PROPOSED LARANTO MARKET JOS
(AN EXPOSITION OF A SATELITE MARKET DESIGN)

BY

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A THESIS SUBMITTED TO THE POST-GRADUATE SCHOOL AHMADU BELLO UNIVERSITY ZARIA NIGERIA IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE MASTER DEGREE (M.Sc) IN ARCHITECTURE.

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DATE: AUGUST 1991

DECLARATION

I, ADAMU, A. SANI, HEREBY DECLARE THAT THIS THESIS IS MY AUTHENTIC WORK.

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DEDICATION

THIS WORK IS DEDICATED TO LATE DR. GODWIN ALLI, THE MAN WHO INSPIRED ME TO STUDY ARCHITECTURE, WHO IS ALSO A FRIEND AND A BROTHER. MAY HIS SOUL REST IN PEACE.

AND

TO MY LATE FATHER MALLAM ADAMU TAL WHO TAUGHT ME THAT: WHAT DOES NOT KILL ME CAN ONLY MAKE ME STRONGER.
MAY ALLAH HAVE MERCY ON HIS SOUL.

CERTIFICATION

THIS THESIS ENTITLED PROPOSED LARANTO MARKET JOS. (AN EXPOSITION OF A SATELITE MARKET DESIGN) BY ADAMU, A. SANI MEETS THE REGULATIONS GOVERNING THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN ARCHITECTURE, AHMADU BELLO UNIVERSITY ZARIA, AND IS APPROVED FOR ITS CONTRIBUTION TO KNOWLEDGE AND LITERARY PRESENTATION.

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THE FRIENDS AT SCHOOL FOR THEIR CRITICAL COMMENTS.

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ZARIA, NIGERIA
AUGUST, 1991

ADAMU TAL, A.S.

PROPOSED 'KATAKO' MARKET - LARANTO JOS

An Exposition of a Satellite Market

ABSTRACT

Trading forms one of the most basic economic activity engaged the majority of the urban populace in Nigeria. Even a great number of workers, with white-collar jobs, find time and engages in trading in one form or another. This is of course to supplement their earnings from their salaries which cannot even cover their needs. Trading and commercial activities takes place best in the market.

However, most of our markets are inadequate and have hitherto received very little attention, yet they provide employment for the overwhelming majority of the urban population in our towns and cities. That is why on a typical visit into market places where the trading activities are carried out, which is more important to the majority of the population than supermarkets or departmental stores, one is evidently confronted by many problems like, congestion, inadequate space requirement, improper circulation lack of orderliness, health harzard, poor sanitary service and high risk of fire incidence.

This study is centred on a satellite market - Katako Market-place- which is. located at Laranto Quarters at the Northern part of Jos Town. The study deals with a programme of investigations on effective retail space requirements, fire precaution measures, effective storm water drainage and proper adequate traffic

(Pedestrian and Vehicular) Circulation. However, other problems or issues related to design and construction shall be examined.

It is hoped that the study will provide information which architects and other related professionals, may find of relevance and interest as they seek better market solutions particularly in Nigeria.

a. PARKING FACILITIES

There is total absence of parking facilities cars, buses and lorries are parked by the road (Main Road) side while loading and unloading is carried across the pedestrian walkway. There is conflict between pedestrians and motorists resulting, very often, in exchange of angry and abusive words.

b. SPACE REQUIREMENT

The retail spaces for display and sell of merchandise is poor. There is no adequate space between the customer and the display area. In which is in most cases insufficient for the merchandise.

c. FIRE INCIDENT

Since the establishment of the market in 1975 to the present there has been nine fire incidence resulting in great loss of materials and severe human injuries. The causes of the fire include cigarrette smoking, ironing machines, fire from smithing activities, and 'flash-over' from the guardmen fire.

d. HEALTH CONDITION

This is completely absent in the market. First, there is no toilet facilities. Traders have to go to their various houses or travel down to the nearby bush to relieve themselves. Secondly, there is no proper source of water in the market. Wells however, were dug which are the only source of water supply. Refuse disposal is totally absent.

1.3 AIMS AND OBJECTIVES

a. The new design would provide, as much as possible the use of non-combustible materials incorporating modern facilities and also the market will act as a focal point of trading activities within Laranto and the State.

b. To provide supporting services like a Bank, Police Station, and a Post-Office for the utilisation by the market users, and also to provide administrative facilities.

c. To create a functional design which enhance the welfare and security of traders and provision for fire prevention facilities - ensuring efficient control and reduction in the spread of fire within the market.

d. To design adequate vehicular and pedestrian movement within the market.

e. To design an effective storm water drainage system within the market.

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1.0 INTRODUCTION

Nigerian cities have grown very rapidly in the last twenty-five years and have become trading centres in which commercial and economic activities are highly concentrated. It is because of these reasons that the Federal Government of Nigeria has invested a lot of money in establishing modern markets to replace the traditional open markets particularly in urban centres. One of such market is the Jos modern market. The main market does not, however, offer sufficient range of goods and services like timber and timber products, carpentry, bulk food items, local cooking oil (Manja) lorry body-makers second-hand clothing and shoes. This is so because the bulk of the above mentioned goods and services are offered and can be obtained at Katako market place which is the subject of this study. It is located on the northern part of Jos town, about five miles away from the main market. The market continue to flourished for two main reasons: firstly it is the largest market in the whole northern states that offers timber and timber products and carpentry services, in addition to second-hand clothing and shoes. Secondly, it is located at a fast growing neighbourhood of Jos town.

1.1 MARKET - DEFINITION

The term market is derived from the latin word 'MERCATUS' which means either 'THE PLACE OR METHOD OF CONTACT BETWEEN SELLERS AND BUYERS.'

Bohannan and Dalton (1962) defined market as a 'SPECIFIC SITE WHERE A GROUP OF BUYERS AND A GROUP OF SELLERS MEET.' In additional one can say that market can be an economic forum where commercial and socio-cultural activities are exercised and experienced. Again the economist may say that market refers to the field in which economic market forces operate to determine prices of commodities. However, in this study market would mean market-place as defined in the first definition above. In the African context market-place means more than just the process of buying and selling. It is a place to meet with friends, disseminate views, propagate informations and mass mobolisation for political or social reasons. However, the impact of western civilization, on Nigerian economy has made the economic asphect overshadowed the non-economic asphect and as a result the markets are now mere places of final sales only.

1.2 PROBLEMS DEFINITION AND ANALYSIS

The most striking thing about 'Katako' market is its ram-shackle and improperly placed retail shops and stalls, in addition to other problems relating to design and construction. The flowings constitute the major problems confronting the market:-

a) CIRCULATION

Firstly, the existing routes within the market are inadequate and unmotorable. The ground is punctuated

with rocky outcrops. It is difficult even to walk on the roads. There is total absence of parking facilities, cars, buses and lorries are parked by the road (main road) side while loading and unloading is carried across the pedestrian walk-way. There is conflict between pedestrians and motorist resulting, very often, in exchange of angry and abusive words.

b) SPACE REQUIREMENT

The retail spaces for display and sell of merchandise is poor. There is no adequate space between the customer and the display area. In which is in most cases insufficient for the merchandise.

c) FIRE INCIDENT

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d) HEALTH CONDITION

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however, were dug which are the only source of water supply. Refuse disposal means are totally absent.

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d. To design adequate vehicular and pedestrian movement within the market.

e. To design an effective storm-water drainage system within the market.

1.4 HISTORICAL DEVELOPMENT OF MARKETS

Pre-historic man or stone age man had finally settled down after evolving methods of land cultivation. This development further led and gave birth to subsistent societies as people came together to live in cluster groups in search of better means of communication and defence against animals, wild man and safe-keeping for their farm produce. Communal societies finally evolved as different subsistant societies merged and interacted to develop and progress. One of the significant developments at this time was the upgrading of trading activities which were enhanced by surplus production of the communal societies as opposed to the subsistent societies were people cultivated and produced just enough for their own day to day consumption. This surplus production of the societies led to increase in level of trading activities and therefore, the beginning of the market.

Throughout history, markets have existed in one form or the other as areas in which trading activities were exercised and where known as 'AGORA' in GREECE, 'BAZAAR' in MIDDLE EAST. The term market was derived from a latin word 'MERCUTUS' which means the place or method of contact between buyers and sellers.

The first markets were simply incorporated into the homes of the craftmen who produced and sold their wares on the premises. In West Africa by the 10th century, however, a

a new breed of enterprising merchants emerged who were primarily interested, not in the production of the products but in its purchase and the re-sale to others. At first, they too operated from their homes. Eventually, however, they outgrew the house and they had to find a large area which could accommodate their wares.

In Africa markets had existed in many forms before the advent of colonialism, either as periodic, permanent markets, daily markets and even night markets in which trading exercise were carried out in the form of barter or cash and carry. A notable significant african market or trade from the 10th century onwards was the Trans-Saharan Trade.

The period of colonialism, however, brought about new development in the market system in Africa by way of building roads, railways and encouragement of european trade. These new developments made easier the means of communication. The new roads created better and easy access to the markets and the location of railway stations attracted new markets.

Most African towns had their first markets at a focal point usually at a major cross-road into the central area or administrative seat of government. They were also located near the chiefs palace or within walking distance.

Some markets in the olden days specialised in the sales of defined or particular goods - indeed this is still existing particularly in Nigeria e.g. the market under this study - 'KATAKO' Market, and JOS KASUWAN NAMA (Meat Market) KADUNA RAILWAY MARKET, KASUWAN KURMI IN KANO, that specialises in textiles, just to mention a few.

1.5 LITERATURE REVIEW

This comprise reviews in historic, social, geographical and economical characteristics. However, in West Africa traditional markets have not been studied extensively and the few studies made are mostly on socio-economic aspects of the markets as compared to the physical aspects. The aim of this review is to familiarise the reader on the elements of the market that are characteristics of its growth and trend.

Study of traditional markets in West Africa, Nigeria in particular have been extensively carried out by Hodder and Ukwu in their book "Markets in West Africa" (1969), who defined the market place as authorised public concourse of buyers and sellers of commodities meeting at a place, more or less at an appointed time. Furthermore, traditional markets according to Hodder are not only economic institutions but also reflect religious, social, cultural and political functions.

Hodder and Ukwu further went on to exclude the numerous

places of adhoc trading involving a handfull of women meeting at street corners, in front of compounds or building sites, and the regional markets concept where buyers and sellers are in such a free intercourse with one another that prices of goods tend to 'EQUALITY' easily and quickly.

