UNIVERSITY FOR DEVELOPMENT STUDIES, TAMALE

URBAN LAND USE PLANNING AND ITS EFFECTS ON THE PROVISION OF PUBLIC SANITATION FACILITIES IN THE WA MUNICIPALITY, GHANA

BY

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DECLARATION

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I hereby declare that this thesis is the result of my own original work and that no part of it has been presented for another degree in this University or elsewhere:

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ABSTRACT

There is a connection between urban land use planning and urban sanitation management. The rationale of land use planning is to protect and create attractive urban environments. However, despite the land use planning rationale, there is a sanitation mess in the built environment of the Wa Municipality. This study investigates the implications of land use planning on the provision and management of public sanitation facilities in the Wa Municipality. The study adopted the mixed method of research design which used both qualitative and quantitative data analysis. Field survey, key informant interviews and spatial planning methods were employed to gather primary data. A total of three hundred and seventy four household heads and three heads of institutions were interviewed. The study found that local plans were not available at the time Zone 1 was developed, hence the cause of haphazard development. Some areas with sanitary spaces had sanitary facilities provided by the Wa Municipal Assembly and Zoom lion Ghana Ltd. The study further noted that the sanitary facilities in some neighborhoods are not adequate and also not well spaced. Access to public sanitation facilities is also very difficult for service providers as well as the beneficiaries of the services. It is recommended that the Municipal Assembly would collaborate with the Town and Country Planning Department to educate people on the need and procedures of obtaining building permit before developing their lands through radio programs, and community fora. The Wa Municipal Assembly should acquire lands within the neighborhoods for sanitation purposes. Urban development specialist should also adopt urban renewal strategies to provide sanitary services for unplanned areas.

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DEDICATION

This work is dedicated to my parents; Mr. & Mrs. Bayorbor Abubakari.

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LIST OF ABBREVIATIONS

BLM	Bureau of Land Management
CBD	Central Business District
CBR	Crude Birth Rate
CGSW	Center for Global Safe Water
DPA	District Planning Authority
FAO	Food and Agriculture Organization
FLPMA	Land Policy and Management Act
GIZ	Gesellschaft Für Internationale Zusammenarbeit
GPS	Global Positioning System
GSS	Ghana Statistical Service
JHS	Junior High School
MLGRD	Ministry of Local Government and Rural Development
MMDAs	Metropolitan-Municipal District Assemblies
MOFA	Ministry of Food and Agriculture
MTDP	Medium Term Development Plans
NGO	Non-Governmental Organization
O D	Open defecation
OS	Open space
PPPs	Policies, plans and programs
RCC	Regional Coordinating Council
SDF	Spatial Development Framework
SSNIT	Social Security And National Insurance Trust

TCPD	Town and Country Planning Department
UN	United Nations
UNICEF	United Nations and International Children Education fund
US	United State
USA	United State of America
WC	Water Closet
WGS	World Geographic System
WMA	Wa Municipal Assembly
WSUP	Water and sanitation for the Urban Poor

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

All over the world, there is a strong connection between urban land use planning and urban sanitation management. Improving access to public sanitation facilities in urban areas in developing countries is very significant, but a difficult issue for urban planners (Abubukar, 2017). This means that effective and efficient land use planning is paramount for the provision of public sanitation facilities like public toilets, dumping sites or communal solid waste containers and public urinal pits. Public sanitation facilities are provided by the local council or NGO for the benefit of whoever wishes to use it (Heijnen *et al.*, 2014).

Globally, it is estimated that about 2.4 billion people do not have access to improved sanitation facilities, and in sub-Saharan Africa, about 63.6% of the population lacked access to improved sanitation facilities in 2015 (Abubakar, 2017). In Ghana, 85% of Ghanaians lack access to improve sanitation facilities (UNICEF, 2015). Urban sanitation has become increasingly important as developing countries urbanize rapidly. In developing countries, sanitation issues are complicated by the informal nature of many urban settlements. This decreases the amount of land and space available in urban areas, which depletes the amount of space available for building sanitation facilities and increases the environmental contamination from solid waste (Mulenga, 2011).

Land use planning according to UN-Habitat (2012), is an effective tool in the development of infrastructure as well as the provision and distribution of public facilities. Considering the impacts of land use planning on physical development, some researchers like Boamah *et al.* (2014) have pointed out its (land use planning) essence to be that land-use plans generally ensure a cleaner and safe environment and aims at improving the lives, living environment

and health status of the residence of a given urban area. Land use plans therefore have the potential in averting the nuisance that unsanitary conditions will cause to households. Also land use planning is a key component of urban management. Urban sustainability is directly influenced by land use controls which ensure efficient use is made of urban land (Owei *et al.*, 2010). Afrane (2006) cited in Maxwell (2011) argued that planning for a town is significant because: it enhances aesthetics and serenity in the built environment; it ensures safety and adequate health standards in the space economy; and provides convenience and harmony in the use of space for all land uses.

But, other researchers like Obialor *et al.* (2017) have also looked at the consequences of the failure of land use planning. The failure of land use planning has resulted in structures built anyhow anywhere. Several other sections/neighborhoods of cities are a built up of unregulated, congested, ramshackle housing surrounded by indescribable filth. There are no drainage facilities or solid waste disposal facilities. Mountains of refuse are common features everywhere and they continue to creep increasingly into the limited road spaces. Unsuccessful enforcement of land use plans is one of the reasons of urban sprawl in developing countries, since the enforcement is often corrupt and intermittent in these countries (Owei *et al.*, 2010). Ineffective planning schemes have poor access to sanitation facilities such as refuse bays and collection points, poor access to residential areas and haphazard siting of buildings (Yendaw, 2014). In the Wa Municipality, ineffective land use planning is a major issue of concern to researchers such as Dambeebo and Jalloh (2018) and Abugtane (2015). This has made it difficult to access space for the provision of public facilities with implications on sanitation and health. It is based on this that this study seeks to examine urban land use planning and its effects on the provision of public sanitation facilities in the Wa Municipality.

1.2 Problem Statement

The rationale of urban land use planning systems is to establish the conditions needed to protect and create attractive and efficient urban environments. Urban planning can also ensure the provision and maintenance of public goods, such as land for public uses or community facilities (Nicole, 2007; Bennet *et al*., 2013). A clean urban environment lies on the success of proper urban planning guidelines or the level of enforcement and compliance (Abugtane, 2015).

In the Wa Municipality, compliance to land use planning by local communities is a major worry to land development planners. Boamah *et al*. (2014) argued that noncompliance to building regulations in the Wa Municipality is caused by plethora of factors including socio-cultural, political interference and generally lack of knowledge regarding the importance of physical development planning. As a result, areas demarcated for the development of social infrastructure such as the construction of public toilets, siting of communal containers are often encroached and used for residential purposes (Abugtan, 2015). This is a clear indication that urban land use planning rationale has not been actualized in the Wa Municipality.

The Wa-Township has recorded what could best be described as ‘sanitation mess’ within the built environment (Boamah, 2013). Indiscriminate waste disposals, and open defecation, posing insanitary conditions are common characteristics of the neighborhoods (Boamah *et al.*, 2014). Non adherence to bye-laws particularly building regulations has been a major factor responsible for the insanitary conditions in the Wa Municipality (Osumanu *et al.*, 2016).

Designated areas for sanitation in the Wa Township are provided by Municipal Authorities to manage sanitation, but these designated areas have been encroached upon by individual

land developers due to the growing phenomenon of unregulated development and blatant disregard for zoning regulations within the Wa Municipality (Boamah, 2013). As a result of this situation, sanitation management in the municipality has become problematic. Thus, accessing public sanitation facilities in the Wa Municipality has become almost impossible due to the haphazard nature of physical developments (Osumanu *et al*., 2016).

Against this background, an effective land use planning is crucial for the provision of designated sanitation areas and accessibility to public sanitation facilities to enhance good urban sanitation management. This study therefore investigated the implications of land use planning on the provision of sanitation facilities in the Wa Municipality.

1.3 Research Questions

The general question of the study is: how does land use planning affect the provision and management of public sanitation facilities in the Wa Municipality? The specific questions of the study are:

i. How does physical development conform to land use plans in the municipality?
ii. How does land use planning provide space for sanitation facilities in the municipality?
iii. How does land use planning affect access to public sanitation facilities in the municipality?

1.4 Research Objectives

The general objective of the study is: to investigate the effects of land use planning on the provision and management of public sanitation facilities in the Wa Municipality. The specific objectives of the study are;

i. To examine the conformity of physical development to land use plans in the municipality.

ii. To assess the effects of land use planning on the provision of space for sanitary areas in the municipality.

iii. To investigate the effects of land use planning on the accessibility of public sanitation facilities in the municipality.

1.5 Significance of the Study

Early land use planning studies in the Wa Municipality, such as Land use planning and housing situation in the Wa Municipality, Ghana (Boamah, 2013) and land use planning in Ghana: Implications for food systems in the Wa Municipality, Kuusaana & Eledi (2015) were focused on housing and food crop production respectively. That of land use planning on urban sanitation management especially public sanitation facilities was not looked at all, putting municipal authorities in the situation of lack of any information pertaining to that. This study contributes to knowledge by pointing out the effects of urban land use planning on the provision of designated sanitary areas and accessibility to public sanitation facilities. The study will also help individuals, institutions and the government to get information on the current state of land use planning with regards to provision and accessibility to public sanitation facilities in urban areas of Ghana. The research again will be of importance to policy makers, the Wa Municipal Assembly and other relevant organizations and agencies as far as urban land use planning and sanitation management is concerned. This work piece is expected to contribute greatly towards the achievement of Sustainable Development Goal 3. The findings of this study will also challenge other researchers to further explore the subject matter. Finally the study will add to the existing body of knowledge or database both in academic and professional fields as a secondary data on urban planning with respect to sanitation management.

1.6 Scope of the Study

The study aims at examining land use planning and its effects on the provision of designated sanitary areas and accessibility to communal waste containers and public toilets in the Wa Municipality. The geographical scope of the study is the Wa Municipality in the Upper West Region of Ghana. The study is concentrated in the Wa Township, specifically, the three clustered residential areas (zones) according to town planning. Zone 1 is an indigenous area developed without local plans, Zone 2 is a new developed area, developed with local plans and Zone 3 is a mixed developed area made up of indigenous and new developments. The newly developing area of zone 3 is developing based on local plans. The Wa Municipality is selected due to the fact that the Municipality is challenged with sanitation management as a result of uncontrolled physical development. It is also considered because it is the only municipality in the region experiencing fast urban growth and land use change.

1.7 Organization of the Study

The study is structured as follows: Chapter one is introductory, detailing the statement of the problem, research questions and objectives of the study, significance, scope and organization of the study; Chapter two presents literature review on land use planning and public sanitation facilities; Chapter three describes the study area and the methodology that will be used in gathering data from the field; Chapter four presents findings in the forms of tables, pictures and maps and Chapter five provides information on conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW AND CONCEPTUAL ISSUES

2.1 Introduction

Chapter two presents the literature on land use planning and public sanitation facilities in urban areas. The chapter is divided into three sections. Section one highlights the various studies on the concept of sanitation or public sanitation facilities and the role of land use planning on urban sanitation management. Section two comprises of conformity of physical development to land use plans; the effect of land use planning on the provision of sanitary areas or facilities; land use planning and access to public sanitation facilities; the overview of land use planning; impacts of land use planning and principles of land use planning. Lastly, in the chapter is the literature review of land use planning in Ghana-the three tier framework and land use legislation; theories of land use planning and the conceptualize framework of land use planning and public sanitation facilities.

2.2 Conceptual Review

2.2.1 Sanitation

The definition of the concept of sanitation differs with time, space and context. World Health Organization (2018) noted that sanitation is about ensuring that excreta, sullage and solid waste are treated or disposed of safely. Sanitation ensures a clean and healthy living environment both at home and in the neighborhood. (Lenton *et al.,* 2005, cited in Mulenga, 2011). Sanitation is to develop and maintain clean, safe, and pleasant physical environment in human settlements to promote the social, economic and physical well-being of people Atuahene(2010). Sanitation is a standard and practice of effecting healthy and hygienic conditions in the environment to promote public health and ensure sustainable development. It also deals with a series of interventions designed to improve the management of excreta, sullage, and solid waste (Zomal, 2016). According to Zomal (2016), in the Wa Municipality,

the standard and practice of effecting healthy and hygienic conditions in the environment to promote public health is not effective, therefore causing the insanitary condition in the municipality.

2.2.2 Municipal Waste Management

Municipal Waste is generated from commercial / industrial premises, institutions (schools, hospitals, care homes and prisons) and public spaces (streets, markets, slaughter houses, public toilets, bus stops, parks, and gardens) (Mansoor & Bella, 2016). Globally, at present, 1.3 billion tons of municipal waste is generated annually. Urban environmental planners in developing countries have been bedeviled with challenges in the management of the huge volumes of municipal waste generated in the cities. Municipal waste generation is expected to increase to 2.2 billion tons by 2025 and the challenge will become greater (Kuusaana & Sekyere, 2018). The post-colonial municipal waste management in Ghana is typical of discarding and disposal of waste in open dumps. This practice has contributed to the glaring poor sanitation in the cities of Ghana. The rapid urbanization in the cities of Ghana is linked with rampant waste generation. The current rate of waste generation in Ghana stands at 12,710 tons of waste per day (Mawuli *et al.*, 2018).

A research conducted by Dongballe (2016) in the Wa Municipality revealed that lack of definite disposal points for waste is a serious challenge of municipal waste management in the municipality. This has created room for indiscriminate dumping of waste in street corners, in between houses, in gutters, drains, and water ways. The lack of defined disposal points and facilities for managing municipal waste is a major obstacle in the delivery of good sanitation in the municipality. One of the better ways of solving the municipal waste management crises in the cities experiencing urbanization is through the implementation of effective land use planning guidelines. Land use planning impacts positively on the quality

of the living environment, since one of its objectives is to create an attractive and clean urban environment (Sairinen, 2014). Dambeebo & Jalloh, (2018) noted that the Wa Municipality, like other urban areas in Ghana has implemented land use planning guidelines in order to achieve a sustainable urban environmental development like municipal waste management.

2.2.3 Public Sanitation Facilities

The concept of public sanitation facilities refers to the provision of public sanitation facilities by the local council or NGO for the benefit of whoever wishes to use it (Heijnen *et al.,* 2014). These public sanitation facilities (public toilet and communal containers) are usually sited at sanitary designated areas within the neighborhood. They are located mostly at the Central Business Districts (CBDs), government institutions, transport terminals and low income residential areas. The usage of these public sanitation facilities may or may not involve payment of money.

Public Toilets

Public toilets are toilets open to anybody, in public places or in residential areas: typically there will be a charge for each use. Sometimes charging will be monthly: each user pays for a monthly ticket. Public toilets are found worldwide, in locations like bus stations and markets. Pay-per-use public toilets are most commonly seen in public locations, but may also be constructed in low-income residential areas or in "hybrid locations" serving both residential and transient users (for example, in a low-income community adjacent to a market) (WSUP, 2011). Oyinloye & Oluwadare (2015) noted that public places of conveniences are often thought of as toilets that allow people to meet their sanitary needs in public places such as markets, and transport centers. Public toilets are located for the transient population in all areas of intense public activities such as markets, shopping areas,

transport terminal. The provision of properly managed place of convenience facilities in high density areas consolidates the government efforts in managing waste. The lack of quality and adequate public toilets in urban areas compelled millions of people to practice open defecation, which is manifestation of poor urban sanitation planning (Zomal, 2016).

Center for Global Safe Water, Sanitation, and Hygiene's (CGSW) in 2016 revealed that seventy three percent of the urban population in Ghana relies on public sanitation facilities. Government of Ghana regulations require that all landlords provide household sanitation, but this has been difficult to enforce. Lack of alternative safe household sanitation options in urban low income residential areas suggest that public toilets need to be part of the solution. New policies and programs to improve quality, quantity, affordability, and safe management of public toilets are required. Osumanu and Kosoe (2013) in similar studies in the Wa Municipality revealed that public toilets are inevitable option for sanitation management in the low-income residential areas within the municipality. They however indicated that the public toilets are inadequate and therefore call for an urgent need for the provision of more public toilets and the need to improve in the standard of these public toilets – flush public toilets. This is to encourage more peoples in the low income residential areas to use public toilets instead of open defecation.

Oyinloye & Oluwadare (2015) argued that public toilets that are badly designed badly maintained and poorly located, is a result of poor land use plans. Lack of public toilet facilities in low income residential areas contributes to unsanitary conditions and spread diseases. Safe disposal of human waste is most important to improve community health and quality of life. Osumanu *et al*. (2016) noted that the haphazard physical development in the old residential areas results in lack of public toilets and accessibility to these public toilets causing insanitary conditions in the Wa Municipality. They suggest that the old residential

areas need some redevelopment to create room for the provision and access to public sanitation facilities in the municipality.

Communal containers

According to Atuahene (2010), in most developing countries like Ghana, facilities for disposing solid waste are often inadequate. Most urban areas in these developing countries have limited solid waste facilities to collect solid waste. Solid waste collection facilities are inadequate in informal settlements, because of this inadequacy in solid waste collection facilities, uncollected garbage along with excreta, is often disposed of in drainage ditches, and other unapproved areas (Dongballe, 2016). Osumanu et *al*. (2016) argued that solid wastes generated in the Wa Municipality are collected and disposed of at designated sites by the Assembly or its authorized agents and contractors. The Assemblies have designated vantage points to place communal containers for people to dispose of their solid waste for collection. But the communal containers are inadequate couple with inaccessibility caused by the poor nature of access roads in the suburbs. This has made the sanitation situation in the municipality not the best.

2.4 Role of Land Use Planning in Urban Sanitation Management

In fast developing towns and cities, some important elements that the Town Planners have to deal with are primarily land use and sanitation management. Presently, there is growing pressure on land use and public sanitation facilities in many developing countries (Osumanu and Kosoe, 2013). In the rapid urbanization processes today, land use and use of public sanitation facilities has increased rapidly in most of the countries due to the rapid growth of urban population. The negative effect of this rapid growth of urban population is the haphazard physical development, which creates challenges for the city or town authorities in the management of urban sanitation especially the provision of public sanitation facilities

(Boamah, 2013). Considering the aforementioned, the role of effective land use planning on urban sanitation management cannot be over emphasized.

According to Dambeebo & Jalloh (2018), land use planning plays a major role in sustainable urban environmental development such as environmental sanitation management. Land use planning process assists developing countries like Ghana in the formulation of appropriate land use polies and the implementation of effective land use planning schemes to manage urban environmental issues. Abugtane (2015) argued that the noncompliance to land use plans and regulations in the cities by developers is the reason why many of the cities in Ghana are experiencing environmental problems (uncontrolled housing development, poor sanitation, poor drainage, pollution, poor accessibility and solid waste management problems) in urban areas. Kesavan (2003) noted that low income groups in cities generally suffer from inadequate provision of sanitation facilities and hazardous solid wastes, due to the absence of effective land use planning process. The situation is not different from the argument put forward by Osumanu and Kosoe (2013) on the causes of unsanitary conditions experienced in the Wa Municipality. This suggests the need to rethink, and design plans that will capture the attention of residents of the Wa Municipality.

Urban planning plays a key role in urban sanitation management. Land use planning plays a critical role in environmental protection, especially the built environment. The quality of the urban environment greatly depends on how land use in cities is planned. Land use regulations are used to control human activities on the land in order to achieve sustainable use of land (create order in an urban setting, directs developments, improve the beauty of urban areas and reduces the cost of providing public facilities (Dambeebo & Jolloh, 2018). Boamah *et al,* (2014) argued that several tools are used in development control which include; land use regulations, zoning, sub division, building codes and standards,

accessibility standards, and public health standards. Akola (2007) also noted that land use regulations do provide ways of how to site landfills, garbage skips and collection points at household level. One way to achieving sanitation free environment in the urban setting is through subdivision (TCPD, 2011). Subdivision is looked at as a means to proper solid waste management by reserving land for compost mechanisms on individual plots. Subdivision standards are also a means of improving accessibility by creation of access roads.

Another role of land use plans on sanitation management is that planning schemes aim at promoting proper and appropriate development in order to promote aesthetics, safety and convenience in the built environment. Good land use practices which are as a result of effective land use planning, lead to positive impacts on land use. This ensures that land is used sustainably but the reverse of these will impact negatively on land use if poor land use plans are used. Proper land use entails the utilization of land in accordance to physical development plan or land use plan prepared for the purpose (Mwangi, 2012). Planning mechanism such as development plan system and planning control system play important roles in achieving sustainability in urban development. In the context of housing, land use planning seemed to be the key player to promote a sustainable housing especially in the urban areas (Dambeebo and Jalloh, 2018). A well planned zoning of land for housing area, ensures the provision of sanitary areas and provision of community facilities that can impact positively on the living environment of the people (Yakob *et al*, .2012), particularly the Wa Municipality.

A recent study conducted by Dambeebo & Jalloh (2018) in the Wa Municipality noted that sustainability in urban land development can be achieved through proper implementation of planning mechanisms such as development plannig system, planning control system and

appeal board system. Planning for physical development should concern with how it may affect the community within the house and within the neighborhood areas in the aspect of safety, availability of sanitary facilities and accessibility to public facilities. According to Tinsari (2010), the role of physical planning is vital in understanding how planning can help to achieve a balanced development. Generally, physical planning has the role of translating social and other policies into spatial and physical forms. To attain this strategy, social policies are evaluated on its spatial and physical implications; emphasizing on the aspect of environmental quality in physical planning and providing facilities (sanitation) to ensure higher standard of living for all (Owei *et al.,* 2010). This suggests that proper physical planning improves the living status of urban dwellers as it promotes healthy living.

2.5 Conformity of Physical Development to Land Use Plans

According to the Town and Country Planning Department (2011), conformity of physical development to land use plans is the situation where by a building permit is given by the planning authority to indicate conformity with the Building Regulations in force that are applied to the location in which the building is proposed to be constructed. It is also a situation where by Development Permit is given by the Planning Authority to indicate conformity with the planning standards and guidelines provided in the planning scheme. Conformity to buildings standards is the hallmark to achieving a well-planned settlement (Boamah, 2013). A well-planned settlement will incorporate the needs of residents in the locality. This includes creating provision for sanitation facilities, and accessibility within the neighborhood (Dambeebo and Jalloh, 2018). In the Wa Municipality, Abugtane (2015) found that most land use regulations are undermined. This is a clear indication that non conformity to land use plans would have consequential impact on the provision of public sanitation facilities.

Planning Standards (TCPD, 2011) means provisions of the plan in relation to the carrying out of development being provided by or under which requirements are specified or standards are fixed in respect of any aspect of that development. This include, but not limited to, the generality of the foregoing requirements or standards in respect of: the dimensions of any land, building or other structures; the proportion or percentage of the area of a site which a building or other structure form any specified point; the provision of public access or landscaping; the provision of facilities or the standing, movement, parking, maneuvering, loading, or unloading of vehicle and the provision of services, facilities and amenities demanded by development. Despite the fact that these planning standards are applicable to the Wa Municipality, empirical studies (e.g. Boamah, 2013, Abugtane, 2015, Dambeebo and Jalloh, 2018) highlighted on the lack of adherence and enforcement of building standards in the Wa Municipality. This in effect, has had negative impacts on the provision of public sanitation facilities in the Wa Municipality and its associated health impacts.

Ngetich *et al.* (2014) observed that the global city population has increased to 2.76 billion in 1995 and is projected to be 5.34 billion in the year 2025 (UN-Habitat, 2012), thus exerting greater pressure on the natural environment than ever before. Sustainable cities are characterized by conformity of physical development to land use plans. This rapid urbanization will therefore need to be guided by effective urban development control instruments and practices to ensure conforming land uses. Development control therefore is a process of achieving goals and objectives depicted in spatial plans, and it entails the government regulating land use and new buildings. Effective urban development control ensures that developers do not deviate from approved building plans in the course of construction on the plot earmarked for such development (Boamah *et al.,* 2014). Subsequent

development requires planning permission, which will be granted or refused with reference to development plan as a material consideration.

