Abstract

Across the globe, both developed and developing countries strive to continuously increase economic growth. Many strategies have been developed to guide these countries towards achieving growth and development in a sustainable manner. For many of these countries, cites have become the hubs with regards to the various socio-economic activities taking place within countries. This has in turn subjected cities to tremendous growth. The increased growth of cities has been characterized by radial expansion, wherein development spreads out from the city center to the fringes.

The radial expansion of cities has not always been under control or properly managed by government or the private sector as well as the relevant role playing stakeholders. Many socio-economic and environmental challenges have been associated with the rapid urban development that spreads into urban fringes.

This dissertation focuses on assessing the sustainability of urban fringes and their developments. It presents a conceptual framework that tackles multiple urban fringe challenges and their various causes as well as the possible solutions thereof. It also focuses on empirically assessing the sustainability of the Cato Ridge urban fringe development in eThekwini Municipality, KwaZulu-Natal Province. The study discovers that the challenges of urban fringe development are economic, social and environmental. It concludes with recommendations for addressing policies of urban fringe developments in order to ensure sustainability.

An Assessment of the Sustainability of Urban Fringe Developments in eThekwini Municipality
A Case Study of Cato Ridge

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A short dissertation submitted in partial fulfillment of the requirements for admittance to the degree of Masters in Town and Regional Planning (MTRP) in the School of Architecture, Planning and Housing-University of KwaZulu-Natal, Durban

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Declaration

I declare that this research is my own work and has not been used previously in fulfilment of another degree at the University of KwaZulu-Natal or elsewhere. Use of the work of others has been acknowledged in the text.

Signed:

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List of Acronyms

CBD	Central Business District
DMOSS	Durban Metropolitan Open Space System
EIA	Environmental Impact Assessment
GDP	Gross Domestic Product
IDC	Industrial Development Corporation
ORW	Outer Western Region
OWSDF	Outer West Spatial Development Framework
SDF	Spatial Development Framework
SURF	Sustainable Development Framework
UDL	Urban Development Line
UK `	United Kingdom
UN	United Nations

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CHAPTER ONE: INTRODUCTION

1.1 Background of the Research

Cities are regarded as the primary drivers of the economic and social development of a country (Kashem and Hafiz, 2006). As their populations and land use activities grow, the demand for land and space to accommodate those activities increases and cities begin to expand outwards to their outskirts. The literature refers to these outskirts as 'urban fringes'. Johnson (1974) notes that, studies of urban fringes are not new and can be traced back to as far as 1940, when various spatial disciplines such as urban geography began to study their transition in order to understand the patterns of development occurring in such fringes. Johnson (1974) adds that, the term 'urban fringe' was first used by US Geographers, to describe the transformation of the composition of the population of the State of Louisiana. From 1940 to 1950 this concept was widely adopted in the academic literature to refer to areas with both urban and rural land uses that formed a transitional zone between the city and its periphery, and in relation to growth in suburban areas (Ibid).

However, as the literature on the concept of the urban fringe evolved over the years, there was no universal, clear-cut delineation of the urban fringe area, in terms of precise location, composition and overall functions. The concept has been defined differently from the perspective of different countries and cities. Adell (1995:5) observes that the uniform character of land uses, the intricate practical relations and the changing social constructions of the urban fringe are the sources of complex discussions and debates about its physical and conceptual boundaries (Adell, 1999: 5).While there is no single definition, the development of urban fringes in different parts of the world is not only evident but is also increasing, in different patterns and velocities.

1.2 Research Problem

According to McGregor et al. (2006), urban growth in developing countries has resulted in urban fringes bordered by poverty-stricken slums or other informal dwelling units, with inadequate infrastructure and service provision and insecure tenure. In some cases, urban and rural forms exist side by side, with an uneven distribution of infrastructure and services (Ibid). This leads to unequal economic and social status, as well as poor environmental conditions in the urban fringe area. The literature notes a lack of effective

management of development, proper environmental management and equitable delivery and distribution of services in the urban fringe. McGregor et al. (2006) noted that this poses difficult challenges for planners, governments, non-governmental organisations and residents alike, in terms of enhancing security of tenure, upgrading settlements, service provision, economic growth, environmental protection and integration as well as forward planning for sustainable urban fringe development.

Urban fringe developments are a reality in most growing cities; however, they have been neglected by planners, governments, investors and other relevant stakeholders. One of the reasons for this is that the main focus is on the city centre rather than its peripheral areas. The City of Durban under the eThekwini Municipality is one of South Africa's growing Metropolitan cities, within which urban growth and sprawl is clearly visible. Durban's city centre offers many different economic opportunities. These have led to growth in population densities and increased city expansion. Development has therefore spread into the urban fringes where people, businesses and organisations can still be close to the city centre.

The study area for this research, Cato Ridge, is one of the areas located in Durban's urban fringes. Cato Ridge covers the area north of the N3 (the Pietermaritzburg to Durban highway) between Umlaas Road substation and the eThekwini Metro boundary in the west of Georgedale substation in the east (Samouilhan, 2011: 18). Cato Ridge is characterised by mixed land use activities consisting of light to heavy industrial development and commercial enterprises interspersed with various agricultural enterprises, and farming and recreational activities (Cato Ridge Country Club and the golf course). Land uses include small holdings and informal settlements, roads and railway. According to Samouilhan (2011), Cato Ridge's socio-economic structure covers the full spectrum, with both high and low income groups. Most of the land in Cato Ridge is undeveloped or used for farming, and is currently being converted to industrial use in line with the eThekwini Municipality's plans for the area. The growing industrial land use within the area poses numerous environmental threats. The conversion of agricultural land to commercial or industrial use also raises concerns regarding sustainability and food security. There is evidence of service delivery imbalances, as low income settlements within the area lack infrastructure provision and exist in close proximity to higher income settlements with superior infrastructure. This study therefore aims to assess the sustainability of urban fringe developments within the

eThekwini Municipality using Cato Ridge as a case study.

1.3 Objectives and Research Questions

1.3.1 Main Objective

To assess the ways and extent to which the Cato Ridge urban fringe development in the eThekwini Municipality is sustainable in order to inform the theory and practice of managing urban fringe developments in South Africa.

Subsidiary Objectives

- To explore the relationship between sustainability and urban fringe development.
- To learn from local and international precedents through cross reference and comparisons about the sustainability of urban fringe developments.
- To make an empirical assessment of the sustainability of the Cato Ridge urban fringe development in eThekwini Municipality.
- To establish how sustainability can be achieved on the urban fringe of the metropolitan city of eThekwini Municipality.
- To inform policy and development interventions concerning urban fringe developments within eThekwini municipality.

1.3.2 Main Research Question

- To what extent and in what ways is the Cato Ridge urban fringe development in eThekwini Municipality sustainable and what are the implications for other urban fringe developments in South Africa?

Subsidiary Questions

- What is the relationship between sustainability and urban fringe development?
- What are the sustainability challenges facing urban fringe developments within eThekwini Municipality with specific reference to Cato Ridge?
- What sustainability issues concerning urban fringe developments emerge from international and local precedents?
- How can policies and development interventions concerning urban fringes be

addressed to inform the sustainability of urban fringe developments in eThekwini Municipality?

1.4 Rationale for the Study

As cities continue to grow and become more urbanised, the search for sustainable development approaches continues, in order to address manifold and continuous challenges within cities. Many strategies have been implemented, but there has been no definite solution to these problems and challenges. Most of the endeavors to address the challenges confronting cities have focused on the city centre itself, with the urban fringes either mentioned in passing or completely sidelined. It could be argued that the reason for this is that urgent issues and problems have not surfaced in urban fringe areas, as compared with the city centre where there is rapid population growth, environmental problems from pollution and congestion, and the need for increased infrastructure provision to accommodate and promote economic activities, amongst other challenges. Therefore, policies have focused on addressing sustainability challenges in the city centre, while little effort has been made to create policies specifically aimed at addressing the sustainable development challenges facing urban fringes.

Policies and planning mechanisms have been put in place by eThekwini Municipality for sustainable development in the city. The Municipality's Integrated Development Plan (IDP) aims to make eThekwini Municipality Africa's most caring and livable city, by addressing various environmental, economic, and social challenges (eThekwini Municipality, 2010). Although urban fringe areas are included in the plans, the researcher is of the opinion that little has been done to identify strategies that would ensure sustainable urban fringe developments in order to maximize their full potential. Furthermore, in order for eThekwini Municipality to indeed become Africa's most caring and livable city, its urban fringes should be an integral part of the planning equation. Sustainable urban fringes would ensure the creation of a holistically sustainable city that is not neglectful of its other parts. It is therefore a worthwhile endeavour to assess the sustainability of urban fringe developments, to unearth the challenges confronting urban fringe sustainability, and to create an awareness of urban fringe developments in order to maximise their full potential and promote policy formulation centred on urban fringe developments.

1.5 Structure of the Dissertation

The first chapter provides an introduction to the assessment of urban fringe developments and their sustainability. The chapter highlights the background of the study, as well as the research problem and the rationale for the study. It notes the research questions and the justification for the study. The second chapter provides a literature review which is based on a comprehensive survey of previous studies in this research field. It focuses on the literature on urban fringe developments and their sustainability to address the research questions. This chapter also presents concepts and theories that are relevant to the present study.

Chapter three examines local and international cities' experiences of urban fringe developments so as to provide lessons based on cross reference and comparison. The fourth chapter outlines the methods that were used to collect and interpret data. It highlights the strengths and weaknesses of the research methodology.

The fifth chapter is an empirical presentation of the case study of the Cato Ridge urban fringe within eThekwini Municipality. It seeks to ascertain the extent to which developments within the area are sustainable. This chapter presents the findings of the study from the data collected as well as an analysis of the data. The final chapter offers a summary of the study and conclusions based on its findings. It discusses the study's contribution to the body of knowledge and provides recommendations for further research.

1.6 Conclusion

This chapter presented the background to this research study. It also discussed the research problem, which provides the core rationale for the study. The research objectives and research questions serve as an important guide to ensure that the study has a clear direction and specific questions to answer in order to avoid collecting data unrelated to the research topic. This chapter also outlined the structure of the study. Chapter two presents a literature review that informs the formulated research questions and objectives.

2. CHAPTER TWO: CONCEPTUAL AND LITERATURE FRAMEWORK

2.1 Introduction

The primary focus of this chapter is to discuss the key concepts and theories underpinning this research study on the sustainability of urban fringe developments in eThekwini Municipality. The concepts urban fringe, urban growth, urban sprawl, and sustainability are explored together with their underlying theories and explanations. These concepts are relevant in that they provide an understanding of the characteristics of urban fringes as well as how their development patterns unfold. This forms the basis for understanding the factors that contribute to the sustainability or lack thereof of urban fringe developments.

2.2 Urban Growth

According to Cheng et al. (2004) one of the requirements for the representation and anticipation of future trends and changes in urban land uses and their ecological impacts, is comprehension of the urban growth system, which is made up of physical expansion and functional changes. Physical expansion refers to spatial transition (a transformation from undeveloped to urban), while functional changes refer to changes in major activities (land uses) (Ibid). Horn (2009) notes that the Industrial Revolution at the end of the eighteenth century triggered rapid urban growth which led to the emergence of modern urban and regional planning in response to the social, economic and environmental problems caused by the Industrial Revolution. Horn (2009) observes that in the last decade of the eighteenth century and the early years of the twentieth century, town planning became critical in developed industrial countries in order to find solutions to urban growth.

Horn (2009) adds that the economic and demographic changes associated with urban growth had a major impact in altering the spatial structure of cities. As the economy and population of cities grew, recognisable zones such as shopping districts and office parks began to emerge. Mixed industries, which could not be located in close proximity to shopping districts and office parks, as well as residential land uses for the working-class in the city centre, were located on the urban fringes. However as urban growth continued and the city centres became overpopulated, urban fringes began to be occupied by middle-class residents. Horn (2009) notes that the vast scale of urban growth therefore gave rise to a new range of urban problems. Although private capital investments were made for economic

transformation, the increase in the urban population created major social problems, and continuing suburban expansion posed a recurring problem in terms of drawing the city's boundaries (Ibid).

The years following World War 2 were characterised by mass consumption, increased ownership of consumer durables, especially the private automobile and by association significant overall economic growth for cities (Horn, 2009). Increased economic growth coupled with population growth, resulted in pressure for urban living space. There is consensus in the literature that the continued growth of large urban accumulations had negative economic, social and environmental effects. Both employers and employees were affected by congestion, long commuter journeys and inflated housing costs. Most planners in the post-war years therefore paid attention to the principles of urban containment, conservation and the creation of self-contained communities in order to decrease overreliance on the city centre. Planners also subscribed to the view that the physical environment had a demonstrable effect on economic and social life (Ibid).

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Cheng et al. (2004) explained the progression of urban growth by relating it to three systems: the planned urban system, developed urban system and developable non-urban system. Figure 1.1 below shows the progression of urban growth; it highlights the fact that urban growth is the centre point of planned urban systems, developed urban systems and developable non-urban systems and also shows that these three systems are related to one another. The developed urban system is a significant compound social and economic system at the heart of urban activities, offering space for activities that are in progress rather than space for future activities. The developable non-urban system is characterised by a physical and ecological system that consists of various ecological elements such as grasslands, water bodies, forests and agricultural terrain. The urban fringe is most likely to fall under this system. According to Cheng et al. (2004), until a planned urban system is initiated, the developable non-urban system offers opportunities for potential urban growth. The planned urban system results from a spatial planning scheme and remains conceptual unless it is implemented. The purpose of this system is to arrange orderly and organised space for future urban growth and its activities. However one can argue that the planned urban system is perhaps the most crucial of the three, because it is important to maintain and control developed urban systems, and ensure that the developable non-urban system is properly developed and managed. Therefore, the failure

of the planned urban system would result in poor urban growth management, and chaotic developed and undeveloped urban systems. The function and integration of all these systems have an impact on the development of urban fringes (Ibid).

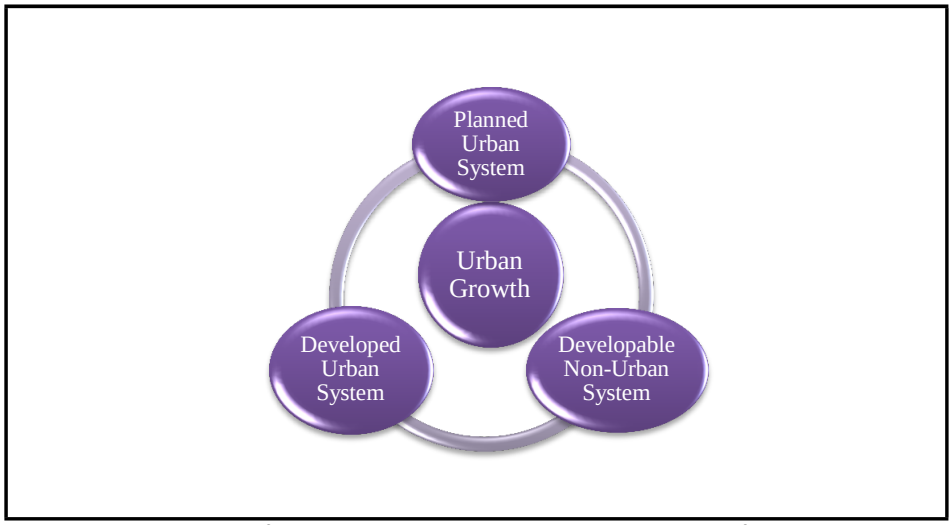

Figure 1.1: Progression of urban growth Source Cheng et al. (2004). Modified by researcher

2.2.1 Sources of Urban Growth

(a) Population Growth

According to Bhatta (2010) one of the leading causes of urban growth is the increase in the urban population. The hasty growth of urban areas can be the consequence of two population growth aspects, namely; the innate increase in population resulting from more births than deaths, and migration to the urban areas. Bhatta (2010) adds that migration can be the result of push factors, which represent unfavorable living conditions in the migrant's place of origin, for example unemployment and political oppression, or pull factors, where migrants are attracted by certain conditions or activities, for example, job opportunities and better access to certain services and facilities. Migration may involve people moving from the outer rural areas into the city centre or the urban fringes or from the city centre to the urban fringes.

