A NEW PARADIGM DESIGN OF COMMERCIAL CENTRE IN TEMA, GHANA.

by

Kwasi Ofei Ackonor B.Sc in Architecture

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Kwame Nkrumah University of Science and Technology

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ABSTRACT

The aim of the thesis is to develop an ever vibrant commercial centre by introducing recreational facilities surveyed from a suburban community in Tema. It evaluates the key attributes of major commercial centres in Accra and Tema that may be adopted for the development of a new design model of commercial centres. It also outlines the general concepts and trends of commerce, and operative methods of the major types worldwide to develop a general guideline to realise the new model. Hopefully, the new way of designing the centres would make them friendlier, less stressful and more fun to shop in thereby developing an ever vibrant centre of commerce. The methods used are, literature review on existing concepts and trends of commerce and current types of commercial centres in the above cities. Questionnaires were distributed to shoppers, sellers and residents of community 22 in Tema on their preferred commercial centres and pull factors. Interviews were conducted at Tema Development Corporation and Accra Municipal Assembly on types of commercial centres existing in the study areas. Studies were also conducted on major design approaches locally and internationally for an understanding of their functioning. The results outline two major types of commercial designs; the traditional market style (60%) and the modern mall style (40%). Most of the residents in the study areas require entertainment facilities such as a golf course and a table tennis court which are the major pull factors aside the normal restaurant and sale points. The results obtained helped to design a new prototype commercial centre by merging the two major types of designs on an actual site in Tema and adding the community based pull factors mentioned above. Two sets of conclusions and recommendations were made: theoretical, based on literature review and case studies and practical; based on findings on community 22 (resident community for the model).

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DEDICATION

I dedicate this document to my dear sister, the late Miss Abena Darkoa Ackonor, for motivating me in the pursuance of the Architectural course.

DECLARATION

I declare that I have personally, under supervision, undertaken the study herein submitted.

Signature: Date:

……. ……

Kwasi Ofei Ackonor

(Student)

I declare that I have supervised the student in the undertaking the study and confirm the student has my permission to submit.

Signature: Date:

…….. …….....

Mr. Daniel Amoateng-Mensah.

(Supervisor)

I, the Head of Department, declare that the student, under supervision undertook this study.

Signature: Date:

…… ……

Mr. S.O. Afram

(Head of Department)

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CHAPTER ONE

INTRODUCTION

1.1.Preamble and Problem Statement

A commercial centre is a group of retail and other commercial establishments that are planned, developed, owned and managed as a single property with a provision of an-on site parking space. Basically, there are three types of commercial centre design approaches. These are the malls which are enclosed, climate-controlled, lighted and flanked by shop fronts on one or both entrance; the open air or strip centre (traditional market place) which is a linear form with shops side by side and hybrid centres which combine elements from the two main types of commercial centres.

The mall or the shopping centre is patronised much more in the western world especially in Europe and America. Recently Africa, specifically Ghana, has seen the entry of such facilities namely the Accra mall and Makola shopping malls which harbour supermarkets, food courts, grocery shops and stalls.

In Ghana, the most prominent type of commercial centre is the traditional market place which has seen no improvements over the years. It is normally made up of a strip line of stalls, table top sale points and a lot of mini shops which are disconnected and individually managed. Hence, the whole scenario results in a disorganised establishment which produces filth, traffic and pedestrian congestion, heat and eventually a stressful shopping environment.

In the urban settings of Ghana, such as Tema, there are attempts to create well organised commercial units which are either enclosed or semi- enclosed. Though these attempts are laudable there are still lots of scattered supermarkets, department stores, kiosks and table

top sale units which produce the same results as the traditional market in the central business district (CBD).

It will be easier to access the commercial spaces such as shops and definitely be a pleasant sight to see if all dispersed commercial units are gathered and designed as a single unit. The most effective way to manage such a facility so that there is the absence of stress, filth, traffic and pedestrian congestion and the build-up of heat is to task corporate bodies to individually build and manage the commercial centre. It is, therefore, important to propose a prototype hybrid commercial center which is consumer- centered. Thus, the model centre should address the foremost needs and wants of the target group specifically the resident community (the community that harbours the commercial centre).

Hence the thesis seeks to add another dimension to the design of model commercial centres by researching on the major social needs such as recreation which will make the new commercial centre unique, fun-to-patronise and addressing primarily the needs of a particular community. Though the design of the commercial centre will be adaptable to most communities, researched commercial needs and ideologies peculiar to the resident community will be incorporated into the design to create a unique and new paradigm of commercial centre. The new model should be located in suburban communities (for example community 22 of Tema) away from the CBDs in order to provide an alternative source for commercial activities, thereby reducing pressure on the commercial facilities downtown.

1.2. Hypothesis

It is suggested that to avert the exodus of consumers to existing commercial hubs, and to stop current trend of individualistic, disorganized building of mini commercial units in the CBD, a creation of all-inclusive hybrid commercial centres which are consumer centric and possess unique attributes peculiar to specific locations (preferably sub-urban communities) will be preferred by the users. The community will have a commercial edifice customised for their needs and thereby discourage their movement to the CBD which is already congested. Thus there will be a connection between the new commercial centre and citizenship of the community.

1.3. Objectives

- To determine the past, current and future trends in the design of commercial centres for appraisal and adoption.
- To determine the major types of commercial centre designs in Ghana, specifically Accra and Tema, so as to appraise their merits and demerits.
- To determine the commercial, social and ideological needs of the residents of a community with a view to incorporating such needs into the practical design of the new commercial centres.
- To design commercial centres which are consumer centric and have less stressful shopping environment through the incorporation of entertainment facilities.
- To create a climate-sensitive prototype commercial centre which enhances commercialised entertainment activities.

1.4. Scope

The thesis will focus on the major types of commercial centre in the CBDs of the urban areas in Ghana, specifically in Accra and Tema. The two cities contain all kinds of commercial premises which are constantly busy. They will, therefore, present good cases to study in order to find solutions to commercial problems such as traffic and pedestrian congestion as well as filth and stress constantly faced by customers.

A comprehensive study will be conducted on these major commercial centres to understand their mode of operation, their attributes as well as outline their merits and demerits.

It is also suggested that the design of the new commercial centre should be contextualised. Hence, a study of community 22 in Tema will be conducted to determine the commercial needs and ideologies of this resident community in order to develop a practical model commercial centre.

CHAPTER TWO

LITERATURE REVIEW

The aim of the chapter is to enlist the norms as well as determine the general structure of how commerce and commercial centres work. It also outlines several lines of thought on how various models of commercial centres were developed by various designers in order to create a vibrant and unique commercial centre.

Conclusively the chapter gives a general basis for the development of the new model.

2.1. Definition of Commerce

Commerce, primarily expresses an abstract notion of buying and selling, whereas trade refers to the exchange of a specific class of goods ("the sugar trade", for example), or to a specific act of exchange (as in "a trade on the stock-exchange") (International Council of Shopping Centres, 1999). Commerce, therefore, is a division of trade which deals with the exchange of goods and services from producer to final consumer. It comprises the trading of something of economic value such as goods, services, information or money between two or more entities (International Council of Shopping Centres 1999).

Thus, by the exchange of one's belongings for economic value, one commercializes that entity, packaging it for sale. Hence, commercialization is the process of transforming a commodity into a product, service or activity which one may then use in commerce for economic gain (Wikipedia, the free encyclopedia).

2.2. Evolution of Commerce and Commercial Venues

Some commentators trace the origins of commerce to the very start of communication in prehistoric times. Apart from traditional self-sufficiency, trading became a principal facility of prehistoric people, who bartered what they had for goods and services from one another. In historic times, the introduction of currency as a standardised money facilitated a wider exchange of goods and services.

The circulation of a standardised currency in commerce avoids the patronage of double wants, which is evident in barter trade. Today, commerce includes a complex system of companies that try to maximize their profits by offering products and services to the market (which consists both of individuals and other companies) at the lowest production-cost. Basically, exchange of goods and services can happen anywhere (Newpersuasion.typepad.com- shopping trends; Wikipedia, the free encyclopedia).

Commerce occurs on a trader to customer or company of traders to customer basis in ones abode, on the streets and market. However, for commerce to be vibrant in terms of competition, comparison and variety, it is normally harnessed into single venues such as a market and commercial centres for accessibility and monitoring (Shopping malls, From Wikimedia Commons, the free media repository).

Commercial venues include kiosks, retail shops, supermarkets and commercial centres. A kiosk is normally an unauthorised cubicle with an average size $6m^2$. Kiosks are found in singles or in rows along urban streets in the central business districts of cities. Kiosks are upgrades of the table top sale services offered in the traditional market. They are commonly constructed with wood and painted with oil paint to protect them from the vagaries of the weather. Steel containers are gradually taking the place of the wooden kiosks; being more

durable than the latter. They normally gather low quality accessories, fashion wares and foodstuffs.

Retail Shops are commercial units that are ordinarily situated along high streets in inner cities and towns, urban fringes, neighbourhoods and out-of-town, as well as near motorways and main road junctions. Retail shops fall into two main categories, convenience shops which cater for the daily shopping needs of the neighbourhood leading to the frequent purchase of goods; namely food, drugs, iron mongery and goods from variety shops such as Woolworth (David, 1999; Wawrowsky, 1996) and comparison shops which cater for the weekly to monthly needs of customers, who often compare prices, quality and variety before they purchase products such as television sets and fridges (David, 1999). Other types of shops are specialty, leisure and remote shops with the average shop size being 36m^2 (Neufert, 2000).

Supermarkets are major large retailing spaces in cities. They house regular domestic foods that are properly packaged for purchase and consumption. They are enclosed with climate-controlled mechanisms installed for the comfort of the customers (Longstreth, 1991). The requisite floor area range for a supermarket is 1000 – 2500m^2 (Neufert, 2000). Most of them are found in the town centres, suburban neighbourhoods, filling stations and rest stops. Larger versions of the supermarkets are the hypermarkets (which are located at urban fringes), superstores and discount stores which occupy minimum areas of 2500m^2, 5000m^2 and 10000m^2, respectively (Neufert, 2000).

A commercial centre is a complex of retail stores and other related facilities such as supermarkets, banks and cinemas planned as a unified group with a unified architecture to give maximum shopping convenience to the customer while maximising exposure to the

merchandise on display. Below are common elements that are pertinent to commercial centres.

- A unified architectural design and treatment.
- A unified site either under single ownership or a development group.
- An on-site parking for customers designed to be accessed primarily by automobiles.
- Service areas are separated and screened from the public parking areas.
- As a general rule in commercial development, the building square footage consumes approximately 25% of the site area (Hardwick, 2003).

Commercial centres are normally differentiated by their style of design; be it an open-air, enclosed or a hybrid design, as explained earlier in chapter one. They can also be categorised with respect to their location and purpose. The following are types of commercial centres:

Neighbourhood Commercial Centres are smaller centres that meet the daily and immediate needs of a limited residential population of 2500 -40000 people (International Council of Shopping Centres, 1999). This is a row of stores customarily (but not always) in a strip, or line, paralleling the highway and with parking between the line of store fronts and the highway. Some neighbourhood needs that they normally address are grocery store, drug stores and other smaller retail stores and restaurants. They normally require a land area of range 1.2-4 hectares (International Council of Shopping Centres, 1999).

A Community Commercial Centre serves a range of 40000-50000 people, occupies an area of range 4-12 hectares and usually has all services required by residents of the neighbourhood, with an addition of junior department store, a discount store and a greater number of outparcels than that of the neighbourhood centre.

Regional Commercial Centres are located near major highway junctions and along highway roads. They exhibit characteristics such as large multiple but unified shopping complexes, having a full- line department stores as main anchors which address goods and services needs of a wide catchment area. Distinctly, they occupy 3.7 – 9.3 hectares of gross leasable area on 12.1 to 20.2 hectare sites. They serve a trade area of over 150,000 people within a range of 16.1-24.1km and have now recognised by the suburban communities as the downtown of the region (International Council of Shopping Centers, 1999).

Considering the extent of the target group, a regional commercial centre may include supermarkets, recreational facilities and malls.

A Traditional Marketplace is a setting where goods and services are exchanged in an open space. The traditional market square (which is typical of European communities) is a town centre where traders set up stalls and buyers browse the merchandise. Such markets are open, countless and are still in operation around the whole world though this kind of trading venue is very old.

Markets are often temporary, with stalls only present for one or two days a week (market days), however some are open every day of the week. Such markets are normally specialist. Thus they come along with various stalls and associated shops which sell a variety of alternative lifestyle products ranging from clothes and jewellery to compact disks (CDs), instruments and furniture which are evident in community one market of Tema.

Another aspect of the market is wholesaling which primarily sells to traders such as caterers and small shopkeepers, rather than to members of the public, although members of the public are not necessarily excluded.

A mall is a building or set of buildings that contain a variety of retail units, with interconnecting walkways enabling visitors to easily walk from one unit to the other.

It is a place where a collection of shops adjoin a pedestrian area, or an exclusively pedestrian street, that allows shoppers to walk without interference from vehicle traffic.

The concept of the fully-enclosed mall was pioneered by the Austrian-born architect Victor Gruen. He believed that the mall which is a self-contained entity would become 'the centre of cultural activities and recreation (Darlow, 1972). The Mall is generally used in North America and Australasia to refer to a large shopping area usually composed of a single building which contains multiple shops, usually "anchored" by one or more department stores surrounded by a parking lot, while the term arcade is more often used in Britain, to refer to a narrow pedestrian-only street, often covered or between closely spaced buildings (New York Times, 2004).

Components of the Mall are anchor stores which are departmental stores, normally owned by popular corporate bodies, meant to serve as a main pull factor to the mall. They are also known as draw-tenant. Anchors generally have their rents heavily discounted and may even receive cash inducements from the mall to remain open (Darlow, 1972).

In physical configuration, anchor stores are normally located as far from each other as possible to maximize the amount of traffic from one anchor to another.

Another component of the mall is the food court. A shopping mall's food court consists of shops and stalls offering different cuisines. These shops may be owned by an individual or by several companies making the food court a franchised food court (Neufert, 2000).

In a typical food court, meals are ordered at one of the shops then carried to a common dining area, which is normally a plaza contiguous with the counters of the multiple food vendors.

Retail shops are another component of the mall. They are inward-looking and hence open into aisles meant for pedestrian traffic flow. They usually serve a sparsely populated region and stocked with a wide variety of goods. The selling of goods to consumers are usually in small quantities, hence these shops are small in size with minimum floor space of 6.25m^2. They normally have the front doors open for air circulation and showcase of products (Neufert, 2000; Green, 1991).

2.3. Basis for the Design of New Prototype Commercial Centres.

Over the years various designers have redefined the methods used in designing commercial centres for consumer satisfaction. The prototypes developed are dependent on one of the following.

Philosophies and Concepts

Victor Gruen, a master designer of commercial centres usually adopted this approach. For example, he emphasises on the use amusement in commerce by introducing fountains, flowers, sculptures, benches and landscaping elements. These elements, as he explains, portray an outdoor space for relaxation (Hardwick, 2003).

Crankshaw (Harvey, 1992), in his book “Creating Vibrant Public Spaces” also adopts the philosophical approach of developing a new commercial centre model by stating that “a good commercial centre design is one that facilitates movement and access and creates

dynamic social spaces. In nut shell, Crankshaw says the centre should be a space for social, commercial and institutional interaction. This line of thought is along that of Gruen.

In a book "History of Shopping Centres", Tabea Sollner reiterates that, nowadays shopping centre are not only mere shopping destinations but modern places where there are shopping, dining, entertainment, sports and recreation. Tabea Sollner, therefore, describes it as an "amusement function premises".

These three authors basically describe the commercial centre as a place of entertainment and relaxation aside shopping.

Fitch's ideology on commercial centre design is based on a different philosophy; i.e, "the design should respect the people's needs, wants, aspirations and in doing so provide them with experiences that enhance their lives in many different ways". Thus, in a convenience store peoples' wants, such as sandwiches, are put right in front and in supermarket Fitch says the "have-to-haves "are put at the back because people will definitely go there to purchase them (Fitch, 1990).

Some departmental stores such as Tesco (London) and Asda (London) use psychology to define new ideas of commercial designs by adopting colour schemes such as greens and oranges (that have been incorporated in wall and façade elements) to arouse consumers to purchase goods. The choice of the above colours has been endorsed by Angela Wright (Fitch, 1990), a fellow of Royal Society of Arts, who says that the best colour for food branding is orange, followed by green while blue in marketing food suggests clear communication, reliability and trust.

The concept behind the name of a commercial centre can also affect its design.

For example in Poyry's book, "Concept design of Commercial design" Poyry proposes a unique name for a commercial centre as "Aurora" which means Northern lights: Northern lights oscillate the coloured façades and in the interiors thereby pronouncing its presence with themed outdoor event areas thereby creating a welcoming luminous, fresh and leisure time commercial premises. Such an idea alone creates a new way of designing the facades of the commercial centre (which might have been originally boring). Thus commercial centres should also be designed as landmarks rather than mere boring boxes for selling and buying. In brief, the use of philosophies and concepts which add new ideas to the design of a commercial centre should promote commerce in the premises.

