiological and psychological effects of urbanity. Theories of restorative environments and the relationships between environments and health and well-being are discussed compared and contrasted. A distil of experiential qualities from the restorative environment theories is then drawn.

2.1 An overview of health, wellbeing and quality of life

Urbanization presents both opportunity and challenge for those concerned with organizing and designing the urban environment. There is an increasing concern on the urban environment and its effect on an individual. The necessity of having clear understanding of connections between the ever-changing urban environment, health and wellbeing is increasingly being appreciated.

2.1.1Concept definitions

The key terms that are defined in this section are applied throughout this study. Regard for these definitions is key to avoid conflicting interpretations.

2.1.1.1 Health

The latest definition was coined during a Preamble of the Constitution of the World Health Organization as acquired by the International Health Conference, New York, 1946 June; accepted on 22nd July 1946 by the 61 member state representatives (World Health Organization) and came into operation in 1948 7th April. It states that health does not only exist without any diseases or weakness but also a peaceful condition of physical, mental and environmental well- being also matters.

The Definition of health has not been changed since 1948. In 1986, during the Ottawa Charter for Health Promotion, the WHO stated that health is a resource for day- to- day life and not just an end. Health is a concept of positivity that describes social and personal resources and physical abilities.

2.1.1.2 Well- being

Well-being is widely defined from two different perspectives. First, the clinical perspective that defines wellbeing as the absence of negative conditions. Second, the psychological perspective defining well-being as the prevalence of positive attributes. Generally, positive psychological definitions of wellbeing convey several six characteristics. Six characteristics are consistent in the various definitions of well-being:

- Personal Optimization;

- A balance of conditions;

- An active pursuit of well-being;

- Life contentment or positive affect;

- Pro-social behavior;

- Numerous dimensions

- Finally, Personal optimization.

Gough et al describes wellbeing as things that people notionally tend to do and to be, and things they have been able to do and to be' (Gough & McGregor, 2007). Furthermore, Gough describes that even philosophical literature denotes the 'simple notion' of well-being (that is 'a life going well') in different ways such as goodness in a person, benefit, advantage, involvement, prudential quality, health, happiness, growth, utility, quality of life, and prosperity.

McAllister views well-being as not only the absence of pathology or illness but also includes subjective (self-assessed) and objective (ascribed) dimensions (McAllister, 2005). It can be assessed at an individual or society level. It accounts for fulfillment that cannot be explained or initially explained by economic development (Cramfield, Streuli, & Woodhead, 2010).

2.1.1.3 Quality of life

Quality of life has been defined "as the fulfillment of an individual's values,goals and needs through the actualization of their capacities or lifestyle". This definition is consistent with the conceptualization that fulfillment and prosperity stem from the degree of fit between an

individual's perception of their objective circumstance and their needs or yearnings (Felce & Perry, 1995).

The World Health Organization characterizes Quality of life as "an individual's discernment of their position in life within the setting of the culture and esteem frameworks in which they live and in connection to their objectives, desires, standards and concerns. It may be a broad-ranging concept influenced in a complex way by the person's physical wellbeing, mental state, individual convictions, social connections and their relationship to notable highlights of their environment".

Quality of life may be a wide concept that crystalizes all perspectives of life and has been utilized in an assortment of disciplines such as design, topography, logic, therapeutic sciences, social sciences, wellbeing advancement, and promoting. Quality of life, subsequently, can be seen as well-being addressing four regions: quality of life is physical, mental, social and spiritual well-being.

2.1.1.4 Urban areas

An urban area is characterized by higher population density and human activities in comparison to the zones encompassing it. This may be cities, towns or conurbations, but the term isn't commonly expanded to include rural settlements such as towns and villas. Aside from population thresholds, urban areas can be characterized according to diverse criteria (EEA, 2009).

- Administrative area: constitutes the territorial expression of the political and technical framework of governance, forming the focus for, and critical to the understanding of, the development and implementation of policies to secure both quality of life and sustainable development.

- Morphological area: constitutes, irrespective of administrative borders, the spatial dimension and form of cities and towns in physical terms, comprising urban fabric with buildings, roads and artificially surfaced area, industrial and commercial units, green urban areas within urban fabric, and in addition port areas, airports, and sport and leisure facilities if included or continuous to other urban land use.

- Functional urban area: constitutes the socio-economic reality of towns and cities expressed in terms of the territorial influence of the town or city across its hinterland, and identified in the relevant structures of the built environment.

2.1.2 Urban growth and transition

The world's urban population is predicted to rise by 35 percent over the next 15 years. This translates to 2 billion individuals for the next three decades. Except for North America, urbanization rates are generally slowing down in all other regions (UNDP, 2006).

A substantial proportion of the population growth experienced in developed countries correlates to sprawling slums that have risen unprecedently over the last 15 years. (Vlahov & Galea , 2007). There were less than three-fourths of a billion slum dwellers globally in 1990. That figure will hit 1.4 billion by 2020, up from about 1 billion today, if existing trends persist (Habitat, 2007).

From a population standpoint, it is the development of smaller cities that hold most significance. Megacities will account for just 12 per cent of urban expansion between 2007 and 2025, according to the UN Population Division. In comparison, cities with less than half a million people will account for about half of the urban population growth during the same period (Vlahov & Galea , 2007). The spatial spread of population is mostly concentrated in countries and regions where poor governance and underdevelopment of public structures are the most prevalent.

Urbanization cycles typically increase with population transfer. It's extrapolated that as the world population grows, the number of older people will continue to climb. (UNDESA, 2005). For several regions of the world, particularly Eastern Europe and the former North American industrial belt, there is an extraordinary decline in the urban population. UNEP: Improving urban environment management will help to prevent some of the adverse environmental effects of urbanization. (UNEP, 2003).

The relationship between health , education and community development is a result of changing attitudes towards both illness and planning. Before the twentieth century, theories about the miasmatic existence of the illness sparked the physical isolation of the working class from the suburban neighborhoods of the upper class, in an attempt by the wealthy to protect their wellbeing.

In the mid-twentieth century, community planning changed its focus away from public safety issues with the advent of automobiles and modern construction technology. Regional sprawl and carbon-based construction materials have been criticized for adding to the increasing burden of urban population disease.

2.1.3 Urban health and wellbeing

Urban growth usually related to the urbanization cycle. The impact of urbanization on health has changed over time and varies across various urban environments. Urbanization can imply increased access to state-of-the-art health care facilities, technology, and medical professionals. City life typically offers better education and per capita incomes which can – but not always – translate into better health (Bloom, Canning, & Fink, 2008). The "proximity economics" associated with population growth will reduce the costs of delivering infrastructure, such as clean water and social services. On the flip side-life the urban environments also expose the poor to overcrowding, aggression, air pollution, infectious illness, demanding employment, social alienation, crime, and chronic disease risk factors. The irony however is that though the national wealth is overwhelmingly concentrated in developed world cities, inequalities in access to health have also increased.

(Kearns, 1988) coined the term "urban penalty", which he used to describe the poor health and higher mortality rates experienced in urban areas as opposed to rural areas in medieval and early modern Europe. This was mainly related to diseases and conditions caused by poor hygiene, overcrowding and lack of access to clean water and waste disposal. Millions of people living in the cities died of pneumonia, tuberculosis, and typhus epidemics. Average expectancy in the countryside was as much as 50 per cent higher than in bigger towns (Freudenberg, Galea, & Vlahov, 2005).

In most countries health in urban areas is generally better now than in rural areas. This disparity is largely due to the implementation of public health policies and multiple measures (such as vaccinations, vaccination, improved safety, medications, hygiene, water management and information systems) that have resulted in decreased infectious disease incidence (such as dengue fever). Today, urbanization is linked to lifestyle adoption which encourages the development of chronic non-communicable diseases (Vlahov, David; Galea, Sandro, 2002). According to Mendez & Popkin(2011), large consumption of salt and energy rich foods, lesser physical activity, tobacco use, mental stress and isolation have resulted in an increased prevalence of risk factors like hypertension and obesity – which have further led to a rise in heart disease, stroke, several cancers and diabetes (Mendez & Popkin, 2011).

Today's urban environments are also distinguished by rising health and well being differentials within cities. Though health has improved on average in urban areas , urban poor people living in slums or in deprived circumstances could be subject to such bad living

conditions that their health problems are much worse than in rural areas (Kyobutungi, Ezeh, & Ye', 2008). The poorer areas in urban settings often face inadequate housing and sanitation, lack of running water, population density, pollution, substance abuse, violence, lack of social support, poor health care facilities, forced exposure to extreme climatic conditions such as flooding or drought, and exclusion from policy and decision-making (UNDP, 2011). These conditions, that are not unique to urban areas, clearly impact negatively on health and well-being and significantly threaten many urban populations. Less developed countries have more reason for concern about their health and well-being even though the issues of poverty and social inequality cut across countries at all levels of development (Perez & Barten, 1999).

Some of the urban environments face specific challenges related with informal settlements, food insecurity, job insecurity, migration, long-term and emerging conflicts, massive environmental degradation, and emergence of infectious diseases. Indeed, the latter predominates in nations where economic growth has been accomplished at an extraordinarily rapid rate and on a wide scale. Many cities rely heavily on fossil fuels for energy and these are significant sources of greenhouse gas emissions contributing to global warming (Mv Neil, 2005). In cities, climate change will affect the health of people in different ways (such as food insecurity, flooding that increase the potential of transmission of some infectious diseases and the exacerbation of certain urban air pollutants). Such factors influence the health and welfare of urban residents, both individually and collectively for long periods.

2.2 Environmental stress

Transactions between humans and their environments take different forms, resulting in different outcomes. Despite the capacity of humanity to survive, these transactions have positive effects to a large degree. However, it is not without risk that positive adaptation to environmental threats and demands happens. Suboptimal conditions in the environment generate demands that can sometimes exceed individual capabilities. Such an imbalance between the demands and human responsiveness is called stress (Cohen & Evans, 2004). Cohen & Evans observes that stress has a clear connection to poor health that takes place through changes of the immune system, increased cardiovascular responses and changes in inflammatory responses (Cohen & Evans, 2004). Stress has also been constituently linked with psychological issues like mental health deterioration (Hammen, 2005). However, not all stressor are equal, nor are any stressor's effects negative for both physical and psychological well-being.

Environmental stressors (e.g. noise, crowding, emissions) may either be acute (e.g. rates of emissions while trapped in a tunnel) or persistent (e.g. living next to a busy road) – each eliciting different reactions. Chronic environmental stressors are of more consequence for humans. For example, a reliable correlation between chronic stressors and compromised immune responses has been identified, whereas acute stressors seem to have little consequences. (Brannon, 2009). Individuals are limited in their ability to manage, escape or extinguish environmental stressors and thus their chronic effects. As an illustration, people who live near an airport may not be able to afford the possibility to move away. People living in low-income communities on the outskirts of industrial areas do not even have the option of deciding to move. This chapter provides a brief overview of general stress models, followed by a review of scientific evidence on the effects of a set of five environmental stressors.

2.2.1 Conceptualization of stress

Cannon (1932) and Selye (1956) are two researchers who established that when faced with emergency conditions animals and humans exhibited adaptive 'fight-or-flight' responses. Such reactions also included the sympathetic-adrenal medullary (SAM) activation. This physiological system regulates the release of adrenaline in case of an emergency.

Psychological stress models evolved independently of biological models and based on the effect of psychological influences on the responses to stress. The transactional model elaborated by Lazarus et al is by far the best known of these models (Lazarus & Folkman, 1987). How the human-environment interaction causes stress is the focus of this model.

More recently, a dynamic view of stress has been proposed by allostatic load theory as the body's continuous effort to achieve allostasis or stability through change (McEwen, 1998) . There is no single perfect state of bodily functioning according to this theory. The prevailing conceptual paradigm in stress research has progressively changed from stabilization (homeostasis) to adaptive transition. Long-term exposure to stressful conditions requiring constant modification of the functioning of the base line can result in progressive degeneration of the body.(Ganzel, Morris, & Wethington, 2010).

2.2.2 Environmental stressors and their effects

People experience a wide range of environmental stressors in their day-to-day life, more so if they reside in large cities. Five most prominent and extensively studied environmental stressors discussed in this section.

2.2.2.1 Noise

The urbanite deals with booming or continuous noise everyday. What may appear like a simple nuisance or irritation in a person daily life may have critical impacts on your both the long- and short-term health. Noise pollution is described as any kind of extremely loud or irritating noise that disrupts comfort. These kinds of noises can be produced from a wide range of sources such as animals and machines and even other people. Residing or working closer an airport, where the loud sounds of airplanes taking off and landing is one example of how a person may be exposed to noise pollution regularly.

In urban areas, modes of transport such as cars, trains and airplanes are some of the most common sources of noise pollution because they can be specifically loud and unrelenting in some areas. Generally, people who reside in urban areas are more likely to be exposed to noise pollution due to population density and the increased need for transport. Construction sites in developing and growing urban areas also affect urban dwellers.

Exposure to noise pollution can have negative impacts on one's health. The effects can be more severe if your exposure is regular. Some of the most common health issues related with noise pollution include hearing loss, hypertension, headaches and migraines, stress, and insomnia (Kryter, 1985).

2.2.2.2 Crowding

When the requirements for space exceeds what is available crowding is considered to have happened (Stokols, 1972). Individual preferences including culture, personality, gender, age and situational aspects (such as temporal duration, activity, private versus public space) can influence the perception of this density. Where available space is limited, there will be a struggle to control social interaction, behavioral options and will result in violation of personal space. Crowding raises physiological stress according to experimental studies: the longer people face crowding, the higher the rise in stress levels (Evans, 1979).

Different genders respond differently to crowding. Typically, men show stronger resilience towards crowding compared to women (Evans, 1979). Gender Disparities in gender responses

toward crowding could spring from the fact that men have greater personal areas than women, and these discrepancies could be attributed to men having less afflictive ability and thus less crowding tolerance than women.

When people feel crowded then it implies that they also experience psychological stress. They exibit tension, anxiety and nonverbal signs of nervousness such as fidgeting or playing with objects continuously (Cohen & Evans, 2004). Crowding is commonly related to social isolation, which is a coping mechanism that is characterized by a lack of eye contact, interpersonal distancing and avoiding unwanted conversation. Social withdrawal can in turn hamper such mental health protective factors as the development and maintenance relationships that are socially supportive. (McEwen, 1998). When they cope with crowding, for example, through isolation, they unbeknowingly harm social support, thus reducing resources to counter various stressors, which could ultimately have increased effects on mental health (Cohen & Evans, 2004).

2.2.2.3 Air pollution

Notwithstanding the reality that man has managed to subdue nature to serve human needs modifying it into rather peaceful and comfortable living spaces, man has also largely weakened the natural balance thus generating large distortions in the natural environment that will be unavoidably faced by humanity the future (Trajkovic & Petrovic, 2010).

Air pollution has become a major developing issue in large cities and large urban areas around the globe. In many cities transportation is recognized as the major source of air pollution (Goyal, Ghatke, & Nema, 2006). The set-up of large urban agglomerations unavoidably result in air pollution. Despite the significant negative effects on human health and environment, there lacks a systematic measures to curb the problem in many cities.

2.2.2.4 Traffic congestion

Large scale traffic congestion may result in increased physiological stress and negative affect (Koslowsky, Kluger, Reich, & Mordechai, 1995). A research by car users found that traffic congestion rates were correlated with mental discomfort, adverse impact and diminished motivation. (Koslowsky, Kluger, Reich, & Mordechai, 1995). The research also highlighted that drivers had a lot of unpleasant experiences with family members at home after a stressful commute. This is one of the examples of a form of cumulative fatigue produced by environmental stressors also referred to as the drain effect, that occurs when a situation in one setting persists to affect a person 's wellbeing in another setting (Cohen & Evans, 2004).

Studies on traffic-related stress are becoming more important from both a psychological and a social perspective since commute times are rising in most countries. In the US, people spend an average of 50 minutes a day commuting, and those in excess of two hours are also fast rising. Indeed, Americans spend more of their annual commuting time now than they do on holiday.

We provided some facts in this chapter regarding the effect on stress of noise, crowding, air quality and traffic congestion. A common effect of physical parameters and psychological factors are the adverse impacts of suboptimal physical environments on individuals. To better emphasize how chronic environmental stressors affect human health and well-being, physical and socio-cultural

People experience a large array of environmental stressors every day. This chapter looked at noise, crowding, air quality, and traffic congestion and their impact on stress. The adverse impacts of undesirable and less than optimal physical environments on humans are a combined result of physical and psychological variables such as environmental stressors regulation. Even after the source of stress is removed, their negative effects sometimes linger on long after. For one to better understand how human health and well being is affected by environmental stressors, these settings

To better understand how chronic environmental stressors influence human health and well-being, physical characteristics of suboptimal settings need to be studied along with the context in which they are embedded – both social and cultural and how individuals analyze and cope with those situations.

2.3 Restorative environments

What precisely is a restorative environment? One anticipates such environments to "refresh, renew, revitalize, manage or balance one self". However, how can an environment be created to achieve these haughty aspirations? Nancy Gerlach-Spriggs suggests in her book Restorative Gardens: The Healing Landscape that restorative environments should be designed to stir rhythms that boost the body, touch the spirit, and eventually improve the recuperative abilities inherent in a frail physic or mind. It would be fairly tough to achieve consensus, for instance, on what design strategies would "inform the spirit" and no doubt would differ based on personal experience and culture (Spriggs, Kaufman, & Warner, 2004).

Similarly, Martha Tyson's (1998) The Healing Landscape: Therapeutic Outdoor Environments suggests that a "healing" environment should be created to consider "the universal desire for human interaction with nature, with humans as the stewards of the land". This definition recommends that human activities guide and inform the design process (the desire to interact with nature) to create the goals and design patterns that will result in positive healing outcomes for the users. Tyson did not define these therapeutic outcomes, she however, specifies the process or direction of travel like a point of departure designed to bring about the restorative values of the landscape into the lives of those who require healing -physical emotional or spiritual. These restorative values are fairly indistinct except for these four recurring values: the value of sunshine, access to nature, fresh air and the ability to walk the land" which help in the process of healing. Tyson recommends that each healing garden be designed based on particular requirements and therapeutic goals, utilizing design patterns found by Alexander, et al to aid those requirements. The needs and goals are subject to personal elucidation, thus eliciting confusion in this relatively new field of study due to lack of consensus (Christopher, Ishikawa, & Silverstein, 1977).

Furthermore, these two examples bring up issues that exist in work that has already been done around restorative environments. The conflicting terminology as illustrated restoration and healing being applied interchangeably by different writers. This obstructs consensus in the area and perhaps the young state of the field of study exposed. Second, the direction for

design is either too obscure or too context or user specific therefore obstructing the search for a convergence of ideas in unpacking design for restorative environments.

Marcus and Barnes' Healing Gardens: Therapeutic Benefits and Design Recommendations clearly reflect these points. They cover and attempt to explain the theoretical improvements in restorative environments research and has a set of chapters dealing with design suggestions specific to the built environment. The conceptual approaches discussed in the book are so differed that one can easily conclude that the state of this area of research remains as pluralistic segregated (Marcus & Barnes, 1999). Marcus and Barnes arrive at three general requirements for achieving or creating a restorative or healing environment. First, is that the space needs to helps one attain a "degree of relief from physical symptoms". Second, that the space increases individual comfort levels as it also reduces stress levels when approaching and accessing it with emotional and physical fatigue. Finally the third condition is the development of a complete sense of well-being and hope that an individual is improving in his physical state (Marcus & Barnes, 1999, p. 3). How a model should seek to satisfy these criteria remains equivocal, even though there is agreement on their necessity.

Through a summary of the leading theoretical views in the literature on the constructs of restoration, this chapter will filter out a collection of restorative experiential qualities that can assist a designer's quest to create a restorative environment.

2.3.1 Restoration from a Stress Perspective

Roger S. Ulrich asserts that for a space to be referred to as "healing", the setting should have beneficial influences on the majority of users (Ulrich, 1999, p. 30). Such positive results are used as markers for restoration from tension. Ulrich emphasizes that tension is related to people's physical environments (Ulrich, 1999). He also states that stress is a process of responding to functions and environmental aspects that are demanding, challenging and that threaten health (Ulrich, 1999, p. 32). In our daily frantic life, stress plays a major role and adversely affects our health both physically and mentally. The psychological element has emotions like fear, sadness, anger and coping mechanisms (Ulrich, 1991). Increased heart rate, blood pressure, and muscle tension are some of the negative physiological impacts.

Ulrich postulates that restorative environments give relief from stress. That an aspect such as viewing nature can be a stress reliever from stress using a network of positive effects was one of his major findings. Exposure to vistas trigger positive thoughts, reduce negative emotions (such as anger, fear, and sadness), and capture one's interest while diverting stressful feelings.

Ulrich cites four design resources aside from views of nature that are required to enhance restoration. These four resources are a sense of control and access to privacy, social support, physical movement and keeping active, and access to nature and other positive distractions (Ulrich, 1999, p. 36).

2.3.1.1 Control and access to privacy

A sense of control is the actual or discerned ability for a person to choose what they are doing, influence their circumstances and determine what others are doing to them. Ulrich claims that controlling one's environment is promoted or hindered by design that improves way finding, gives privacy options should one choose, reduces personal space infringement, and provides choice from a variety of spaces. (Ulrich, 1999).

The findings of Marcus and Barnes revealed that the primary benefit obtained from people utilizing city parks was restoration from stress by giving them an escape (Marcus & Barnes, 1999). Urban parks give a temporal buffer from stressors further helping in restoration. "Escape" can sometimes be passive (as when enjoying a good view) or active (as when taking a walk or running in a park). A study of Ulrich and Addoms in 1981 concluded that "escape" attains perceived control (Ulrich, 1999). Ulrich and Addom's findings seem to be consistent with those of Marcus and Barnes. An urban park with easy wayfinding that offers a range of private sub-spaces or open socialization areas would alleviate stress and offer restorative benefits.

2.3.1.2 Social Support

Ulrich describes social support as discerned emotional help or care, and material or physical help that a person receives from other people. He also states that social support improves health through a combination of effects that largely include reduction of harmful stress issues, and relief through buffering or lessening of stress responses when faced with tough challenges (Ulrich, 1999, p. 43).

Social support - promoting design considerations were found out in computer analysis of likely -outdoor surroundings done by Barnhart et al. Natural spaces that were covered that offered opportunities to choose between having a conversation or retreating in privacy were preferred as well as spaces for meditation with vistas. However, designing to promotes social interaction over privacy is not advisable according to Ulrich. Both are to be considered important for reducing stress effects.

In addition, social support is given more weight from medical studies, which linked positive outcomes from cardiac patients to receiving greater social support. Many researchers will draw further design strategies, from studying users of urban parks who use parks for social contact and privacy and not necessarily those that are ailing (Marcus, Clare Cooper; Francis, Carolyn, 1997).

2.3.1.3 Movement and Exercise

Aerobic exercises are helpful in reducing chances of cancer and heart disease. The psychological aspect of exercise is necessary in alleviating the issues of stress. For the management of depression, exercise is considered as one of the important tools (Ulrich, 1999). Mild exercise like a twenty minute walk on some or all days mitigates tension and reduces rates of anxiety. Considerations in design that promote movement and exercise in urban parks and open spaces include encouraging the identification of walking paths, designing walking paths with loops and destinations as targets, enabling children and adolescents to play in views and fields (Ulrich, 1999, p. 48). The exercise level and intensity should be spread to cover all phases of fitness and all ages.

2.3.1.4 Natural Distractions

A positive natural distraction can be defined as an environmental aspect or condition that enhances a perceiver's emotional state (Ulrich, 1999, p. 49). Ulrich concluded in his 1992 papers that exposure to positive distractions can result in lower blood pressure and stress. Laughter, companion animals, nature, art, and music are some positive distractions considered in health care settings. These distractions activate the hearing and tactile senses. Animals also involve the senses of touch, sight, sound, and smell. Art engages our sight and touch, while music engages our sense of hearing. Nature on the other hand involves all five senses.

Ulrich concentrates on nature as a best positive natural distraction that reduces stress and enhances restoration of individuals (Marcus & Barnes, 1999). From 1972 to 1981, a study by Ulrich analysed patient cholecystectomy (gall bladder surgery) data. Patients with window views had shorter post-operative hospital stays, more positive nurses' remarks and less use of analgesic medicine. As a result, Ulrich concluded that attention should be given to the quality of patient views during hospital design.

Cities tend to be overly stimulating and as such are not restorative because of the negative distractions and the sheer high demand one's attention.

2.3.2 Restoration from a Mental Fatigue Perspective

The Kaplans concluded that natural environments promote recovery from mental fatigue due to their aesthetically satisfying nature. A desired setting is more likely than not going to be a restorative setting according to (Kaplan & Kaplan, 1995). The restorative effects of nature work in various degrees in: clearing of the brain, recovery of concentrated attention, cognitive stillness, gentle fascination

In 1998 the Kaplans' book - With People in Mind focused on two aspects: Design and Management of Everyday Nature. The first thing is that knowledge is conveyed in the community and the second is that people need to learn and explore their world.

Coherence is considered as a logical interconnection of themes that aid the understandability of an environment. When a person experiences a level of control and/or comfort the space referred to as coherent. Complexity provides greater influences in feel and visual attention with sensory stimulation. Legibility has to do with movement or circulation within the environment. What visual ques exist for orienting one self, and are there landmarks that one can easily identify? We are provoked by mystery to want to go through and identify what is next beyond the known and is created by winding pathways and slightly blocked lines of sight. The Kaplans' viewed environmental experience as being built on dynamics of the human's processing of information. When the gap overgrows the person becomes mentally stretched and fatigue will set in. The ability of a person to cope with the environment is then compromised, therefore necessitating a restorative experience (Kaplan & Kaplan, 1995).

2.3.2.1 Being Away

The notion of Kaplans "Being Away" is close to the concept of "temporary escape" by Driver & Knopf. To be away can also mean to expose oneself to cognitive material that deviates from the norm. The perceived virtual differentiation and isolation of the object from the environment during the workday can be as important as the actual physical distance. This psychological gap offers relief from mental tiredness (Kaplan & Kaplan, 1995, pp. 180 - 190).