2.6 Land Use Planning and the Provision of Sanitary Areas or Facilities

The Town and Country Planning Ordinance, Cap 84 of 1945, and other Technical Memoranda are the sources of guidance for spatial planning and zoning in Ghana. The Zoning Guidelines of TCPD (2011) provide clear definitions for land use activities within each land use zone; the uses that are permitted and prohibited in these zones. The Zoning Guidelines of TCPD (2011) also spell out the considerations that must be taken into account if the land use zone is to be changed, either for an individual plot or parcel of land within a Local Plan or a broad land use zoning classification in the Structure Plan. Zoning is a tool used by planners and planning authorities to prescribe the acceptable use and form of development of an area of land. Zoning defines the use category of the land, prescribing allowable and non-allowable activities and developments on a parcel of land within a zone (TCPD, 2011). This means that zoning greatly influence the nature and use of land. A study conducted by Boamah *et al*. (2014) in the Wa Municipality bemoaned that zoning has been greatly flawed and this affects proper planning of the city. They blamed institutional failure as a major cause of haphazard siting of building infrastructure in the Wa Municipality.

Planning schemes are regulatory urban growth management policy instruments used by Local Planning Authorities in urban environment management to ensure the proper use of land in the mix of competing economic, environmental and social needs of society. The lack of urban planning or failure to adhere to the provisions of such land use plans leads to unplanned, uncontrolled urbanization, also known as urban sprawl (Mabaso *et al.*, 2015). Urban sprawl, a common phenomenon in developing countries, leads to increased land consumption and loss of sanitary space or open space. Haphazard urbanization dictates

future urban land and limits the decisions of urban planners, resulting in urban areas ending up with inefficient infrastructure and facilities (Gary, 2015).

The planning authority prescribes in the Structure or Local Plan, ordinances that cover the form of the development and other considerations that must be observed by those developing or using the land. Some of these include: Sanitation requirements for all developments within a designated area. Land use plans or the zoning of lands has made adequate provision for public services such as Waste disposal sites, waste collection facilities and toilets (Abugtane, 2015). Also, basic supportive facilities are provided in a neighborhood through land use planning. It is mandatory that designated residential neighborhood should have public refuse space/sanitary area and parking space (TCPD, 2011). However, provision of space for public sanitary facilities has been a major challenge in the Wa Municipality. This pushes residents to resort to open defecation as observed by Osumanu and Kosoe (2013). This has call for the urgent need to assess major pathways of reinforcing adherence to zoning, in order to create provision for sanitary sites in the Wa Municipality.

Land use planning is a decision-making process that facilitates the allocation of land to the uses that provide the greatest sustainable benefits. It is based on the socio-economic conditions such as population and environment concerns. Through a negotiation process with all stakeholders, the outcome is in the form of decisions on how land should be allocated for specific uses (for sanitary purposes) and the standards to be complied within development (Mwangi, 2012). According to Atebije (2016), in urban or city planning practices, one main focus of the planners is the formulation of development plans to achieve desired goals like sustained provision of sanitary areas and the control of developers to comply with the approved plans. Development plans contain planning standards that are a

set of criteria for determining the scale, location and site requirements of various land uses in a planned development. Diligent implementation of planning standards facilitates maintenance of harmonious and livable environments and improves aesthetic quality.

Cheshire & Shepard (2001) explained that land use planning serves a variety of purposes: it can reduce the cost of providing some public goods or facilities; isolate land uses which are likely to generate costly external effects and space for sanitation. The outcome of effective land use planning is the achievement of compact or smart development which is characterized by reduced cost of providing infrastructure and utilities or facilities. Smart development will lead to a well-served settlement with facilities including health and sanitation facilities among others. Land use planning aids housing density increase and coverage of infrastructural facilities and public utilities (Yendaw, 2014).

Mwangi (2012) noted that planning standards are used in determining the size and locational distribution of facilities in settlements. They come into play at the planning stage as guide to the implementation of the plan. This is why most visionary and functional city governments establish planning standards with the aim of empowering planners to reasonably strike balances between the built and natural habitat to enhance the health, safety, and convenience of the city for living. The fact of the matter is that most cities in Ghana including the Wa Municipality have planning guidelines, but the major challenge here has to do with who enforces compliance to these guidelines (Kuusaana and Eledi, 2015). As a result, most areas designated for sanitary facilities like public toilets and waste dumping sites are encroached in the Wa Municipality with impunity (Osumanu *et al.*, 2016).

2.7 Land Use Planning and Access to Sanitation Facilities

Accessibility or access refers to the ease of reaching services, activities and destinations (Litman, 2015). Paths and roads provide access to destinations and activities. Land use

planners generally focus on geographic accessibility (distances between activities). In the fields of geography and urban economics, accessibility is the relative ease of reaching a particular location or area. In social planning, accessibility refers to people's ability to use services and opportunities. Land use factors like density, connectivity and walkability affect accessibility (Yendaw, 2014). Smart growth, a more accessible land use pattern, means that less mobility is needed to reach activities and destinations. A typical household's accessibility can be envisioned as a connection between home and public services or facilities (Minner *et al.,* 2015). Improving the variety of public services within a neighborhood and improving paths or roads options from home to public services or facilities, tends to increase accessibility (Omolo, 2011; Yendaw, 2014).

In the zoning guidelines and planning standards of Town and Country Planning Department (2011), the planning authority prescribes in the Structure or Local Plan, ordinances that cover the form of the development and other considerations that must be observed by those developing or using the land to ensure that there is adequate access to both public and private sanitation facilities. Private houses should all have their own toilets. Public toilets should therefore be provided for users of public places and low income residential areas. In the areas of old settlement, public improved sanitation facilities are provided for as part of the upgrading of the area (CGSW, 2016). These old settlement areas usually fall under a low income high density residential zone (Osumanu *et al.,* 2016). It is usually the indigenous residential core of the settlement and characterized by low access to basic community sanitation facilities and roads/walkways (CGSW, 2016). Urban poverty is generally high as well as population density. Environmental sanitation is equally poor and poses a threat to public health and safety. Under the circumstances, full scale redevelopment plan of these residential areas is contained in the structure or local plan where there is an emphasis on the

creation of minimum way leaves for vehicular access, public sanitation facilities and other public services to meet the needs of the people (TCPD, 2011).

Also, access to waste containers or bins is part of the local plans that makes it mandatory that where no central collection scheme is in place and operational. The location of refuse bins for household refuse is determined by residential densities. In low density residential areas with maximum of 30 to 88 persons per hectare, distance from one bin to another should not exceed 360m (1200ft). In medium density residential areas with 89 to 175 persons per hectare, distance between two bins should not exceed 270m (900ft). In high density residential areas with over 175 people per hectare, distance between two bins should not exceed 150m (600ft) (TCPD, 2011).

Again, Town and Country Planning Department (2011) noted that to ensure access to public sanitation facilities, the planning scheme in Ghana has in it the minimum width of any access way serving a single plot of land not fronting a road to be 2.5m. Where an access way serves more than one plot, not fronting a public road, is to be increased by 1.5m per plot up to a maximum of 6m. Not more than six plots is to be serviced from an access way. Parking facilities should be provided by a developer within the boundaries of a site, at an agreed nearby location for all public, commercial, industrial and residential development in accordance to the land use plans. Car parking areas must be provided for all categories of use especially for the collection of waste. Each car park should not be less than 2.4m x 5.5m and adequate provision must also be made for the movement and maneuvering of vehicles onto and around a site (sanitary areas).

Effective planning schemes by government is vital because, it ensures sustain provision, accessibility and maintenance of sanitary facilities (Dambeebo and Jalloh, 2018). Environmental sanitation is among the powerful drivers of human development as it affects

quality of life. It cuts across all sectors of the economy including those that concern health, environmental protection, improvement of human settlements and services (Osumanu and Kosoe, 2013). Environmental sanitation is aimed at developing and maintaining a clean, safe and pleasant physical and natural environment in all human settlements, to promote the socio-cultural, economic and physical well-being of all sections of the population. Notwithstanding the importance of proper land use planning which incorporate improved sanitation, the Wa Municipal Assembly and the Town and Country Planning Department are still struggling to enforce the building guidelines (Abugtane, 2015). This suggests the need to step-up education on land use planning in order to create awareness and access to public sanitation facilities in the Wa Municipality.

2.8 Overview of Land Use Planning

Urban land use planning has a number of aspects which may be considered from different opinions. Therefore, any definition of planning that is adopted can only express one of the many aspects of planning activities. Planning is a philosophy and a social technology; therefore it cannot be studied in isolation from other areas of social and pure sciences (Oduwaye, 2013).

Land use planning improves the quality of life in urban areas. It allocates space in a particular area for various socio-economic activities or in other words areas are assigned particular activities based on various parameters which will help in increasing overall efficiency of the urban area. The categories of activities include residential, commercial, transportation and public uses. This categorization is considered essential to keep a balance of different activities taking place in an area (Shubham, 2016). The concepts and methods that planning authorities apply today will have durable effects in the future. Urban planners intend to generate land development patterns that will positively affect the accessibility of

residents to facilities and the equitable distribution of common resources into the future (Minner *et al.,* 2015).

World Bank (2012) also said that land use planning refers to the process by which planning institutions decide where on the land different socio-economic activities should take place. This includes establishing provisions that control the nature of development activities. These controls determine features such as plot areas; land consumption; the technical standards of the infrastructure and buildings that will serve them; areas for solid waste discharges and onsite or pre-disposal treatment of pollutants. The Nigerian Institute of Town Planners (2016) argued that planning standards determining the scale, location and site requirements of various land uses, spaces, facilities and utilities in a planned development. Aluko (2011) noted that effective implementation of planning standards reduces environmental risks and disasters, creates liveable environments, and improves aesthetic quality as well as for preservation of historic sites and open spaces. Land use planning standard is an effective tool for urban management. Planning ensures that the growth and management of cities can be such that it makes for orderliness, healthy and aesthetics. It also ensures that the environmental challenges as a result of city growth can be reduced to tolerable levels.

Urban Planning has been interchangeably called 'Town and Country Planning', 'Land Use Planning', and 'City Planning 'or 'Physical Plans' and in some cases Spatial Planning. Keeble (1969) cited in Tinsari (2010) noted that town planning orders the use of land, siting of buildings and communication routes so as to secure the maximum practicable degree of economy, convenience and beauty. Keeble further argued that city planning promotes accessibility, the employment of resources, the separation of incompatible land uses from each other and the carrying out of all development in visually pleasant.

According to BLM (2005), land use plans include both resource management plans and management framework plans. Land use plans ensure that lands are managed in accordance with Land Policy and Management Act (LPMA), under the principles of multiple use and sustained yield. As required by LPMA policy, the lands must be managed in a manner that protects the quality of ecological, environmental, air and atmospheric and water resource. Yakob *et al.* (2012) argued that land use planning ensures sustainable housing development in the urban areas. A well planned zoning of land use for housing areas results in the provision of open space or recreational areas and the provision of community facilities. Proper housing development can be achieved through a good implementation of planning mechanism such as development plan system and planning control system.

According to Chapin (1972), cited in Tinsari (2010), the objectives of land use planning include providing for the orderly growth and development of the region while preserving a measure of diversity among its parts; allocation of land in the region, recognizing that it may become a scarce resource to be conserved rather than wasted and serve the varying housing needs of the region's population in particular. Chapin also said, other objectives of land use planning include, helping promote sound economic development and assure employment stability of both the region and the state and facilitate the provision of required public services, particularly transportation and utilities.

2.9 The Impacts of Land Use Planning

Land use planning ensures certain percentage of land is reserved for different activities. This helps in balancing all the activities and avoiding excess of a particular activity (Mabaso *et al.*, 2015). Land use planning also helps in keeping a check on conflicting activities such as residential and industrial. It also helps in pollution control by segregating different activities by means of zoning. Further, land use planning in master plan is binding for all the activities

and no development should take place which do not conform to the assigned land use. The complete information about the permitted activities is provided in different plans which must be followed (Shubham, 2016). This suggests that planers in the Wa Municipality are using different planning mechanisms to control physical development.

According to Sairinen (2014), social impacts of urban land use plans include quality of housing, local services, living environment and segregation conditions of transportation. In like manner, Shubham (2016) argued that planned development affects sustainable development and thus optimal use of land as a resource. Land is fixed in size, it is therefore necessary to use it wisely. Land use plans provide both theoretical and spatial information which will guide the growth of the towns and cities. Dambeebo & Jalloh (2018) also argued that ineffective land use plans impact negatively the growth of Wa Municipality, thereby preventing the sustainability development of the environment, hence, the sanitary mess in the municipality.

Another impact of urban land use planning is that it contributes to improved accessibility in residential areas. Accessibility within areas is improved as proposed road networks and other forms of transportation system outlined in land use plans are successfully implemented. Roads and movement networks in the cities and towns are said to have developed along the broad lines of land use planning implementation (Omolo, 2011; Yendaw, 2014). Land use planning also has impacts on human growth and development. Land use planning is viewed as an integral part of the process of national growth and development. Land use planning seeks to accommodate the social and economic needs of people within a technical and spatial framework (Thomas, 2001). There is therefore the need for city dwellers, particularly the Wa Municipality to see land use planning as a

developmental tool. This can be achieved through education and awareness creation of the significance of land use planning Abugtane, 2015).

Thomas (2001) further argued that land use planning influences development controls, because it takes place within a legal context. The legal context provides the justification for undertaking land use planning and sets out the powers and duties of the agency responsible for the planning function. The laws enforcing land use plans create room for revising and changing land use plans and policies to ensure that they are always current and relevant to the country's development needs. The laws enforcing land use plans of a city (Wa) in Ghana include; Local Government Act (Act 462), 1993, the National Building Code (LI 1630), 1996, and Land Use and Spatial Planning Act (Act, 925), 2016. The laws provide remedies for persons affected by planning and development decisions/activities and penalties for those who fail to comply with the provisions of the legislation. Land use planning regimes also have economic impact. Land use planning in Ghana contributes considerable benefits in residential areas. A substantial portion of these benefits emanate from tarred roads and concrete drains, electricity and pipe-borne water (Baffour *et al.*, 2014).

Land use planning equally influences a better road network with the presence of designated areas for loading and offloading which encourages the operation of public vehicles in the community thereby making houses, facilities and other land uses easily accessible in the planned area (Town and Country Planning Department, 2011). Land use planning also affects the distance of public facilities from most houses in a community. These public facilities include educational, health, sanitation and emergency (Yendaw, 2014), suggesting poor land use planning may affect access to emergency services in the Wa Municipality. Cheshire & Sheppard (2001) also added that land use planning serves a variety of purposes:

can control the spatial structure of residential development; can reduce the cost of providing some local public goods; can also be a method of providing valued neighborhood quality.

2.10 Principles of Land Use Planning

Any effective land use planning is based on some principles including: safety, aesthetics, harmony, economy and convenience. The implementation of these principles ensure that within the neighborhood: people are protected from all forms of disasters; people can locate facilities like sanitary sites at the appropriate places, one can move from one location to another destination to access a service and conflicting land uses are avoided in order to avoid nuisance like noise and air pollution. The economy prevents high cost in implementing land use planning. That is, the benefits of the plan should exceed its cost as well as reduce waste land which can be very expensive (Maxwell, 2011).

Gary (2015) argued that the comprehensive plan is a document designed to ensure that there is harmony in the use or development of land within communities. A community comprehensive plan seeks to strike a balance among the many competing demands on land by creating development patterns that are orderly and rational, provide the greatest benefits for individuals and the community as a whole. The plan set forth policies that foster a distinctive sense of place, thereby ensuring aesthetics. It is the means by which a community can reduce the cost of public services. Well-planned, orderly and phased development patterns are also less expensive for a community to provide with public services than low-density, scattered development. UN [FAO] (1993) land use planning systematically assesses the physical, social and economic factors in such a way as to assist and encourage land users to select the best use of land. The best use of land could be grouped under three different headings of efficiency, acceptability and sustainability. Efficiency-land use must be

economically viable. Acceptability-land use must be socially acceptable. Sustainability-every land use must be sustainable.

According Verheye (2002), land is fixed in size, whereas more and more people compete for land use resulting into conflicts. Land use planning is a tool to support the orderly use of land for developments. Land use planning is always focused on one or more specific objectives, and is closely linked to the concepts of efficiency, equity and sustainability. Other principles pointed out by Gesellschaft für Technische Zusammenarbeit [GTZ] (2012) are that land use planning is an iterative process based on the dialogue amongst all stakeholders aiming to define sustainable land uses. It also implies the initiation and monitoring of measures to realize the agreed land use. Land use planning also creates the preconditions required to achieve a type of land use that is environmentally sustainable, socially just and desirable and economically sound.

Adeagbo (1998) and Nnah *et al*. (2007) cited in Owei *et al.* (2010) mentioned that land use has been described as a process aimed at achieving orderly physical development with the overall aim of evolving a functional and live able environment where individual and common goals can be achieved. In urban centers, the essence of land use planning is to ensure that urban activities are organized and developed in physical space with due consideration for the protection of the public interest which include health. Unfortunately, this urban land use planning essence or rationale is yet to happen in the Wa Municipality (Dambeebo and Jalloh, 2016).

2.11 Land Use Planning in Ghana

2.11.1 The Three Tier Framework

Land use planning in Ghana has evolved over the years to adjust to a dynamic society. This evolution is reflected in changes in the implementation of instruments and methods (Sliuzas, 2014; Matey, 2016). The master plan approach was the basis of land use planning in Ghana in the early 1960s. But much emphasis was not placed on local economy and social development to generate wealth, expertise and needed resources to better environment. Other shortcomings of the master plan identified included long preparation time; the need for a strong admiration system to oversee it; lack of coordination among development agents at different levels of government and private sector. These challenges led to the adaptation of the Three Tier planning system in Ghana (Matey, 2016).

The concept of land use planning in Ghana has its basis on a three-tier framework. The three tier framework is made up of three plans; Spatial Development Frameworks, Structure Plans and Local Plans. According to the Town and Country Planning Department (2011), the Spatial Development Framework (SDF) is the spatial strategy that defines social, economic and environmental policies. It addresses the spatial development implications of issues like housing, infrastructure services, transportation and the environment. The Spatial Development Framework is a plan, showing the expected development within twenty-year period, which will include the location of key components of the strategy aimed at achieving the desired development. The SDF provides a strategic vision for the spatial development of the national, region and district. The SDF must be in coherence with the National Development and Medium Term Development Plans (MTDP) and other relevant national and regional-level Policies, Plans and Programs (PPPs).

The SDF provides the parameters for Structure and Local Plans, which each must be in compliance with the higher level plan. The Regional or Sub-Regional SDF is initiated by the Regional Coordinating Council (RCC) and prepared in conjunction with all the MMDAs covered in part or whole by the Framework. The requirement for the Spatial Development Framework will be specified in the proposed implementing regulations attached to the Land Use and Spatial Planning Law. The implementing regulations specifiers the requirement for compliance and the basis for appeal. It also identifiers the form and nature of the consultation required in the formulation of the Framework (TCPD, 2011).

Again, according to the Town and Country Planning Department (2011), the Structure Plan is a document that prescribes both private and public use of land. A Structure Plan is used to guide the future development of a District, town or city or the development or redevelopment of a part of these areas. It defines all land uses, including residential, commercial, industrial and mixed use areas and major open space. It also demarcates the alignment and corridors of trunk and major transportation routes, trunk and major water, sewerage and power networks. It further provides a framework within which all Local Plans for the city or town complies with. Some of the basic land uses identified in the Structure Plan are: open space, residential and areas of public facilities.

A Local Plan is a plan that spells out the use of land by function and purpose and a sustainable use of land. Local Plans indicate that the use of land must be in conformity with permitted use of the land in the designated zoning classification, as identified in the approved Structure Plan. The Local Plan contains the following details such as: Local Plan in compliance with the approved Structure Plan for the area; maps showing precise land uses for each plot in the area covered by the Plan; type of buildings that can be built on each of the designated plots; the dimensions of any parcel; the permitted maximum ratio of built

area to plot area and details of designs for each type of road or footpath, including pedestrian footpaths, cycle ways, drainage and reserve for infrastructure lines (TCPD, 2011).

Kuusaana and Eledi (2015) pointed out that land use planning in Ghana has its basis on a three-tier framework as illustrated in Figure 2.1. It starts with a spatial development planning framework at the national, regional and district levels. The spatial development framework has a strategic vision for the spatial development of the nation, regions and districts. It covers a period of 15 to 20-years planning period. The second level of a three-tier framework is the structure plan, which defines land uses on a very broad perspective and includes the planning of main infrastructure networks as defined by the land use classifications. The structure plan also sets a basis for the preparation of local plans. The last level of the three-tier framework is the local plans. The local plan demarcates a planning area into specific zones, residential areas and further into plots and defined proposed uses. It also includes a proposed local road network as well as social infrastructure such as schools, hospitals, playing grounds and sanitary areas. The local plan also sets the basis for the acquisition and issuance of a development or building permit.

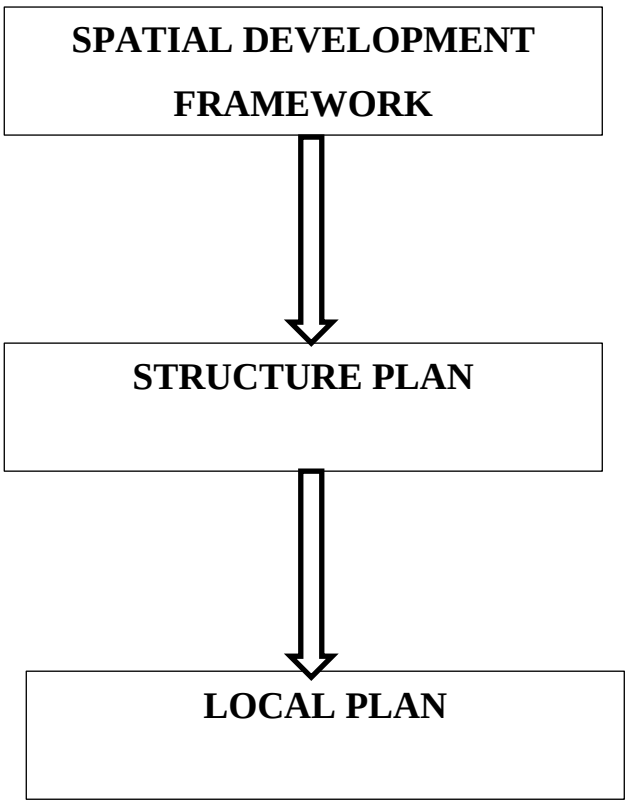


Figure 2. 1: Land use planning processes in Ghana (three-tier framework)

Source: Town and Country Planning, 2011

2.11.2 Land Use Planning Legislation in Ghana

Due to the importance of development controls for the attainment of sustainable cities and cleaner and safe living environment, Ghana has instituted a land-use control regime (Boamah *et al.*, 2014). From the colonial era through independence, physical development in Ghanaian towns and cities has been guided by the Town and Country Planning Ordinance (Cap 84) of 1945; Town and Country Planning Act, 1958; Town and Country Planning Regulations, 1959; the Local Government Act (Act 465), 1993; and the Building code (L.I. 1630), 1996.

Currently, the Local Government Act, (Act 462), 1993, the National Building Code, (LI 1630), 1996 and Land Use and Spatial Planning Act 2016, (Act 925) are the main instruments used for the guidance of physical development throughout Ghana. The Land

Use and Spatial Planning Act, 2016, (Act 925) is to revise and consolidate the laws of land use and spatial planning, provide for sustainable development of land and human settlements through a decentralized planning system, ensure judicious use of land in order to improve quality of life, promote health and safety in respect of human settlements and to regulate national, regional, district and local spatial planning. The Land Use and Spatial Planning Act, 2016, (Act 925) establishes Land Use and Spatial Planning Authority to replace the Town and Country Planning Department.

Section 46(1) of Act 462 establishes the Metropolitan-Municipal District Assemblies (MMDAs) as the planning authorities for their respective districts. The MMDAs are therefore responsible for the preparation and implementation of development schemes, and the enforcement of development controls in their areas of jurisdiction. The Act 462 makes building permits a mandatory requirement for physical development in Ghana. Section 49, sub-section (1) of Act 462 states that "no physical development shall be carried out in a district without prior approval in the form of written permit granted by the District Planning Authority", and sub-section (2) states, "the procedure and manner for securing a permit under subsection (1) of this section shall be prescribed by regulations".