Hodder (1969) drafted a conceptual framework of market classification identifying a hierarchy in market set-up in Nigeria. This notion of trading the development of markets from the simplest 'PERIODIC MARKET' through to 'RETAIL SHOPS' and large 'SPECIALISED MARKETS' in larger towns actually agrees with most other methods of classification.

Therefore, this conceptual framework can be applied to any other approach of market classification which might come due to the fact that the process of distribution and exchange differ from society to society. This differences arise chiefly from the different historical, natural, economic, social, phsychological and technological factors operating in one society as distinct from another. The problems, trends and end products, however, remains fundamentally the same in all Nigerian societies.

Although the study carried out by Hodder and Ukwu is on the socio-economic functions of the market, characteristic elements of traditional markets were identified in their detailed study. Hodder and Ukwu's study gives an insight into the market system in most west African countries.

Eva Krapf describes the market place as centres of social interaction, political views and as a terminal point of many festivities in a given part of a city. This description is however, inadequate as it does not address the fundamental issue in market formation - commercial transaction.

Mabogunje, in his book "URBANISATION IN AFRICA" referred to markets as places where transactions are carried out as delineated area occupied periodically by buyers and vendors of retail goods. While, Mintz (1964) in his paper "MARKET SYSTEM AND WHOLE SOCIETIES" (1964) defined market as the physical definable setting where crowds of buyers and sellers are engage in exchange of goods and materials and money.

In another development, Bromley, stated that the most important trading institution in any developing country is the market and that since a much greater volume and variety of goods is handled by the internal or local trade as opposed to international trade, therefore, the internal trade deserves a lot of attention. Bromley, however recognised that in some parts of the world particularly in third world countries, the traditional markets have continued to decline giving way to modern shopping centres which are more permanent and offers the properietor greater security, better facilities for storing and displaying of goods and greater advantage to sell goods of high value and

quality.

However, Yang after his studies of markets in Northern China, concluded with the observation that markets offer cheapness and opportunity to bargain. This is one of the advantages of traditional markets over the shopping centres where prices are fixed and no room for bargaining.

In his book "MARKET CENTRES IN ZARIA," Professor J.A. Gana from his study, discovered that a hierarchy of markets exists. This he said range from rural to urban centres. Of course this is true for all traditional African societies. Buyers visits, more frequently, the market place where they can get more chance of bargaining and the hope of getting their needs on cheaper prices.

Also, Berry in his book "GEOGRAPHY OF MARKET CENTRES AND RETAIL DISTRIBUTION" observed a hierarchy of business Centres but this time within the city or urban settings. This he said results from the fact that different commerical activities have different goods and services and purchase than with different degrees of frequency.

In the study of the anatomy of traditional markets in Nigeria guided by Professor Vagale (1972) it was noted that Nigerian markets generally, have small site area coverage because most of them developed on identical open space that do not give room for expansion to cope with urban growth thus resulting

into congestion. It has noted in the same study that most of these traditional markets are poorly served by access roads that are found to be full of pot-holes and defective intersection.

Furthermore, he noted that most of the markets lack facilities and services which is responsible for their deplorable environmental quality.

The dumping of garbage and solid waste hapzardly at street corners, open drains and lack of trees or landscaping or absence of open spaces are common sights at the market places. The study by Vagale (1971) noted that over two-thirds of the market structures are constructed with temporary materials such as - timber posts, iron sheets - added to the crowded nature or rather arrangement of the stalls which expose the markets to fire hazards.

From the study conducted by Vagale (1972), he observed that what is needed in Nigeria is improving or rebuilding of the markets in order to be able to function as efficient, clear and viable socio-economic institutions and as integral component of urban and regional systems.

Therefore, on this bases some recommendations were made about the land use structure and design proposals depending on the type and status of market.

Again, Arinze, (1976) in her studies of market centres identified the hierarchies of markets and shopping centres in Zaria and their special distribution. As a result she proposed the intergration of markets and shopping centres but also observed that they should be in hierarchies. Reasons for such proposals range from the following observations: that the markets and shopping centres have virtually growth together in some zones and in terms of commercial activities, they offer similar commodities, through different levels and scales thus catering for different categories of a city's population. And also that their integration will mean better utilisation of space which will create a quality environment that will increase their economics of scale. Also, for the consumer, a lot of money will be saved for commuting over space moving from market to shopping centre since they are located in one place.

Previous studies on markets mentioned above in Nigeria, have shown that the traditional markets have been identified with lack of planning coupled with poor material quality and most of them lack basic facilities and services and are made up of temporary market structures.

However, physical planning efforts have not gone beyond suggestion on how to solve these problems.

1.6 MOTIVATION

The motive behind the choice of 'KATAKO' market as the subject of this study was based on the following reasons - firstly, the market place is unique, in the sense that it is the single largest timber market in northern part of the country. Although it cannot be said to be solely a timber market per se, because other various wholesales commodities are also sold in the market. Again, it enjoys the monopoly of being the only largest market place in the north where bodies for lorries and vans are made to specifications.

Secondly, it is strategically located at the heart of fast growing communities, in which expansion is still going on toward the northern direction. Thus the market would in the nearest future serves a larger population.

Thirdly, the frequent fire incidences in the market place which result in great loss and damage to property and severe human injuries. The properties loss and damage in all the fires was estimated at a minimum of 50 million naira. This is very disturbing. It is a large sum of money by any standard. The amount of money is more than enought to build three standard modern markets. Even the present cost of Jos main market was to be 11 million naira which was however, raised eventually to 23 million naira probably for some reasons.

Lastly, there is a growing waves of trading and commercial activities amongst Nigerians today. More and more people are turning to commerce as a means of employment. Even some workers rather than depending only on white-collar jobs as was the case ten years ago. Therefore, there is going to be a demand for more commercial and retail spaces. And no where this is possible than in market place. The frequent springing up of shops in residential areas and along streets attest to the above fact. Another relevant reason, is that presently Jos main market is congested and cannot accommodate many more growing shoppers. In addition the main market has some inherent problems related to planning.

Indeed most central functions within Jos are concentrated within the CBD (MURTALA AND AHMADU BELLO WAY). The heavy and mixed concentration of uses in the center of Jos creates the need for daily transportation of large numbers of people to and from it for work.

The distribution of land uses and other functions within Jos defined by the land use, makes it apparant that there is a large and fairly indiscriminate mixture of uses, that is not particularly conducive to the promotion of a properly functioning of urban environment.

One of the causes for the present congestion and mixture of uses in the CBD of Jos is that commercial and civic services

for its growing population (reaching the target of 900,000 by the year 2000) have not yet really been extended and distributed over the new residential sectors. The CBD has now been overburdened with services for new communities lying away from it. A rational distribution of these to new local centres and markets seems therefore urgent in order to achieve a more even distribution of services.

Again the size and shape of the expanded area of Laranto towards the northern part including the university campus, will necessitate a new commerical center which will serve the whole area and to a significant extent the wider catchment area. This need is in fact in the progress of consideration by the relevant state authority.

1.7 SCOPE AND OUTLINE OF PROPOSALS

Previous studies on market places and shopping centres will be reviewed in an attempt to discover the existing problems, the areas covered and those yet to be tackled and finding possible solutions to the problems.

Informations and data related to the physical aspect will also be collected and analysed. This would be necessary for the physical planning and design of the market.

The design proposals will include the layout plan of the market with regards to general circulation, fire precaution,

proper arrangement of retail shops and other services and a detail design of all units in the market.

1.8 LIMITATIONS AND POSSIBLE CONSTRAINT

Lack of accurate demographic data and informations on the existing market will be a constraint. This is because officials of the local government may deliberately mis-inform or withhold some informations for official reasons or for fear of repraisals or because the information or data has never been documented.

1.9 OUTLINE OF THESIS PROPOSALS

The design proposals will provide a separation of vehicular and pedestrian traffic. This would solve the problem of forcing delivery vans to stand at the road side while loading and unloading takes place across the pedestrian routes.

Again, the design would provide obtainable solution for frequent fire incidence in which they are so far nine major fire incidence in the market since its establishment in 1975.

Furthermore, the design will provide sufficient and adequate spaces for the retail shops and the display area. This will prevent the retail shoppers, traders and merchants displaying their wares along passages and walkways, thereby creating congestion and overcrowding.

The proposals will encourage zoning of trades of commodities

for easy identification and access.

1.10 METHODOLOGY

This study will be conducted by research into current and previous materials on the issue of market places. Although the study is aimed at, in the final analysis, designing of the physical structures and providing solutions to the planning problems of market, however the socio-economic problems would also be examined.

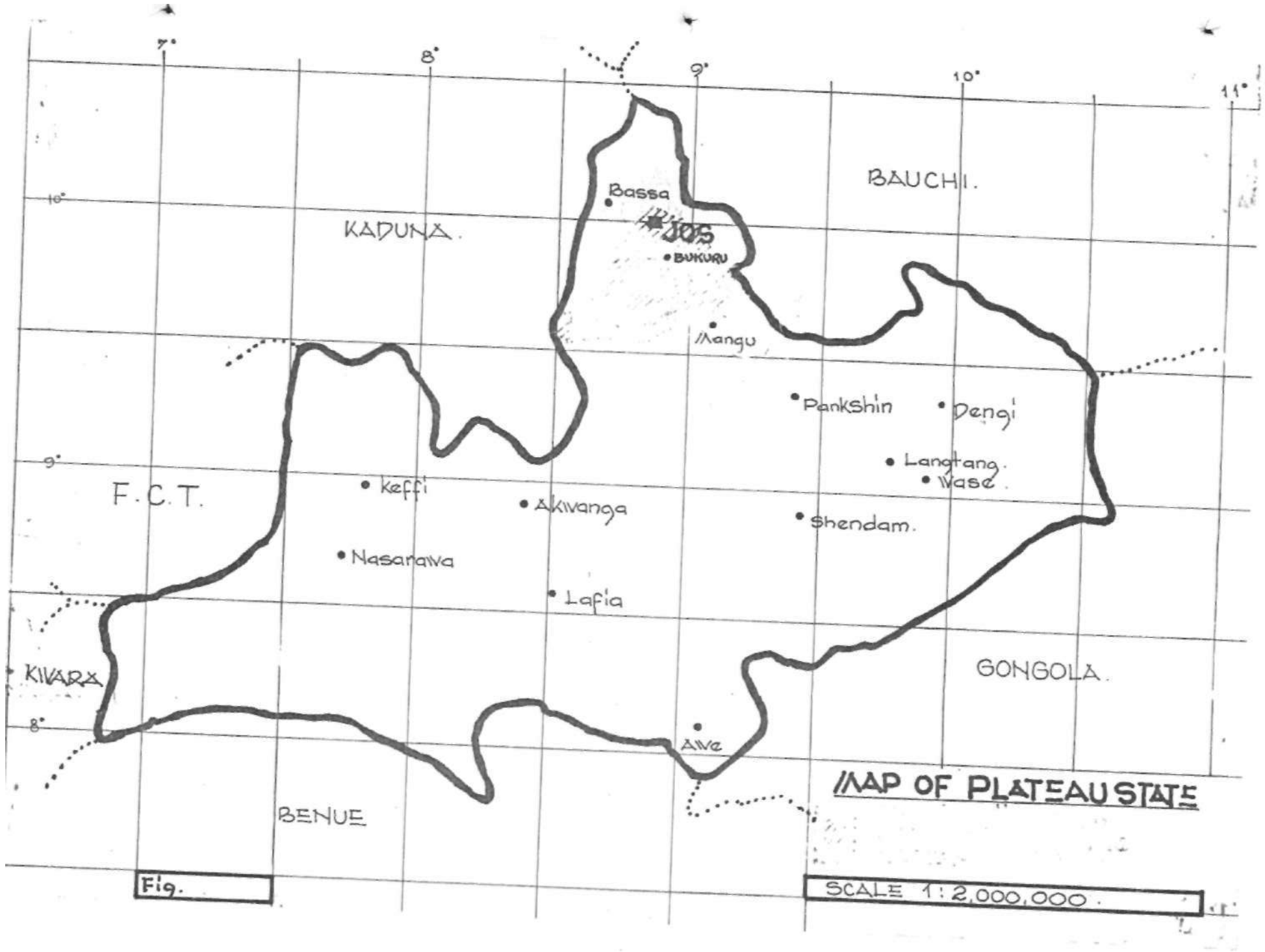
Secondly, there will be interviews and discussion with officials and administrators of the market and also with the users and occupants of the market.