Rearrangement of Commercial Spaces / Entities

Repositioning of spaces, such as the parking area, for commercial facilities will require a different approach of designing the parking area of the centre with respect to its accessibility, structural and aesthetic design. Such a scenario includes a new feature specific to the centre, hence developing a new prototype. For instance, Victor Gruen, the "mall maker" solved Milliron's (Hardwick 2003).

parking problem by placing the cars on the roof and adding another entrance (which was open) at the roof top for consumer access. Thus, the repositioning of the car park created a peculiar mall (commercial premise) with the parking space at the roof top and a double entrance; one on the ground level and the other on the roof top. He also created criss-crossing concrete ramps (which appeared to be floating) for accessing the rooftop car park.

Fitch, the chief executive officer of Fitch Studios also creates an exemplar of commercial design by rearranging the position of stalls of goods and services to pull

customers through the facility. In effect, Fitch (1960) intentionally placed the "have-to-haves" at the back of a store because people will definitely go there to buy. This contradicts the norm of placing the have-to-haves at easier accesses for consumer to purchase them and exit the centre.

Augmentation and Addition of Spaces

The enlargement of walkways and other open spaces such as courtyards and plazas for other uses including recreation, sheltering small entertainment hubs and medical centres creates a perception of luxury and freeness. This is evident in Victor Gruen's Montclair (Hardwick, 2003) proposal where he introduces wider interconnecting walkways for both circulation and seating, and courtyards and plaza for social gathering and sheltering of mini retail units.

Victor also proposed the Southdale centre of commerce which was covered in order to prevent the influx of solar glare, rain, dust and heat that would have been difficult to cater for in multi-storey buildings considering the 100 retail units he was to design. In Southdale, he introduces a petting zoo which houses, scientific trees, flowers and birds in cages among others. The idea behind the Southdale design has become the basis for most commercial centre designs especially in the western world (Woolley, 2003).

Enforcing Polices

Policies such as restriction of vehicles to specific areas of the commercial centre also add a new character to the centre. Thus, pedestrians have an impression of easiness when they enter the grounds of the facility since there are no vehicle and pedestrian conflicts.

Again Victor Gruen and his team created a downtown commercial centre at Forthworth, Texas, by instituting a policy to limit traffic from a six block section of the main street and encouraging pedestrian oriented shopping and thereby making the streets more lively and walkable (Hardwick, 2003).

2.4. Emerging Trends of Commerce

Entertainment in Commerce: It is no longer just about buying and exchanging goods and services for money. Shopping has to be fun and an experience to remember. Nowadays, in commerce, entertainment serves as an anchor package alleviating the customer of most stress in shopping and simultaneously inducing the customer to engage in trade. Caution should be taken not to introduce entertainment facilities that will not generate income for business. In short, there should be maximum commercialisation of most facilities to prevent losses (Newpersuasion.typepad.com- shopping trends).

Electronic Commerce which is commonly known as e-commerce or eCommerce, and basically consists of the buying and selling of products or services over electronic systems such as the internet and other computer networks. A small percentage of electronic commerce is conducted entirely electronically for virtual items such as access to premium content on a website, but most electronic commerce involves the transportation of physical items in some way. (Shopping malls, From Wikimedia Commons, the free media

repository). Online retailers are sometimes known as “e-tailers” and online retail as e-tail. Almost all big retailers have electronic commerce presence on the World Wide Web.

Electronic commerce that is conducted between businesses is referred to as business-to-business. Electronic commerce is generally considered to be the sales aspect of e-business. It also consists of the exchange of data to facilitate the financing and payment aspects of the business transactions (Newpersuasion.typepad.com- shopping trends).

Green Architecture should simultanously be considered in the design of the Commercial Centre. The Environmental News Network (IHEA. Application Notes for Energy Saving Mixed Mode / Natural Ventilation.)

reports that "retailers are among the busiest from whom builders receive criticism on everything from the style of the structures to the traffic they attract. Driven by a mix of reasons, from public relations to saving money to a desire to be more responsible, a growing number of builders are experimenting with more environmentally sensitive and energy efficient stores (IHVE Guide). In the light of this, it is imperative for this thesis to highlight on the benefits of environmentally sensitive designs by focusing on passive ventilation since there is an increasing digression to use active systems which cost more (Olgyay, 1963; Markus, 1980).

Ventilation is the act of supplying fresh outdoor air (which is of lower temperature) and getting rid of warmer indoor foul air for an appropriate micro-climate (Givoni, 1969). It basically depends on pressure and thermal gradients at different points on a building.

Each category of ventilation affects the comfort of occupants of the building; hence the need to make an informed choice of the best ventilation types that suite a space in the commercial complex.

Human comfort in a space is relatively dependant on the physiology of the occupant at a specific time but the characteristics of air (such as wind direction, speed and humidity, temperature) also have substantial influence (Givoni, 1969). The effects of air speed on human comfort are summarized in Table 2.0.

Table 2.0. Effect of Air Speed on Human Comfort.

Air velocity (feet per minute / metre per minute)	**Probable impact on occupants**
Velocities up to 100 fpm (31 mpm)	Comfortable for most people
Velocities between 100 and 200 fpm (31 and 61 mpm)	Acceptable even though people will be aware of the air movement
At 160 fpm (49 mpm)	Loose paper and light objects may start to blow around and annoy people
Velocities over 200 fpm (61 mpm)	They create drafts and can be a nuisance.
Above 300 fpm (91 mpm)	Requires corrective measures if comfort and productivity are to be maintained

Source: Givoni, 1969.

This means for human comfort in a commercial space, its design should perpetually make use of the appropriate characteristics which will help maximize natural ventilation (Givoni, 1969). In naturally ventilated spaces, people normally wear appropriate clothes, open or close windows to adjust the airflow for their comfort.

Well-designed natural ventilation systems in commercial spaces enhance workers productivity and customers may feel more comfortable when they can open and close windows and vary the airflow in the spaces where they transact business (Humphreys, 1970).

This could be due to the sense of control the occupant might have to create his or her own favourable environment thus by the provision of operable ventilation systems such as louvre and awning windows.

However, it is important to point out that the self control psychology an occupant might have in an office may not be so for an occupant who is in a large commercial space such as a supermarket, banking hall, conference room or an internet café, since the number of occupants may want diverse comfort levels.

Thus, the design of naturally ventilated space should include an automated mechanism such as an automated window shutter system that will enhance collectively the micro-climate of occupants in the commercial space. On the other hand, people in air-conditioned buildings expect even and cool temperatures, and are quickly dissatisfied if thermal conditions differ from their expectations (Givoni, 1969).

To better appreciate the need to patronize natural ventilation systems over artificial systems, further merits and demerits of the two systems have been listed below. Relative to a specific climate, the benefits of natural ventilation differ significantly. Below are general merits and demerits of natural ventilation system that buildings employing such systems encounter.

Natural ventilation can reduce energy required to cool buildings by reducing or eliminating the need for HVAC systems (chillers, fans and pumps) (Olgyay, 1963; Markus

1980). The type and placement of operable windows or air inlets and outlets is critical in directing air into and out of the building so that they provide both ventilation and cooling of interior surfaces. This suggests that in order to experience the benefits of natural ventilation, inlets should be orientated either perpendicularly or obliquely to the direction of airflow to effectively harness air for adequate ventilation (Olgyay, 1963).

In this way, substantial energy requirement is avoided by decreasing or eliminating the need for mechanical cooling. The use of natural ventilation system results in huge savings that will offset the cost of installing operable windows which is initially expensive. Thus, according to the Eley Associates of Hawaii (Chartered Institute of Building Services Engineers (CIBSE), 1997), the simple payback period may be as short as to 1 to 4 years. Natural ventilation may also improve the building's indoor air quality, provided that dust and other pollutants in the air outside the building are not a problem. Natural ventilation systems are also easier to install and require little maintenance.

Cross ventilation, which is the main natural ventilation technique normally adopted in buildings, can quickly exhaust odours and contaminants from indoor sources (Olgyay, 1963).

Increasing the airflow in a space through cross ventilation complimented with stack ventilation may result in moderate to cool thermal comfort levels and increased productivity in tropical buildings. The system employs the use of operable openings at the occupied level, giving the occupants a sense of individual control over the indoor environment (Ring, 2000).

An intangible benefit of natural ventilation is that it establishes a relation with the outdoors weather patterns and seasonal changes. This results in higher tolerances for variations in

temperature and humidity levels. Its strategies such as the use of courtyards, may also allow for social gatherings thus serving a dual purpose.

The quality of airflow into a space may be low due to dusty or unclean environs. As a result the use of some natural ventilation techniques, such as courtyards, makes the space prone to the vagaries of the weather, thereby disrupting the operations of most commercial spaces. Lastly, the use natural ventilation components, such as louvre windows, distort the façade of the commercial building, especially if it is repetitive. This is the opposite for HVAC system buildings which use clear non-openable windows which aside their disadvantage improve the aesthetics of the façade.

Is it proper to prioritize appearance over workability? More often it is a decision of the architect to make but to a further extent I think, comfortable (which are naturally ventilated) commercial spaces with appropriate merchandise for sale will invite more consumers than otherwise.

CHAPTER THREE

RESEARCH METHODOLOGY

Introduction

Generally, this section discusses the methods of data collection and the reasons why the respective methods of research were used. Thus literature was reviewed in chapter two to determine the general ideas behind commerce and commercial centres.

Secondly case studies were appraised in order to outline practical attributes for possible adoption into the new model. Finally in order, to contextualise the prototype commercial centre (which is based on the data obtained from literature reviewed and cases studied), commercial surveys were conducted on a resident community to make the model more practical.

Data was then gathered and processed into quantitative and qualitative presentations. The limitations and ethical considerations encountered during the research are also outlined.

3.1. Data Collection and Tools

1. Literature on the concepts of commerce was reviewed in order to have a clearer understanding of the subject matter. Literature review was also done on the following for the respective reasons.

- Types of commercial premises:
  - To understand and outline their attributes, modes of operation and commonalities for adoption and enhancement in the new proposal.

- The various design approaches adopted by previous designers in developing prototype commercial centres. Such prototypes will either be based on the

  - Philosophies and Concepts,

  - Rearrangement of spaces,

  - Augmentation and addition of commercial facilities and

  - Policy reinforcement.

- The current trends in commercial centre design:

  A review of the current trends was done in order to establish a firm basis for proposing realistic ideas for designing the commercial facility, including provision of entertainment elements which should be incorporated into the floors, walls and ceilings of the commercial space.

In short, the review of literature under these headings provided the basic qualitative information relevant to the research.

2. Case studies were done on the three major types of commercial centres in Ghana, namely the traditional market place (open-air) in Tema, the Makola mall (semi-open and a hybrid centre in Accra) and the Accra shopping mall (enclosed centre in Accra).

   This exercise helped to outline attributes of these types and their modes of operation for comparison and affirmation of information obtained from the literature review.

   Subsequently, the most favourable type or types of commercial centre(s) were determined for possible adoption.

3. Other qualitative information, such as concepts and philosophies, used in the design of local commercial centres were obtained through interviews and questionnaires from design experts, such as architects, urban designers, planners, consumers and tenants of

the various types of commercial centres.This tool gave practical data from both experts and consumers.

4. Measurements of various physical components of the case studies, such as walkways, room heights to increase ventilation and lighting, photographs and observations were also taken into consideration in the hypothetical commercial centre design in community 22 of Tema.

3.2. Study Population and Sample size

Two types of population were studied:

a) The first population included the major types of commercial centre managed by corporate bodies. For instance, the Tema Development Corporation (TDC) manages the traditional market place in community one, the Makola shopping mall is also managed by Social Security and National Insurance Trust (SSNIT) and the Accra mall managed by Broll Company Ltd. These commercial centres were selected for the following reasons:

- Their modes of designs fall under the major types of commercial centres earlier described in pages 1 and 2 and are also busy hence giving realistic information in all aspects of their design method.
- Secondly, due to logistical reasons, the study was restricted to venues of convenience.

b) Residents of Community 22, Tema.

The reason for studying this population is that, the community should host the commercial centre in the hypothetical scenario being proposed in this research document. Hence, it was

necessary to know the type of goods and services the populace would prefer so as to prevent a dead mall in the future.

As a result, questionnaires were administered (see appendix A) to determine the social class of the resident populace, the choice of shops, goods, recreational amenities and ideologies preferred by the resident community.

The data on preferred shop types (see pg. 53), preferred concept of commercial centres (see pg. 53) and social class in C22(see pg. 67) have been collated from the questionnaires administered so as to make an informed choice of the commercial needs required for the resident community.

Out of 320 houses, 131 houses were visited for questionnaire administration over a period of three weeks. Averagely, nine questionnaires were administered daily between the hours of 3:00pm – 6:30pm when most occupants were at home. These households were visited because they are amongst the target group who will benefit from the proposed project.

3.3. Data Processing

Raw data were processed into pictorial presentations, graphs and tables with the support of qualitative and quantitative analysis of data. The data collected will be projected to the entire population under study.

3.4. Ethical Consideration

Owners and managers of the various case study areas were made aware of the documentation exercise carried on their edifices. Permission was also sought from tenants for any picture taking.

3.5. Limitations of Study

Data collection from some parts of Accra and Makola shopping mall such as banks and security stations, as well as picture taking, were disallowed. Also, due to cost on mobility, case studies were limited to places of convenience.

CHAPTER FOUR

FINDINGS

Introduction

Local and foreign case studies have been appraised in order to outline and adopt their practical or workable operative mechanisms, in order to have a firm basis for the new model. Hence this chapter basically discusses the merits and demerits of major commercial centres in Ghana, laying out the practical norms, pertinent to existing centres. Furthermore it highlights the "don'ts", in the design of commercial centres to avoid a dormancy in the facility.

4.1. Case Studies

Three major types of commercial centres have been appraised under the listed sub-headings. The sub-headingS surface their respective characteristics and styles of design which make them unique; thus making them a model to learn from.

4.1.1. Tema Traditional Market (TTM)

The market is located at the central business district of Tema and is managed by Tema Muncipal Assembly (TMA) but the shops are owned and managed by individual traders and several organizations. It lacks uniqueness and it is a jumble of mostly unauthorized kiosks and stalls. It is planned with the grid pattern system with commercial units situated in each grid. It consists of three major commercial facilities including an on-site parking (Fig. 4.1) on the west and east ends crowded temporary kiosks and stalls which are

arranged in rows, shops (Fig. 4.2) and banks and offices located at the peripheries of the commercial centre and possessing their own parking lots.

Fig. 4.1. Showing on-site parking in TTM

Fig. 4.2. Showing shops near on-site parking in TTM

Utilisation of Activities

The bulk breaking area which is a general yard where goods are off-loaded sorted out and conveyed to their various shops which is a feature of the TTM as shown in (Fig.4.3), is also the main entrance and the first point of call for most vehicles and shoppers. It is untarred making it uncomfortable for shoppers and vehicles to use especially when it rains. The internal walkways are made of mass concrete pavements which, because of non-maintenance and continuous use by heavy loaded trolleys, have developed pot holes. They in turn create pools of water when it rains. The on-site parking lot located at the eastern end of the market has asphalt ground, which is suitable for the use by commercial vehicles.

Wood and metal (obtained from shipyard containers) have been used for construction of the various stalls and kiosks, rendering them very hot particularly on sunny or humid days. Aluminium roofing sheets have been used to roof most of the kiosks and stalls while translucent rubber sheets, flour sacks and worn-out roofing sheets have been used to cover

internal walkways. With time the rubber sheets get torn and also sag thereby creating pools of water and leaking roofs.

Fig.4.3. Showing untarred bulking breaking area in TTM

Modification of Climate

The micro climate of the TTM has been modified as follows: Natural lighting is mostly employed due to the openness of the design, but it simultaneously employs active lighting system during the day because of the low luminance in certain portions of the market due to the covered and crowded walkways. The shops generally make use of natural lighting during the day with the exception of some special shops such as photo labs which require extra luminance for picture taking. Also because the shops operate 24hrs daily, both fluorescent and incandescent bulbs are used so as to facilitate their business at night. The banks generally use active lighting system especially during the night.

Natural ventilation is mostly relied upon in the stalls/ kiosks section of the market; but due to congestion, electric fans are also used concurrently to improve comfort. Likewise, the shops use electric fans to supplement natural ventilation because the design of the shopping blocks do not allow cross ventilation since there is only a single point of access and exit for airflow. Banks and office blocks use air-conditioning units and fans for the comfort of the staff and customers.

Fig.4.4.showing partially covered walkways with impeded lighting in TTM

Services

Generally, individual commercial units such the banks and shops have their own stand-by generators to supplement the usual electric grid supply. Most of the electrical installations at the kiosks and stalls section are unauthorised and also have been done in a clumsy manner, hence posing several threats, including fire outbreaks, in future. Banks, offices and shops have their individual sanitary and waste management systems, which are often cleaner than that of the kiosks/stalls section. The kiosks/ stalls sections also have a waste management system in place, but the location of the main rubbish container is adjacent to the entrance of the main off-loading area on the south of the market; this produces stench, aside being an eye sore. Tenants find it uncomfortable accessing the main public sanitary area since it is about 50m from the kiosk/stall section, which is the core of the Tema Traditional Market.