Bhatta (2010) observes that cities are perceived to offer a more desirable lifestyle in terms of economic, residential and recreational facilities. Cities are deemed places where salaries and wages are better and that offer improved access to basic services and recreational amenities. Such perceptions attract people from the peripheral areas to seek residence as close to the city centre as possible. This includes the rural poor, who find it difficult to improve their standard of living given the limitations of their agricultural livelihood activities which are vulnerable to unpredictable weather and environmental conditions such as floods and drought. Cities therefore become overcrowded and begin to expand into their outskirts or urban fringes (Ibid).

(b) Economic Growth

According to Irwin (2005), an increase in per capita income and the number of working persons leads to an increased economic base, which leads to demand for new housing. Developers are encouraged to construct new houses as fast as possible to meet increased market demand. The rapid construction of urban housing and infrastructure often results in irregular and uncorrelated developments. Rapid development is also criticised for poor planning and a lack of coordination among stakeholders in the development process (Ibid).

Furthermore, according to Irwin (2005), as regional economies transform from an agrarian-based economy that is primarily reliant on farming, to a more urbanised economy driven by industry and service, economic growth involves converting rural land to urban uses such as industrial, commercial, residential, and recreational, amongst others. The development of urban areas in most developing countries experiencing structural economic change is greatly influenced by economic growth. However, Briggs and Yeboah (2001) note that, although urban growth usually results from economic growth, it can take place without it; Briggis and Yeboah (2001) used the example of sub-Saharan African cities, where urban growth is evident in peri-urban regions or urban fringes; the main land uses are for residential purposes rather than commercial or industrial activities.

(c) Industrialisation

Horn (2009) observes that the influx of new industries into the urban outskirts leads to increased concrete surfaces. In other words, development, whether properly planned or not, becomes permanent and prompts further development. Industrial zoning creates an obligation for residential zoning, primarily to cater for those employed by industry. More often than not, the residential zone becomes larger than the industrial zone, mainly because the shift from agricultural-based employment to industrial employment requires more housing (Ibid). According to Bhatta (2010), sprawl is the result of erecting single storey buildings in industrial parks, with low densities and large parking lots. Bhatta (2010) suggested that instead of using so many hectares of land, it would be preferable to build multi-storey buildings for light industry and commercial activities.

2.2.2 Implications of Urban Growth

Urban growth has a double-edged outcome, with both positive and negative impacts. However, because growth is often unrestrained or unmanageable, there tend to be more negative than positive impacts (Bhatta, 2010).The positive attributes of urban growth include increased employment opportunities, an increase in Gross Domestic Product (GDP), and increased availability of basic services such as shelter, water, sanitation, and electricity as well as social services, including education and health care facilities. However owing to the limited ability to manage and control urban growth, some of its positive attributes are not easily maximised to their full potential. Instead, urban growth leads to urban sprawl, which enters the urban fringe in a disorderly manner, resulting in chaotic developments at the urban fringe without an environmental, economic and social balance.

2.3 Urban Sprawl

To describe urban sprawl, Rahman et al. (2008) quote Whyte's (1958) definition: "Urban sprawl is the expansion of metropolitan areas resulting from scattered development of diverse land use types in remote locations on the urban fringe, followed by the gradual in-fill of the intervening spaces with parallel uses." Critics of urban sprawl argue that it has a negative impact on the physical environment, making it unpleasant for people and animals to live in. They add that sprawl affects not only urban fringe areas but the city centre as well as rural areas. According to Wassmer (2002), urban sprawl is another term for "excessive"

metropolitan decentralisation or suburbanisation. Suburbanisation results from the spread of residential and business activities from their essential location. However it is difficult to determine the point at which urban decentralisation becomes excessive (Ibid).

Squires (2002) describes urban sprawl as a phenomenon where urban and metropolitan growth is characterised by low density developments that are highly dependent on the use of the urban fringe. Urban growth related to sprawl, is characterised by limitless outer expansion of development; low density commercial and residential land uses; spill over development into the outskirts of the city; cities without boundaries or edges; divisions in decision-making amongst municipalities; overreliance on the use of private vehicles; environmental hazards; pollution; and a decline in society's sense of community (Ibid).

Deal and Schunk (2004) note that, sprawling patterns in land use transitions have been closely related to rapid population growth. A logical explanation for this is that as the population increases, people require more services and housing. This puts pressure on urban fringes to accommodate the additional population. Other factors that can be related to sprawl include economic wealth and the accumulation of disposable income (Ibid). According to Deal and Schunk (2004), minimal regulations in terms of tax laws and building codes enable the increased construction of housing and land purchase in urban fringe areas. Another factor promoting sprawl into urban fringes is low commuting costs, which can result from subsidised transportation or increased affordability stemming from individuals' economic prosperity. Overman et al. (2001) put this in a nutshell by stating that urban economists characterise the spatial growth of cities as being determined mainly by population and income growth, as well as by the price of land in alternative uses such as agriculture. Another factor of urban sprawl is individual choice, where single-family homes in a more peaceful environment are preferred to living in the city centre.

2.3.1 Causes of urban sprawl

(a) Living and Property Costs

Bhattah (2010) observes that living and property costs are generally higher in the city centre than in the peripheral areas of the city; this attracts development to the periphery. Although some might prefer to live in the city centre close to economic opportunities, the costs of

living in the city are too high.

(b) Transportation

Arbury (2006) notes, that transportation routes improve mobility from the city to the urban fringes. This leads to an increase in outward growth from the city centre as well as traffic congestion; therefore roads are often taken into consideration in analysing urban sprawl patterns, as they are one of the key catalysts for sprawl. In contrast, roads and transportation facilities are important for the overall economic wellbeing of cities and their neighbouring areas, as urban economic growth and employment opportunities are heavily reliant on these facilities (Ibid). While Aurbury (2006) observes that the development of transportation facilities cannot be suppressed, government should formulate policies to regulate negative transportation impacts.

(c) Government Developmental Policies

According to Bhattah (2010), provisional land-use policies in one political authority may lead to the transfer of development to a less restrictive political jurisdiction. Variations in development restrictions and policies amongst adjacent municipalities may cause irregular development that is not easily controlled and manageable (Ibid). Government development policies have been critiqued as being theoretical and impractical. Although they may appear good on paper, implementation is often ineffective and unsuccessful. Sprawl is therefore often a result of the failure to implement government's development policies.

(d) Lack of Suitable Planning Policies

Bhattah (2010) notes, that the lack of suitable and consistent planning policies also causes urban sprawl. A city's zoning policies may provide for separate residential, commercial and industrial land uses. This creates remote, isolated islands of land uses. This form of development creates reliance on transportation to travel between residential and other zones, leading to increased consumption of fossil fuels and pollution. This suggests the need for a mixed land uses policy in order to manage sprawl. However, policy is not sufficient; it is crucial that such policy is successfully implemented and enforced. Most developing countries fail to implement their planning policies because of a lack of

financial support, corruption, and poor planning, amongst other challenges, and therefore experience increased sprawl.

2.3.2 Costs and Benefits of Sprawl

According to Squires (2002) both costs and benefits are associated with sprawl. Some of the liabilities of sprawl have negative effects on the general wellbeing of metropolitan areas. The major costs related to sprawl are the environmental problems aggravated by the sprawl pattern of development. The outer expansion of metropolitan areas, which is promoted by auto-mobile dependent lifestyles, leads to an increase in air pollution and a range of diseases. The costs of sprawl include declining water quality as development activities increase the pollution of different water bodies. Consumption patterns resulting from sprawl lead to the increased use of energy, damage forests and possibly contribute to global warming. Farm and forestland is consumed as residential and commercial developments spread outwards (Ibid).

According to Squires (2002), sprawl patterns of development intensify economic inequalities among communities. Distant affluent communities have a large tax base and fewer social services needs to finance. Therefore the inequalities in the quality of public services increase. Dependence on local property taxes to fund public schools renders equal education a significant challenge. As industries relocate to outlying areas, the relocation of jobs heightens urban/suburban economic disparities. Therefore, the growing concentration of poverty and segregation in urban communities are both a cause and effect of these trends. These developments are associated with crime, racial tensions and other social ills (Ibid).

Sprawling development patterns often lead to the loss of a sense of community and connectedness to a place for people at both the lower and upper end of the socio-economic spectrum. Although there are certain benefits to free mobility, the absence of a sense of place and community can compromise one's full capacity to realise their individuality (Squires, 2002). However, Squires (2002) notes that urban sprawl can provide benefits for some residents. It provides a low density lifestyle with ease of mobility and access to commercial facilities for those who work in settled suburban areas. It also offers distance from the problems of poverty, racial conflict, and other issues generally associated with city life.

According to Grimm et al. (2000), failure to control sprawl may lead to a change in

the patterns and processes of ecosystems, resulting from the concentration of people in residential and industrial settings. Sprawling development not only decreases the amount of forest area, farmland and open spaces but also breaks up what remains into pockets of land that disturb ecosystems and fragment habitats. The extension of urban sprawl into the natural environment such as woodlands and wetlands in rural areas ranks as one of the primary forms of wildlife habitat loss. Infrastructure such as roads, power lines, subdivisions and pipelines often cut through natural areas, fragmenting wildlife habitats and altering wildlife movement patterns (Ibid).

2.4 Urban Fringe

There are several definitions of the urban fringe. According to Biller (2008), one of the early definitions to emerge in the literature can be traced back to the Second World War period; it focuses on the conflict between urban and rural land uses that has been prevalent since the birth of cities. At that time, the urban fringe was described as a shift in land uses from agriculture to urban land (Ibid). A more detailed description of the urban fringe is provided by McGregor et al. (2006) who stated that an urban fringe is an area that is a transitional or interaction zone, where urban and rural activities are juxtaposed, and landscape features are subject to rapid modifications induced by activities. In terms of the levels of socio-economic status, there is a variation of activities as the urban fringe receives two flows of migrants; urban people seeking a more rural lifestyle or cheaper accommodation, and poorer rural people searching for work and better opportunities for their children (McGregor et al., 2006: 18). Thus, the urban fringe is valued differently by different groups of people. For the poor it is a place to build a shelter and acquire land for livelihood activities such as agriculture; for industry it is a source of material and land for industrial activities; and for conservationists it is a site of valuable protected areas, forested hills, preserved woodlands, important wetlands or mangroves, and major coastal ecosystems amongst other things (McGregor et al., 2006: 18).

In the past development studies has not focused on the urban fringe. However, several factors suggest that the urban fringe deserves greater attention from policy makers (Biller, 2008: 68). Biller (2008) observed that in both developed and developing countries, the increase in household incomes, urban subdivision codes, infrastructure investment patterns, and the undervaluation of and commuting under-pricing, amongst other factors,

translated into expansion to the urban fringe. Occupation of these peripheral or marginal areas generates substantial demands for infrastructure and services, including environmental, social and economic demands.

2.4.1 Composition of Urban Fringe Areas

In order to understand the urban fringe, it is important, particularly for policy makers, to comprehend what it consists of or what it is likely to be made up of in the future. This would involve distinguishing the urban fringe from areas that are not urban fringes. This would facilitate an understanding the uniqueness of urban fringe areas, in order to identify planning approaches towards sustainable development. Andrews (1942) described the urban fringe as characterised by both urban residential and non-residential uses as well as extensive areas of vacant land which extend out along the main highways from the city. It could be said that expanding uses invade the rural area adjoining the city and therefore the rural land economy undergoes transformation. The problems of the urban fringe lie in the nature and repercussions of this transformation (Ibid). Even today, Andrews's (1942) description is applicable in most countries.

Although the urban fringe is an extension of the city centre, it is common to find mixed land use activities with an urban component, such as residential, commercial, and industrial land uses. One could argue that the reason for the development of these varied activities is that in most cases one type of land use activity cannot exist in isolation; an interdependence of activities is required in order for them to function effectively. For example, the development of commercial activities would lead to the development of residential areas, as people would want to live closer to the economic opportunity. At the same time, residences would provide a market for commercial activities. Hence, Andrews (1942) stated that depending on varying conditions and patterns of transportation, local government regulation, topography, city growth, rents and values, and urban forms will sometimes freely intermingle within the fringe. These conditions noted by Andrews (1942) play a significant role in determining the sustainability or lack thereof of urban fringe areas. For instance, if local government regulations are not as effective as they ought to be, industrial and residential land uses may not be properly zoned so as to ensure that residential areas are not negatively affected by industrial activities, making residents vulnerable to the risk of pollution.

Gallent et al.'s (2011) brief search of the literature on the urban fringe and official policy statements from the United Kingdom (UK) and elsewhere reveals a number of dimensions in terms of which fringe urban areas are frequently defined. Some of these are discussed below.

In terms of location, the proximity of an area to a built-up area is one of the obvious factors delineating the urban fringe. However, urban fringe areas are not always located within a neat or clear belt encircling a town or city, but penetrate into the urban core, perhaps adjoining a natural feature such as a river or a man-made feature such as a railway. The characteristics of an urban fringe also vary according to distance from the urban edge, which is not always clearly defined. Concerning land use**,** the urban fringe is often the location of particular land uses and functions that vary profusely. In some instances, the urban fringe accommodates essential but un-neighbourly functions such as waste disposal and sewage treatment, and contains dilapidated areas, and vacant and under-used land as well as agricultural land and woodland suffering from a range of urban pressures. In other instances, the urban fringe is a mixture of residential and commercial activities (Ibid).

Furthermore, according to Gallent et al. (2011), the spatial economy of the urban fringe is also seen as possessing certain (spatial) economic characteristics and efficiencies. An urban area can be defined as one where land uses from customary and traditional 'urban' activities produce higher returns than customary 'rural' activities. Therefore, the urban fringe is the frontier in space where the returns from traditional and customary urban land uses are roughly equal to the returns from traditional and customary rural land uses. In other words, spatially, the urban fringe is economically transitional (Ibid).

Gallent el al. stated that, despite its special characteristics, the transitional nature of the urban fringe is emphasised in many definitions of its role as an interface between urban and rural areas. Because of this transitional nature it is almost as though the urban fringe, even as it stretches, is influenced by two different areas, each with its own aura, the rural area on the other hand and the urban area on the other. However although these two areas are different, one could argue that some of the land activities taking place in the urban fringe are beneficial to both areas. For instance, the urban area may be dependent on agricultural produce from the urban fringe, whilst the rural area finds economic opportunities

through employment in urban areas. The same could be said of commercial and industrial activities; both sectors benefit from each other, for example, the disposables of one may be valuable to the other. According to Gallent et al. (2011), the nature of the transition is often doubtful. For some commentators, the urban fringe provides a buffer that protects the farming landscape from trespassing urban land uses. For others, the urban fringe is not a neutral buffer, but an interface. This interface can be beneficial by providing space for new economic or social activities.

According to Gallent et al. (2011), in terms of the landscape, the urban fringe is often perceived as a focal point for un-neighbourly land uses, and sometimes as a disorderly landscape subject to the abuse of both legal and illegal dumping. However, it is also recognised that the urban fringe may contain a diversity of landscapes, host important habitats and boast significant levels of biodiversity (Ibid). Furthermore, Gallent et al. (2011) stated that a unique landscape stands between urban and rural areas: often vast in area, though hardly noticed, it is characterised by warehouses, big stores and derelict industrial plant, office parks and travelers' encampments, golf courses, allotments and fragmented farmlands. These varied elements are arranged in a disorderly and often chaotic fashion against a background of untidy wasteland, frequently surrounded by uncontrolled growth of colourful plants, both indigenous and exotic.

These dimensions govern most conceptions of the urban fringe. However, they differ for different countries, cities and regions, and policies are influenced by different factors. These dimensions are very important as they play an important role in understanding the urban fringe and how it is influenced by various factors.

2.4.2 Urban Fringe Development

According to Masum (2009), urban fringe development is are not restricted to transforming land from rural to urban uses; rather, this is a complex process that includes many factors such as a transfer of land ownership, types of development and their authorisation, as well as the enforcement of regulatory measures. Urban fringe development processes are often not monumental in nature and may be carried out by either rural or urban actors in a formal or informal way (Ibid).