The regulations being referred to here is the National Building Code (LI 1630), 1996. The building code regulates all physical development in Ghana (section 1, LI 1630, 1996). The LI 1630 spells out in detail the building permit application requirements, building densities, permissible land uses, site and spatial standards, the responsibility of the DPA, and the validity period of building permits. The code makes it mandatory for the DPA to notify a permit applicant within 3 months of the receipt of an application of its decision to grant or to refuse the application (section 8(2)). Section 7(3) of LI 1630 stipulates a 5 year validity period for building permits.

This provision is unrealistic and inconsistent with the socio-economic status of most Ghanaians. It will thus be extremely difficult for any DPA to implement section 7(3) of LI 1630; there will be public uproar. Worthy of note is the inconsistency between Act 462 (1993), sections 49(1) and 64(1), and the LI 1630 (1996) section 8(2). Sections 49(1) and 64 (1) of Act 462 prohibits any physical development without prior written approval by the planning authority. But, section 8(2) of LI 1630 states that "an applicant not informed of the grant or refusal of the application may after the expiry of 3 months commence development on the basis that the application is acceptable to the District Planning Authority". This flaw in itself may be a source of confusion for both physical developers and the District Planning Authority.

It is important for this conflict to be resolved if orderly development of Ghanaian towns and cities is to be attained. Section 52(1) and 64(5) of Act 462 empowers the planning authority to prohibit, abate, alter, remove or demolish unauthorized developments and recover any expenses incurred in such an enforcement exercise from the developer. Also, section 52(3) of Act 462 empowers the planning authority to issue an enforcement order demanding an immediate stoppage of unauthorized development.

Section 52(4) of the Act 462 also imposes a fine of twenty Ghana cedis (Ghc 20) or to a prison term of at most 6 months or both on developers who violates an enforcement notice issued under section 52(3) of Act 462. Also, section 55 of Act 462 empowers the planning authority to instantly prohibit, abate, alter, remove or demolish any unauthorized development that encroaches or will encroach upon a community's right of space, or interferes or will interfere with the use of such space. There exists sufficient legal backing for the enforcement of land-use regulations by the MMDAs in Ghana.

2.12 Theories of Land Use Planning

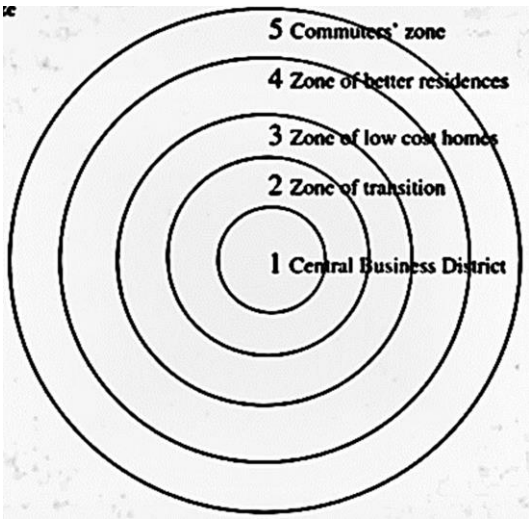
Urban land use planning dwells on three main traditional models. These models have their roots from North America. The Concentric Zone Model, the Sector Model and the Nuclei Model are the major land use models of which other models were propounded based upon a critical review of these traditional models. As cities changed in shape and form over time, new models of urban land were developed to describe an urban landscape that was becoming increasingly complex and differentiated. Because the models were general in nature; devised to understand the overall patterns of land use, none of them accurately could describe patterns of urban land use in all cities. These models have been criticized for being more applicable to cities in the United State of America than other nations' cities. These models have also been viewed to be static; they only describe patterns of urban land use in a generic city, but do not describe the processes by which land use changes. Despite these criticisms, these models are still considered relevant to land use planners and has been applied in recent studies (e.g. Asamaoh 2010, Maxwell 2011, Yendaw 2014). The study reviewed these models to ascertain how land use planning can incorporate provisions for public sanitation facilities in the Wa Municipality.

2.12.1 Concentric Zone Model

The concentric zone model postulated by Earnest Burgess is the first urban land use model (Maxwell, 2011). Burgess around the 1920s depicts urban land as a set of concentric rings with each ring devoted to a different land use. The model describes the process of land development and urban growth by a series of concentric circles which expand drastically from the core - Central Business District (CBD). The CBD has most economic activities because it is the focus of an intra-city transport (Nakatudde 2010; Yendaw 2014). The model argues that major transportation emanates from the city's core, making the CBD the most accessible location in the city setup (Nakatudde, 2010).

Two important features of this model is the positive correlation between physical development of urban lands and socio-economic status of households with distance from the CBD - more affluent households were observed to live distances from the central city. Burgess described the changing spatial patterns of residential areas as a process of "invasion" and "succession". He said, as the city grew and developed over time, the CBD exerted pressure on the zone immediately surrounding it (the zone of transition). Outward expansion of the CBD was invaded by nearby residential neighborhoods causing them to expand outward. As the city grew and the CBD expanded outward, lower status residents moved to adjacent neighborhoods and more affluent residents moved further from the CBD (Yendaw, 2014).

Critics however argued that the theory failed to critically look at the development of complementary clusters and the possibilities which give rise to focal points other than the CBD. Also, the theory is criticized for assuming that the higher the income the further away a household is likely to locate from the center. From the economic perspective, this connotes that accessibility or access considerations are more than counterbalance by preferences for space. Hence, the specialized pattern of land use produced by the theory points only to the importance of accessibility to the CBD. Nevertheless of these criticisms against the model, it is of significance in explaining how land use in an urban area is structured (Asamoah 2010; Yendaw 2014). The Concentric Zone Model is illustrated in Figure 2.2



1. Central Business District
2. Zone of Transition
3. Zone of Low-cost homes
4. Zone of Better Residences
5. Commuters' Zone

Figure 2. 2: Concentric Zone Model

Source: Adopted from Yendaw (2014)

2.12.2 The Sector Model

The sector model holds the view that housing areas in a city develop in parts along the lines of communication, from the CBD outwards. High quality areas run along roads and also reflect the incidence of higher ground. Industrial sectors develop along canals and railways, away from high quality housing. Thus a high status residential area will spread out along the lines of the sector by the addition of new belts of housing beyond the outer arc of the city. Once contrasts in land use have developed in a sector near to the city, these contrasts will be perpetuated as the city grows (Maxwell, 2011).

This theory was advanced by Hoyt (1939) as an alternative to Burgess' concentric model, and was based on residential rent patterns in the USA (Asamoah, 2010). Hoyt theorized that cities would tend to grow in wedge-shaped patterns or sectors emanating from the CBD and

centered on major transportation routes. Hoyt observes that higher levels of access translate into higher land values. This means that many commercial functions remain in the CBD while manufacturing activities develop in a wedge surrounding transport route. At that point residential land use patterns would grow in wedge-shaped patterns with a sector of lower-income households bordering the manufacturing/warehousing sector. This is because traffic, noise and pollution make these areas less desirable locations to live (Nakatudde, 2010). But, a sector of middle-and-higher income households would be located away from the industrial sites. In many respects, Hoyt's sector model is simply a concentric zone model modified to account for the impact of transportation systems on accessibility and land values. The Sector Model is illustrated in Figure 2.3.

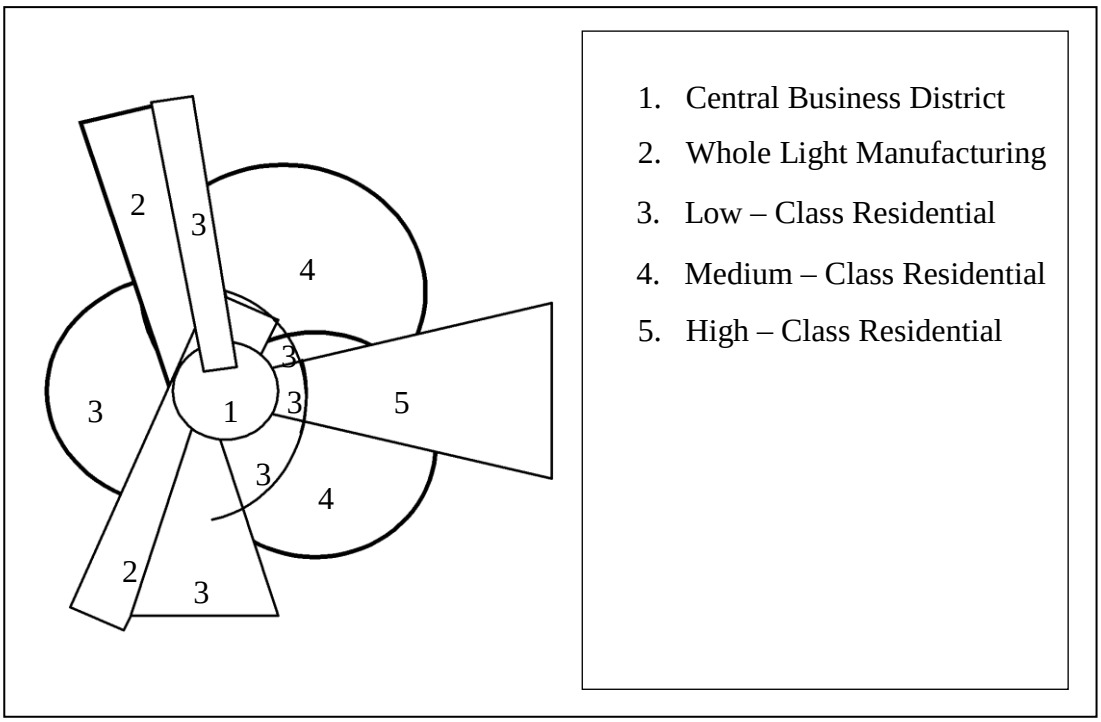


Figure 2. 3: Sector Model

Source: Adopted from Yendaw (2014)

Zone 1 in the Sector Model is the CBD where major commercial or business activities take place, which is also the case in the Wa Municipality; Zone 2 is the sector of whole sale and

light manufacturing, Zone 3 is a low class residential sector surrounding the CBD. Residence of low class prefer to live in this sector because it surrounds the CBD and Zone 2, where they can get informal jobs to work, shops and cheaply commute to the CBD or Zone 2 for work. The environment of this Zone (3) is not attractive and clean, therefore posing environmental hazards like poor sanitation (Maxwell, (2011). In this Sector Model, Zones 4 & 5 are middle class and high class residential areas respectively. The high class residential area is far from the CBD, the residence there are mostly engaged in the formal sector and can afford for transportation to the CBD. The neighborhood in the high class residential area is not congested in terms of space, very clean and attractive, therefore being the desirable part of the city to live (Asamoah, 2010).

2.13.3 Multiple Nuclei Theory

This theory was proposed in 1945 by Harris and Ullman to demonstrate that not all cities fit into the concentric and sector model (Maxwell, 2011). This model, which is closer to reality, views a city as growing and assumes that urban growth takes place around several distinct nuclei. These nuclei could include a market, a nearby village, a factory, a mine or a railway terminal. Ultimately, all the nuclei would be combined into one urban area largely agglomerated by residential use and intra-city transportation. At the center of the model is the CBD with light manufacturing and wholesaling located along transport routes (Nakatudde, 2010).

The model argues that cities of greater size develop into substantial suburban areas. Subsequently, some suburbs, which reach significant size, function like smaller business districts. These smaller business districts act as satellite nodes or nuclei of activity around which land use patterns form. Under this theory, the CBD is still seen as a major center of commerce. This suggests that specialized cells of activity would develop according to the

specific requirements of certain activities and different rent paying abilities. It is also suggested that there is a high tendency for some kinds of economic activity to cluster together. Heavy industry is thought to locate near the outer edge of the city, perhaps surrounded by low-income households. Suburbs of commuters and smaller service centers occupy the urban periphery (Yendaw, 2014). Figure 2.4 illustrates the Multiple Nuclei Theory.

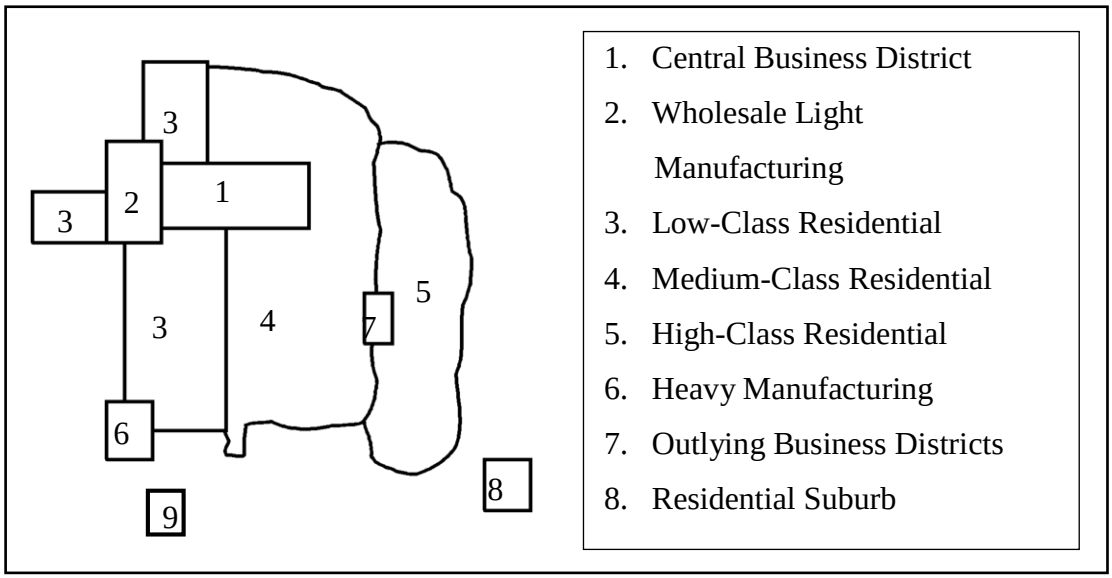


Figure 2. 4: The Multiple Nuclei Model

Source: Adopted from Yendaw (2014)

2. 11.4 Linkage between Land Use Planning Theory – the Sector Model and the Study

The study adopts the Sector Model based on the fact that it describes the urban structure in the form of sectors or zones (Zone 1 - Central Business District, Zone 2 - Whole Light Manufacturing, Zone 3 - Low Class Residential, Zone 4 – Middle Class Residential and Zone 5 - High Class Residential) with regards to urban land development. Differences in the structure of urban areas generally lead to differences in the quality of life in respect to sanitation management and income of the inhabitants (CGSW, 2016). The Sector Model attempts to show the differences in the quality of life (low-class residential, middle-class residential areas couple with issues of poor sanitation and high-class residential areas couple with issues of better sanitation).

Maxwell (2011) argued that land use planning models like the Sector Model play a critical role in the development of urban environment (urban structure). The quality of the urban environment greatly depends on how land use in cities is planned. Land use regulations are used to control developments on the land in order to create order in an urban setting and direct developments to enhance proper sanitation management. The specialized pattern of land use produced by the Sector Model indicated the importance of accessibility to residential areas. Access route within the neighborhood is vital for activities like public sanitary services. It is therefore importance knowing how land use in an urban area is structured (Asamoah, 2010).

The study conceptualizes the Sector Model by classifying urban land use planning of the Wa Municipality according to (Osumanu *et al.*, 2016) into three main zones. Thus, Zone 1 is made up of indigenous areas, surrounding the CBD, classified as a low class

residential area, developed without local plans (unplanned suburbs), Zone 2 consists of new developed areas, located far from the CBD, classified as a high class residential area that is developed with local plans (planned suburbs) and Zone 3 is a mix settlement classified as a middle class residential area. The study therefore seeks to find out whether urban land use plans have created provision for the establishing of public sanitation facilities in these zones for the proper management of sanitation in the Wa Municipality.

2.14 Conceptual Framework of Urban Land Use Planning and Public Sanitation Facilities

This section presents the conceptual framework of the effects of land use planning on the provision of public sanitary areas and facilities. The framework provides an understanding of the effects of effective land use planning in the management of urban sanitation. The framework helps to shape and guide the research to a logical conclusion. The proper use of land is very significant to urban sanitation management, especially when there is fast urbanization and physical development against a finite land resource. This requires an intervention in the use of land for human activities to promote efficient land use in urban areas. Urban land use planning is the only tool for intervening to the use of land in urban Ghana. The basic rationale of land use planning is to achieve; convenience and harmony in the use of space for all land uses; economy and efficiency in the use of resources and space; enhanced safety and adequate health standards in the space economy; and enhanced aesthetics and serenity in the built environment (Afrane, 2006, cited in Maxwell, 2011).

This means, an effective use of urban land use plans as a tool can be evaluated based on a number of attributes such as its contribution to mix of land-use types (the location of

commercial, residential, sanitation and other important amenities) and accessibility (the ability of people to be able to assess their desired facilities, infrastructure, green space and roads within neighborhood). The effective application of land use planning should therefore result in a proper or controlled physical development of settlements where as an improper land use planning is expected to promote sprawl.

Figure 2.3 conceptualizes the effects of land use planning on the provision of public sanitation facilities in the Wa Municipality. The conceptual framework indicates that an effective land use planning is based on some principles. These principles include; safety, aesthetics, convenience and economy. An effective land use planning ensures redevelopment in the old residential areas and new residential development. These developments are characterized by improved road network or transportation and reduced cost of providing public sanitation facilities, this intent brings an improvement in the public sanitation service or facilities delivery and effective provision of public sanitation facilities. In all, lead to access to public sanitation facilities and a sustained urban sanitation management. Again the framework also indicates that an effective land use planning reduces urban sprawl and creates room for conforming land uses or neighborhood lineness resulting in planned residential areas. Planned residential areas achieve sustained urban sanitation management as they are characterized by availability of sanitary areas, reduced cost of providing public sanitation facilities and access to public sanitation facilities.

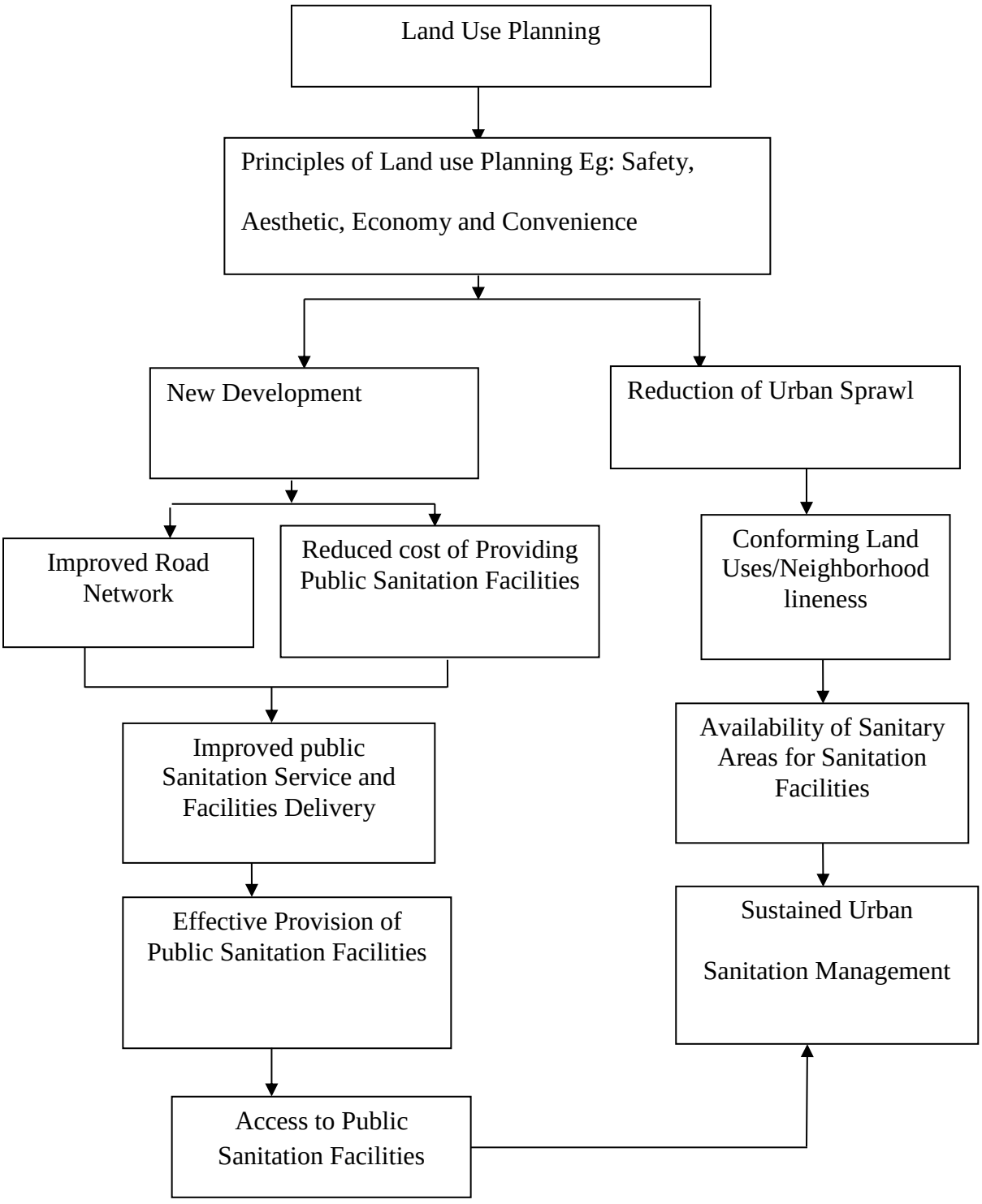


Figure 2. 5: Effects of Urban Land Use Planning on the Provision of Public Sanitation Facilities

Source: Author's Construct, 2018

CHAPTER THREE

STUDY AREA AND METHODOLOGY

3.1 1ntroduction

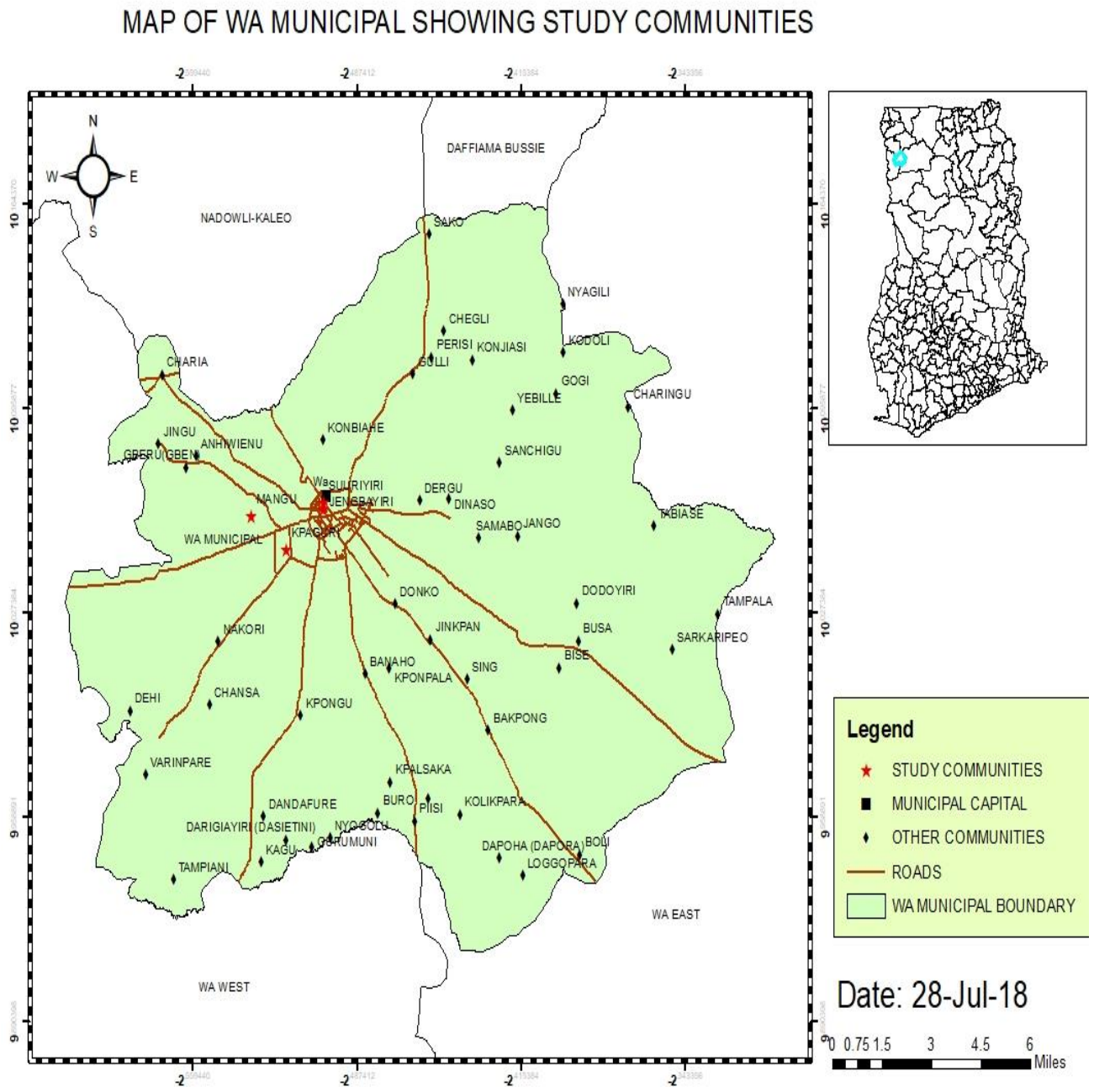
This chapter is divided into two sections; section one presents information on the study area, that is the location and size, climate and vegetation, population, geology and soil and housing and household waste disposal and facilities. The other section deals with the research design and approach; the sampling techniques, sample size determination as well as data sources and methods and tools for data collection. The chapter also presents the data analysis techniques of the study. The methodology adopted by the study aims at achieving the objectives of this study and understanding the implications of urban land use planning in the provision of sanitary areas and access to public sanitation facilities in the Wa Municipality.