Data and informations will be collected based on personal observations and experiences, in addition to climatic and physical data relating to the site under study. Again pictures will be used for real life demonstration of the existing condition at the market-place.

There will also be case studies of related market-places. The individual market will be analysed and appraise with the hope of discovering problems and their solutions used.

It is to be a prototype market centre which provides trading and manufacturing facilities for a functional, effective and convenient accommodation of trading activities.

The prototype would act as model or guide for market designs particularly this will be more so in the local government areas.


7°
8°
9°
10°
11°
10°
9°
8°
KADUNA.
BAUCHI.
Bassa
JOS
BUKURU
Mangu
Pankshin
Dengi
Langtang.
Wase.
F.C.T.
Keffi
Akwanga
Shendam.
Nasarawa
Lafia
KWARA
GONGOLA.
Awe
BENUE
MAP OF PLATEAU STATE
Fig.
SCALE 1:2,000,000.

CHAPTER TWO

2.0 THE STUDY AREA

2.1 HISTORICAL BACKGROUND OF JOS CITY

For most part of tropical Africa cities were not part of the traditional cultures and hardly existed until they emerged during colonial times in response to economic stimuli. It was within this general pattern that Jos, the present state capital city of Plateau State came into existence.

Physically, Jos City is an attractive place to visit and live in and many people prefer to live and work in Jos than elsewhere, solely because of the favourable climatic and pleasant social conditions, situated approximately on latitude 9.5 degrees north and longitude 8.5 degrees east, Jos city stands beautifully on the northern edge of the plateau named after itself. Its height is 4,000 feet above sea level and lies close to the geographical centre of Nigeria. For variety and scenic beauty, Jos capital is Non-peril: The shere hills (local mountain everest) rise to a height of 6,000 feet to the east of the city escarpments and precipitous hills on the edges of the Jos Plateau provide spectacular water-falls and mountain torrents. The greatest of these is the River Farin Ruwa which descends in series of falls and cataracts; a distance of 2,000 feet in a little over two kilometres.

Round Jos itself, the ground is broken by rocky outcrops and to the south is an open plain with a few scattered trees.

The picturesque villages dotted about the landscape are surrounded by cactus hedges originally planted for their defence.

The name Jos is a mispronunciation of Gwash (meaning hilly or Rocky area or place) by early Hausa traders who patronised the newly established tin transportation camp in 1915. From this artificial creation about 73 years ago, Jos also popularly known as the 'Tin City' has grown into one of the most attractive state capital cities in Nigeria. It is strategically placed at the geographical centre of the northern states and besides its busy new airport at Heipang which may be equipped to international standard, is also a nexus of railroad transportation.

The introduction of Tin mining particularly on the Jos Plateau marked an important turning point and the first 50 years that the mines were operational brought about tremendous changes to the life-style and landscape, the economy and the social organisation of its inhabitants. These also motivated them to migrate from the hills to the plains to take up unskilled labour in the tin mines. People from other parts of the country and a good number of other west African groups and europeans decided to settle on the Jos Plateau and they now make most of the urban dwellers including Bukuru Town which is about 14 kilometres from the Tin City.

The projected population of Jos City at 2.5% increase annually by 1989 is about 499,669 with most of its residents born and brought up elsewhere. The peoples native to the area around Jos welcome strangers with maximum civility.

Characteristics commonly associated with west African non-traditional urban centres are ones that apply to Jos: large portion of immigrants, ethnic diversity, and a tendency for ethnic groups to live in separate quarters and to be identified with specific occupations. These traits of urban communities do not necessarily foster disunity. A social scientist, Dr. Leonard Plotnicer (1966), who studied the social situation of Jos after the Nigerian Independence had this to say, "The people of Jos make up a stable urban population and the community itself continues to develop its own viability." Inspite of the diversity of people, Jos does not have the language problems found in other parts of Africa for many of its inhabitants can communicate in the Lingua-francas of English, Pidgin english and Hausa, that last being learnt and spoken by both Africans and Europeans.

It is within this set-up that 'KATAKO' (Timber) market is located. It is located at Laranto Quarters in the northern part of Jos Town. Most of the residents in Laranto comes from the southern part of the country - especially the Ibos. However, a larger percentage

of Jos indigenes and environs also resides in the area. These people are mostly civil servants, workers, and unskilled labourers. The southerners mostly engage in trading and other commercial activities. Apata Street which can be ranked as the fifth business centre in Jos is located very close to the market.

2.2 POPULATION DISTRIBUTION

Jos City can be said to be grouped in sections based on ethnicity, relating to socio-economic background of the respectives inhabitants.

The central part of Jos (UKIN GARI AND SABON FEGI AREAS) starting from the Jos Main Market and runs towards the Northern direction is completely inhabited by 'HAUSAWA/ FULANI." These people are muslims and speak Hausa as the Lingua Franca. This group is the largest and most populated in Jos Town. A considerable number of this group are also found in other groups. Their occupation is trading and commerce.

The second largest group can be said to be Laranto Quarters. In fact this is the single most important section economically. It covers a very large area largely dominated by trading and commercial activities. In addition to the 'KATAKO' Market, another market of Agricultural produce is located in this area. Mechanical repairers and motor spare parts sellers, who covers a large part of this

area, added to the economic and commercial activities of the area.

The third largest section can be said to be Nassarawa Quarters. This is close to the centre. Its residents are predominantly Yourubas and the mixture of the various indigenes of the state. The Yorubas are engaged in trading activities while the other various ethnic groups are workers and civil servants.

Next comes Tudun Wada Quarters which is located on the Western part of Jos Town. The residents of this area are the mixture of the state ethnic groups with Ngas being the largest single ethnic group in the area. Most of the people are christian and there are dominantly workers and unskilled labourers.

It is significant to realise here that this area borders with the first section-infact, the 'KATAKO' market is located right at the border of this two largest section of the city.

Another important factor in Laranto area is the concentration of a considerable number of educational institutions. There is a major seminary, a relevant technology, young people home, school for the deaf, an advanced teacher college campus, two secondary schools and five primary schools. By all means Laranto Quarters is the most

bussiest section in Jos Metropolis. Thus its day and night populations are quite different. The population is heaviest during the day-time. Obviously, this is because of the various economic and educational activities involves or concentrated in the area.

Another section is 'GANGARE'. This has no any economic significance. It is strictly residential and one or two institutions. Its predominantly inhabited by the people of Kanuri origin from Borno.

At the periphery of Jos Metropolis are the Biroms and Jarawa ethnic groups. These are pre-dominantly farmers. They only visit the markets periodically.

2.3 CLIMATE

On the basis of available climatic data, the city of Jos lies in the high Plateau region with much pleasant weather than that of the surrounding plains.

RAINFALL

Monthly rainfall varies in the range of 0-13 ins while annual rainfall reaches up to 50 inches. About 90% of the rain falls in the six month between April - September and it comes usually in thunderstorm of high intensity particularly in the beginning and towards the end of the rainy seasons.

TEMPERATURES

As a result of the high elevation of Jos Plateau, average annual temperatures are lower than those of the surrounding plains, with March and April as the hottest months while July and August are the coldest. The mean maximum temperature fluctuates around $80^{o}F$ while minimum temperature is around $62^{o}F$.

RELATIVE HUMIDITY

The low relative humidity of Jos which is less than 25% between November and March is the most significant factor for the comfortable climate. The weather of this period is windy and very dry and the speed is usually 50 km/hr.

CONCLUSION

From the above information the climatic conditions of Jos, Buildings require less cooling agents such as fans and air conditioning. This is because of the cooling nature of the environment for most part of the year. Thus, the use of concrete as a building material is only appropriate, since the thermal radiation of the environment is minimal. The concrete also withstands the wall-washing effect of the thunder-storms which bring along driving rains.

2.4 MARKET SYSTEMS

It is believed that periodic markets are temporary features and that with increasing population density, a steady rise in rural incomes broadened norms of consumption and improved transport, markets lose their periodic character and become daily.

Understanding the socio-economic conditions under which the contemporary market system was evolved in Nigeria is necessary for an understanding of both the spatial and temporal attributes of the system and its functions.

The basic physical layout, setting and organisation of rural markets is similar in most parts of Nigeria. The market place is usually consisting of a rectangular site which is lined by small retail stalls and shops and ancilliary services.

Most people sell their agricultural produce and buy other goods and commodities for domestic consumption. The reason behind the sale of goods may be because of an immediate demand either for cash (to pay school fees for the kids, pay taxes, ceremonies etc.) or for some item or service available in the market or near-by shops. The items offered for sale to satisfy this demands may not necessarily be surplus items. Majority of marketers travel a few kilometres to market on foot or other forms of transportation, once or more per week and many regularly visit more

than one market place.