Separate decisions made by homeowners, farmers, businesses, government and other

organisations are often a result of changes in land use. The vital drivers of fringe developments are population growth and household formation. Economic growth increases earnings and wealth, and preferences for housing and lifestyles, enabled by the availability of transportation and communication technologies, lead to the development of new settlements and new land-use patterns (Masum, 2009). According to Masum (2009), metropolitan areas grow organically, following well-known stages of growth. Finally, development can disturb existing social, community, environmental and ecological patterns, imposing a variety of costs on people, wildlife, and water, air, and soil quality. Agricultural production has its own negative environmental impacts, but these are generally less harsh than those arising from urban development (Ibid).

2.4.2.1 Typical Issues Associated with Urban Fringe Developments

A number of challenges are associated with urban fringe developments. The Sustainable Urban Fringes (SURF) project in the United Kingdom has identified complex issues of ownership and administration where land is owned by farmers as a common issue. Developers need to buy land from farmers. Disputes arise when farmers are not willing to sell and assessments have to be made to establish whether the land has more agricultural or developmental value. Another concern is the decline in biodiversity owing to development of land in built-up areas. Open spaces infringe on species' habitats; therefore the development of urban fringes is deemed to be an obstruction to biodiversity. Environmental concerns include the loss of green spaces and pollution in many forms from construction activities. The development of urban fringes requires that access roads be built from the fringe to the city centre and adjoining rural areas, which can be a costly undertaking. In both developed and developing countries, urban fringe areas face pressure due to the growth and expansion of the city centre as the shortage of land leads to sprawl. A further challenge is the lack of effective planning policies for urban fringe developments (SURF, 2010).

Adesina (2007) notes, that, the changing dwelling patterns of minority groups raise social and political challenges for urban outskirts. In some cases, the suburban system reflects racial and income segregation, reproducing urban socio-economic structures. However, in other instances, there is more integration. A huge array of religions and cultural institutions has located themselves in suburban landscapes. Finally, development can interrupt existing

social, community, environmental and ecological patterns, imposing a diversity of costs on people, wildlife, and water, air, and soil quality. Agricultural production has its own negative environmental impacts, but these are generally less severe than those resulting from urban development (Ibid).

2.5 Sustainability

It is unclear whether sustainability is a concept, a theory, or a discourse. In the context of this study, the actions and outcomes that give sense to sustainability and ultimately sustainable urban fringe development are important. Therefore, this study treats sustainability as a concept to avoid further complications in an already complex debate. Various scholars have attributed different qualities to the concept of sustainability; these offer an idea of what the concept ought to represent. At the same time, there is much uncertainty that this goal can be achieved (Ofuso-Kwakye, 2009). According to Du Plessis and Landman (2002), the concept of sustainability in urban development is often seen as a remedy for a multi-dimensional problem, relating to spatial characteristics; geographical location; environmental conditions; economic viability; institutional ability and structure; human development; social relations; local values; and aspirations. The multifaceted set of issues that determine sustainable development and settlement sustainability, and the recognition that these issues are interconnected and interdependent identify sustainability as a systematic concept that requires a systems approach to problem solving and planning (Ibid). Furthermore, Du Plessis and Landman (2002) observe that these facets have created a new urban geography, and to a large extent demonstrate the recognition of the sustainable discourse stated in the global prescriptions of Local Agenda 21 and the Habitat Agenda.

According to Ofosu-Kwakye (2009), the onus for sustainable urban development lies with professional planners, who have the ability to regulate and recommend the principles and practices of institutions and actors whose actions influence the built environment. However, the downside of achieving sustainable outcomes is largely associated with the constraints created by the competing powers and interests of capitalists, politics and the urban fantasies of city governments (Ibid).

Sustainable development has been defined in different ways by different schools of

thought. There is no single conceptualisation of the standards and measures of sustainability. While most of the literature defines sustainability in terms of three main pillars, namely, environmental, economic and social aspects, conceptions of sustainability within each pillar differ and remain complex.

According to Jabareen (2006), a sustainability agenda acknowledges the importance of maintaining good conditions for the natural environment while developing and enhancing social capital, involving people in decision-making, attending to issues of social and environmental justice, and ensuring that decisions are economically feasible and sustainable in the long term. Furthermore, according to Jabareen (2006), sustainable development' or 'sustainability' directs the way in which development can be balanced and have low impact. However, rapid urbanisation, alongside technological advancement, threatens sustainability both at the local and global levels. Jabareen's (2006) definition exposes a dilemma in that as much as urbanisation and technological advancement are threats to sustainability, they are important for growing the economy and providing employment opportunities in order to alleviate poverty. Kashem and Hafiz (2006) question whether the earth's resources will be able to meet the demands of a growing human population that has increasing aspirations for consumption and a better quality of life while simultaneously maintaining the rich diversity of the natural environment.

Christen and Schmidt (2011) maintain that the sustainability problem can be conceptualised as a developmental predicament: On the one hand are the goals of development, such as achieving a better quality of life, while on the other, due to the prevailing social and natural structure, endeavours to achieve these goals may weaken their further realisation. Therefore myopic endeavours to achieve sustainability would fail. To understand this dilemma and therefore overcome it, there is a need to grasp the aims of sustainable development, as well as the experiential constraints within which these goals are to be accomplished (Ibid).

According to Newman (2000), sustainability has its roots in a global political process that has attempted to bring together the most powerful needs of our time; economic, environmental protection and social justice needs. Thus this study will assess the sustainability of urban fringes, with sustainability viewed as incorporating all these factors. According to Kashem and Hafiz (2006), sustainability has been defined at the international and national levels

and has been applied to cities. While Agenda 21 or other United Nations (UN) documents on sustainable development are not clear on how to achieve this, the principles of sustainability outlined above can be applied to cities (Newman, 2000). Sustainable city development initiatives are on-going worldwide, both in developed and developing countries (UN-Habitat & UNEP, 2001; Kashem and Hafiz, 2006: 1). Table 1.1 below provides a summary of Agenda 21 principles.

1.	People centred Approach
2.	Rights to appropriate resource - pursuant to Environmental Policy
3.	Intergenerational equity
4.	Environmental protection integral to development process/Biodiversity
5.	Essential task of eradicating poverty - Meet the needs of people
6.	Special attention to environmentally vulnerable people
7.	Partnerships-focus on responsibilities of developed countries that put pressure on the environment
8.	Reduce and eliminate unsustainable patterns of consumption and production
9.	Capacity building-exchange of innovative technologies
10.	Participation at relevant levels - decision making-access to judicial/administrative justice
11.	Enact and apply environmental legislation and standards in context
12.	Support open economic system and trade
13.	Liability and compensation for pollution and risks
14.	Co-operate in the prevention of substances causing degradation and human risk
15.	Precautionary approach shall apply - lack of knowledge is not a valid reason for lack of preventative activities
16.	Internalisation of environmental costs with polluter bearing costs of pollution
17.	Apply EIA's /monitoring/evaluation/ procedures
18.	Disaster Management
19.	Trans-boundary information - timely notification of disasters/ pollution issues
20.	Women have an important role to play in management and development – full Participation
21.	Creativity, ideals of youth - also global mobilisation of youth partnerships
22.	Focus on indigenous people's knowledge - traditional practices, culture and participation
23.	Protection of people and resources under oppression, domination
24.	Warfare - protection of people and environment in terms of international law
25.	Peace, development and environmental protection indivisible
26.	Peaceful Dispute Resolution
27.	Co-operation/partnerships to fulfil above and development of international laws Accordingly

Source: (Luckin, 2003: 21)

2.5.1 Importance of achieving sustainability at the urban fringe

Arguably, there are substantial benefits if an urban fringe fulfills its potential. The urban fringe has the potential to meet many of the recreational needs of nearby urban populations; to provide a rich, diverse landscape close to where people live; provide fresh food for urban markets; develop new business opportunities based on sustainability opportunities (such as green composting); and to give urban and rural populations opportunities to understand each other and the countryside better (Urban Fringe Action Plan for Southern Sweden, 2011).

Furthermore, achieving economic sustainability at the urban fringe can result in economic growth that is beneficial to urban fringe areas as well as extended rural areas at the periphery and the city centre. This could decrease the need to travel from fringe areas to the city centre in order to access economic opportunities. This would ultimately result in a decrease in the use of transportation, thus resulting in a less environmental harm from transportation pollution. Social sustainability at the urban fringe also has positive outcomes in that people residing in urban fringes have the opportunity of a better life through access to basic as well as recreational services. It is important that people at the urban fringe are able to pursue they lifestyle they desire by living in an environment that is conducive for them to do so.

2.6 Conclusion

The theories and concepts discussed in this chapter assist our understanding of the urban fringe phenomenon. Understanding the concepts related to urban fringes, either directly or indirectly, and how it leads to sprawl which then manifests in urban fringes, provides a perspective on the factors that influence urban fringe developments as well as the challenges they face from invading development and facilitates the formulation of possible solutions for sustainable development.

3. CHAPTER THREE: PRECEDENTS ON URBAN FRINGE DEVELOPMENTS AND THEIR SUSTAINABILITY CHALLENGES/OPPORTUNITIES

3.1 Introduction

This chapter draws on international and national precedents on the nature of urban fringe developments. It highlights their experiences with the aim of learning through cross references and comparisons of sustainability issues facing such developments. A global perspective reveals certain key features of the urban fringe that could be useful to the researcher in assessing the sustainability of the Cato Ridge urban fringe.

3.2 Urban Fringe Developments in Developed Countries

European cities are among the fastest growing and most economically prosperous cities in the world. Therefore, the researcher chose to use European cities as examples to inform the study. According to Gunay (2007), lower income groups in most European cities choose to live on the city fringes to be close to employment opportunities. The continued outward dispersal of residential areas led to the development of the steam railroad to provide transportation for residents in the periphery to travel to the city centre. Furthermore according to Gunay (2007), the population was encouraged to relocate from the city to the city fringes, after the electric trolley was introduced in 1880. These transportation systems gave people the option of staying further away from the city centre, but being able to move in and out of it to access various services and facilities.

Gunay (2007) observed that the transition to urban fringes in Europe was influenced by increased ownership of private vehicles and communication technology around the 20th century. Prior to this period, the urban fringe was mainly occupied by middle income groups. However, lower income groups were encouraged to move into the urban fringe area by advancing transportation developments. This resulted in an increase in urban sprawl. Undeveloped land in the urban fringes began to attract production facilities that required large areas of land (Ibid).

Furthermore according to Gunay (2007), in highly developed industrial regions such as Northern America and England, through management and administration dependent on inspection and coordination associations, development began to move into urban fringes. In

Comment [D2]: Not sure what this means. Suggest you rephrase.

this regard, urban fringes became areas of transformation for heterogeneous structures, with mixed land uses including residential, commercial and industrial and office parks with a lower concentration than the city centre. Although the low intensity of structures was a positive development, the increased use of cars resulted in traffic congestion and air pollution (Ibid).

3.2.1 Urban fringe Management through Green Belts in the United Kingdom

Amati (2007) observes that green belts are a globally recognised effort to mitigate and control the spread of urban growth into urban fringe areas. Green belts surround major cities in order to prevent outward sprawl. Planners have used green belts to separate outpost 'new towns' from the urban centre in order to protect agricultural and recreational land.

Amati (2007) adds that green belts were part of a project to construct a worldwide planning principle, despite the fact that urban growth is dissimilar in cities around the world. Green belts were constructed around 14 cities in the United Kingdom and have been a central plank of national planning policy for more than 50 years. Planners have effectively enforced green belts regardless of sustained periods of high development pressure, particularly in South-East England (Ibid).

Amati (2007) further notes that there has been much debate in the United Kingdom regarding the future of green belts in relation to housing needs in the urban fringe. Therefore if green belts are not sacrosanct, as the urban fringe grows it could extend to become one with the green belt, rendering the purpose of green belts, which is to keep urban fringe areas from crossing over and ultimately penetrating into the core city, meaningless. In the United Kingdom, urban fringes were not used as green belts; they existed separately and were used to prevent urban fringes from penetrating the city centre. Unless the parameters of these greenbelts are clearly defined, it is difficult to determine the end of a green belt and the beginning of an urban fringe.

3.3 Urban Fringe Developments in Developing Countries

Urban fringes in most developing countries develop spontaneously and unsystematically and their growth is not always planned for. Therefore, one of the concerns for developing countries is the rapid development of land that does not conform to state regulations.

Owing to the high demand for land, development spreads into urban fringes, where land is more affordable and there is more space. There are various land uses in the urban fringe, including residential, agriculture and commercial, amongst others. According to Masum (2009), one of the major challenges relating to urban fringes in developing countries is the informal development of land. Regulations are not complied with; indeed government might not even be aware of the development. Owing to increased demands for land in low lying areas, land is developed without regard to negative environmental implications. As land is primarily regarded as serving the accommodation needs of a growing population rather than environmental health, there is often poor service and infrastructure provision. According to Masum (2009), these negative factors result from poor urban fringe management.

Masum (2009) observes that a large portion of the world's population resides in areas that can be regarded as urban. This is especially true for developing countries, where growing populations continue to live within or around metropolitan areas. Their livelihood activities are greatly reliant on natural resources such as land for agriculture and water. However, high population density compromises the sustainability of such development (Ibid).

Adesina (2007) observes that urban fringe areas in developing countries tend to be socially heterogeneous as they attract diverse lower income groups that are at the receiving end of negative externalities from both urban and rural systems. These include hazardous health conditions due to occupying unsuitable areas, and lack of access to basic sanitation as well as poor housing conditions. Unstable environmental conditions also affect the livelihoods of these communities.

3.3.1 Urban Fringe Developments in Africa: Examples from Nigeria

The researcher chose to use the example of Nigeria to illustrate urban fringe challenges as well as the lessons that can be learned to ensure sustainable urban fringe development in Cato Ridge, as the main focus of this study and the urban fringe areas of eThekwini Municipality. Nigeria is a good example as most of its large cities are characterised by sprawl, high population densities and congestion. Nigeria has been transformed from a rural to an urban-based economy; this has been accompanied by the transfer of production factors that include technology, capital, and labour as well as information to urban fringes near big cities such as Ibadan, Lagos, Kano, Benin, Aba and Kaduna (Adesina, 2007).

The United Nations-Habitat report (2005) estimates that, by 2025, 61% of the world's population of six billion will be urbanised and most mega-cities will be located in what are known as the 'south clusters'. It is safe to assume that a high percentage of these developments will take place in the urban hinterland, that is, the urban fringe area. Based on the UN-Habitat's estimates and their implications, Adesina (2007) stated that owing to their closeness to the city and the urban-prejudiced nature of development policies in Nigeria, the urban fringe zone experiences much of urbanisation processes and serves as a buffer for future urban development. Adesina (2007) added that the growth of urban fringes provides opportunities even as their spread consumes farmland and open space. Thus the area is highly vulnerable to various risks, as is the city itself; an absence of dependable formal institutions as well as effective governance has caused problems in the jurisdictional administration of the urban hinterlands (Ibid).

One of the most important points raised by Adesina (2007), which connotes that various forces shape most urban fringe issues in Nigeria, is that informal sector activities, particularly in Ibadan, are somewhat ambiguous. Although they provide a means of survival for many, they exacerbate urban fringe political economy problems. One of the possible reasons for this is that it is very difficult for both the public and private sectors to effectively manage and control informal sector activities. Consequently (Adesina, 2007), the failure of urban governance results in growth in the scope of the informal sector in terms of informal residential development, incompatible mixed land uses that have a negative impact on the environment and the failure to restructure economic activities in the fringe areas.