2.3.2.2 Extent

Extent can be described as the connection between each element found in an environment. It can also be referred to as the feeling of being able to move through the environment in order to look for more information for the observer (Kaplan & Kaplan, 1995, p. 195). Extent encloses the assumed and the visualised and ensures a continuation to the world beyond what is instantly discerned (Kaplan & Kaplan, 1995, p. 190). Extent gives a feeling of being in completely different world that can still be explored at a small scale. Often Japanese gardens combine both miniaturization and creating an impression of broad space in providing both sense of reach and connectivity. Extent also operates at a more philosophical level. Settings that include historical artefacts, for example, can promote a sense of being linked to past times and past cultures, and therefore to a greater world. Extent will motivate exploration and will have the same impact of restoration from mental exhaustion as "being away".

2.3.2.3 Fascination

One of the most critical traits for a restorative environment is fascination. This is how something grabs your attention without you having to actively focus and think about it. For example, you may observe an object and begin thinking how it came to be or simply how large it is. It may be something as beautiful as a sunset or clouds or a flower and it offers your mind a break as you behold its beauty. Fascination captivates us and maintains our focus directed. Nature gives us numerous opportunities, creatures, and activities that we as humans find fascinating. The need to deploy directed attention may not be necessary as a reflective and enjoyable mood sets in (Kaplan & Kaplan, 1995).

2.3.2.4 Compatibility

Compatibility is the 4th attribute that makes a given environment a restorative environment. This has to do with how much an environment supports what the person wants to do there. Parks generally provide several people using it with different forms of compatibility. An

urban park can be used as a mode of transport, providing a route around a town. (Hartig, 1991, p. 9)

2.3.3 Restoration as Emotional Healing

Marcus and Barnes performed a psychological research in 1992 involving university students on spaces that provide emotional healing. The determined components and qualities were natural components, sensory qualities, safety or comfort, privacy or solitude provision and exploration opportunities (Marcus & Barnes, 1999).

Healing is described by Marcus and Barnes as a beneficial process which enhances complete wellbeing. They also said gardening can be curative and restorative. The first advantage a garden can provide is providing a measure of physical pain relief. The second benefit is to reduce the stress and increase the level of comfort. (Marcus & Barnes, 1999, p. 3). Any one or blend of the above benefits can be used to describe healing according to Marcus and Barnes.

2.3.3.1 Socialization

Restorative spaces should inspire people to socialize or meet outdoors. Socialization helps in obtaining a level of physical pain relief. The community will give the person a general sense of security, belonging and hope. Marcus & Barnes concluded that these three aspects of socialization provides as healing.

2.3.3.2 Privacy

Private areas within public urban spaces provide chances for self-reflection, meditation and deep thought. Meditation can be used for pain relief for physical symptoms. For stress reduction private thoughts can be useful and private spaces offer a better platform. The opportunity to retreat from an environment where the urbanite has a lack of privacy can enhance the general feeling of well-being or quality of life. These explanations satisfy the requirements set by for healing. Private places in urban open spaces can be created next to reflection pools, ponds or tucked within a groove of trees. Seating can be provided to help one settle down, self-reflect, think or meditate.

2.3.3.3 Strolling

In a restorative space, according to Marcus & Barnes, opportunities to walk at a leisurely pace should be available. Meandering walkways, with focal points showing bits of one's destination will inspire people to find out more about their surroundings. Looping pathways at the end of an exploratory journey can give some sense of achievement.

2.3.3.4 Vigorous Exercise

More intense exercise will have all the benefits of strolling, and more by providing some room for cardiovascular aerobic exercise. This form of exercise provides for stress management and a development of a complete sense of well-being by encouraging the individual to feel that they are improving their health actively.

2.3.3.5 Shade or Sun

By its very nature, a well-built restore space naturally offers both sun and shade. Allowing people to make one of those options will boost the space 's therapeutic ability. Trees provide natural shade and could also provide the same in their absence of building pavilions or gazebos.

2.3.3.6 Choice of sitting or exploring

In order to enhance its capacity for healing, an urban space can offers the choice for active or passive participation. Exploration motivates positive participation. Nature permits to sit and see for passive participation within a park. Both provide opportunities for relief from physical symptoms, reduction of stress, and a general sense of well-being. A looping pathway, meandering brook, vistas, focal points, and creation of destinations are the several aspects that can enhance the exploratory experience. Strategic bench placement in private and social areas can offer the users choices for sitting.

2.3.3.7 Aesthetic of Nature

Nature stimulates our senses. Nature can engage our sight, hearing, sense of smell, touch and even in some cases some tasty healthy fruits for our consumption. Nature 's beauty provides wholehearted healing.

2.3.4 Distiling Experiential Qualities from Restorative Environment Theory

From the above discussion, it is argued that all of the key features identified by the theories of Ulrich (the four resources), the Kaplan's (factors and patterns) and Marcus and Barnes (elements) can be clustered down to three restorative experiential values: sensory stimulation, movement and control. The **Table 1** below summarizes a description of this conceptual clustering of the researchers' design tools, variables, trends and elements that the three researchers assign as experiential values that help to frame the concept of restoration.

Table 1: Conceptual clustering of experiential values that aid the framing of restoration

	Sensory Stimulation	Movement	Control
Design resources per Ulrich			
Movement / Exercise		X	
Control/ Access to Privacy			X
Social Support			X
Natural Distractions	X		
Design factors per Kaplans			
Coherence	X		X
Legibility		X	X
Complexity	X		
Mystery		X	
Being away		X	
Extent	X	X	
Fascination	X		
Compatibiity			X
Design Elements per Marcus & Barnes			
Socialization	X		X
Privacy			X
Strolling		X	
Vigorous Exercise		X	
Shade/Sun	X		X
Sitting/ Exploring		X	X
Aesthetic of Nature	X		

Source: Author, 2019.

2.3.4.1 Sensory Stimulation

To respond, interact and keep the body healthy and safe, our nervous system must obtain and process information about the world outside. This knowledge comes from the organs of the senses: eyes , ears , nose, tongue, skin, etc. Inside those organs, specialized cells and tissues receive raw stimuli and convert them into signals that the nervous system can use.

Nerves transmit the signals to the brain, interpreting them as sight (vision), sound (hearing), smell (olfaction), taste (tasting) and touch (tactile perception);
Sensory enhancement is important when constructing a restorative experience. Our sensory organs are organized rather than static feedback to distinguish changes in stimuli.

Medium stimulation levels promote relaxation and improve performance when greater stimulation results in a decline in performance or positive reactions (Olds, 2001, p. 9). Nature provides a relaxing balance. No too much monotony, or too much noise (Olds, 2001, p. 10).

Among Ulrich 's four design tools required to enhance restoration, natural stimuli give the greatest opportunity to stimulate the sensory. Good distractions in urban environments, can include laughter, animal touch, music, art, casual conversation and nature interaction. These sorts of distractions are stimulating the senses. Nature essentially activates all of the five senses and is therefore a vital tool when designing a restore room.

Looking at Kaplan's design factors that promote restoration: coherence, complexity extent and fascination are all activate our senses while among the design elements that Marcus and Barnes focused on, shade or sun and the aesthetics of nature offer sensory stimulation.

2.3.4.2 Movement

Movement is a crucial quality of perception in a restorative environment. When developing the restorative experience, Ulrich considers the essence of physical activity and exercise. The Kaplans believe that people have a desire to understand their universe and explore it. Landmarks and visual orientation cues assist with legibility. Environmental mystery leads us to want to explore what lies beyond what is understood.

Kaplan's factors of being away and extent point to movement as key experiential quality to be considered. In order to get away person must change location physically to different place. It could be argued, also, that a person could also mentally wander away virtually and still experience restoration.

Movement is reflected in two of Marcus and Barnes' design elements. The satisfaction from vigorous exercises as well as strolling are identified as motivators to experiencing the outdoors.

2.3.4.3 Control

This thesis defines control as giving people the power to influence their actions or the course of events or direct them. Providing people with choices of movement, privacy, social interaction, play and safety opportunities in their community is important in a restorative design.

Control can be enhanced by the manipulation of scale, light, temperature space, manipulating openness and end enclosure. To achieve control, one must design for predictability. Space designed to promote predictability will seek to maintain good views or an elevated location so that occupants can survey all areas of a space and be able to watch events unfold. Passive engagement mechanisms also help to encourage predictability.

Ulrich concludes that a sense of control and ability to retreat in privacy are key resources that are required for restoration. His research findings indicate that the capacity of a person to cope with stress is linked to their ability to retain a sense of control over their immediate environment. On the other hand, the element of control is highlighted in three of Kaplans' design factors. Coherence, legibility, and Compatibility.

Four of the design elements and qualities highlighted by Marcus and Barnes relate to the restorative aspect of control. These are Socialization, privacy, shade/sun and sitting/exploring.

This chapter started by highlighting some of the literature's difficulties in the evolving field of restorative environments, including the lack of consensus on key terms and the varying levels of research at which the investigation took place. A review of the theoretical literature has

revealed a set of experiential qualities which should inform restorative environmental design Here it is argued that there are three such experiential restorative qualities that intersect the various theoretical highlights: sensory stimulation, movement and control. These experiential qualities can help to structure design for restoration and decision making of the environment. Natural ecosystems are especially rich in qualities needed for restorative experiences.

2.4 Case studies

The author identifies two international cases that make a fair attempt at demonstrating the strategies and approaches that use insights and knowledge from environmental psychology to inform the design of more psychologically and physiologically restorative urban environments.

2.4.1 The Superkilen, Copenhagen, Denmark.

The Superkilen is a half kilometre long urban space weaving through one of Copenhagen's most ethnically diverse and socially challenged neighbourhoods. It has one consistent theme, that it is framed as a massive exhibition of best practices in urban open space design. The space has a worldwide collection of found objects from 60 different nationalities of the people occupying the area encircling it. The objects varying from exercise gear from muscle beach Los Angeles US, to sewer drains from Israel, palm trees from China and neon indicators from Qatar and Russia. Every object is supported by a small stainless plate inlaid in the ground describing the object's place of origin and details in Danish and in the language(s) of its origin.
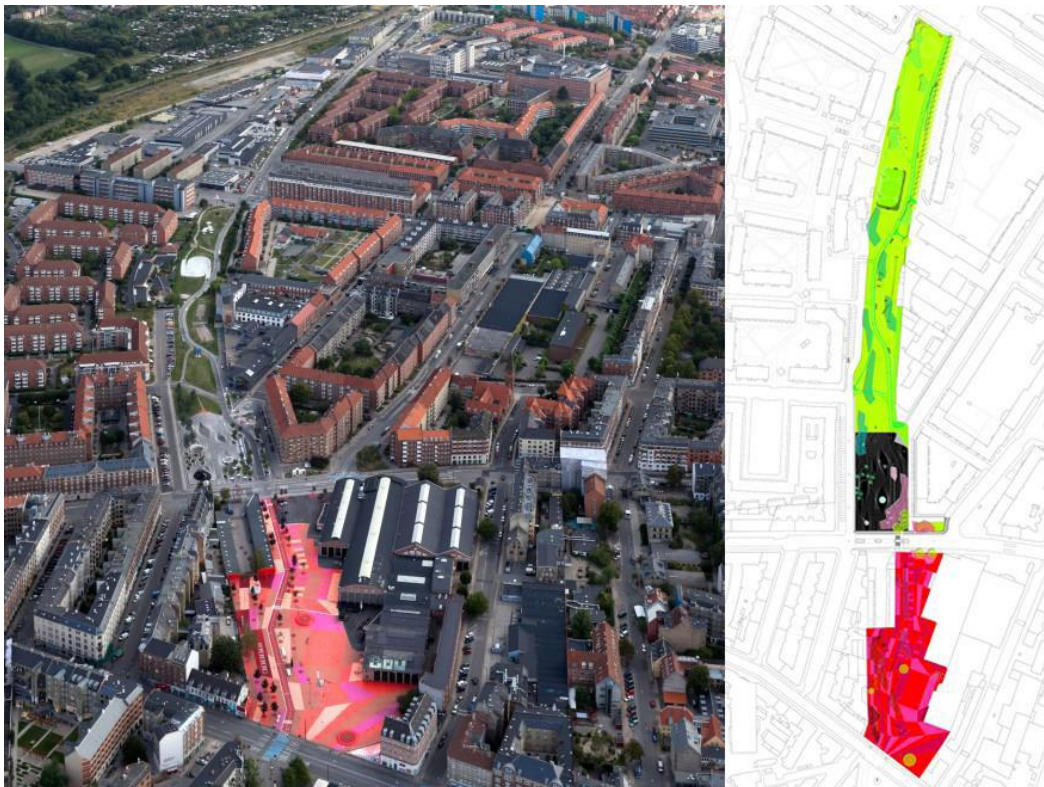
Figure 1 Aerial photo and Site Plan of The Superliken Copenhagen Denmark

Source: www.archdaily.com

2.4.1.1 History

Nørrebro is one of Copenhagen's most restive neighbourhoods. In modern times from the 1980s, it's streets have undergone massive uprisings. Violence from the altercation between police and demonstrators, who protested over topics ranging from Denmark's accession to the European Union to the destruction of a cultural centre, has remained embedded in Danish minds, hence adding to the neighbourhood's stigmatisation. Beyond the media buzz surrounding these activities, Nørrebro's everyday life is distinguished to a great degree by the complexities resulting from the immense cultural diversity of its 70,000 inhabitants from over 60 different nations. Bosnians, Somalis, Turks, Pakistanis, Albanians and many others share an urban setting where small private houses and cooperative housing blocks coexist.

The Superkilen in Copenhagen is a new urban park named after the famous 'big wedge' strip of land in town. The £8 m project saw the transformation of a disused railway track into a park. The Park is planned to be a place of celebration for the neighbourhood's cultural diversity. Therefore, recognizing the challenge, the collaborative production focused on exotic imaginaries contributed by the residents and the collaborative multidisciplinary work of architects, landscapers, and artists was crucial. The new park was intended to encourage many other countries and cities to use their neighbourhoods' 'cultural diversity positively to reinforce their spaces' character.

2.4.1.2 The Spaces

The Superkilen is conceptually divided into three different zones and colours - green, black and red. The different surfaces and colours are connected to create a new dynamic environment. Different finishes applied on the ground define the different sections.
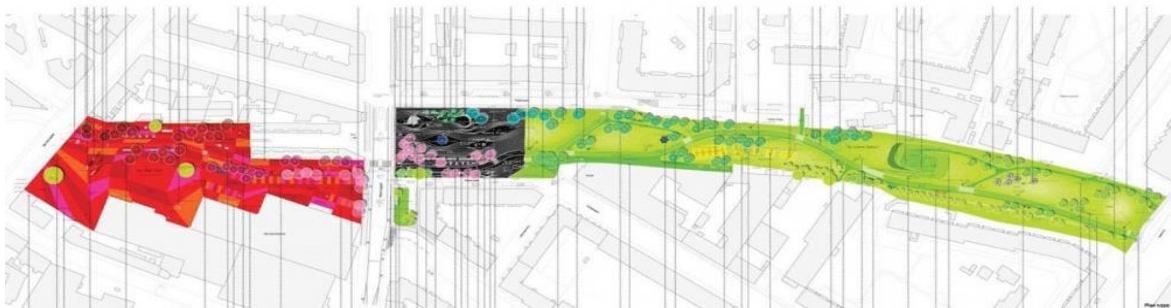
Figure 2: General plan of the intervention.

Source: www.archdaily.com

2.4.1.3 The Restorative qualities

2.4.1.3.1 Social support

The Superkilen is set in a Copenhagen quarter which is strongly international. The importation of essential elements from other places and cultures represents and enhances the neighborhood's multiethnic fabric. The imagination and fantasy of the Quarter was ignited through several months of workshops and interaction with the people and local organizations.

Figure 3: The cosmopolitan community

Source: www.archdaily.com

The scheme exhibits opportunities for conversation and interaction as it serves as a spill out space and central gathering place. The space hosts intercultural events and concerts that bring the community together. The designers however were careful to find the balance between social interaction and privacy. As a user seeking some privacy, nooks have been created with sitting benches where one can sit read a book or meditate.

Figure 4: Casual sitting spaces

Source: www.archdaily.com

Mimers Plads is considered as the core of the Superkilen Masterplan. This is the meeting place around the Moroccan fountain with the Turkish bench under the Japanese cherry-trees. In the weekdays, outdoor fixed tables and benches create an urban living room for players of backgammon, chess and other games. The East side of the Square is reserved for bike traffic by partly solving the issue of height variations by introducing bike ramps and bike path connections. Towards the north is a hill facing south overlooking the main square and its activity.

Figure 5: The urban living room

Source: www.archdaily.com

Figure 6: The main square where public functions are held

Source: www.archdaily.com

2.4.1.3.2 Movement and exercise

Sport is one of the activities in society, where very diverse people can still agree on the rules. Everyone can play football irrespective of your background, beliefs, and language. It is the reason a number of sports facilities were designed-in, including a hockey field with an integrated basketball court. Sports facilities are natural assembly spots for local young people.

Figure 7: Sporting facilities

Source: www.archdaily.com

The Green Park's character with its soft hills and surfaces draw the children, young people and families. Families with children find this space conducive for meeting, sunbathing and relaxing in the grass. Less vigorous sports and activities like hockey, badminton and light exercises are hosted between the hills.

Figure 8: Children play areas

Source: www.archdaily.com

The space also affords opportunities for light exercise such as walking or cycling across the space that is well shielded from vehicular traffic.

Figure 9: Dedicated cycling path

Source: www.archdaily.com

2.4.1.3.3 Natural distractions

The desire for interaction with nature is accommodated through the introduction of vegetation and plants throughout the whole neighbourhood clustered in small islands of different trees with different blossom periods and colours.

Figure 10: Pockets of planting in the asphalt zone

Source: www.archdaily.com

The largest part of the park has resonated with the the residents' yearning for a greener neighbourhood. This area is called the Green Park. This area is green, from the large grassy textures planted with Lebanese cedar trees and Central European larches, to the areas enclosed in painted asphalt.

Figure 11: Lawns with provision for group sitting

Source: www.archdaily.com

2.4.1.3.4 Being away

The space is designed to have content that is different from the usual. Being in this space evokes a sense of a distinct separateness from the rest of the business district. The experience provides a relief from mental fatigue and thus promotes restoration.

Figure 12: The contrasting Copenhagen business district

Source: www.archdaily.com

2.4.1.3.5 Extent

The Superkilen has been designed to be one flowing open space. One can easily move through the three distinct zones. As one's curiosity is satisfied on one zone a new interest is created as the next zone comes into view.

Figure 13: The half a mile stretch that is Superkilen

Source: www.archdaily.com

The Superkilen is a generous space dedicated to non-motorized transport and the public's use. It has a series of relationships between the environmental features. The space comprises aspects that relate to each other and which, when taken as a set of features, are related to a wider context. This distinct theming of the three sectors has helped to achieve this.

The design is such that when standing anywhere within the space one experiences a breadth that shows there is more than the immediate environment available, either physically simply out of sight or even within the imagination. The place is designed provide a sense of a completely different world, and natural environments including distant wilderness or trails and paths created give the illusion of small areas seeming larger.

2.4.1.3.6 Fascination

The use of colour patterns varieties of texture and public art engages the users of the space and keeps their attention directed. The design is a conversation among the different cultures residing in Superkilen.

Figure 14: Children attracted to play slides

Source: www.archdaily.com

2.4.1.3.7 Compatibility

The special connection between the human inclinations and the natural environment are respected by the introduction of tree plantings scattered in the design. The introduction of a variety of functional furniture allows for the users to exercise choice of where to sit lean or even lie.

Figure 15: Users afforded a wide array of choice as to where to sit

Source: www.archdaily.com

The edges of the Superkilen are sufficiently porous to allow passers-by to look into this park and park users can have a view out. The space does not have a clear boundary as like the porous edges permit casual access. The range of facilities including playing fields, tennis courts and playgrounds have been placed so that there are clear sightlines between them to motivate passive surveillance and therefore achieve an intensified sense of safety. The sense of safety is further improved by giving users with a choice of entrances and exits. The physical permeability and choice of direct and attractive routes through the space maximizes legibility and physical accessibility. These factors collude to ensure the comfort of the user of the space.

Figure 16: Creative furniture

Source: www.archdaily.com

2.4.1.3.8 Privacy

The Superkilen lacks entirely Private spaces. However, it has a variety of sitting furniture that can allow one to sit for self-reflection, thought, and meditation. The ability to have solitude in this public environment can enhance the complete sense of well-being or quality of life within the urban setting. One can access privacy next to the Moroccan reflection pool, or even seated alone on the ample street furniture. These places present sitting places that would increase self-reflection, thought or meditation.

2.4.2 The Darling Quarter,Sydney, Australia.

The Darling Quarter zone is a 1.5 hectare place-making project that has changed the public domain of Darling Harbour, one of most visited destinations in Australia. The new mixed use zone includes the Commonwealth Bank Place and two large campus-styled 6 Star Green Star commercial buildings. The public domain integrates the new city pedestrian links, a 3,000 square metre retail terrace with new cafes, restaurants and bars, generous grassed community areas, a children's theatre seating 300 and a creative playground as its focal point. The large spectacular 4,000 square metre playground is one of the greatest well-lit playgrounds in Australia and is a regional attractor. It is also one of largest play areas of Australia that incorporates interactive water play in an urban setting.

Figure 17: The site plan

Source: www.archdaily.com

This project set off a shift in thinking about the significance of the public domain in the re-vitalisation of the western edge of Sydney's CBD. Darling Quarter has established a new benchmark for the public domain and commercial architecture in Sydney. A keen attempt has been made to link this project to the existing context so that it reads as an extension of the existing public domain. Darling Quarter demonstrate design quality and leading green design initiatives, creating a free, public space brought to life by the community day and night.

Figure 18: Aerial photo

Source: www.archdaily.com

2.4.2.3 The Restorative qualities

2.4.2.3.1 Social Support

The project addresses social and cultural challenges through place making strategies to secure long-term social sustainability. These following features are highlights:

- One of the largest well lit playgrounds in the nation
- It has Australia's first theatre exclusively dedicated for children shows
- A large community green
- A busy retail section
- An interactive digital media façade this is one of the world's biggest interactive digital media canvases.

Figure 19: Active edge of the darling quarter

Source: www.archdaily.com

2.4.2.4.2 Movement and exercise

As Sydney's the largest inner city playground with excellent play apparatus for all ages, involving interactive water play provisions designed into the landscape, it offers great space and opportunity for movement and exercise.

Figure 20: Table tennis tables

Source: www.archdaily.com

2.4.2.3.3 Natural distractions

The Community Green is an open grassed area intended for people to relax and picnic in the open or under the trees with occasionally programmed initiatives. Apart from the grassed area, the trees and birds chirping away, the area is fairly limited in what it offers for natural distraction.

2.4.2.3.4 Being Away

The Darling Quarter project reinvigorates and connects the former Sega Worldview, which was an underperforming amusement to the retail venue that was separated from the harbour foreshore and CBD. The improvement serves to soften the strength of the CBD's dense character with the open parklands and promenades of Darling Harbour and stitches these two zones together.

Figure 21: The Darling quarter against the backdrop of the dense CBD.

Source: www.archdaily.com

2.4.2.3.5 Extent

The mixed-use zone combines a vibrant public domain with a commercial development. There are different attractions for families with the three zones characterized by the retail area, the children's theatre and the playground and the community green all interlinked to read as one. The design is such that there can be uninterrupted ease of movement from one zone to the other. Families accessing the commercial area often find themselves relaxing in the community green and even lingering longer for a public children's show. For the workers in

the surrounding buildings, views into this open space leave a desire to access and experience it in their free time.

The space also has a unified character that responds to the urban and park context with the consistent use of materials such as timber, stone, steel and glass.

2.4.2.3.6 Fascination

The architecture of the buildings enclosing the space is in itself fascinating and attention drawing. The design creates a two-part ensemble of stepped campus-style commercial buildings a top a podium of retail activities that activate the ground level. The stepped character of the city scape is maintained by the designers keeping the higher sections of the buildings facing Harbour street and the lower scale forms facing Tumbalong park. The roofs make for a unique connection from the upper to lower volumes, giving the development an interesting profile and highlighting the significance of the atria at the centre.

Figure 22: Darling quarter

Source: www.archdaily.com

The whole of the western façade of the buildings becomes an interactive digital canvas with energy saving and solar powered lights. The architectural marvel in itself draws people.

Figure 23: The interactive digital canvas

Source: www.archdaily.com

The space features a 1000 sqm water play park. This is a wonderland for all and especially a favourite among children. At the upper edge of the park, there are water pipes that can be manipulated by children, letting water flow through the concrete channels. For safety considerations, the water is monitored so that it never rises above an adult's ankle. The channels, further downstream, have different movable blocks and stylized stones with interactive textures and elements which children can use to change the course of the water. These include water wheels, sluice gates, hand pumps, and Archimedes screws. Everything is elegantly created, while still allowing for a playful and delightful environment for everyone. Some elements also reference the harbour's industrial history. The park visitors are allowed to operate the flow of water with the similar technology applied in larger industrial and civic instalments such as dams and cause ways. People and more so children find it fascinating to be able to interact with such technology at a miniature scale. Some areas such as the water-squirts are simply for fun, and a creative interactive way to cool down during the hot summer seasons.

Figure 24: The water park

Source: www.archdaily.com

2.4.2.3.7 Compatibility

The Retail Terrace provides a combination of bars, restaurants, cafes and convenience shops to serve workers and families. The children are also not left out by finding a space of their own in the well-designed children's theatre.

The Darling Quarter's Feature Lighting permits for activity to stretch well into the night, the result being an active and vibrant area where people dine meet and play.

A pedestrian street that runs along the east-west, links Darling Harbour South to the City and the north-south pedestrian boulevard, which runs along the western edge and is characterized by al fresco dining places, retail tenancies, the children's theatre, the grassed areas and the playground at the centre. This north-south link reinforces the pedestrian axis that begins at the southern edge at the Entertainment Centre and goes through beyond the Cockle Bay promenade. Ample underground public parking and upgrades to the roads and pedestrian crossings lend clear sight lines, therefore making it safer for cyclists and pedestrians.

Darling Quarter offers a pleasant and enjoyable environment for a variety of visitors to the area. The use of natural materials, bench seating and shade offered by trees and plants make for a calm environment essential for a restorative environment. The zone draws people round the clock, day and night, aiding to create a safe and relaxed atmosphere. Safety is further enhanced by the provision of energy saving public domain lighting with dimming switches throughout the area.