Merits and Demerits

The proximity of the bulk breaking area to the on- site parking area makes it easier for shoppers and tenants to load and off-load their goods respectively. The design is energy-conservative because it uses passive design methods such as uncovered walkways which facilitate stack effect of hot air. Also, availability of basic and cheaper goods such as groceries and clothes is guaranteed.

On the hand, the untarred floors at the bulk breaking area render the zone uncomfortable for users. Walkway zones have low luminosity due to the use translucent and opaque roofing over some walkways. They are also congested as a result of extra table-top sale structures positioned on them, making it difficult to walk through.

The absence of intermediary dustbins and paladins makes it difficult to keep the market clean.

Lastly, business halts during rainfall due the uncovered walkways and disjointed building structures.

4.1.2. Makola Shopping Mall (MSM)

The Makola Shopping Mall replaces and conserves the retail concept of the previous Makola number one market after it was burnt down in the 1990s.

It is a hybrid commercial centre that blends the traditional market place and the modern shopping mall design approaches. It is a climate - sensitive design, using a lot of open spaces to harness natural lighting and ventilation, a design which is suitable for tropical countries such as Ghana. It is centrally located at the traditional business district of the Accra city to address the basic commercial and cultural needs of the people. Thus, to attract

consumers of all social classes to patronise the facility, it has been designed as a hybrid commercial premises that meets the retail, lifestyle and convenience needs of the target group.

Meaning and Delight

The MSM exhibits features such as robust balconies, stairwells and parapet walls, aiding the mall to pronounce its presence and relate itself to similar buildings with similar appearance. To soften this effect of sharpness and robustness, subtle finishes such brown mosaic and washed terrazzo have been used.

Cream coloured and thick brownish concrete balustrades (Fig.4.5.) have also been employed at the entrances and on the facades to pronounce them and blend with its surroundings. Thus it contextualizes the edifice with respect to colour and material used. The MSM also uses organic balustrades which have traditional symbols to associate the commercial centre with the ideologies of the community.

Fig.4.5. A picture of the MSM showing colourful organic balustrade at open spaces and verandas

Facilitation of Activities

In the Makola shopping mall, segregation is distinct hence facilitating the customers; to access the various segments of the facility. Thus, low class (table top), middle class and high class (banks) tenancies are clearly separated but linked with skywalks, verandas and other circulatory pathways.

Both pedestrian and vehicular access-ways are evident for both access and exit, though they are too close to the major road. Hence, there are consistent pedestrian–vehicular and vehicular-vehicular conflicts. Such a situation discourages potential customers from making use of the mall. Policies that restrict the parking of vehicles at the frontage of the building could be very helpful in solving this problem.

A parking space is situated at the sub-basement level of the structure, secluding itself from the users. Its location presents both an advantage and a disadvantage; thus it avails additional space at the ground level for a more fluid pedestrian circulation but for a first time user it would be difficult in steering his or her way to the sub-basement parking space. Also because phase two of the mall has not been completed, vehicles use a single access point as the entry and exit to the sub-basement parking. This creates vehicular-vehicular conflicts.

For vertical movement, staircases (of width 2 metres) have been solely employed in the design of the mall. In terms of mobility, no considerations were given to the disabled. Hence, there are no ramps or lift cars situated in the commercial complex, rendering the facility user unfriendly.

Commercial Components of the MSM

The mall consists of three main commercial components, including table top tenancies which employ the open plan concept with individuals creating niches for themselves to exhibit their retail. A typical space for sales measures 2 x 1.8m. These spaces are generally choked up with extra tables located in pedestrian walkways. Such a situation creates a tensed up atmosphere causing perspiration and immobility of the customers and other users of the space.

The second component, which is the retail shop tenancies, comprises shops arranged in a linear pattern and are bounded by verandas thereby giving a sense of semi-openness to the block. The verandas provide shading for the shops from glare and rain though such a design also permits rain to wet the veranda floors making these pathways uncomfortable to ply. The block is prone to theft cases due to the numerous accesses and openness provided. A typical floor area space for a shop is 12.25m^2. Sanitary facilities are located along the verandas making such spaces uncomfortable to use due to stench. They serve the respective floors of the table and retail shop block.

The office block, which is the third component of the mall is made up of office spaces of typical floor area 18m^2. They have been let-out to major companies such as the International Commercial bank.

Modification of Climate

The natural interior luminance of the edifice was found to be generally adequate for its purposes. This has been made possible by the provision of voids, open spaces and adequate and suitable positioning fenestration incorporated in the design of the mall.

Fig.4.6. Open roof top terrace for restaurant seating in MSM

Fig.4.7. Void at the table top tenancy segment admitting light into sub-basement parking level in MSM

On the other hand, lighting luminance at the two level sub-basement car parks was found to be quite low except at the regions of the voids. The car parks utilise fluorescent tubes of specifications 40w, 1200mm per 25m^2 on ceiling space for constant luminance. This is inadequate because they have luminance (E) of 200lux which is below the recommended luminance (E) (of 2000lux) for working areas such as sub-basement parking.

The provision of stack effect at the roof levels and the distribution of open spaces at vantage points of the building maximises natural ventilation. Table 4.0 provides a list of fenestration systems employed in the mall and their ventilation admittance represented in percentages

Table. 4.0. List of Fenestration employed and their respective level of Airflow Admittance.

Fenestration employed	Ventilation allowance (%)
Fixed glazed windows	0% ventilation
Awning windows	80% ventilation
Sliding windows	50% ventilation

Source: Baden-Powell, 1997; Ring, 2000

Utilization of Resources

The roofing material is a brick-red clay tile which aids the cooling effect of the building attic and also adds a touch of tropical and organic architecture to the entire design.

The walls and facades require little or no renovation to enhance the beauty of the edifice because of the brownish and creamish mosaic tiles and paint used as well as the washed terrazzo employed.

Fig.4.8. Washed terrazzo used on the facades of the office block in MSM

Fig.4.9. Mosaic tiles (brownish and creamish) used on the stairwell in MSM

The floors of the mall basically employ polished terrazzo flooring which when dirty, is not easily noticed and easier to clean. The interior floor spaces, especially in offices, utilise carpet finishes giving a cozy feel. On the other hand brick pavement blocks have been laid for easier surface drainage at the parking and pedestrian circulation spaces.

Services

Generally services have been properly integrated into the architectural and structural framework of the building to ensure safety, as well as preventing losses of income and merchandise in case of disaster situations. For instance, several fire combating gadgets have been incorporated in the mall to halt the on-set of fire. They include a water pak

which has a panel that indicates the location of a fire outbreak for water to be distributed to the specific location extinguish any fire outbreak (Doe, 1980).

Fire extinguishers have been positioned at intervals of 5 metres on each floor in the horizontal plane, thus facilitating prompt and trouble-free extinguishing of any combustion. Smoke detectors are also evident at the ceiling levels at specific distances (5m) especially at the two-level sub-basement car park. Fire water hosepipes have been situated at vantage points to facilitate fire fighting. The open veranda concept that has been employed also will facilitate rapid escape of smoke and other toxic fumes from the commercial premises.

Another important service provided in the MSM is water supply. Roof gutters have been aligned along the eaves of the roof material for rainwater harvesting which is used for cleaning purposes, especially at the sanitary areas. In addition are drain gulleys (Fig. 4.10) with PVC fixtures of diameter 75mm have been integrated in the veranda floors to drain and harvest rainwater.

Security and storage facilities have also been provided in the mall and the main storage facility is a basement warehouse which is not the best because of low ventilation and luminance levels which could affect the quality of the goods.

Due to several entrances and exits to the facility there are several security interventions that have been provided. Examples are the 15 security guards who run shifts to keep the facility constantly secure and the self-provided security roller shutters, in (Fig. 4.11). The latter disfigure the tabletop sellers block despite though it also serves a useful purpose.

Fig.4.10. Drain gulley integrated in veranda floors of MSM

Fig.4.11. Self provided security roller shutters in MSM

Merits and Demerits

The design of the mall allows for several advantages. It uses the open air-concept of design which encourages the influx of natural air and lighting to constantly freshen the shopping atmosphere. Also cost on energy usage is minimised.

Segregation of spaces for particular goods and target groups are distinct. Hence, one is able to find his or her way around easily. The distribution of sanitary facilities at each level is very convenient for users. The robustness, choice of materials and semi-open space concept of the edifice gives the design a tropical African touch. The concept of stack-effect

employed facilitates ventilation, especially in the stairwells. Service pipes are properly integrated into the building structure thereby facilitating repairs.

Several demerits are also visible in the mall. Thus, there is an attempt to create a less stressful shopping environment through the introduction of open spaces and enlargement of walkways but there is the absence of any form of entertainment in the premise which makes the facility less lively and unexciting. With respect to the vertical movement, the design does not cater for the disabled. Thus ramps and others likewise are not provided. The open space concept employed in the table top section does not encourage the sellers to confine their goods to the allocated space. Hence, they spill into walkways creating pedestrian congestion. Sanitary areas at the table top sellers block are not properly concealed, creating an eyesore and also diffusing bad odour into the corridors.

Materials such as washed terrazzo, brown mosaic tiles and brown paint used for the mall give a feel of uncleanliness. Openings, though provided to maximize ventilation, do not control rain splash hence allowing wetting of verandas and other open spaces.

In conclusion, the Makola Shopping Mall is a magnificent edifice endowed with several attributes that are suitable for the climate and serves the purposes for which it was built. However, there are demerits such as not catering for the needs of the disabled. Efforts will be made to address some of the demerits in the prototype design envisaged in this thesis.

4.1.3. Accra Shopping Mall (ASM)

The Accra Shopping Mall employs the enclosed retail concept of commercial centre design. It harbours major stores such as Game, Shoprite and Mr. Price. It presents itself as an all-inclusive commercial centre offering all kinds of services ranging from food to

recreational services. It uses a single storey structure due to its location in an aviation zone and because goods on the upper floors of commercial facilities have a low patronage level.

From Tema, the ASM is situated at the tail end of the Tema -Accra motorway. It is bounded by the Spintex road on its south-eastern end and by the Tetteh Quarshie interchange on its north-western end (Fig.4.12). Its design befits its vicinity, having a number of civic hotels and other important buildings surrounding it.

There is a simplistic blend of glazing, steel and a concrete material (Fig.4.13) giving the design a touch of modernism. Also the choice of steel trusses and huge concrete columns gives a feel of structural integrity.

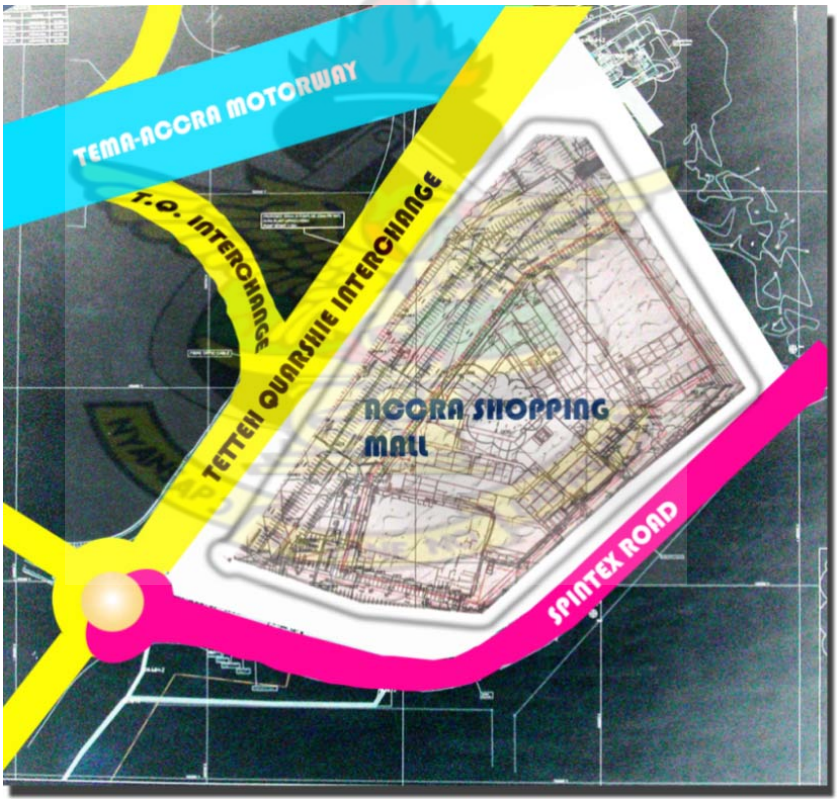

Fig.4.12. Site layout of the Accra mall

Fig.4.13. A view of the coffee bar showing the integration of steel, glazing and concrete in ASM

Facilitation of Activities

Major components of the ASM are the anchor stores which are Shoprite with a floor area of 3466.15m^2 and Game stores with floor area of 3572m^2. They are strategically located at opposite ends of the facility to serve as major pull factors to attract consumers through the facility.

Secondly, the retail shops are 27 in number with floor area of 60m^2 each. Most of these grid-allotted retail spaces have been partitioned ready to be shared by tenants. They flange both ends of the mall in rows thereby arousing customers as they try to locate the anchor shops. The food court is at the core of the facility and serves as the third force of attraction in the facility. It consists of the coffee, franchised sale units and a restaurant.

The promotion court is located at the south-eastern end of the mall and serves the purpose of advertisement of in-stock and incoming merchandise. Offices for banks and Broll management are located at the sub-basement level.

There are two main parking allotments mainly for customers, staff and service vehicles. The customer parking space is located at close proximity to the main entrance, enabling

easier access to the facility. The staff and service parking is situated at the rear of the building and is closer to the main anchor shops to aid easier servicing and stocking of these shops. Therefore, the position of the parking spaces is advantageous to the respective users. Service corridors and ramps also connect the service yard to the retail shops with the purpose of goods distribution. There are also gentle slope ramps to ease wheeling of goods from the service yard to the various sale points of the shopping mall.

Modification of climate

To a great extent, about 85% of the mall uses active design systems to modify the climate effectively**.** The only attempt to harness natural lighting is through clerestories (Fig.4.12) located in the main malls specifically at the opposite ends and also at the food court zone. Artificial lighting has been employed to the maximum in most spaces including the anchor shops, retail shops and mall. The consideration given to natural lighting is approximately 15%.

Fig.4.14. Clerestory employed to harness day lighting in ASM

The design of the mall employs a combination of both passive and active ventilation systems. Thus, few open spaces in the food court zone employ passive system to aid natural ventilation, hence reducing energy consumed and also giving a sense of relaxation in this

particular area. The mall also employs the barrel roof system to aid the escape of hot air from the interior spaces.

In terms of active ventilation system, the facility uses a central air-conditioning system (Fig.4.15) with its high energy requirements provided by six high wattage generators of capacity 1000kva each to power the building due to electric power fluctuations.

The ASM has its outdoor systems, such as the cooling towers, concealed in the large roof attics and gutters. Air-conditioning distribution ducts and other service ducts are well hidden in the ceiling spaces except at the sub-basement level and service corridors where they are exposed rendering such spaces untidy.

Fig.4.15. Air-condition supply outlet for the mall and shop in ASM

Utilization of Resources

Brown coloured slates of sedimentary rocks and porcelain tiles have been used at the lower levels of columns and walls to prevent permanence of stains especially when it rains. Brown porcelain tiles have been employed for the walkways to camouflage stains created by footprints of users (Fig. 4.16). They are also polished to facilitate effective cleaning.

Fig.4.16. Dull floor tiles to camouflage stains in ASM space

Services

Generally, service rooms, pipes and other service gadgets have been well integrated into the structural and aesthetic components of the mall. Most service ducts are concealed in the ceiling space, sub-basement level and cavities at the rear of the edifice. Customer parking employs a parking relation of 4-6 car/100m^2 of retail space which produces the requisite area for a number of parking lots in the commercial complex. The staff parking is located at north-western end of the sub-basement level of the edifice, whereas the service parking is situated at the north-west end of the ground floor level and is closer to the anchor stores. The total area for service floor parking is 1125m^2 with adequate circulation space of 570m^2 facilitating entry, exiting and turning.

Other service facilities of the mall are service corridors of width 2200mm which start from the service yard and branches to the various retail shops. These service corridors house sanitary facilities and service cables in the wall recesses and cavities as well as the ceiling space respectively. Ramps have been designed to a gentle gradient of 0.8 % at the entrance and service yard. Also, for vertical movement at the coffee bar and promotion

court, a panoramic lift has been provided making the commercial complex very user accessible.

Waste generated is dominantly cardboard used for packaging goods and sewage. The pieces of cardboard are kept in wire mesh cages for disposal whereas sewage is channeled to the water treatment plant for recycling. The sewage treatment plant is located on the outskirts of the facility with the control panel pin-pointing at the frontage of the building. The use of such a facility defines the mall as a good waste manger.

Spatial calculations for generators and transformers have been based on their capacities required for the various shops and other facilities.

For generators: Floor area/generator

$=4.5 \times 3.5m=15.75m^2$

For the transformer

$=5 \times 4.5m=22.5m^2$

Metallic vent slits have been installed into the walls that enclose the generator rooms in order to aid convective cooling of the generators. Located at the top of the slit vents are the generator smoke spouts to direct smoke from the generators to the exterior space.