As noted above, one of the leading causes of growth and expansion into the urban fringe is that, due to an increase in population and the demand for land, the characteristics, features and usage of peripheral urban landscapes undergo change that can be either positive or negative. According to Oluseyi (2006), the inadequate basic infrastructure in the urban centres of Lagos, congestion, urban decay, poor urban planning and other urban governance challenges, contribute to the invasion of urban fringe spaces, resulting in a loss of land and natural resources. As the city expands its geographic boundaries, lateral changes occur, leading to sprawl and peripheral developments, while there is slow structural growth within urban centres (Oluseyi, 2006:43). It has been observed that the dynamism of Lagos as an urban centre cannot be halted. Oloto and Adebayo (2007) stated that

precautionary measures need to be taken to curb the anticipated fallouts of the trend of urban peripheral development. According to Oloto and Adebayo (2007), the urban fringe areas of Lagos, although not yet organised, are an integral part of the function of the city centre. This could well be true not only for Lagos's urban fringes but for South African cities' urban fringes and thus for Cato Ridge. This is an important motivation for ensuring urban fringe sustainability, as the benefits thereof would not be limited to the fringe areas, but would extend to their adjoining core city centres.

3.3.1.1 Key Urban Fringe Problems in Lagos, Nigeria

Oloto and Adebayo (2007) highlighted some of the key urban fringe problems in Lagos, which are similar to urban fringe challenges in most developing countries. Firstly, owing to uncontrolled settlement and infrastructure development, Lagos' urban fringes are vulnerable to environmental degradation. Secondly, irrigation of peri-urban agricultural land with untreated urban waste water has been a recurring problem. Thirdly, owing to limited access to clean water in informal settlements, there are high rates of disease and mortality. Adding to these challenges is that government is not fully equipped to deliver adequate basic services such as water and waste collection and disposal. Fourthly, there is a lack of interest in retaining functional green areas - arable land, forests, recreational areas and changes in land use. Finally, there is a lack of forward development planning and control in peri-urban areas, and a lack of clarity regarding planning and development jurisdiction (Ibid).

Adesina (2007) identified two main environmental challenges in Nigeria's urban fringes that required strategic planning and environmental management that would benefit the poor and enhance their quality of life as a way of ensuring sustainability. The first challenge was the physical state of the environment in urban fringe areas within which people lived and worked. For example, in the Ibadan urban fringe, informal sector activities had a great impact on the landscape. The area consists of mixed land uses and low income communities which are vulnerable to the negative externalities of surrounding rural and urban systems. Owing to a lack of access to basic infrastructure and poor housing conditions the community is vulnerable to the health risks and physical hazards associated with occupying unsuitable sites. The second set of challenges in Nigeria's urban fringes is related to the usage of renewable and non-renewable resources as well as being able to regulate the transfer of

environmental impacts from both urban and rural systems to urban fringe areas. According to Adesina (2007), urban fringes are vulnerable to conflicting interests if there is no proper organisational framework to strike a balance that could bring about poverty alleviation, environmental protection and increased productivity or create collaborative urban and rural relationships. Therefore from a broad perspective, the changing patterns of commodities, capital and natural resources as well as pollution in the urban fringe, have an impact on the sustainability of both urban and rural areas (Ibid).

3.3.1.2 Solutions for Nigeria

The urban challenges in Abuja are a reflection of the poor implementation of effective land management strategies by government structures. Good governance is a prerequisite for changes to management processes. Owing to poor governance, land management remains theory rather than reality. Although developing countries are characterised by weak governance systems, one of the solutions would be active participation by stakeholders in order to ensure the implementation of land management strategies.

According to Kadiri and Oyalowo (2008), there is a need to focus on land as a revenue source: in as much as land resources need to be protected, it must be realised that land in urban fringe areas is seen as the main source of economic prosperity. Coordinated land allocation and guidelines for land use activities in urban fringe areas are essential to ensure that land is allocated prudently in terms of a land use plan or framework. Furthermore, a proactive planning approach is required in order for urban fringes to evolve in a sustainable manner.

A regional outlook that views urban fringe areas as inclusive transitional zones, rather than in isolation is important in all planning and management practices (Ibid). Furthermore, according to Kadiri and Oyalowo (2008), local community partnerships are crucial elements of the framework. The reason for this is that people regard land as family holdings and as a primary resource for agricultural practices and returns; therefore it is important that people are empowered to participate effectively in land management decisions that affect them. Local governments should be empowered through investment, monitoring and other support from upper levels of government to play their role effectively (Ibid).

3.3.2 Case of Dhaka in Bangladesh

Dhaka the capital city of Bangladesh in South Asia is one of the fastest growing cities in the world. After Bangladesh gained independence in 1971, its population grew by more than one hundred thousand people on a yearly basis. Dhaka is currently the 11th largest city in the world. The growing population hampers the fair distribution of services and land, as well as housing provision. Dhaka's urban fringe is therefore vulnerable to heavy population pressure (Masum, 2009:3). These characteristics promoted the researcher to use the case of Dhaka, in order to learn from its experiences as one of the world's mega cities.

According to Masum (2009), rapid population growth in Dhaka has challenged the City Development Authority to effectively manage and control urban spatial growth due to its limited capacity. However government as well as the private sector has created new towns in Dhaka's urban fringe areas. Masum (2009) observes that these areas are inhabited by the poor due to informal land development; there is a disorderly mixture of formal and informal development in these urban fringes (Ibid).

Masum (2009) maintained that Bangladesh's government lacks economic and technical capacity to effectively manage urban fringe problems, and also lacks institutional planning and enthusiasm to control urban fringe growth. It should be noted that urban fringe problems cannot be resolved within a short period of time and that the solution is not direct and singular. The multiple problems confronting the urban fringe require multidisciplinary contributions to possible solutions. It is therefore important that Dhaka endeavours to achieve good governance that considers the integration of different methods for land management in order to address land development challenges (Ibid).

3.3.2.1 Failure of Planning to Guide Urban Fringe Developments in Dhaka

According to Masum (2009), no plan has been fully implemented since 1950, when the RAJUK (Rajdhani Unnayan Kartripakkha), the Capital Development Authority, took change of Dhaka. Masum (2009) adds that planning frameworks have not gone beyond the conceptual phase. This resulted in the failure of the city's planning system. Although the city's planning commission launched several initiatives in 1980, government failed to implement them; as a result there are no planning guidelines or master plan to inform the development that continues apace (Ibid).

According to Masum (2009), the unsuitable and unproductive development plans for Dhaka are due to RAJUK's incompetence, coordination challenges among agencies, inadequate resources, government reluctance, corruption and bureaucracy. Frequent extensions of time for completion have hindered the preparation and implementation of a workable plan. Therefore, Dhaka City has no clear zoning policy or any solid master plan. This has led to sprawling development with a low level of services and facilities and in some cases no services and facilities.

3.3.1.1 Need for Good Governance

According to Masum (2009), the situation in Dhaka reflects the gap between conceptual land management strategies and their practical implementation; the blame lies with poor governance. Effective urban fringe management requires good governance prior to making adjustments to management processes. The failure to implement development plans negatively affects urban fringe development in Dhaka and other developing countries (Masum, 2009:4).

3.3.2 Case of China

China's urban fringes consist of diverse land uses, which are visible in complex infrastructural patterns, a complicated system of living-work relationships, very rapid development, and alterations in the functions of the area and in the composition and activities of the population (Feng, 2004). A lot can be learned from China, as it is one of fast growing states in East Asia. China is also well known for overpopulation and massive sprawl development. An analysis of China's urban fringes can help put the dynamics of the sustainability challenges confronting urban fringe developments into greater perspective. Important lessons can be learned from the key influences and challenges in China's urban fringes to inform sustainability challenges in urban fringe developments globally and in particular, the case study for this research.

3.3.2.1 Influences on China's Urban Fringe Developments

According to Feng (2004), urban growth and the development of urban fringes in China is more complex than in western countries. Feng (2004) identified the following forces behind China's urban fringes:

- Topography as well as the natural environment is one of the major external forces that hamper the development of urban fringe areas. Agricultural activities are affected by soil fertility, terrain and climate conditions. Flat topography and a suitable natural environment offer a better platform for the development of urban fringes in a cost effective manner.
- Based on the argument that urbanisation is greatly influenced by economic growth, the pursuit of economic growth is therefore one of the forces driving urban fringe developments. Feng (2004) further maintained that urban fringes unfold in the same developmental patterns as economic growth.
- Improved transportation and communication act as accelerating catalysts for the increased development of urban fringes. As more high-speed roadways are built, public transportation systems increase and private car purchase is more affordable, urban fringe developments become more desirable.
- Another factor that contributes to the increased development of urban fringes is the structuring and execution of government policies. For example, the construction of large industrial zones, rezoning of heavy industry, encouraging towns to develop industry and exclusive administrative patterns, usually take place in the urban fringes affected by policies or plans.

Other forces that should also be borne in mind are social and cultural factors, people's psychological behaviour and characters. Some researchers have shown that people no longer have a strong preference to live in urban centres as before. This may result in more people flowing into the urban fringe (Ibid).

3.3.2.2 Problems Related to China's Urban Fringes

Feng (2004) summarised the problems related to China's urban fringe as follows: owing to the lack of proper planning policies and theoretical guidance, the construction of China's urban fringes has been disorderly; this hampers the achievement of a balance between urban development and protecting environmental resources. Secondly, because the urban fringe is located in peri-urban areas that combine both rural and urban aspects, its planning is different from that of rural and various built-up areas and index planning is uncertain.

Thirdly China's urban fringes are active, on-going zones because of their contact with the city and the contradiction of the city's expansion and farmland contraction. The city's expansion causes a loss of primary farmland on the fringe. Finally, the social and industrial construction of the fringe is not stable. The economic system is very compound and the economic activities and resources are often inclined to focus on short- term benefits (Feng: 2004).

3.3.4 Local Precedents: the South African Context of Urban Fringe Developments

South African urban patterns are characterised by the legacy of apartheid spatial model of racially segregated residential areas, with the urban poor generally living on the outskirts of urban areas (Carey et al., 2004: 8). According to Murray (2011), the complex process of urbanisation that has shaped some South African cities such as the greater Johannesburg metropolitan region fostered contradictory patterns of growth and development that are not easily grasped within the analytic paradigms of conceptual frameworks that seek to make sense of urban transformation and metamorphosis.

According to Murray (2011), a common factor between South Africa and North America, Australia and Britain is that urban growth resulted in scattered residential build-up at the urban fringe. However, in the case of South Africa, urban sprawl can be related to the country's complex political and cultural history. Prior to 1994, policies were informed by racial segregation. Apartheid spatial planning located settlements for the black population in peripheral areas and industrial as well as environmental buffers were used to separate them from white settlements (ibid). Murray (2011) notes that, as a consequence, black settlements suffered, as they were deprived of economic opportunities which were predominantly available in white settlements. When South Africa experienced economic stability between 1960 and 1970, people were more able to afford to own individual housing units and they began to relocate into the urban fringe. As a result of apartheid spatial planning, most urban fringe areas in South African cities today are occupied by black households, the majority of which are poverty stricken.

According to Heimann (2003), another factor that influenced the sprawl of South African cities was measures introduced by the democratic government to redress apartheid. These took the form of moving previously disadvantaged communities closer to the city centre. The

democratic government implemented various policies and legislative frameworks, including the Urban Development Framework (UDF), the Rural Development Framework (RDF) and the Development Facilitation Act (DFA), to address spatial development patterns based on racial segregation. This was done in order to allow poor communities to access opportunities. The low income settlements that developed on the urban fringes of South African cities were either the result of government policies on large scale development for low income households, or the developments were unauthorised and were erected by communities seeking to be closer to economic opportunities (Heimann, 2003).

According to Horn (2009), scattered and unmanaged urban growth has a negative economic, social and environmental impact, which affects the sustainability of urban areas in the medium to long term. Horn (2009) adds that these impacts prolong the poor living conditions of poverty stricken families that live far from employment, economic and social service opportunities, thus perpetuating apartheid inequities.

In the case of Johannesburg, Murray (2011) argued that instead of the conventional radial-concentric model of urban evolution, in which concentration of the central core takes place in tandem with extensive expansion along the dependent urban fringes, the spatial configuration of the Johannesburg city should combine high-density concentration of multiple nodal points with low-density suburbanising sprawl that is spread haphazardly across an extended metropolitan zone. Without the conventional signposts of the modernist city giving a sense of boundary lines, the seemingly boundless Johannesburg metro-scope and rapidly urbanising peripheries can be visualised only in discrete fragments, that could be transitory and sometimes appear as conflicting images that offer little by way of a coherent understanding of the whole (Murray, 2011: 34).

Murray (2011) describes the city of Johannesburg as a tangled skein of high-density downtown office buildings combined with low-density suburban communities stretching over extraordinary distances, industrial and manufacturing pockets located on the urban fringes (particularly on the East Rand), far-flung black townships and impoverished informal settlements south of the city, and widely dispersed commercial nodes and residential enclaves of varying degrees of affluence and exclusivity. This implies a high degree of mixed land uses and inequality on the fringes.

3.4 Conclusion

Urban fringe developments are greatly influenced by patterns of urban growth, urbanisation and urban sprawl. The development of the majority of urban fringes appears to be disorderly. This may be one of the reasons why it is difficult to provide a clear-cut definition of urban fringes. Urban fringes are characterised by mixed land uses. Lessons from precedent studies show that urban fringes are important, as they offer opportunities for transformation. However, there is a need for good governance, planning, and the formulation of effective policies that need to be enforced. Lack of effective management renders urban fringes vulnerable to various environmental and socio-economic issues, which can be a constraint to achieving sustainability within these fringes.

4. CHAPTER FOUR: METHODOLOGY FOR ASSESSING THE SUSTAINABILITY OF URBAN FRINGE DEVELOPMENTS IN ETHEKWINI MUNICIPALITY

4.1 Introduction

Having conceptualised the theoretical background and precedent studies that inform this research, the next critical step was to focus on the case study area by collecting relevant data in order to make findings regarding the sustainability of the development of the case study as an urban fringe. Therefore it is important that findings relevant to the case study area in question be made, instead of making generalised assumptions about the area. It was important for the researcher to have a well-formulated research methodology to guide all data collection and analysis processes. This chapter provides an overview of the research methodology used in the study. It highlights the sampling procedures as well as data collection methods used.

4.2 Research Methodology

Burns (2000) defined research as a systematic investigation to find answers to a problem. According to Manhein (1977), research can also be defined as the careful, diligent and exhaustive investigation of a specific subject matter, aimed at advancing mankind's knowledge. According to Polit and Hungler (2004), methodology refers to ways of attaining, organising and analysing data. Furthermore, according to Burns and Grove (2003), methodology consists of the design, setting, sample, methodological limitations, and the data collection and analysis techniques in a study. Henning (2004) described methodology as a rational group of methods that balance one another and that have the ability to effectively deliver data and findings that will reflect the research question and fit the research purpose. According to Holloway (2005:293), methodology refers to a framework of theories and principles on which methods and procedures are based. For this study methodology, refers to how the research was done and its rational progression. A research methodology can be carried out in many different ways and the selection of the best methods is based on the type of research questions and objectives.

4.3 The Case Study of Cato Ridge

The researcher chose Cato Ridge within eThekwini Municipality, to assess the sustainability of urban fringe developments within metropolitan cities. Cato Ridge was chosen because it is located on the outskirts of eThekwini Municipality on the outer west and is characterised by mixed land use activities consisting of light to heavy industrial development and commercial enterprises interspersed with various agricultural enterprises, farming activities and recreational activities. As noted in Chapter 2, these can be regarded as typical characteristics of urban fringes. However an understanding of the distinctive characteristics of the case of Cato Ridge as an urban fringe development, can inform both practice and understanding of sustainability issues in the urban fringe within the study area and similar situations in other areas. It should be noted, however, that according to Leedy and Ormrod (2005), one of the major weaknesses of a case study is that one cannot be certain that the findings are applicable to other situations.

In the case of Cato Ridge, the researcher used relevant methods to collect data on development patterns, land use activities and social and economic as well as other factors that influence the sustainability of Cato Ridge as an urban fringe development, in an endeavour to answer the research questions.