3.2 The Study Area

3.2.1 Location and Size

According to the Ghana Statistical Service (2014), the Wa Municipality is one of the eleven Districts/Municipalities that make up the Upper West Region. The Wa Municipality shares administrative boundaries with Nadowli District to the north, Wa East District to the east and to the west and the south Wa- West District. It lies within latitudes 1º40'N to 2º45'N and longitudes 9º32'W to 10º20'W (figure 3.1). The Wa Municipality has its capital as Wa. It has a land area of approximately 579.86 square kilometers, which is about 6.4% of the Region. The study was conducted in Wa, which is also the capital of the Upper West Region; the largest and most developed town in the region and located at the Southern part of the region. The Upper West Region is located

in the North-Western part of Ghana and shares borders with the La Cote D'Ivoire to the West, Burkina Faso to the North, Upper East to the East and the Northern Region to the South.



Source: Author's Construct, 2018 Based on GSS (2014)

Figure 3. 1: Map of Study Area

3.2.2 Geology and Soil

The Wa Municipality lays in the Savannah high plains, which generally is undulating with an average height between 160m and 300m above sea level. Underlying the Municipality are predominantly Pre-Cambrian, granite and metamorphic rocks and the soil types are; the laterite, the savannah ochrosols and clay (GSS, 2014). The Wa Town's landscape is generally a gently undulating plain, (about 200-350 meters above sea level), and is characterized geologically as the Upper and Lower Birrimian (Blench, 2006**).** The town is found on soils formed over Birrimian rocks, post-Birrimian granites and associated basic rocks and mixed recent alluvium. It is characterized by flat plains cut by granite outcrops and out crops of red laterite.

3.2.3 Climate and Vegetation

The climate is tropical equatorial or continental which prevails throughout the northern part of Ghana with one rainy season from May to October and a dry season from November to March with humidity ranging between 70-90% but falling to 20% in the dry season (Otupiri, 2012). An annual mean rainfall volume of between 840 mm and 1400 mm which is sparsely and poorly distributed over the raining months, characteristically erratic and punctuated by spells of long droughts and heavy downpours sometimes causing floods is experienced (MOFA, 2011). The area has an average minimum temperature of about 15°C and maximum of about 40°C (GHS, 2008).

The Municipality is located on the Guinea Savanna zone (Otupiri, 2012) and is characteristically grassland and interspersed with scattered trees and shrubs with the grasses growing up to heights of about three to four meters during the raining seasons consequently informing their usage as thatch for roofing. The area is characterized by

drought resistant trees which shed off their leaves during the dry season with the grasses drying up hence making them susceptible to fires a common phenomenon in the area. Some tree species found in the area are the locust, (Parkia biglobosa), the shea (Vitellaria paradoxa), the mahogany, (Khaya senegalnesis), the silk-cotton, (Ceiba pentandra) and Baobabs, (Adansonia digitata) as well as introduced trees, such as the neem, (Azadirachta indica), and the mango (Mangifera indica).

3.2.4 Population

The Wa municipality has an estimated population of about 120,884 of which 59,356 are men with the remaining 61,528 being women. Men constitute 49.1 percent and women represent 50.9 percent. Wa is projected to be about a total population of 80,111 of which males are 39,296 and females are 40,815 (GSS, 2014). About 34 + percent of the population reside in rural localities. The municipality has a sex ratio of 97.7 and 35 percent of the population is below 15 years, with a small number of elderly persons (60 years and older) representing 6.2 percent. The total age dependency ratio for the municipality is 65.1. The age dependency ratio for rural localities is higher (77.5) than that of urban localities (59.4). The Total Fertility Rate for the municipality (3.3) is slightly lower, compared to the regional fertility rate of 3.5. The General Fertility Rate is 82.6 births per 1000 women aged 15-49 years. The Crude Birth Rate (CBR) is 22.7 per 1000 population. The crude death rate for the municipality is 5.0 deaths per 1000 (GSS, 2014).

3.2.5 Housing

According to the Ghana Statistical Service (2014), the housing stock of the Wa Municipality is 9,592 representing 11.7 percent of the total number of houses in the Upper West Region. The average number of persons per house is about 11, compared to 8 persons for the entire region. The highest proportion (58.3 percent) of dwelling units in the municipality is compound houses; 23.0 percent are separate houses and 10.2 percent are semi-detached houses. More than half (55.4 percent) of the dwelling units in the municipality are owned by members of the household; 26.6 percent are owned by private individuals; 10.7 percent are owned by a relative who is not a member of the household and only 3.6 percent are publicly or government owned.

3.2.6 Waste Disposal and Facilities

The Ghana Statistical Service (2014) indicated that the commonest toilet facility used by 37.0 percent of households in the municipality is public toilet. The use of water closet (WC) is the second commonest and about 41.8 percent of households in the municipality have no toilet facility. As high as 42.7 percent of households in the municipality share separate bathrooms in the same house while only 29.4 percent own bathrooms for their exclusive use. The most widely used method of solid waste disposal is by public dump (container) accounting for 44.6 percent households in the municipality. As high as a proportion of 17.6 percent of households dump their solid waste indiscriminately. House to house waste collection accounts for 4.3 percent of households. For liquid waste disposal, throwing liquid waste onto the street, 53.5 percent and onto the compound, 17.7 percent are the two most common methods used by households in the municipality.

Most houses in the Wa Municipality lack basic amenities such as toilet, bathing, and waste disposal facilities, which pose life and health threat to the occupants and have dire environmental consequences for an entire neighborhood. Occupants of housing units without toilet and proper waste disposal mechanisms may engage in open defecation and indiscriminate waste disposal (Zomal, 2016). Such activities have serious environmental consequences such as surface and ground water pollution. 17.5 percent of households' have no in-house bathhouse; 12.5 percent households are involved in indiscriminate defecation (free range) and 62.5 percent of the households use public toilet (Boamah, 2013).

3.3 Methodology

3.3.1 Research Design

The research design is the strategy that is used to integrate the different components of the study in a coherent and logical way, to ensure that the research problem is effectively addressed (Creswell, 2014). It is the plan or design for the collection, measurement, and analysis of data (Penneerselvam, 2011). This research examines the effects of urban land use planning on the provision of public sanitation facilities as well as access to public sanitation facilities in the Wa Municipality. The mixed method approach was adopted for the study (Neuman, 2014). The choice was informed by the ability of the researcher to select residential areas without land use planning schemes and residential areas with land use planning schemes to establish the effect of land use planning on the provision of public sanitation facilities and access to these public sanitation facilities.

Again, mixed method approach was useful in this research because land issues involve multi-stakeholders, and thus requires all encompassing approaches to enhance a

comprehensive and robust discussion. Mixed method approach was also useful in this study because it achieves the logic of triangulation since no single method could capture all the relevant features of any study and maximizes the strengths of the quantitative and qualitative data and minimizes their weaknesses (Neuman, 2014). In this study design, data were systematically collected at a particular point in time, analyzed and presented to give a clear picture of the effects of urban land use planning on the provision and access to public sanitation facilities in the Wa Municipality.

3.3.2 Sources of Data

This is the stage where the information required for the study-both secondary and primary data were gathered. Secondary data were gathered from journals, books, articles, newspapers and World Wide Web (internet) sources to review literature. Secondary data were also gathered from Town and Country Planning Department, satellite images of the study area from Google Earth and Population and Housing Census Report (2014). The primary data were collected directly from home owners, the Town and Country Planning Department, the Municipal Assembly and Zoom Lion Ghana Limit as the providers of public sanitary areas or facilities. Primary data were also collected from the field's direct observation for facts on the provision of sanitary areas, the conformity of physical development to land use plans and the accessibility of sanitation facilities.

3.3.3 Unit of Analysis

The unit of analysis is the most elementary part of the phenomenon being studied or the most elementary or smallest unit of the phenomenon around which data is gathered. The unit of analysis according to Kumekpor (2002), refers to the actual empirical units, objects, occurrences etc. which must be observed or measured in order to study a

particular phenomenon. Thus, the units of analysis are institutions, individuals (opinion leaders) and households (Kumekpor 2002; Atuahene 2010). Households and key informants, such as heads of institutions were the unit of analysis for the study. The institutions that were selected in the study included the Wa Municipal Assembly, Zoom lion Ghana Limited, and the Town and Country Planning Department. The household heads (house owners) were chosen because, they are the group of people always in demand of land for development, so when settlements expand, the developers are normally the household heads and their demand for land have an impact on land development. The impact can be haphazard development, which is generally coupled with insanitary conditions. Hence the need for an adoption of land use planning and the preparation of planning schemes by the Town and Country Planning Department and Assembly Authorities for a better control of the use of land. The Wa Municipal Assembly and Zoom - lion Ghana Limited were also chosen because; the Municipal Assembly is the only government institution responsible for the management of sanitation. But the Municipal Assembly has involved Zoom lion Ghana Limited (a private institution) to assist manage sanitation in the Wa Municipality.

3.3.4 Sampling Techniques

The sampling techniques that were adopted for the study were: two-stage sampling and purposive sampling. A two-stage cluster sampling techniques was adopted in the selection of households for the interviews. The first stage was the clustering of residential areas according to town planning into Three Core Zones. Zone 1 is made up of indigenous areas, which were developed without local plans (unplanned suburbs), Zone 2 comprises of new developed areas, that are developed with local plans (planned suburbs)

and Zone 3 covers the mixed neighborhoods, made up of indigenous and new developments. The newly developing areas are developed based on local plans. The study also considered the categorization of residential areas or zones into classes by the Municipal Assembly. Thus, zones 1, 2 and 3 as Low Class, High Class and Medium Class Residential Areas respectively.

Jengbayiri, Suuriyiri, Mangu and Kpaguri Residential Area were purposively selected from the Three Core Zones for households study. Jengbayiri and Suuriyiri located in the Central Business District (CBD) are from Zone 1, Kpaguri Residential Area is from Zone 2 and Mangu from Zone 3. Zone 1 has more houses than Zones 2 and 3, therefore 150 houses (40% of the sample houses) were allocated to it (Zone 1) and Zones 2 and 3 each was allocated 112 houses (30% of the sampled houses). Inside the selected suburbs, blocks were created based on the number of houses and interviewer selected households to interview by systematically walking through the blocks and interviewing one household in every fifteenth house. In a house where the household head interviewed was not the owner of the house, an attempt was made to interview the owner of the house. With this approach a respondent was interviewed in each fifteenth house until the required sample of 374 houses – 150 for Zone 1and 112 houses each for Zones 2 and 3 were obtained.

In addition, purposive sampling technique was used to select the heads of the Town and Country Planning Department, Wa Municipal Assembly and Zoom Lion Ghana Limited. These institutions were selected because they are in charge of the provision of public sanitary areas and facilities, implementing land use policies and other land use planning issues in the study area.

3.3.5 Sample Frame and Sample Size Determination

The total number of houses in Wa according to Ghana Statistical Service (2014), is 5,794. This 5,794 total number of houses represented the sample frame of the study. The sample size of the houses was determined by the proportional allocation formula proposed by Yamane in 1967: $n = N \div (1 + N \times e^2)$, where; n is the sample size, N is the total number of houses (5,794), e is the error of margin (0.05) and the confidence level is 95%. By substituting N = 5,794 and e = 0.05 into the formula: $n = 5{,}794 \div [1 + 5{,}794 \times (0.05)^2]$, n = 374. A sample size of 374 houses was drawn from the sample frame at a confidence level of 95 per cent and was divided among four suburbs.

3.3.6 Methods and tools of Data Collection

The researcher employed questionnaire survey, key informant interview, Global Positioning System (GPS), Satellite Imagery and direct observation methods in the gathering of primary data. A total of 374 structured questionnaires were administered to household heads or their representatives. Serious attempts were also made to interview the owners of the selected houses in cases where the household head contacted was not the owner of the house. In addition to the household surveys, semi-structured interviews were conducted on three (3) heads of institutions – the Town and Country Planning Department, the Wa Municipal Assembly and Zoom-lion Ghana Limited.

Hand-held global positioning system (GPS) receiver was used to pick geographic coordinates of various public toilets and communal waste containers in the study suburbs. The coordinates were taken in the degree minute second format. These were converted to decimal degree in Microsoft excel spreadsheet using the formulae = $D + M\ 60 + S\ 3600$ where D = Degree, M = Minutes and S = Seconds. The coordinates were imported to

ArcMap software and converted to a Shapefile. The projection parameters were changed from the default World Geographic System 1984 (WGS 84) to projected Universal Transverse Mercator Zone 30 North. It was then overlaid with existing country Shape files and layout maps were produced showing how the various public toilets and communal waste containers are spatially distributed within Wa.

Satellite image of the study area was taken from Google Earth as base map to check the conformity of physical development to land use plans within the neighborhood. In addition, direct field observation with the help of local plans was conducted to cross-check for the availability of sanitary areas in the selected suburbs.

3.4 Data Analysis and Presentation

All administered questionnaires were cross-checked for completeness and accuracy in order to detect and eliminate errors. The data collected from the survey were analyzed using both qualitative and quantitative techniques. The quantitative data were analyzed by means of descriptive statistics; thus frequency distribution, percentage frequency distribution and crosstabulation. Besides, chi-square test of independence was performed on the crosstabulation. Qualitatively, information gathered from the interviews of key informants was transcribed and summarized into statements and quotations, which was used to clarify some of the results obtained in the study. The geographic location points of public toilets and communal containers were analyzed using ArcGIS (version 10.1) and the results was presented in maps to establish the spatial distribution of public sanitation facilities in the study suburbs.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the results and discussions of the study. Several variables have been analyzed based on the objectives of the study. The first part of the chapter presents the background characteristics of the study respondents. The remaining analysis and discussion focused on conformity of buildings to land use plans, provision of sanitary areas or facilities, and households access to public sanitation facilities.

4.2 Demographic Characteristics of Respondents

In this section, tables are used to present the respondents' demographic characteristics: age, marital status, occupation and level of education. Also presented under this section is the year respondents built their housing structures.

4.2.1 Sex of respondents

The results in Table 4.1 show that 73.3% (274) of the respondents were males while 26.7% (100) were females. The males dominated because, household heads were used in the survey. In the absence of the males, females were interviewed. The males dominated because within the traditional setting of the study area, household decisions are made by the household head (male). Even if the woman takes the decision in the absence of the husband or male head, she needs his approval upon returns. It is further argued that females only assume leadership of the household in the absence of the husband. It is therefore justifiable to argue that decisions relating to land use planning are male dominated. However, the quality and accessibility of the neighborhood affect the lives of both males and females. This calls for ways of incorporating female views in matters

relating to land use planning, particularly sanitation issues. This is because females play vital role when it comes to cleanness of the household and the neighborhood at large.

Table 4.1: Sex of respondents

Sex of respondents	**Zones**			**Total**
	Zone 1	Zone 2	Zone 3	
Male	135 (90.0%)	68 (60.7%)	71 (63.4%)	274 (73.3%)
Female	15 (10.0%)	44 (39.3%)	41 (36.6%)	100 (26.7%)
Total	**150 (100%)**	**112 (100%)**	**112 (100%)**	**374 (100%)**

Source: Field Survey (2018)

4.2.2 Age of respondents

In Table 4.2, majority of the respondents (55.6%) were in the age group 40-59 whereas minority of the respondents (6.4%) was within the age bracket 80+. Also, the results of the study revealed that majority of the respondents are within the economically active class. This explains why people are putting up buildings in the emerging or new developing areas.

Table 4. 2: Age of respondents

Age Category	Zone			Total
	Zone 1	Zone 2	Zone 3	
20-39	15 (10.0%)	21(18.8%)	38 (33.9%)	74 (19.8%)
40-59	74 (49.3%)	70 (62.4%)	64 (57.1%)	208 (55.6%)
60-79	39 (26.0%)	19 (17.0%)	10 (8.9%)	68 (18.2%)
80+	22 (14.7%)	2 (1.8%)	0 (0.0%)	24 (6.4%)
Total	**150 (100%)**	**112 (100%)**	**112 (100%)**	**374 (100%)**

Source: Field Survey (2018)

The results also revealed that older household heads dominate in Zone 1 than the other zones. This is due to the fact that Zone 1 being an indigenous settlement has older residence. On the contrary, among the younger households' heads such as those within the age group of 20-39, majority were found living in Zone 2 and Zone 3. This is an indication that the economically active age groups are moving out of the indigenous settlements. This could be attributed to their ability to afford for cost of constructing new houses.

4.2.3: Respondents Marital Status

From table 4.3, out of the 374 respondents, 79.9% were married whereas 5.9% were divorced. Majority of the respondents are married because, marriage is held in high esteem in the study area. Men and women who are not married are sometimes deem social misfit. Based on this, it is the dream of every young person within the study communities to get married attaining the age of marriage.

Table 4. 3: Respondents Marital Status

Marital Status	Frequency	Percent
Married	299	79.9
Single	24	6.4
Widower/Widow	29	7.8
Divorce	22	5.9
Total	**374**	**100**

Source: Field Survey (2018)

4.2.4 Respondents Level of education

Education plays a key role in all aspects of the socioeconomic functional system of a society. An individual level of educational attainment determines how he/she will embrace and take part in key decision making. Of the 374 respondents, 31.6% had attained tertiary education while 24.8% had no formal education (Table 4.4). Also, from Table 4.4, it can be seen from zone 1 (indigenous communities) 9.3% of the respondents attained higher levels of education, but in zone 2 (Kpaguri Residential) 76.8% of the respondents attained higher levels of education. Though respondents have attained other levels of education, tertiary education which gives an individual the power to critically analyze and appreciate issues is low among the respondents.

Land use planning, compliance to building regulations among others are determined by the individual level of understanding and this depends on one's level of education. Abugtane (2015) found in the Wa Municipality that low educational attainment results in residence inability to understand building standards, and this greatly leads to noncompliance to building regulations. Similar findings were obtained by Boamah

(2013) in the Wa Municipality. This also explains that noncompliance to building regulations caused by low level of educational attainment would have consequential impacts on the provision of sanitary facilities in the municipality.

Table 4. 4: Level of education

Level of education	**Zone**			**Total**
	Zone 1	Zone 2	Zone 3	
Primary	26(17.3%)	4(3.6%)	14(12.5%)	**44(11.8%)**
JHS	19(12.8%)	8(7.1%)	47(42.0%)	**74(19.8%)**
SHS	26(17.3%)	10(8.9%)	9(8.0%)	**45(12.0%)**
Tertiary	14(9.3%)	86(76.8%)	18(16.1%)	**118(31.6%)**
None	65(43.3%)	4(3.6%)	24(21.4%)	**93(24.8%)**
Total	**150(100%)**	**112(100%)**	**112(100%)**	**374(100%)**

Source: Field Survey (2018)

4.2.5 Respondents Occupation

Of the 374 respondents, 98.6% were employed in various sectors of the economy whereas 2.4% of the respondents were unemployed (Table 4.5). The results in Table 4.5 further revealed that traders (business men and women) were the majority in terms of employment (41.2%) while bankers (1.1%) were the least. The results further showed that teachers (33.0%) dominated in Zone 2 but Zone 1 has been dominated by traders (48.0%). Furthermore, respondents without employment (6.0%) are found in Zone 1.

Table 4. 5: Zonal Occupation

Occupation	Zone			Total
	Zone 1	Zone 2	Zone 3	
Teacher	18(12.0%)	37(33.0%)	22(19.6%)	**77(20.6%)**
Trader	72(48.0%)	38(33.9%)	44(39.3%)	**154(41.2%)**
Civil servant	14(9.3%)	31(27.7%)	13(11.6%)	**58(15.5%)**
Farmer	27(18.0%)	2(1.8%)	20(17.9%)	**49(13.1%)**
Driver	10(6.7%)	0(0.0%)	13(11.6%)	**23(6.1%)**
Banker	0(0.0%)	4(3.6%)	0(0.0%)	**4(1.1%)**
Unemployed	9(6.0%)	0(0.0%)	0(0.0%)	**9(2.4%)**
Total	**150(100%)**	**112(100%)**	**112(100%)**	**374(100%)**

Observation = 374, Pearson Chi-Square = 93.49, df=12, Asymp. Sig.=0.000

Source: Field Survey (2018)

Results on chi-square analysis in table 4.5 shows a chi-square test value of 93.49 and being significant at 1%. This suggested that any claim of independence of occupation on residential area should be rejected. Hence occupation of the respondents relates with the residential areas. The results also suggested that some occupational distributions are located in some residential areas than others. For example, most of the formal jobs are concentrated in the high class residential areas such as Kpaguri Residential (Zone 2) and middle class residential area-Mangu (Zone 3), while the informal jobs are concentrated in the low class residential areas such as Zone 1. This agrees with the Sector Zone Model that describes the urban structure to be in zones (residential areas). The low class residential areas live very close or within the CBD where most of them work in informal jobs, shop and cheaply commute to work. While the high class residential areas live far from the CBD, work in formal jobs.

4.2.6 Age of Respondents' Building

The study revealed that the respondents live in both old and new housing structures (minimum of 1 year and a maximum of 110 years) in the Wa Municipality. The mean age of the houses is 25.5 years with a standard deviation of 18.17 as shown in Table 4.6.

Table 4. 6: Respondent's House Age

Zone	N	Minimum	Maximum	Mean	Std. Deviation
Zone 1	150	4	110	38.29	21.857
Zone 2	112	1	25	17.43	6.478
Zone 3	112	1	27	16.45	7.544
All Zones	**374**	**1**	**110**	**25.5**	**18.17**

Source: Field Survey (2018)

From Zone 1 (indigenous settlements) the minimum age of the structure is 4 years and a maximum of 110. The average age is 38.29, which is above the sample average. This means that housing structures in Zone 1 are relatively older than those in the other residential areas. Besides, the maximum age of houses in Zone 2 (Kpaguri Residential Area) is 25 years with a mean value of 17.43 years. Zone 3 has a maximum year of 27 and a mean of 16.45 years. The houses in Mangu (Zone 3) are also older than those in Kpaguri Residential (Zone 2). This is because part of Mangu (Zone 3) is an indigenous settlement. The fact that all the residential areas have a minimum age of 1 means that housing development is still taking place in all of them. However, the maximum age of 110 also suggested that some of the households were constructed before the introduction of physical development planning in the Wa Municipality.

4.3 Conformity of Buildings to Land Use Plans

This section presents the results and discussion of households' adherence to building plans. Figure 4.1 shows the land uses in the local plan of parts of the Wa Municipality. All land uses on the plan indicate the kind of physical development that is allowed. The local plan indicated areas for residence, open spaces as well as sanitary areas. The areas marked with ash color (figure 4.1) are designated for sanitation purposes. The local plan is used as a tool for controlling physical development to achieve conformity of buildings to land use plans. This was affirmed by UN-Habitat (2012), that land use planning is an effective tool in the development of infrastructure as well as the provision of public sanitary facilities.