Most small-scale enterpreneurs confine their trading activities to rural market. They travel from one market to another displaying and selling their wares. A man may be away from his home for weeks before returning. Most of these market are periodic or rather weekly.

The periodicity of a market is determined by the frequency with which market activity occur at a given market place. In Nigeria, for example markets can be broadly classified into two groups based on frequency of occurrence.

a. PERIODIC MARKETS

b. DAILY MARKET

PERIODIC MARKETS - These are markets that operates at regular intervals. It is common in rural areas.

DAILY MARKETS - These are markets that operates daily and exist in areas where the economic activities can set-off a large external demand that can sustain continuous market exchanges. Therefore, the presence of a daily market in an area shows the level of economic activities of that area. It is commonly found in urban areas.

2.5 TYPES OF MARKET

Markets can broadly be grouped into four groups on basis

of the type of goods and commodities offered at the market viz:-

(A) GENERAL PURPOSE MARKET

This is a market where all kinds of goods and commodities are sold and/or exchanged. The 'KATAKO MARKET,' under this study, could be classified as a general purpose market.

(B) SPECIFIC MARKET

This is a market for certain particular goods or commodities only, e.g. 'KASUWAN YAN AWAKI' - market for selling and buying of livestock and stock market etc.

(C) SPECIAL MARKET

It is a market where only restricted goods are sold. For example - goods or commodities that are lincenced like- guns, ammunition etc.

(D) SUPER MARKETS

This is a market where the goods and commodities have a fixed price tag. There is no room for bargaining. It is highly organised. This type is obtained mostly in industrialised societies, most of goods are manufacturered and imported.

CHAPTER THREE

3.0 ANALYSIS OF 'KATAKO' MARKET

3.1 INTRODUCTION

For a proper understanding of any issue which is problematic, so to say, one has to understand its history. This will result in answering question like. How, is the subject under study come to be in the place it is and why?

In the following pages only the problems will be discovered and analysed. The suggested solution to them will be discussed in Chapter Five.

3.2 THE ANALYSIS OF 'KATAKO' (TIMBER) MARKET

(i) HISTORICAL BACKGROUND

The development of 'Katako' (Timber) Market was completed in stages. Firstly, in 1970, the then Plateau State Government decided to give Jos City a face-lift which resulted in the removal of Truck-body-builders around Dilimi Area to former Laranto Graveyard. These group of people were the first settlers of the present 'Katako' Market. The site was obviously choosen by the Government, because it saved them from paying compensation, which would have been the case had they choosen a site which did not belong to the Government. This fact clearly demonstrated that there was no planning in the

establishment of the 'Katako' (Timber) Market place. A related issue is also the establishment of another market - the 'New market' which was located on the 'Yan Doka' football field which was also belong to the Government inspite of existing sites which are better located around Jos town. A good example then was the site at Unguwar Rimi.

The second stage occurred two years later-in 1972 when the Ibos were returning to Jos from the east after the Nigerian civil war. These Ibos found out that their former market sheds had been occupied now by northerners. The most affected were the timber sellers because their numbers was considerably high. They however, appeal to the government to come to their aid. Again the government found it convenient and gave the timber merchants a site at the Laranto graveyard. Because the number of the 'Katako' (Timber) merchants was very large - in fact they now occupied half of the market-place - the market become to be known as the 'Kasuwan Katako' (Timber Market). It is significance to mention here that the present 'Katako' market at Laranto is the largest in all the northern region. In fact apart from the timber market in Ibadan, the Laranto 'Katako' Market is the largest in the country.

In 1975, the Jos citizens witnessed the burning down to ashes of the Jos Main Market which was established

sometime in 1954. Immediately, after the fire incident a period of chaos followed as regards the provision of infrastructure to accommodate trading activities in Jos. Once again, the government found it convenient to accommodate 'Yan-Gwanjo' (Second-hand goods dealers) 'Yan Buhu (Grain dealers) food stuff sellers and a motor park at the Katako market place.

As from 1976, the market place has been increasingly growing by the arrival of other traders and commodities. At present awide range of goods are offered in the market place. One can find almost anything in the market place with the exception of motor spare parts, which are not sold even at the Jos main market.

At present, there are one thousand and five hundred retail stalls existing in the market place with an estimated population of 2612 persons.

(ii) ZONING

The market is composed of seven main sections based on different trades. The largest of these is the timber and carpentry section. It mainly consist of whole-sellers in raw timber in addition to carpentary work such as school desk benches, chairs, cupboards etc. They occupied about one-third if not half of the market site, and are largely located at the northern part of the market. The second largest sections are the 'Yan-Gwanjo

(Second-hand goods dealers) and 'Yan-Buhu' (grain whole sellers). The second-hand goods dealers who are mainly engaged in selling imported second-hand clothing and footwears occupied central part of the market. That is the more reason why any fire incidence in that part result in extensive damage to property and materials. On the western part are wholesellers in grains (maize, guinea corn, millet etc.) close to the 'Yan-Manja' (Palm oil) dealers. The western perimeter of the market is dominated by small entrepeneurs selling building materials iron mongers and farming implements in addition to hawkers with push carts selling provisions, who hope to graduate to shops. At the southern end the market is bordered by the motor park which is mainly for lorries and trailers. The Kola-nut dealers occupied almost more than half of the eastern part of the market. They share the area with the people selling household goods. Close to these is a minor 'industry' that manufacturers of metal aluminium coated cooking pots, spoons, buckets, etc. This group need special attention because of the risk of fire. The segregation of goods and trades is characteristics of Islamic market which is also of classical origin. At the 'Katako' market there is however, no clear separation or boundaries between separate sections. One finds some spill-overs and overlapping of goods and trades among the various sections. What really is obtained is the tendency for various goods and trades to concentrate on a particular

section.

(iii) ACCESSIBILITY

Heavy traffic, within the market place is concentrated mainly on three sections, viz - the timber, grain and the kola-nut whole-sellers. These are areas characterised by a lot of activities of loading and unloading from heavy vehicles.

A major road (Kure Street) which link Jos main town with Bauchi ring road runs through the market place. This road serves as the major access to the market both from the northern and southern ends. Traffics coming from outside the state mainly use the northern end, while the inhabitants of Jos city and environs uses the southern end. Three direct access roads into the market place are connected with the major road at different points. The roads are inturn linked with minor indirect access mainly pedestrian into the centre of the market place. All the access roads are inadequate which is due to lack of planning and construction. A direct access road connect the market with the Laranto Quarters on the western part.

(iv) FACILITIES WITHIN THE MARKET

There is a complete absence of supporting facilities apart from a police station, within the market. Facilities such as Bank, Fire station, Post office are of

advantage if they are located within or close to the market.

3.3 CLASSIFICATION OF GOODS

The goods sold in 'Katako' Market can be classified under three broad categories:

1. Food Trade
2. Non-food Trade
3. Services Trade

1. FOOD TRADES

This group is further divided into two sub-groups of PERISHABLES and NON PERISHABLES.

The perishables goods includes:

. Vegetables

. Fruits

. Fresh Fish

. Fresh Meat

The Non-perishable includes the followings:

. Grains

. Tubers

. Provision

. Oils

. Confectionaries.

2. NON-FOOD TRADES

These includes goods like:

. General wears and fabrics

. Household utensils

. Timber and timber products

. Plastics goods

. Hardwares.

3. SERVICES TRADES

These are trades that render a sort of services to people.

These includes:

. Trucks body builders

. Furniture making

. Pot and metal box making

. Painters sign and writers.

3.4 PLANNING AND LAND USE

Planning in this context involves a process of arrangement of structures, facilities and services and circulation in a way that they would function and serves their users in the most convenient manner. However, considering the above definition the 'Katako' Market has no planning. There is however, the tendency of people with similar trades or commodities to concentrate in one particular place. This may suggest that there was something like zoning plan so to say. But on closer examination one realised these zoning occurred at the time of establishing the market as traders with similar trades and professions where transfered en masse to the market place. Thus, the tendency for them to be in the

same place exist probably for security reasons. This is to say had they come differently at different times they would not have been concentrated in one place. The case of the present Jos Main Market attest to this fact - as the zoning of trades and profession does not exist. However, this should not be the case. Its strongly believed that there should be zoning in the market place. This makes it easier for easy identification and access to goods. It reduces confusion and eliminate time-wasted trying to locate a particular trade or good within the market.

Closely related to zoning planning, is the land-use existing in the market place. No consideration exist to suggest there was conscious land-use planning at the market. By going into the market obviously one is confronted with the problem of building extending or rather enchroaching into roads. In addition to the menance of hawkers who display their wares in any available space they find, particularly on roads sides, thereby causing traffic congestions both vehicular and pedestrians. It is necessary to separate vehicular and pedestrian access. Building lines must be marked and observed.

3.5 TOPOGRAPHY

The topography is typical of land forms found commonly on the Plateau. The land is punctuated with rocky out

crops some big enough that they need to be blasted. Because it was formerly a grave-yard the people uses rocks and other junks to fill-up the site when there were settling at the market site.

Lack of drainage also makes it easier for water to further erode the land during the rains, the whole site has a rugged appearance. This is also accelereated by lack of trees in the market.

From the north the market was bordered by seminary, at the eastern direction there is the dilimi river while towards the south and east it was bordered by motor station and Mallam Kure Street respectively.

3.6 STALLS

The stalls are dilapitated structures. They are made of highly inflammable combustible and perishable materials. These materials aids the growth and rapid spread of fire. Fire-resisting materials and construction is required, Steel incase in concrete is the form of fire-proof construction.

Orderly and proper arrangement of stall is inadequate. In fact, most of the stalls are at point of collapsing. The stalls are dirty with dust. Due to the condition of stalls the market place wears a getto-look or appearance so to say.

The market contain one-thousand and five hundred (1,500) stalls with an estimated population of twenty six thousand (26,000)inhabitants.

The interior space inside the stalls is inadequate considering that most of the marketers display their wares outside the stalls either because the inside is already full or that the goods could not be seen by prospective customer if displayed inside. This called the problem of orientation of the stall in relation to access, for solution this requires efficient spaces for the stalls. This however, shall be arrived at after careful studies of other existing markets situations.

3.7 ZONING

This however, has been discussed already under 'Planning and Land-use.' It should be noted here that goods and commodities such as timber and its product, the grain wholesellers and palm oil merchants should be located where there will be no difficulty for loading and unloading by lorries and vans.

3.8 FACILITIES WITHIN THE MARKET

Facilities here means those supporting physical buildings or structures that serves the market users in one way or another. Facilities like Banks, Post-office,

restaurants, administration, fire station, toilets, parking spaces and mosque as the case may be, telephones stands are also necessary of course, a Police Post/ Station is an integral part of the market to keep peace and maintain order and security in the market.