Figure 25: The green

Source: www.archdaily.com

As far as safety is concerned, the zone is accessible day and night, making it a welcoming area to visit at any moment of the day or night. Safety in the nighttime is extended by energy saving public field and building lighting provided with brightness regulating switches. The quarter's playground is well illuminated during night times, offering a safe area to play for children even at night. Changes to roads, parking and pedestrian walk paths at the zone have enhanced he safety for cyclists and pedestrians.

Figure 26: Activity rich centre

Source: www.archdaily.com

Walkability in this precinct greatly improved as a result of the re-development. Generously sized pedestrian paths through the quarter offer links from the CBD neighbourhood to the Darling Harbour. The project also included improvements on the road designs to clear sight lines and creation of underground public parking to clear the ground level for cyclists and pedestrians. The quarter is well-lit and active 24 hours a day, thus creating a pleasant zone to walk through at any time.

Figure 27: Improved walkability – Paved walkways with attention capturing paving patterns.

Source: www.archdaily.com

The theories reviewed in this chapter have highlighted three restorative experiential values that Urban Designers should aim to achieve when designing spaces that can offer and enhance restoration. Sensory Stimulation, Movement and Control. The two international case studies were able to express how these restorative qualities can be achieved through design.

Urban planners may use a range of architectural features such as heights from floor to ceiling, scale, lighting, a range of textures and materials to increase sensory engagement through visual appeal and complexity. Nature has been found to activate all five senses and is thus a vital tool to be used when designing restore spaces.

Movement was established as another key experiential quality in restorative settings. In order to promote increased activity and exercise, attention must be given to design, including discovering simple routes, designing walking paths that circle and have destinations as targets, allowing for views and designating for playing spaces.

Urban designers should also design to meet different requirements of users from different age groups. A sense of control and choice between being in public and the ability to retreat in privacy are key resources that are required for restoration.

2.4.3 The Kuala Lumpur City Centre Park.

In the words of this park's Landscape Architect – Roberto Burle Marx, the intention of his creation was to '*leave the world a little more sensitive and a little more educated to the importance of nature*.'

Figure 28: KLCC against the Petronas Towers backdrop.

Source: www.mediatimeout.com

Kuala Lumpur City Center (KLCC) is a mixed-use, master-planned development. It is Malaysia's biggest public-private partnership that was to serve as a catalyst for real estate growth in this sector of the city. The PETRONAS Twin Towers are the main landmark of the city.
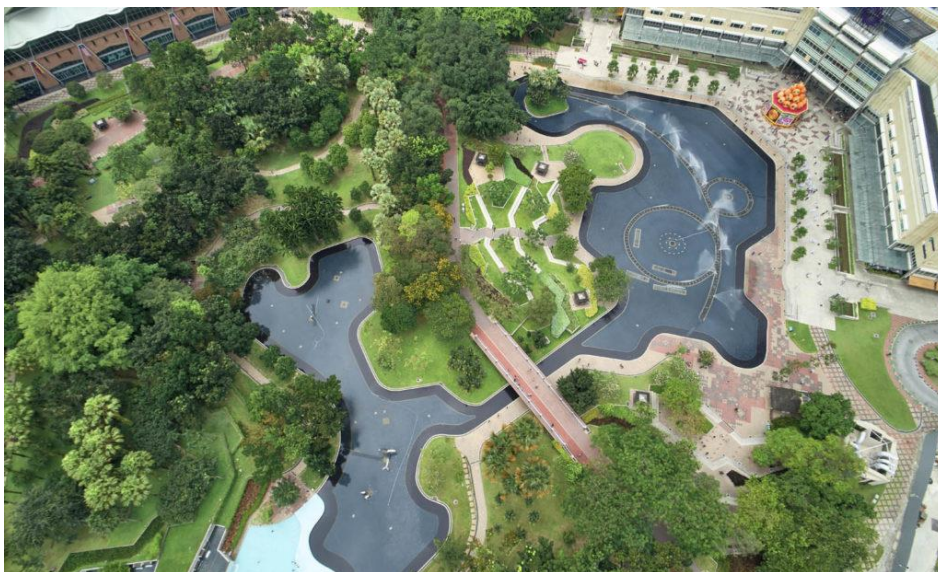
Figure 29: Dense foliage in the park.

Source: www.amimagazine.global

Its location is central to the city and has been designed to cater for the needs of its urban people.

The design intentions were

1. To balance the large scale, high density development at KLCC
2. To give back to the city a space for the urban dweller to relax and indulge in a variety of recreational activities and buffer from the hustle and bustle of the surrounding city
3. To showcase the tropical plants in Malaysia

2.4.3.1 The Restorative qualities

2.4.3.1.1 Social support

The park features a two acre Playground with swings and slides that is very popular with children. The Children's wading pool complements the space especially during the peak of summer season with vantage seating installed for parents and guardians to supervise them during play.

Figure 30: Children's Playground.

Source: www.amimagazine.global

Figure 31: The Children's water park.

Source: www.amimagazine.global

Open grassed spaces are also provided for group exercises and gatherings.

2.4.3.1.2 Movement and exercise

The park is also well known for its 1.3km jogging track with comfortable rubberized material. This makes it extremely popular with joggers in the mornings and evenings before temperatures soar.

Figure 32: Exercise in the park.

Source: www.amimagazine.global

2.4.3.1.3 Natural distractions

The park boasts of 1900 indigenous Malaysian trees that attract local and migratory birds, squirrels and a variety of insects like butterflies.

Figure 33: Dense foliage in the park.

Source: www.amimagazine.global

2.4.3.1.4 Being away

Kuala Lumpur City Centre Park is the largest open space in Kuala Lumpur and is a stark contrast against the dense city, designed to be a calm environment amid the hustle and bustle of the city. The dense planting creates the illusion of being in a lush tropical forest with the occasional views of the city's skyline giving away the reality of the park's context. The reflection pool also gives opportunity for users to sit by it and meditate, with the serenity of the feature helping the process along.

Figure 34: The Reflection pool.

Source: www.amimagazine.global

2.4.3.1.5 Extent

In today's growing cities, a park that is 50 acres situated at the heart of a city is a rare occurrence. The size of the park allows for curios user to walk through and discover more and more features and interests that may not be apparent at the beginning of their experience.
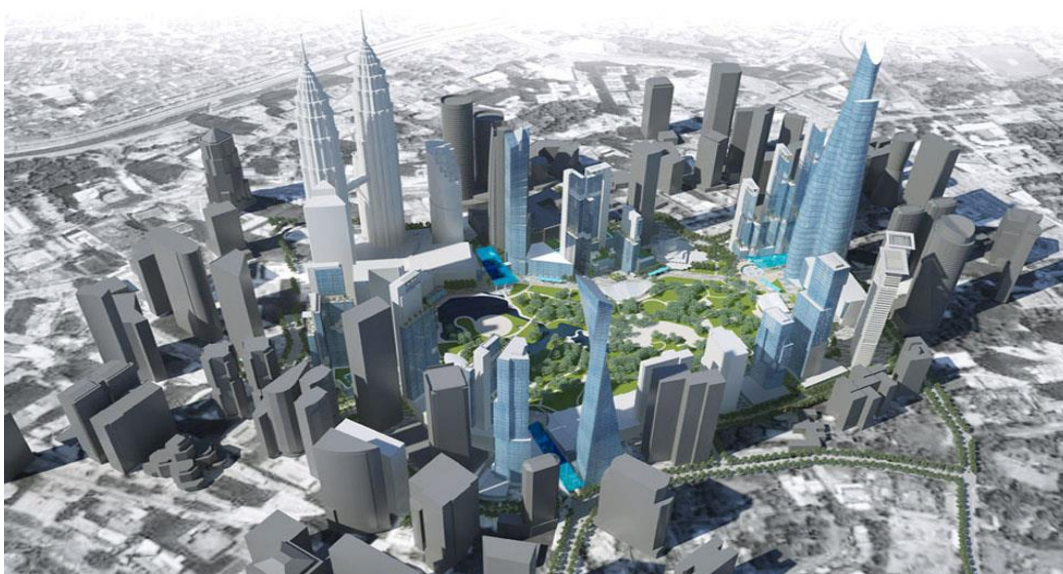
Figure 35: The Park's context.

Source: www.amimagazine.global

2.4.3.1.6 Fascination

The Decorative whale sculptures at the reflection pool, ornamental water features, cascades and water fountains all draw the users' involuntary attention and awe.

Figure 36: The whale sculptures.

Source: www.amimagazine.global

Figure 37: The dancing water fountains.

Source: www.amimagazine.global

The Unique lake symphony with performances at varying intervals of the day is a major attraction for both locals and tourists alike. The light play also introduced at night also adds to the dramatic effect and is one of the anchor spaces in the park as group after group gather round for the performances.

Figure 38: The lighting effects on the dancing fountains at night.

Source: www.amimagazine.global

2.4.3.1.7 Compatibility

The rubberized material on jogging track lowers the risk of injury on the users and enhances their speed, making it one of the favorite spaces for joggers.

Figure 39: The rubberized jogging track.

Source: www.amimagazine.global

Clean and well-maintained public restrooms make it particularly easy for vulnerable groups of people, like the elderly, to use park. Adequately provided ramps and well sized walkways ensure that the Disabled can also move through the park with ease.

Comfortable seating is also adequately provided.

CHAPTER 3: METHODOLOGY

3.1 Introduction

Having introduced the research problem (1.2) and set out the objectives for this research (1.4), and thereafter established variables from a synthesis of guidelines obtained from critical review of literature in Chapter 2, the next step involved selecting and applying an appropriate research method that would achieve the objectives set out.

The purpose of carrying out this research was to meet the objectives set out in Chapter 1 (1.4). In order to achieve this, an appropriate research design method was selected and justified. Under the selected research design method, an applicable sampling method was established and justified.

3.2 Research Design

The decision on which research method was to be used in a social science research such as this was determined by certain factors that included; the forms of questions, the presence and/or degree of control over the phenomena being studied and how contemporary these phenomena are. Due to the factors under investigation in this research the study rendered itself suited to qualitative research methods.

3.2.1 Why qualitative?

> "Qualitative research involves broadly stated questions about human experiences and realties, studied through sustained contact with people intheir natural environments, generating rich, descriptive data that helps us tounderstand their experiences and attitudes" (Rees, 1996).

According to Rees qualitative research will produce words in the form of comments and statements, instead of statistically presenting the results. Its purpose is to classify feelings and perceptions of experiences from their own point of view, rather than from that of the researcher. Qualitative research is more legitimate because it has a holistic approach to research that does not reduce participants to working artifacts and in recent history has gained more recognition of health.

Qualitative work is not only aimed to collate numbers but at being able to understand how different space users feel and what they like and want. The only way to do this was to survey

CBD users from Nairobi using the qualitative approach, and the methodology was semi-structured interviews using questionnaires.

The study is grounded in the field of environmental psychology and the ideas and theories there in drawing on real- world experiences, actions, and meanings to understand peoples' relationships with environments and places. The approach helped to understand the feelings, values, and perceptions that underlie and influence behaviour.

Since the study sought to understand the phenomenon of restoration from the view of the local population, qualitative research was found to be useful in getting cultural - specific information about the, opinions, values, behaviours and social contexts of particular people.

3.2.1 The Research Questions

This research on the quality of urban open spaces in Nairobi's C.B.D is centred on the research questions (1.3) as follows:

i.   What are Restorative Environments and why do we need them in the urban context?

ii. What determines the quality of Restorative Environments?

iii. What are the restorative urban open spaces in the context of Nairobi's C.B.D, and how does their design or lack of it determine their quality in terms of encouraging or frustrating the constructs of restoration?

Following Yin's (Yin 2003) guidelines, the definitive questions that formed the "what" part of the research questions were answered through critical review of literature. The explanatory questions on how and why, specific to the study area were yet to be answered and as such, the **Case Study approach** was taken as the most suitable research approach. The method was also found to be flexible, specific to context and had a wide coverage of the variables to be studied.

3.3 Time horizon

The research took the form of a Cross-Sectional study. It involved an investigation into the quality of Nairobi's open spaces in the period of April 2018 and May 2019. This period was chosen due to the constraints in time as the entire research exercise was to take 6 months and

the author had apportioned the 2 months for fieldwork immediately following the Literature review.

The assumption made is that the patterns of the use of the spaces studied during the research period (April and May) would be a reflection and fair representation of the general patterns of use throughout the year, except for periods when there was were special events. These studies were carried out concurrently in the spaces selected for the exercise.

3.4 Sampling design

Sampling design is the technique or procedure the researcher adopts in selecting items for the sample as well as the sample size (Kothari 1985). Since the case study method was chosen as the appropriate research design method, it was necessary to come up with a sampling design to select the locations that would be used, and the justifications for their selection.

Of the 2 types of sample design; purposive sampling (non-probability) and random (probability) sampling, the author chose the purposive (non-probability) sampling. This method is chosen as the author has formed an opinion on what he expects to find in the study area prior to undertaking the fieldwork research. As such, the sample of the study area is not chosen at random, but on a preposition made by the author given his prior contact with and knowledge of the study area. (The author is an everyday user of the city and was aware of the areas that are frequented by people that would be ideal for carrying out the research. This influences the choice of sample, although it is not the basis for selection of the locations. The basis for selection is given under the justifications for selecting the locations that are studied.)

The users of the sampled spaces however were randomly sampled. The advantage of this was that it was free of classification error, and it needed no prior understanding of the population. The simplicity also made data collected easy to interpret. Of these purposes, simple random sampling was better suited to the analysis as there was not much knowledge available about the population and data collection was conducted effectively on users distributed at random. Sampling costs were low enough to render performance less important than simplicity.

Locations studied

The study area was the Central Business District (C.B.D) of Nairobi as defined by the City's Zoning laws. This is the region defined by Uhuru Highway to the east, Moi Avenue to the west, Haile Selassie Avenue to the South and University Way to the North.

The locations for the research were chosen following the decision to use the case study design and purposive sampling method. A total of 3 cases were selected based on the following 2 criteria:

   i.   All cases selected were designated as Public Spaces by the Nairobi City County (Urban Design & City Planning Departments) which is the body in charge of creating and maintaining these open spaces.

   ii.   All the cases areopen to public access and use.

The study area had several urban open spaces, but others were not selected on the basis that they did not fulfil both criteria. For instance, there were open spaces which were not designated as public spaces as they were mostly left-over spaces such as road reserves, the margins or islands along avenues & streets and were too amorphous to be properly defined while on the other hand, there were open spaces which were definite and designated as "public" but due to social and political factors, they remained inaccessible to and unusable by the public.

The cases selected for the research are:

      i.   Jeevanjee Gardens

     ii.   Aga Khan Walk (and the sunken car park next to it)

   iii.   The August 7th Memorial Park
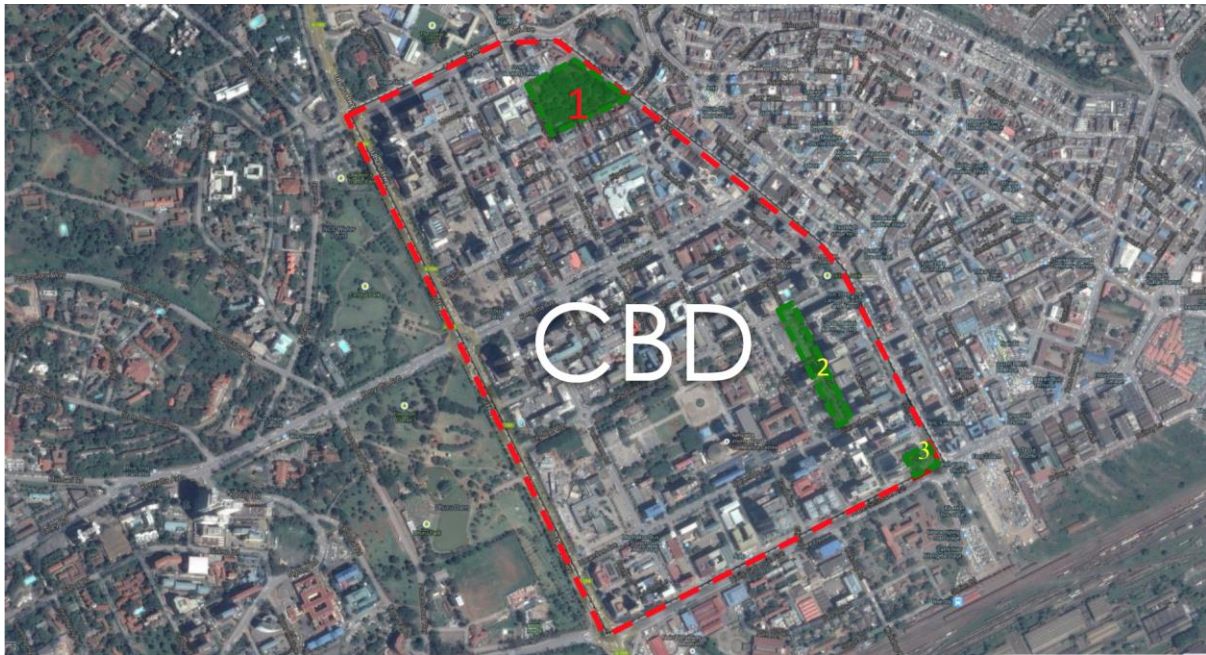
Figure 40: Aerial image of the CBD showing the selected cases

Source: Google maps

3.5 Data collection methods

The exercise on data collection was guided by the following principles as established by Yin (2003) which state that the research should:

i. Using multiple sources of evidence that converge in the same set of facts.
ii. Create a case study database.
iii. Create a chain of evidence showing a link between research questions, data collected and secondary data collection for triangulation.

Following these guidelines and with the aim of establishing that important link between research questions and data collected, the data applied for the intention of this research is collected via two methods they are primary and secondary data collection.

3.5.1 Secondary methods

Secondary data collection methods involved sourcing data from secondary sources which include:

I.   Sourcing architectural drawings of the urban free areas that were chosen as Case studies for this research from the Urban Design Department of the Nairobi City County.

II. Sourcing Published material.

3.5.2 Primary methods

The following were the primary data collection methods used for this research:

i.   Observation

ii. Interviews

iii. Questionnaire

3.5.2.1 Observation

The direct observation method was used as it focuses on human actions, physical environments and real-time events as they happen within their context (Yin, 2003). Since the research involves an investigation into the quality of urban open spaces, this was the most appropriate method of gathering first-hand data on site.

Under the observation method, the following data collection techniques were used to record the data:

i.   Unstructured observations

Unstructured observations were used where the variable was non-continuous. For continuous data such as daily activity patterns on weekdays and weekends, structured observations were carried out. These observations were carried following a predetermined timeline as follows: 7:00-9:00 a.m. (morning),noon(10:00-12:00),lunchtime(12:00 noon-2:00 p.m.), early afternoon (2:00– 4:00 p.m),rush hour (4:00-7:00 p.m)andnight (7:00-9:00 p.m).

ii. Photography

Taking images using a digital camera was used to collect most of the data in the field. This technique was used as it was convenient, appropriate for recording real-time events, easy to apply and the tool to be used (digital camera) was readily available to the researcher. In order to get unaltered data, the camera had to be concealed so that people in the urban open spaces were oblivious of its presence.

iii.   Field sketches

Analytical sketches were used to supplement photography. Sketches had the advantage of creating a rapport with the study variables, which would lead to a better understanding of the problem.

3.5.2.2 Questionnaire

A select number of respondents were asked to fill questionnaires, (see Appendix 1). Due to time and other logistical constraints, the sample size was limited to 150 respondents within the three sampled spaces. This was done to assess the layman's view and perception of what they thought is design that is restorative. Open- ended questions gave room for personal expression from the respondent regarding his/her views of the physical environment.

These helped in the execution of a semi-structured interview of the users on the conditions of the urban open spaces and opinions towards the utilization and experiential variables under study. Structured questions were used to facilitate a collection of the desired data without shifting the focus from the objectives of the study. They helped to gather information regarding conditions of the urban open spaces and opinions towards the utilization variables under study.

The Perceived Restorative Characteristics Questionnaire (PRCQ) was applied to determine perceived restorative characteristics of attractions in urban open spaces, and included items geared to measure fascination, novelty, escape (both physical and psychological), coherence, and compatibility (see appendix 1). The language used was English, and items were place in random sequence. Some items included in the questionnaire were based on the PRS as developed by Hartig (Hartig et al., 1997b), and Laumann (Laumann et al., 2001). Some of the items from the original scale were adopted while others were left out. The items focused on aspects within the urban open spaces. Participants specified on a 5-point Likert Scale how much they agreed with the items, scaling from 1 being 'totally disagree' to 5 to mean'totally agree'.

3.6 Data Processing and analysis

3.6.1 Data Processing

This involved scrutiny of completed questionnaires, compiling and comparing data. The same was coded, to put responses into a finite set of categories or clusters for systematic analysis more so for those questions that sought opinions from the respondents. Data classification based on common characteristics was also done here to reduce raw data into homogeneous groups for meaningful relationships.

3.6.2 Data Analysis

This entailed a computation of respondent's distribution on various facets, searching for relationships and trends that presented themselves among the data-groups and evaluating the values of unknown parameters of the population. As such, this involved: Descriptive analysis, which as Kothari suggests, is a study of distributions of one variable which provides us with profiles of workgroups, persons and other subjects on any of the multiple characteristics such as size, composition, preferences and efficiency (Kothari, 1990). This described data collected on research sample regarding their opinions towards urban space usage. The percentage was the main descriptive statistic employed.

Conversion involved calculating sums and averages under various components as outlined in the data collection tools. The scores were then being entered into the computer software for analysis. Data analysis started with first describing and summarizing the data by applying the descriptive statistics. The intention of descriptive statistics was to allow the researcher to explain a distribution of scores using a few indices or statistics. Means and modes were also used for this study. In measuring variability frequency, distribution the analysis applied percentages to describe frequencies in terms of proportions.

3.7 Limitation of research tools

The study encountered several challenges;

a) **Trustworthiness**: Trustworthiness is a key element in qualitative research. The reality of the experiences are reflected in the findings. Giving participants the opportunity to review the interpretation of the researcher can establish trustworthiness or credibility. There was no opportunity for such feedback to test this.

b) **Narrow view**: By presenting these users with the questionnaire that had pre-arranged questions did not allow them to fully express their views and opinions. Questionnaires that were used in the three sampling grounds were static yet the sample areas were altogether different. I used a sample size of 150 respondents – 50 from each of the three spaces in focus. It can be argued that this number of respondents was not large enough to warrant the generalisation of findings. A further survey will need to be done under stricter research methods in selecting the sample in order to triangulate the findings of this inquiry.

3.8 Data validity and reliability

3.8.1 Data validity

The validity of data collected involves finding out whether the data and the method used explain what we and others need in order to act on the world and achieve desired results. According to Mugenda, validity refers to the measure to which the results arrived at from the examination of data actually reflects the phenomenon being studied. It thus entailed confirming the respondents account with what actually existed. Structured observation of the environment and users was used as an internal check.

3.8.2 Reliability

"…a test is reliable if it measures something consistently" (Simon, 1996). Reliability of the data collected from the field is concerned with consistency; the same data should be obtained if the study is to be conducted again in a situation that did not change at all. This was ensured by having a large enough sample in order to collect the closest representative views and by having some standardized questions for the park users, adjacent land users and the resource persons. Also, a pilot study to the three study areas helped to refine the interview schedules. In the same token, the reliability from the questionnaires was enhanced using interactional checks through direct observation.

3.8.3 Establishing the Validity and reliability of this Qualitative Study

In qualitative analysis, validity refers to whether a study's findings are accurate and sure. Qualitative researchers employ the method of triangulation to determine validity in their studies. The study applied three types of triangulation:

3.8.3.1 Data triangulation

This kind of triangulation is the simplest and therefore the most common among researchers to implement. In this case the author referred to different sources of information to enhance the validity of a research.

3.8.3.2 Theory triangulation

This involves taking advantage of multiple theoretical viewpoints to unpack single data collection. Unlike triangulation by investigators, this method usually requires the use of experts outside the research field. One common solution is to put people from different disciplines together, even if they are in different positions, they might be used within the same disciplines. When each evaluator arrives at the same conclusion from the various disciplines then validity is established. This study is rooted in concepts proposed by environmental psychology researchers and practitioners. Four scholars reviewed the hypotheses as advanced at: Ulrich, Kaplan, Marcus and Barnes. The intersection of their ideas forms the basis for some of the conclusions of this study

3.8.3.3 Environment triangulation

This method of triangulation requires the use of different places, environments, and other factors relevant to the context in which the research was performed, such as time, day or season. The aim is to recognize which environmental factors may affect the information obtained during the analysis. These environmental conditions are adjusted to see if the results across environments are similar. Unless the results under different environmental conditions remain the same, then validity has been identified.

Environmental triangulation cannot be used in every case as is the case with other types of triangulation. This is only used when it is possible that environmental variables will affect the results. In this study, environmental triangulation was limited to two strategies, the selection of three different cases from different CBD locations and the collection of data throughout the different times of the day. Due to the time constraint it was not possible to research the same in different seasons.

CHAPTER 4: THE CASE OF NAIROBI'S CBD

4.1 Introduction

This chapter covers the research in the study area– the Central Business District of Nairobi, and analysis the value of urban free spaces in the C.B.D of Nairobi – holding the assumption that such have the greater potential to offer restoration more than any other setting within the urban fabric.

The chapter starts by tracing the idea of urban open spaces and their relationship to the general town layout in the context of Nairobi from the founding of the town in 1898 to the Nairobi of today (2016). This is done by engaging the various master plans that were developed for Nairobi in 1898, 1927, 1948 and 1973. This historical study establishes the factors that shaped the nature of the urban open spaces in the C.B.D both in previous and current times.

The second part of the chapter (4.2) introduces and defines the study area and more importantly, de-fines what urban open spaces in the context of the Nairobi C.B.D are. It goes further to distinguish be-tween public and private urban open spaces both of which are found in the C.B.D of Nairobi. This distinction is important in the idea of the study zone because unlike in the Western World where even privately owned urban open spaces (such as the Rockefeller Plaza in New York) are open to the public as they were developed for public purposes, the situation in Nairobi is different as such spaces are completely closed off to the public. As such, the research will be limited to the urban open spaces accessible to the public in the C.B.D of Nairobi.

The third part (sub-chapters 4.3-4.7) involves an analysis of 3 public urban open spaces found in the C.B.D of Nairobi. These are; Jeevanjee Gardens, The Aga Khan Walk (together with the Sunken Car Park) and the August 7th Memorial Park. The analysis of these spaces is preceded by a brief historical background and description of the form & layout of the spaces. The analysis of elements determining the quality of the open spaces shows how these spaces frustrate or encourage restoration based on the synthesis of what a restorative space should be which was developed in Chapter 2 (see 2.3).