4.4 Data Sources

In order to achieve an informed analysis of the study area, it was necessary to utilise both primary and secondary sources of information. This was achieved by means of interviews with relevant stakeholders, field observations by means of a physical analysis, and consulting the relevant literature in the form of books, journal articles, unpublished dissertations, planning reports and websites. The information to be collected had to come from relevant and reliable sources. These steps are further discussed below in the sequence that they were carried out.

4.5 Data Collection

Data collection can be defined as the accurate, orderly gathering of primary and secondary information applicable to the research sub-problems, applying methods such as interviews, participant observation, focus group discussions, narratives and case histories (Burns and Grove, 2003:373). This requires that the researcher decides where and from whom data

will be collected (Talbot, 1995:472). Collecting data was a key process in this study and every step had to be carried out effectively and diligently in order to make an informed and in-depth assessment of the sustainability of urban fringe developments.

4.5.1 Primary Data Collection

According to Currie (2005), primary data are data that were previously unknown and which have been obtained directly by the researcher. The advantage of primary data is that it allows the researcher to attain firsthand unbiased data from relevant sources. The primary data sources included personal observation, and semi-structured and unstructured interviews. Interviews provided the researcher with firsthand information from institutions and bodies who had direct and indirect relation to the study. Personal observation provided direct information which could not be obtained from other people. According to Patton (2002:22), participant observation permits the researcher to understand a phenomenon to an extent not entirely possible from the insights of others through interviews. The following methods were used to collect primary data:

4.5.1.1 Interviews

Interviews refer to structured or unstructured oral communication between the researcher and the participants, in which information is presented to the researcher. Face-to-face interviews were conducted with relevant stakeholders. The following categories of people and organisations were interviewed: eThekwini Municipality officials, development organisations such as the Industrial Development Corporation (IDC), industries, including Assamang and SAFAL, business owners, ward councillors and private consultants. One of the main reasons for interviewing these persons and organisations is that they are involved in the development of Cato Ridge.

- Conducting the Interviews

Interviews are usually initiated with a broad or general question. It is the researcher's task to persuade the participants to continue talking, using techniques such as nodding one's head. In some cases, the participants were encouraged to elaborate further on a particular aspect of the topic to follow up cues for an in-depth interview in order to establish the "true" meaning of a phenomenon (Mamabolo, 2006).

The researcher followed the following steps in each interview:

1. Made an appointment with each participant at a time which suited them.
2. Prepared a tape recorder with the permission of the respondents.
3. Thanked the participant for their time and willingness to participate in the study (Talbot, 1995:477).

- Open unstructured Interviews

Open unstructured interviewing is one of the most important methods for data compilation in phenomenological research as it allows the participants' descriptions to be explored, clarified and investigated (Kvale, 1996:89). The open unstructured interview in phenomenological studies is intended to be in-depth (Burns and Grove, 2003:284). De Vos (2002:302) stated that the aim of unstructured interviews is to understand the perceptions of people from the standpoint of theory concerning the study. No questions are deliberately formulated. According to Hallet (1996), this approach reflects the open and compliant style of interviewing that seeks the honest views and feelings of participants. This may be difficult to achieve if the process has a predetermined structure. The common ground in phenomenological interviews is that by their nature, the interviews make the researcher the research instrument "through which data are collected" (De Vos, 2002:301). In open unstructured interviews, the researcher may use reasonable guidelines to prevent the participants from feeling that they are being "cross-examined" on a topic (Burns and Grove, 2003:285).

4.5.1.2 Advantages of Interviews

- Interviews are easy techniques that allow the researcher to flexibly obtain and explore data in its depth.
- The researcher can use personal skills to persuade the interviewees in order to gain more information.
- Participants provide more responses in interviews than in questionnaires, which can be an important advantage in gaining further understanding of the topic at hand.

- Interviews allow the collection of data from participants who are unable or less likely to complete questionnaires, such as people who are illiterate and those who cannot express themselves effectively (Burns and Grove, 2003:285; De Vos, 2002:302).

4.5.2 Secondary Data Collection

The use of secondary data sources will be subject to quantitative data which refers to an experimental, surveyed or statistical means of researching that relies on the use of quantitative data (Badenhorst, 2008). Quantitative data has the comparative advantage over qualitative data of being able to establish or refute simple general propositions regarding casual impact and covariant change for large populations with a high degree of confidence (World Bank, 2007). The researcher used published and unpublished sources including books, journals, government publications, newspapers, internet sources, and conference papers dealing with sustainability at the urban fringe to gain more understanding and provide background information in order to answer the study's research questions.

The advantages of secondary data include opportunities for replication, and the availability of data over time enables the researcher to conduct longitudinal research by finding a base line from data collected a long time ago. Secondary data is less costly than primary data. In this research study, the reasons for using secondary data were substantive and methodological. It is important to note that secondary data, like any other data collection method has its own limitations. Nachmias and Nachmias (1996) noted that there is a gap between primary data that is collected by the researcher from personal initiatives and secondary data collected by other people for different purposes.

At times it is difficult to access secondary data because the original researcher is not willing to release it. Furthermore, the researcher is not aware of how the data were collected; therefore it is not possible to identify possible sources of bias (Ibid). Nevertheless, given the conceptual-substantive and methodological reasons underpinning the use of secondary analysis in this research, the researcher used secondary data cautiously since the deficits are already known.

The first step was to obtain relevant literature on urban fringe developments, and their patterns and characteristics as well as issues that contribute to their sustainability or lack

thereof. It was also necessary to obtain relevant data on concepts and theories relating to the topic at hand such as urban fringe, urban growth, urban sprawl and sustainability in order to gain an in-depth understanding that would facilitate the task of assessing the sustainability of urban fringe developments. Furthermore, it was profitable to undertake precedent studies in order to learn from experiences in other countries. Other sources of information included internet articles, books and journals from the University of KwaZulu-Natal Libraries, the Campbell Collections Library, and the eThekwini Municipality's Libraries.

4.6 Qualitative Research

Qualitative research refers to inductive, holistic, subjective and process-oriented methods used to understand, interpret, describe and develop a theory on a phenomenon or setting. It is a systematic, subjective approach used to describe life experiences and give them meaning (Burns and Grove, 2003:356). Qualitative research is mostly associated with words, language and experience rather than measurements, statistics and numerical figures (Ibid). According to Holloway (2005), one of the advantages of using qualitative research is that it enables a researcher to adapt a people-centred and holistic perspective to understand the human experience, without focusing on specific concepts. The original context of the experience is unique, and in-depth knowledge and insight can be generated to present a lively picture of the participants' reality and social context. These events and circumstances are important to the researcher (Ibid).

4.6.1 Qualities of Qualitative Research

Holloway (2005) stated that qualitative research adopts a more person-centred and holistic approach. It develops an understanding of people's opinions about the lives of others. It also helps the researcher to generate an in-depth account that will present a more realistic conceptualisation of participants' reality (Ibid). In order to maximise the attributes of qualitative research, Van der Wal (1999) stated that the researcher should to a good listener, who is non-judgmental, friendly, honest and flexible. Qualitative research is a form of content analysis covering a spectrum of approaches ranging from empirical phenomenological psychology to hermeneutical-phenomenological psychology, depending on the data source (Ibid).

4.7 Quantitative Research

The use of secondary data sources will be subject to quantitative data which refers to an experimental, surveyed or statistical means of researching that relies on the use of quantitative data (Badenhorst, 2008). Quantitative data has the comparative advantage over qualitative data of being able to establish or refute simple general propositions regarding casual impact and covariant change for large populations with a high degree of confidence (World Bank, 2007).

4.7.1 Qualities of Quantitative Research

- Quantitative research helps to calculate the proximity of populations at large.
- It can indicate the depth of the mind-set held by people.
- It can provide results which can be converted to statistics.
- It allows for numerical comparison between various groups.
- It is accurate, and is definitive and standardised.
- It helps measure level of occurrence, actions and patterns.
- It can provide clarity in terms of "How many?" and "How often?" (Sukamolson, 2000)

Comment [D3]: Not sure what this means. Suggest you rephrase.

4.8 Sampling Procedure

The researcher chose to use a non-probability purposive sampling design for the study. This sampling procedure allowed the researcher to make decisions about the individual participants who would be most likely to contribute suitable data, both in terms of significance and depth (Oliver, 2006). In doing so, the researcher ensured that the participants met the eligibility criteria to inform the study. According to Oliver (2006), the main disadvantage of purposive sampling rests on the bias of the researcher's decision making. This can be a significant threat to the validity of the research outcomes. This may be mitigated by an endeavour to ensure that there is an internal stability between the aims and epistemological basis of the research, and the processes used for selecting the purposive sample (Ibid).

4.9 Data Analysis

Data analysis is a method to reduce and organise data to produce findings that need interpretation by the researcher (Burns and Grove, 2003:339). Data analysis is a demanding and creative process that requires an intimate association between the researcher and participants and the data generated (De Vos, 2002:339).

4.9.1 A Physical Analysis of Cato Ridge

Once the literature review process was complete, it was necessary to physically analyse Cato Ridge. This required the researcher to map out the geographic boundary of the study area, both physically and by means of a cadastral map and an aerial photograph. A physical analysis of the study area provided the researcher with a context within which to undertake field observations and land use surveys. The cadastral and aerial maps were available on the eThekwini Municipality's website (www.durban.gov.za).

The physical analysis of Cato Ridge, that is, the core study area, involved analysing existing land uses, as well as the condition of the physical environment and the order of land uses. The residential component of the area was analysed in terms of the range of dwelling types, and the condition thereof. It was also necessary to observe the formal commercial activities, and informal trade in the area.

4.9.2 Land Use Survey

At this stage, it was necessary to conduct a land use survey, and to compare the existing Town Planning Scheme Map and Clauses, which was available from the eThekwini Municipality's offices with that of actual land uses. Prior to conducting the land use survey, the researcher consulted the Braby's Business Directory for the area. This helped in terms of knowing exactly what types of businesses to expect. The aim of this survey was for the researcher to gain knowledge of the range of land uses that exist in Cato Ridge, and to establish whether there is any apparent disjuncture from what was planned for the area in terms of the Town Planning Scheme. The survey also assisted in determining what formal and informal activities exist in the area.

4.9.3 Field Observation

The land use surveys revealed which specific areas required further field observations. These observations were necessary to identify specific problem areas, which impede the sustainability of Cato Ridge as an urban fringe. Field observations resulted in the compilation of a series of maps with, for example, different land uses (residential, commercial, industrial and agricultural) as well as open spaces. Photographs were taken to provide a general picture of the area, as well as a clearer understanding of existing facilities, the condition of buildings, existing land uses and other relevant activities. An analysis of these observations provided the researcher with an understanding of the extent of sustainability in the Cato Ridge urban fringe which in turn led to recommendations in terms of interventions that may be undertaken to improve the sustainability of the area.

4.9.4 Qualitative Phenomelogical Data Analysis

Qualitative data analysis needs to be conducted with rigour and care (Coffey and Atkinson, 1996:189). In phenomenological research, the analysis begins as soon as the first data are collected. They may consist of no more than a single interview. When the researcher prepares to attend to the data, the first task is a conceptual one: the explanation of the researcher's own preconceptions of the study. This means illuminating the researcher's personal interpretations and engaging fully with the views of the interviewee (Tesch, 1992:92). The actual data analysis occurs when the researcher reads the entire data set. Phenomenological reading involves more than casually noting the content. The researcher repeatedly reads the data, in order to achieve an understanding of and make sense of the entire content. When the researcher is satisfied that the text has become accessible, he/she can delineate all 'meaning units' throughout the entire interview transcript, decide which are relevant to the research questions asked; and then bind the meaning units that contain them (Tesch, 1990:91). As the researcher became engrossed in the data, significant statements were identified. According to Streubert Speziale and Carpenter (2003), it is critical to identify how statements or central themes emerge and connect with one another if the final description is to be comprehensive and thorough.

4.9.5 Types of Qualitative data analysis

Thematic analysis

The researcher translated and transcribed the tape-recorded interviews, then read and reread the interviews in their entirety, reflecting on the interviews as a whole. She then summarised the interviews; keeping in mind that more than one theme might exist in a set of interviews. Once identified, the themes that appeared to be significant and concepts linking substantial portions of the interviews were written and entered on computer (Morse and Field, 1996:115).

Content Analysis

In this analysis, the researcher read the entire interview and identified several topics. These topics then become primary categories or category labels. With too many categories, saturation is achieved slowly. Once the categories have ample data, the researcher may select to categorise this data into sub-categories of two or more (Morse and Field, 1996:117). A tree diagram is developed with types of the main category. When each category is reasonably full and saturation is reached (that is, no new data emerge), the researcher writes descriptive paragraphs about the categories and looks for relationships between categories. These relationships could be concurrence, antecedents or consequences of an initial category (Morse and Field, 1996:177).

4.9.6 The Data Analysis Process

The researcher used Tesch's proposed eight steps of data analysis:

1. The researcher carefully read through all the transcriptions, making notes of ideas that were formulated.
2. The researcher selected one interview and read it to try to get meaning from the information, writing down thoughts that came to mind.
3. After going through the transcripts, the researcher arranged similar topics in groups by forming columns labelled 'major topics'; 'unique topics' and 'leftovers'.
4. The researcher then abbreviated the topics as codes and wrote the codes next to the appropriate segment of the text. The researcher observed the organisation of data to

check if new categories or codes emerged.

5. The researcher found the most expressive wording for topics and converted them into categories. The aim was to reduce the total list of categories by grouping topics together that relate to one another other. Lines drawn between the categories indicated interrelationship of categories.

6. A final decision was then made on the abbreviation of each category and the codes were arranged alphabetically.

7. The data material belonging to each category was put together in one place and preliminary analysis was performed.

8. Recording of the data was done if necessary
(De Vos, 2002:340-341).

The data collected had to be considered in terms of its relevance to the research problem and questions. The questions posed to the City officials and private consultants were specific and directly related to the research topic, and were therefore used accordingly. The information that they provided also aided in comparing international experience and trends with that of eThekwini Municipality in terms of what is expected in terms of the sustainability of urban fringe developments.

Interpretation

Interpretation focused on the usefulness of the findings for clinical practice or moved towards theorising. The researcher identified any relations between categories that could be used to formulate tentative propositions. These tentative propositions were recorded on index cards and sorted into categories (Burns and Grove, 2003:389).

4.10 Limitations of the Study

During the interviews with households, the researcher had difficulty translating some of the questions and answers into isiZulu as the majority were isiZulu-speaking. Due to financial constraints, it was difficult to hire a translator. Business owners were very busy and the researcher had to make a lot of adjustments to fit into their schedules rather than the researcher's preferred schedule.

4.11 Suggestions to Improve the Study

Having a professional researcher to assist with data collection would improve the study. The availability of a private vehicle would improve the research as it would allow the researcher to travel freely and as often as possible to the study area in order to be aware of different occurrences within the study area. Being able to communicate with international experts on the research topic would also help improve the study by providing more insight from an international perspective.

4.12 Conclusion

Data collection is one of the most critical steps in a research study. Having established the theoretical framework relevant to the study, collecting data is critical in order to produce findings on the research topic at hand. The research methodology served as an important guide for the researcher to collect, analyse and present data to help assess the sustainability of urban fringe developments.

5. CHAPTER FIVE: FINDINGS AND ANALYSIS

5.1 Introduction

This chapter presents the findings and analysis of data gathered from primary and secondary sources on the sustainability of the Cato Ridge urban fringe development. The aim was to answer the study's main research questions. The researcher structured the field work according to themes of urban fringe developments and their sustainability, by unpacking various aspects that had either a direct or indirect impact thereon. The themes in this analysis were also guided by the theoretical framework of the study.

5.2 Presentation of the Cato Ridge Urban Fringe Development Case Study

According to the eThekwini Municipality (2010), Cato Ridge forms part of the Outer Western Region (OWR) of the Municipality and is 13 kilometres along the N3 from the eastern border of the uMsunduzi Municipality. Cato Ridge has been earmarked by eThekwini Municipality as an area for industrial development, because it is mostly undeveloped, and the N3 corridor (South Africa's busiest freight corridor) passes through it. Compared with other areas in eThekwini Municipality, Cato Ridge offers a particular strategic advantage with the N3 corridor as the main access corridor to Pietermaritzburg and Gauteng (Ibid). There are nevertheless relatively few industrial activities in Cato Ridge and only a few new sites are currently being developed for such use. The Assmang Ferro- Manganese plant is by far the most notable industrial land use development in the area.