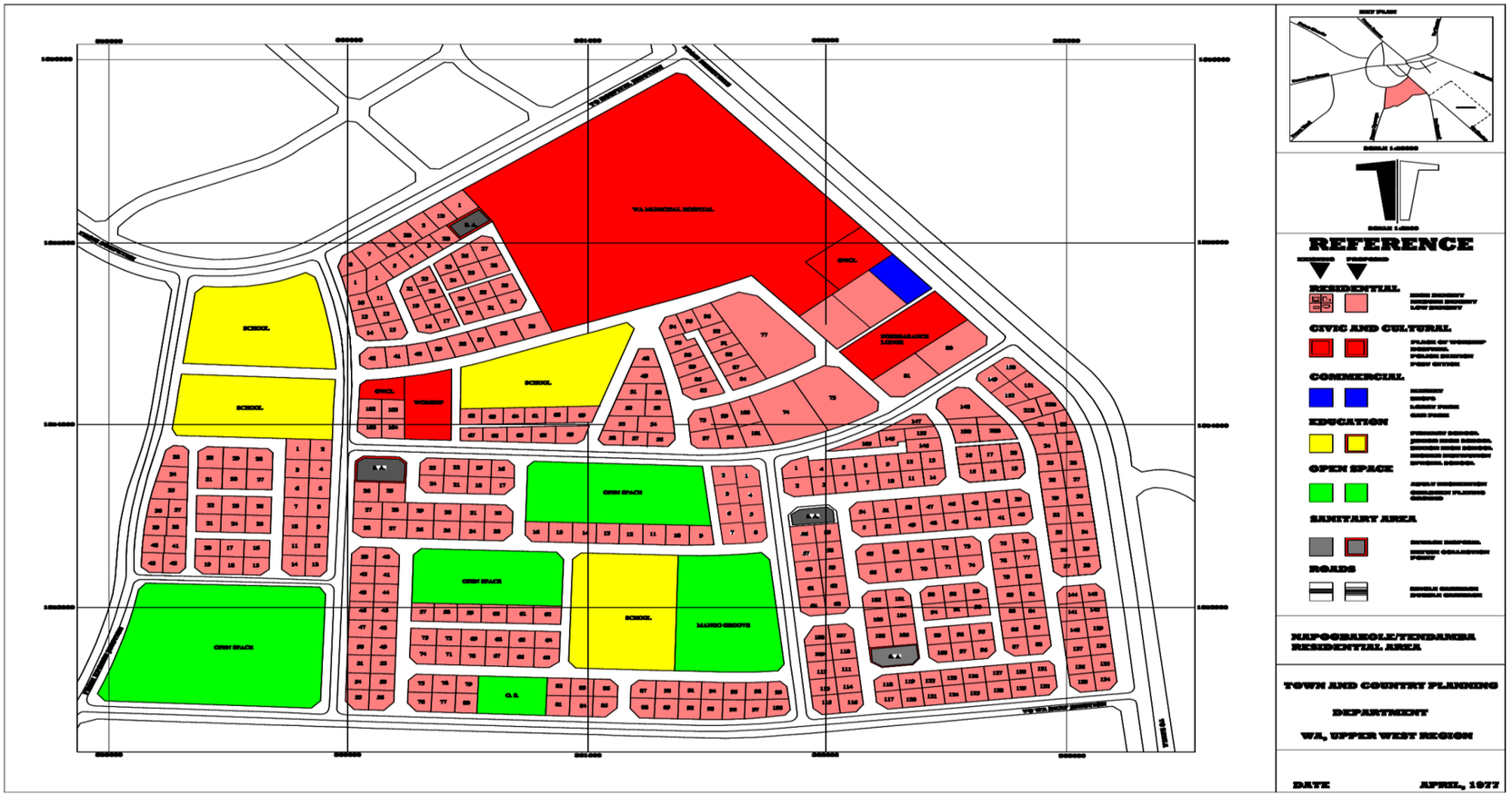


Figure 4. 1: Local Plan of Part of the Wa Municipality

Source: Town and Country Planning Department (2018)

The argument put forward by Yendaw (2014) that communities in Ghana with ineffective planning schemes have poor access to sanitation facilities such as refuse bays and collection points, poor access to residential areas and haphazard siting of buildings is not applicable to Kpaguri Residential (Zone 2) of the Wa Municipality. Blocks of land within parcels of land have been given areas for sanitation purposes. Perhaps the view of Owei *et al.* (2010) will be the case of the Wa Municipality. They argued that unsuccessful enforcement of land use plans is one of the challenges of urban sprawl in developing countries, since the enforcement is often corrupt and intermittent in these countries. This brings to the fore, the discussion on household compliance with land use plans. The key issues discussed include the type of building, obtaining of building permit as well as the extent of adhering to planning standards and regulation.

4.3.1 Type of Respondents Building

It was discovered from the findings of the study that respondents stay in different kinds of residential units. The results indicated that compound housing facilities dominates in the Wa Municipality. From the results on the type of building unit being used by 374 respondents, 58.3% revealed they live in compound houses, while 0.5% of the respondents stay in story buildings as shown in the Table 4.7. Based on the three zones used for the study, it came to light that Zone 1 had majority (83.3%) of the houses being compound houses, 12% of the structures are detached, and 4.7% are semi-detached houses. The dominance of compound houses, the study revealed that, contributes greatly to the congestion of the Zone. This buttresses the Sector Zone Model that the low class residential areas live in a congested area or environment, while the high class residential areas live in spacious environment.

In Zone 2, 48.2% of the houses were detached houses, 39.3% are semi-detached, and 10.7% are compound houses and 1.8% story buildings. But in Zone 3, 72.3% of the houses were compound houses, 20.5% are detached houses and 7.2% are semi-detached houses.

Table 4. 7: Zones and Type of Buildings

Type of building	**Zone**			**Total**
	Zone 1	Zone 2	Zone 3	
Detached	18 (12.0%)	54 (48.2%)	23 (20.5%)	95 (25.4%)
Sami-Detached	7 (4.7%)	44 (39.3%)	8 (7.2%)	59 (15.8%)
Story building	0 (0.0%)	2 (1.8%)	0 (0.0%)	2 (0.5%)
Compound house	125 (83.3%)	12 (10.7%)	81 (72.3%)	218 (58.3%)
Total	**150(100%)**	**112(100%)**	**112(100%)**	**374(100%)**

Observation = 374, Pearson Chi-Square = 158.95, df = 6, Asymp. Sig.= 0.000

Source: Field Survey (2018)

The chi-square test value is 158.95, which was found to be significant at 1%. This means that the claim of independence of type of housing structure on residential zone should be rejected. This means that the residential areas determine the type of housing structures found in a particular area. This probably explain why modern structures such as story buildings, detached and semi-detached houses are found in the high class and middle class residential areas such as Kpaguri Residential (Zone 2) and Mangu (Zone 3) respectively.

4.3.2 Period of House Construction

The period of house construction was examined by considering different time periods. The time period considered include the period before independence, the period between 1957 to 1992, the period between 1993 to 1995, the period between 1996 to 2000, the period between 2001 to 2010, and the period between 2011 to 2018. From Table 4.8, 7.8% of the respondents had their houses constructed in the period before independence and many of these are found in Zone 1. Besides, 16.3% of the respondents constructed their houses between 1957 and 1992, and many of these are also found in the Zone 1. Active development of Kpaguri Residential (Zone 2) and Mangu (Zone 3) started in the period after the year 2000.

Table 4. 8: House Construction Period

Construction period	Zone			Total
	Zone 1	Zone 2	Zone 3	
Before 1957	29 (19.3%)	0 (0.0%)	0 (0.0%)	29 (7.8%)
1957-1992	55 (36.7%)	0 (0.0%)	6 (5.4%)	61 (16.3%)
1993-1995	5 (3.3%)	4 (3.6%)	0 (0.0%)	9 (2.4%)
1996-2000	54 (36.0%)	65 (58.0%)	61 (54.4%)	180 (48.1%)
2001-2010	0 (0.0%)	29 (25.9%)	28 (25.0%)	57 (15.2%)
2011-2018	7 (4.7%)	14 (12.5%)	17 (15.2%)	38 (10.2%)
Total	**150 (100%)**	**112 (100%)**	**112(100%)**	**374(100%)**

Source: Field Survey (2018)

The period before independence corresponds with the colonial era where the physical development in Ghanaian towns and cities was guided by the Town and Country

Planning Ordinance (Cap 84) of 1945. During the establishment of the Town and Country Planning Act, 1958, and the Town and Country Planning Regulations, 1959 physical development in the Wa Municipality was still concentrated in the CBD (Zone 1). Development in most parts of Mangu (zone 3) and the whole of Kpaguri Residential Area (Zone 2) took place after the introduction of physical development planning where local plans have been developed.

4.3.3 Use of Building

On the uses of the buildings within the study area, it came to light that they are used for the following: commercial, residential and for both commercial and residential (mixed purposes). Of the 374 respondents 94.9% indicated they used them for residential purposes whereas 2.2% use their building for commercial purpose (Table 4.9).

Table 4. 9: Use of Building

Use of building	Frequency	Percent
Commercial	8	2.2
Residential	355	94.9
Mixed used	11	2.9
Total	**374**	**100**

Source: Field Survey (2018)

4.3.4 Building permit

Of the 374 respondents, 262 respondents represent 70.1% built their houses without obtaining a building permit while 112 (29.9%) had obtained building permit. The revelation supports the findings of Boamah *et al.* (2014) that most landlords built without securing building permits in the Wa Municipality. Analyzing the acquisition of building

permit based on the study zones, it is revealing from Table 4.10 that no respondent (landlord) in Zone 1 was found to have obtained a building permit before putting up his or her building, but 89.3% of the respondents in Zone 2 (Kpaguri Residential) obtained building permits before building while 10.7% in Zone 3 (Mangu) obtained permit. The results suggested that residential areas (Zone 2) with high compliance to building regulations have the tendency of attaining good sanitary conditions. Abugtane (2015) argued that lack of acquiring building permits before building is a major factor behind insanitary conditions in the Wa Municipality. He argued that lack of access to refuse dumping sites such as communal containers caused by haphazard development is responsible for the sanitation mess in the city of Wa. From the study result, majority of the respondents have not complied with building regulations (LI 1630 – national building regulations, 1996) in the Wa Municipality. This means that the Wa Municipal Assembly will not enjoy the benefits of land use planning as indicated by empirical studies. For example, Yakob (2012) pointed out that, planning mechanisms such as development planning system and planning control system play important roles in achieving sustainability in housing development. He further argued that in the context of housing, land use planning seemed to be the key player to promote sustainable housing especially in urban areas. The failure to comply with land use planning guidelines by landlords would have consequential impact on the provision of public sanitary facilities in the Wa Municipality.

This calls for greater attention to be given to Zone 1 and Zone 3 by way of educating residence on the importance of adhering to land use plans particularly building permits. Abugtane (2015) posited that educating residence on the significance of adhering to land

use plans is the surest way of promoting compliance to land use planning in the Wa Municipality.

Table 4. 10: Zones and Building Permit

Obtain permit	Zone			Total
	Zone 1	Zone 2	Zone 3	
Yes	0 (0.0%)	100 (89.3%)	12 (10.7%)	**112(100%)**
No	150 (57.3%)	12 (4.5%)	100(38.2%)	**262(100%)**
Total	**150 (40%)**	**112 (30%)**	**112(30%)**	**374(100%)**

Observation=374, Pearson Chi-Square=271.855, df=2, Asymp. Sig. 0.000

Source: Field Survey (2018)

The test of independence of variables using the Pearson chi-square reported a chi-square value of 271 which was found to be significant at 1%. This means that the claim of independence of adherence to building regulation across residential areas should be rejected, presenting enough evidence to conclude that the type of residential areas influence one adherence to the building regulations. Furthermore, residence in the new developed areas (which are well planned) were found to have been complying with building regulations such as obtaining permits before putting up buildings and aids to the provision of sanitary facilities in these area. On the issue of how the land use and spatial planning department assess compliance to building permits in the Wa Municipality, a key informant at the TCPD had this to say:

> "*The Town and Country Planning Department operates on statutory frameworks such as the Land use and Spatial Planning act 2016 (Act 925) and National Building Regulation 1996 (L.I. 1630). The statutory frameworks mandate the department to ensure efficient use of land by way of planning of land. Building*

and development permits are what the department use to ensure conformity of physical development to land use plans. However, there is no conformity to such development plans in the Wa Municipality because; many land developers often fail to comply. Hence some sanitary areas have been converted to other purposes" [Interviewee, Staff of Town and Country Planning Department: 21st March, 2018].

These findings suggest residents in the Wa Municipality do not attach much attention to the significance of land use plans. This could be blamed on ineffective enforcement of land use plans by the Wa Municipal Assembly as well as the spatial planning unit.

From Table 4.11, 85.9% of the respondents who did not obtained building permit indicated that they were not aware of building permit when they were constructing their houses. Those who were aware (6.4%) but still did not obtained it indicated the high cost of obtaining as their reason. Others indicated that they were denied a building permit when they tried to obtain it, on the basis that they could not provide the required information for obtaining a building permit.

Table 4. 11: Reasons for not Obtaining Building Permit

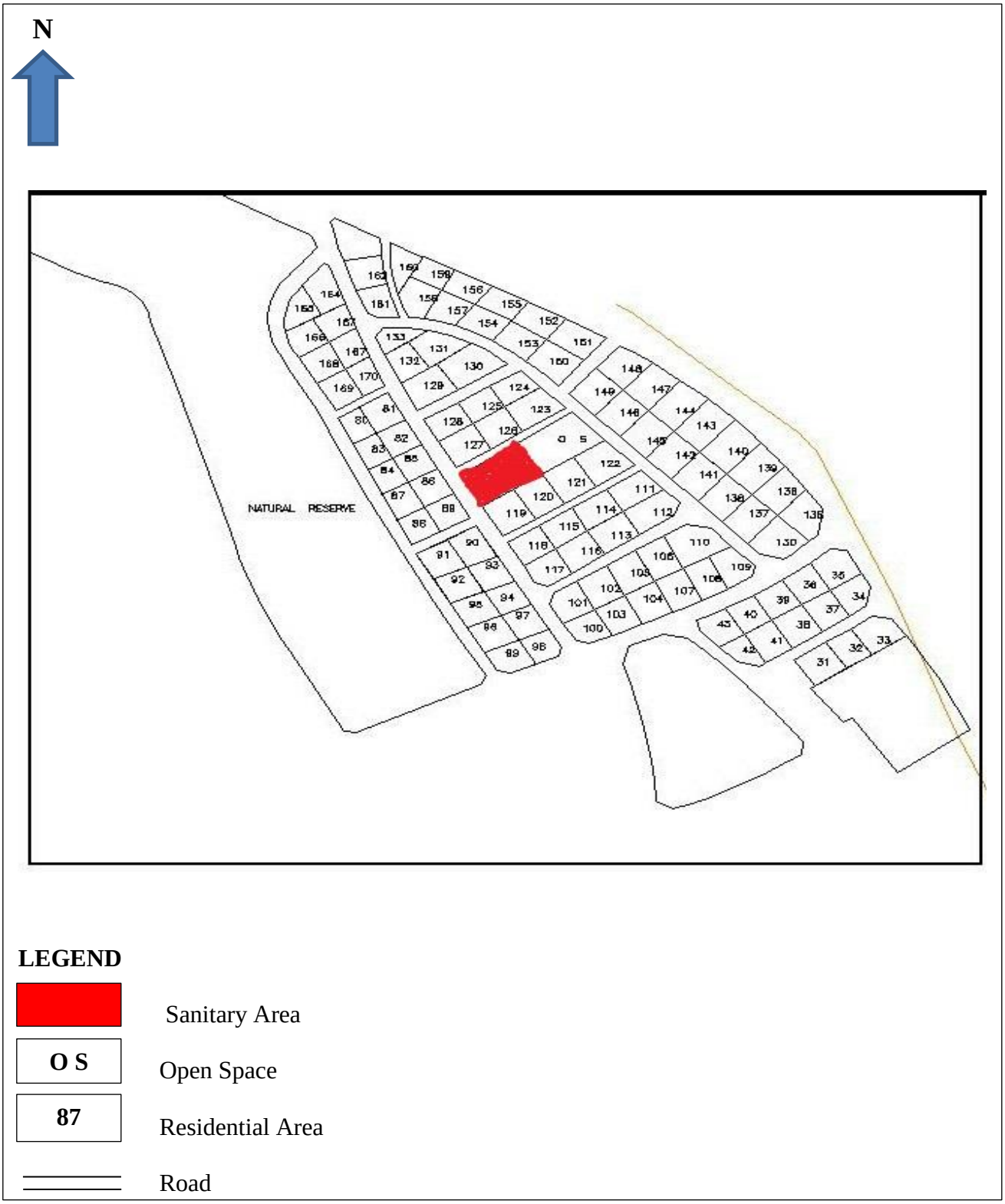
Reasons	Frequency	Percent
High cost of obtaining building permit	14	6.4
Not aware of building permit	189	85.9
Denied a building permit	17	7.7
Total	**220**	**100**

Source: Field Survey (2018)

The results have different implications. First the fact that people are not aware of a building permit means that there is little or no education on the physical development and planning guidelines. It also means that people have considered the cost of obtaining a building permit to be higher than the benefits associated with it. The reasons provided for non-compliance with the planning standards are associated with behavior change dimensions of land developers in the Wa Municipality (Abugtane, 2015).

4.3.5 Adhering to Planning Standards and Regulations

The study sought to find out whether respondents adhere to buildings planning standards and regulations. About 70.6% (264) of the respondents confirmed not to have adhered to building regulations before putting up their buildings, while 29.4% (110) of the respondents confirmed that they have adhered to planning standards and regulations in the constructions of their buildings. The respondents who adhere to the planning standards were found obtaining building permits before the development of their lands. Hence such people avoided putting up their housing structures in unauthorized places such as lands for public purposes. One such critical area is sanitary area as shown by a red color in Figure 4.2. Form Figure 4.2, the sanitary area is provided for within parcel of land. That area is designated for the construction of public toilet or placement of communal containers. It shows that such areas are provided in Mangu (Zone 3), which means that any incidence of limited access to public sanitary facilities will partly be due to non-compliance with planning standards.



Source: Adopted and modified from the Town and Country Planning Department (2018)

The results in Table 4.12 showed that 24.1% of the respondents rated high in meeting the planning standards and regulations while 2.7% indicated low in meeting planning standards and regulations. Regardless of the fact that majority of the respondents buildings do not meet planning standards and regulations, 80.4% of respondents in Zone 2 have high conformity with planning standards and regulations. In Zone 3, 91.1% has not complied with the building standards, while 7.1% and 1.8% were found to have low and average compliance respectively.

Table 4. 12: Compliance to Building Standards by Zones

Meet building standards	**Zone**			**Total**
	Zone 1	Zone 2	Zone 3	
High	0(0.0%)	90(80.4%)	0(0.0%)	90(24.1%)
Low	0(0.0%)	2(1.8%)	8(7.1%)	10(2.7%)
Average	0(0.0%)	12(10.7%)	2(1.8%)	14(3.7%)
None	150(100.0%)	8(7.1%)	102(91.1%)	260(69.5%)
Total	**150(100%)**	**112(100%)**	**112(100%)**	**374(100%)**

Observation=374, Pearson Chi-Square= 334.75, df= 6, Asymp. Sig.= 0.000

Source: Field Survey (2018)

The results on compliance with building standard by residential areas suggest that people in the Kpaguri Residential (Zone 2) have been associated with high compliance to building standards. Besides, a statistical test using the Pearson chi-square revealed a chi-square value of 334.75 which was found to be significant at 1%. This means that there is enough evidence to support the conclusion that compliance with building standards vary according to the residential area. The fact that the high class residential areas are well planned could be the reason for the high compliance.

On the other hand, the unplanned areas lack proper land use planning as evidence in plate 4.1 (an aerial photography from Google Earth that depicts the scenario where many of the households in Zone 1 of the Wa Municipality lack a pattern that can make it possible for the provision of some sanitary services). This means that households do not have planning guidelines from which compliance is expected from them. This result relates to empirical studies such as the finding of Mabaso *et al*. (2015). They maintained that the lack of urban planning or failure to adhere to the provisions of such land use plans leads to unplanned, uncontrolled urbanization, also known as urban sprawl, which creates single-use, low-density settlements.

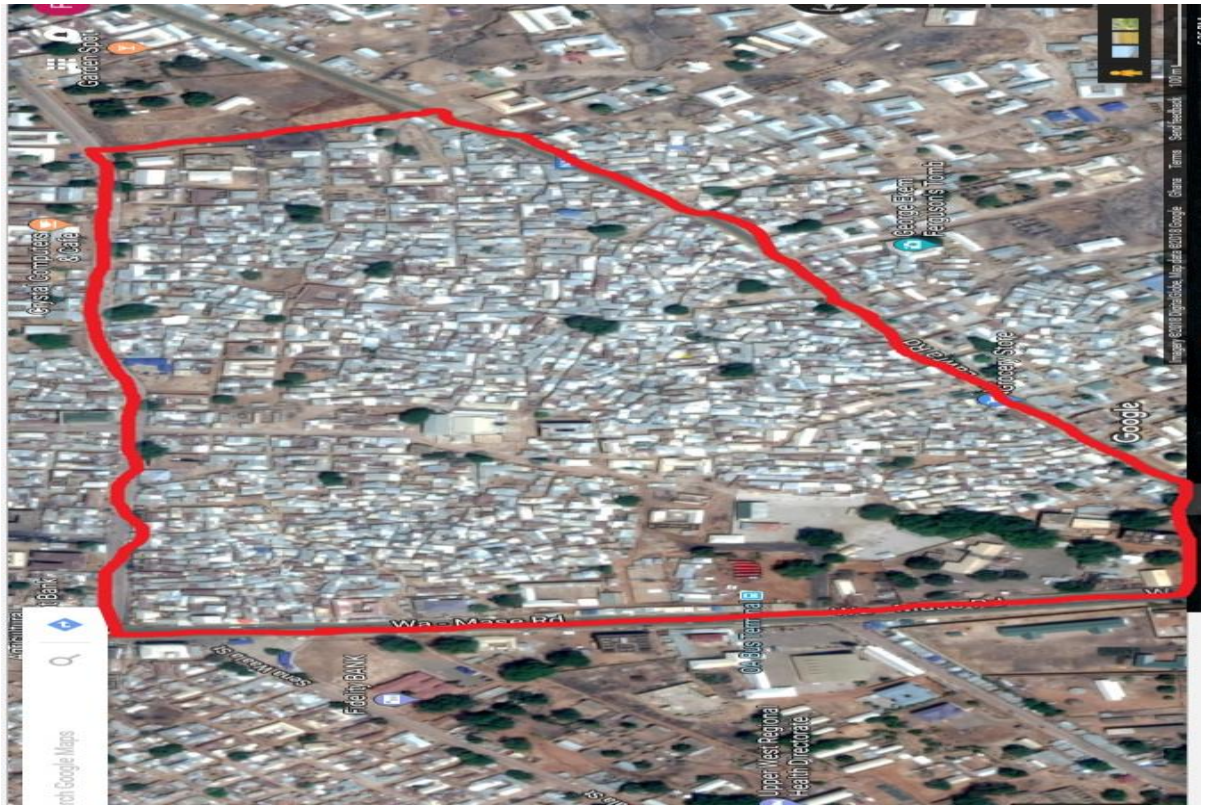


Plate 4. 1: Developments without Planning Standards in Zone 1

Source: Goggle Earth, 2018

Those who did not obtain building permit or building without adhering to planning standards and regulations were asked to describe the extent to which they deviate from the planning guidelines. From Table 4.13, 82.2% described it as high, followed by 12.2% who described it as average while 4.5% described the extent to which their building did not meet planning standards and regulations as low.

Table 4. 13: Extent of not meeting planning standards

Statements	Frequency	Percent
High	217	82. 2
Low	12	4.5
Average	32	12.2
None	3	1.1
Total	**264**	**100**

Source: Field Survey (2018)

4.3.6 Conformity to Land Use Plans

In the study, respondents were asked to indicate whether their buildings conformed to land use plans. The study revealed that 28.1% said that their buildings are in conformity to land use plans because their zones were planned before the construction of buildings while 71.9% opined that their buildings do not conform to land use plans since they built without plans. This implies that majority of the landlords in Wa Municipality particularly the indigenous settlers do not abide by building rules and regulations. This finding also suggests that many of the respondents have not regarded zoning regulations in the Wa Municipality. This means that there is either no plan to follow or people have just failed to comply with them.