The final part of the chapter summarizes the findings on the analysis of the quality of these urban open spaces. This is done through a comparative analysis of how these spaces fare against the established variables, both individually and collectively.

This first part of the chapter examines the historical development of urban open spaces as recreational and restorative areas in Nairobi. The historical study will shed light on how the spaces came to be, how this influenced their current status and how such information can be used to influence future model of urban open spaces in the Nairobi's city. Hence this study will establish the origin and development of these spaces through time to date. It will also be important in order to define what an urban open space is in the context of Nairobi.

The historical study of the urban open places goes hand in hand with a brief description of the general town layout, as the spaces are part of a larger urban fabric. As urban open spaces are a factor of planning, the brief description of the layout of the Core of the town and its urban open spaces, and their historical development will be covered in the 4 master-plans developed for the city as follows:

    4.1.1 Plan for A Railway Town - 1898.

    4.1.2 Plan for a Settler Capital - 1927

    4.1.3 Master-plan for a Colonial Capital– 1948

    4.1.4 Metropolitan Growth Strategy– 1973

    4.1.5 NIUPLAN – 2014

The 1973 masterplan was the last to be developed and currently the one that is in use (in 2016).

> "In 1898, the railhead reached a swampy area at the foot of the Kikuyu escarpment. The Maasai called the place "**Nakusontelon"** meaning "the beginning of all beauty" Nakusontelon was bisected by a river referred to by the Maasai as **Enkare Nyaribe**(river of cold water) a term from which the town got its name– **Nairobi.**"

> Source: Stephen Mills, 2010.

Figure 41: An image of the settlement in Nairobi in 1903 on the arrival of the railway line.

Source: Stephen Mills, 2010.
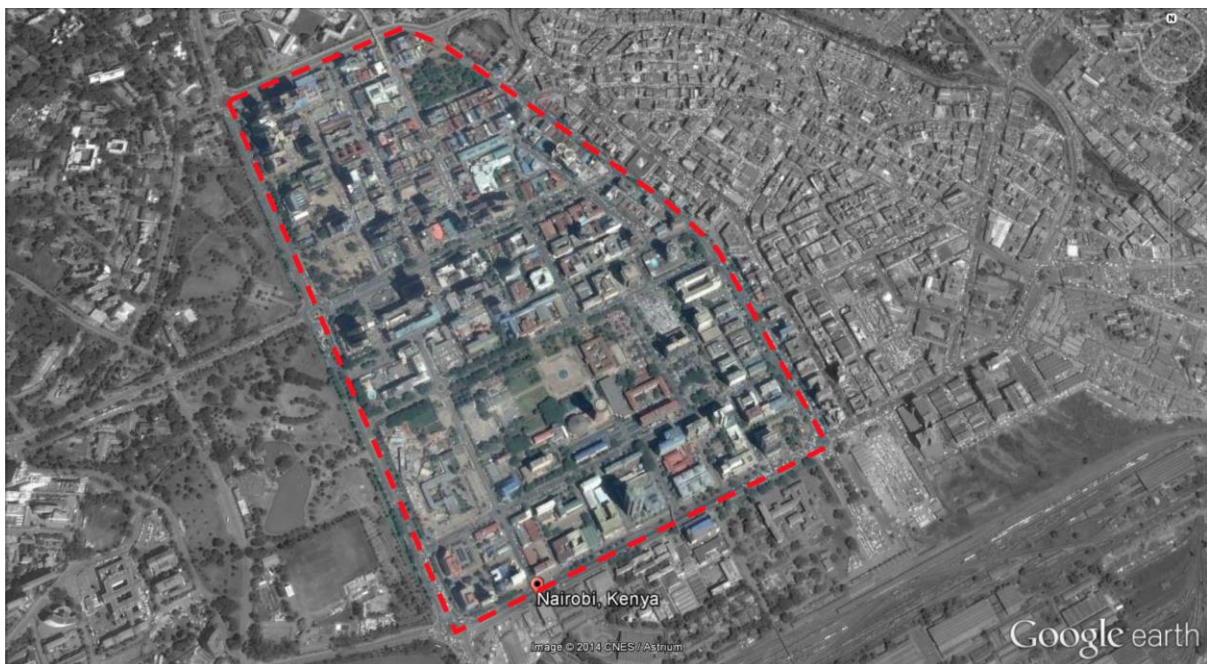
Figure 42: A map showing the study area– the Nairobi CBD

Source: Google maps 2015

4.1.1 Plan for A Railway Town -Plan for Nairobi Station Area [1898].

The town of Nairobi was established in 1898 as a train depot when the railway arrived there. Nairobi had a strategic location as it had; ample level land for tracks, siding & other train impediments, abundant water supply from the river and an elevated cooler area nearby suitable for the European settlers. The railway was set up and from it two roads; Station Road (later Government Road, now Moi Avenue) which had senior staff houses and Victoria Street (Tom Mboya Street) which had the European and further down the Indian Bazaar. (Soren, Emig & Ismail, 1980).
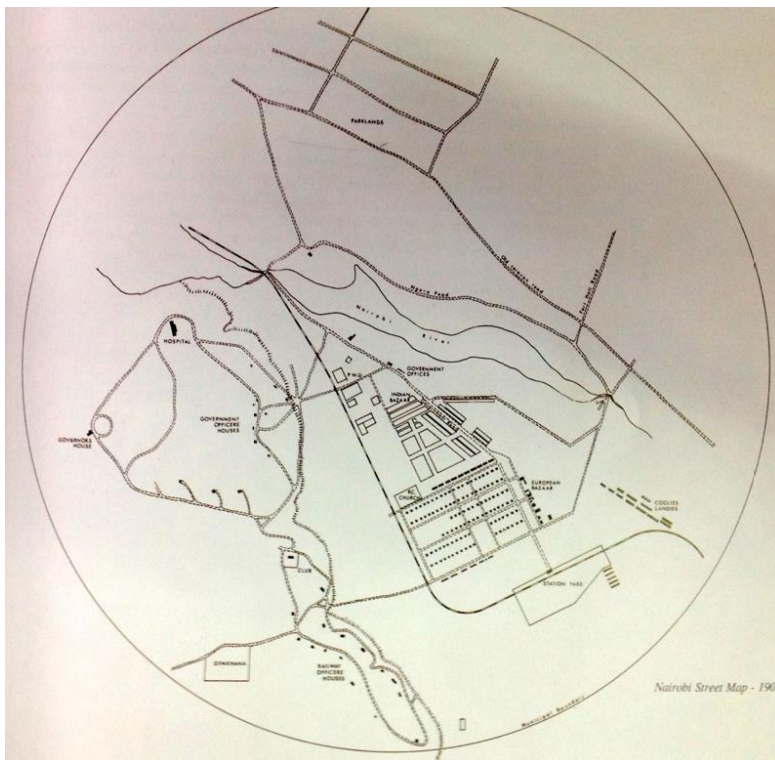
Figure 43: The 1905 layout of Nairobi town. The circle shows the municipal boundary.
Source: Stephen Mills, 2010.

This early town plan was based on engineering needs and therefore had little planning considerations. The town was laid out in a segregated manner with the Europeans having their own commercial and residential areas, then the Indians with their bazaar and the Africans on the outskirts. Roads were used to separate these regions with the Europeans being near Station Road and the Indian settlements used to buffer them from the African population. The town was therefore established on a technical plan as dictated by the engineering

requirements of the railway. The town layout at the time was based on a divide and rule basis with the regions based on racial status. (Soren, Emig & Ismail, 1980).
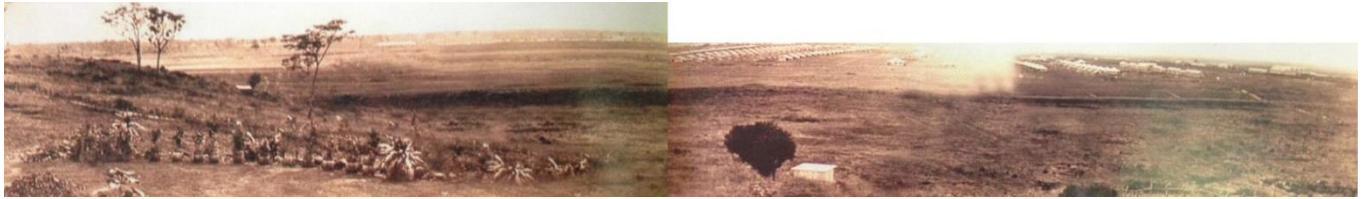
Figure 44: A panoramic view of Nairobi in 1903 from the hill (Upper Hill) area.

Source: Stephen Mills, 2010.

4.1.2 Plan for a Settler Capital – 1927

This plan was laid out using the Zoning principle where there were regulations on the use of particular areas. The Europeans were located on the central and hill area of Nairobi with the Asians in Parklands and Lower Parklands areas and Africans in the Pangani, Pumwani and Kileleshwa areas. The central part of the city was zoned for Commercial purposes only. The industrial and manufacturing zones were placed on the outskirts of the town (Soren, Emig & Ismail, 1980).

As regards Open Space & Recreation, the plan designated areas for this. These included the former Racecourse site (the racecourse was to be moved to Ngong Road). the land adjacent to it to the east and a small area west of the Native market was also reserved as an open space. The allocation of open spaces was based on class and race hence the Europeans and upper class Asians who already had enough private open space were provided with more public open space while in contrast, the crowded African settlements were offered small public open spaces. The allocation of these spaces also had a political angle. The Asians are thought to have wanted the space where the former racecourse was (now City Park) to act as a buffer from the African settlement (Soren, Emig & Ismail, 1980). Therefore, although the plan did provide for public open spaces for the city, they were poorly distributed and inadequate to match the population.

Figure 45: A map showing the main road arteries layout of Nairobi in 1930.

Source: Soren, Emig & Ismail, 1980.

Figure 46: An image of Government road (Moi Avenue) in 1920.

Source: www.sikh –heritage.co.uk

4.1.3 Master-plan for a Colonial Capital– 1948

The master plan came at a time when Nairobi was growing rapidly and could no longer be governed by the 1927 plan. This master plan was influenced by the post-World-War industrial expansion and modernist principles of functionalism. Under these principles, architecture was freed from local traditions and history and emphasis laid on industrial and technical development.

The master plan was based on the Neighbourhood Unit Planning principle, a modification of the gar-den City Planning. In this case, the neighbourhood units were designed with an area for open space and recreation, a centre for commerce, administration and social activities with interconnected traffic. A perfect example of this model is the layout of Kaloleni Estate in Nairobi.

The master plan designated the heart of the city for commerce and business only. It laid emphasis on its pedestrianization and compaction as opposed to having heavy car traffic over a relatively short distance. This was however an unrealizable policy since the planners did not consider that the commercial activities would in themselves attract heavy vehicular traffic including trucks (White, Silberman & Anderson, 1948).
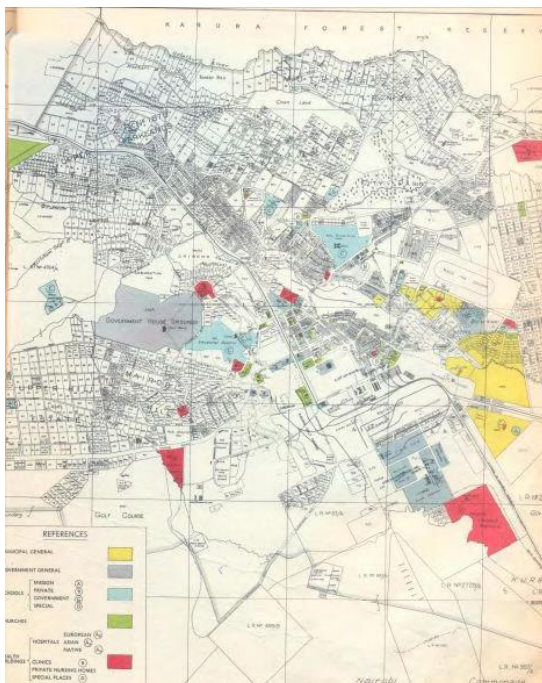
Figure 47: A map of Nairobi from the 1948 masterplan

Source: White, Silberman & Anderson, 1948.

On open space and areas for recreation, the master plan clearly laid out the importance of open spaces and why the city of Nairobi needed them. It cited economic, biological and health benefits that could be realized, with an emphasis on cultural exchange, social medicine, sports and play. It also recommended that these open spaces not only be provided, but also consciously treated, preserved and furnished with landscaping for the utilization and enjoyment of the public.

Although both the neighbourhood unit and the overall city plan recognized the importance of open space and provided for them, lack of enforcement and specification meant that these theories were never fully realized. This is highlighted in the document by the summary of the chapter on open spaces which stated "happily, the city still has plenty of undeveloped land and does not have to buy plots. Nairobi is in the fortunate position of being able to give up open space." which made the recommendation seem more of a suggestion (Soren, Emig & Ismail, 1980 pp. 45).

4.1.4 Metropolitan Growth Strategy– 1973

This plan was based on studies carried out by the Nairobi Urban Study Group. It was the last comprehensive master plan done for the city of Nairobi to date (2016). The metropolitan area of the city was to spill over into the outskirts with towns in Kajiado, Kiambu and Machakos districts being incorporated therein through a decentralization strategy.

The master plan strengthened the 1948 ideology of commerce being at the heart of the city. It further proposed restrictions on the growth of the Central Business District by advocating for the decentralization of all city functions by setting up additional commercial centres at strategic locations. Within the C.B.D of Nairobi, this role was to be taken up by the Nairobi City Council.

The master plan did not make any specific recommendation on open space and recreation. Instead, it recommended that the newly formed decentralized sub-cities take up the initiative to create and develop open spaces for recreation and that each community have its centres with recreational areas.

The reality was that only the upper and upper-middle classes could afford to have such spaces for recreation as only they had ample open space for such. The majority of the population was forced to de-pend on the provisions offered by the City council, which were either too small or barely accessible.

The master plan failed to be effective as far as public space was concerned as it lay more emphasis on intensive residential and industrial development while having no corresponding increase in recreational spaces and facilities for the growing population (Soren, Emig & Ismail, 1980).

In addition to this, the Nairobi city Council failed to carry out detailed area studies and conduct periodic reviews over time. This coupled with corruption and inefficient systems led to the neglect of urban open spaces that persists to date.

Figure 48: Aerial view of the CBD of Nairobi in the 1973.

Source: www.sikh-heritage.co.uk

4.1.5 The Situation Today

From the review of these master plans for Nairobi, it is evident that the need for public or open space in the city never actually corresponded with what the administration provided. The reason for this shortfall was political since the colonial government only provided these spaces for themselves (European settlers and upper class Asians) excluding the majority of the city inhabitants (Africans) who were put up in crammed settlements with little or no open space or recreational facilities. Post-independence Nairobi saw the Metropolitan strategy in 1973 to sustain the city until the year 2000. The emphasis on decentralization was a rich idea although the body assigned the task of implementing it, the Nairobi City Council, failed to do so effectively. The City Council also failed to carry out periodic reviews of the master plan over time leading to the situation that we see today– a lack of good quality public urban places within the city that can be the containers where restoration can be accessed as it is, the City is still operating on the 1973 master plan which was to run up to 2000.

In recent times (2011), the Nairobi City Council (now Nairobi City County) became a signatory of the United Nation's Urban Development for Sustainable Cities resolution and other similar initiatives such as the Safer Cities Program and the UN Habitat's I'm a City changer. This led to the Nairobi City County taking initiative to restore the public spaces of the city, a campaign led by its City Planning and Urban Design Departments.

The Council embarked on an audit of public spaces throughout the city with the aim of improving them, reclaiming the lost ones and creating new ones where possible. The process of auditing and reclamation is still on going.

The Nairobi City County has also been working in collaboration with Project for Public Spaces (P.P.S) a non-profit organization that has pioneered a "Place making" approach to public spaces. They have undertaken several projects within the city including the rehabilitation of Silanga grounds in Kibera, the Sunken car Park and Jeevanjee gardens.

Within the C.B.D, the City County has been able to improve some public places in recent years while others are earmarked for improvement. The reclaimed areas include: the World War monuments on Kenyatta Avenue and Tom Mboya Square on Moi Avenue while the Jeevanjee Gardens have been ear-marked for rehabilitation.

4.1.6 The City's Vision going forward and NIUPLAN (Nairobi Integrated Urban Development Plan)

In 2007 UNEP prepared for Nairobi (City of Nairobi Environment Outlook) a State of the Environment survey. The study established a benchmark for which environmental concerns should be addressed in all construction and planning activities. The study highlighted how overcrowding has exacerbated public health issues in disadvantaged neighbourhoods.

Following this, The Kenya Vision 2030, the country's development program for the period 2008 to 2030, included in its objectives housing and urbanization. The Nairobi Metropolitan Development Plan, which gave birth to the Nairobi Metropolitan Region Plan 2030 (NMR 2030) or Nairobi Metro 2030 was established on the back of this in 2008. The goals included the creation and implementation of zoning laws, and the design of a Metropolitan Area Space Plan. The Nairobi Metro 2030 (including some proposals for the city prepared in 2013 in the Spatial Planning Concept) has developed into the new Nairobi Integrated Urban Growth Master Plan (NIUPLAN) 2014-2030. However, NIUPLAN is only tailored for the Nairobi City County – it does not apply to the broader Metropolitan Area of Nairobi which includes other counties and municipalities.

The goal of NIUPLAN is to ensure spatial order for physical investments, to improve the quality of life for citizens, to direct investment by providing location criteria, and to embrace the changing urban policy regime by incorporating social , cultural , environmental and political issues within a single unit. It aims to incorporate all current city sector plans, such as water, solid waste management, energy, and electricity subsector plans, and align them with The Kenya Vision 2030, providing a structure for urban development coordination. The new master plan is ambitious; seeking to address the urban housing demand by introducing, for example, hubs densification and decentralization. The proposal was completed in May 2014, and was validated in September 2014 (the public was invited to a validation event), according to the NIUPLAN website.

The NIUPLAN looks at the planning of the city from a broad policy level and it is up to the local planners and urban designers and other stake holders to rein in presented ideas if they envisage them to be unrealistic for local needs.

Considering the rapid growth of Nairobi, and its complex and partly challenging background, UN-Habitat has consistently assisted the City County and its partners in identifying appropriate approaches to implementing the program. A "car-free" street festival, the

Placemaking Week is an example that inspired Nairobians to stroll, bike and skate the CBD streets and enjoy the public spaces of the city. Considering the rapid growth of Nairobi, and its complex and partly challenging background, UN-Habitat has consistently assisted the City County and its partners in identifying appropriate approaches to implementing the program. A "car-free" street festival, the Placemaking Week is an example that inspired Nairobians to stroll, bike and skate the CBD streets and enjoy the public spaces of the city.

As a regeneration engine east of Tom Mboya Road, it is envisaged to be a catalyst for action on air quality in the sense of broader climate change, a vehicle for economic revitalization and an example of sustainable regeneration of urban and built heritage. It is also expected to be both a legacy project for the city and a flagship project for both the city and UN-Habitat to demonstrate the leadership of Nairobi in implementing the ideas found in the New Urban Agenda. This initiative would contribute significantly to the ongoing reconstruction plan for Nairobi, as well as the adoption of the Nairobi Integrated Urban Development Plan (NIUPLAN). These projects are important and if the local government opens up more of these partnerships and the same applies to other open spaces in the city with a view to enhancing their restorative qualities can drive change and enhance the urban dweller's quality of life.

4.2 Nairobi CBD

The study area is the core C.B.D of Nairobi. This is the area defined by University Way to the North, Moi Avenue to the East, Haile Selassie Avenue along the South and Uhuru Highway to the West.

4.2.1 Layout of the C.B.D

The C.B.D of Nairobi is ordered in a Grid Iron layout that is about 27° off the North direction. The origins of this layout are found in the initial town planning which was based on the location of the railway depot. In 1899 when Nairobi was established as a railway depot, there were two streets leading from the Railway Station; Station Road (later Government Road, now Moi Avenue) and Victoria Street (now Tom Mboya Street). These two led to the European and Indian Bazaar and the area set-aside for commercial purposes, which grew into today's C.B.D.

The railway line off the station ran along what is now Uhuru Highway perpendicular to the station at that point. This formed the Western edge of the town with the Eastern edge being formed by Victoria Street (Tom Mboya) and Government Road (Moi Avenue). The edge formed along Moi Avenue bends at the former Bank of India Building (now National Archives) as it runs parallel to the Nairobi River going to the North giving the C.B.D its unique shape. The main avenues run uninterrupted West to East from Uhuru Highway to Moi Avenue. These are University Way, Kenyatta Avenue, City Hall Way, Harambee Avenue and Haile Selassie Avenue on the lower part.

The C.B.D was zoned as a commercial area since its inception with some of the buildings along the Indian Bazaar doubling up as shops cum residential buildings. Today, the C.B.D is mainly commercial and civic with a few areas set aside for recreational purposes.

Figure 49: Aerial view of Government road (Moi Avenue) in the 60s showing the fairly open sky line

Source: www.sikh-heritage.co.uk

4.2.2 Urban open spaces in the C.B.D

The C.B.D of Nairobi has several urban open spaces. These can be broadly classified into the following;

i. Public Urban Open Spaces- which are freely accessible to members of the public.

ii. Private Urban Open Spaces- privately owned urban open spaces accessible to the public but which have controlled access.

iii. Other open spaces- the spaces leftover as islands or medians of a main street or after pedestrianization of some parts of a street.

4.2.2.1 Public Urban Open Spaces

Public urban open Spaces in the context of Nairobi are the spaces that have been set aside for public recreation and enjoyment. These spaces are freely accessible to the public and are run and maintained by the Nairobi City County through its Urban Design & City Planning Departments, which are also in charge of reclaiming, lost public spaces.

These public urban open spaces as realms for restoration and form the subject matter of the research and will be studied in detail. Some notable spaces are such as The Jeevanjee gardens, Tom Mboya square, Hilton Park, Aga Khan walk and the sunken Car park adjacent to it.

4.2.2.2 Private Urban Open Spaces

The private urban open spaces are the open spaces that are privately owned (or owned by a parstatal). Public access and use of these spaces is restricted or controlled by the institutions that own the spaces. As such, the Nairobi City County has no control over these areas as it does with the public open spaces. Some of the key private urban open spaces within the CBD include The August 7th Memorial Park, The KICC Plaza, the open space next to The International life House and the GPO Plaza.

4.2.2.3 Other Open Spaces

The other spaces found in the city are those that are open to the public but not designed as public urban open spaces. These are mainly spaces that were left over as part of the edge (an island) or median of a main street or avenue. These spaces are planted and fitted with sitting benches and act as areas for relaxation. Some of these areas include:

  i.   The on-street islands found along Moi Avenue (at the junction with Harambee Avenue)
 ii.   The on-street islands found along Kenyatta Avenue (next to the World War monuments)
iii.   The area adjacent to the August 7th Memorial Park.
 iv.   Part of Mama Ngina Street which was pedestrianized.
  v.   The median along Kimathi Street
 vi.   The median along Muindi Mbingu Street.

These spaces are also equally important for the city as they act to ease pedestrian traffic off the main street and provide seating areas.

Figure 50: Nairobi's Key open spaces

Source: Author, 2019.

4.3 The Demand for Restorative Open Spaces in the C.B.D of Nairobi

The importance of urban open spaces has already been discussed in Chapter 2 and these apply for the C.B.D. The demand for restorative urban open space in the C.B.D is evidenced by the pedestrians resting and finding refuge in places that are not designed for that purpose. There are several examples within the CBD of Nairobi where people tend to use the space as if it were public. The site left empty after the demolition of a building at the junction of Muindi-Mbingu and Biashara Streets is an example of such. Pedestrians, taxi drivers and workers from the adjacent City Market occupy the space and use it as if it were a public space.

Figure 51: An open space left after demolition of a building on Muindi Mbingu St. being used as a public space.

Source: Author, 2019..

Figure 52: pedestrians seated on a demolished wall along Tom

Source: Author, 2019..

The reason they utilize the leftover spaces is borne of a need to rest or relax. It is also an indication of the inadequacy in terms of the number and distribution of such spaces within the C.B.D.

4.4 An Analysis of Urban Open Spaces In The C.B.D Of Nairobi.

What follows is a look at some existing urban open spaces in the CBD of Nairobi as the spaces where restoration can likely be accessed in line with the assumptions laid out in the first chapter. The spaces are discussed under three subtopics; the historical background that introduces the context of the space, The Design of the Public Space, that covers the shape & layout, the form and the space defining elements. The third subtopic covers the Analysis of the of the elements determining the restorative qualities of the space. The enquiry shows how the factors of location, accessibility, catchment area, size, seating, planting, microclimate, food and programs determine how successful each space is. The findings are tabulated in summary with a comparative analysis showing how each public space fares individually and collectively. It is shown that in most cases, these elements are either lacking or not properly implemented for public benefit. However, there are certain successful features which if enhanced could make the quality of these spaces even better.

4.4.1 Jeevanjee Gardens

The Jeevanjee Gardens is a public urban open space located in the North part of the Central Business District of Nairobi. Monrovia Street to the North, Moi Avenue to the East, Muindi Mbingu Street to the West and Moktar Daddah Street to the South form the outer edges of the the park. The public space was created in 1906 and the land is held in trust by the Nairobi City County through a 99-year lease (1931-2031) from the Government of Kenya. The Nairobi City County is in charge of running and maintaining the park.

4.4.1.1 Historical background

The Jeevanjee gardens is the first and oldest public space in the City of Nairobi having been in existence for over a century. The Jeevanjee Gardens was established in 1906 by Alibhai Mulla Jeevanjee, (after whom the park is named) who was at the time the wealthiest Indian merchant in Kenya. At the beginning of the 20th Century, the colonial administration was looking for land to set up a public garden in the city. Mr. Jeevanjee donated his parcel of land that was adjacent to the Indian Bazaar (now Biashara Street). Mr. Jeevanjee commissioned a sculpture of the Queen Victoria in her honour in the garden. The statue was unveiled in March 17th 1906 during the Royal visit and stands there to date, 106 years later.

Figure 53: The unveiling of the statue of Queen Victoria in 1906 at the Jeevanjee Gardens.

Source: Mills, 2010.