Cato Ridge is the only area within the Municipality on the Natcor rail freight corridor and the N3 national route that offers the possibility of the development of not only an industrial area but an inter-modal freight hub link with the Port of Durban (eThekwini Municipality, 2010). Rail linkages and infrastructure exist (the Natal Corridor (Natcor) line) from the Port of Durban to the Cato Ridge area and extend all the way to Gauteng. Furthermore, according to the eThekwini Municipality (2010), because of the strong rail and road infrastructure already in place, there is a great possibility that container related companies could locate in Cato Ridge and serve future industries and businesses in the area. However, for this to become a possibility eThekwini Municipality (2010) realised that an efficient, speedy, regular and reliable rail service will need to be established between the port

and Cato Ridge, as well as between Gauteng and Cato Ridge.

According to the eThekwini Municipality (2010), as land becomes increasingly scarce within its core centre, there will be increased demand for land in neighbouring municipalities, particularly along the N2 and N3 corridors, such as iLembe, Mkhambathini and uMzunduzi Municipalities. It was therefore acknowledged (eThekwini Municipality, 2010) that without appropriate inter-municipal spatial planning for its urban fringes and beyond, private development and investment will become haphazard, which may lead to conflicting and inefficient land uses located next to each other. Future road developments and municipal services risk being planned inappropriately and may be mis-timed without co-ordinated spatial planning.

5.2.1 Cato Ridge Demographics

Table 1 below shows the population of Cato Ridge in terms of race and indicates that the Cato Ridge urban fringe is mostly dominated by Africans, followed by Whites, with Indians and Coloureds constituting the lowest percentage. There is therefore multicultural diversity in the Cato Ridge urban fringe consisting of different beliefs, languages and general lifestyle. As such, it is important for development initiatives in the urban fringe to promote an atmosphere that allows different groups of people to freely express themselves according to their culture and lifestyle choices. One can argue that development in the city centre is mostly influenced by modern, western types of living that do not necessarily encourage people to adopt a cultural lifestyle which is considered backward. However urban fringe areas can offer society the opportunity to truly have freedom of expression in terms of culture and diversity.

Population by Race	%
African	55
White	42
Indian	2
Coloured	1

Table 5.1: Population groups in Cato Ridge (Source: Census Data 2001)

In terms of employment, Figure 5.1 below shows that the majority of employees in Cato Ridge are semiskilled and unskilled. Most of these workers are from the OWR. According to the eThekwini municipality (2010) the informal economy is an important

source of employment for the OWR, contributing a higher percentage of employment than high skilled employment. Highly skilled and skilled workers are also employed in Cato Ridge, which is an important element in the area's economic growth.

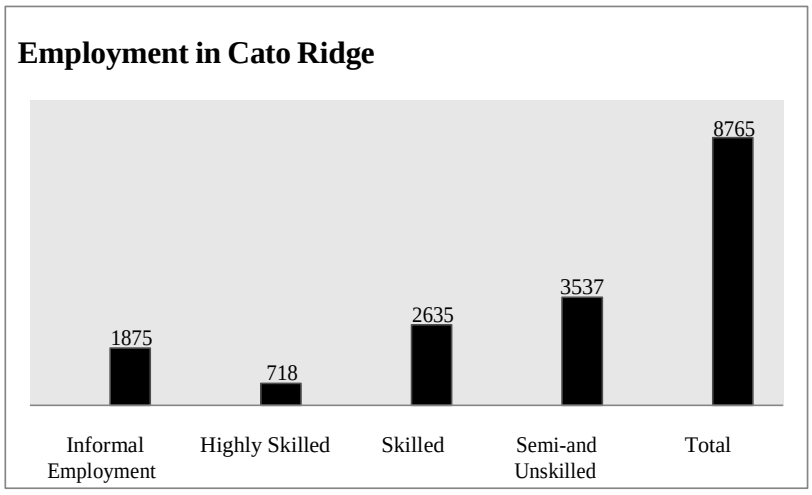

Figure 5.1: Employment in the Cato Ridge (Source Quantec regional data base 2009)

Figure 5.2 below shows that Cato Ridge's housing typology consists of mostly formal housing. Other housing typologies include flats, simplex and duplex types of housing and informal dwellings. The traditional dwelling typologies are mostly found in the surrounding rural areas stretching from Cato Ridge as part of the OWR.

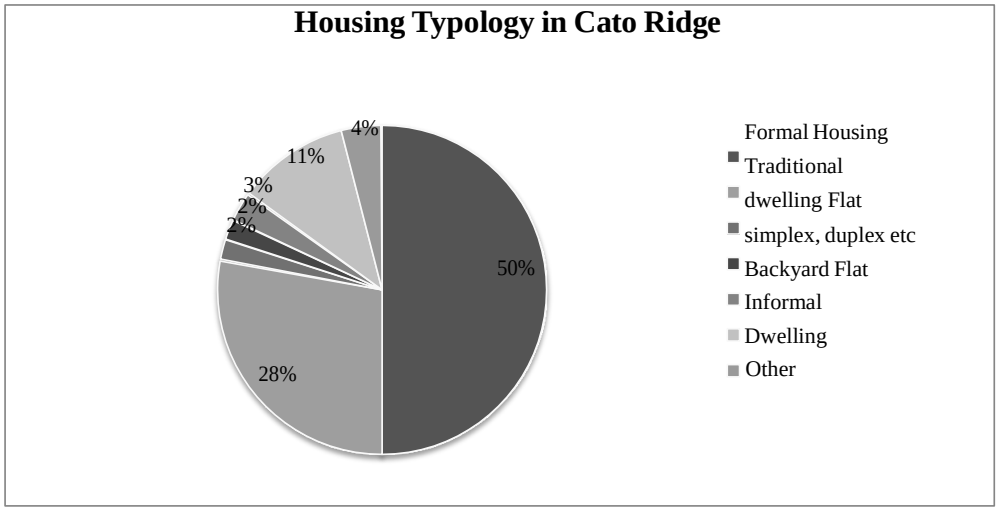

Figure 5.2: Housing Typologies in Cato Ridge (Source Quantec regional data base: 2009)

5.3 Findings on the Sustainability of Cato Ridge Urban Fringe Development

In analysing the sustainability of the Cato Ridge urban fringe development, the researcher started by determining the driving forces of development in the area order to gain more understanding of how various development processes unfold. Furthermore, the researcher conducted interviews with relevant stakeholders in order to understand their perspectives of the development of the Cato Ridge urban fringe and its sustainability. The researcher was then able to make an assessment of the sustainability of developments in the area, as well as the opportunities and challenges to development. As an important part of assessing the sustainability of Cato Ridge urban fringe development, the researcher assessed governance in Cato Ridge as well as municipal plans for the future development of the Cato Ridge urban fringe.

5.3.1 Driving Forces for Land Use Change and Development in the Cato Ridge Urban Fringe

As with cities in different countries and regions, there are various driving forces for development in urban fringe areas. These forces have great influence in terms of determining what type of development is to take place, and where and when the development will occur as well as the beneficiaries of such development. In any endeavour to achieve sustainability in urban fringe development, it is important that these driving forces be clearly identified and understood to ensure that they accord with set sustainability standards and requirements or initiatives. In order to assess the sustainability of Cato Ridge urban fringe development the researcher sought to identify some of the key driving forces for land use change and development in the area. This was an important undertaking as it helped to understand how development in Cato Ridge has evolved and to make assumptions as to how it would most likely unfold in the future. The researcher identified the following driving forces for land use change and development in Cato Ridge:

5.3.1.1Industries

Urban fringes are considered suitable for industrial development in order to prevent close proximity to large commercial land uses, office parks and residential land uses in the city centre. Industries in Cato Ridge such as Assmang and SAFAL play a significant role in influencing development in the area. In most cases, industrial developments lead to the development of other land uses such as residential, mainly to accommodate the work

force in the industry; commercial opportunities are also created in response to the market that is made available. Infrastructure such as road and rail to support industrial developments also becomes a priority.

5.3.1.2 Commercial Sector

Cato Ridge has a number of small businesses as well as formal businesses. Amongst these are clothing stores such as Pep, Cato Ridge Clothing, and food markets such as Spar. These businesses have a great bearing on the economic development of the area. The development of commercial facilities influences how different stakeholders respond to the area. For instance the presence of commercial facilities can favour further development of residential areas by enabling people to conveniently access goods and services. As with the development of industries, commercial developments can lead to a great need for infrastructure development.

5.3.1.2 Municipalities

eThekwini municipality is one of the main driving forces of development in its city centre and its urban fringe areas. The primary role of the municipality is to plan and prepare land use zoning schemes for development and to oversee the implementation of development processes. Municipal plans are very important as they determine suitable land uses and their location. These plans have great influence in shaping both the short and long term development of a given area.

5.3.1.3 Ward Councilors

Ward councilors who represent local communities are actively involved in decision-making processes that affect the overall wellbeing of these communities. Ward councilors are considered people who are well informed about the practical needs of the local population. They can therefore influence what type of development is suitable to meet these needs.

5.3.2 Perceptions on the Cato Ridge Urban Fringe Development by Various Stakeholders

At this point of the study, the researcher had come to an understanding that there is no universal definition of an urban fringe. Urban fringes are defined in many different ways by different people and organisations. In order to assess the sustainability of urban fringe

developments, it was important for the researcher to understand how different stakeholders defined and viewed Cato Ridge as an urban fringe development. These definitions and viewpoints can be a key determinant of the stakeholders' long or short term intentions to utilise the urban fringe or to disregard the area. The following stakeholders were interviewed:

5.3.2.1 eThekwini Municipality Planning Officials

In an interview with one of eThekwini Municipality's planning officials, the respondent stated that the Municipality views urban fringe areas as areas of innovative development that integrate environmental, economic and social aspects to achieve sustainability. According to the respondent, the urban fringe areas around eThekwini Municipality could be ideal for nature preservation and agricultural use. However, owing to urban growth and consequent urban sprawl, development inevitably invades urban fringe areas. The respondent stated that, as planners they are faced with the challenge of managing sprawl and ensuring that development in urban fringe areas takes place in a manageable and orderly manner. In the case of Cato Ridge the respondent stated that the area is ideal for industrial, residential and commercial development as well as other land uses.

5.3.2.2 I Industries

As noted earlier, some industries are major role players in the Cato Ridge urban fringe development; it was therefore important for the researcher to solicit the views of these industries on the development and sustainability of Cato Ridge as an urban fringe. During an interview conducted with Assmang's representative it was indicated that Cato Ridge was a suitable location for Assmang which produces Ferro Manganese. Furthermore, the respondent stated that, as a company, they endeavor to ensure that their development processes take the overall wellbeing of their surrounding environment into account. Their philosophy statement states they stated that they are " committed to conducting business in a manner that takes into account the social, economic and natural environment in which it operates, and to integrating environmental management into all its activities". The respondent said that in order to ensure sustainability, it is important for industry to adopt a philosophy that takes Cato Ridge's environmental and socio-economic milieu into account, rather than operating solely in the interests of the company. Furthermore, the respondent stated that the company conducts its activities in a manner that does not compromise the

integrity of the environment by avoiding pollution as much as possible and also by training its employees to be conscious of environmental health. The respondent indicated that in order to promote sustainable development, it is important for industry to maintain good relations with the government, the private sector and the general public, because sustainable development should be a joint initiative.

5.3.2.3 Local Businesses

Cato Ridge has a number of formal and informal businesses. These businesses also play an important role in determining the sustainability or lack thereof of development in the area. Local businesses are important for the economic growth of any area. The researcher conducted interviews with local businesses in Cato Ridge in order to understand their perspective of development in the urban fringe and their role in sustainable development initiatives. A clothing store owner indicated that Cato Ridge offered great opportunities as there was less competition than in the city centre. However, this respondent noted that the lack of adequate infrastructure, as well as insufficient support for local businesses were a challenge. The store owner felt that investors paid less attention to businesses in urban fringe areas, perhaps because their markets are not as flourishing as those in the city centre. One of the informal business owners in the area also indicated during an interview that there was very little support from government or relevant organisations for businesses in Cato Ridge. This respondent added that the poor infrastructure and services, crime and the current market position in this area makes it difficult to access bank loans, as the banks are not convinced of the long-term feasibility of doing business in Cato Ridge.

Business owners were concerned about the market size, which hampers their growth. Another issue was the need for constant travel to the city centre for supplies. A small business owner stated that in order for businesses to promote sustainable development in Cato Ridge, they need to create jobs for local residents, protect the environment in the course of their operations and have a close working relationship and good communication with government in order to ensure that the policy framework is supportive of business and industrial development activities.

5.3.2.4 Development Organisations

Development organisations are important contributors to development and land use change in Cato Ridge. Development organisations facilitate development in different ways through funding and other support systems. The Industrial Development Corporation (IDC) supports the SAFAL industrial development in Cato Ridge. The IDC representative who was interviewed observed that Cato Ridge is fast growing area that is ideally located between Pietermaritzburg and Durban. It is also a non-metro area (unlike Pietermaritzburg or Durban); the IDC is keen to promote sustainable development in non-metro and rural areas. Furthermore, Cato Ridge is also not as congested as highly populated metro areas, although finding suitable land may be a challenge (depending on an industry's needs). In terms of measures to promote sustainability in Cato Ridge as an industrial hub, this respondent felt that there was a need to develop more large scale, high impact, sustainable industries which create more jobs. This can be achieved by providing adequate bulk infrastructure, technical support and the required skills. An adequate market for new industries is also required, as it will not be sustainable to develop industries which do not have a market to sell their products. It could be argued that as markets for industrial products tend to be large and spread across the country, the growth of industries in Cato Ridge will lead to increased demand for adequate accessibility and mobility.

5.3.2.5 Ward Councilor on behalf of the Community

Ward Councilors are also key informants in terms of community development needs. An interview with one of the ward councilors in Cato Ridge revealed that one of primary concerns expressed by the community is inadequate service delivery. There is a need for proper infrastructure such as road links, and basic services such as water and electricity in the surrounding rural areas. The respondent also stated that being located in the urban fringe tends to slow down the delivery of services as the urban fringe has a long history of neglect by government officials. In order to work towards sustainability the respondent felt that development policies and guidelines should be concerned with meeting people's basic needs and that, community members should participate in development decisions that impact their lives.

5.3.2.6 Environmentalist's Perspective

The researcher conducted an interview with one of the environmentalists that had been involved in some of Cato Ridge's development projects. The respondent noted that Cato Ridge includes important grasslands that are badly degraded in some areas as a result of over-grazing, infestation with alien plants and agriculture. Asked about environmental opportunities in Cato Ridge, this respondent noted that because the area has been earmarked for industrial development and forms part of the N3 corridor, it receives attention from the national and provincial governments. There is therefore potential within such development to improve environmental goods and services through innovative planning and the rehabilitation and/or enhancement of wetlands. Open spaces can be retained within the areas to be developed and most of this land could be rehabilitated. Turning to existing land uses that threaten the environmental health of Cato Ridge, the respondent felt that heavy industry located to the north of the N3 has the potential to cause serious pollution and is a threat to both human and environmental health. The legacy of the now defunct mercury recycling facility operated by Thor Chemicals remains and is unresolved. Cleaner technologies could alleviate environmental problems. Use of land for logistics and warehousing has the potential to provide substantial economic benefits without undue environmental compromises.

In terms of environmental policies for Cato Ridge, the respondent felt that the area is adequately policed by the environmental authorities. The Municipality participates actively in Environmental Impact Assessment (EIA) and planning processes and is generally opposed to development to the south of the N3. Low density housing and agriculture are favored but the land in the urban fringe has poor agricultural potential. In response to sustainability initiatives by both the private and public sectors to protect the environmental integrity of Cato Ridge as an urban fringe, the respondent stated that large areas of land have been identified as Durban Metropolitan Open Space System (DMOSS) areas and development of this land has been restricted. Some private developers have been sensitive in their treatment of the environment in their designs. However, no specific measures have been put in place to formally protect the environment. The respondent felt that challenge of environmental sustainability in Cato Ridge as an urban fringe development was that grassland and wetlands are threatened by agriculture, neglect and poor planning; therefore planning will be the key to sustainability.