Fire extinguishers, water hoses (spaced out at intervals of 5m) and smoke detectors are located on the walls and ceiling material, respectively, to combat fire promptly.

Fire escape staircases are positioned at fire prone areas such as the service yard and kitchen areas of the anchor shops. Installed sprinklers cover a standard area of $30m^2$ /sprinkler to quench fire effectively. These are mostly located at the sub-basement parking level. Also on this level are extractor fans to suck out smoke from any outburst of fire.

The considerations noted above present a safety conscious feature of the mall which is necessary to adopt in the new model.

Merits and Demerits

Unlike the MSM and the TTM, design both merits and demerits, the design of the ASM introduces additional facilities such as cinemas, night clubs, promotion and food courts aside the normal shops and stalls creating an entertaining commercial atmosphere which eventually draws in customers of all social classes. There is also a conscious attempt at ASM to entice buyers to purchase goods by the strategic arrangement of the various components of the mall namely the anchor shops, retail shops and food court.

Service rooms, corridors, ducts and other service gadgets are well integrated into the design to make the general appearance of the mall tidy. Finishes for walls, floors and columns have been chosen to prevent frequent renovations, thereby reducing cost of maintenance (Asante, 1967).

On the other hand, the design of the mall is not energy-efficient due to the constant use of active design systems (which consume a lot of energy) to create a favourable micro-climate. The design also does not provide a natural outdoor relaxing feel as proposed by Victor Gruen (Hardwick, 2003) in his Southdale design.

The location of sewage treatment plant is an eyesore due to its position at the frontage of the mall. The parking lots, though adequate impedes traffic flow on the Spintex and Shangrila roads.

4.2. Special Study (Dead malls)

This study was conducted to find factors that could be incorporated in the design of the new model to enhance its ability, and thereby preventing dormancy.

A dead or dormant or grey mall has high vacancy rate, low consumer traffic level and is outmoded or deteriorating in some manner (Israel, 1994; Wikipedia, the free encyclopedia). Generally a mall may die when there is economic decline in the surrounding neighbourhoods, when a newer or larger mall is nearby and when there is an anchor store which is less vibrant. A structural change in the anchor mall or department store may also lead to a dead mall.

A typical example of dead malls is the Swanzy mall in Accra Central, Ghana which was dormant because, a greater portion of it is used for offices rather than shops and it had no anchor store to act as a pull factor for the customers.

The Malta mall in Round Lake, New York also collapsed because the arrangement of its shops did not encourage customers to enter the main facility. Entrances to the retail shops opened to the outdoor rather than to the indoor environs. Hence, customers purchased whatever they intended to patronise and quickly drove off without going through the other merchandise.

Another example is the Amsterdam Mall, Amsterdam, which collapsed because the main anchor store the NYS labour department store, was not lucrative enough (International Council of Shopping Centers, 1999; Hardwick, 2003).

The Tanglewood mall, Virginia, USA also died because generally it needed an uplift of its image through renovation (International Council of Shopping Centres, 1999).

To ensure long-term success of a commercial centre such as a mall, the edifice should have a vibrant anchor store, the arrangement of retail shops and anchor stores should promote business. In addition, the structural integrity of the building should be sound to avoid any disruptions in business. Malls should not be too close to each other to avoid patronage polarization and aesthetics of the edifice should be dynamic to stand the test of time and avoid renovations at short intervals.

The *shop front* is the first point of call for the shopper. It persuades the shopper to actually enter and buy the goods on display. It is an art form of which the shop advertises on. A typical shop front has components which include a fascia for shop identification, blind lath lighting, entrance doors, and enclosed screen with corner mullion and ventilation duct.

4.3. Technical studies

For the new concept of commercial centre to be successful, a research on the general regulations guiding the design of commercial centres was carried out in various sectors of a commercial complex. Examples of such aspects are aisle widths; shelve spacing, fire safety measures, location of stand-by- generators, cinema, amusement arcades, bank and office specifications.

Department Stores, Superstores and Shops

When designing retail outlets, all national regulations including those on building and planning, fire, health and safety at work should be observed (Neufert, 2000).

For example, basic dimensional guidelines give the minimum height of spaces in shops and storage facilities as:

Table 4.1. Showing the minimum heights of various sizes of retail spaces

Spatial area	Height
▪ up to 400m^2 retail floor space	= 3m
▪ over 400m^2 retail floor space	= 3.3m
▪ over 1500m^2 retail floor space	=3.5m

Source: Neufert, 2000.

These guidelines must be adhered to as much as possible. The height specifications in these cases are proportional to the size of commercial space as well as its capacity and they help to keep the space comfortable.

Food Courts and Restaurants

Food courts are large halls that house groups of small outlets selling a wide variety of specialist food products. Customers can either sit and eat on the premises or take the food away. Food courts offer a pleasant shopping atmosphere and can be added to superstores or supermarkets beyond the check-outs (exit points for payment of goods).

The produce is primarily fresh or cooked on location; hence the provision of a storage space for lone day's trade is adequate. Deliveries are usually made in the early hours of the morning. A typical food court might include a bakery, an ice-cream parlour, a pop-corn sale point, beers and wines, as well as pizza and local specialties.

Commercialised Recreational Facilities

There is a global trend of merging entertainment with commerce to create an environment that is enjoyable and stress–free and as a result stimulate the customers to patronize more

goods on display. Hence the possibility of including major recreational facilities, namely a live band stand, a mini golf course and other indoor entertainment facilities such as a cinema, table tennis, snooker and an amusement arcade is likelihood.

Open- air Swimming Pool

Open-air pools are used almost exclusively for leisure. The required water area per user ranges from 0.15m^2 in low population density catchments to .05m^2 where the population density catchments are high (The Sports Council,1981). For the entry area, there should be a 50m^2 spatial allotment for a covered entrance with a ticket office and some form of entry control. An area of 10m^2 should be reserved for staff rooms in facilities with water areas up to 2000m^2; above this, 20m^2 should be allowed for staff.

Amusement Arcade

Gaming machines which provide winnings of goods or money and which should be allowed in gaming halls must be separated from machines which are designed for amusement only. Adjacent gaming and amusement arcades can share the same toilet facilities (Neufert, 2000).

Cinema

No outside light should be permitted in the auditorium other than emergency lighting. Walls and ceiling are made from non-reflective materials and in not too bright colours. The audience is to be seated within the outside edge of the screen. By standards, the viewing

angle from the first row of seats to the seats to the centre of the picture should not exceed 30^o (Neufert, 2000).

The angle from the middle of the last row of seats to the outer edge of the picture should be at most 38^o for cinemascope and the ratio of the spacing of the last row of seats to the projection screen should be 3:2 (The Sports Council, 1981).

Offices

Requirements for office space are dependent on the way office work is organized and roles are defined.

The workstation which is the space allocated to a person to execute his or her tasks can be a private office with full-height partitions and a door, an open-plan 'cubicle' configured from systems furniture or low-height partitions, or an individual desk in an undivided space. Minimum space requirements for various office spaces are given in Table 4.2.

Table.4.2. Minimum space requirements for various office spaces

Office employee	$4.50m^2$
Secretary	$6.70m^2$
Departmental manager	$9.30m^2$
Director	$13.40m^2$
Assistant vice president	$18.50m^2$
Vice president	$28.00m^2$

Source: Neufert, 2000.

Parking

Commercial centres usually employ two main parking allotment types; customer parking and goods and services parking.

Commercial or shopping centres allot a 4-5 parking lots for every $100m^2$ of retail space under the customer parking type (Neufert, 2000). As much as possible the parking area is conspicuous to customers and close to the main entrance.

In a typical goods and services parking type, provision is giving for large-space users who require a minimum space of length of two articulator trucks 15m, each with width 10.7m, allowing 1.5m allowance on each side of the truck. Thirty percent (30%) circulation space is factored into the calculation of the size of the parking area (Neufert, 2000).

4.4. Contextualising the New Paradigm of Commercial Centre Design

In order to achieve a more practical result on the research document, a study on both the intended target group (i.e. the populace of community 22) and a demarcated commercial site in the community was undertaken so as to collect data for designing a suitable commercial centre. The following sub headings explain further.

Socio-Commercial Culture and Architectural Character of Tema

Tema is the industrial city of Ghana with income generated from its manufacturing companies as its major backrest. The existence of these manufacturing companies has resulted in whole sale commerce which in turn, compliments these production industries.

Retail stores make themselves available to discharge the merchandise from these wholesale stores in order to satisfy the daily basic needs of the customer.

For the Tema retailing businesses to be at its peak, commercial structures, traditional markets, kiosks and supermarkets have been constructed in various locations with the bulk of these structures being located at the central business district at community one.

Post-modernism style of architecture is prevalent in the intended resident community, community 22 of Tema. The building types surrounding the proposed site comprise of one and two storey residential facilities that dominantly use sandcrete blocks and other concrete materials as building materials. The general material used for roofing is aluminium and the forms of construction are either gable or hipped roofs.

Clay tile roofing is also used to enhance the cooling effect of the roof attic and the building as a whole. There are also public buildings, such as hotels and schools, which employ the post and beam system of structural systems. The findings above will help design a model of a commercial centre that is in context with the community under study. These physical attributes of the neighbourhood may also inform the aesthetic features of the proposed centre.

Commercial Survey and Culture of Community Twenty - Two (C22), Tema.

The questionnaire on commercial survey and culture of C22 in Tema gave the results presented graphically in Fig. 4.17 and Fig. 4.18.

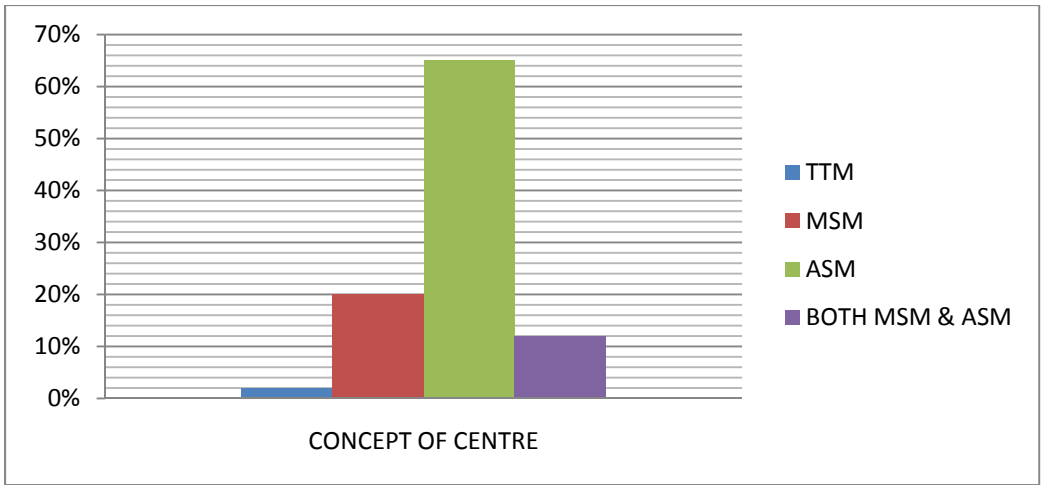

Fig. 4.17. Graph showing the concept of commercial complex preferred in C 22, Tema.
Source: Author's field data, 2008.

This new concept of commercial centre design merges some attributes of both the Accra Shopping Mall and Makola Shopping Mall concept of commerce but with a greater percentage of 75% geared towards the ASM concept. Shops and other facilities will be inward- looking (i.e. entrances will open into indoor spaces) with respect to their access points. The design will seek to harness natural ventilation and lighting to minimize cost on energy. The survey also indicated the shop preferences presented in Fig.4.24.

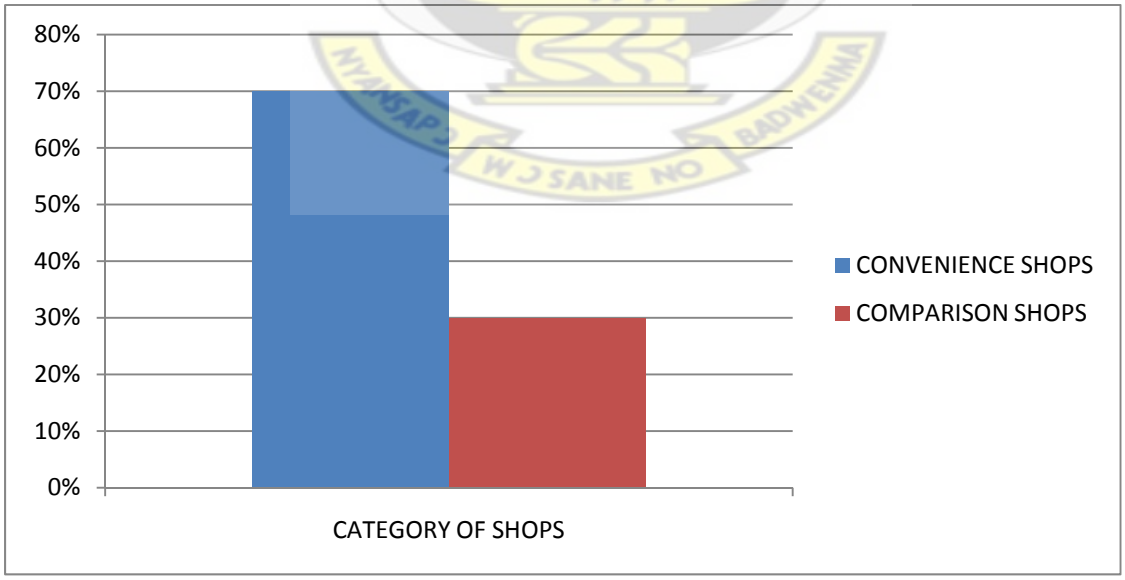

Fig.4.18. Graph showing patronage of shop types.
Source: Author's field data

From the graph above, 70% of convenience shops (that cater for day-to-day needs) existed as against 30% of comparison shops in C22.

These facilities were found to be well patronised by residents of C22 in particular and the whole of Tema in general. Thus, approximately 67% of the residents interviewed have a culture of patronising food courts and other restaurants such as Papaye and Frankies (located at Osu, Accra), especially on weekends.

Visits to the 131 households indicated that, residents bemoaned the lack of a communal facility that could be used for social events such as an entertainment and weddings in the community. Such a communal facility would, therefore, be included in the new (proposed) design to serve as a major pull factor for the new model. The questionnaire also indicated residents' preference for the game of football over other sports such as table tennis. However, football requires a relatively large space and, therefore, games such as mini golf, table tennis and snooker, which are equally loved by both the youth and the elderly, could be more suitable for the new model. It is also possible to design the commercial centre such that main indoor sports area would also cater for the general communal and recreational needs of the community.

Currents trends in the operations of commercial units in C22 include the introduction of side attractions such as museums and entertainment facilities which serve as pull factors to promote business. Electronic sales are on the ascendancy, bringing services and goods to one's doorstep. Shoppers patronise larger shops such as departmental stores because they are seen as all-inclusive shops and patronising them saves time. Thus department shops, supermarkets and other organized commercial units are gradually replacing smaller retail shops, kiosks and table top sales in the catchment area. It is on the basis of these trends that

the philosophy of merging commerce and fun should be of paramount consideration in the new model in designing commercial centres in C22.

4.5. Proposed Project Site and Justification

In choosing a site for this project, attention should be focused on zoning for commercial activities, site suitability to host the project, availability of adequate floor area for future expansion and the distance from existing major commercial centres (the latter is to reduce possible competition and polarisation).

Preferably, the commercial facility will be situated at the fringes of the Tema city to facilitate decongestion in the commercial zone at the CBD (in community one) of the metropolis. Upon inquiry, the TDC confirmed the existence of two sites for such commercial projects in C22 as shown in Fig. 4.20.