The public space was run by the then Municipal Corporation (now the Nairobi City County). In its early days, the European and upper class Indians used it for recreation. It was governed by by-laws developed in 1925 relating to cleanliness, care of the environment and restrictions of animals, games and music. By 1931 the park was hosting Sunday auction sales. Over the years and even after independence the space gained popular use (Patel, 1997).

In the late 80's and early 90's there was a proposed development to turn the gardens into a multi-storey car park and shopping mall. The 10,000m2 shopping mall and 1,500 vehicle capacity car park were to be accommodated on 3 levels below ground with a giant glass dome at the top for lighting. The gardens were to be replaced by a privately owned piazza. This project was however never realized due to opposition from the family of Jeevanjee, the late Prof. Wangari Maathai and the general public. The elderly Indians still refer to it as Rani Bagh- the Queen's Garden (Patel, 1997).

4.4.1.2 Shape & Layout

Jeevanjee gardens takes the shape of a trapezium. Its layout is shaped by the City grid that runs at about 27o off the North axis. Access is from Muindi Mbingu Street and Moi Avenue. These access points act as both the entry and exit for pedestrians. The entrance along Moi

Avenue is restricted to vehicles with only a few using it to access the Park management offices.

Figure 54:An aerial view of the space showing the trapezium shape of the gardens

Source: Google maps

The main walkway starts off from Muindi Mbingu Street. At about a third of the way, it bifurcates into two secondary walkways (where the statue of Jeevanjee is located), which join again (where the statue of Queen Victoria is located) into one walkway which terminates on Moi Avenue.

Figure 55: A massing model of the Jeevanjee Gardens showing its form.

Source: Author, 2019. 2015

There are secondary walkways that run parallel to the main walkway with others running perpendicular. On the side facing Muindi Mbingu Street, the main walkway bifurcates into two secondary walkways creating a bow-like shape. At the heart of the space is a green island on the lateral ends of which are the statues of Queen Victoria to the East and that of Alibhai Jeevanjee to the West.

4.4.1.3 The space defining elements

The following are the space defining elements of Jeevanjee gardens that give the space form shape and scale and further define their function.

Walls

The space is entirely enclosed by a 2metre high hedge. The hedge acts to define the space physically and visually becoming a 'wall for the space'. The hedge prevents physical and visual access both into and out of the space. It is an inactive wall since it does not support any activities including those of the surrounding streets. Other walls of the space are formed by

the surrounding buildings. These are the buildings found along Moktar Daddah street, Muindi Mbingu street, Monrovia street and Moi avenue. These buildings are visible from certain points within the space due to the presence of the hedge which acts as a barrier.

Figure 56: The walls defining the extent of the physical and perceived space

Source Author 2015

Roof

The roof of the space is made of the canopies of the trees. The crowns of the trees act to define the space below them without sealing off the sky completely. The trees cover a significant part of the park and the perception of the space is different at different points within the space.

Figure 57: The tree canopy defining the roof of the space

Source: Author, 2019. 2015

Floor

The floor of the space is mainly green. The hard Paving is found on the walkways and areas with structures. The floor is articulated as follows; the walkways have loose ballast on the walking surface. Green grass covers most of the rest of the space. Jeevanjee Gardens has a variety of plants especially in the nursery and green island in the middle. These plants and flowers also form the floor of the space.

Figure 58: The garden's floor

Source: Author, 2019.

4.4.1.4 Analysis of the elements determining the restorative qualities of the space

The following is an analysis of the space as per the three major clustering of qualities that support restoration.

Social Support

Jeevanjee Gardens is a popular spot with a group of city residents. It supports various activities such as sitting, gatherings, debates, preaching, walking through and relaxation and the smoking zone that is also popular. The space has few users in the early mornings (6:30 a.m. to 8:00 a.m.) The pedestrian traffic gradually rises and by 10:00 a.m. most of the seats are fully occupied. The late mid-morning, noon/ lunch time and early afternoon i.e, 11:30 a.m. to 3:00 p.m. is the peak period for the space as it reaches its effective capacity. The space is busiest during the lunch hour as some of the city inhabitants tend to spend their lunch time there. In the evening, the space is not as busy as the peak time. College students and young couples frequent the space the most at this time. The space is rarely used at night and the gates are closed at around 10:00 p.m.

The space however has a weak relationship with its surrounding streets. There are only 2 accesses into the public space¨ off Moi Avenue and Muindi Mbingu. The presence of the live fence around the space prevents any sort of movement from the streets into it and vice versa¨ other than through the 2 access points. As such¨ the activities that take place on the surrounding streets are completely detached from the space. The streets are therefore unable to feed the public space with human traffic and activity.

The location is prime as it has a significant pedestrian flow especially along Muindi Mbingu and Moktar Daddah streets. This traffic is made up of people going to or from work, the shops around or the higher learning institutions in the vicinity. It is a location that is along a path used by people moving towards the surroundings. However the public space is unable to attract many of these pedestrians as it has restricted physical and visual access.

The public space has reduced physical access and restricted visual access into it.
It has only 2 entry and exit points which are gated. As a fully public space it should have unrestricted access and multiple entry and exit points for the users. In addition, the
space is fenced all round using barbed wire and a live fence that is about 2 – 2.5m high. The

gates are unwelcoming to most of the users who prefer to go round the space.

The hedge that denies passers by visual access into the space brings about visual inaccessibility. This discourages use since a space that cannot be seen will most probably not be used. The thick hedge has also been associated with insecurity. It blocks off views from surrounding buildings and the street thereby going against the principles of natural surveillance making the place seem insecure. The public place is therefore divorced from most of its surrounding streets and related activities.

A major social conflict is observed. Jeevanjee Gardens attracts different groups of users. However, the Bunge la Mwanachi (The People's Parliament) members tend to dominate the space as they debate the issues of the day. This at times causes discomfort to other users as they block the main walkway or make noise for other users who go there for the silence and peace of mind.

Movement and exercise

The space offers opportunity to move through take a stroll or even jog. The surface material used on the walkway however does not support comfortable movement.- thus movement is restricted in speed to walking or strolling.

Natural distractions

The Jeevanjee Gardens is characterized by a variety of planting material. It is the only public space within Nairobi's CBD which has extensive use of material. The 'floor' of the space is in grass cover while the vertical 'walls' made of a hedge while the crowns of large trees cover the 'ceiling'. The planting materials within Jeevanjee gardens also serve to define the sub spaces and circulation as well as for environmental modification.
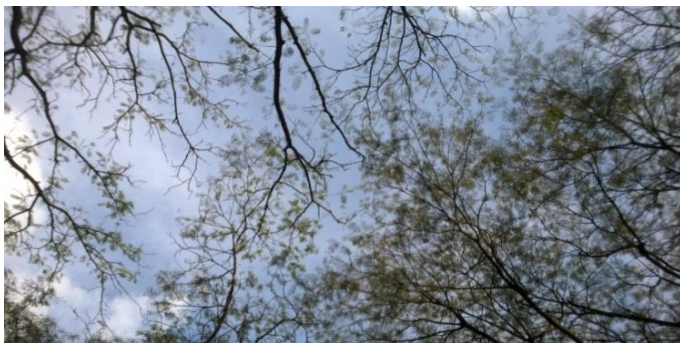
Figure 59: Tree cover of exotic Jacaranda trees

Source: Author, 2019.

The flowers, birds and small insects that have made this their habitat provide the users of the space with soft fascination. These draw ones attention without too much effort.

Being away

The immediate surroundings are characterized by commercial developments including hotels, retail outlets, business shops, stalls, eateries and a primary school along the four streets that surround it. The space offers a good opportunity to access a contrasting environment within this North Eastern part of the CBD. The almost solid green wall encloses the space creating a distinct 'urban room' further enhancing the feeling of being in a different space from the CBD's noise and density of buildings and people.

Figure 60: Location in context of the built-up density

Source: Author, 2019.

Extent

The garden has a trapezoid shape. The four sides measure 113m on the side along Monrovia Street¨ 120m on the slanting side along Moi Avenue , 170m on the longest side along Moktar Daddah and 106m on the shortest side along Muindi Mbingu Street. It has an approximate area of 1.5 ha (3.7 acres).

On the macro-scale and in relation to its immediate urban context¨ the size is appropriate for its catchment area. Its size is also appropriate for its internal activities. This size allows for the various interactions of a public space from intimate to a pleasant human scale within a social field of vision.

Fasciation

Jeevanjee Gardens is a green urban space. The variety of trees and plant material act to give the space some sense of aesthetic. However, the space is ill maintained as some of the flowers dry up or go unpruned. The space therefore lacks an ordered visual complexity.

Public Art pieces are exhibited in the Jeevanjee Gardens. It has 2 monuments and sculptured seating. The two monuments are the statue of Alibhai Mulla Jeevanjee which stands opposite that of Queen Victoria. The statue of A.M. Jeevanjee is made of iron wires and is a figure of him having his favorite delicacy -the roti.

Figure 61: The statue of A.M. Jeevanjee

Source: Author, 2019. 2015

The statue of Queen Victoria is a marble statue that depicts the Queen with her scepter on one hand. Most of the respondents questioned were not aware of what the statues represented. These monuments do not hold as much meaning to the users of the space as say that of Tom Mboya in Tom Mboya square. Most people walk past the monuments while others try to familiarize themselves by reading the plaques on the statues. The dancing girls seat and sculptured sets in the space act as good examples of how art can be fused with function.

Figure 62: The statue of Queen Victoria

Source: Author, 2019. 2015

Figure 63: A resting area with the sculptured seats

Source: Author, 2019. 2015

Compatibility

There is a circulation route that passes through the public space from Muindi Mbingu to Moi Avenue. This attracts a reasonable number of pedestrians who prefer to use the public space as a shortcut to either street.

However, the space does not offer activities that would draw these passers by. To shorten the distance, the pedestrians prefer not to use the main walkway but instead make their own path on the grass. There are no significant changes in level within the public space. The entire space is almost on one gradient level meaning that it can be used by the physically challenged. However¨ the use of loose ballast as the floor material makes navigation through the space uncomfortable.

Figure 64:Accesses from moi Avenue and Muindi Mbingu street

Source: Author, 2019. 2015
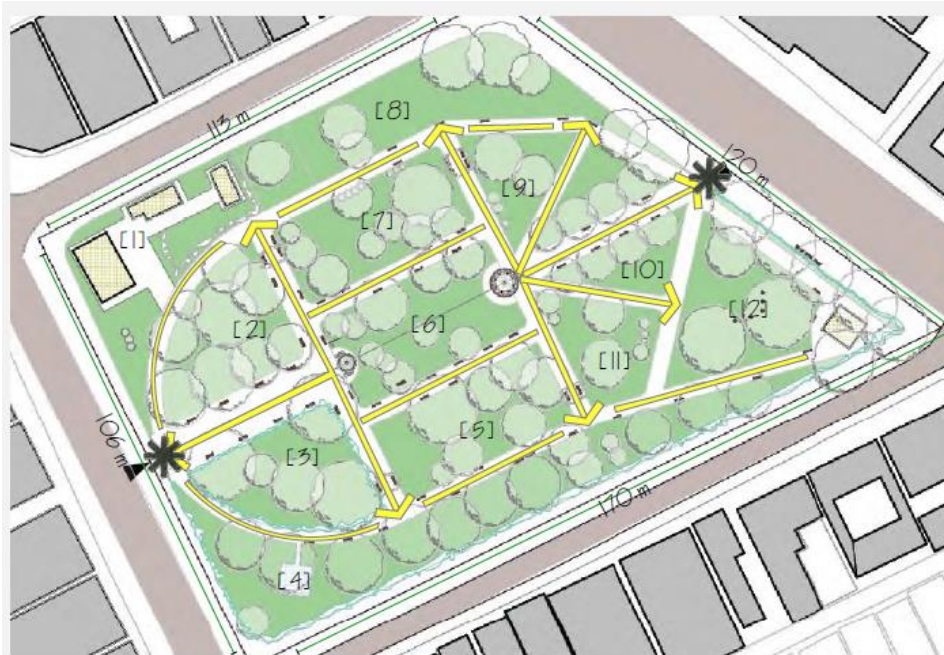
Subspaces

Sub-space 1- Park management offices
Sub-space 2- Resting area, Sitting
Sub-space 3- Resting area, (Sitting on the lawn, taking naps)
Sub-space 4- Smoking zone
Sub-space 5- Children's play, resting area
Sub-space 6- Dense planting (shaded resting area)

Sub-space 7- *Bunge la mwananchi* debates
Sub-space 8- Resting area, bench sitting
Sub-space 9- Sitting, resting area
Sub-space 10- Bench sitting, Resting area
Sub-space 11- Resting area
Sub-space 12- Resting area with Sculptured seats

Figure 65: Accesses and circulation

Source: Author, 2019. 2015

The Jeevanjee Gardens has several sub-spaces within the greater whole that offer the user an array of choice. These are well-defined outdoor rooms. There are several walkways that cut through the public space dividing it into smaller sections. The boundaries between the subspaces are defined by a change in the floor material from loose gravel along the walkway to grass cover on the green areas.

These subspaces take different dimensions and shapes as determined by the overall layout of the space. Each outdoor room or space supports a different activity. The floor on the green spaces is used for relaxing and taking naps. The walkways are not only used for circulation but also form the stage upon which preachers give their sermons from.

Figure 66: The pergola hosting the Bunge la Mwananchi debates

Source Author 2015

The space is largely unused at night. The poor lighting and hedge around the space are often associated with insecurity. There have been reported cases of muggings and robberies within the space.

The main type of sitting is in the from of benches which are made of either concrete or steel. The concrete benches are profiled in a curvilinear shape whereas the steel benches take a rectilinear form. Some of the concrete benches are painted in bright colours. The steel benches are finished with a thin layer of timber laminate and all-weather plastic signage on the sitting surface. There is one sculptured concrete bench (Dancing Girls sculpture). The other type of sitting is the fixed individual seats. These are 5 steel-sculptured seats.

Most of the sitting spaces are located along the edges of the walkways. In some cases, the seats face each other and in some they are staggered to alternate. Most of the benches are also located beneath shaded areas. This is ideal for the microclimate as most afternoons are hot and shading is required for human comfort.

4.4.2 The Aga Khan walk

The Aga Khan Walk is a Promenade or Pedestrian Walk located within the Nairobi C.B.D. The pedestrian walk stretches from City Hall Way to Haile Selassie Avenue with a break at Harambee Avenue. The walkway is open to the public and is managed by the Nairobi City County. It is characterized by a 23-metre wide walkway, which is split into two by a 10 metre green median.

Figure 67: Plan drawing of Aga Khan Walk from City Hall Way to Haile Selassie Avenue.

Source:Author

4.4.2.1 Form and layout

The Aga Khan Walk is a linear pedestrian Walk. The Pedestrian Street is approximately 460m long and has a uniform width of 23m It has an approximate area of 1.05ha (2.6 acres). It stretches from Kencom Bus terminus on city Hall Way to Haile Selassie Avenue. The first

and more popular stretch from City Hall Way (at Kencom) to Harambee Avenue (at Electricity House) is approximately 290m long. Harambee Avenue breaks the Promenade into two. There is a pedestrian zebra crossing to link one side of the promenade to the other.

The remaining stretch from Harambee Avenue (at National Bank building) to Haile Selassie Avenue (at Ex-Telecoms) building is approximately 170m long.

The Pedestrian street is characterized by a Linear Walkway that is bifurcated by a green island median. The split walkway is 7m on the Eastern side and 6m on the Western side with the 10m green median running between the two. The two paths become one at junction points where the walkway achieves its full width of 23m. These junctions become nodes where people cross between the two arms of the promenade as well as connecting with the linking avenues to Moi Avenue.

Figure 68: Massing A model showing a bird's eye view of the public space.

Source: Author, 2019.

The space is a pedestrian promenade. It cannot therefore be classified as the other public spaces in the CBD which are mostly Squares. The major difference being that a Promenade is mainly transitional while a square is more terminal. The analogy is that if a street is seen as a river that flows with people, then the square is the lake upon which they settle (Moughtin C. , 2003). However, the promenade can also serve the purpose of being a destination, a square. In the case of Aga Khan Walk¨ the pedestrian movement is mainly transitional. There are however certain points with benches and a ledge where pedestrians choose to rest. The promenade therefore acts as both a pedestrian street and a square.

Figure 69: A panoramic image showing the space as seen from the KICC building.

Source: www.jambonairobi.co.ke.

The sub-space (Sunken Carpark)

Figure 70: Plan of the subspace that is the sunken car park

Source: Author, 2019. 2015

Figure 71: Aerial photo of the subspace that is the sunken car park

Source: Author, 2019. 2015

Figure 72: Massing model

Source: Author, 2019.

4.4.2.2 The space defining elements
Walls

The walls of this promenade are formed by buildings that define its limits. Since the space supports transit, the walls are perceived differently as one walks along and are not static as those of a square. The walls enveloping the space are formed by building shown in **Figure 30**.

Figure 73: Plan drawing of Aga Khan Walk from City Hall Way to Haile Selassie Avenue.

Source: Author, 2019.

Floor

The floor of the Aga Khan Walk is paved on both sides of the walkway with the middle part being green. There are small changes in level, the most significant being the ledge on the boundary of the space. The ledge rises about= 0.35-0.45metres above the ground level providing the main sitting surface. There is also a rise in level by 0.5m between Uchumi House and Uchumi Supermarket.

Ceiling

The ceiling of the space is formed by the open sky. The pedestrian walk is about 460m Long. The skyline is constantly changing across this distance. Therefore the height of the sky perceived as the ceiling will be constantly changing as one walks across the promenade. The height of the sky as perceived will be a variation of distances given by a factor of the tallest buildings surrounding the space.

Figure 74:Pedestrians using the ledge as a sitting surface

Author: Source

4.4.2.2 Analysis of the elements determining the restorative qualities of the space

The following is an analysis of the space as per the three major clustering of qualities that support restoration.

Social Support

The Aga Khan Walk is located in the C.B.D and is a pedestrian street that flows from City Hall Way down to Harambee Avenue and finally to Haille Selassie Avenue. It is a route that is used by people as they go home or connect to various parts of the city. The space links with different parts of the city. The connection between Kencom Bus Terminus to Railways headquarters which also acts as a bus terminus.   There are also several work places, civic (along Harambee Avenue) and commercial. There are also several learning institutions within the vicinity. These work places and learning institutions attract a heavy pedestrian flow making the location of the promenade very strategic.

The public space is physically accessible form many points along its length. It has no physical boundaries other than the surrounding buildings. This makes the space very porous as pedestrians enter and exit the space as they wish. This lack of enclosure encourages unrestricted movement.

Visual Access- the space is also visually accessible. The space is visible from different parts of the city. Pedestrians are able to orient themselves from this point to their destinations. The space is especially busy during the peak (rush hour) period in the evenings as people making their way home stream in from their work places.

Aga Khan Walk is in itself a street. However, the fact that the Walk is purely for pedestrian traffic means that it acts as both a street and square. Other than its internal activities, the Walk is connected to other streets in its proximity. These include City Hall Way, Harambee Avenue and Moi Avenue (through the various small avenues that run from the Walk to Moi Avenue) and Haile Selasie avenue. This link with the surrounding streets is important as it becomes the centre of the neighbourhood.

The catchment area for Aga Khan Walk Tom Mboya Square covers parts of City Hall Way, Mama Ngina Street and Kimathi Street directing to the North; Moi Avenue and Tom Mboya Street to the East; Harambee Avenue and Haile Selassie Avenue directing to the South; and Taifa Road and the Nairobi Law Courts to the West. These areas (most

significantly Harambee Avenue and City Hal Way) have a large working population which uses the space mostly during lunch hours and in the evenings as they head home.

The Aga Khan Walk hosts an array of activities. The space is mainly used for circulation and as such, a lot of people can be found walking in different directions on their way to their businesses, workplaces or home. Along the sitting ledge and on the benches, people can be found resting or relaxing while within some of the green areas are frequented by those who wish to bask, sit or lie down on the grass.

The sitting ledge accommodates those sitting, having group meetings or just standing next to it. The space also allows for group meetings for students or workmates to have discussions. There are also choir practice sessions that are held in the evenings or over weekends. Street poetry is another event that takes place within the space in a shaded area close to the main walkway. The early mornings are characterized by people going to work and as such, the space is mainly transitional. People start gathering on the ledge and benches from around 9:00 a.m. the mid-morning session is characterized by mixed traffic as some people move to and fro the space while others sit or hang around. By 12:00 noon, the space is a buzz with public life and usually reaches its peak at lunchtime (between 1:00 and 2:00 p.m.). During this time, the ledge is more often than not fully occupied. It remains in this state for the better par of the afternoon, thinning out at around 3:00 p.m. and peaking again at around 4:30 p.m. as people make their way home. The space is well lit meaning it could still be used at night. However there are only few groups of people to be found past 7:30 p.m.

Aga Khan Walk is a space that is always abuzz with activity. The space however lacks popular use at night despite being well lit, past 8:00 p.mthere are only few groups of people or a person. Past 10:00 p.m. the area is largely unused and this makes it insecure as people avoid it.

There is no single user group that dominates the sunken carpark space to the extent of causing discomfort to other users. The skaters and bike riders who use the space on Sundays have authority to do so from the County government and can therefore not be said to be using the space at the expense of others. The same goes for the business people who sell their wares on Saturdays.

The sunken car park also has minimal night use. On weekdays, the parking lot is occupied until about 9:00 p.m. Past this hour, the space is in disuse. This makes it a dangerous spot as it is occupied by street children. The dim lights also add to the feeling of insecurity a probable reason why the space is shunned at night.

Movement and exercise

On Sundays, the sunken area is used for roller-skating and bike riding. The skaters circle around the main driveways as they practice their routines. The younger skaters and learners are found on the edges of the space from where they are taught how to skate. The users are from all ages including small children¨ young adults and middle aged adults.

Figure 75: The skating and biking taking advantage of the bitumen surface

Source: Author, 2019. 2015

The skating and bike riding usually attract a large Audience. The motion of the skaters round the sunken car park creates a dramatic, rhythmic and colourful setting for the passersby. This

makes the sunken car park one of the most popular public space in this part of the CBD on the weekends.

Natural distractions

The Aga Khan Walk is characterized by a green median that cuts across the main walkway. These green surfaces act to articulate the space and soften the hard surfaces. Planting for Circulation Control The plant material acts to split the main walkway into two. This gives the walk its most distinct character. Pedestrian traffic moves in either direction on the 2 branches of the walkway. At the points where the green spaces break¨ the walkway becomes one. Thus the green space bifurcates the walkway. This is important as it softens the hard surfaces and breaks the monotony of walking in a straight line. The green spaces act to define smaller subspaces within the walk. This offers variety for the space users as they can rest on the hard surfaces or green surface. This mix of green and grey surfaces adds to the contrast within the space.

The green spaces are lined with rows of trees and other smaller plants. Seats are located below the mature trees to offer shade to the users. These shaded areas are frequented by people especially in the hot afternoons as they offer reprieve from the discomfort of the hot sun. People can also be found within the green spaces lying down to take a nap under the shade of trees.

Being away

The space being the most prominent pedestrianized street and free from vehicular traffic gives the space a sense of being away from the density of the CBD. The pockets of green with seating space albeit inadequately provided, offers contrasting settings from the streets that pedestrians share with vehicles as well as the office environments that some of the users spend time in. The Aga khan walk in a sense offers a distinct separateness from the rest of the streets in its context by virtue of it being a pedestrianized street. The route also offers a temporary escape from the rest of the streets where there is vehicular and pedestrian conflict.

Extent (Size of Aga Khan walk)

The Pedestrian Street's1.05ha (2.6 acres) space easily passes as the most popular stretch from City Hall Way (at Kencom) to Harambee Avenue (at Electricity House)and stretches approximately 290m long while the remaining stretch from Harambee Avenue (at National Bank building) to Haile Selassie Avenue (at Ex-Telecoms) building stretches approximately 170m long.There is no other public open space of this size and it appears to be appropriate for the large catchment area it serves.

Fascination

The Aga Khan Walk offers users views into different parts of the city. The openness of the space allows for panoramic views from various points. The space represents the character of the surrounding buildings due to the unique place it finds itself. Public Art- Aga Khan Walk does not have any artistic elements such as monuments or water features. This space becomes transitional with no attractive features to keep people there or generate interest.

The foliage and green attracts a fairly large population of birds and insects that offer opportunities for soft fascination. The space also supports a variety of programs that can capture the user's active attention. Given the length of the space, the events only take place in selected parts of the walk. The programs include performance by artists. These take place mostly over the weekend alongside the other recreational events that take place in the sunken car park. Street Poetry is one of the activities that takes place every 3rd Sunday of the month. The event includes performances by artists, musicians and poets.

Compatibility

The Pedestrian Street has 2 main subspaces. The walkway and the green islands that separate the walkway. The linear walkway is bifurcated by a green island/median. The split walkway is 7m on the Eastern side and 6m on the Western side with the 10m green median running between the two. The two paths become one at junction points where the walkway achieves its full width of 23m. These junctions become nodes where people cross between the two arms of the promenade as well as connecting with the linking avenues to Moi Avenue. Whereas the walkway is mainly transitional with people moving across it, the green spaces act as areas of rest. Some of these spaces are however cut off from comfortable access thus forcing some users to breach these barriers.

Figure 76: Breached barriers.

Source: Author, 2019.
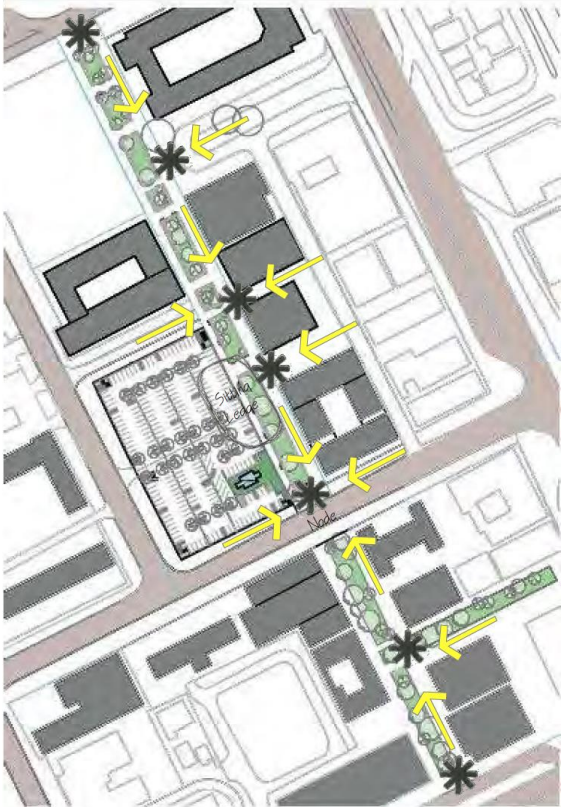
Figure 77:Plan of Aga Khan Walk showing the main circulation paths and access points.