4.4 Provision of Sanitary Areas and Facilities

This section assessed the provision of designated sanitary areas and the kind of sanitary facility used by respondents. As a result, respondents were asked to indicate their sanitary facilities, provider of sanitary facilities and location of sanitary facilities. In the researcher's preliminary visit to the study suburbs, it was revealed that Zone 1 is developed without local plans, Zone 2 is a new developed area with local plans and Zone 3 is a mixed developed area made up of indigenous and new developments. The newly developed area is developed based on local plans. In the local plans of Zone 3 (Mangu), sanitary areas are provided. But most of the sanitary areas have been encroached except three which were found to have sanitary facilities. Figure 4.3 is a local plan of part of Mangu (Zone 3). In Figure 4.3, it was found that all the sanitary areas except one have been encroached. In an attempt to find out why the sanitary areas have been utilized for different purposes, this is what a staff of TCPD had to say:

> *As far as I know, about eighty-ninety percent of the Wa Municipality has a layout. The local plans indicate areas of residential, educational, public open spaces, sanitary areas, commercial land uses and both existing and proposed roads. All land uses on the local plan prescribe what should be done in each zone and what should not be done. Achieving orderly development and well planned Municipality does not entirely depend on effective enforcement of plans or the different control mechanisms like zoning and permit systems adopted in in the Municipality, but also the ability of the Wa Municipal Assembly to procure areas designated for public purposes. So the failure of the Assembly to procure and*

protect such areas has equally resulted into the encroachment [Interviewee, Staff of Town and Country Planning Department: 8th January, 2018].

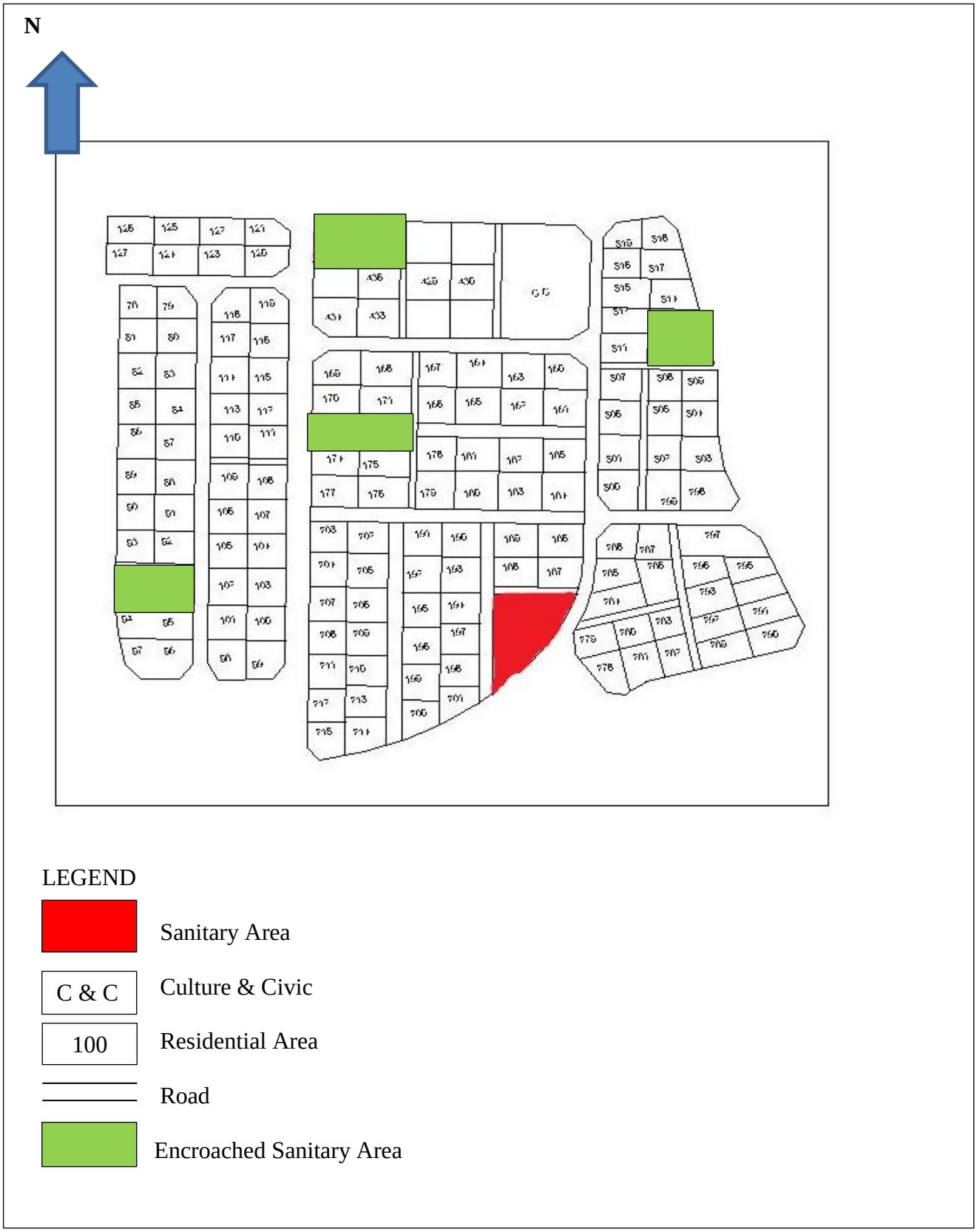


Figure 4. 3: A Local Plan with Sanitary Areas in Part of Mangu

Source: Adapted from Town and Country Planning Department, Wa Municipal (2018)

Apparently the ownership of land in the Wa Municipality has an influence in the provision of sanitary areas. The evidence is that land owners can go ahead to influence the zoning of the area by changing the land use once the required institutions have failed to compensate them for their land.

4.4.1 Waste Dumping Facility

The study revealed specified places where households dump waste in the Wa Municipality using Communal Container. About 57% of the respondents indicated that their households dump their waste in communal containers while 2.1% of the respondents always burn their waste (Table 4.14). The results confirm the findings of GSS (2014) that the communal container is the commonest waste disposal site in the Wa Municipal. There is therefore the need for land use planners to create provision for the siting of communal containers in building plans and enforce adherence to these plans. According to Osumanu *et al.* (2016), spaces for communal containers have been encroached, compelling residence to travel long distance before accessing communal containers in the Wa Municipality. Thus, some people are tempted to dump their waste at inappropriate locations. This may have deleterious sanitary ramification on the health of dwellers in the Wa Municipality. Zomal (2016) also argued that sanitation in the Wa Municipality is poor due to the inadequacy of public sanitation facilities like the communal containers. Eighty eight per cent of the respondents who reported dumping their waste in waste bins were found in Zone 2 .While no member from Zone 2 was found to be dumping waste in communal container, almost all respondents (67.6%) within Zone 1 (Jengbeyiri and Suuriyiri suburbs) were dumping their waste on communal containers. All respondents who manage their waste by sending them to dumping site were respondents from the

third Zone (Mangu suburb). No respondent from Zone 1 and 2 reported sending their waste to the dumping site. Of the 8 respondents who stated that they manage their waste through burning, 75% of them were from Zone 3 while the remaining 25% were from Zone 2. No respondent in Zone 1 was found managing waste through burning. Residents of Zone 2 were found to be using waste bins. This revelation relates well with the sector model which argues that the wealthy class prefer to stay far away from the Central Business District, and are able of pay for other services such as transport and sanitation.

Table 4. 14: Zones and Their Waste Dumping Facility

Dumping of waste	**Zone**			**Total**
	Zone 1	Zone 2	Zone 3	
Waste bin	6 (4.8%)	110 (88.0%)	9 (7.2%)	**125(100%)**
Communal Container	144 (67.6%)	0 (0.0%)	69 (32.4%)	**213(100%)**
Dumping site	0 (0.0%)	0 (0.0%)	28(100%)	**28 (100%)**
Burning	0 (0.0%)	2 (25.0%)	6 (75.0%)	**8 (100%)**
Total	**150 (40%)**	**112 (30%)**	**112 (30%)**	**374(100%)**
Observation=374, Pearson Chi-Square=379.693, =6, Asymp. Sig.=0.000				

Source: Field Survey (2018)

The results on test of independence revealed a chi-square value of 379.69 and this was found to be significant at 1%. This means any claim of independence of the method of dumping waste on residential area should be rejected. Hence the methods of waste disposal vary according to residential areas.

As shown in Figure 4.4, Zone 1 and 3 have places for public sanitation facilities. This is due to the fact that Zone 1 and part of Zone 3 are indigenous settlements and also considered as low and middle classes respectively, where the provision of pubic sanitary areas and facilities are needed. The red dots on the map (figure 4.4) are places for

communal containers and this means that at least some households will have access to these sanitary areas. In the Kpaguri residential Area (Zone 2), communal containers are not provided because it is a newly developed area, considered as a high class residential area and developed with local plans without sanitary areas, where every house is expected to have a waste sanitary facility.

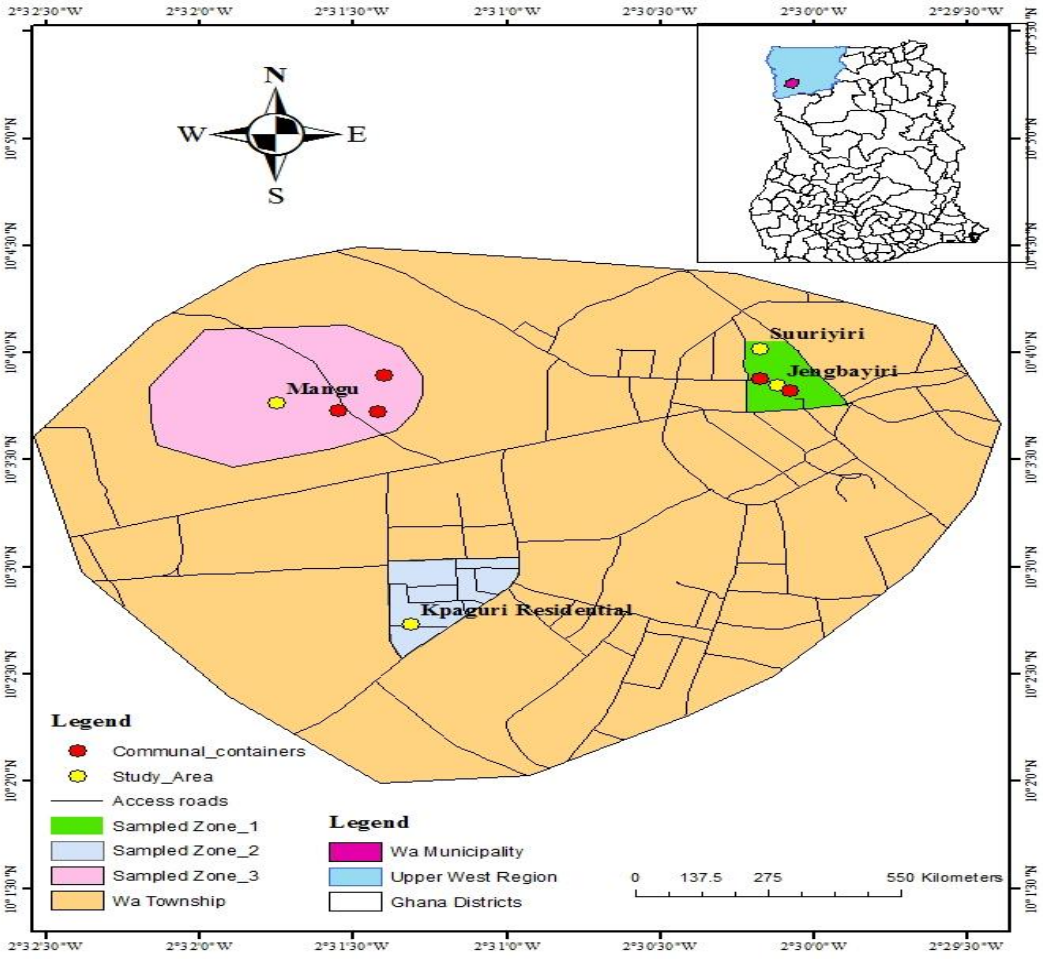


Figure 4. 4: Spatial Distribution of Communal Containers

Source: Author's Construct, 2018

According to Atebije (2016), in urban and regional or city planning practices, one main focus of the planners is the formulation of development plans to achieve desired goals like sustained provision of sanitary areas and the control of developers to comply with the

approved plans with sanitary requirement. The Wa Municipal land planners have provided some sanitary areas and public sanitary facilities for some residential areas as evidence in Figure 4.4. However, public sanitation facilities are not found in Kpaguri Residential Area (Zone 2). They rely on the House to House Waste Colleting Containers (Waste bins) managed by Zoom lion and the Wa Municipal Assembly. Further results have confirmed that the absence of sanitary areas in the Kpaguri Residential (Zone 2) has conformed to the local plans of the Wa Municipality. An interview with a staff of Town and Country planning Department shared his experience on this when he said:

> "*In the planning guidelines, local plans are to be prepared in blocks; each has sanitary area. Sanitary areas are provided in the local plan for a low class and second class residential areas, while that of the high class residential areas, no provision is made for sanitary but rather every house must have toilet and waste facilities*" [Interviewee, Staff of Town and Country Planning Department: 21st March, 2018].

The findings suggest that the absence of Communal Containers in some areas such as the Kpaguri Residential Area (Zone 2) does not mean limited access to sanitation, but every household in the area (Zone 2) is expected to own a waste bin in the house. The findings further revealed that households in Kpaguri Residential (Zone 2) do not share sanitary waste bins with other households, which is desirable in human wellbeing. The Sector Modal attests to this fact by describing the high class residential areas as most desirable part of the city. Figure 4.5 shows a local plan prepared for Zone 3. The red marks in the plan indicate the sanitary areas.

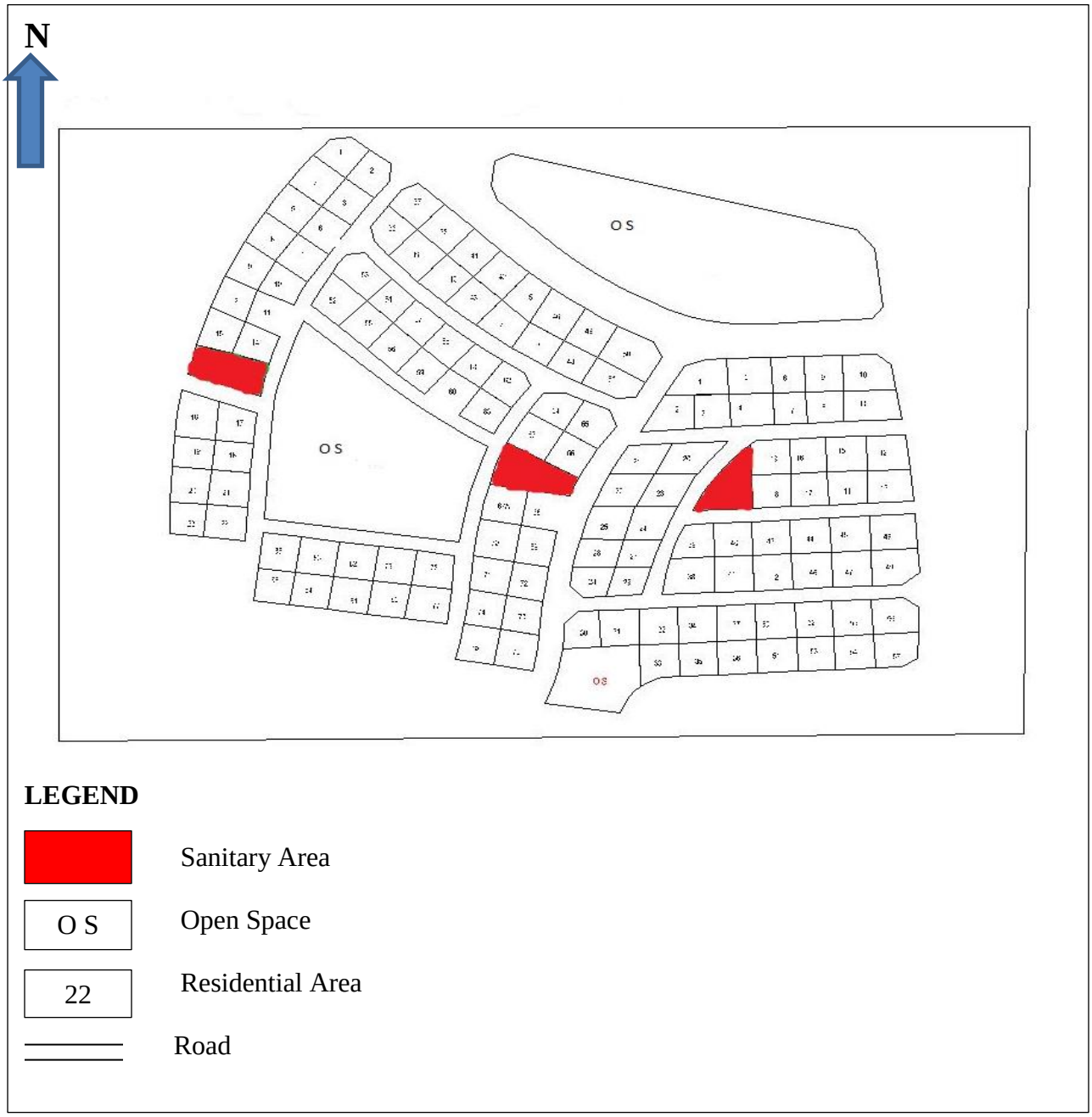


Figure 4. 5: A Local Plan with Sanitary Areas Prepared for Zone 3, in the Municipality

Source: Adapted from Town and Country Planning Department, Wa Municipal (2018)

In the case of Zone 1, which was developed without local plans, it was revealed that there was some collaboration of the Municipal Assembly and the elders of Jengbeyiri and Suuriyiri to create the sanitary areas. It was also revealed that both the communal waste

containers and the public toilets were found on the same space due to lack of space for the facilities. It was further revealed that spaces were not provided for the siting of communal containers in these areas in particular; hence the District Assembly had to provide spaces for the communal containers in order to create access for residents to dump their waste.

Enquiry was made on who provides the waste facility. The results obtained are shown in Table 4.15. Of the 374 respondents, 50.5% said the waste facilities were provided by the Wa Municipal Assembly (WMA), followed by 40.4% who mentioned Zoom Lion Ghana as the main provider of the waste facility. Interestingly, 4.3% indicated that the waste facilities are being provided by the community members themselves especially the elders. This notwithstanding, empirical findings by Dambeebo and Jalloh (2018) suggest that limited access to land for sanitary purpose has prevented the Wa Municipal Assembly from discharging its duties when it comes to conveying waste from source to the disposal site. Most spaces created for public waste sites in the Wa Municipality are encroached with impunity (Abugtane, 2015).

From Table 4.15, it was discovered that 84.0% of respondents in Zone 1 indicated that their waste facilities were given to them by the Municipal Assembly, and 16.0% acquired theirs from Zoom Lion Ghana Ltd. In Zone 2, Zoom Lion provided majority of the waste facilities as suggested by 96.4% of the respondents. Furthermore, 54.5% of the respondents in Zone 3 are using facilities provided by the Wa Municipal Assembly. The results also show that all the respondents 16 (4.3%) who claim that their waste facilities were provided by the community members themselves were from the suburb of Mangu (Zone 3).

Table 4. 15: Providers of Waste Facility across Zones

Provider of waste facility	Zone			Total
	Zone 1	Zone 2	Zone 3	
Municipal assembly	126 (84.0%)	2 (1.8%)	61(54.5%)	**189(50.5%)**
Zoom Lion Ghana	24 (16.0%)	108 (96.4%)	19 (17.0%)	**151(40.4%)**
Community Members	0 (0.0%)	0 (0.0%)	16 (14.3%)	**16(4.3%)**
No response	0 (0.0%)	2 (1.8%)	16 (14.2%)	**18(4.8%)**
Total	**150(100%)**	**112(100%)**	**112(100%)**	**374(100%)**

Observation = 374, Pearson Chi-Square = 278.35, df = 6, Asymp. Sig.= 0.000

Source: Field Survey (2018)

A test of independence of provision of waste management facilities across residential areas was done using the Pearson chi-square analysis. The test value was estimate at 278.35 and this was found to be significant at 1%. This means that there is enough evidence to reject the claim of independence of provision of waste management facilities on residential areas.

An interview with a key informant at Zoom Lion Ghana Ltd revealed how the company operates and contributes towards the provision of sanitary facilities in the Wa Municipality. A staff had this to Say:

> *"Zoom Lion Ghana Ltd is into private partnership with the Wa Municipal Assembly. The company's main role in the management of public sanitation is to clean public areas and place communal containers at designated sanitary areas. The company also lifts the containers with waste to the main dumping site"* [Interview with Zoom lion Staff: 13th March, 2018].

This revealed that Zoom Lion Ghana is a partner to the Municipal Assembly in the area of waste management. However, the private services that are being delivered by the company can widen access to sanitation through households subscribing to their services in areas of limited access to public facilities.

4.4.2 Locations of Communal Container

From Table 4.16, majority of the respondents (56.1%) said communal containers were kept in specific location within the suburbs while 0.8% indicated that they were not placed at their required location within the suburb. About 43.1%, especially those who do not use the communal containers could not tell which area the containers were placed.

Table 4. 16: Place for communal container

Sites	Frequency	Percent
Others	161	43.1
Anywhere	3	0.8
Specific Locations	210	56.1
Total	**374**	**100**

Source: Field Survey (2018)

Of the 374 respondents, 32.9% of the respondents said it is the WMA who provided the spaces, 22.5% said the spaces are being provided by the community elders while only1.3% pointed out that Zoom Lion Ghana is the provider of the space. Finally, 43.3% of the respondents did not respond to the question of who provided a space for waste dumping facility as shown in Table 4.17.

Table 4. 17: Providers of Space

Agents	Frequency	Percent
No Response	162	43.3
Wa Municipal Assembly	123	32.9
Zoom lion Ghana	5	1.3
Community elders	84	22.5
Total	**374**	**100**

Source: Field Survey (2018)

The results revealed that different institutions and personalities in the Wa Municipality contributed in various ways towards influencing households' access to sanitary facilities. Plate 4.2 shows a typical communal container provided by Wa Municipal Assembly at Jengbayiri.

Plate 4. 2: Public Container Provided by WMA in Zone 1

Source: Field Survey, 2018

4.4.3 Adequacy of Communal Containers

The respondents were quizzed on whether the communal containers (Public Containers for waste dumping) are adequate for their waste management. Of the 374 respondents, it was revealed that 0.8% of the respondents were of the view that communal containers were adequate in their suburb and 63.9% indicated that the containers were inadequate. The respondents who said the communal containers were inadequate maintained that the unplanned nature of the suburbs, refusal of WMA to empty full containers as well as the refusal of WMA to provide communal containers contributed to the shortage of containers in their respective areas. However, some respondents (35.3%) did not answer the question relating to the adequacy of the communal containers.

According to Dongballe (2016), the inadequacy of public waste facilities in the Wa Municipality poses a serious challenge of waste management in the municipality. This has created room for indiscriminate dumping of waste in streets, corners, in between houses, in gutters, drains, and water ways. Similar finding was obtained in an interview with a staff of the Wa Municipal Assembly. The respondent lamented on the shortage of communal containers in some residential areas as follows:

> *"The inability of households to obtain waste bins and the Municipal Assembly inability to provide efficient Communal Containers for Waste Collection, result in much waste unattended to within the Municipality"* [Interview with Wa Municipal Environmental Health Officer: 8th March, 2018].

The results confirmed that there are insufficient containers for waste management in the Municipality. Several factors including lack of proper planning are responsible for this challenge associated with sanitation in the municipality. This view is in tandem with the

argument put forward by Dambeebo and Jalloh (2018) that poor land use planning is a major cause of poor sanitation in the Wa Municipality.