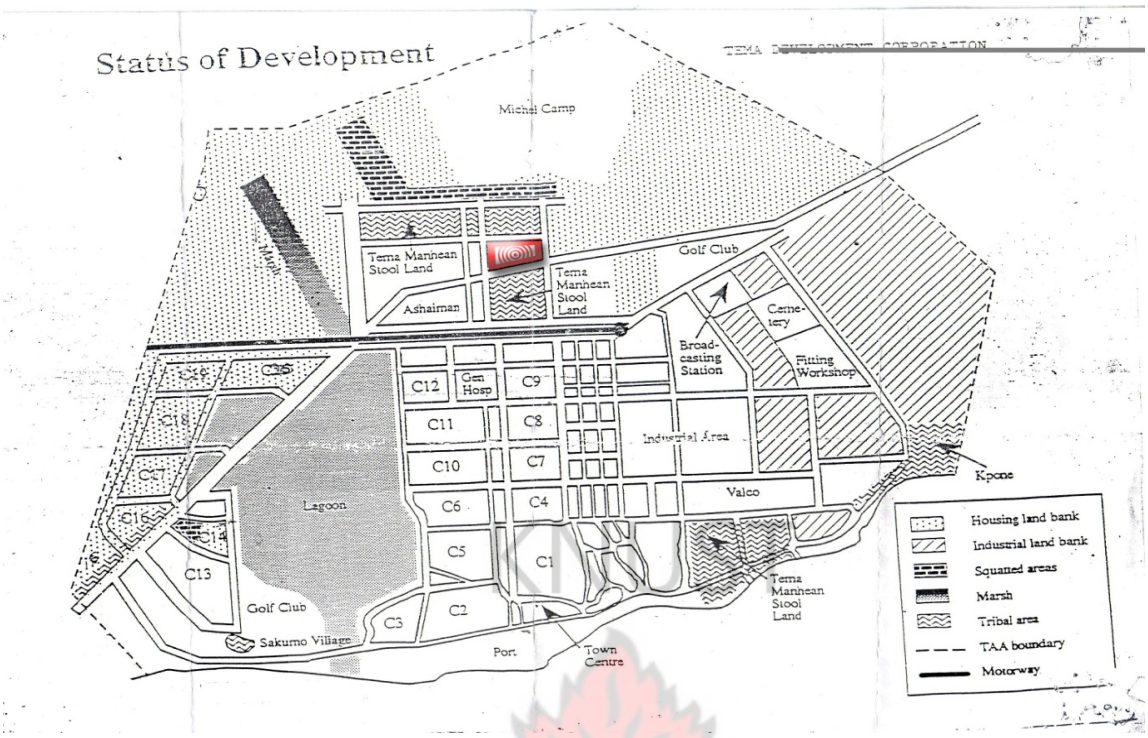

Fig.4.19. Site map of Tema highlighting C22 (a satellite community of Tema)

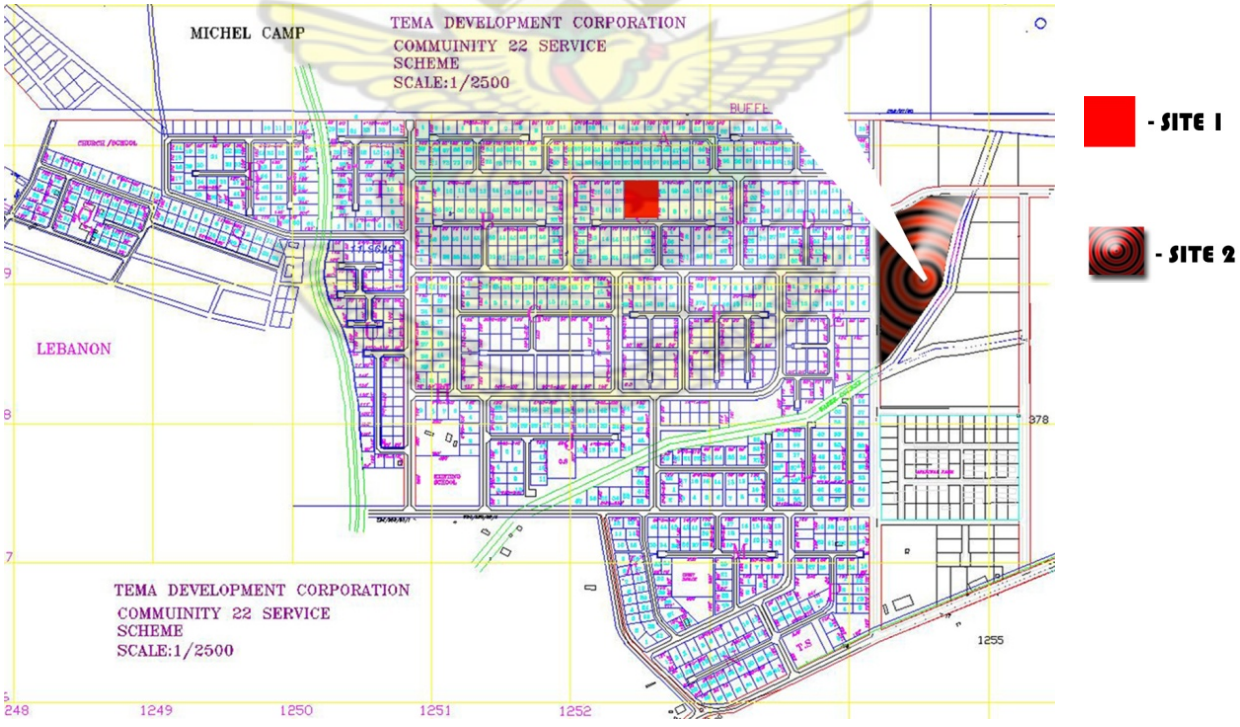

Fig.4.20. Site map of community twenty two showing the sites in consideration

Site one is approximately 1.2 hectares and is bounded by residential developments on all sides. It has a slope gradient of 1/250, hence it barely slopes. This site has the advantage of being easily accessible to pedestrian customers.

Unfortunately, room for future expansion is inadequate**.** There is, therefore a tendency for future congestion which will defeat the purpose of establishing the commercial edifice.

Site two is approximately 11 hectares and is bounded by residential development on the east and the north, but on the south and west cardinals with foliage. Its position and size allows for future expansion and being located at the fringes of the community, reduces the possibility of future congestion. However, pedestrian customers would have to walk long distances to patronize the facility due to its location.

Having considered the merits and demerits outlined of each site, site two was chosen being a more feasible site of such a facility, hence meriting an in depth analysis which is presented in the following paragraph. The following factors justified the choice of site two for the proposed complex.

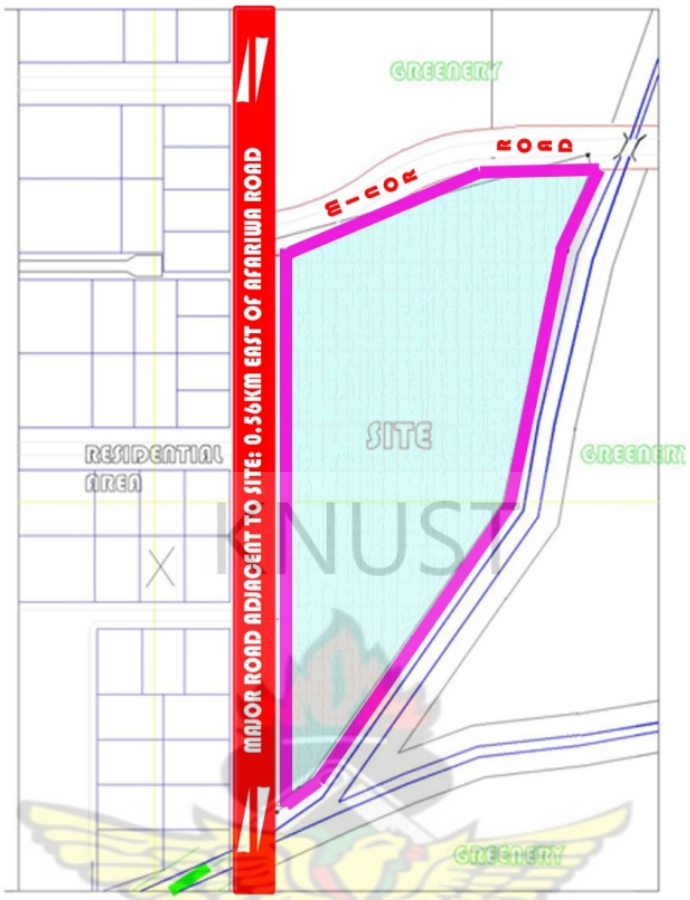

Fig.4.21. Site plan of site 2

In the first place, this site has been demarcated by Tema Development Corporation (TDC) for commercial purposes and secondly it is located at the fringes of the community, hence there will be room for future expansion. Its floor area, of 11 hectares, is within the required range of land sizes (10 - 30 acres) for the establishment of a community commercial centre. Furthermore, the site is off-setted about 8km from CBD (which harbours well established shopping centres and other commercial facilities), thus increasing the potential for full patronage of the proposed commercial centre at C22.

4.6. Site Inventory and Character

Detailed examination of the peripheral environs of site two (Fig. 4.21 and Fig. 4.22) are necessary for final decision on the actual location (within the site) and effective positioning of the various components of facility so as to ensure a workable commercial facility and also aid in contextualizing the commercial centre within C22. On the north, south and eastern ends of the site exist grass and short trees which are sparsely dispersed. On the western end, are residential buildings owned by middle to high income workers and on the eastern side is a storm drain gully which could be used as a waste drainage channel connecting it to the main sewer pipe along the major roads. A major road bounds the site on the west while a minor one bounds the north.

The site has already been serviced by the TDC, reducing the hassle of connecting electricity and water to the facility. Thus, the existing infrastructure and services will help the facility to connect easily to the existing networks of roads, plumbing and electrical lines of the community hence reducing cost.

The major and minor roads on the western and northern ends of the site, respectively, will facilitate access to the site. Aligned to the roads are the drainage ways which will aid discharge of waste water from the site.

The terrain is generally flat with a gentle slope of gradient 1/200 in the northern direction. The soil is predominantly, loamy and slightly muddy soil in the south due to the presence of a drainage gully on the eastern periphery. It is generally grassland with sparsely scattered trees.

The climate of the region is warm and humid, and the wind is mostly south-west to the north-east direction. There is a general drift of sea breeze with wind speed and direction of

21 km/h SSW respectively. This will definitely inform the design to orientate most habitable spaces in the wind direction.

The major noise sources are from the major and minor roads on the east and north, respectively. This is as a result of vehicles that ply the major road every two minutes and three minutes on the minor roads.

4.7. Site Analysis

A sketch analysis of the proposed project site is shown in Fig. 4.22.

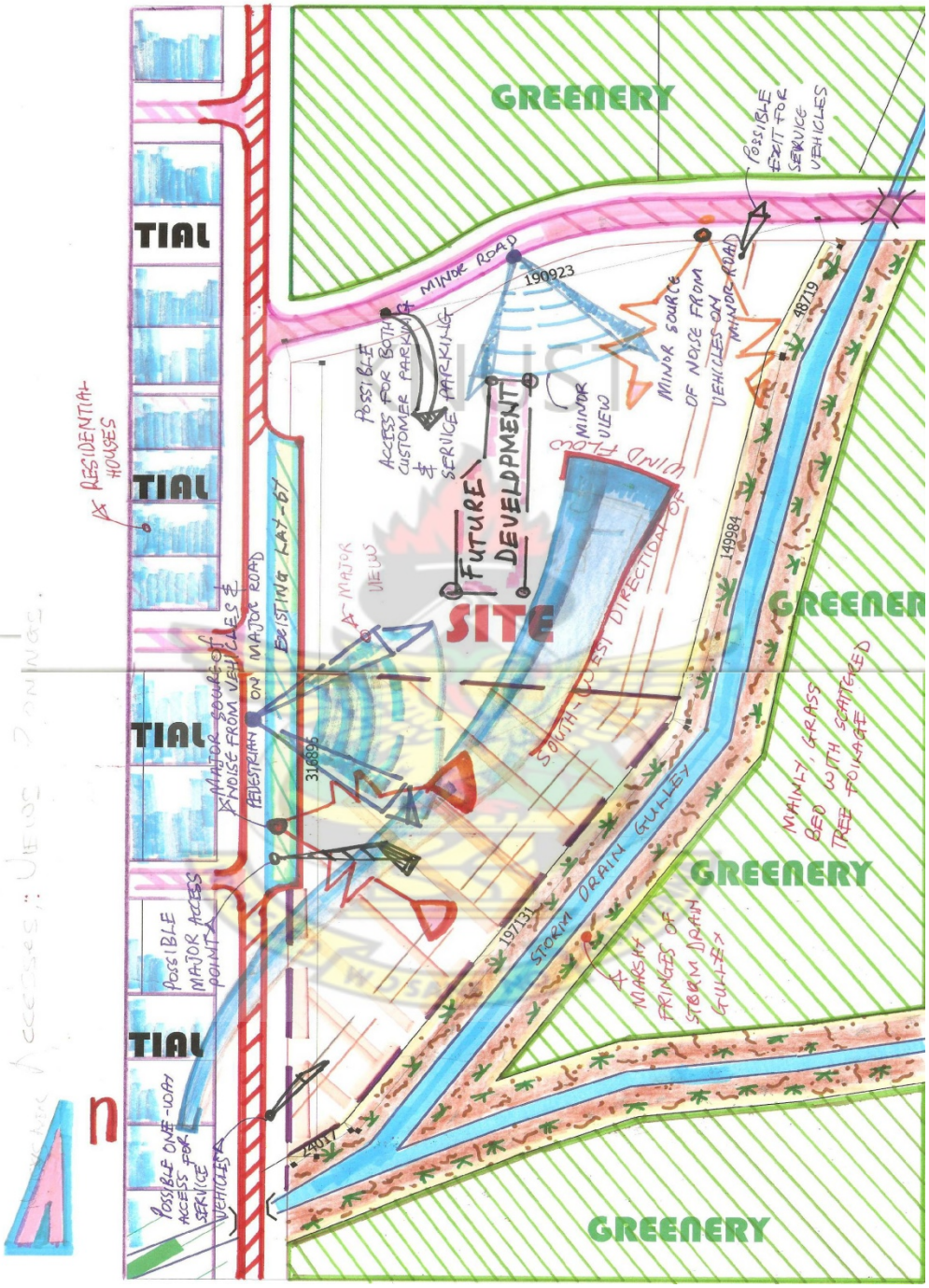

Fig.4.22 A sketch analysing proposed project site

4.7.1. Swot Analysis

A swot analysis of the site is as follows:

Strength: The site is large enough and is located at the fringes of the community, hence, there is room for future expansion.

Weakness: By orientation, the longer sides of the site face the east and west cardinals thus exposing the facility to possible solar ingress which will make the complex to consume more energy. Also the site is in a coastal zone and walls are, therefore, prone to effluorescence which will lead to weakening and pillage of wall paints.

Opportunity: Existing storm drain gully on the eastern end of the site will facilitate the discharge of sewage form the facility.

Threat: There is a possibility of the storm drain gully being choked in the future when peripheral developments spring up.

It is important to point out that the west–east orientation of the site makes it necessary to introduce courtyards into the facility. Such courts will be sandwiched between the main blocks (of the facility) to facilitate natural ventilation and lighting. This will evidently help to minimize the effects of the west and east sun.

4.8. Proposed Client and Funding

It is proposed to entrust sponsorship and management of the proposed facility to the Broll Company of Accra mall and Tema Development Corporation.

Already Broll company management of Accra mall intends to build a satellite commercial centre at C22 of Tema to address the socio-commercial needs of the suburban community.

The needs of the general populace of the entire Tema city will be a second priority.

The project will be executed in two phases. Phase one will include the construction of the two blocks at the north wing with a food court serving as a main pull factor (refer to appendix B). Phase two will include the construction of mini anchor shops with a main mini golf recreational course with the live band stand as the major pull factor of the commercial centre. Funds generated from phase one will be used for the construction of phase two (refer to appendix B).

Broll Company of ASM will be the major financier of the project. Other stakeholders are the Tema Development Corporation, Game, Mr. Price and Tesco companies could be main anchor shops in the commercial complex.

CHAPTER FIVE

RECOMMENDATIONS AND CONCLUSIONS

Introduction

The last chapter discusses recommendations deduced from the theoretical data which were gathered from the literature review in chapter two and practical (*practical* is used here because information gathered helped to contextualise the new model) recommendations collated from studies outlined in chapter four. Thus, the two sets of recommendations were translated into the architectural design model of the commercial centre which served as the final conclusion of the research document. These are outlined below.

5.1. Theoretical recommendations and Conclusions (based on literature review and studies)

The first has been deduced from theoretical information obtained from literature review, case, special and technical studies. These are as follows:

- There should be a philosophical or conceptual backing for the development of the prototype commercial centre. The current trend of integrating entertainment into commercial centres should be adopted, because it will promote business. Hence, a new concept of "Fun-In-Commerce" will serve as the backbone for the new model.
- The design and patronage of all-inclusive commercial centres should be the norm in urban commercial hubs so as to eliminate the disorganised and stressful developments presented by the existence of various mini independent commercial units.

- The design of a model commercial centre should consciously include "green architecture" that would preserve nature as much as possible while aiding recreational activities without using excessive energy.
- To achieve the concept of merging fun and commerce, it is necessary to adopt the open air design concept of the MSM (to cater for commercialised recreational events) and the enclosed design concept of the ASM (to cater for the major commercial purposes).
- Based on the general theoretical recommendations presented above, the following attributes will be evident in the new model:
  - Large open- air areas with lots of greenery, about 40% of the facility, will be open but well designed to prevent the entry of rain, glare and dust.
  - Major recreational facilities such as mini golf course and live band stand as suggested by residents of the community 22 during the commercial survey will be incorporated in the model design.

The following are the specific conclusions based on the various studies conducted.

Tema Traditional Market

- The open nature of the market will be adopted but measures such as creation of aprons around openings and voids will be installed to control rain splash.
- As much as possible intermediary waste bins will be located at concealed areas to keep the proposed centre tidy.

Makola Shopping Mall

- EffortS will be made to segregate the major components of the facility to allow easier circulation for users.
- Though an open space concept will be employed in the proposal, measures will be taken to cater for rain penetration and security enhancement.
- The disabled will be catered for by the provision of ramps and other facilities which were absent in the mall.
- Though sanitary areas will be positioned at convenient points, they will also be well concealed with double lobbies, which will be naturally lit and ventilated with extractor fans.
- Service pipes and other service apparatus (example smoke detectors) will be properly positioned, installed and concealed in order not to distort the aesthetic features of the building.