Source: Author, 2019.

Figure 78: Plan of Aga Khan Walk in context showing the catchment.

Source: Author, 2019.

There are two types of sitting; integral sitting and bench sitting. The integral sitting is in the form of a sitting ledge which forms the primary mode of sitting. This ledge forms the boundary of the sunken car park which lies adjacent to the Walk. There are about 16 benches which act to supplement the integral sitting.

The ledge is located across the length of the sunken car park. It forms the boundary of the sunken car park. This location faces into the main circulation route. It is properly located as it faces into the action. The benches are located at the junctions of the walkway and under the shade of trees.

Sitting Patterns- the ledge is the most used sitting surface. People sit on the ledge facing the Walk (the main circulation route) on weekdays as they watch the movement of

people. However, on Sundays when the sunken car park is transformed into a skating rink, people sit facing the opposite direction into the car park.

Physical Comfort: the ledge is 450-600mm high and 600mm thick (width). Despite the fact that it lacks a backrest, the sitting surface is physically comfortable. The 600mm width is thick enough and comfortable for the average human backside considering a width of about 450-500mm is required. The benches are the more comfortable sitting surfaces as they have a backrests and armrests in addition to the generous sitting surface.

The seating ledge is socially comfortable. Although it does not offer the users the choice of sitting in the shade or in the sun, it offers the opportunity for different kinds of groupings. The benches are more socially comfortable as some are located in sunny spots while others are located under the shade. As such, users have the option of choosing where and how to sit.

Figure 79: The ledge of the sunken carpark serving as sitting space on a Sunday

Source: Author, 2019.

The sunken car park is however also used as a garbage collection point. The containers do not hold the volume of garbage delivered to the space. That in turn causes an unsightly and smelly pile that repels the users of the space especialy the north eastern corner.

Figure 80: Pile of Garbage that's a repellent to users due to smell and poor aesthetics.

Source: Author, 2019.

Figure 81: Collage showing various activities within the sunken car park

Source: Author, 2019.

4.4.3 The August 7th Memorial Park

This is also commonly known the Bomb Blast memorial park or the August 7th Memorial Park. It sits at the junction of Haile Selassie Avenue and Moi Avenue and was the scene of the 1998 terrorist bomb attack on then United States Embassy.

4.4.3.1 Historical background

The August 7th Memorial Trust is a non-profit organization established by the citizens of the America and Kenya. The Trust was tasked with changing the grounds to act as a memorial to the victims in a park. The park is an enclosed landscaped garden featuring exotic trees, flowers, a wall inscribed with the names of those who died, a Ying Yang fountain that signifies healing and reconciliation, a sculpture built from the rubble from the blast, a souvenir store and a visitor center. It is currently funded via the proceeds from the public and private sector, gate sales, event fees, grants, and sponsorship.

4.4.3.2 Shape & Layout

Figure 82: Preliminary designs for the August 7th Memorial Park developed by Melanie Richards.

Source: The August 7th Memorial park management

The park is designed in honor of the innocent people who lost their lives on that fateful morning. In an atmosphere of relative peace and serenity one can find warmth, power and conviction. The Park is also a testament to the bravery of those who are coping with sustained injuries and the suffering of a loved one while condemning terrorist attacks.
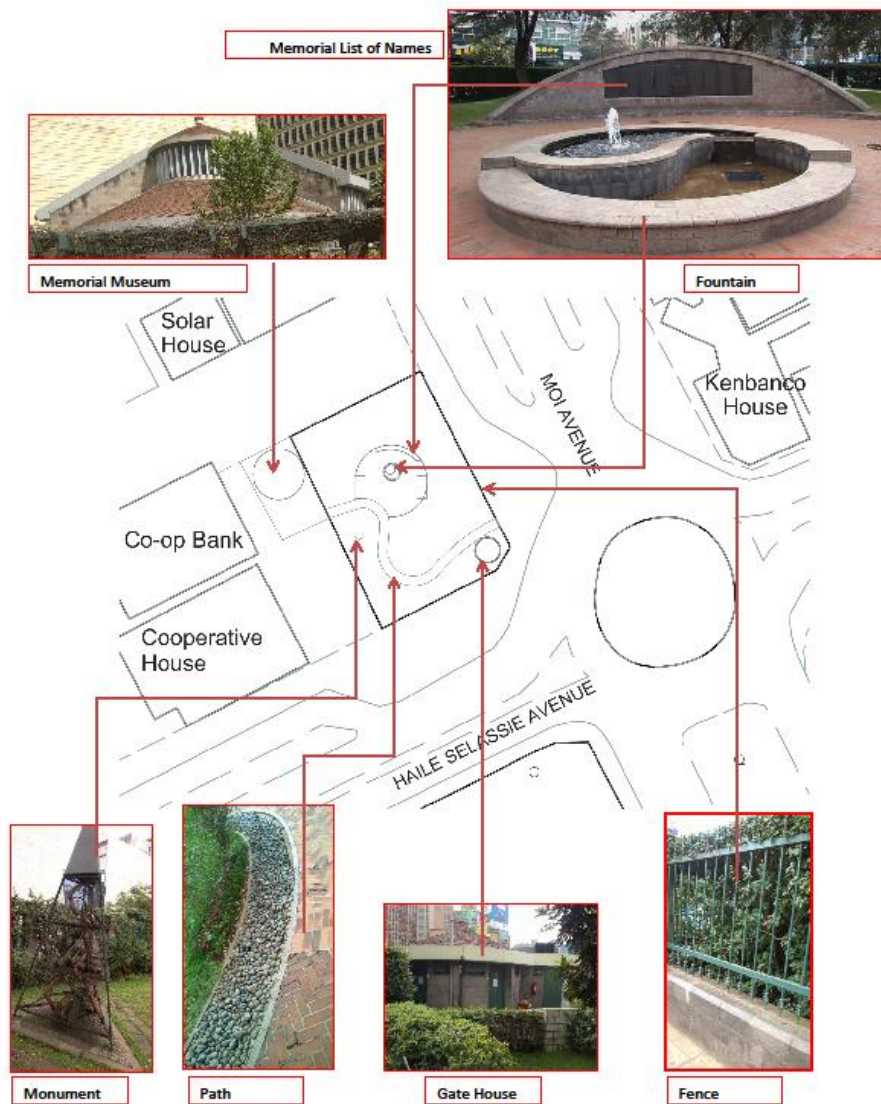
Figure 83: Key feature elements of the park

Source: Author, 2019.

A triangular sculpture called 'Mind, Body and Spirit' is made of debris and materials saved from the building of the embassy. The trustees commissioned a second-generation Kenyan-born artist Mary Collis, with American origins to do the art piece for placement in the Park. The use of partly twisted and burnt rubble in the sculpture from the bombarded embassy building was intended to serve as a reminder of the impact the bombing had on the buildings.

4.4.3.3 Analysis of the elements determining the restorative qualities of the space
Social Support

The entrance has a guarded checkpoint complete with a ticketing system and metal detectors. This security gives the user a sense of comfort. However for some pedestrians the security check and the charges at the entrance are a deterrent. A pedestrian would not easily wander through the space. The space is well lit at night and guarded therefore allowing its use late into the night. Many use the space in the weekdays over lunch hour to socialize with friends and family.

Movement and Exercise

The space due to its size limits for extensive movement. The space also has only one main access along Moi avenue and therefore no alternative exit points. Apart from the winding path there is not so much opportunity for the user to walk and stroll around. However, the existing paved walkway winds gently and has incorporated texture in the form of the pebbles in use and the shape and colour of pavers.

Natural distractions

A main characteristic of the Memorial Park is the indigenous trees and plants brought in from each of Kenya 's eight former provinces. Many Kenyan ethnic groups have historically not constructed monuments in memory of tragic events. Instead hope and rebirth are usually parked by planting sacred plants and trees. The dream of the trustees was to honor this by planting sacred plants in the park and by borrowing from this very tradition.

These trees are unique in their nature and as they attract birds and small insects and one sits below them, they offer natural destruction in a sector of the city largely lacking in similar green spaces.

Being Away

The small park is a beautiful, friendly, and calm area that gives everyone inside it the feeling of relaxation. In this part of the city there is no similar well-built and protected open space and thus accessing this area evokes a sense of being away. The small park is a spacious, friendly, and quiet place that gives everyone in it the feeling of relaxation. Within this part of the city there is no comparable well-designed and protected open space and so accessing this area evokes a sense of being abroad.

Extent

The park is fairly small (about 3 quarter of an acre) but the thoughtful design expands the perceived space by incorporating the small winding path and the creation of some sub-spaces.

Fascination

The fountain is the centerpiece of the park whose architecture is based on Taiji's Chinese philosophy, and has Taijitu diagrams, which literally translates as the Supreme Ultimate Diagram. A traditional Taijitu diagram, based on Chinese beliefs, should be circular with two fishes, each representing the Yin and Yang (Gu, 2003).

Figure 84: View of the water feature

Source: Author, 2019.

The Memorial Park symbolizes the continuation of life after death, bad deeds followed by good deeds, and though many died in the bomb explosion, it didn't mean the end of life.The park also offers through the management programmes music and poetry events every so often hosted in the park.

The designer also deliberately uses play of colour and texture of the grass, pebbles and the brick walkway to define the path and create interest.

Figure 85: The use of colour and textures

Source: Author, 2019.

Compatibility

Moveable plastic chairs have been provided that allow for the user of the space to sit under a shade or in the open alone or even in groups. The lawns are also very well maintained and comfortable to sit, lie or even walk on. The edge of the park facing Moi avenue has two retail outlest one of which is a convenience store where visitors can buy snacks or water for use within the park. The same edge also has two ATM machines also offering convenience of money access to the users. There is also a newspaper vending spot on the edge facing Haile Selasie Avenue. Off the gatehouse is a visitor ablution block well maintained and cleaned by the management and open to the public.

Figure 86: Pergolla made out of masonry pillars and covered in timber members

Source: Author, 2019.

The pergola with creepers growing on it also offers a cool space to sit under on a hot day.

4.5 Summary of Findings & Recommendations from the City Council of Nairobi, Urban Design and Planning Control Department

Because of time constraints allocated to this study, the scope of inquiry was limited to one senior official at the Nairobi City County offices. This was key because the Nairobi City County government is the custodian of the urban space and would be well versed with both its strengths and weaknesses. The official interviewed was Mrs. Winfred Gathangu, the County Executive Committee Member for Lands, Housing and Physical Planning.

4.5.1 Challenges facing the Nairobi City County

Emerging from the interview held at the county offices, the two key challenges facing the county's delivery, design and management of open spaces that have the potential to be restorative were as follows.

1. Insufficient technical capacity within to carry out planning and design functions. It was noted that the County assembly is the legislative arm of the administration. They thereby make county planning laws. However, the technical know-how of many Members of County Assembly to oversee the planning process from initiation to completion was noted as being inadequate. There was therefore need to be sensitized on the importance of planning and regulating development based on plans developed by the county assembly. Stake holders like the UN Habitat have been involved in building capacity to help the county legislature and technical planning teams appreciate objective planning and design.

2. Limited access to financial resources from the County revenue collections and support from National Treasury is probably the most crippling set back. Without adequate resource allocation toward significant improvement of the existing open spaces, development and implementation in the county will be an impossible task. Stakeholders such as the UN Habitat have expressed interest in various avenues to collaborate with county governments to source for resources to go into county planning and project development using grants and other commercial capital engagements using public private partnerships.

4.5.2 Interventions to counter the challenges

To counter the challenges to planning at the county level, the county government is already undertaking the measures such as;

1. Hiring more technical staff to join the planning departments. The technical capacity is still insufficient to satisfy the demand and need for basic county planning. This has thereby crippled the county planning process as per the requisite demand for planning services.

2. Seeking partnerships with local and multinational organization for planning the county; such as collaborated the collaboration with JICA to prepare the Nairobi Integrated Master Plan. Through a thorough engagement with the Nairobi City County leadership bodies, the county has begun to embrace public space as an important political contribution. For example, the county has approved the establishment of an Office for Urban Safety and Public Space (within the Department of Urban Planning) and committed to the upgrading and revitalization of 60 public spaces in the city. In 2012, UN-Habitat and Nairobi City County agreed to jointly develop a city-wide Public Space Strategy to deliver capacity building for City County staff and civil society partners. The UN-Habitat has also worked with the city to conduct an inventory of open public spaces, looking at locations, distributions, quantity, accessibility, quality and safety of public spaces. The results of the inventory will build the foundation upon which the city-wide strategy on public space can be implemented. Furthermore, the collaboration agreed to implement two pilot project sites to demonstrate participatory and integrated public space development approaches. One of the selected sites were Jeevanjee Gardens - the only significant green space within Nairobi's CBD.

CHAPTER 5: ANALYSIS OF USER PERCEPTIONS

This chapter provides analysis and findings of the research as set out in the research methodology. The results are presented on the perceptions of the perceived restorative qualities of Nairobi CBD's urban open spaces. The data was collected with the help of a questionnaire as the research instrument. The questionnaire was generated in line with the objectives of the study.

150 out of the 150 respondents randomly selected filled-in and returned or responded to the administered questionnaires making for a 100% response rate. This commendable response rate was made possible after the researcher carefully selected areas where the respondents would be comfortable to fill-in and return the questionnaires. 50 were administered in each of the three spaces being under interrogation.

5.1 Characteristics of the users

5.1.2 Age of Respondents

The study started with investigating the age of the respondents. Majority of the participants (51%) were aged between 26 and 50 years, 37% of the participants were aged 25 years and below and 12% of the respondents were aged above 51 years. This implies that majority of the respondents were aged below the age of 50 years. These, first of all, would be the principal users of the spaces studied where the survey was carried for reasons such as relaxing with friends, waiting for either a contact or an appointment in the many offices within the contexts. These are the people who are in need of restorative experiences within the CBD hence are conversant with the issues sought by the study and volunteered as respondents.
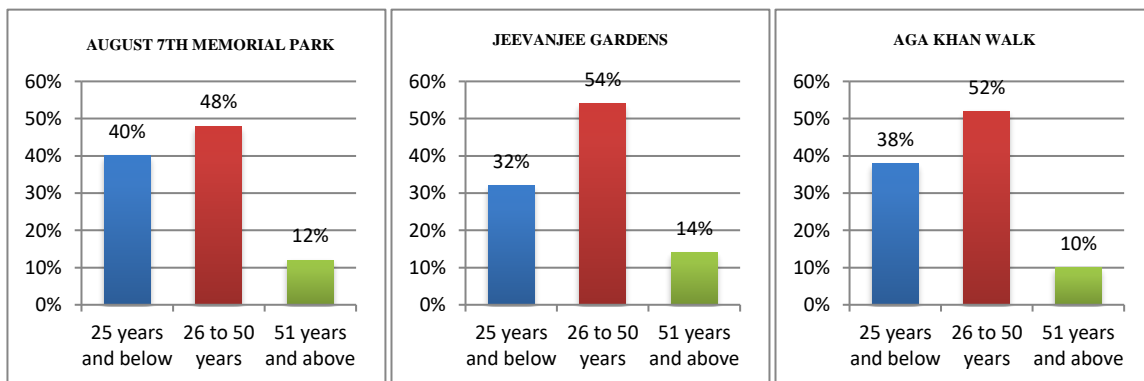
Graph set 1: Age distribution across the three spaces
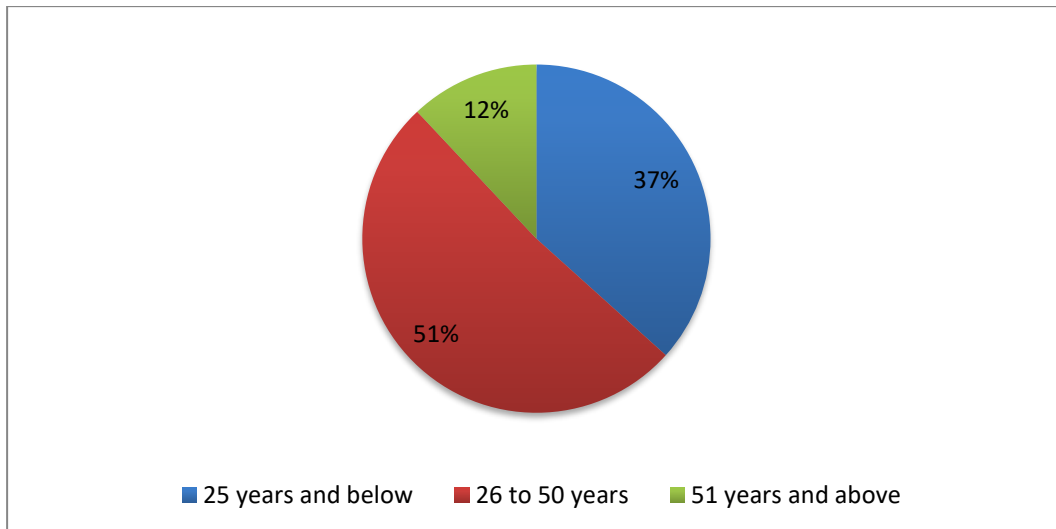
Pie Chart 1: Overall Age distribution

5.1.2 Gender of respondents

The research sought to establish the gender of the respondents. According to the study, 55% of the respondents were male while 45% of the respondents were female.
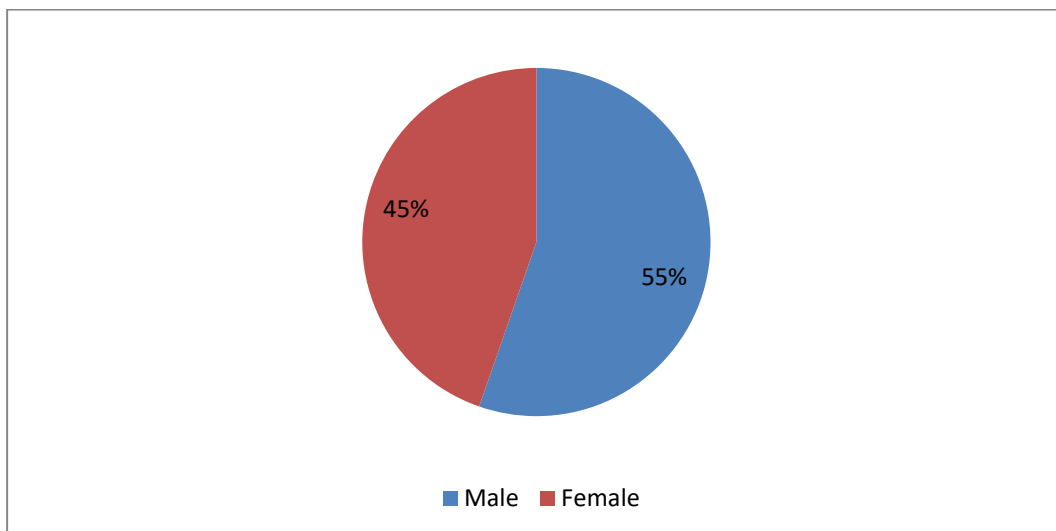
Pie Chart 2: Overall Gender distribution

The August 7th Memorial Park and Aga Khan walk however both notably registered 52% of the users as females. This can probably be attributed to the perception of safety of the spaces. The Jeevanjee gardens registered 30% of females, this being a sharp contrast to the other two sampled areas.

| AUGUST 7TH MEMORIAL PARK | JEEVANJEE GARDENS | AGA KHAN WALK |
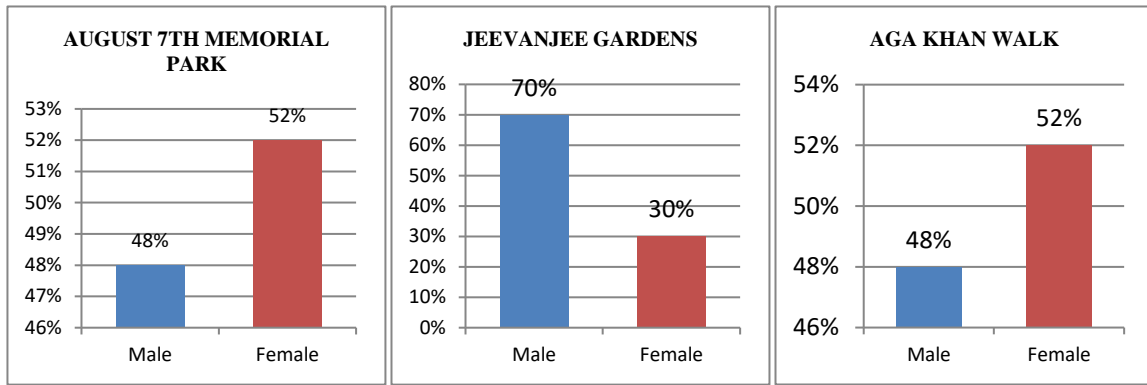
Graph set 2: Gender distribution across the three spaces

5.1.3 Occupation of respondents

From the field survey, it was established that 37.8% of the population were formally employed, 28.1% were self-employed, 9.6% were unemployed and 24.4% were students. From the study findings it is clear that the spaces seem to be popular with the formally employed and self-employed groups of people. This can be attributed to the locations of the spaces at the core of the CBD where offices and many businesses are located.

5.1.4 Respondents' area of residence

68% of the respondents live within Nairobi County. 23% of the population came from the City's outskirts. 9% came from other towns. From the findings, it was established that the spaces are mostly used by Nairobi residents.
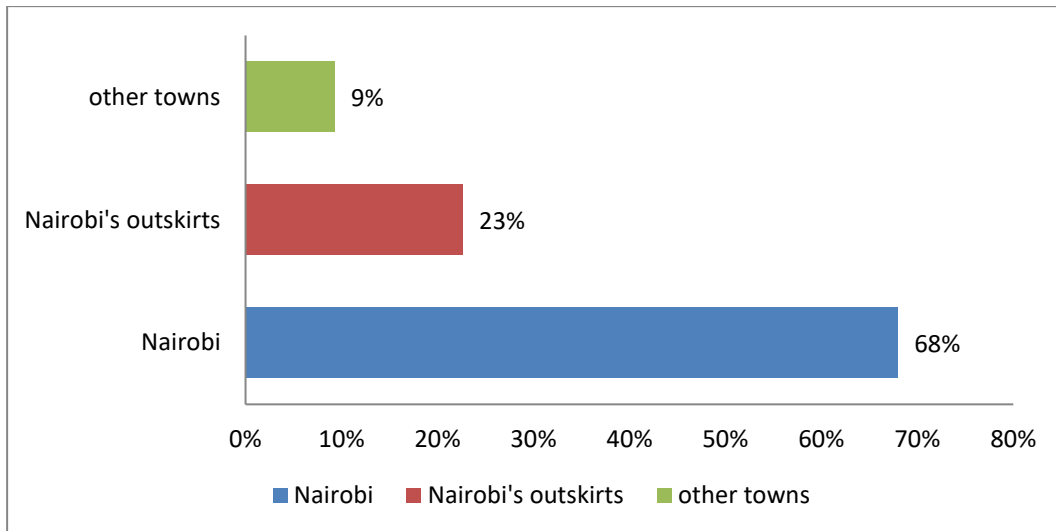
Graph 3: Area of residents of respondents

5.2 Space Usage

5.2.1 Frequency of visits

The study established that the three spaces were fairly busy throughout the week with the majority of the park visitors i.e. 33% visiting the park on a weekly basis. The employed are the main visitors to the gardens during weekdays. 17% of the sampled population visited these open spaces daily, 33% did so weekly while 11% visited the spaces on a monthly basis. 31% of the respondents indicated that they rarely visited those spaces.
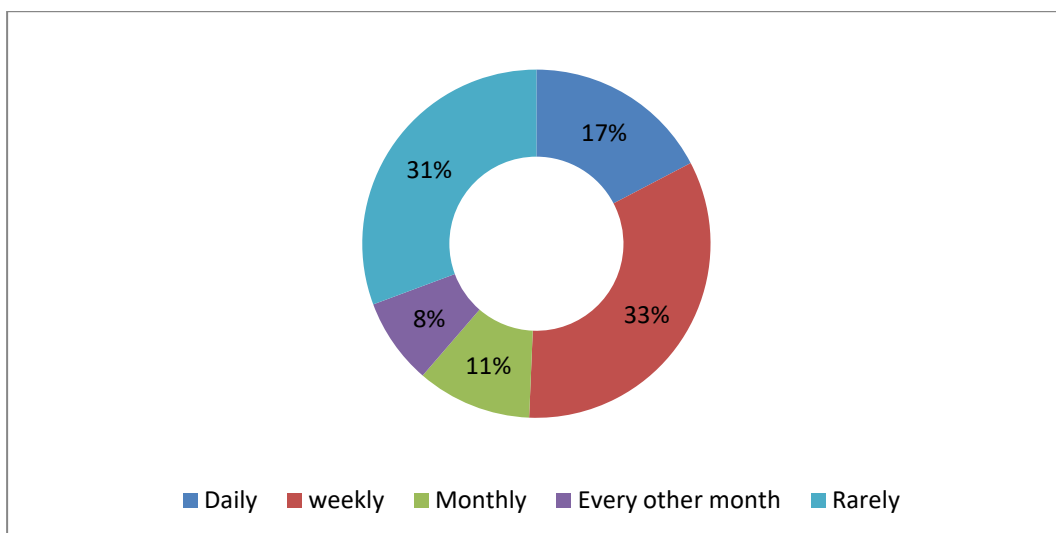
Pie Chart 3: Frequency of visits across all three spaces

Aga Khan Walk registered the highest percentage of respondents visiting it daily. This can be attributed to the fact that the space is a major pedestrian thoroughfare.