5.3.3 Existing Developments and Land Uses in Cato Ridge: Sustainability Challenges and Opportunities

5.3.3.1 Industrial Development

The Cato Ridge Industrial Precinct is currently zoned general industrial, which covers much of the existing developments along Eddie Hagan Drive, special industrial, covering and surrounding the existing abattoir, and some service industries north of the railway alignment. In an interview conducted with one of eThekwini Municipality's town planners, it was noted that these industries play an important role in terms of providing economic opportunities by creating jobs and promoting local economic growth as well as the overall regional economic growth of eThekwini Municipality. The respondent added that Cato Ridge is attractive and valued as an industrial hub because a large portion of the land in the area is undeveloped; its location along the N3 corridor is an added advantage. However, owing to the limited existing development and the scattered nature of industrial developments within the area, there is a lack of interrelation and interconnectivity of land use activities. The researcher concluded that this is the result of a lack of planning and enforcement of zoning policy and regulations in the urban fringe that would ensure land use integration. This type of disorderly and unplanned development is found in urban fringe areas around the world. Therefore it is important to work towards the integration of development activities in order to achieve sustainability.

During interviews with planners and owners of industries in Cato Ridge the researcher identified some of the negative factors that have an influence on the further development of the Cato Ridge Industrial Precinct. One of the factors that were evident during field visits was the steep topography of the area. This makes building a production facility extremely costly. Another factor is the provision of appropriate support services. The lack of services such as appropriate road networks, electricity and water is a major challenge for industrial development. Some of the interviewees in the industrial sector pointed out that one of the major challenge they face is transportation. Since they are located in the urban fringe, it becomes costly for them to transport goods to and from the city centre.

5.3.3.2 Commercial Development

Cato Ridge has a number of formal and informal commercial businesses. These can be found in the small economic node in the area shown in Figure 5.1 below. The small business centre serves the local population as well as people from the surrounding rural areas. In an interview conducted with one of the small business owners, it was indicated that there were numerous negative and positive aspects of being located in the urban fringe. One of the advantages was that since Cato Ridge is far from Durban's CBD, most consumers rely heavily on local shops. However, there is a lack of opportunity to grow, as the market is limited; therefore, the growth of local business depends heavily on the expansion of the urban fringe area itself. There are also bigger stores such as Pep and SuperSpar within the area.

Figure 5.1: Formal Retail Business in Cato Ridge (Source: Researcher's personal collection)

Near to these stores, informal traders sell fruits and vegetables to local residents. Business owners also complained that inadequate public transport hampers effective economic activities. According to Weisbrod (2009:6), public transport services enable mobility, influence development and land use patterns, create employment opportunities, increase economic growth, and uphold public policies on the use of energy, air quality and carbon emissions. In an interview conducted with one of the business owners in Cato Ridge, the interviewee pointed out that, when consumers are able to save on transportation costs, their consumption patterns change. Furthermore, the less, employees spend on transportation, the more businesses can save on wage costs. The eThekwini Municipality's Local Area Plan (LAP) for Cato Ridge identified the following problems and challenges for businesses and industries: electricity provision; inconvenient road linkages; waste water treatment constraints; historical and existing levels of pollution; a lack of skills amongst local community members; high levels of crime; and slow planning approval.

5.3.3.3 Residential Development

The existing zoning covering the Cato Ridge Village consists of special residential covering all existing development as well as presently undeveloped areas, except the small area adjacent to the N3 underpass for intermediate residential; substantial commercial areas covering the existing limited development, as well as additional areas around the N3 interchange (the latter includes a 'business park'); widely dispersed 'administration' mainly covering existing amenities; existing residential development north of the N3; and the railway line within the railway reserve. While the existing zoning allows for significant additional residential and commercial development, no attempt appears to have been made to provide a 'village centre', appropriate entrance features or additional recreational development.

According to the eThekwini Municipality (2010), the development of the Cato Ridge Village is expected to be influenced by the following issues: demand for additional residential development; potential for accommodating additional residential development; eliminating truck traffic and light industrial development intrusion; applying urban design principles to any future development of the village; creating appropriate entrance features; creating a green barrier towards the N3, railway and industrial development; and

establishing a civic centre.

5.4 Cato Ridge Urban Fringe Sustainable Development Challenges

In order to achieve sustainable development in Cato Ridge it is important to identify and understand the development challenges in the area. During the course of interviews with stakeholders, the researcher was able to identify numerous development challenges in Cato Ridge. The key development challenges confronting the area can be summarised as follows:

5.4.1Complex Issues of Land Ownership and Administration

Various parts of the land in Cato Ridge are owned by different entities. These include Assmang, SAFAL and farm owners, amongst others. In an interview with one of the eThekwini Municipality's town planners it was stated that it is often difficult to implement development projects because of the complex land ownership situation and conflicts of interests that result from this complexity. A transport planner at eThekwini Municipality stated during an interview that because the Municipality owns the primary, but not most of the secondary road networks, the planning and implementation of road network strategies is difficult. Different land owners do not always have the same vision in terms of preferred development activities. Failure to reach common ground may lead to a standstill in development progress or a situation wherein whoever has more influence either economically or politically on the development direction in the area takes over.

5.4.2 Informal Development

Informal development refers to development that takes place without government or the relevant land owner's permission. The eThekwini Municipality is faced with the challenge of dealing with light industry intrusions in the area. One of the Municipality's town planners interviewed, stated that such informal development hampers the Municipality and developers' ability to implement coordinated and controlled development in the area. There are many reasons for the occurrence of informal development; one could be the government's failure to enforce regulations and ensure, through a follow up process, that land is not developed without their approval. However corruption, an increasing population and the urgent demand for land often render such situations beyond government's control.

5.4.3 Transportation and Mobility

During the interviews, respondents from the public sector, business owners and community representatives expressed concern regarding the transportation challenges facing Cato Ridge. An eThekwini Municipality transportation planner revealed that transportation planning for the urban fringe areas is a challenge in terms of cost. The respondent explained that because of low population density levels in Cato Ridge and other fringe areas in general, the tax base for public and private transportation is low and is insufficient to support the construction and maintenance of transportation infrastructure. Furthermore, according to the respondent, government tends to give first preference to transportation investment and initiatives in the highly populated city centres. In an interview conducted with one of the supervisors at Cato Ridge Truck Stop, the respondent noted a lack of adequate road infrastructure for trucks. Narrow and unpaved roads impacted on truck traffic within the area. Another concern was the lack of good transportation to and from Cato Ridge. Commuters in the area noted that it costs a great deal for them to travel to the city centre to access goods and services that are not available locally. The existing local road network is limited and consists mainly of priority intersections. The introduction of new developments in the area would require roads to be widened and upgrades to intersections.

5.4.4 Service Delivery

The lack of basic services such as water and electricity is a threat to the community and businesses. Poor infrastructure also hinders sustainable development. In an interview with one of the ward councilors, the respondent indicated that service delivery in the urban fringe of eThekwini Municipality is very slow and that there is a severe lack of services in the area. The respondent also indicated that there was an imbalance in terms of service delivery between the city centre and the more urbanised parts of the urban fringe and the rural components of the area. Inadequate service delivery is a challenge to environmental, economic as well as social sustainability in the area.

5.4.5 Interrelation of Land Uses in the Urban Fringe

More often than not, urban fringe developments are characterised by mixed land uses, wherein different types of land uses coexist and function. There is usually a mixture of residential, commercial, industrial and agricultural activities, amongst others. This is the case in Cato Ridge. Industrial, commercial, and agricultural activities are found in the area.

However, because of poor development controls, some of these developments tend to exist in isolation and are scattered around the area. It is difficult for scattered land use activities to have an effective relationship in which they can benefit from one another in various ways. In an interview with the ward councilor it was indicated that because of some industries' dispersed location, it was difficult for local residents and businesses to have an economic relationship that explored all possible benefits.

5.4.6 Poverty in the Outer West Region

The areas in the OWR suffer high levels of poverty. One of the eThekwini Municipality's town planners stated in an interview that, as Cato Ridge is an industrial hub and an area with potential further industrial development, the surrounding areas as well as Cato Ridge itself depend on the area for poverty alleviation; poverty alleviation strategies therefore need to be incorporated into planning strategies for the entire OWR.

5.4.7 Issues of Governance

Lack of good governance is one of the stumbling blocks in achieving sustainable development. The lack of policies to guide and address urban fringe development issues is one of the major challenges for sustainability in urban fringes. In an interview with one of the local small business owners, the respondent observed that the government was not doing enough to assist small businesses in the urban fringe, and that there was also a lack of direct investment in small businesses or infrastructure upgrade to ensure they are able to access credit. One of the ward councilors interviewed by the researcher felt that there was a lack of good governance in terms of engaging with local communities in decision-making processes, and that communities in the urban fringe did not have a strong participatory relationship with the government. This respondent added that government policies are not sufficiently enforced in terms of controlling pollution in the area, which has a negative impact on the local community. Furthermore, the respondent felt that there was a lack of good governance in terms of social housing provision and service delivery.

5.5 A response to the call for Urban Fringe Sustainability by eThekwini Municipality

The eThekwini Municipality has various plans and strategies to guide overall development activities and processes. These are geared towards achieving integration and long term sustainability. Although the Municipality has not developed specific policies for urban fringe areas, these areas are included in general planning.

5.5.1 Development Plans

In response to the call for sustainable urban fringe developments, the eThekwini Municipality formulated and adopted planning guiding tools such as the Integrated Development Plan (IDP) and the Spatial Development Framework (SDF). In an interview conducted with a municipal planner, it was indicated that these policies are crucial instruments for planning approaches and strategies for sustainable development in Cato Ridge. As the perceptions and intentions of the Cato Ridge urban fringe were expressed in these documents, the researcher analysed them and the questions posed during the interviews took these documents into account.

5.5.1.1 An Overview of eThekwini Municipality Integrated Development Plan

According to the eThekwini Municipality (2010) the vision of the City of Durban is to be "Africa's most caring and livable city by 2020".This would enable citizens to: (a) have ease of movement in the city; (b) enjoy a safe environment in all parts of the municipal area; (c) afford what the city offers (d) enjoy a clean and green city; (e) have access to economic opportunities; (f) enjoy homely neighborhoods; and (g) have access to services, in particular municipal, health and education especially on a metropolitan scale. The Municipality's long-term development framework has been formulated with the intention of adopting sustainable practices to meet the socio-economic, environmental and infrastructural needs of its citizens. Sustainability and integration are major elements of the IDP.

5.5.1.2 An Analysis and Overview of eThekwini Municipality Outer West Spatial Development Framework

According to the eThekwini Municipality (2010) the Municipality's SDF is the most important spatial strategic response to the development context, needs and vision of the municipality as described in the IDP. The SDF therefore pictorially depicts the drivers of the IDP, showing the City's investment intentions and development management approach. It is the underlying document that provides for the implementation of the eight plans which respond to the City's growth demands. One of the key features of the Outer West SDF (OWSDF) relevant to this study is the concept of an Urban Development Line (UDL). According to the OWSDF, the UDL is used not only to demarcate the extent to which urban development will be permitted within the metropolitan area in the long term, but to promote a more convenient, efficient, equitable and sustainable settlement form. Whilst the line indicates the outer limit to which urban development will be restricted, there are areas within the UDL that will not be allowed to be developed (i.e. environmentally sensitive areas). In an interview with one of eThekwini Municipality's town planners, the respondent stated that a perfect delimitation of the UDL, as can be presented on a conceptual map, cannot be as easily evident in the practical sense. According to the respondent this is a result of informal developments that already exist and development that existed before the formulation of the UDL. Therefore the control and management of the UDL will be a challenge to the Municipality.

According to the OWSDF (2010), the UDL indicates that there is a rural periphery or surrounding area that differs in character and requires different servicing, supports different lifestyles and has different servicing constraints. The researcher concluded that the eThekwini Municipality's ability to effectively manage the UDL has an important bearing on managing and controlling boundaries that determine the entry of urban sprawl development into the urban fringe.

5.5.1.3 Managing Land Uses in the Urban Fringe to Ensure Sustainable Development

(a) Industrial Land Uses

The Municipality intends to prepare an industrial precinct plan and Town Centre precinct plan for Cato Ridge/Harrison to guide the precise location of industrial and mixed use development in order to determine the realistic impact on waste water and traffic infrastructure. It is important that the Municipality adopts a strict plan for the location of industries, as past experience has shown a lack of effectiveness in ensuring location according to plan. One of the researcher's concerns during field observation was the issue of truck traffic congestion in Cato Ridge illustrated in Figure 5.3 below, and trucks using narrow roads. Another concern was the observation of damage caused by trucks to unpaved roads in the area, illustrated in Figure 5.4 below. In response to these and other concerns the Municipality aims to develop a public rating system, where industry is investigated, monitored, rated and rewarded for being environmentally concerned.

(Figure 5.3: Usage of narrow roads by trucks Figure 5.4: Damage on unpaved roads caused by trucks)

In terms of industrial land uses in the Cato Ridge urban fringe development, the Municipality intends to set up a multi-disciplinary team to assess all potential development according to specific criteria to determine whether the proposed activity will benefit the area in terms of social, environmental and economic development. During an interview with one of the planners in eThekwini municipality it was indicated that this could create a situation where different industries would benefit through an exchange of goods and services.

(b) Commercial Land Use

During an interview with one of the eThekwini Municipality's planners, the respondent stated that, as outlined in OWSDF, the intention of the municipality is to upgrade and revitalise the current Cato Ridge Village to a Town Centre urban node supporting local community and commercial facilities. The respondent felt that commercial facilities will only succeed when the industrial node is fairly well-developed, as the current buying threshold is low. The development of commercial land uses in urban fringes is important in creating a strong local economic base.

(c) Residential Land Use

According to the eThekwini Municipality (2010), residential densities for traditional rural areas should be measured in order to maintain a rural lifestyle and discourage large scale densification close to environmentally sensitive areas on steep land. A respondent from eThekwini Municipality indicated that this was important for social needs as people's

lifestyles need to be taken into account. Furthermore, overpopulation needs to be avoided in order to prevent depletion of resources in order to ensure sustainability. The Municipality is also proposing to cluster rural housing closer to rural service nodes to encourage improved use of infrastructure. The respondent stated that promoting accessibility to services can reduce travel costs and pollution.

5.6 The Public-Private Edge to Sustainable Development in the Urban Fringe

According to Jinbai and Shifeng (2005), the development of urban fringes is not only about transformation from rural to urban land uses; this is a multifaceted process that is characterised by many factors that include land ownership patterns, transferring land from one owner to another, development typologies, and regulatory measures, as well as their enforcement. In the case of Cato Ridge, because of the varied forms of land ownership, it is difficult to assign responsibility for development activities to a particular party. Both the public and private sectors play a major role in the development of Cato Ridge. While the public sector is mainly concerned with development that meets the needs of the people and is environmentally cautious, fringe developments by the private sector have the tendency to seek to maximise earnings and increase sellable land. This leads to the violation of land use standards and decreases the amount of land available for basic facilities. Weak governance is therefore also responsible for poor urban fringe development (Jinbai and Shifeng, 2005).

Urban interventions, and for that matter, urban development, are no longer confined to the State; but go beyond national borders (Clark, 2003). Resources are allocated to areas where the market is expected to perform well. This makes it imperative to determine the boundaries between the private and public sectors' responsibility for urban sustainability (Ofosu-Kwakye, 2009). This is pertinent to Cato Ridge, as both sectors own land in the area.