It is indeed sad to realise that apart from a Police Station non of these mentioned facilities exist within the market in fact even close to it.

3.9 SERVICES

Utility services like water supply, electricity, refuse receptacles and mechanical services are non-existing. Where it exist as in the case of electricity, it is poorly installed and maintained.

To begin with there is no tap water supply in the whole market place. People uses ordinary dug up wells in which case the water is not clean and there is danger that it can spread epidemics like cholera.

Means for refuse disposal are absence in the market. Garbage and rubbish are heap on corners and other likely places.

3.10 SANITATION

This is an important aspect of market places. However, 'Katako' market is far away from being hygienic. From the preceeding discussion it is obvious that the market place is full with filth that can keep the sanitation officials working for at least a period of twelve months. There must be provision for waste disposal both human and materials such as saw-dust from the scraped timber and wood.

3.11 TRADERS PERCEPTION OF THE MARKET

The users' perception and values are very important. Traders were sampled for interview to gain an idea how they viewed the physical conditions of the market. A number of problems were listed. Respondents were asked to rank them in order of severity. They were also to name their problems apart from those in the questionnaire. The results are shown below:

TABLE 3.1

TRADERS' PERCEPTION

S/No	PROBLEMS	%
1	Dirty State of the Market	10
2	Preserving perishable goods	10
3	Lack of water and toilets	38
4	Inssfficient stalls	5
5	Lack of Sales/fluctuating sales	2
6	Lack of electricity	5
7	Market has dilapitated structures	10

TRADERS' PERCEPTION (CONT'D)

S?N=	PROBLEMS	%
8	No Lock facilities	15
9	No parking space	3
10	No loading Bay	2
		100%

DATA-AUTHORS' FIELD SURVEY

TABLE 3.2

SHOPPERS PERCEPTION OF THE MARKET

S/No	PROBLEMS	%
1	No parking space	15
2	Congested walkways	30
3	Dirty state of the market	15
4	Difficulty in identifying of specific zones	15
5	Difficulty in carrying goods	15
6	No Toilets	10
		100%

DATA-AUTHORS' FIELD SURVEY

3.12 LAND USE (ZONING) PATTERN

Land use pattern is one of the principal determinant influencing functional efficiency of a market. The Table below gives the existing and proposed values land use for the market.

TABLE 3.3

LAND USE (ZONING) %

	WALKWAYS	LOADING BAYS	COMMERCE	SERVICE	PARKING
EXISTING	13	-	2612	-	1
PROPOSED	20	9	3541	12	9

DATA - AUTHOR'S FIELD SURVEY

3.13 'OPEN' TRADING (HAWKING)

This is a form of trading activity not carried out in market stalls. This takes palce under tree shade, open areas, streets, walkways etc. The hawkers display their wares on ground or makeshift platforms or push-carts. At the end of the day they either take their wares home or keep them in some of the lockable stalls (with payment of certain charges to the stall owner).

Most of the hawkers sell petty goodsuch as spoons, combs, house-hold utensils, food stuffs, etc.

Generally, the reasons given by the hawkers for hawking is given on the table below:

TABLE 3.4

S/No	REASON	PERSONS %
1	Cannot get a stall	40
2	Cannot afford to pay for stall	25
3	Irregular trader	10
4	Sell more when hawking	25

TOTAL	100%

DATA-AUTHOR'S FIELD SURVEY

HAWKING ACTIVITIES

This is indeed a social problem, however, the architect should always keep at the back of his mind the need for a provision of hawker's stand.

3.14 USERS PERCEPTION OF THE MARKET

That the market is congested, dilapitated and in need of re-development and expansion is agreed by almost all the traders and public alike, what they do not agree is the removal of the market to any other place. Most of them reasoned that presently there is no possible available site within Jos Town that can contain the market and they never heard of a market being established in the 'Bush' or rather far way from centres of populations. Furthermore, even the government itself do not have the plan of removing the market to other place even if there is available site. This is because the government does not want to pay any compensation - for lack of funds.

3.15 ANALYSIS OF STALLS

The stalls at 'Katako' Market can be grouped into two categories: 1 - Open Access Stalls

2 - Lockable Stalls

The open access type are used by the timber merchants alone. This is because of the bulky and rigid nature of timber or wood. There is a considerable number of these types in the market.

The lockable stalls have doors which can be locked after business. These are used by all the other shoppers in the market. These type of stalls are found out to be inadequate with regards to space and orientation.

All the stalls are roofed, without provision for ceilings, with corrugated iron sheets.

3.16 PLANNING STANDARDS

Planning standards could provide a conceptual framework for the analysis and planning of the provision and location of services within the market. It is, therefore, necessary to adhere to spatial and physical standards in providing commercial developments. (Onokerhoraye, 1982). These spatial and physical standards serve as guidelines to planners in the design and layout as well as providing criteria for evaluation of commercial developments.

Planning standards for market should reflect the need to provide easy access to from the market; and there should be a means of efficient circulation within them.

TABLE 3.5 SUGGESTED SETBACKS FOR MARKET FROM DIFFERENT TYPES OF ROADS

TYPE OF ROAD	SETBACK (M)	CARRIAGE WAY	RIGHT OF WAY
Major Access	12 - 15	24 m	14 m
Collector Street	9 - 12	18 m	10 m
Local Street	6 - 9	9 - 12 m	0 - 9 m
1st Order Walkway	-	6 - 10 m	-
2nd Order Walkway	-	3 - 6 m	-
3rd Order Walkway	-	5m (Distance btw two opp. stalls)	-

SOURCE -

ANATOMY OF TRADITIONAL MARKETS IN NIGERIA. VAGALE (1972)

The allocation of land use is an essential part in market design and layout. The following table shows the recommended land use allocation in market.

TABLE 3.6

3.17 LAND USE ALLOCATION IN A MARKET

LAND USE	PERCENTAGE OF DEVELOPED AREA
Stalls (Commercial)	30 - 40
Organised Open Space	15 - 20
Utilities, Services & Facilities	10 - 15
Streets, Walks etc.	15 - 20
Other uses	10 - 12

SOURCE - MANUAL SPACE STANDARDS FOR URBAN DEVELOPMENT

- VAGALE (Ed) 1971

A market should have certain essential facilities which would serves the needs of traders and customers.

3.189 FACILITIES, UTILITIES AND SERVICES REQUIREMENTS

Elements	Number required
Toilet	1 Faucet per 40-50 stalls
Water taps	1 tap per 90-100 stalls
Refuse disposal points	1 receptacle per 20-25 stalls
First aid post	1 for the market
Mail box	1 for the market
Fire post	1 for the market
Police Post	1 for the market
Restaurant	1 per 800-1,000 stalls
Day care centre	1 for the market
Central hall	1 for the market

SOURCE - ANATOMY OF TRADITIONAL MARKETS IN NIGERIA VAGALE (1972)

Another, important aspect is the sizes and type of materials used in construction of stalls in markets. Emphasis on increasing durability and decreasing susceptibility to hazards.

STALL SIZES AND CONSTRUCTION MATERIALS

STALL SIZE	CONSTRUCTION MATERIALS	ROOF
Large (4x3)m	Concrete and cement blocks	Asbestos
Small (3x3)m	Concrete and cement blocks	Asbestos