AUGUST 7TH MEMORIAL PARK

Daily: 8%, weekly: 32%, Monthly: 16%, Every other month: 10%, Rarely: 34%

JEEVANJEE GARDENS

Daily: 16%, weekly: 28%, Monthly: 12%, Every other month: 4%, Rarely: 40%

AGA KHAN WALK

Daily: 28%, weekly: 40%, Monthly: 4%, Every other month: 10%, Rarely: 18%
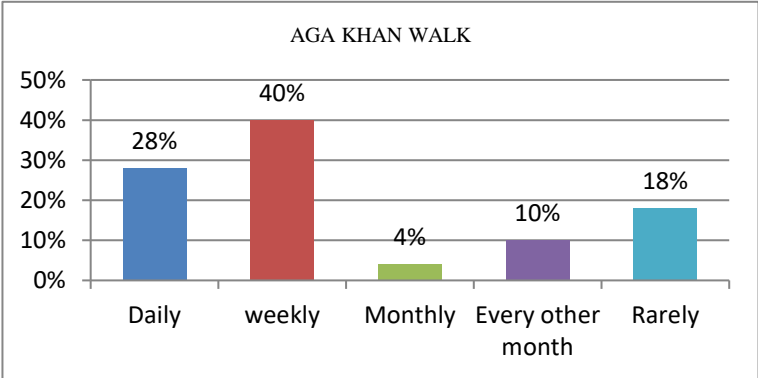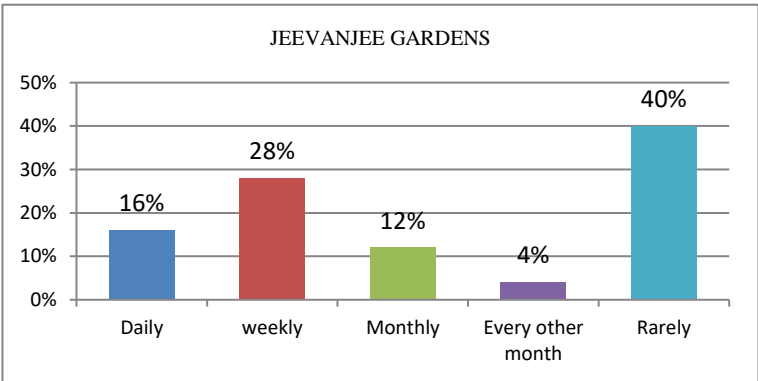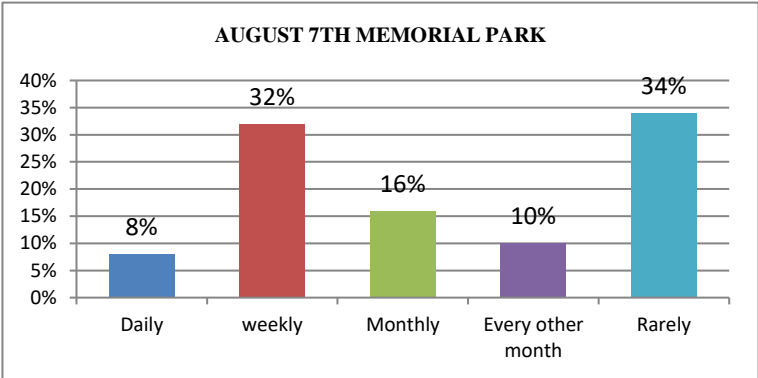
Graph set 3: Frequency of visits

5.2.2 Nature of visits

It was established that across the three spaces, 59% of the sampled population visited the park in the company of others. 41% visited the park alone.
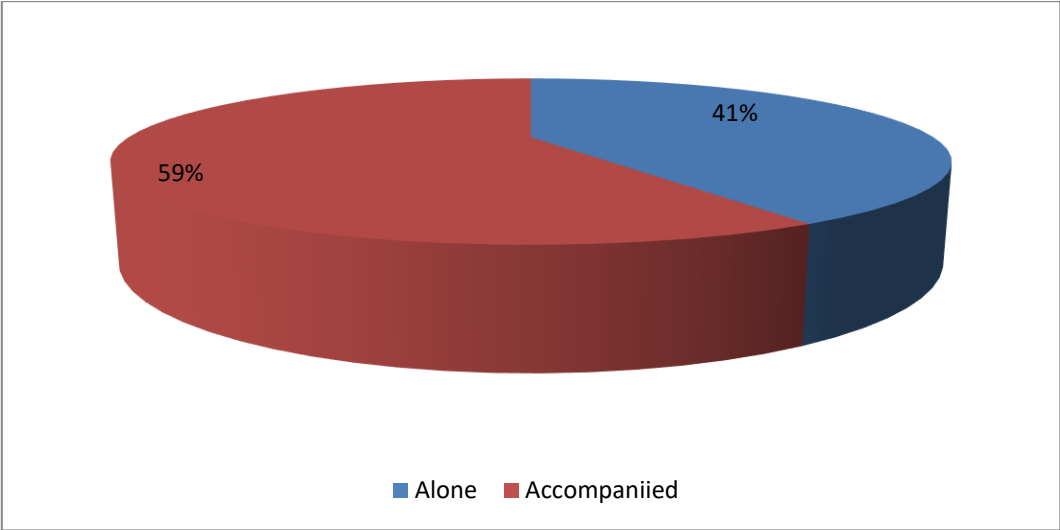
Pie Chart 4: Nature of visits

Amongst those who visited the spaces accompanied, a majority of 66% came in the company of their friends, 14% visited with their workmates while 11% were there with family.
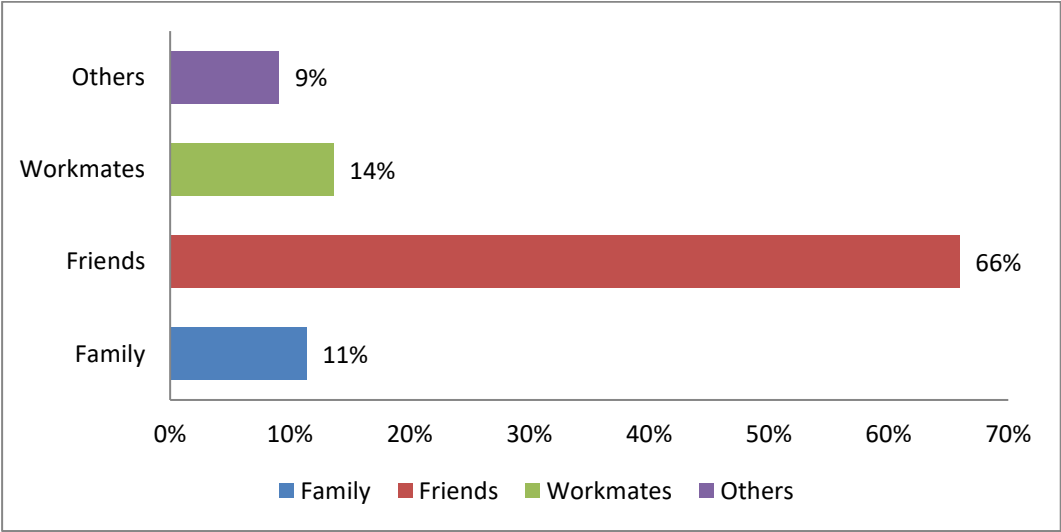
Graph 4: Nature of company during visits

The Aga Khan walk registered the highest percentage of respondents who were using the space with their workmates. This can be attributed to the context; that of offices and commercial ventures.

AUGUST 7TH MEMORIAL PARK

■ Family ■ Friends ■ Workmates ■ Others

Family 20% | Friends 66% | Workmates 9% | Others 6%

JEEVANJEE GARDENS

■ Family ■ Friends ■ Workmates ■ Others

Family 7% | Friends 66% | Workmates 10% | Others 17%

AGA KHAN WALK

■ Family ■ Friends ■ Workmates ■ Others

Family 4% | Friends 67% | Workmates 25% | Others 4%
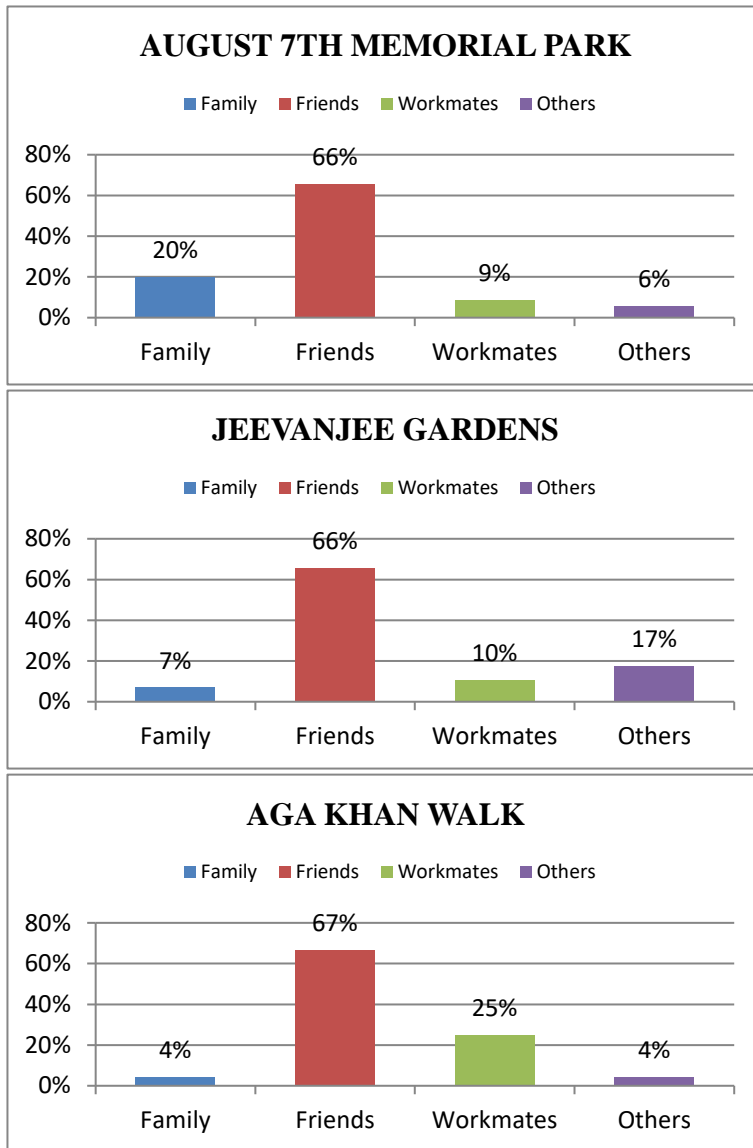
Graph set 4: Nature of company during visits

5.3 General perception of the space

5.3.1 Favourite physical features

It was established from the study that 49% of the sampled population when asked what physical features they liked, stated that the open space is what they found attractive. 24% cited the greenery available while 20% indicated that the relatively quieter environment was to their liking. From this one establishes the fact that what attracts many to the park is the available open space that contrasts the dense built context. Noteworthy is the fact that a majority of respondents indicated that they liked the water fountain at The August 7th

Memorial, 52% of them, indicative of the attraction toward the healing and calming properties of water.

5.3.2 Nature of activities

Overall, a majority of 64% of the respondents found the activities of the open spaces as complementing each other.

90% of the respondents polled in The August 7th Memorial Park felt that the activities in the park were complementing each other. This can be attributed to the thoughtful and efficient design of the park together with the controlled access and security. Aga Khan Walk seemed to have the majority of respondents indicating that the activities were conflicting. This could be attributed to the high pedestrian densities and occasional preachers who can be a nuisance.
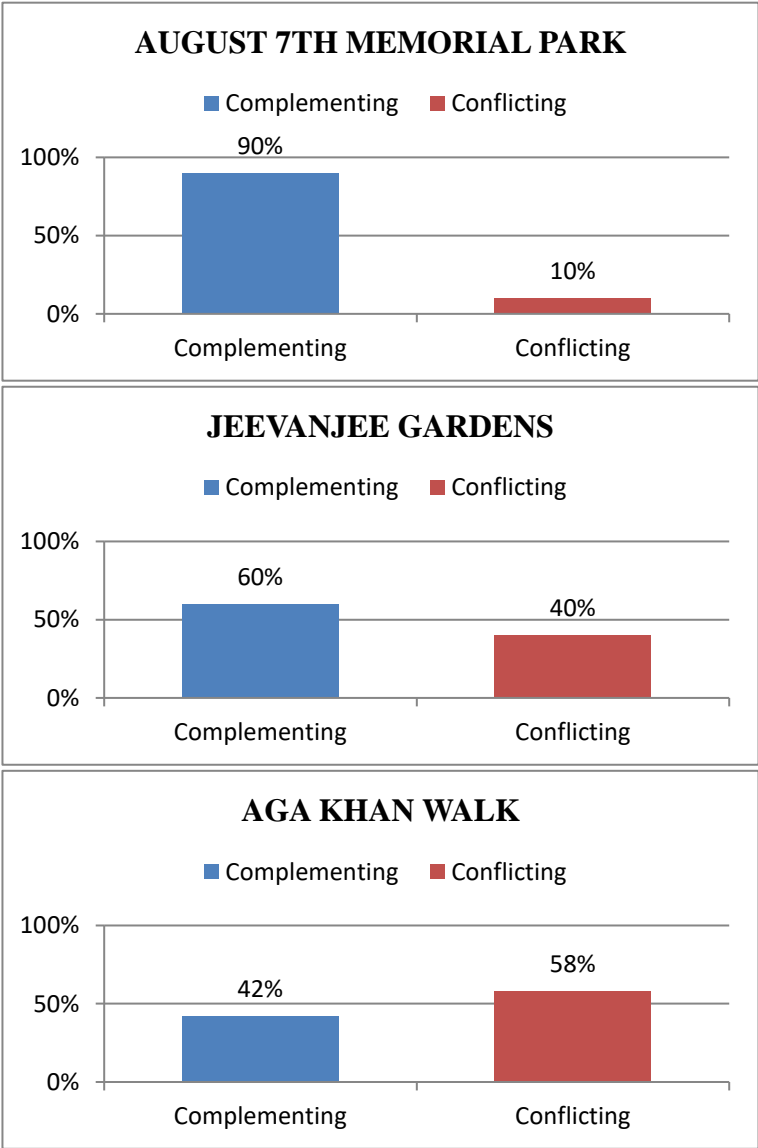
Graph set 5: Nature of activities

5.4 General perception of the restorativeness

5.4.1 Being away (Being here is an escape experience)

38% of the respondents indicated that being in the urban open spaces was for them an escape experience.
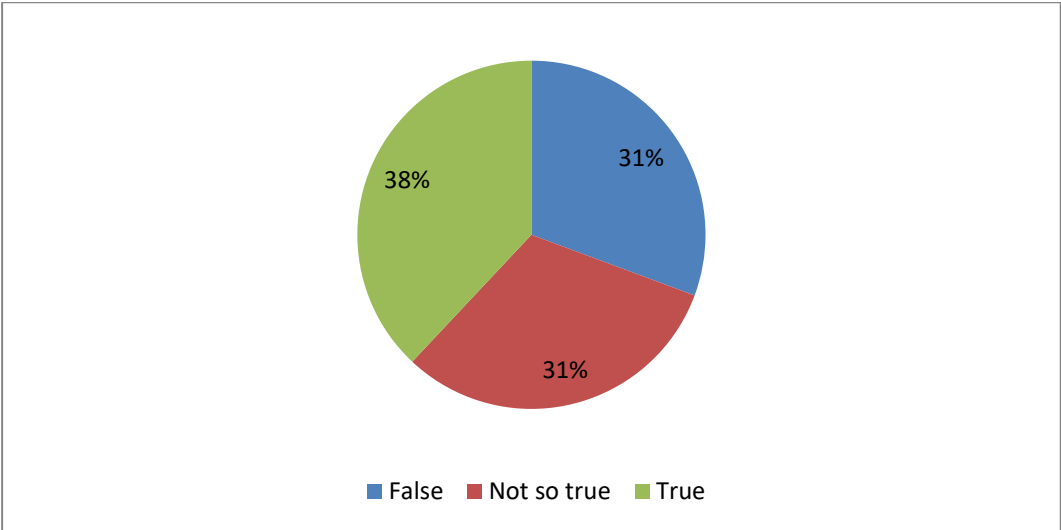
Pie Chart 5: The spaces offer an escape experience

However respondents from Aga Khan Walk did not feel that the space offered an escape experience. The August Memorial Park users felt that the space was highly effective with a majority (50%) of the respondents indicating so.
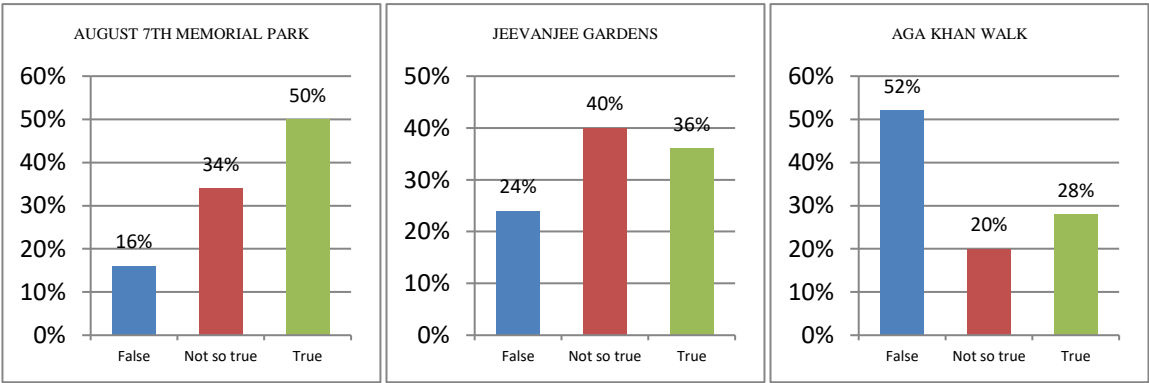
Graph set 6: The space offers an escape experience

Spending time here gives me a break from my day-to-day routine.

61% of all the respondents felt that the urban open spaces offered a break from their day-to-day routine.
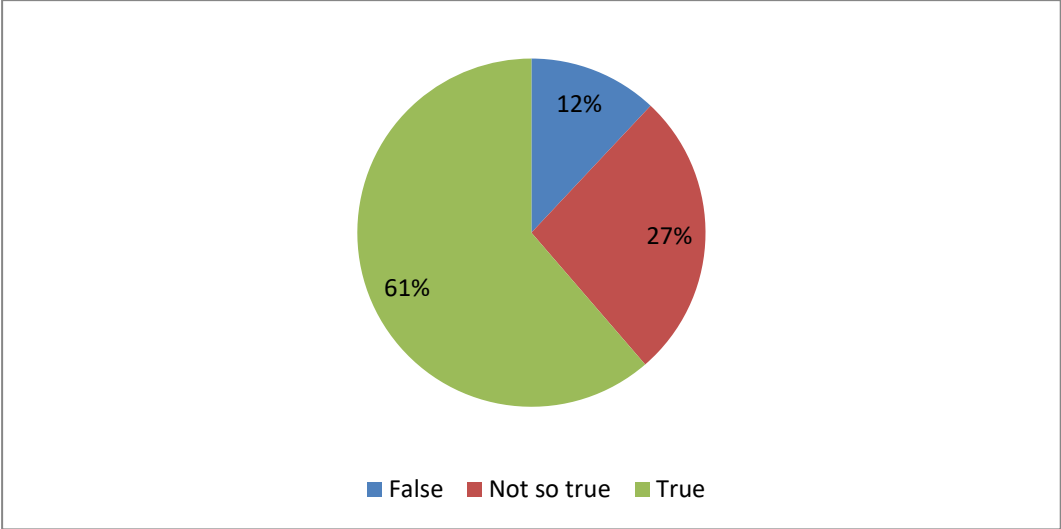
Pie Chart 6: The spaces offer a break from day-to-day routine

The most effective space in giving this resource, from the responses, was the August 7th Memorial followed by the Jeevanjee gardens and finally the Aga Khan walk.

Coming here helps me to get relief from the noise of the CBD

49% of all the respondents felt that the urban open spaces offered a relief from the CBD's noise. The most effective space in offering this resource, from the responses, was the August 7th Memorial followed by the Jeevanjee gardens and finally the Aga Khan walk.
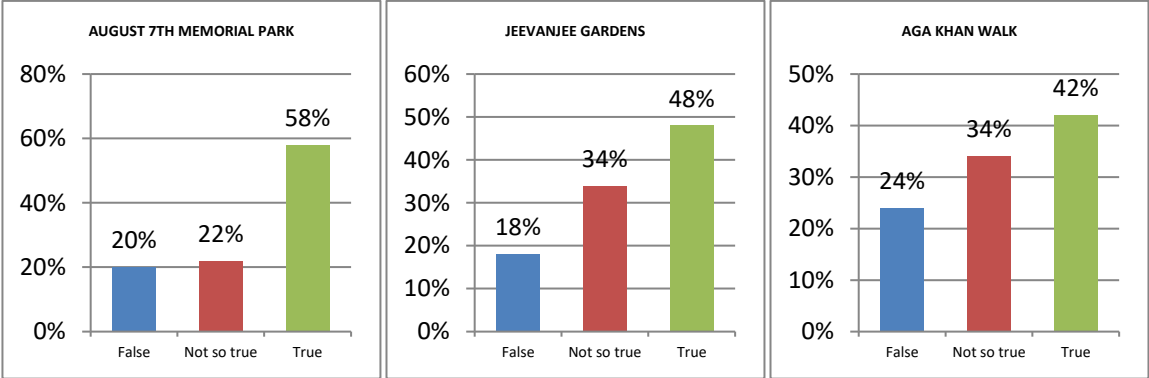
Graph set 7: The space offers relief from noise
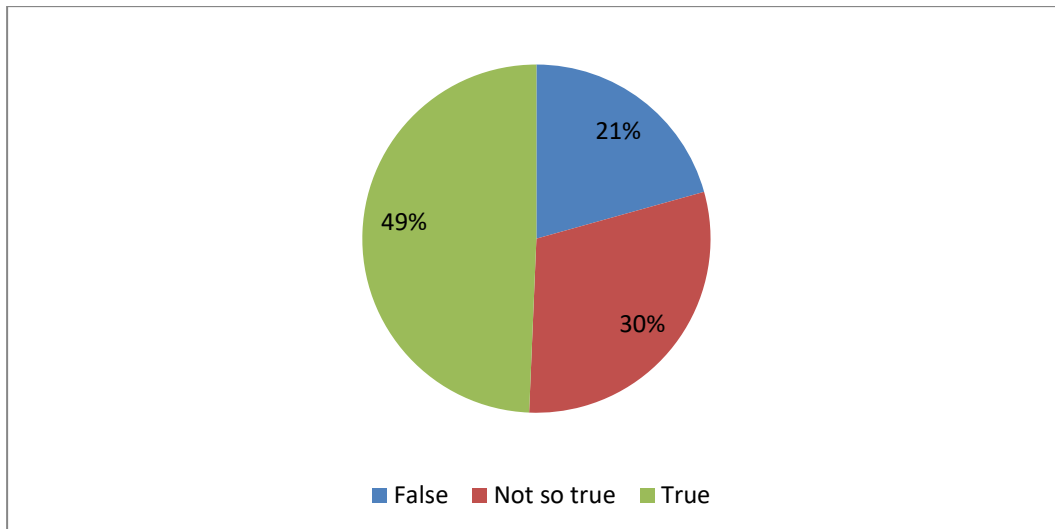
Pie Chart 7: The spaces offers relief from noise

5.4.2 Fascination
This place has fascinating qualities

29% of all the respondents did not find anything fascinating within the three spaces in study. A majority (52%) of the respondents from The August Memorial Park reported that the space had fascinating qualities with very few (10%) reporting that nothing fascinated them.

My attention is drawn to many interesting things

38% of the respondents were not drawn to many interesting things. 46% of the respondents from the Aga Khan Walk indicated that they were not attracted to numerous interesting things.

There is much to explore and discover here

44% of all the respondents felt that the urban open spaces offered little as far as exploration is concerned. The most effective space being the Jeevanjee gardens where 32% of the respondents indicated that the space had opportunities for exploration. A majority of the respondents from The Aga Khan Walk (56%) felt that there was very little to discover and explore in the space. The size of the space and design approach might have been of influence.

I want to spend time looking at the surroundings

A majority of the respondents from the Aga Khan Walk indicated that they did not expect to spend time viewing the environment. This could point to the fact that there is potential for the use of the space as a pedestrian thoroughfare to overpower the other uses, therefore should the space (or part of it) be designated to offer a restorative experience, then more deliberate effort would be needed to achieve that end.

This place is boring

59% of all the respondents felt that the urban open spaces were not boring. 78% of The August 7th Memorial Park respondents strongly disagreed that the place was boring, pointing to the deliberate and thought out design of the space.

This setting is fascinating

The responses of those who thought the spaces were fascinating were almost equal at 30% and 31% respectively.

There is nothing worth looking at here

67% of all the respondents felt that the urban open spaces offered visual interest. The most effective space being The August 7th Memorial where 78% of the respondents strongly disagreed with the statement that there was nothing to look at in that space.

5.4.3 Coherence

When questioned on the coherence of the spaces the respondents, the following emerged;

A majority of The August 7th Memorial respondents (90%) felt that the place space was orderly with none disagreeing. 10% thought that there was more that could be done to make the place more orderly. Overall, the three spaces were generally viewed as orderly. The responses from Aga Khan Walk indicated that it was viewed as the least orderly of the three spaces.

71% of all the respondents felt that the urban open spaces were not confusing, with the strongest disagreement being expressed at The August 7th Memorial Park. Of the three spaces surveyed, The Aga Khan walk was perceived as the most confusing.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

Over recent decades, authorities around the world have realized the necessity of densifying the urban environment to serve sustainability goals. Despite good intentions and ambitious projects, the success seems to have been limited, at least when considering the relationship between urban compactness and sustainability. A prominent explanation for the seeming lack of association refers to the inability of dense urban environments to fulfill social physiological and psychological needs of the residents.

The quality of living in a healthy environment is one of the basic demands of the modern society, particularly in urban settings where the opportunities for contact with restorative urban spaces are sparser. In this respect, an informed design of urban open spaces can have major influence on developing quality experiential and restorative everyday spaces for urban people.

This final chapter shows how the objectives set out in chapter 1 were met. This is done by forming opinions based on the synthesis of the critical review of literature carried out in Chapter 2 and the findings from the investigations in Chapter 5.

6.2 Conclusions

The first research question that addresses the first objective of this research was to define what restorative environments are and justify their need in the urban context.

6.2.1 Definition of Restorative Environments

The word restoration is an umbrella term that, within environmental psychology, refers to the experience of a psychological and/or physiological recovery process that is triggered by particular environments and environmental configurations, i.e. restorative environments. A substantial number of experiments have shown that natural environments tend to be more restorative than urban or built environments.