4.4.4 Toilet Facility

Table 4.18 shows the distribution of the type of toilet used among the various zones. It shows that 80.6% of respondents who had toilets within their home were in Zone 2 (Kpaguri Residential), 10.8% of them were within the suburb of Mangu (Zone 3) while the remaining 8.6% who are the minority were from Zone 1 (Jengbeyiri and Suuriyiri). Of the 218 respondents who use public toilet, 63.3% were from Zone 1 (Jengbeyiri, Suuriyiri) while the remaining 36.7% were found at the third zone (Mangu). However, in Kpaguri Residential Area (Zone 2), no respondent was found to be using the public toilet. With regards to the practices of open defecation, all respondents who reported using open defecation are from Zone 3 (Mangu). No respondent from the other two zones was found to be practicing open defecation. This finding confirms the argument of Oyinloye and Oluwadare (2015) that lack of public toilet facilities is responsible for increase in open defecation in low income residential areas and its associated health impacts. The findings also confirmed the argument of Zomal (2016) that the inadequacy of public toilets in the Wa Municipality has compelled some residence to resort to open defecation.

Table 4. 18: Toilet Facilities across Residential Zones

Toilet	Zone			Total
	Zone 1	Zone 2	Zone 3	
Private toilet	12 (8.6%)	112 (80.6%)	15 (10.8%)	**139(100%)**
Public toilet	138 (63.3%)	0 (0.0%)	80 (36.7%)	**218(100%)**
Open Defecation	0 (0.0%)	(0.0%)	17 (100%)	**17 (100%)**
Total	**150 (40%)**	**112 (30%)**	**112 (30%)**	**374(100%)**

Observation=374, Pearson Chi-Square=307.955, df. = 4, Asymp. Sig. 0.000

Source: Field Survey (2018)

The chi-square test of independence revealed a test value of 307.95 which was found to be significant at 1%. This means that there is enough evidence to reject the claim of independence of toilet facility being used across the residential areas. Hence, access to some toilet facilities such as toilets within homes is common in the Kpaguri Residential (Zone 2) Area; public toilet is common in the indigenous areas while open defecation is also common in Mangu (Zone 3).

From Figure 4.6, the results revealed that public toilet facilities are provided for residence in (Zone 1) and Zone 3. However, similar facilities were not found in Zone 2 because, it is a new developed residential area and also a high class residential area, where every landlord is expected to have a toilet facility in the house.

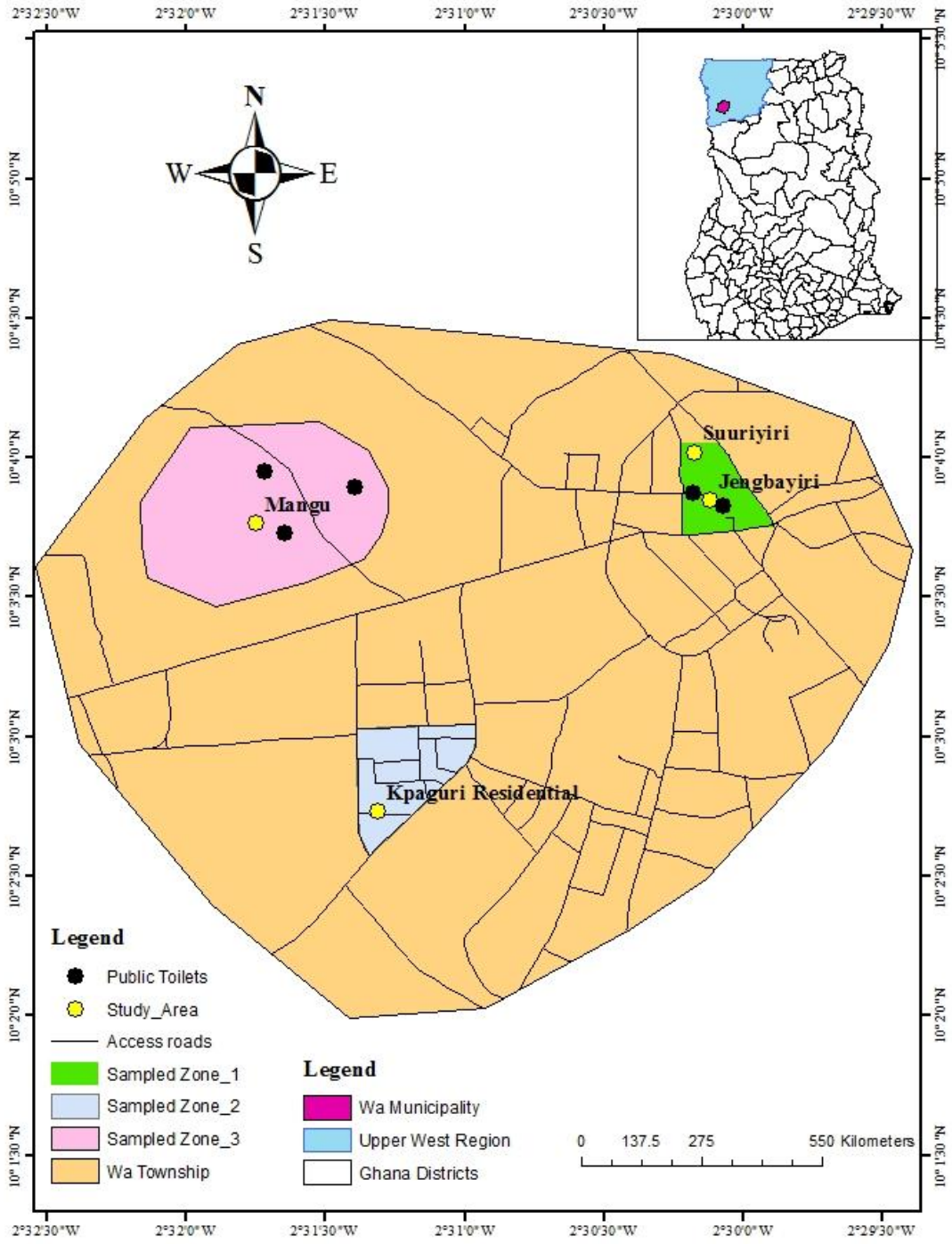


Figure 4. 6: Spatial Distribution of Public Toilets

Source: Author's Construct, 2018

Table 4.19 shows 59.9% of respondents who use public toilet indicated that the Municipal Assembly is the one who provided them while 1.3% said the public toilet is being provided by Zoom Lion Ghana Limited. Only 0.3% said the toilets are being provided by the community members.

Table 4. 19: Provider of public toilet

Agent/Institution	Frequency	Percent
Others	144	38.5
Municipal Assembly	224	59.9
Zoom lion Ltd	5	1.3
Community Members	1	0.3
Total	**374**	**100**

Source: Field Survey (2018)

Plate 4.3 shows a public toilet at Mangu.(Zone 3).

Plate 4. 3: Public Toilet in Mangu

Source: Field Survey (2018)

Despite the relative effort of the Municipal Assembly as well as some individual households in the provision of sanitary facilities such as household/public toilets, the results of the study showed that the effort has not been sufficient. A respondent from the Environmental Health of the Wa Municipal Assembly shared his opinion with the researcher regarding the effort of the Wa Municipal Assembly towards the provision of public toilets when he said:

> *"Liquid waste management requires all households to own toilets in their houses and the Municipal Assembly to provide public toilet for strangers or people on transit. This is lacking because many households in the Municipality do not have toilets and the Assembly has not been able to provide enough for the public. Therefore, there is pressure on the few that are available and many people also*

practice open defecation" [Interview with an Environmental Health Officer: 8th March, 2018].

The results in Table 4.20 indicated that 35.3% of the respondents said the spaces for the construction of the toilets are provided by the Municipal Assembly while 24.9% indicated that the community elders provided space for the construction of the toilet. Only 0.5% respondents said the spaces for the construction of the public toilets were provided by Zoom Lion Ghana.

Table 4. 20: Provider of Space for the Public Toilet

Agent	Frequency	Percent
Others	147	39.3
Municipal assembly	132	35.3
Zoom lion Ltd	2	0.5
Community elders	93	24.9
Total	**374**	**100**

Source: Field Survey (2018)

4.4.5 Adequacy of Public Toilets

Of the 374 respondents' adequacy of public toilets, the results indicated that 0.8% of the respondents said due to the planned nature of the suburbs, the public toilet there were adequate. On the other hand, majority of the respondents (66.0%) indicated that the public toilets in their suburbs were not adequate citing the unplanned nature of the suburbs as well as the negligence on the part of the WMA to provide them with toilet facilities. However, 33.2% respondents did not answer the question relating to the adequacy of the public toilets. These results have also revealed that public toilets in the

Wa Municipality are not adequate for the public as reported by majority of the respondents.

4.5 Access to Public Sanitation Facilities

4.5.1 Home Easily Accessible by Vehicles

From Table 4.21, 34% agreed while 63.6% disagree that their houses were easily accessible by vehicles. Besides, when asked to indicate whether their houses are well connected with roads, 28.9% agreed while 69% disagreed.

Table 4. 21: Home Accessibility

Accessibility	Agree	Disagree	Neural	Total
House accessible by vehicle	127 (34%)	238(63.6%)	9 (2.4%)	**374(100%)**
Houses well connected with road	108(28.9%)	258 (69%)	8 (2.1%)	**374(100%)**

Source: Field Survey (2018)

The results suggest that majority of the respondents are found in residential areas that are not properly planned, hence the limited accessibility as confirmed by the responses. On the other hand, people with access to roads are living in well planned residential areas and their houses can be accessed by vehicles. This means that such households will be able to access the services of private waste management services such as that of the Zoom Lion Ghana Ltd.

An interview with a key informant at Zoom Lion Ghana Ltd has revealed the challenges associated with waste management regarding access to some residential areas. The respondent made his comment as follows:

> *Our waste trucks have easy access to residential areas with roads network but have challenges in areas without roads and walkways. It is therefore, not easy accessing communal containers in Suuriyiri and Jengbeyiri'* [Interview with Zoom lion Staff: 13th March, 2018]

The result has confirmed that some residential areas especially in the indigenous suburbs are very difficult to access. The absence of roads networks in such areas means that public transport system such as heavy duty vehicles cannot provide sanitary services to the residence. Access to public sanitation facilities is therefore, very difficult for both service providers as well as the beneficiaries of the services.

The results in Table 4.22 revealed that 24.3% indicated that the condition of roads linking their houses is good. Besides, 66.3% described the condition of the links as poor while 9.4% only see the networks in the suburbs as fair. It was also discovered that 80.4% of the respondents in Kpaguri Residential Area (Zone 2) indicated that the roads are good whiles 19.6% rated them as fair. However, 92.7% and 97.3% of the respondents in Zone 1 and Zone 3 respectively maintained the conditions are poor. The results imply that Zone 1 and Zone 3 need urban redevelopment in order to provide links (good roads) to promote accessibility. Access to the neighborhood would help enhance transport service delivery. The finding is in conformity with the findings of Litman (2015) who argued that land use planning improves public sanitation services within a neighborhood and improving roads options from home to public sanitation facilities, tends to increase accessibility.

Table 4. 22: Condition of Links across Suburbs

Conditions of links in the suburb	Zone			Total
	Zone 1	Zone 2	Zone 3	
Good	1 (0.7%)	90 (80.4%)	0 (0.0%)	**91 (24.3%)**
Fair	10 (6.6%)	22 (19.6%)	3 (2.7%)	**35 (9.4%)**
Poor	139 (92.7%)	0 (0.0%)	109 (97.3%)	**248 (66.3%)**
Total	**150 (100%)**	**112 (100%)**	**112 (100%)**	**374 (100%)**

Observation = 374, Pearson Chi-Square = 331.64, df. = 4, Asymp. Sig. 0.000

Source: Field Survey (2018)

The chi-square test of independence revealed a chi-square value of 331.64 and this was found to be significant at 1%. This means that the independence of the two variables (conditions of roads, and Zone) in Table 4.22 should be rejected. This revealed that Kpaguri Residence (Zone 2) is well planned with roads linking the houses than the unplanned ones such as Zone 1. Access to residential areas through roads has implication for access to sanitary facilities in the Wa Municipality (Osumanu *et al*., 2016).

Figure 4.7 shows the distribution of roads network in the study Zones. The map shows a clear network of roads in Kpaguri Residential Area (Zone 2) implying that public transport services can be accessed with ease. On the other hand, the Zone 1 which comprises of Suuriyiri and Jenbgeiyi lack the transport route within the suburbs, hence giving rise to limited access to sanitation facilities. The implications of the absence of roads network is that residence will have to walk for a long distance to access sanitation facilities elsewhere or living under poor sanitation conditions. Empirical evidences have confirmed this finding, thus the Sector Model describes the low class residential area as a

zone of highly inaccessible, no open spaces (congestion) couple with bad environmental issues like poor sanitation and air pollution. However, the Sector Model describes the high class residential area as a zone of spacious and clean environment.

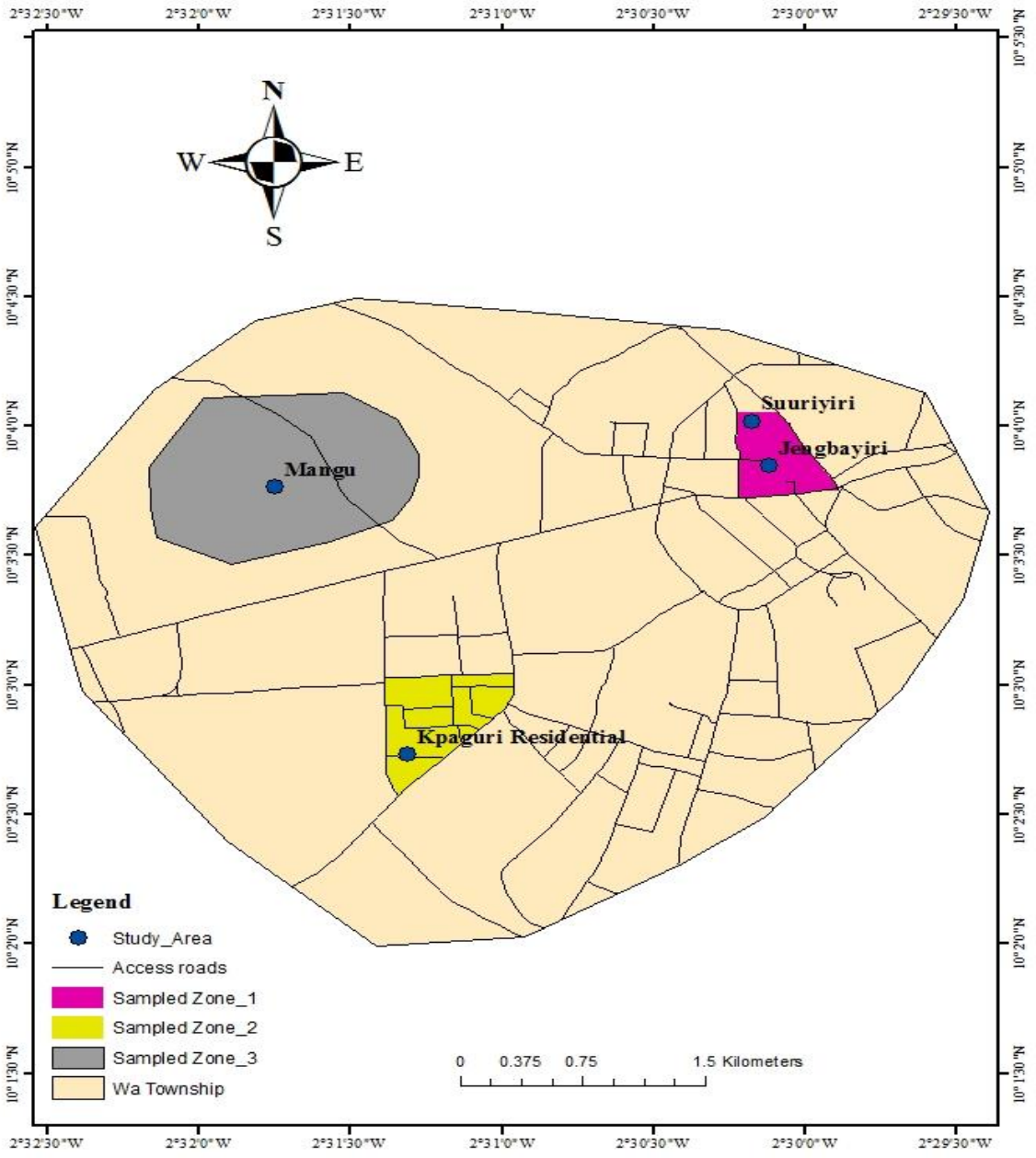


Figure 4. 7: Distribution of Roads in the Study Area

Source: Author's Construct, 2018

4.5.2 Challenges Posed by Poor Condition of Links and Networks

The challenges posed by poor conditions of links and networks were inability of waste loading vehicles to access their houses (59.6%) and poor condition of links in the suburbs resulting in their inability to have access to public sanitation facilities (58.8%) as shown in Table 4.23. This means, poor urban planning and noncompliance to building regulations have the tendency to worsen sanitation services in the Wa Municipality. Similar finding was obtained by Yendaw (2014) who blamed poor planning as major cause of the sanitation mess in Tarkwa Nsuaem Municipality. Abugtane (2015) obtained similar finding in the Wa Municipality.

Table 4. 23: Challenges

Challenges	Frequency	Percent
Unable to access house	223	59.6%
Unable to access public sanitation	220	58.8%

Source: Field Survey (2018)

4.5.3 Adequacy, Distance to and the Conflict of Public sanitation Facilities with Land Use

Table 4.24 shows that 66.8% disagreed that there are adequate sanitary facilities in their suburbs, 30.5% agreed that sanitation facilities within the suburbs are adequate while 1.6% could not tell whether or not sanitation facilities within the suburbs are adequate. Also, 62.8% disagreed while 2.4% agreed that these facilities are adequately spaced for easy access. 3.7% could not tell how adequately public sanitation facilities are spaced. Respondents were again asked if they agreed that the distance from their houses allows easy access to public facilities. Forty eight per cent (48.1%) of the respondents disagreed that they have easy access to public sanitation facilities due to the distance from their

homes. On the other hand, 9.1% agreed while 11.5% were neutral about how the distance from the home allows easy access to public sanitation facilities.

Of the 374 respondents, 37.4% disagreed that the siting of public sanitation facilities conflict with other land uses while 15.2% agreed that the sitting of public sanitation facilities conflict with other land uses. On the part of some respondents (15.8%), they could not tell whether or not the siting of public sanitation facilities conflict with other land uses hence remains neutral.

Table 4. 24: Adequacy, Space, Easy Access and Conflict with Land Use

Statement	Agree	Disagree	Neutral	No response	Total
Adequate sanitation facilities	114 (30.5%)	250 (66.8%)	6 (1.6%)	4 (1.1%)	**374 (100%)**
Facilities adequately spaced	9 (2.4%)	235 (62.8%)	14 (3.7%)	116 (31.1%)	**374 (100%)**
Distance allow easy access	34 (9.1%)	180 (48.1%)	43 (11.5%)	117 (31.3%)	**374 (100%)**
conflict in siting facilities	57 (15.2%)	140 (37.4%)	59 (15.8%)	118 (31.6%)	**374 (100%)**

Source: Field Survey (2018)

The results imply that some residential areas of the Wa Municipality have challenges regarding access to sanitary facilities. The main challenges include inadequate facilities for sanitation, long distance to cover before accessing a sanitary facility, and conflict of land use in sitting public sanitary facilities. An interview with a staff of the Wa Municipal Assembly gives further explanation on the conflict regarding land use.

"The Municipal Assembly provides sanitary areas, as contained by the general layout of the municipality by the Town and Country Planning Department. Besides, the sanitary facilities have to be provided by the Assembly. However, when the assembly fails to negotiate well with landlords to procure and protect such places for sanitary areas, they are encroached by the land owners and large sums of monies are paid to compensate the landlords in order to acquire places for sanitation practices. Besides, the unplanned areas are deprived of sanitary facilities once it is difficult to access land" [Interview with an Environmental Health Officer: 8th March, 2018].

The results imply that the local plans provide spaces for residential as well as sanitation. However, the Wa Municipal Assembly will have to negotiate with the landlords in order to procure and protect the public places (sanitary areas). If the negotiation fails or delays, the land owners can claim their lands thus making it difficult for the Municipality to access places for sanitation. Hence, the dynamics between the Municipal Assembly on one hand and the land owners on the other hand also contribute to the challenges associated with limited access to sanitary facilities in the Wa Municipality.

4.5.4 Respondents Walking Time to Public Sanitation Facility

From Table 4.25, 46.3% stated that they used 1-10 minutes to walk to the nearest public sanitation facility from their houses. About 2.7% were found to always use more than 20 minutes (21-30 minutes) to walk to the nearest public sanitation facility from their houses.

Table 4. 25: Walking time

Time (in minutes)	Frequency	Percent
No response	130	34.8
1-10	173	46.3
11-20	61	16.2
21-30	10	2.7
Total	**374**	**100.0**

Source: Field Survey (2018)

4.5.5 Having Full Access to Sanitation Facilities

Generally, the respondents were asked whether they have full access to sanitation facilities. Of the 374 respondents, 68.2% of respondents indicated that they have no full access to sanitation facilities in their suburbs because of the unplanned nature and 31.8% opined that due to the planned nature of the suburbs, they have full access to sanitation facilities in their suburbs.

The results revealed that many households still have challenges accessing sanitary facilities in the Wa Municipality. This is because the Wa Municipality has inadequate sanitary facilities. In that case, such respondents are not having access to both toilet facilities and dumping containers or places for their household waste. Similar finding was gathered by Boamah (2013) and Dongballe (2016) in the Wa Municipality. An interview with a staff of Town and Country Planning Department had this to Say:

> "*In providing sanitary space in the local plans, the distance of every house to the sanitary place is considered to ensure easy access. Planned areas allow every house in all the residential areas to have good access to sanitary facilities. However, areas not planned face challenges in accessing sanitary facilities"*

[Interviewee, Staff of Town and Country Planning Department: 21st March, 2018].

This implies that efforts are being made by the Town and Country Planning Department to facilitate residential areas access to sanitary facilities. However, this is only possible if the area is well planned. Indigenous settlements which have been occupied before the development of land use planning guidelines often lack the opportunity to be provided with sanitary areas within their residences.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of major findings of the study, the conclusion and recommendation. They are presented and discussed according to the research objectives.

5.2 Summary of Major Findings

The study is conducted on the effects of urban land use planning on the provision of public sanitation facilities in the Wa Municipality, Ghana. Empirical studies have argued that the Wa-Township has been characterized by sanitation mess in the built environment such as indiscriminate dumping of waste resulting from inaccessibility of public sanitation facilities within the neighborhoods. The study therefore, sought to examine the conformity of physical development to land use plans in the Municipality, assess the effects of land use planning on the provision of space for sanitation facilities, and to investigate the land use planning on the accessibility of public sanitation facilities in the Wa municipality.

The study used a mixed method approach in the investigation of the phenomenon because of it flexibility, comprehensiveness and robust discussion. Primary data were collected from households' heads, heads of institutions, and through observation. Questionnaire was used to collect primary data from 374 household heads while interviews were conducted on the administrative heads of Wa Municipal Assembly, Zoom lion Ghana Limited, and the Town and Country Planning Department. The households were selected through a two-stage sampling procedure while the administrative heads were selected using purposive sampling procedure. Hand-held global positioning system (GPS) receiver

was used to pick geographic coordinates of various public toilets and communal waste containers in the study suburbs. Besides, photographs of some public sanitation facilities were taken as evidence of observation. Satellite image of the study area was taken from Google Earth as base map to check the conformity of physical development to land use plans within the neighborhood.

The quantitative data were analyzed by means of descriptive statistics (tabular methods). Besides, chi-square test of independence was performed on the crosstabulations. Qualitatively, information gathered from the interviews of key informants was transcribed and summarized into statements and quotations, which was used to clarify some of the results obtained in the study. The geographic location points of public toilets and communal containers were analyzed using ArcGIS (version 10.1) and the results was presented in maps to establish the spatial distribution of public sanitation facilities in the study suburbs. Several findings were obtained and are summarized as follows:

5.2.1 Conformity of buildings to land use plans

The results of the study indicated that physical development and planning guidelines have been provided for many parts of the Wa municipality. Areas with local plans were Zone 2 (SSNIT Residential Area, Kpaguri Residential Area and Konta Extension) and most parts of Zone 3 (Mangu). However, such plans have not been provided for areas that have been developed before the development of the plans or the legislative instruments guiding their development. Among the three main residential areas studied, Zone 1 which comprises of Suuriyiri and Jengbayiri suburbs are unplanned, hence household in these suburbs have not developed their lands in conformity to any physical development planning guidelines.