Accra Shopping Mall

- Building services will be consciously merged into the proposed commercial centre during the preliminary design stage of the hypothetical design.
- Particular efforts will be made to employ more passive design systems rather than active design systems into the proposed commercial centre. This relates to the research done in chapter two, pg. 16-20.
- The arrangement of shops and other ancillary facilities will be done primarily to promote business.

Special Studies

- The proposed commercial centre will be distanced from the vibrant shopping centre at community one to avoid polarization in patronage.
- Also, the shopfront concept of advertising in commercial centres will be adopted to attract as many customers as possible to the centre.

5.2. Practical Recommendations and Definite Conclusions

In order to develop a more practical model, the listed hypothetical ideas were contextualised by relating the proposed model to a real community (C22 of Tema). The following paragraphs outline the various recommendations and conclusions emanating from studies conducted on a real target group, project location and clientele in the community.

Even though the main target group for the proposed centre is residents of C22 in Tema, whose income levels are within the middle to high level range (Fig. 5.1). However, the entire Tema populace should benefit from the facility.

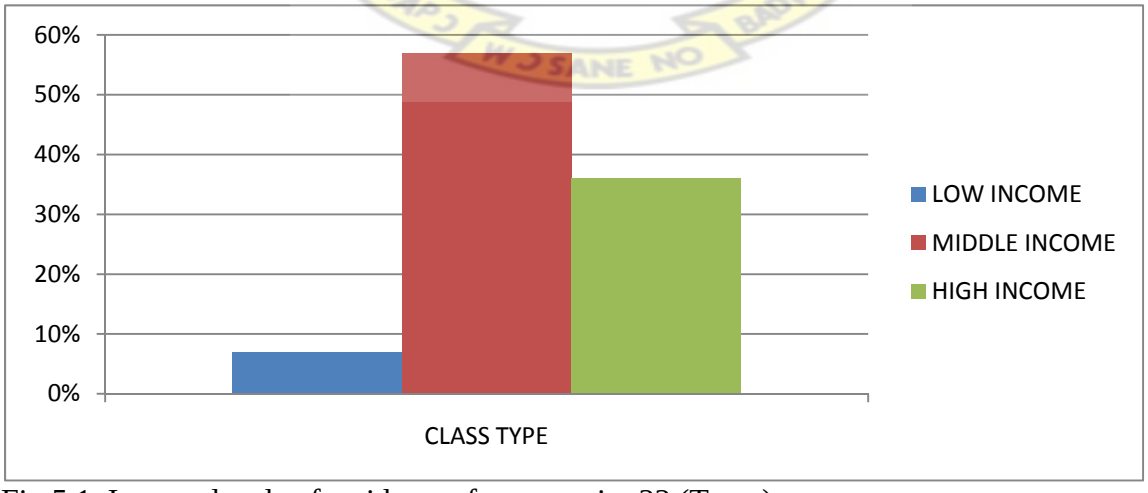

Fig.5.1. Income levels of residents of community 22 (Tema).
Source: Author's field data

The three main intended target groups are customers and shoppers from C22, customers/shoppers from other communities and tenants, particularly those in the middle-high level income shops and officers of corporate companies.

It is concluded that, a greater percentage of convenience shops (70%) will be required, as a against comparison shops (30%). Anchor shops will be introduced to merge the two dominant types of shops found in the community. Other types, such as leisure shops, will also be introduced.

5.2.1. Brief Development and Design Evolution

A design brief was developed in a chronological manner. Thus, the client, Broll Company of ASM, together with TDC will draft a brief and present it to the Project Architect. The chief builder will conduct a commercial survey and feasibility study on the project to capture the real needs of the target community. Research on the current trends in commerce will be done to keep the facility up to date.

Based on these three lines of activities, a detailed design brief will be outlined for the design of the proposed Tema Commercial Centre.

5.2.2. Design Brief and Schedule of Accommodation

A proposed design brief (Table 5.1) is prepared to guide the designer for efficient use of the available space.

Table 5.1: A Design Brief with Accommodation Schedule Serving As a Guide for the Efficient Use of the Available Space.

SPACE	**STANDARDS**	**QUANTITATIVE CALCULATION OF GROSS AREA**	**PERCENTAGE (%)**
1. SHOPPING AREA o Anchor shops - 2 o Shops - 10 -convenience - 7 -comparison - 5 -Specialty - 5	Minimum space of $500m^2$ (35% of sales area or staff and services minimum space for a shop is $36m^2$	$2500+875+(27x36)m^2$ **Total=4302m^2**	**31**
2. FEAST COURT -Franchise court with night bazaar and fast food services -200 people -restaurant -30people -cocktail bar and coffee bar with brass band stand – 30people	$1.9m^2$/person + 30% of circulation space	1.9x200 =**380m^2** 1.9x30 = **57m^2** 1.9x 50 = **95m^2** $= 532 +159.6m^2$ **Total =690.6m^2**	**5**

3.COMMERCIALIZED RECREATIONAL COURT *Mini basketball court *Swimming pool with water polo sport section *Gymnasium	-Standard court 28.2 x16m -6 lane option -16.66 x 25m Avg. space/ equipment =2.5m^2 Avg. space/ person= 2m2 **Total = 4.5m^2**	**451.2m^2** **416.5m^2** 4.5 x 20 equipments **= 90m^2**	**11**
AMUSEMENT ARCADE *Video games room *Indoor cinema -100 people *Drive-in cinema -25 cars	Avg. space /machine =5.6m^2 Avg. space/ person =1.4m^2 Total =7m^2 0.65m^2/ person + 30% of circulation space 12.25m^2 /car + 30% of circulation space	7 x 10 machines **= 70m^2** 0.65 x100=65 +19.5 **= 84.5m^2** (12.25 x 25)+ 30% of circulation space 306.25 +91.88 **= 398m^2**	
		Total = 1510.2m^2	

4.CUSTOMER SERVICE BLOCK -Banks and other corporate bodies -Telecommunication Services/library- 100people -Multi purpose hall– 150 people *promotion court *conferences etc -Post office -Dry-cleaning and Laundromat services	1.5m^2/person +30% of circulation space and storage 0.65m^2/person +30% of circulation space	**300m^2** 150 + 45m^2 **= 195m^2** 97.5 +29.25m^2 **= 126.75m^2** **100m^2** **100m^2** **Total = 821.75m^2**	**6**
5.CIRCULATION **Pedestrian circulation**	30% of gross leasable retail space	7166 x 0.3 **= 2149m^2**	**15.4**

Parking and service areas • Customer parking	4-6 parking lots /100m^2	200 cars x 12.25m^2 **=2450m^2**	
• Staff parking -80 people	12.25m^2/ car	(12.25m^2 x 80)+30% of circulation space =980 +294m^2 **=1274m^2**	**31.6**
• Service vehicle parking	128.25m^2/ articulator truck	(128.25m^2 x 4)+30% of circulation space =513m^2 +153.9m^2 **=666.9m^2** **Total =4390.9m^2**	
		TOTAL=13865m2	**100.0%**

5.2.3. Zoning and Spatial Disposition

The locating of commercial spaces for specific uses will be done as practical as possible with attention paid to accessibility to users and goods.

Commercial Zones

- Retail areas for anchor shops will be strategically positioned to continually aid customers and thereby induce them to patronise goods and services.

- Civic and social facilities such as the banks, offices and a multi-purpose hall will be located for the convenience of the general public.
- Commercialised recreational zones will be adjacent to the retail zones to serve as a pull factors thereby promoting trade.
- Land for future expansion will be sited at the North-Eastern end of the proposed site such that there could be easier linkage to the main building.

Vehicular Zones

- Customer parking will be noticeable at the forefront of the edifice but segregated from the staff and service parking.
- Staff and service parking will also be separated and screened from the general public parking at the rear of the building. The two will be combined but a clear distinction will be given.
- Vehicular entry and exit points and driveways will be clear and straightforward as much as possible.

Pedestrian Circulation Ways and Zones

As much as possible, pedestrian circulation ways in the malls, courts, and lanes would be linked horizontally (by the provision of corridors, courts, etc) and vertically (by the provision of escalators, lifts, ramps, etc) to aid fluid movement and encourage patronage in all directions.

5.2.4. Philosophy and Concept

The philosophy of merging commerce and fun to generate wealth for the client, tenant and customer was derived from the socio- commercial survey conducted in C22, the commercial trends and the case studies. As stated earlier, introducing fun in a commercial complex will serve as a draw factor to increase patronage of merchandise on exhibit. In addition, wealth for the client and tenants will be in the form of money from the customer but for the customer, wealth will be acquired through the goods and services (either tangible or intangible) offered by the commercial facility. Such tangible and intangible services will include bank services, as well as a stress-free, entertaining environment presented by the design of the centre. As the saying goes "a healthy and happy mind is more prolific at the workplace than otherwise".

5.2.4.1. Conceptual Planning and Expression of Philosophy

To achieve the above philosophy, recreational activities will be introduced in the courtyards to harness natural lighting and ventilation. Other recreational facilities, such as amusement arcades, will be located at the upper floors to promote patronage in the vertical direction.

Basically, there will be a zonal allocation of the major components of the project. The following three options were considered, after which a choice was made, based on the advantages and disadvantages of each.

Option One

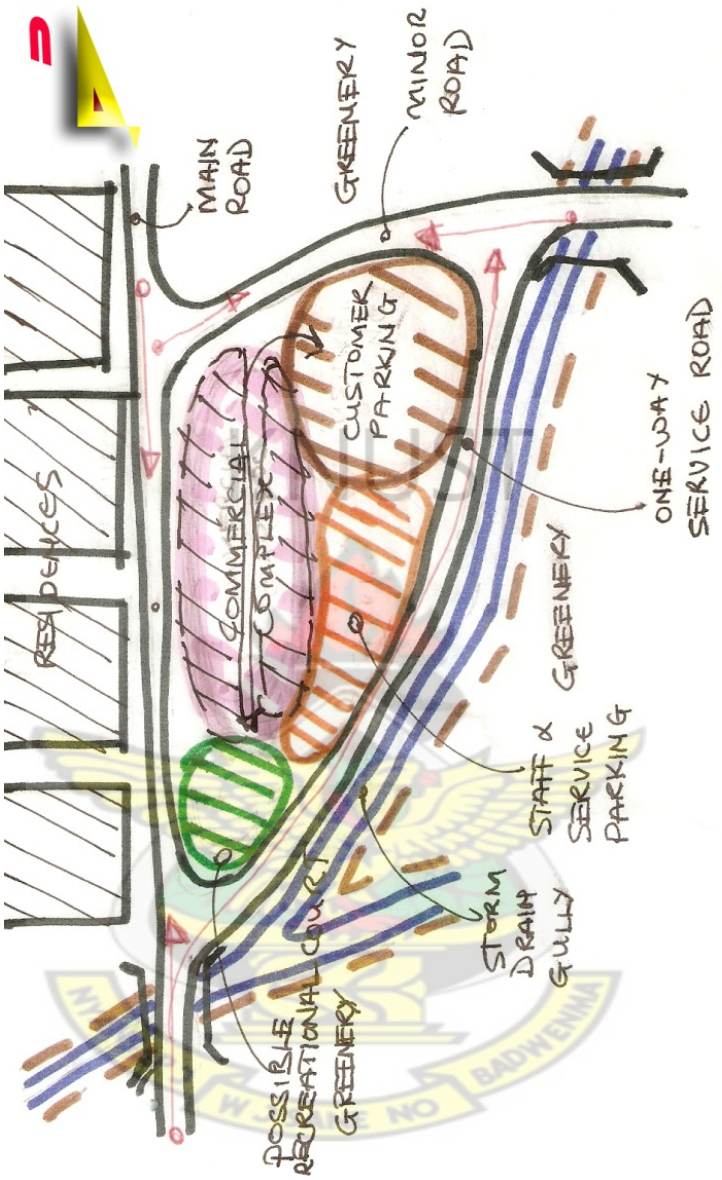

Fig.5.2.Conceptual sketch plan of option 1

Option one (Fig.5.2) has the advantage in which the major axis of the complex gives an opportunity to exhibit a bulk of merchandise because the major road is parallel to it. On the other hand, the option has the disadvantage of having its major axis facing the east and west cardinals and thereby requiring the building to consume a lot of energy to maintain its

micro-climate. Furthermore, the customer parking will be concealed from the public and this is not the best.

Option Two

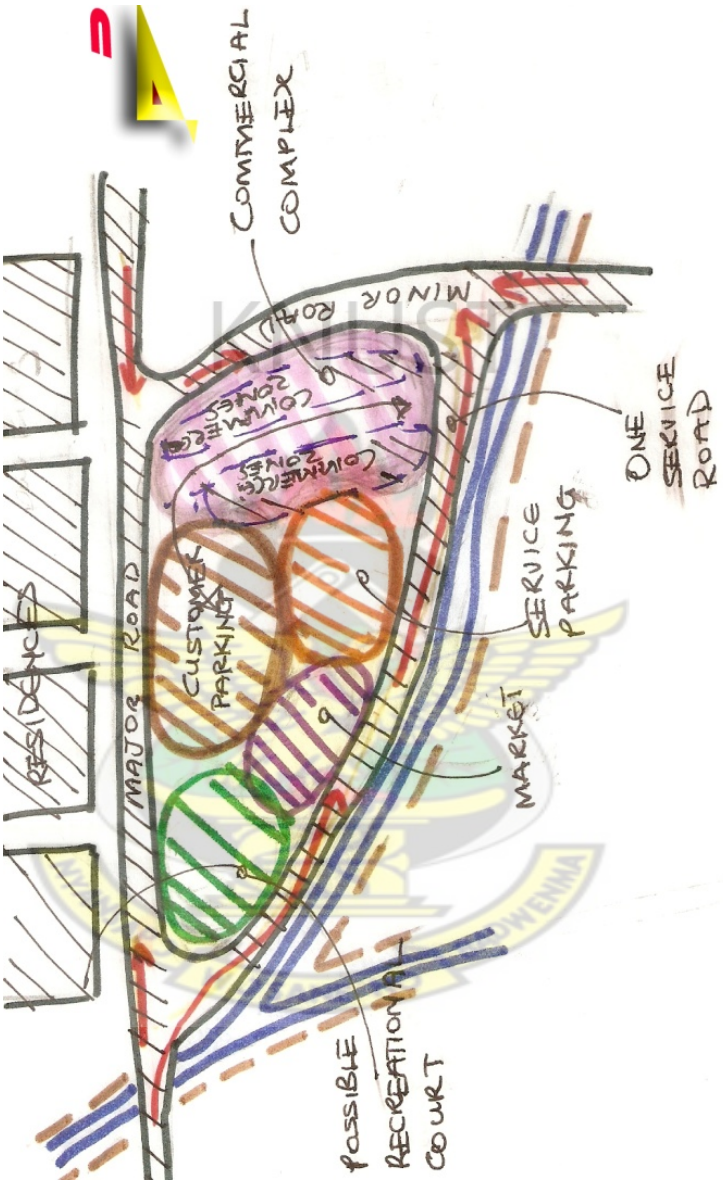

Fig.5.3. Conceptual sketch plan of option 2

In option two, Fig.5.3, the major axis of the commercial complex will face the north and south cardinals. Therefore, the building will consume less energy, compared to the orientation of option one. Unfortunately, the main blocks of the facility are disjointed and

customer parking access is from the major road, a situation likely to create vehicular conflicts. Also, land will be underutilised due to the awkward corner spaces created.

Option Three

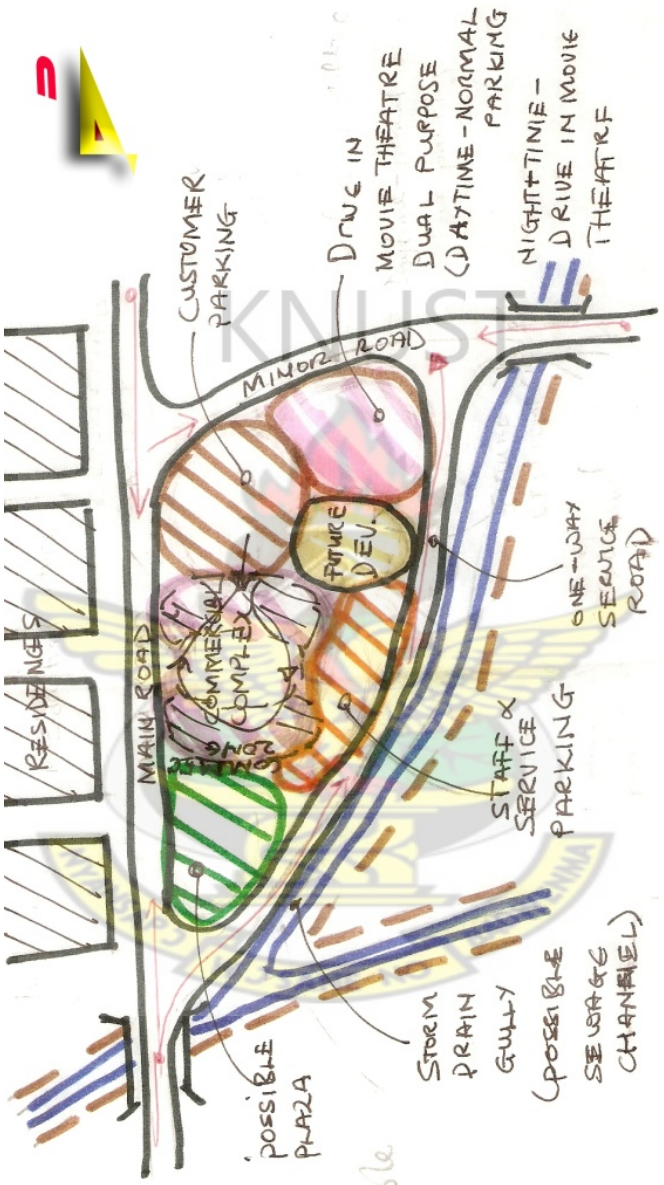

Fig. 5.4.Conceptual sketch plan of option 3

A positive aspect of option three Fig. 5.4 is that the major blocks of the complex are orientated in the north-south directions, hence are less exposed to glare requiring the building to use less energy. Customer parking is easily accessible to the public, and due to

its location, it helps to reduce vehicular conflicts. The plaza with seating and recreational court located at the southern corner are very appropriate for their respective activities and the one way service route created is also accessible to the service yard. A problem of inadequate parking may, however, emanate in the future and hence the drive-in movie theatre might be converted to a normal customer parking area. Option three was chosen because of its overwhelming advantages over the other two options.