SOURCE - PROPOSED RENEWAL OF KURMI MARKET (MSc. Thesis) KABIR 1977

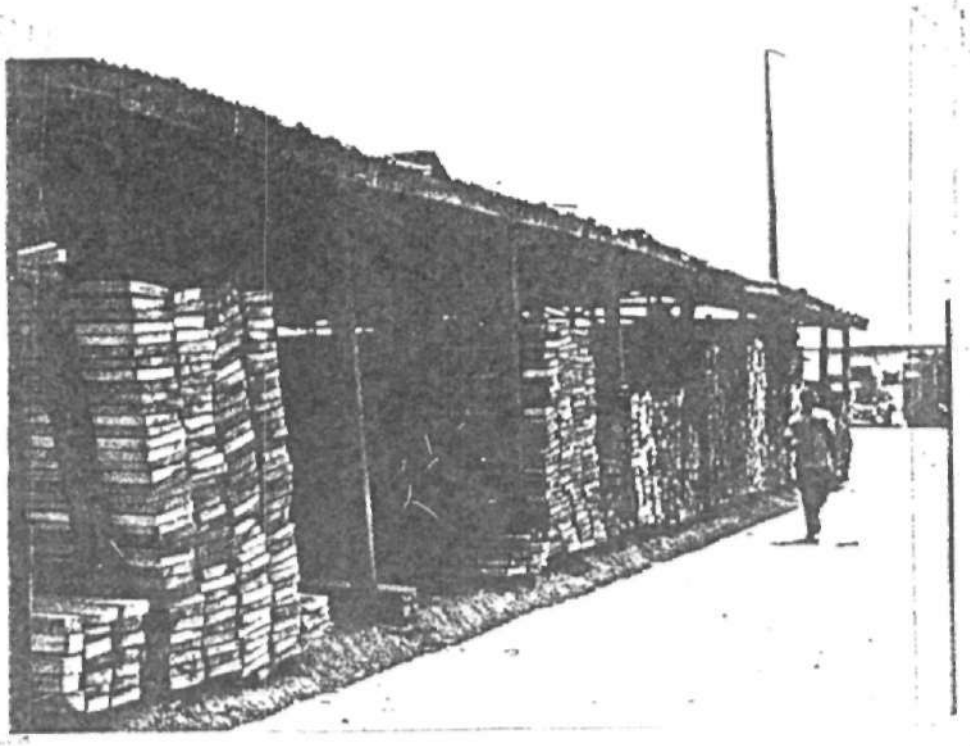


plate 3.1 A TYPICAL TIMBER AREA



Plate 3.2 TIMBER MACHINERY IN ACTION

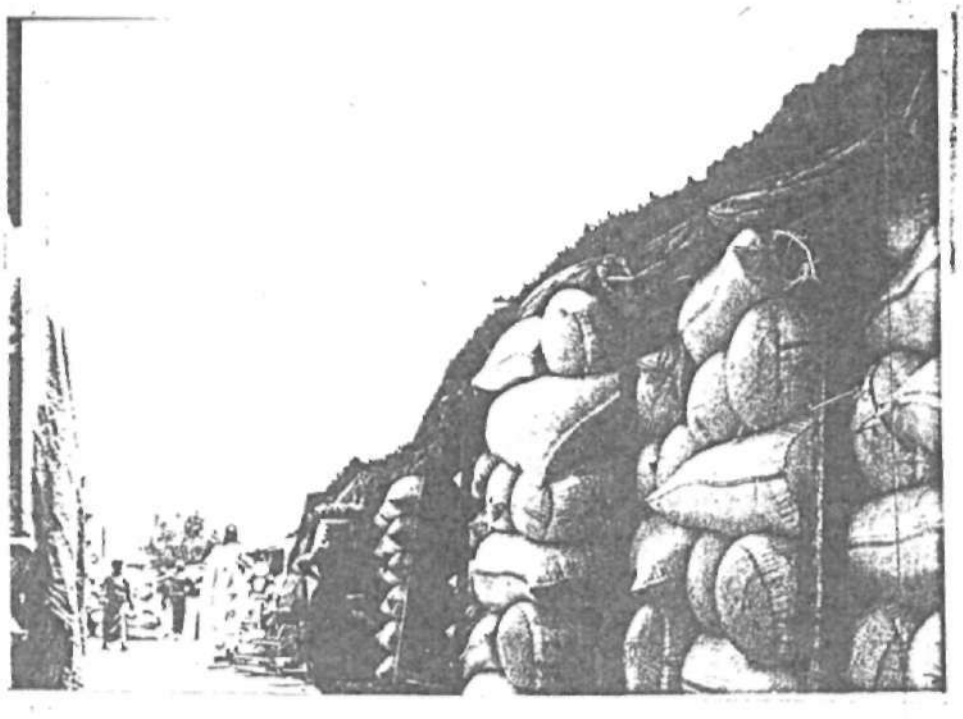


PLATE 3.3 TYPICAL AREA OF GRAIN WHOLE SELLERS

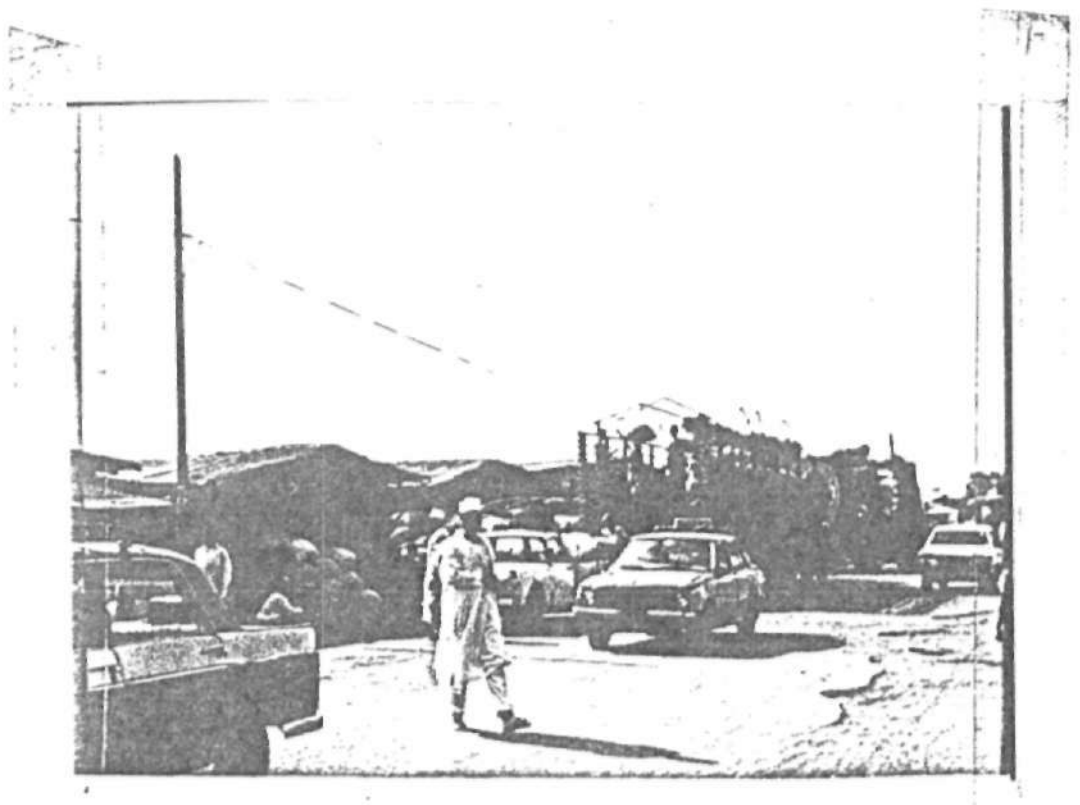


PLATE 3.4 LOADING AND OFF LOADING TAKING PLACE BY THE ROAD SIDE



A TYPICAL ROAD SCENE ALONG THE MARKET



A TYPICAL CAUSE FOR TRAFFIC CONGESTION -
PARKING / AND OR LOADING BY THE ROADSIDE

CHAPTER FOUR

4.0 CASE STUDIES

This chapter will deal with studies of selected markets in Jos, Kaduna and Maiduguri. These markets were chosen because they were planned and designed by architects. The markets will be studied with the view of discovering their problems and deficiencies and how these are solved.

Attention will be emphasised on fire precaution and control circulation and traffic patterns and spacial requirement in each of the selected markets. The aim is to derive planning and design standards on the basis of comparative studies of the above mentioned markets. These standards shall act as guides in the proposals for the design of'Katako'market, under study.

1. PROJECT- JOS MAIN MARKET

   CLIENTS- FEDERAL GOVERNMENT OF NIGERIA
   PLATEAU STATE GOVERNMENT
   UNION BANK NIG. LTD.

   ARCHITECTS- ENPLAR NIGERIA

   CONTRACTORS- BEPCO NIG. LTD.

Location

The rectangular site of the Jos main market is located in the commercial and shopping centre of Jos town. It is adjacent to the Jos University Teaching Hospital

(JUTH) and the terminus round-about. It is accessible by road from north, west and east bearings by major roads.

THE SITE

The site is basically a rectangular site sloping from the west end to the east. The site is limited in terms of expansion.

TOPOGRAPHY

The site is undulating and slopes towards the eastern direction.

FACILITIES

The market is a storey high with stalls on both the ground and top floors. Mezzanine floors are also situated at strategic grids to accommodate the administration, mosque and some parts of the 'Wet Area' of the market.

A breakdown of stalls and other facilities available in the ultra modern Jos main market includes:-

a. 1650 traditional market matforms of approximately 3.30 m^2 each.

b. 144 meat and fish retail stalls of approximately area of 10 m^2 each.

c. 2,406 Retail and wholesale stalls of 7.30 m^2 average area for various items and wares.

d. 44 standard canteens of approximate area of 10.5 m^2 each.

e. 36 meat and fish wholesale stalls of approximate area of 10.0 m^2 each.

f. 1 large modern restaurant of approximate area of 175.5 m^2.

g. 1 Post office space

h. 2 commercial banks

i. Market administration space

j. Modern designed toilets

k. 2 courts of justice

l. A police post

m. Parking spaces.

4.1 MATERIALS OF CONSTRUCTION

The choice of materials used for the construction of the market was based on factors such as availability, durability, resistant to fire.

Most of the materials, with the exception of the roofing and the sun shading devices, are locally available.

The materials are choosen to give a 'Modern' touch of aesthetics and to blend with the environment and landscape.

COST

The initial cost of the whole project was estimated to be ₦11 million. After the work has started for some time, the project was grounded because of suspension of financial transaction with the Union Bank.

Funding for the project was however, resumed in 1980 and the 1976 contract terms were reviewed and the project cost rose from ₦11 million to ₦23 million. This increase of over 100% of the initial cost, was due to the austerity measures introduced in Nigeria by the then Shagari's administration.

APPRAISAL

The rectilinear form adopted by the architects is economical in terms of maximum use of space and its simplicity.

The design has some elements of post-modern approach. The architects made efforts to integrate into a modern design some aspects of traditional rural markets. This evident in terms of provision for space of specialisation/ zoning of goods. Also the system of continuous cross passages is an improvement over the traditional market system which is normally not define and tends to take any form and shape depending on the turnout of traders in the market at particular period.

However, the location of the hall where perishables are sold, in the centre of the market is not the best. Perishables commodities (food stuff+ vegetables) need a provision for easy disposal of garbage and other perished items within reach of the traders. But in this case the garbage and waste collection points are situated outside the market and are out of the immediate reach of the traders in the market hall who sell easily perished items.

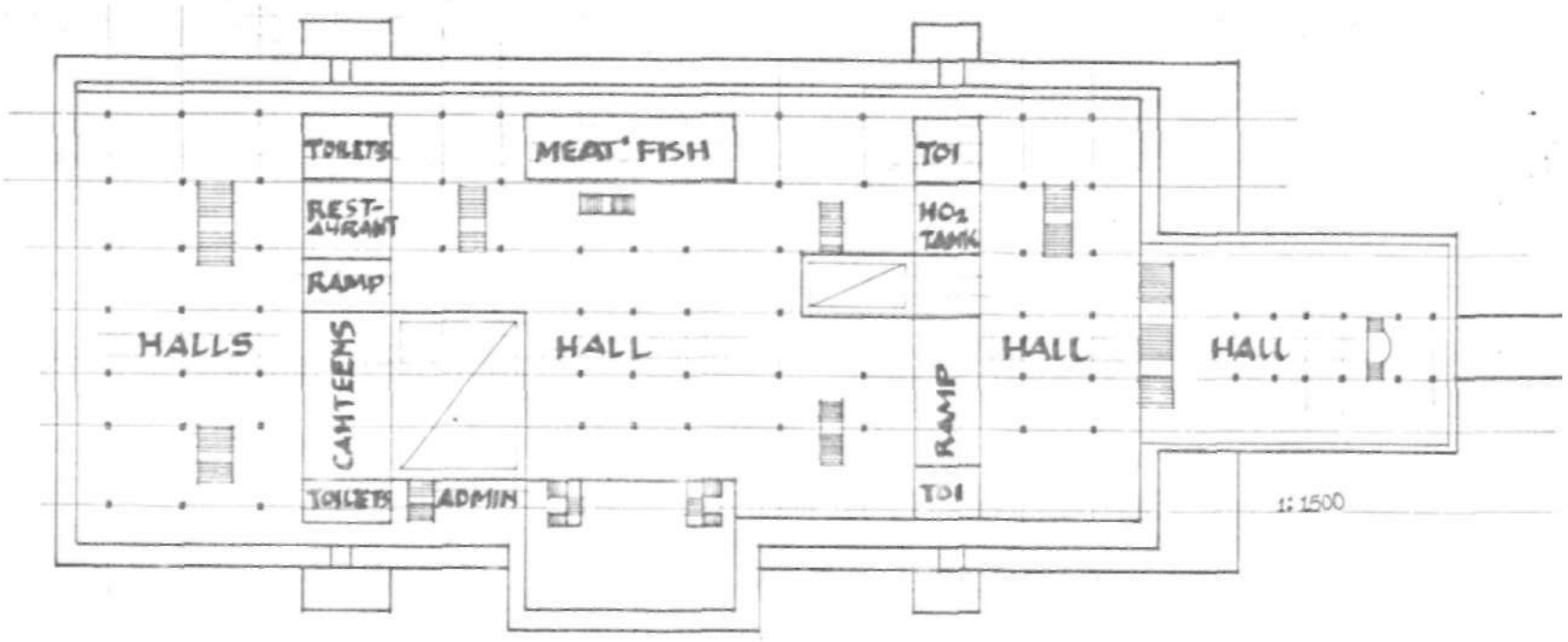
Again considering, that people are forced to go through into the core (centre) of the market to buy just a few perishable items for daily domestic needs, further add to the congestion in the market with regards to traffic.