The type of structures being put up in the various residential areas include detached houses, semi-detached houses, story buildings, and compound houses. Majority of the detached and semi-detached houses (58.7% and 74.6% respectively) were found in Zone 2 and 3. Major development of housing structures in Zone 1 started from the period before independence to the year 2000. On the other hand development of the planned areas started effectively from 1996 to date. Therefore, many of the structures in Zone 1 were not regulated by the National Building Code, (LI 1630), 1996.

The results pointed out that 69.5% of the respondents have not obtained building permits before putting up their structures. Such people have therefore, failed to developed their lands in conformity with the land use plans. It was observed that 57.3% of Zone 1 respondents, 38.2% of Zone 3 respondents and 4.6% of Zone 2 were the distribution of people who have not complied with building permit requirement. Residence in Zone 2 recorded high compliance with building standards while those in Zone 3 recorded low standard of compliance and those in Zone 1 recording no or poor standard of building. Factors such as high cost associated with compliance with building permit and standard of building, ignorance about building permit, and denial of people of the permit were the reasons noted for non-compliance with land use planning.

5.2.2 Provision of sanitary areas and facilities

The result of the study revealed that the opportunities available to residence for dumping of their solid waste include the use of waste bins, communal containers, dumping sites, and burning. It was discovered that residence of Zone 2 constituted 88% of those who use waste bins, while residence of Zone 1 constituted 67.6% of those who use communal containers. The use of dumping site is practiced by only those in Mangu (Zone 3) and

again residence of Zone 3 constituted 75% of those who burn their solid waste. While the use of communal containers and dumping site are totally absent in Zone 2, residences in Zone 1 do not also use dumping site nor burning of waste.

The results further indicated that public sanitary areas have not been provided in Zone 2 residential areas. The reason is that every household in a new developed area is expected to have its own sanitary facilities as required by the local plans. In the indigenous areas with sanitary spaces, sanitary facilities are provided by the Wa Municipal Assembly, Zoom lion Ghana Ltd or individual members in the communities. It was found that 50.5% of the respondents are using dumping facilities provided by the Wa Municipal Assembly, 40.4% are using facilities provided by Zoom lion Ghana Ltd while 4.3% of the respondents are using sanitary facilities provided by community members. Further evidence suggested that Zoom lion Ghana Ltd is a partner to the Municipal Assembly in the area of waste management. However, the private services that are being delivered by the company can widen access to sanitation through households subscribing to their services in areas of limited access to public facilities. This is the case of Zone 2 with no public sanitary facilities but the residences were found using the services of Zoom lion Ghana Ltd.

It was also discovered that 63.9% of the respondents have limited access to the public facilities. This means that there are insufficient containers for waste management in the Municipality. Several factors including lack of proper planning are responsible for this challenge associated with sanitation in the Municipality. The main toilet facilities found being used by households in the Wa Municipality include household toilet facilities (37.2%), public toilet facilities (58.3%), and open defecation (4.5%). Further results

indicated that 80.65% of those using private home toilets are from Zone 2, 63.3% of those using public toilets are from Zone 1 and 82.5% of those using open defecation are from Zone 3.

While private home toilets are provided by household heads or house owners, the public toilet facilities are provided by the Wa Municipal Assembly. In terms of the provision of space (land) for the construction of these toilets, the results indicated that 35.3% said the spaces for the construction of the toilet are provided by the Municipal Assembly while 24.9% indicated that the community elders provided space for the construction of the toilets. However, the facilities available to households were found not to be sufficient as indicated by 66% of the respondents.

5.2.3 Access to public sanitation facilities

It was discovered that 63.6% of the respondents' houses are not accessible by vehicles and 69% also indicated that their houses are not well connected with roads. This means that they lack access to sanitation services such as public vehicles that provide sanitation services to the various suburbs in the Wa Municipality. Further results suggest that limited access to some suburbs makes it difficult for Zoom lion to extent its services to some areas. Access to public sanitation facilities is therefore, very difficult for both service providers as well as the beneficiaries of the services.

It was revealed that 24.3% of the respondents described their roads networks as good while 66.3% described their situation as poor. About 98.9% of those who considered their road networks as good are from Zone 2 (Kpaguri residential area) while 55.5% and

44.5% of those who described their situation as poor are from Zone 1and Zone 3 respectively.

Respondents therefore, face challenges in their effort to access public sanitation facilities. Key among them as discovered in this study includes the difficulty to access their houses. It was further noted that the sanitary facilities in some neighborhoods are not adequate and also not well spaced such as the case of Zone 1. This further generates a problem of walking for long distance to access these facilities. In situation where the Municipal Assembly fails to procure designated areas for sanitation, such places are often encroached by the landlords and this introduces additional cost of acquiring lands for sanitation.

5.3 Conclusion

5.3.1 Conformity of buildings to land use plans

The findings of the study implied that conformity of land development to land use planning guidelines is a key issue in urban development. However, it will be very difficult for some residential areas such as the indigenous settlements to respond to the requirement of modern spatial planning guidelines. Many houses in these areas were built before the introduction of land use planning guidelines and hence development of such places in accordance with modern land use plans will required urban renewal strategies with its concomitant challenges such as population displacement. However, the newly developed areas have comprehensive planning guidelines that will require relatively less effort by enforcement institutions to achieve high level of compliance.

The results of the study also implied that development of land use plans alone is not a sufficient condition for compliance. Planning guidelines that have not been accompanied by effective education will not lead to the desire compliance by land developers. On the other hand, conflicting objectives by enforcement institutions such as the Municipal Assembly will also lead to high levels of non-compliance with the local plans. For example, the cost associated with obtaining a building permit can generate further financial resources to the Municipal Assembly which can be used to further develop the unplanned areas. However, land developers may consider such costs unacceptable and hence fail to comply with the basic procedures in developing their lands.

5.3.2 Provision of sanitary facilities

The most critical sanitary issues that are of most importance to households are dumping of solid and liquid waste. The results of this study therefore, considered waste dumping facilities such as household waste bins, public communal containers, households' private toilets and public toilet facilities. The study provides mixed results on the provision of these facilities in different residential areas of the Wa Municipality. Households in new developed residential areas have been convinced on the need to provide sanitation facilities in their houses as evidenced by majority of them having waste bins and private toilets facilities. On the other hand, those in the indigenous residential areas rely on public facilities such as communal containers and public toilets. This underscores the importance of land use planning on the provision and access to sanitation facilities. The Wa Municipal Assembly therefore, has the choice of insisting on the development of local plans with effective compliance to reduce the cost of managing sanitation or accepts

the responsibility of continuing financing the provision of public sanitary facilities in the Municipality.

The results also implied that public sanitation facilities in the Wa Municipality are not adequate and the Wa Municipal Assembly is currently under pressure to fill in the deficit in public infrastructure. This compels some patriotic citizens to improvised ways of leading their own development by providing space and facilities in sanitation management within their suburbs. This means that such people have understood the need for proper sanitation and could be identified and influenced by the Municipal Assembly to lead their community mobilization process in the provision of household sanitation facilities. Hence the Municipal Assembly has not been utilizing its available opportunities.

5.3.3 Access to sanitary facilities

The lack of proper land use planning guideline in some residential areas of the Wa Municipality has created both direct and indirect challenges to households' access to sanitation. The results implied that provision of sanitary areas with proper facilities will not grant household sustainable access if there are no connected roads networks. There is no immediate difference between unplanned areas and planned areas that have not been developed with roads. The fact that roads network in Mangu (Zone 3) has not been developed and linking houses means that households cannot get immediate access to sanitary facilities. This means that development of land use planning guidelines needs to be accompanied by the necessary infrastructure to facilitate the services of public transport services. Hence development of local plans without roads connectivity does not grant households immediate access to sanitation facilities.

5.4 Recommendations

The findings of this study have several suggestions for policy and land use management for the provision of sanitation facilities in the Wa Municipality.

5.4.1 Recommendations regarding conformity of buildings to land use plans

Land developers in the Wa Municipality have not complied fully to land use planning regulations and guidelines because of lack of awareness or the costs associated with compliance. This therefore, requires effective sensitization to increase people knowledge and awareness of the need to comply with land use planning guidelines. The Wa Municipal Assembly should collaborate with the Town and Country Planning Department to educate people on the need and procedures of obtaining building permit before developing their lands through radio programs, and community fora. Besides, the content of the education should include the need to provide for sanitation facilities in their homes. There is also the need for government to subsidize the cost of obtaining building permit to make the process flexible for people to comply. This will save future costs in responding to the challenges of non-compliance.

5.4.2 Recommendations regarding provision of sanitary areas and facilities

The Wa Municipal Assembly through the Environmental Health Unit should partner with development organizations such as UNICEF to improvise local sanitation facilities such as simple Pit latrines at the household level. Such facilities can be used in place of improved latrines in order to meet the requirements of housing facilities.

The services of Zoom lion Ghana Ltd are very useful in proving sanitation facilities to households. Residences of Zone 2 rely entirely on the waste bins provided by the

company. Households should be made to know by the Municipal Assembly that the waste bins are very effective in the management of sanitation and hence the need to subscribe to the services. In areas of limited sanitary places such as the case of Zone 1, the Wa Municipal Assembly should have effective stakeholder consultation in the various communities to procure lands within their neighborhoods for sanitation purposes. This approach should be cost sharing and hence communities should have effective roles towards achieving this development objective.

5.4.3 Recommendations regarding access to public sanitary facilities

The unplanned nature of some suburbs such as the case of Zone 1 means that stakeholders in urban development are facing challenges in providing social services. It is therefore, recommended that urban development specialist should adopt urban renewal strategies. To minimize the cost of this development idea, only some sections of the population should be relocated to enable the creation of roads and sanitary places in such areas. This will be the only feasible strategy of granting this and future generations in such areas a sustainable access to sanitation facilities.

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APPENDICES

APPENDIX 1

UNIVERSITY FOR DEVELOPMENT STUDIES

FACULTY OF INTEGRATED DEVELOPMENT STUDIES

DEPARTMENT OF ENVIRONMENT AND RESOURCE STUDIES

QUESTIONNAIRES FOR HOUSEHOLD HEADS/LAND LORDS

1.0 INTRODUCTION

Good day. My name is **Bayorbor A. Sumaila,** a final year masters student at the graduate school of university for development studies, Wa. I am conducting a study on **Urban Land Use Planning and Its Effects on the Provision of Public Sanitation Facilities in the Wa Municipality, Ghana.** The study forms part of my academic requirement for award of a Master of Philosophy Degree in Environment and Resource management.

Kindly answer the following questions to enable me accomplish the task. I promise to use this information for the stated purpose only and not to disclose it to a third party. You have the right to refuse or blackout of the interview process at any time. Please indicate your answers by ticking and specify by writing where necessary.

Interview Date…….. Questionnaire Number……

Interviewer……. Location…….....

House Number……

SECTION A: Demographic information of respondent

1. Sex of respondent Male [ ] Female [ ]
2. Age of respondent A) 20-39 [ ] B) 40-59 [ ] C) 60-79 [ ] D) 80+ [ ]

3. Marital status of respondent. A) Married [ ] B) Single [ ] C) Widower/Widow [ ] D) Divorce [ ]
4. Level of education attained by respondent A) Primary [ ] B) JHS [ ] C) SHS [ ] D) Tertiary [ ] E) None [ ] F) Others, specify…….
5. Occupation A) Teacher B) Trader C) Civil Servant D) Farmer E) Others, Specify……

SECTION B. Conformity of Buildings to Land Use Plans

6. What is the type of your building unit? A) Detached [ ] B) Semi-Detached [ ] C) Story Building [ ] D) Compound House [ ] E) Others, Specify……
7. Which year did you construct this house?……
8. What is the use of the building? A) Commercial B) Residential C) Mixed use D) Others, specify……
9. Did you obtain a Building Permit before building this house? A) yes [ ] B) No [ ]
10. If yes, A) Did you adhere to planning standards and regulations in construction this house? [ ] B) Did not adhere to planning standards and regulations in construction this house [ ].
11. To what extent does your building meet the planning standards and regulations? A) High [ ] B) Low [ ] C) Average [ ] D) None [ ].
12. If No in Q10, why? A) High cost of obtaining building permit [ ] B) Not aware of building permit [ ] C) Deny you a building permit [ ] D) Others, specify……

13. To what extent does your building not meet the planning standards and regulations? A) High [ ] B) Low [ ] C) Average [ ] D) None [ ].
14. In your own opinion, has your building conformed to the land use plans? A) yes [ ] B) No [ ]

SECTION C: Provision of Sanitary Areas and facilities

15. Where do your house members dump their waste? A) Waste Bin [ ] B) Communal Containers [ ] C) Dumping Site [ ] D) Others, specify……
16. Who provides the waste facility? A) Municipal Assembly [ ] B) Zoom Lion Ghana Limited [ ] C) NGO [ ] D) Others, specify……
17. If the waste facility is communal container, where is it placed within the suburbs? A) Anywhere [ ] B) Specific places [ ] D) Others, specify……
18. Who provides space or area for the communal container? A) Municipal Assembly [ ] B) Zoom Lion Ghana Limited [ ] C) NGO [ ] D) Others, specify……..
19. Are the communal containers adequate in this suburb? A) Yes [ ] B) No [ ]
20. If yes, what do you think is the reason for the adequacy? A) The planned nature of the suburb [ ] B) The unplanned nature of the suburb [ ] C) Others, specify……
21. If No, what do you think is the reason for the inadequacy? A) The planned nature of the suburb [ ] B) The unplanned nature of the suburb [ ] C) Others, specify……
22. Which type of toilet facility do you use? A) Toilet within the house [ ] B) Public toilet [ ] C) Others, specify……..

23. If it is public toilet, who provides it? A) Municipal Assembly [ ] B) Zoom Lion Ghana [ ] C) NGO [ ] D) Others, specify…….
24. Who provides space or area for the construction of the public toilet? A) Municipal Assembly [ ] B) Zoom Lion Ghana Limited [ ] C) NGO [ ] D) Others, specify……
25. Are the public toilets adequate in this suburb? A) Yes [ ] B) No [ ]
26. If yes, what do you think is the reason for the adequacy? A) The planned nature of the suburb [ ] B) The unplanned nature of the suburb [ ] C) Others, specify……
27. If No, what do you think is the reason for the inadequacy? A) The planned nature of the suburb B) The unplanned nature of the suburb C) Others, specify…….

SECTION D: Access to Public Sanitation Facilities

28. Is your house easily accessible by vehicles? A) Agree [ ] B) Disagree [ ] C) Neutral [ ]
29. Houses are well connected with roads and links within this suburb. A) Agree [ ] B) Disagree [ ] C) Neutral [ ].
30. What is the condition of links/networks in this suburb? A) Good [ ] B) Fair [ ] C) poor [ ]
31. What challenges do the conditions of links/Networks pose to you? A) Unable to access house easily [ ] B) Unable to access emergency service easily [ ] C) Unable to access public sanitation facilities easily [ ] D) Others, specify…….

32. Do you have public sanitation facilities in this suburb? A) Yes [ ] B) No [ ]

    If yes, answer Q33 – Q37

33. The number of public sanitation facilities are adequate for this suburb. A) Agree [ ] B) Disagree [ ] C) Neutral [ ]

34. Public sanitation facilities are adequately spaced for easy access? A) Agree [ ] B) Disagree [ ] C) Neutral [ ]

35. Distance from your house allows easy access to public sanitation facilities A) Agree [ ] Disagree [ ] C) Neutral [ ].

36. Siting of public sanitation facilities do not conflict with other land uses A) Agree [ ] B) Disagree [ ] C) Neutral [ ]

37. What is the distance (walking time) of the nearest public sanitation facility from your house? A) 1 – 10 mins [ ] B) 11 – 20 mins [ ] C) 21 – 30 mins [ ] D) 31 – 40 mins [ ] E) Above 40 mins [ ]

38. In your opinion, do you have full access to sanitation facilities in this suburb? A) Yes [ ] B) No [ ]

39. If yes, what do you think is the reason for the accessibility? A) The planned nature of the suburb [ ] B) The unplanned nature of the suburb [ ] C) Others, specify……

40. If No, what do you think is the reason for the inaccessibility? A) The planned nature of the suburb [ ] B) The unplanned nature of the suburb [ ] C) Others, specify…….

APPENDIX 2

UNIVERSITY FOR DEVELOPMENT STUDIES

FACULTY OF INTEGRATED DEVELOPMENT STUDIES

DEPARTMENT OF ENVIRONMENT AND RESOURCE STUDIES

KEY INFORMANT INTERVIEW GUIDE: WA MUNICIPAL ASSEMBLY

INTRODUCTION

Good day. My name is **Bayorbor A. Sumaila,** a final year masters student at the graduate school of university for development studies, Wa. I am conducting a study on **Urban Land Use Planning and Its Effects on the Provision of Public Sanitation Facilities in the Wa Municipality, Ghana.** The study forms part of my academic requirement for the award of a Master of Philosophy Degree in Environment and Resource Management. I seek your indulgence in answering the following questions to aid the studies. I promise to use this information for the stated purpose only and not to disclose it to a third party. You have the right to refuse or blackout of the interview process at any time.

SECTION A: Respondents' Background Data

1. Name of Department……
2. Position of Respondent……
3. Male…… Female……
4. Start Time…….. End Time……
5. Date of Interview……..

SECTION B: Conformity of Physical Development to Land Use Plans

6. What is your role in land use planning in the Municipality?

7. What is your relationship with the Town and Country Planning Department?
8. What is the state of development control in the Municipality?
9. What development control problems do you encounter in your operations?
10. In your opinion, how does physical development conforms to land use plans?
    A) In planned areas
    B) In unplanned areas
11. What recommendations would you make for the improvement of conformity of physical development to land use plans in the Municipality?

SECTION C: Effects of Land Use Planning on the Provision of Sanitary Areas and Public Sanitation Facilities

12. What is the state of sanitation management in the Municipality?
13. What is your role in sanitation management in the Municipality?
14. Does your outfit provide sanitary areas and public sanitation facilities?

If yes, what kind of public sanitation facilities?

15. How many public sanitation facilities are currently in the following suburbs?

Jengbayiri, Suuriyiri, Mangu and Kpaguri Residential

    A) Public Toilets – WC, KVIP and Pit Latrine
    B) Communal Containers

16. Does the planned nature of an area create any advantages for the provision of these sanitary areas and facilities?

A) If yes, how?

B) If No, why?

17. Does the unplanned nature of areas contribute to a denial of these sanitary areas and facilities in the study areas or any area in the Municipality?

A) If yes, how?

B) If No, why?

18. How do you manage the situation of providing sanitary areas and facilities when the area is unplanned

19. What problems are faced as a result of the unplanned nature of an area when providing it with these facilities?

20. What recommendations would you make for the provision of sanitation areas and public sanitation facility?

SECTION D: The Effects of Land Use Planning on the Accessibility of Public Sanitation Facilities in the Municipality.

21. Do the sanitation vehicles have easy access to sanitation facilities?

    A) If yes, how?

    B) If No, why?

22. Does the planned nature of the area contribute to an easy access of sanitation facilities by the sanitation vehicle?

    A) If yes, how?

    B) If No, why?

23. Does the unplanned nature of areas contribute to a denial of access to these sanitation facilities by sanitation vehicles?

    A) If yes, how?

    B) If No, why?

24. What recommendations would you make for the improvement of access of sanitation facilities by sanitation vehicles?

APPENDIX 3

UNIVERSITY FOR DEVELOPMENT STUDIES

FACULTY OF INTEGRATED DEVELOPMENT STUDIES

DEPARTMENT OF ENVIRONMENT AND RESOURCE STUDIES

KEY INFORMANT INTERVIEW GUIDE: TOWN AND COUNTRY PLANNING DEPARTMENT

INTRODUCTION

Good day. My name is **Bayorbor A. Sumaila,** a final year masters student at the graduate school of university for development studies, Wa. I am conducting a study on **Urban Land Use Planning and Its Effects on the Provision of Public Sanitation Facilities in the Wa Municipality, Ghana.** The study forms part of my academic requirement for the award of a Master of Philosophy Degree in Environment and Resource Management. I seek your indulgence in answering the following questions to aid the studies. I promise to use this information for the stated purpose only and not to disclose it to a third party. You have the right to refuse or blackout of the interviews process at any time.

SECTION A: Respondents' Background Data

1. Name of Department……
2. Position of Respondent……
3. Male……Female…….
4. Start Time……End Time……
5. Date of Interview……

SECTION B: Conformity of Physical Development to Land Use Plans

6. What are the main functions of the department?
7. Within which statutory framework does the department operate?
8. What is your role in the preparation of planning schemes in the Municipality?
9. What do you consider in approving building/development permits?
10. How are these considerations enforced?
11. Do you have any role in enforcing building and land use regulations?
12. What role do you play in ensuring that physical development conforms to land use plans in the Municipality?
13. In your opinion, does physical development conform to land use plans in the Municipality?
14. What recommendations would you make for the improvement of the conformity of physical development to land use plans in the Municipality?

SECTION C: Effects of Land Use Planning on the Provision of Sanitary Areas and Public Sanitation Facilities

15. What is your role in sanitation management?
16. What is the connection between land use planning and urban sanitation management?
17. What are the major considerations in urban planning in term of sanitation management?
18. In the preparation of planning schemes, are there any principles that would ensure the provision of sanitary space for public sanitation facilities?

19. What is the effect of land use planning on the provision of sanitary space for public sanitation facilities?
20. What recommendations would you make for the effective provision of sanitary spaces for public sanitation facilities in the Municipality?

SECTION D: The Effects of Land Use Planning on the Accessibility of Public Sanitation Facilities in the Municipality.

21. What is the connection between land use plans and access to sanitation facilities?
22. What are the major considerations in urban planning in term of access to sanitation facilities?
23. Does land use planning influence access to sanitation facilities in planned areas?
    A) If yes, how?
    B) If No, why?
24. Do unplanned areas have easy access to sanitation facilities?
    A) If yes, how?
    B) If No, why?
25. What is the effect of land use planning on the accessibility of sanitation facilities?

APPENDIX 4

UNIVERSITY FOR DEVELOPMENT STUDIES

FACULTY OF INTEGRATED DEVELOPMENT STUDIES

DEPARTMENT OF ENVIRONMENT AND RESOURCE STUDIES

KEY INFORMANT INTERVIEW GUIDE: ZOOM LION GHANA LIMITED

INTRODUCTION

Good day. My name is **Bayorbor A. Sumaila,** a final year masters student at the graduate school of university for development studies, Wa. I am conducting a study on **Urban Land Use Planning and Its Effects on the Provision of Public Sanitation Facilities in the Wa Municipality, Ghana.** The study forms part of my academic requirement for the award of a Master of Philosophy Degree in Environment and Resource Management. I seek your indulgence in answering the following questions to aid the studies. I promise to use this information for the stated purpose only and not to disclose it to a third party. You have the right to refuse or blackout of the interview process at any time.

SECTION A: Respondents' Background Data

1. Name of Department……
2. Position of Respondent……
3. Male……Female…….
4. Start Time……..End Time…….
5. Date of Interview……..

SECTION B: Provision of Sanitary Space and sanitation Facilities

6. What is your role in sanitation management in the Municipality?
7. What is your relationship with the Municipal Assembly in terms of sanitation management?
8. What is your relationship with the Town and Country Planning Department in terms of sanitation management?
9. Do you provide sanitary space for public sanitation facility?

   If yes explain how easy or difficult it is.
10. Do you provide sanitation facilities in the Municipality?

    If yes, which type?

SECTION C: Access to Sanitation Facilities

11. Do the sanitation vehicles have easy access to sanitation facilities?

    A) If yes, how? B) If No, why?
12. Does the planned nature of areas contribute to an easy access of sanitation facilities by the sanitation vehicle? A) If yes, how? B) If No, why?
13. Does the unplanned nature of areas contribute to a denial of access to these sanitation facilities by sanitation vehicles? A) If yes, how? B) If No, why?
14. What recommendations would you make for the improvement of access to sanitation facilities by sanitation vehicles?