Research into restorative environments has primarily been guided by two theoretical explanations, each with its own interpretation of the construct of restoration. The **Stress Recovery Theory** and **The Attention Restoration Theory**. Although there has been discussion on the compatibility of the two theories, they are generally regarded as

complementary perspectives that focus on different aspects of the concept of restoration.

An environment that is a good fit between the activities an individual wants to take part in, and the kind of activities that an environment avails, lends itself toward a high compatibility for that person. For example, an environment with paths would be considered compatible with someone inclined to walking.

An environment with all four components of fascination, being away, extent and compatibility is considered a highly restorative environment. Natural environments are thought to adequately fulfil these components for most people, and thus, are considered as preferred restorative environments.

The results of this study add to the mounting evidence for the greater restorative potential of urban open spaces relative to built urban spaces.

6.2.2 Design Implications

Based upon the discussions in Chapter 2 on the constructs of restoration, sensory stimulation, movement, and control were established as the three key experiential qualities of restoration.

The design principles set out in this section provide a checklist for anyone creating or improving existing spaces that have the potential to offer restoration.

6.2.2.1 Sensory stimulation

Urban designers should not only focus on the visual quality of spaces but also consider the effect created spaces have on all the senses.

Natural distractions

We for the most part feel comforted by experiencing nature and viewing landscapes. Most of this is experienced visually but other components are also experienced through touch and hearing. Water seems to offer the most memorable experience for humans.

Trees are key features in outdoor space and parks. They help regulate temperature especially in hot seasons and serve as wind barriers. They soften the surroundings as they add colour, texture and even sounds as their leaves whistle in the wind. Trees also provides a sense of human scale and protection especially in large open spaces.

Hard and soft landscaping

Choosing the right kind of surface and cladding materials can have a huge effect on the quality of a restorative public space. Vast fields of asphalt and tarmac offer no delight yet in many public spaces these are seen as the main surface materials.

Because of the heavy use in public spaces, the materials in use need to be robust. Though expensive at the onset, the use of quality materials such as granite and marble, usually prove to be economical in the long term due to their resistance to wear and tear. Soft landscaping (in the form of plants, shrubs and trees), can be regarded as the beauty after the bones (hardscape) has been put in place.

Colour

Colour in both the hardscape and softscape contributes to the overall appeal and variety of an open space. As the most prominent element in a landscape, colour is typically the priority of most clients yet it is the most fleeting element in plants sometimes lasting a few weeks a year. Colour theory (and the use of the colour wheel) can be used to direct and build colour schemes. Colour theory describes the relationship between colours and how to compose them. A simple colour wheel description includes the three primary colours and the three secondary colours and six tertiary colours.

The flowers, leaves, bark and fruit exhibit colour. Foliage usually provides the backdrop colour upon which the flowers display, Green foliage is therefore usually the dominant colour by quantity in all its different shades, but the other brighter colours attract focus more quickly due to their high contrast to green colour. Most colours are typically muted in natural materials such as stone and wood, and tend to be variations of brown, tan and pale yellow. Bright colours on hardscapes are commonly used on manmade items such as painted furniture, brightly coloured ceramic containers or sculptures and glass decorations. Most colours in natural materials, such as stone and wood, are typically muted and tend to be variations of brown, tan, and pale yellow. Bright colours in the hardscape are usually found in man-made materials, such as painted furniture, brightly coloured ceramic containers or sculptures, and glass ornaments.

Variety and interest can be achieved by playing with colour. Emotions, perception of space, quality of light, emphasis and balance can all be affected and manipulated by colour. Colours can also be described as either being warm or cool and may affect the mood of a space and

the users. Cool colours have a soothing effect and should be used to where the desired result is to ease tensions and anxiety. Where the mood being sought is that of energy and entertainment, warm colours can be used to achieve this. The perception of depth and distance can also be influenced by the choice of colour temperature. Cool colours create the perception of a room being larger whereas warm colours reduce the sense of space.

Views can be guided and directed with the help of colour. Bright colours will create focal points and should be used carefully and sparingly to avoid visual fatigue. The quality of light at different times of the day and year also affect the perception of colour. Since colour is transient, more lasting elements such as texture and form should be highlighted instead.

Intrigue and curiosity

Users of public space want a sense of stability and coherence and yet on the other hand are drawn away from dreariness. The hope that a space will fulfil our inherent curiosity is one of the psychological advantages of a good public space. That there is more to a space than meets the eye is fascinating and breeds more interesting discoveries that occur as we experience more of it. Nothing is more boring than a room where you can instantly see everything that's there.

Texture

How fine or coarse the surface of a plant or material is, looks or feels is known as texture. Plant foliage, flowers, bark, and overall branching pattern all exhibit different texture. Size and shape of leaves often determines the perceived texture of the plant. Coarse texture is more dominant than fine and tends to dominate colour and form. Fine texture exaggerates distance and gives the feeling of a larger, more open space.

Complexity and Coherence

Places with distinctive character and identity become positively memorable and may attract repeat visits. People feel more psychologically comfortable in a space that is predictable, has order and repetition. Organized landscapes with predictable patterns (signs of human care) are easier to "read" and tend to make people feel at ease.

Water

Water is calming and refreshing. Water features are always included in some of the most notable and impressive restorative spaces. Being able to wade, splash or soak in water features adds greatly to the value of the space.

Public Art

Historically, Public art was monumental in nature and usually done in commemoration of a famous person or great event. In the last few decades, a more populist and often witty approach to art has gradually replaced the grand approach.

The notion of informal street art is more controversial. This typically takes the form of graffiti and stencil work. Views are varied as to whether such work should be considered as art or vandalism and depending on the nature of the final product the opinions may differ.

Public art installations must be resilient and robust in their build and should not lend themselves to easy defacement. The graffiti and flyposting can easily make brutal sculpture even less appealing. Public art should appeal instantly and shouldn't be too abstract as to cause confusion.

Entertainment

There has been a long tradition of street entertainment much as with public art. This may consist of formal events such as festivals and bandstand concerts, or less formal ones such as pop-up markets and demonstrations. Because of their unpredictable and messy nature, city administrators shy away from easily allowing the same.

These are, however, a low-cost way to bring with appropriate control, some life to public spaces, and they can deliver significant social and democratic benefits. Co-ordinated licensing or drafting simple regulatory contracts are tools that can be used to ensure that street entertainment is orderly and of good standard.

Nonetheless, street entertainment is typically self-regulatory, even in areas of high demand, insofar as people will quickly lose interest in low quality shows and any conduct that causes serious offense can still be handled by the prevailing laws. It is puzzling that more street entertainment is not being promoted, whether proactively by organizing festivals or simply by designating spaces for spontaneous acts and so on, as it is an almost zero-cost way of adding

colour, excitement and delight to public spaces and for Nairobi presents an infinite potential for public talent display and performance.

Rhythm

When elements of a design create a strong repeated and regular pattern thus creating a feeling of organized movement rhythm is achieved. Tools such as color schemes, line, and form can be repeated to create rhythm in landscape design. Rhythm improves legibility in design.

Date lines link elements with geometries, repetition and materiality that are dissimilar. Ultimately, datum is important for rhythm, and can either support or break the rhythm. Breaking the datum causes the item in focus to feel out of place. One can use repetition to create a positive rhythm. Repetition can be achievey by fenestration design, bollards, planters, trees, or other objects

Social Interaction

Social support is a major component that contributes to restoration as per Ulrich's theory. Social support usually refers to perceived emotional help or treatment, as well as financial or physical assistance that a person receives from others. A large body of research interrogated in chapter 2 has shown that people who receive higher levels of social support are usually less stressed and have better health status than persons who are more socially isolated.

Social support benefits of open spaces can be increased by design that promotes social interaction among small groups. While there may be instances when design for larger social groups is desirable, providing spaces for small groups should always be part of the design considerations. Settings that do not accommodate the need for privacy will likely be underutilized. Consideration should also be made for diversity in the way different groups and cultures enjoy using outdoor spaces.

6.2.2.2 Movement
Control/Access to privacy

One of the most important design considerations for a space that offers restoration is accessibility. Accessibility is manifested in several ways — can users find the facility without difficulty? Is the door unlocked? Does the design allow users to interact with the garden, either actively or passively? Designs that allow control by the users will offer choices whenever possible. These choices may relate to seating, social grouping, and environment, to name a few. For example, seating may be provided as individual chairs or benches, with or without armrests, fixed or moveable, and alone or in small or large groups. Garden paths and seating may be located in sunny and shady areas. Privacy should also be a consideration, for the user who either wants to find solitude and enjoy minimal external disturbance.

Legiblity

Legibility is a key quality of healthy and productive spaces. This refers to the property of being simple enough for comprehension. Elements within a setting are easily recognized in a legible urban space. It is determined by the quality of the built environment with all the elements of the setting, its clarity, simplicity, continuity, rhythm, dominance and unity.

This is one of the key physical characteristics affecting a space's reputation and use. Legible spaces improve the attention of users, their understanding of the spaces and their logical awareness. These benefits foster positive relationships between people and encourage social networking and resident interaction.

Mystery

An open public space should be built to pose features or characteristics that are so mysterious as to evoke interest or speculation. Mystery decreases as the general enclosure increases in size.

How to handle transitions is critical to evoking a sense of mystery. The transformation can be achieved by arranging objects in a logical sequential order of varying textures, shapes, or sizes. For instance, coarse to medium to fine textures, round to oval to linear structural shapes, or prostrate to cylindrical to globular plants. There is an infinite number of schemes to establish transformation by incorporating elements of different sizes , shapes, texture and colours.

Being away

Elements like plantings, fences, or trees provide a comprehensive sense of boundary, protection, and enclosure. Path and destination welcome one to enter the space. The sense of what is surrounding ensures a sense of being away and an emotional separation from the urban density.

Designers should understand the spatial relationships between a public space and its surrounding structures, and encourage higher degrees of spatial isolation in more extreme urban environments that generate a sense of being isolated from the environment.

Strolling & Exercise

Installation of pedestrian-friendly, robust and durable structures, lighting (mounted not too high and integrating full color spectra), signage and visual outlook should be considered.

6.2.2.3 Control
Safety

If people feel cut off from their environment, they may feel insecure. An effective restorative space should be planned and maintained in such a way that they are clearly "related" to their environment. It promotes awareness, and the more "eyes to space" it will feel more relaxed for users and the better it will be.

It can be difficult to make a space feel safe for users, particularly when it is also intended to provide habitat for fauna. Clearing understory vegetation, for example, so that people can see into space may be crucial to making an open space successful, but the vegetation may be what attracts birds and other wildlife. Whilst offering wildlife protection, small urban parks can be one of their goals, it is important however to note that the primary purpose of those places is to meet human needs.

People like areas where they can see and "read" the environment while creating a certain mystery — provoking such questions as, "What could be round there?"

Sitting/Exploring

Perhaps the most fundamental feature of a effective space for restoration is good seating. The seating should be designed so that it is comfortable both physically and socially. The best

places to sit are near pedestrian streets, playing fields or other "where the action is" locations. People want to sit down where they can see and watch other people.

Users should be able to pick where they want to go, be it in the light, in the shade, in groups or by themselves. This is what usually makes a public space appealing to most people. You do not have to fix the furniture. Moving seating provides users with options and preferences and is a characteristic of many well-used urban parks.

Generally, people sitting down prefer watching instead of being watched (especially from behind), so seats without a wall or some other barrier behind them are likely to be underused. No 'one size fits all' exists. Different people depending on the circumstances need different seating styles and locations. It is therefore necessary to have an array of seating opportunities in and for every public space that offers flexibility and adaptability.

The best seating in many cases does not necessarily consist of specially built benches or seats, but rather horizontal surfaces that serve multiple functions. An example of this is broad steps where there are level differences.

Orientation is a key factor in whether steps (and other horizontal sitting surfaces) will be in use. They should also provide some form of spectacle-usually a street scene-as steps offer an ideal grandstand. Older people will prefer more conventional seating with backrests.

Vantage points

While in a public space, people like being able to 'see the world go by' or more precisely being able to observe others. Through this a feeling of control is established. Subverting traditional seating and usage arrangements, to get good vantage points are coveted to achieve this end.

Sun and shelter

The climatic vagaries mean that seating in certain places would need to be covered at least partly from cold winds or bright sunlight. There are various methods to achieve this, ranging from selective screening right through to complete enclosure. The weather can adversely affect the enjoyment of outdoor space by people. A restorative space may be designed to have it warmed or cooled by the sun and wind.

Grassed and tree filled spaces are much cooler in the hotter seasons than those filled by paved surfaces. These spaces serve as air conditioning units and can remain cooler than the surrounding area.

Comfort breaks

This is not the most glamorous of topics for planners and policymakers, but adequate provision of suitable public toilets for productive public spaces is part of the fundamental infrastructure. Most local authorities seem to regard public toilets as a liability (and drain on their resources), rather than an asset, and in recent decades there has been a disturbing move towards the reduction, commercialization of the few left and sometimes even closure of these amenities.

The elderly, those with children and the disabled are particularly repulsed and affected by the inadequate provision of toilets

Eating and drinking

Food and drink outlets will draw visitors to cafes and bars with tables outside. However if not explicitly marked as such, there may be appropriate places for picnics too. Public areas, if strewn with empty food and drink containers, may easily look unattractive. Special attention should be made toward avoidance of the same.

Human scale

Restorative spaces should always be built based on the human scale. People seem to like a sense of being confined without the sense claustrophobia. Awe-inspiring may be massive structures (whether walls or buildings) and wide open spaces, but they are unlikely to promote restoration.

Compatibility

The designers will work with potential users (all age groups) while deigning restorative spaces. Why is it they love and dislike? How do they consider as problems? Which is it they want? Why is it they want to change? Designers can also follow 'desire lines' for footpaths.

Legibility

A good place should be 'legible,' meaning '... the ease with which its pieces can be understood and arranged into a coherent pattern.' Many of the spaces people love involve variety and diversity, both in the form and in their operation.

The author does not imply that all the above elements should be present for a space to qualify as restorative, but rather an attempt to find an effort has to be made to consider applying a combination of most of the strategies. How these work to foster restoration is also not an exact science. Some are objective while many are subjective as to the degree of delight and comfort that the design elements will have on an individual. Different elements will affect different users differently.

6.3 Recommendations

Several strategies can be adopted to enhance the restorative qualities of the select Nairobi CBD open spaces that were studied.

6.3.1 Jeevanjee Gardens
6.3.1.1 Sensory stimulation

Jeevanjee gardens offers opportunity for public art. The space already has some art pieces in the form of the bench sculptures. One strategy would be the introduction of more art pieces that are more interactive especially for children as it was noted that the space hardly hosted any children. The space has an opportunity to host visual art galleries either off the main paths or within the sub spaces as a way of revenue collection by the county government. There is also need for a multipurpose performance space that can host small performing arts shows.

The author suggests exploring avenues to collaborate with arts collectives such as the Kenya National Theatre to host some drum, acrobat and other performing arts sessions within this space.

6.3.1.2 Movement

The current circulation paths are a mix of straight and winding paths with the straight paths being predominant. Loose stone gravel is the predominant path material finish with concrete paving in certain areas. This, in the authors view should be replaced with a more solid and comfortable surface. There is need to re look at the path design with the possibility of

introducing winding paths that will enhance casual and relaxed strolls infused with a sense of mystery. A variety of material finishes should be used to create interest in movement through the park.

6.3.1.3 Control

Two tower floodlights generally light the space at night. More lighting is needed to reveal more detail of both the character, layout and users of the space. Introducing an anchor activity in the form of mobile food stalls for street food and possibly a night market will attract activity at night especially due to the large flow of student traffic on Muindi Mbingu street. A viable option would be to open up of the space to make it more transitional with a clear pedestrian link between Moi Avenue and Muindi Mbingu street and between Monrovia street and Mooktar Dadah street. Currently, the former does not exist.

In line with vision 2030 of making Nairobi a metropolitan city it can be very beneficial to create 24-hour activities at the park to ensure there is nocturnal life therefore locking out intruders who take advantage of the night.

Cutting down or reducing the height of the live hedge that encloses the space and creating multiple entry/ exit points. This would allow for physical and visual access into and out of the space, create a strong relationship with the street and allow street activities into the space and vice versa and lower the chances of crime.

To address the conflict that the 'Bunge la Wananchi' the author proposes the design a mini amphitheatre with both scheduled and open uses. This will also cater to anchor the other performing arts suggested above.

Provision of comfortable seating both fixed and moveable will afford the users the choice of where to seat especially because the tree canopy casts a large area of shade on the space. Currently the all seating is fixed thus limiting choice.

The second step would be to anchor the space on a centre that provides affordable places to eat, availing different programmes and performances or even markets on some days. The third step would be a general improvement of the recreational facilities of the space including seating, water and general landscaping features.

Licenced mobile food vendors could be a valuable add to the space acting as one of the anchor activities especially during the weekdays.

With the technological advances of the recent past, together with the reducing costs of accessing internet the local authorities could consider providing free wireless internet connection hotspots in the park. This allows for the users the choice of using their phones or laptops for entertainment or even working from a different environment from the office spaces.

More recently substantial redesign and renovations of the gardens by the City Council supported by UN Habitat has started as part of the project 'Nairobi Revitalizing Public Spaces' which would seem to address several of the suggested. The Kshs 30 million facelift will involve redesign to include a children play area, a local arts corner, removal of all existing restrictive barriers and pruning of the boundary hedge to knee height. Work is already underway.

However this initiative has raised objections from the Bunge la Wananchi who consider it to be environmental destruction and commercialization of the only green park in the city citing their constitutional right to a 'clean and healthy environment'. This therefore calls for a more consultative and participatory approach to the

Introduce new entrances along Monrovia Street and Mokrar Dadah Streets

Use Raised Pedestrian crossing at new entrances to calm traffic flow
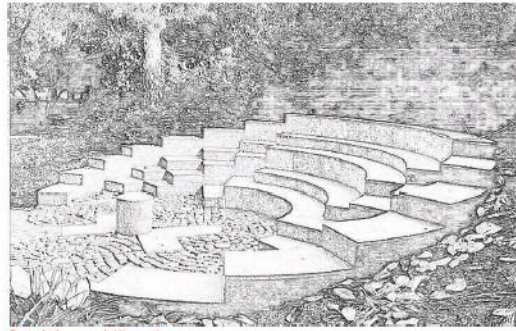
Introduce Play space for kids – climbing art works, close access to water and wc

Multipurpose Performance Space

Licencsed mobile vendors dotted along paths

Seating around the statue of Mr Jeevanjee – Benefactor of the garden to the people of Nairobi

Information/Food Kiosk - with Pergola covered terrace – smart eatery in the gardens

Fixed seating along paths

Market/exhibition area on larger hardscape areas

Lawned spaces for gerneral relaxation

Market/exhibition area Open to both park and street

Figure 87: Proposed Jeevanjee Layout
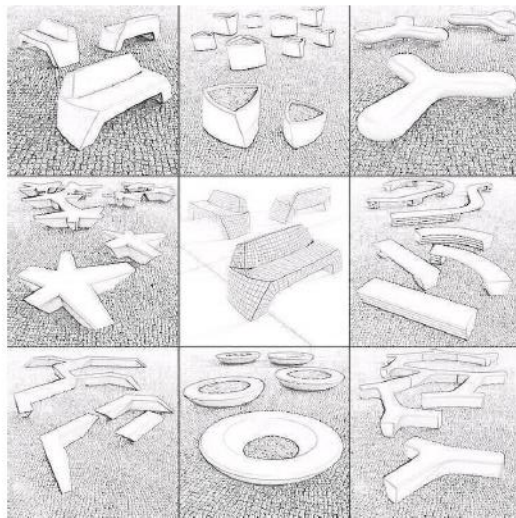
Source: Author, 2019.

Figure 88: Proposed Design Interventions on Jeevanjee Gardens

Source: Author, 2019.

6.3.2 Aga Khan Walk and the sunken car park

The car park is owned by the Nairobi City County, which is free to develop the land as it wishes. However, given the shortfall in urban open spaces in the city, the County government should be first in exemplifying how a sensitive design of any development here could be carried out to try and give back as much public space to the city residents.

6.3.2.1 Sensory stimulation

Art plays a pivotal role in the character of public spaces. A society benefits when its cultural and heritage symbols are displayed and recognized publicly. These enhance the character and identity of public spaces. Public art can be stitched into the space through the choice of flooring materials, the use of walls on adjacent buildings overlooking the space and even with free standing elements.

6.3.2.2 Movement

Pedestrians are a cluster of urban space users with characteristics reflective of the wider population. Not all pedestrians are as fit and 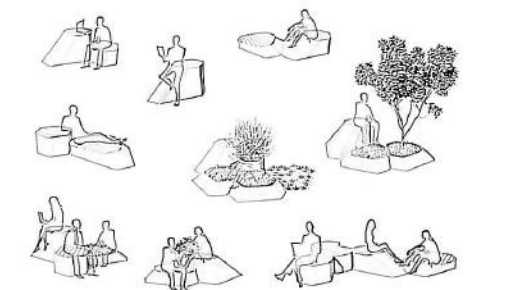healthy with proper eyesight and hearing. Some like the children, the elderly and those with challenges with mobility have to be considered during design. The maintenance and improvement of the uneven paved sections is key to easing movement. Sections with level differences especially neat Uchumi House need functional ramps.

6.3.2.3 Control

Securing the Improve lighting in the evening.

The barbed wire demarcations are very restrictive. The author proposes the opening up the islands for more seating space thus offering more choice.

The seating design can be enhanced. The ledges can be turned into planters that also

A redesign of the Aga Khan Walk would involve creating a center of focus or a terminus for the space to make it more transitional. At this terminus, there would be programmes to spur activity. The potential of creating areas to provide food and possibly seasonal markets can also be explored especially for the sunken car park that stops being in use from around 8pm.

6.4 Addressing the shortfall of urban spaces for restoration

One of the ways of addressing the shortfall in the number of urban open space in the CBD would be to reclaim those urban open spaces which were at one time used for public purposes. This would be applied specifically to KICC and GPO Plaza's, both of which are designed for public use but are closed off to the public as they are privately owned. Their opening up would help decongest the city's urban open spaces, ensure a more decentralized distribution of urban open spaces in the CBD and improve the general outlook of the city.

Another alternative to addressing the inadequate number of urban open spaces in the CBD is to adaptively use leftover spaces. This includes the medians and islands along a main street, such as those on Kenyatta and Moi Avenues, disused spaces such as market square next to City Market, spaces in-between buildings such as that between KenIndia building and Alliance Francais and leftover spaces such as the area below the Globe overpass.

6.5 Areas for further study

Studies in the future may improve the validity by using a broader range of participants, especially including participants besides the users of the open spaces. Although nature is considered to be the most restorative environment, the restorative influence of different built environments can be explored and how one can use simulation of nature in design solutions.

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Appendices

Appendix 1: Questionnaire & Observation Checklist

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NAIROBI UNIVERSITY

DEPARTMENT OF ARCHITECTURE

P.O. BOX 30197, NAIROBI.

PERCEIVED RESTORATIVE CHARECTARISTICS OF URBAN OPEN SPACES IN NAIROBI

</div>

Confidential: The information provided in this study shall be used for academic purposes only.

INSTRUCTIONS: Please respond to the following questions.

A. BIO DATA

Please indicate your;

       (a) Age   _____

       (b) Sex   _____

       (c) Occupation   _____

       (d) Residence.   _____

B. USAGE OF THE URBAN SPACE

1. **How often do you visit this space?**

   ( ) Daily   ( ) Weekly   ( ) Monthly ( ) Every other month   ( ) Rarely

2. **Do you come alone or accompanied?**

   ( ) Alone   ( ) Accompanied

3. **If so with whom?**

   ( ) Family   ( ) Friends   ( ) Workmates   ( ) Others

4. **Is there a particular physical feature that you do not like in this space?**

   ( ) Yes   ( ) No

   If yes , state and explain why:

   _____

   _____

   _____

   _____

5. **What do you feel about the activities in the park?**

   ( )Complementing   ( )Conflicting

6. **Is there a particular activity that you do not like in this space?**

( ) Yes   ( ) No

If yes , state and explain why:

_____

_____

_____

_____

C. PERCEPTION OF THE URBAN SPACE RESTORATIVENESS

Please circle on the 5-point scale the extent to which the given statement describes your experience in the setting (0 = Not an all; 5 = Completely).

7. **Being Away**

1. Being here is an escape experience.

   1   2   3   4   5

2. Spending time here gives me a break from my day-to-day routine.

   1   2   3   4   5

3. Coming here helps me to get relief from the noise of the CBD.

   1   2   3   4   5

4. Which elements of this space give you a sense of being away?

   _____

   _____

   _____

   _____

8 . **Fascination**

1. This place has fascinating qualities.

   1   2   3   4   5

2. My attention is drawn to many interesting things.

   1   2   3   4   5

3. There is much to explore and discover here.

   1   2   3   4   5

4. I want to spend time looking at the surroundings.

   1   2   3   4   5

5. This place is boring.

   1   2   3   4   5

6. The setting is fascinating.

   1   2   3   4   5

7. There is nothing worth looking at here.

   1   2   3   4   5

8. Which elements of this space draw your attention?

   _____

   _____

   _____

   _____

9. Coherence (extent)

1. This place is orderly.

   1   2   3   4   5

2. This is a confusing place.

   1   2   3   4   5

3. There is a great deal of distraction.

   1   2   3   4   5

4. What could be improved in this space to make it more orderly?

   _____

   _____

   _____

   _____

10. Compatibility

1. This space is easy to access.

   1   2   3   4   5

2. I can do things I like here.

   1   2   3   4   5

3. I have a sense that I belong here.

   1   2   3   4   5

4. I can find ways to enjoy myself here.

1 2   3   4   5

5. I can easily get around this space.

   1 2   3   4   5

6. Do you feel safe here?

   1 2   3   4   5

7. Would you come here at night?

   1 2   3   4   5

8. Is the park spacious enough?

   1 2   3   4   5

11. Which elements of this space make it comfortable for you?

_____

_____

_____

12. Which elements of this space make it comfortable for you?

_____

_____

_____

13. In your opinion what can be done to improve this space as a place of escape and rest?

_____

_____

_____

_____

14. Do you feel that there needs to be more urban spaces in Nairobi for escape and rest?

_____

_____