The design of the market also overlooked the problem of hawkers. Hawkers are a nuisance, obstructing traffic and circulation routes creating congestion and refuse problems and indeed encourage criminality within the market.

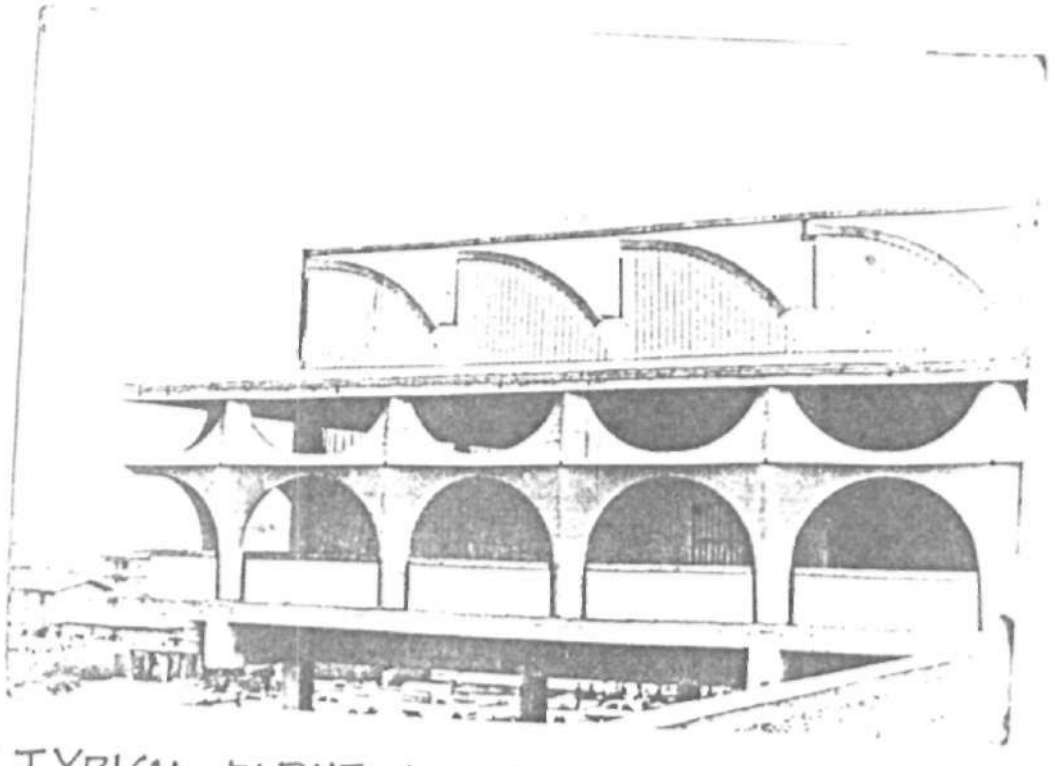
Past experience have shown that hawkers never give up, despite the measures introduced by various governments and the market authorities to curb down their activities. Thus the only option left is that of the complete integrttion of hawkers into the market in a convenient manner.

The design of the market have provided a number of

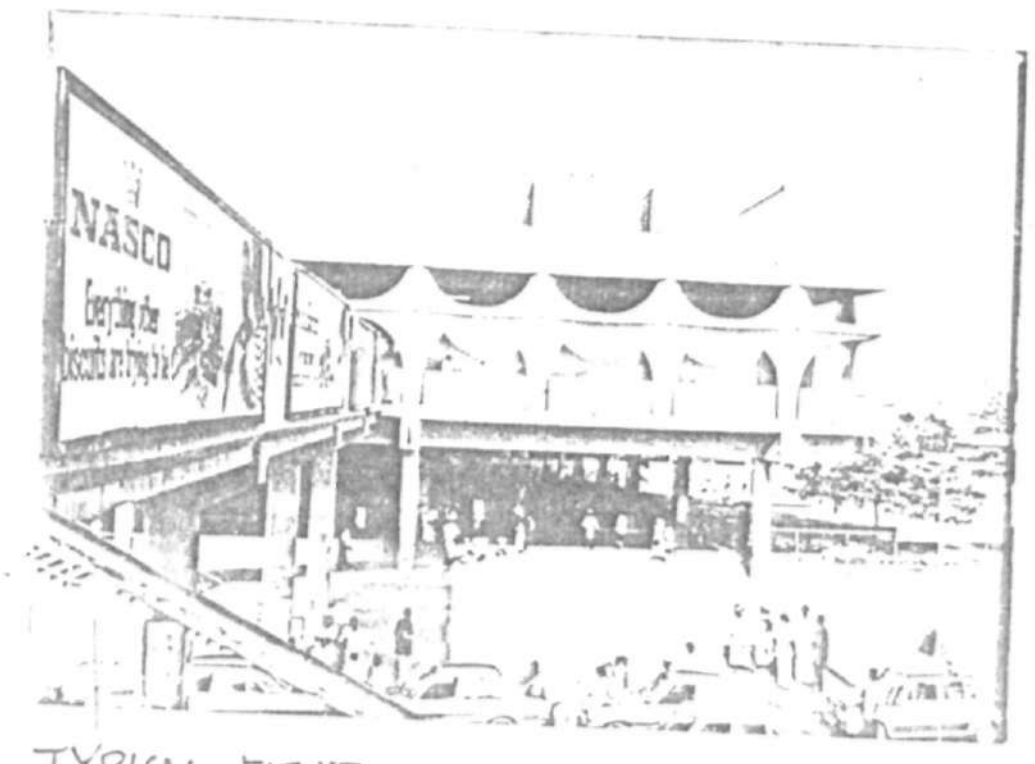
JOS MAIN MARKET



PLAN-- UPPER FLOOR



TYPICAL ELEVATION OF JOS MAIN MARKET



TYPICAL ELEVATION SHOWING THE OVERHEAD BRIDGE

water hoses and alarm at strategic points and a fire fighting unit. However, there is no provision for vehicular (fire equipments) access into the Centre of the market in case of a fire incident in the core of the market.

4.2 MAIDUGURI MONDAY MARKET

The new Maiduguri Market is bounded on the north by Galadima Kyari Drive, on the south by Sanda Road and in the east by Ahmadu Bello Way.

Parking is centralised and there are two vehicular entrances. The road was deliberately looped to provide access to other sections of the market. This road is meant to serve as a service spine for deliveries, garbage collection and for fire fighting trucks to have access to the stalls in the event of fire outbreak. Waste collection takes place once only daily - in the morning.

The spaces adopted in the design of the market are poligonal in shape and are organised around open corrt-yards. A row of number of stalls has a common roofing system linking them together. This arrangement provides shelter in moving from one stall to another without being exposed to sun or rain. For easy identification and may also beauty the roofing were painted in different colors.

FACILITIES AND SERVICES

The covered stalls for commercial activities are as follows:-

a.	Simple stalls	5,394
b.	Stall with cabinets	1,313
c.	Trader's shops	24
d.	Peripheral shops	47
e.	Workshops	10
f.	Stores	12
g.	Stalls with cold storage	310
h.	Food stalls with berbeque grill	60
	TOTAL	7,170

OTHER INCLUDES-

Mosque for 640 persons plus 300 workshippers in the open area

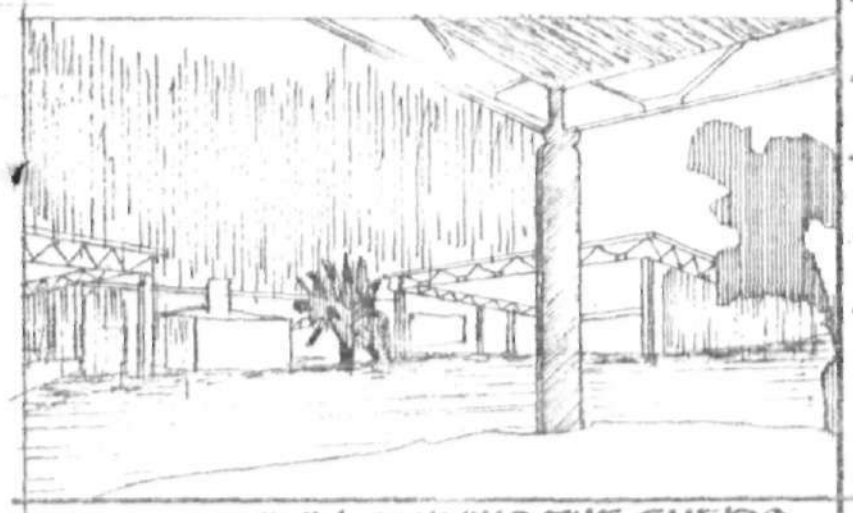
- Male and female toilets	30
- Parking space	147
- Cycle and Donkey Yards	

There are also boreholes and two elevated water tanks of about 320 cubic metres. In addition there are

- Fire hydrants
- Rainwater drainage and sewage treatment plant
- Public Fountains