5.2.5. Design Conclusion

- Option three was chosen because of its laudable merits over the other options.

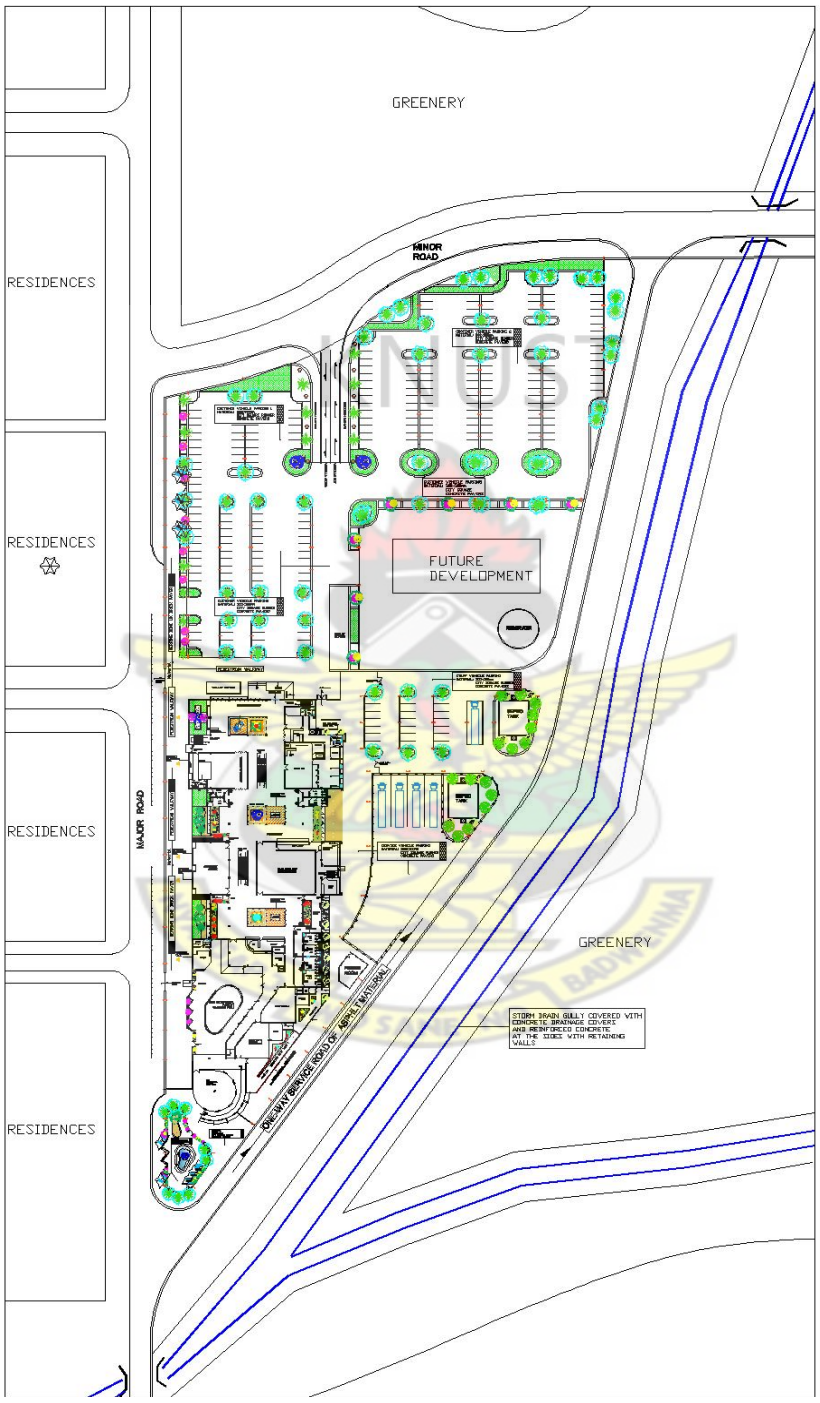

Fig.5.5. Conceptual sketch plan of option 3: Sketch of site layout of proposed Tema commercial centre

5.2.6. Lighting and Ventilation

A conscious effort has been made to allow in natural light and ventilation through the introduction of courtyard systems, open spaces and voids. Thus, with reference to the south-west and north-east wind direction, large openable windows and openings have been positioned on the windward facades to maximise air intake into the complex. It is worthy to note that since the windward facades are on the west and east, sun-screening devices will also be provided to screen west and east windows from glare. However, for large spaces such as the anchor shops, cinema halls, banks, amusement arcades and multi-purpose halls, air-conditioned systems will be centrally located. Generally, the recreational zone at the southern end of the site will make use of natural ventilation and day lighting but the restaurant and anchor shops will have to use the air conditioning units to supplement the natural ventilation when the need arises.

In relation with the technical studies summarised in chapter four, artificial lighting intensities for specific spaces in commercial centres have been outlined below:

- Room height: 3-5m while malls and pedestrian walkways will vary between 40-200 lux
- Room height: 3-5m :Restaurants – up to 200lux

  Multi-purpose hall and gymnasium- up to 500lux

  Anchor shops and promotion court-up to 750lux
- Room height: 3m: offices, libraries – up to 200lux

Security lighting will be automated but it can also be manually managed. Thus, light can be switched on by design during non-trading hours and be operated by separate and usual time switches and circuit breakers. Emergency lights within the mall will be provided by separate battery operating system and positioned at specific locations in accordance with

fire safety regulations. The battery room will be combined with the main power room and provided with natural ventilation and an extractor fan to take out fumes. Lighting luminaires will be fluorescent tubes which are surface-mounted because they are energy saving.

5.2.7. Services

There will be a stand-by generator of appropriate capacity that will supply the facility with power when electricity from Akosombo dam fails. With the transformer located on the site, power supply to the complex will be adequately catered for. Electricity supply to the complex will be through underground cables to keep a clean and appealing facades and skyline. These will run along the main road and end at the power room.

Water will be tapped from the 100mm supply mains along the major road. To ensure continuous supply of water, a booster pump will be provided to facilitate linkage of an underground water tank in addition to an overhead tank which will be elevated off the ground at a considerable height. These facilities will be placed on the eastern end of the site.

Fire control systems such as smoke detectors and fire alarm systems, will be located at possible fire prone zones of the facility to ensure prompt and effective fire fighting. The smoke detection system will operate on the principle of heat sensing and smoke detection and will consist of fire alarm initiators, indication panels and bells. Smoke detectors will be located at vantage points including all anchor shops, restaurants, lettable offices and the multi-purpose hall. A fire and smoke detection panel will also be positioned at the service yard, precisely in an enclosed control room, to alert personnel of any possible fire outbreak

in the facility. In addition, sprinkler heads (spaced at regular interval at the ceiling level) having a spray area of $50m^2$ and hose reels supplied by mains, will be placed at strategic regular locations within the commercial centre to serve as fire extinguishing gadgets.

To disseminate information centrally in the commercial complex the use of a central information centre will be installed and will operate audio and visual information system. Hence, for audibility enhancement, loudspeakers will be installed at vantage points in order to disseminate information to all customers and staff.

As much as possible, the edifice has been designed in such manner as to make it enclosed in order to reduce security breaches. This is exemplified by the limited entrances provided at the north and south ends of the facility. Emergency exits would also be provided at vantage points to cater for any panic situation. Therefore, surveillance of the facility will be easily executed. For an effective security in the facility, three main security systems have been proposed; these are a day-shift, night-shift and the use of closed-circuit television (CCTV) security systems especially during business hours. The CCTV will also enable management to be aware of incidents, such as unexpected sickness, accidents and vandalism among employees and customers alike, within the mall. It can also be used as a crowd control device.

All surface drains will be directed through a network of covered drainage which will discharge into the storm drainage gully (constructed as the main sewer line that connects to the main sewer of the community) bounding the site on the eastern end. Soil waste is to be discharged through underground pipe work into the septic tanks and filtration bed within the site. Surface water will be channelled into existing storm drain gulley (which will be

reinforced with retaining walls on both sides and covered with vented concrete slab) on the eastern side at the site.

5.2.8. Structural System

The facility is generally planned on a modular grid module of 6m × 6m. The post and beam system of construction will mostly be employed. There is an exception at the main recreational zone where the site dictates non geometrical spaces leading to inconsistencies in column spacing.

For areas such as anchor shops, banks, gymnasiums, conference rooms and cinema halls (where clear and unobstructed spaces are required) truss, waffle and troughed-ribbed structural systems will be utilised.

5.2.9. Materials and Finishes

Exterior walls of the commercial complex will generally use coarse concrete aggregate, which will be brown coloured sedimentary rocks. Brick cladding for the foundation walls which are 600mm from ground level, will be employed. Interior walls and columns will employ polished marble tiles, 1000mm from floor level to facilitate cleaning of stains. The walls will employ light cream coloured emulsion paint of excellent quality.

For the floors, pavement materials such as concrete blocks, stone finishes will be used to prevent slipping. Materials used for steps, ramps and retaining wall will be consistent with general hard landscape finishes. Porcelain tiles will be used for shops and offices while specialist approved acoustic materials will be employed in cinema halls and night clubs.

Generally, windows in the courtyards will be vertically pivoted and zinc coated with aluminium oxide heat reflecting glass. This reflects about 70% of the solar radiation incident on it and converts the remaining 30% into a red bias light.

Both vertical and horizontal shading devices will be used on the facades of the facility taking into consideration the calculated shadow angles of these facades.

Also, glazing with properties as stated above will be used for spaces such as the internet café, amusement arcade, among others, due to the fact that red bias light is very good for computer and other electronic fitted rooms since it does not allow glare penetration.

Plastic Tongue and Groove (T&G) will be used for anchor shops, gymnasium offices and other general spaces. Special acoustic material approved by a specialist will be used for a cinema, a promotion courts or a night club, while most doors will be made of laminated glass in aluminium frames.

With respect to signage, wide automated advertising boards will be displayed on the west end blank walls with flood lights of appropriate light intensities highlighting these advertising walls. Diverse multi coloured materials from glass to plastic will be employed for these advertising elements. Generally, the whole fabric of the building will be converted into an advertising element. Thus, the parapet, wall columns and even floors will help sell the merchandise in the proposed complex.

Upon completion of the proposed Tema Commercial Centre, there should be a fulfillment of the main objectives as outlined in chapter one. The client, likewise the customers (especially the populace of C22 of Tema), should benefit mutually, since the needs of both parties have been merged to realise the facility.

The new paradigm of commercial centre design proposed for C22 of Tema will be basically a prototype centre exhibiting unique entertaining features such as advertising building fabric, large corridors and courts with greenery, as well as major entertainment facilities, including snooker, table tennis and mini golf games preferred by the community.

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APPENDIX A

QUESTIONNAIRE WITH RESULTS FOR RESIDENTS OF COMMUNITY 22 FOR THE PROPOSAL OF A MODEL COMMERCIAL CENTRE

Feasibility Study on the Patronage of the Proposed Commercial Centre: Questionnaires for Community 22 residents

1. Do you have a resident commercial complex in the community?

   a. Yes b. No

2. Is it a walking distance?

   b. Yes b. No

3. Which would you prefer?

   a. Open air commercial centre b. Enclosed commercial centre

4. Which would you prefer?

   a. Tema traditional market (TTM) b. Accra shopping mall (ASM) c. Makola shopping mall (MSM)

5. What kind retail shops do you normally patronise?

   a. Comparison shops b. Convenience shops

6. What kind of goods do you normally purchase?

   a. Groceries b. Comparison goods

7. Do you have any recreational facility in the community?

   a. Yes b. No

8. Which would you prefer?

   a. Recreational hub with a live band stand b. Recreational hub with a night club

9. Which would you prefer?

a. Miniature golf course b. Basket ball c. Table tennis d. Snooker

10. Which would you prefer?

a. Traditional chop bar b. A contemporary food court

11. Do you patronise movie cinemas?

a. Yes b. No

12. If yes, where?

13. Which of the social class do you fall in?

a. Low income level b. Middle income level c. High income level

TABLE SHOWING RESULTS ON QUESTIONAIRES ADMINISTERED TO THE POPULACE OF COMMUNITY 22, TEMA.

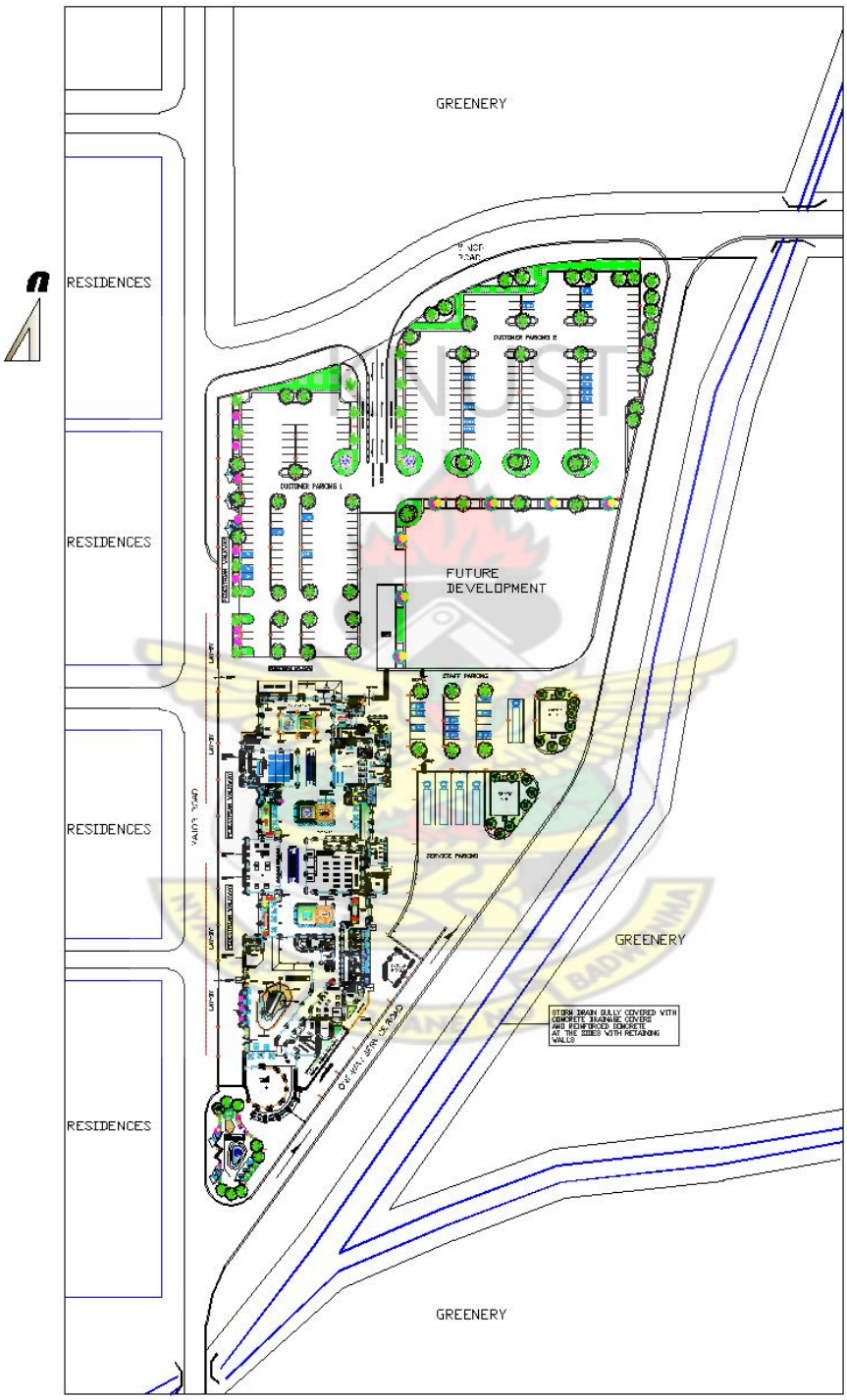
131 questionnaires were administered over a period of three weeks. The households were visited because they include the target group who will benefit from the proposed project.