Furthermore, there is often conflict between the public and private sectors' priorities for urban development. The urban fringe, being undeveloped, offers an opportunity for new ideas and innovation; this can exacerbate such conflict. The private sector is profit-driven, whilst the public sector is concerned with people's general well-being. Urban fringe sustainability requires that public and private sector priorities be rationalised in order to

allocate resources efficiently. The fact that the public sector needs investment from the private sector or other countries for successful development cannot be ignored. These investments take the form of finances, resources or skills. These investment relations therefore promote public-private partnerships that can have both positive and negative outcomes. According to Ofosu-Kwankye (2009), as the private sector buys in to public sector planning and development initiatives are promoted, there is a need to strengthen institutional structures in the public domain. This is based on arguments that planning on a metropolitan scale has not been as effective due to political instability and other governance challenges (Ibid).

5.7 Overall Assessment of the Sustainability of Cato Ridge Urban Fringe Developments

Although there is no fixed consensus on standards to measure the achievement of sustainability, this research study viewed sustainability as encompassing the general wellbeing of environmental, social, and economic factors. It is from this perspective that the researcher has assessed the sustainability of the development of Cato Ridge as an urban fringe area. The researcher's data collection and analysis of the sustainability of Cato Ridge urban fringe developments have revealed that sustainability in Cato Ridge is relatively achievable, as one could argue that the advantages outweigh the disadvantages. Although challenges exist, Cato Ridge's development is not in complete disorder compared with other fringe areas. Industrial developments and other land uses in the area appear to be geared towards sustainability in their day-to-day operations.

One of the positive factors is that the eThekwini Municipality has taken the initiative to develop plans for the future development of Cato Ridge; these plans aim to maximise the area's potential and ensure sustainability through integrating the environmental, economic and social aspects of development. However the lack of specific policy to guide urban fringe developments is a hindrance to truly maximising the potential of urban fringe areas, and creating innovative urban fringe developments. Furthermore, the different stakeholders in the development of the Cato Ridge urban fringe are aware of the issue of sustainability and their development strategies are well channeled towards achieving sustainability.

5.8 Conclusion

For the researcher, one of the most important observations was that developments in Cato Ridge are not influenced by any single factor; rather many forces influence development in the area. Therefore, to understand the development opportunities and challenges confronting Cato Ridge it is important to understand the perspectives of different stakeholders that influence development in the area. In the researcher's interviews with different respondents, it was evident that the urban fringe meant different things to different people and organisations.

For town planners in eThekwini Municipality, the Cato Ridge urban fringe was a place of innovation and creativity in terms of urban design. A town planner stated during an interview that, the Cato Ridge urban fringe is a place to explore new forms of integration, by not repeating the same mistakes made in the past when planning for the core city centre. This respondent observed that as the city expands into the urban fringe, it becomes imperative for the fringe area to be sustainable in order to support its development and avoid an overreliance on the city centre for services and economic opportunities. This would reduce travel costs and the pressure on the city centre to cater for people's socio-economic needs.

For residents, the Cato Ridge urban fringe was a convenient place to be closer to job opportunities both in Cato Ridge and Durban's core city centre. One resident stated that it was a place of peace away from the busy and vibrant city lifestyle. For business owners, the fringe was a place to serve the needs of the market within the fringe area with less competition from the thriving big businesses in the city centre. The urban fringe also offered lower rates on land than the city centre. For industries, Cato Ridge was a place to acquire cheap land in order to run big industrial activities that were not in close proximity to the land uses in the city centre, as this would not be permitted. For environmentalists, the urban fringe is a place where the first preference should be to promote protection of the natural environment and resources for sustainability rather that bombarding the area with developments and industries that would lead to land degradation. Environmentalists view the area as a place to preserve open space systems for the promotion of a healthy living environment. However since the scarcity of land cannot be ignored and development is inevitable, protecting the environment should be a priority in development processes.

Attempts to achieve urban fringe sustainability or to mitigate the challenges thereof therefore need to take all these perceptions into account, as they have a significant bearing on current and future urban fringe development trends.

6 CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter presents a summary of the study as well as recommendations for ensuring the sustainability of urban fringe developments in eThekwini Metropolitan Municipality and similar contexts. The main objective of this research study was to assess the sustainability of urban fringe developments in the context of sprawling metropolitan cities, using the Cato Ridge urban fringe development in eThekwini Municipality as a case study. The researcher set out to formulate a conceptual framework that was applicable to urban fringe developments to guide the assessment of their sustainability. Based on the empirical case study of the Cato Ridge urban fringe development, the researcher presented key findings and discussion concerning the sustainability of urban fringe developments, before drawing conclusions and providing recommendations.

6.2 Synopsis of the Research

The main aim of the research study was to assess the sustainability of urban fringe developments in eThekwini Metropolitan Municipality, using Cato Ridge as the case study. Having formulated the aim of the study and affiliated sub-objectives, the researcher formulated relevant research questions. This ensured that all the objectives were met once all the relevant questions were answered.

The research study also presented a conceptual and theoretical framework centred on concepts such as urban growth, urban sprawl, urban fringe and sustainability. This served as an important and informative guideline for the critical interpretation of precedent case studies on the sustainability of urban fringe developments locally and internationally. The precedent studies focused on international and national experiences of urban fringe developments. They revealed how different cities were confronted by different challenges and the solutions they were able to formulate within their given contexts in order to ensure the sustainability of their urban fringes.

The empirical analysis of the Cato Ridge urban fringe development in eThekwini Metropolitan Municipality was based on primary and secondary data. The collection of data for the study was an important undertaking that had to be carried out diligently in order to ensure that the main research question is answered in the best possible way. Having

collected all the data through various methods the next critical step was to analyse it and make a presentation of the findings. The findings and analysis of the Cato Ridge case study clearly outline the perspectives of different stakeholders in respect of the sustainability issues affecting the area. Having presented the findings, the researcher was able to draw conclusions as well as answer the main research question and its sub-questions.

6.3 Recommendations

Urban fringe developments are faced with different challenges as they receive less recognition than city centres in terms of socio-economic development. However, cities have evolved over the years and urban growth has increased. Consequently, the social, economic and environmental role of urban fringes has been recognised by town planners, developers and other stakeholders in urban governance. Therefore, urban fringes are becoming areas of significant potential for future city development in terms of social and economic activities. However, it is important that these developments take place in a sustainable manner by integrating the environmental, economic and social imperatives of development. Based on the precedents on urban fringe developments internationally and locally and the empirical assessment of the Cato Ridge urban fringe development, the following recommendations are provided in order to ensure the sustainability of urban fringe developments in eThekwini Municipality and similar contexts:

6.3.1 Recommendations for Environmental Sustainability in the Cato Ridge Urban Fringe

In order to ensure environmental sustainability in the urban fringe, planning must focus on the protection of the environment, by ensuring that spatial planning and land decisions consider environmental aspects on a long term basis. The selection of land uses and their location, as well as functions, should be managed and monitored to ensure that environmentally sensitive areas are not harmed or exposed to risk. For instance, in the case of Cato Ridge, environmentalists argued that physical plans should ensure that future developments take place outside ecosystems, such as redeveloping already transformed land (i.e. recycling rather than consuming new open space). Furthermore, zoning schemes or land use management schemes should be consistent with, and give effect to spatial development plans and frameworks, to include appropriately restrictive zoning categories for

ecologically important areas, including threatened ecosystems.

Pollution controls and regulations should also be enforced in the urban fringe by frequently and actively monitoring the area, to ensure that industries, businesses and the community at large are taking responsibility for their actions towards the environment. The Municipality should also improve waste management and sanitation to ensure a healthy environment for people, animals and plants. Attempts should be made to use environmental resources in a manner that does not compromise future generations' ability to use them. Environmental sustainability in the urban fringe can also be achieved through good open space management systems. Open spaces can be valuable assets to the community as they provide many environmental, economic, cultural, and social benefits. Although their maintenance can be costly, it is very important that the Municipality ensures their existence and protection.

Furthermore, planners need to work with ecologists to connect people, place and environment within the urban fringe areas. This will enable an understanding of where humans are positioned within the ecosystem and how their actions affect the environment either negatively or positively. This will be enhanced by ensuring that local people are part of initiatives relating to their place and environment. Therefore, for both planners and ecologists, urban fringes provide opportunities for the positive conversion and transformation of the natural environment to a built environment.

6.3.2 Recommendations for Socio-Economic Sustainability in the Urban Fringe

Urban fringe developments should ensure economic sustainability on a long term basis. Mechanisms should be put in place to ensure that poverty is reduced in fringe areas, through job creation. In order to ensure economic sustainability, planners should design strategic plans to ensure that small businesses in the urban fringe are supported and given the opportunity to grow as well as maximise their profits. To promote economic sustainability in urban fringe areas, the Municipality should focus on the effective delivery of services such as water and electricity in order to attract business opportunities and investment. Effective mobility and connectivity within and outside the urban fringe as well as a good transportation system will also enhance economic sustainability.

In terms of social sustainability, urban fringe developments should be people-centred and consider the overall wellbeing of people living in these areas. It is important that the Municipality, relevant government officials and the private sector consider and understand local communities' needs. Development processes should promote community participation, rather than assuming people's needs and how best to meet them. It is also recommended that social sustainability initiatives in the urban fringe be designed specifically for the area, rather than adopting a one-size-fits-all approach. It is important to understand the social needs, cultural diversity and lifestyle patterns specific to an urban fringe.

6.4 Final Conclusion

Most cities around the world are subject to urban growth and expansion. This is the result of population growth and economic influences. As cities grow, their capacity to accommodate different land uses diminishes. Therefore, development begins to stretch outwards into the urban fringe area. As urban fringes are at the receiving end of cities' unpredictable expansion, they are often characterised by mixed use developments that do not always have an ordered and clear spatial content and design. Urban fringes are therefore utilised by different people and organisations from the public and private sectors, each with their own intentions. This research study argues that as cities continue to grow, urban fringe areas will serve as spaces to accommodate their expansion and municipalities and relevant stakeholders should therefore pay attention to this phenomenon. Biller (2008) notes that, urban fringe areas seem to be forgotten spaces; political engagement tends to be weak and policy rarely explicitly considers these areas.

Although there is no clear cut definition of and standards to measure sustainable development, this study has been guided by definitions from the literature that consider sustainability as encompassing three major aspects, namely, environmental, economic and social dimensions. Striving to achieve sustainability in the urban fringe is important not only for the area itself, but for the city at large, as the two have an interactive relationship. The urban fringe can also be seen as the future of the city's development. Therefore, long term mechanisms for sustainability need to be put in place.

There is a need for an urgent response to the call for sustainability in urban fringe areas as they are vulnerable to spatial change and disorderly development. In the case of Cato Ridge, sustainability is challenged by several environmental, economic and social issues. This study has concluded that sustainability in the Cato Ridge urban fringe can be achieved through the collaboration of different stakeholders with each playing their role effectively. Furthermore, these stakeholders must promote inclusive development and avoid one-size-fits-all approaches. Urban fringes are unique urban spaces that require suitable innovative development approaches in a context of heterogeneity and diversity. In order to achieve sustainability, it is important that the role of all stakeholders in these areas is clearly understood, and that the solutions stakeholders recommend to achieve such sustainability are explored and maximised.

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Appendices

Appendix A: Locality Map showing Cato Ridge

Appendix B: Interview Schedule for eThekwini Municipality Town Planning Officials

1. What distinctive characteristics define Cato Ridge as an urban fringe area according to eThekwini Municipality?
2. How does urban sprawl affect eThekwini Municipality's urban fringe areas, and what mechanisms are put in place to control such sprawl?
3. What are the advantages and disadvantages of Cato Ridge as an area located in the urban fringe?
4. What socio-economic relationship if any, does eThekwini Municipality's urban centre have with Cato Ridge as its urban fringe?
5. What are the preferred land uses for Cato Ridge as an urban area according to eThekwini Municipality? Are those land uses existing and effective in Cato Ridge? Please elaborate on your answer
6. What long term goals does the Municipality aim to achieve for Cato Ridge as an urban fringe?
7. How does eThekwini Municipality define sustainability for its urban fringe areas?
8. What are the socio-economic and environmental challenges facing Cato Ridge as an urban fringe area where sustainability is concerned?
9. What planning policies are put in place to address sustainability issues in Cato Ridge and overall urban fringes of eThekwini Municipality?
10. What challenges does the Municipality face in implementing such plans and policies?

Appendix C: Interview Schedule for Private Sector Respondent in the field Environmental Management

1. How would you describe the general environmental status of Cato Ridge as an urban fringe?
2. How does that status negatively or positively affect the socio-economic status of Cato Ridge?
3. What are the Environmental opportunities and threats of Cato Ridge as an urban fringe?
4. What existing Land uses threaten the environmental health of Cato Ridge and what Land uses if any embrace environmental health and sustainability?
5. How effective are Environmental management policies and regulations for Cato Ridge as an area in the outskirts?
6. What sustainability initiatives are taken by both the private and public sector to protect the environmental well-being of Cato Ridge as an Urban Fringe?
7. Is there any neglected land in Cato Ridge? If so describe how and explain the possible reasons and implications thereof?
8. Is Cato Ridge currently affected by Urban Growth and Urban Sprawl if so how? How is it most likely to be affected in future?
9. What factors challenge Environmental sustainability in Cato Ridge as an Urban Fringe?
10. Are all relevant stakeholders participating in ensuring environmental sustainability in Cato Ridge?
11. What Environmental relationship exists between Cato Ridge and its core city centre? For example in terms of agriculture, or as a landfill site

12. Is there a balance in the distribution of services (infrastructure, water, electricity)? How does that balance or imbalance have an impact on Cato Ridge's environmental status?

Appendix D: Interview Schedule for Cato Ridge Ward Committee

1. What are the social, economic and environmental issues facing Cato Ridge?
2. Do you have access to all services offered by the Municipality? Give reasons for your answer.
3. Are the services (water, electricity infrastructure) distributed equally within Cato Ridge? Please elaborate on your answer
4. What are the disadvantages and advantages of Cato Ridge as an area located outside the city centre of Durban (outskirts)?
5. What economic activities and opportunities (e.g. local businesses) are available in your ward?
6. Does the community benefit effectively from these opportunities (e.g. in terms of employment)?
7. Does your ward committee participate in the sustainability initiatives of eThekwini Municipality?
8. What mechanisms are in place to ensure that Cato Ridge benefits from the sustainability initiatives of eThekwini Municipality?

Thank you

Appendix E: Interview Schedule for eThekwini Municipality Transport Planner

1. How would you describe the current transportation system of Cato Ridge in general?
2. How effective is the transportation network (for both public and private transport) within Cato Ridge itself?
3. What are the main reasons causing you to create and/or upgrade accessibility to and from Cato Ridge and the city centre Durban?
4. Is there a high percentage of vehicles travelling from Cato Ridge to the city centre? If yes, what are the environmental implications thereof?
5. As Cato Ridge is located in the outskirts of Durban, how does this affect transportation infrastructure provision and management?
6. As Cato Ridge develops and grows, what factors do you think should be considered to ensure a sustainable transportation system and environment for Cato Ridge?

Thank You!

Appendix F: Interview Schedule for Industries

Name of Industry: ..……..

Type of Industry……

Address…….

1. Why did you choose to locate your Industry in Cato Ridge?

2. Does your Industry use local labour force? If so how many local employees are employed in your Industry?

3. What role does your Industry play in Cato Ridge and in eThekwini Municipality as a whole if any?

4. What economic contribution does your Industry make within Cato Ridge?

5. What are the advantages and disadvantages of your Industry being located in the urban fringe of eThekwini Municipality?

6. What is your Industry doing to mitigate negative environmental impact in Cato Ridge?

7. How economically sustainable is your Industry in Cato Ridge?

8. Any Further Comments?

Thank You

Appendix G: Interview Schedule for Commercial Enterprises

Name of Commercial Enterprise:…….

Type of Commercial Enterprise ……..

Address:……

1. Why did you choose to locate your business in Cato Ridge?

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2. How does your business make an economic contribution in Cato Ridge?

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3. How many local residents are employed in your business?

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4. What are the disadvantages and advantages of locating your business in Cato Ridge as an urban fringe of eThekwini Municipality?

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5. How sustainable are commercial activities in Cato Ridge?

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6. Any Further Comments?

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Thank you