NO.	REASON FOR QUESTION	**RESULTS** (Households)
1	To avoid patronage polarisation	Yes = 131 (100%) No = Nil (0%)
2	To strategically position the new model for accessibility.	Yes = 56 (42.75%) No = 75 (57.25%)
3	To propose a centre that relates to the culture of the community	Open air commercial centre = 59 (45%) Enclosed commercial centre = 72 (55%)
4	To get a clearer idea of the kind of centre the populace prefer	TTM = 16 (12.2%) ASM = 85 (64.9%) MSM = 27 (20.6%) Both ASM and MSM = 3 (2.3%)`
5	To provide an appropriate shops addressing the needs of the community	Comparison shops = 90 (68.7%) Convenience shops = 41 (31.3%)
6	To stock the shops with the appropriate goods for continual patronage	Groceries = 87 (66.4%) Comparison goods = 44 (33.6%)

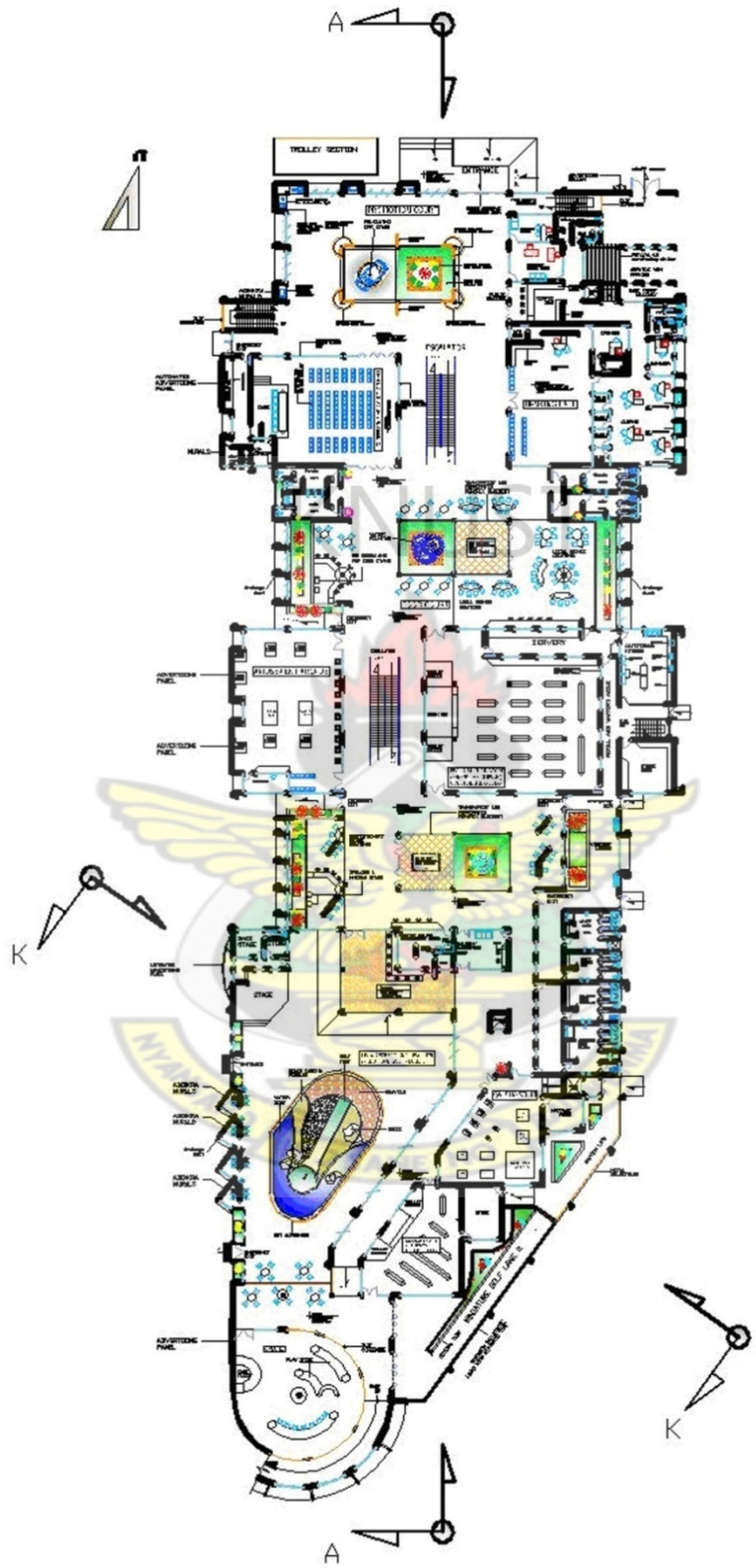
7	To determine possible competition or provide an alternative recreational facility	Yes = 131 (100%) No = Nil (0%)
8	To avoid the provision of a side attraction activity which would serve as a social vice	Recreational hub with a live band stand = 101 (77.1%) Recreational hub with a night club = 40 (22.9%)
9	To determine the possible side attraction recreational events to make the centre fun to shop in.	Miniature golf course = 35 (26.7%) Basket ball = 40 (30.5% Table tennis = 31 (23.7%) Snooker = 25 (19.1%)
10	To determine the appropriate eating atmosphere for the community	Traditional chop bar = 53 (40.5%) Contemporary food court= 78(59.5%
11	To determine the feasibility of providing a place for social gathering	Yes = 94 (71.8%) No = 37 (28.2%)
12	To avoid patronage polarization and provide a case to study	Non- applicable
13	To determine whether residents can afford the services the new model presents	Low income level = 7% Middle income level = 57% High income level = 36%

APPENDIX B

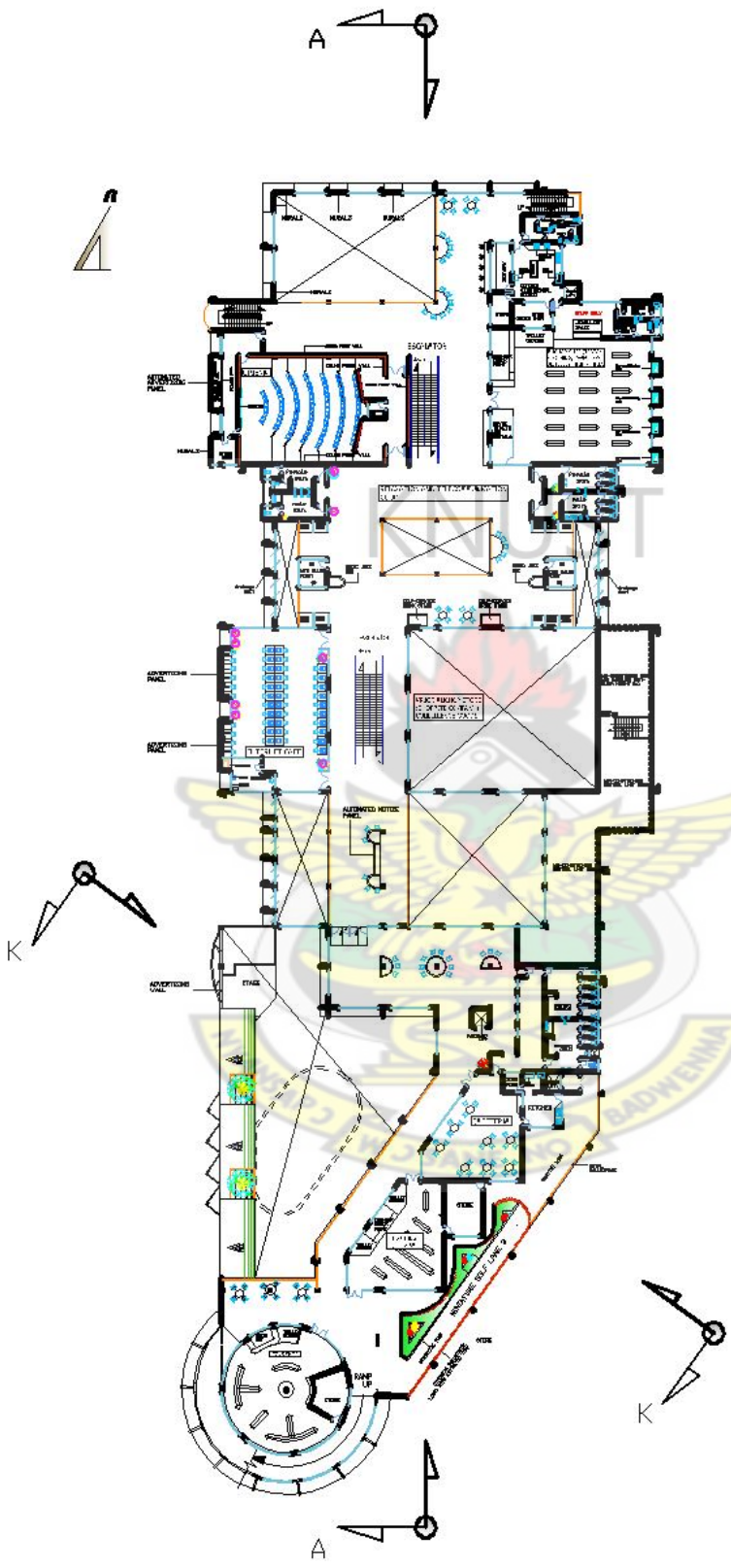
Architectural Drawings of Proposed Tema Commercial Centre



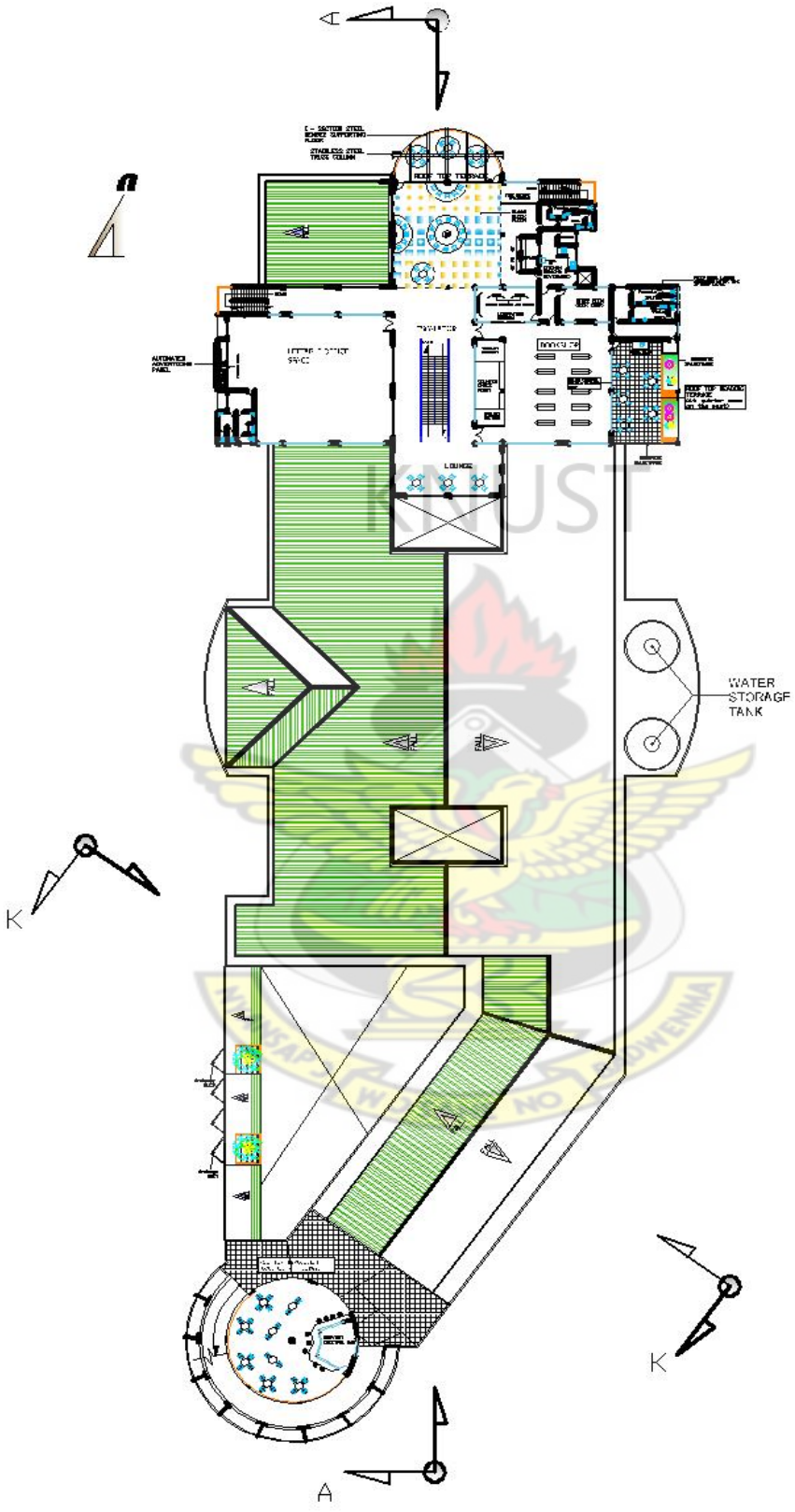
SITE LAYOUT



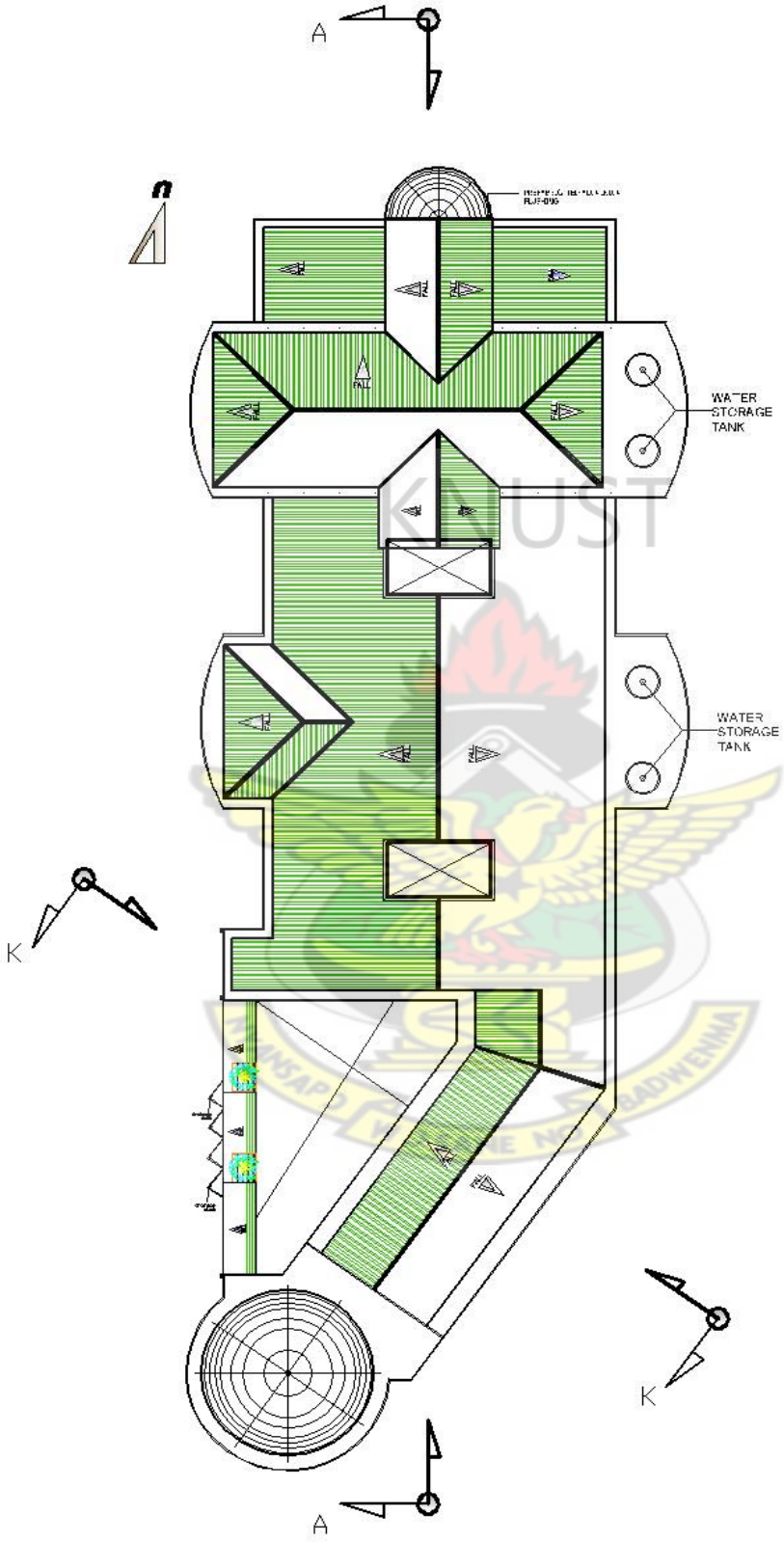
GROUND FLOOR PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN



ROOF PLAN

NORTHERN ELAVATION

SOUTHERN ELAVATION