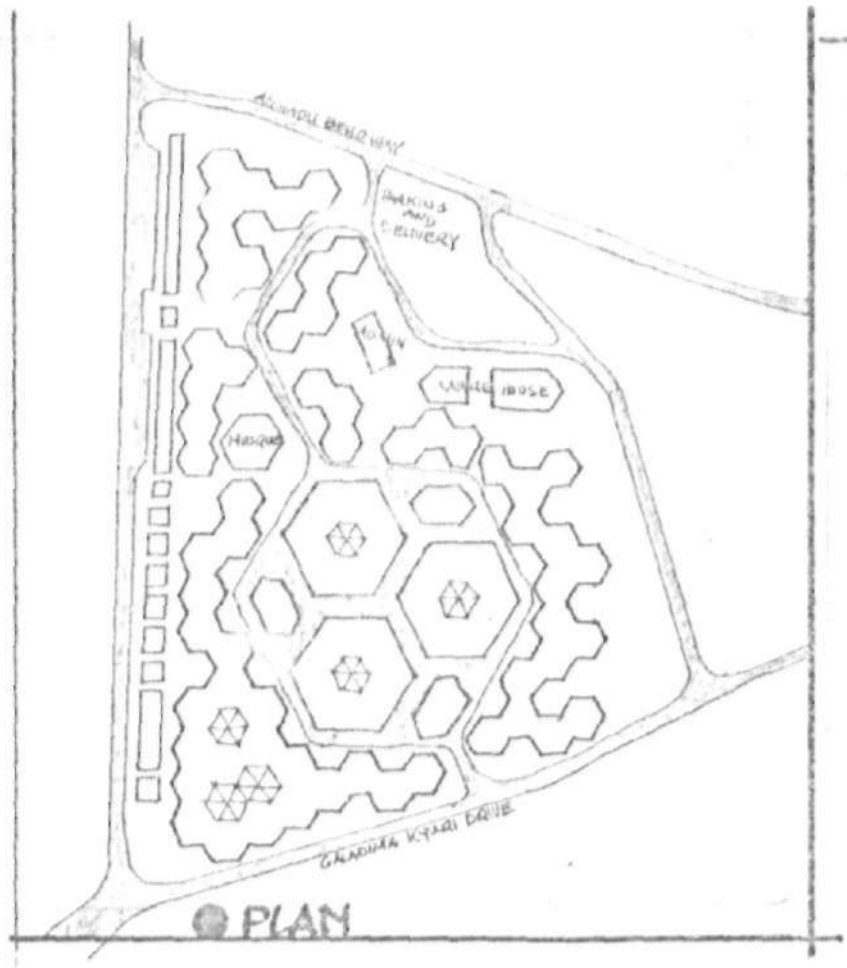
Total land Used

Covered area 40,000 m^2 (approx)

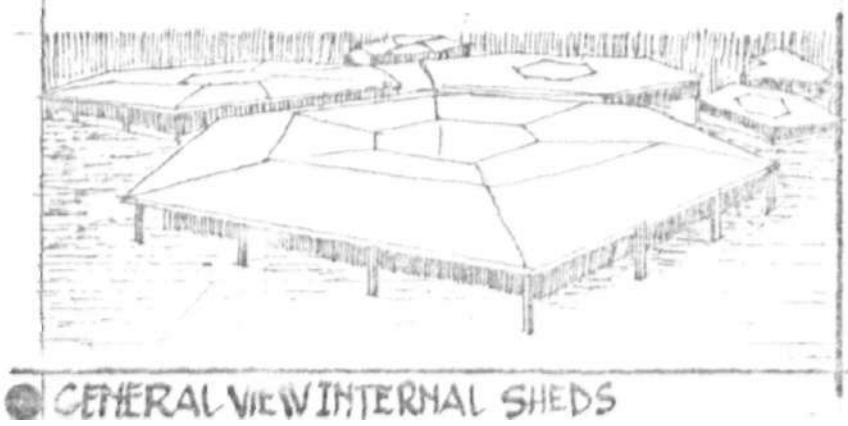


TYPICAL VIEW SHOWING THE SHEDS

PROJECT
MAIDUGURI MARKET
CLIENT
BORNO STATE GOVT.
CONSULTANTS
CONTRACTOR
COST
TOTAL FLOOR AREA
8.5 Ha
NO. OF STALLS
1170
PLANNING
PARKING IS CONTAINED
STACES ORGANISED
AROUND COURT YARDS



PLAN



GENERAL VIEW INTERNAL SHEDS

Paved External Area	7,200 m^2
Natural Ground (uncovered)	24,000 m^2
Others	9,000 m^2
TOTAL	85,000 m^2

OTHER FACILITIES INCLUDES (DETAIL BREAKDOWN)

Administrative Building, A Clinic, Court and Police Station

Mosque	for 640 + 300 persons
Food units	10 in number
Toilets	30 in number
Parking	for 147 cars
Waste disposal	5 in number
Public fountain	9 in number
Public entrances	7 in number
Vehicular entrances	2 in number

COMMENT

The market has too much open spaces which could have been utilised. Again landscaping elements are absent in the market. However, the general design of the conform with the African Traditional Market.

4.3 KADUNA CENTRAL MARKET

TECHNICAL DATA

Total Floor Area	13 HA
Total number of designed stalls	2,148

Open Access Stalls	24%
Lock-up Stalls	76%
Distance between block of stalls	5.0 m
Stall sizes	$5 \times 4\ m^2 = 20\ m^2$
	$4 \times 3\ m^2 = 12\ m^2$

FACILITIES AND SERVICES

a. Administrative Building

b. Central Motor Park

c. Toilets

d. Mosque

e. Public Drinking Facets

f. Elevated Water Tank

g. Sewage Disposal

LAYOUT

Parking spaces are limited to the immediate outskirt of the market. Thus the commercial area of the market is strictly limited to pedestrians.

Stalls are arranged in rows and laid in long clusters. Public utilities services and perishable commodities are located at the perihphery of the market. This is an advantage over that the situation in Jos main market where the perishable commodities are located at the Centre of the Market.

KADUNA MARKET

PROJECT KADUNA CENTRAL MARKET

CLIENT KADUNA STATE GOVT.

CONSULTANTS

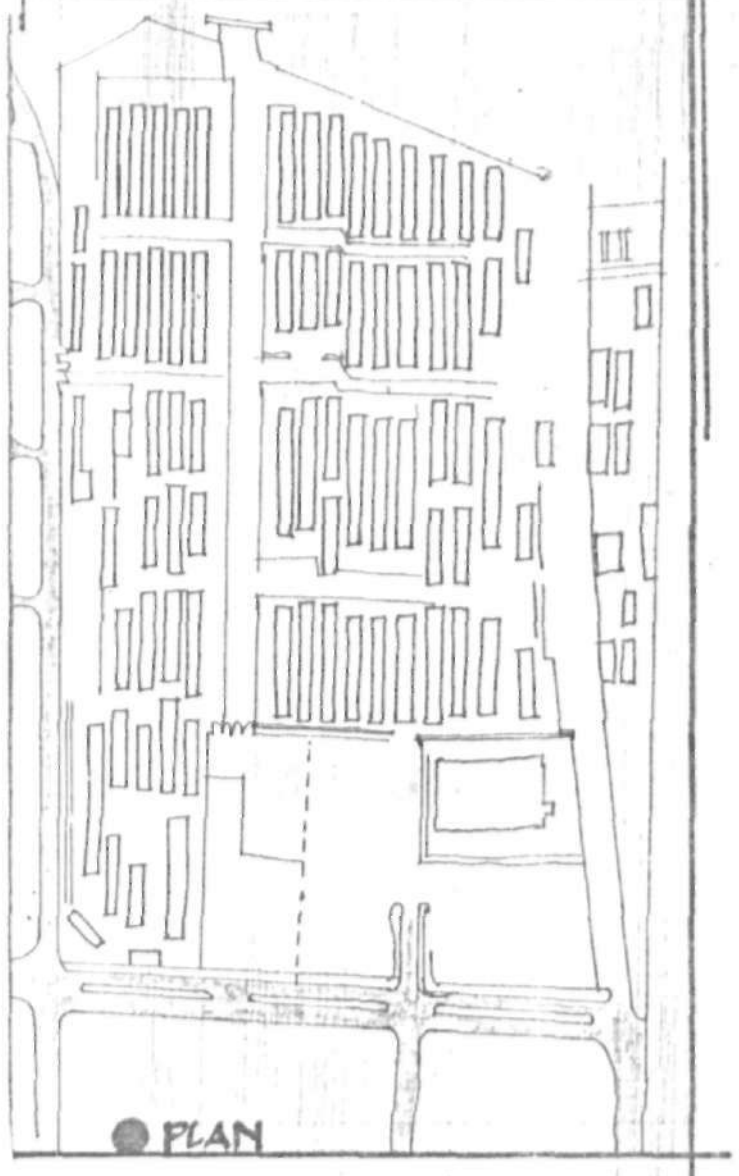
CONTRACTOR

COST

TOTAL FLOOR AREA 15.0 Ha

NO. OF STALLS —

PLANNING



PLAN



ENTRANCE
KADUNA CENTRAL MARKET

4.4 SOKOTO CENTRAL MARKET

TECHNICAL DATA

Total floor area	50 acres
Total number of stalls	5000 stalls
Open access stalls	45%
Lock up stalls	55%
Distance between block of stalls	6.0 m
Stall sizes	(a) 4 x 3 m
	(b) 5 x 3 m
Total population served	279,775 (1985 projection)

LAYOUT

The stalls are arranged in cluster having a common space at the centre. Cluster type of planning is preferred is the hot tropical climate, because building would give mutual shading to one another.

Non-trading facilities such as mosque, the administration building and a monumental tower are located at the Centre. These serves as focal point and also act as land mark.

Other public services are concentrated at the periphery close to the major entrances for easy identification and accessibility.

CIRCULATION

Parking spaces are decentralised to reduce congestion at any one gate.

APPRAISAL

The design is not dynamic in the sense it does not evoke a feeling of being in a (modern' market place.

4.5 AGBADO MARKET (BENIN CITY)

Agbado market is located mid-way along Akpakpara Street which runs through the eastern block of the old central area of the city. The site is flat, the stalls have a north-southeast orientation. There is a limit for expansion.

LAYOUT PATTERN

The stalls are laid out in rows. The space between block of stalls are used for circulation. The spaces are narrow and can present difficulties in control of fire spread.

There are 40 (6%) lockable and 631 (94%) open access stalls. There is no parking facilities. Again no provision for fire prevention and control.

The market has a continuous roofing system which is joined to cover the stalls.

FACILITIES AND SERVICES

There is a total absence facilities and services at the market.

However, a breakdown of the so-called facilities in the market would include the followings:-

Car park 1 per 269 stalls

Toilets 1 per 244 stalls

Water taps 1 per 200 stalls (it does not work anyway)

Waste disposal - None

Drains - None.

ZONING

There is some element of zoning. Traders selling similar commodities can be seen located closed to one another. However, this is rather accidental than a concious planning.

CHAPTER FIVE

5.0 FIRE HAZARDS

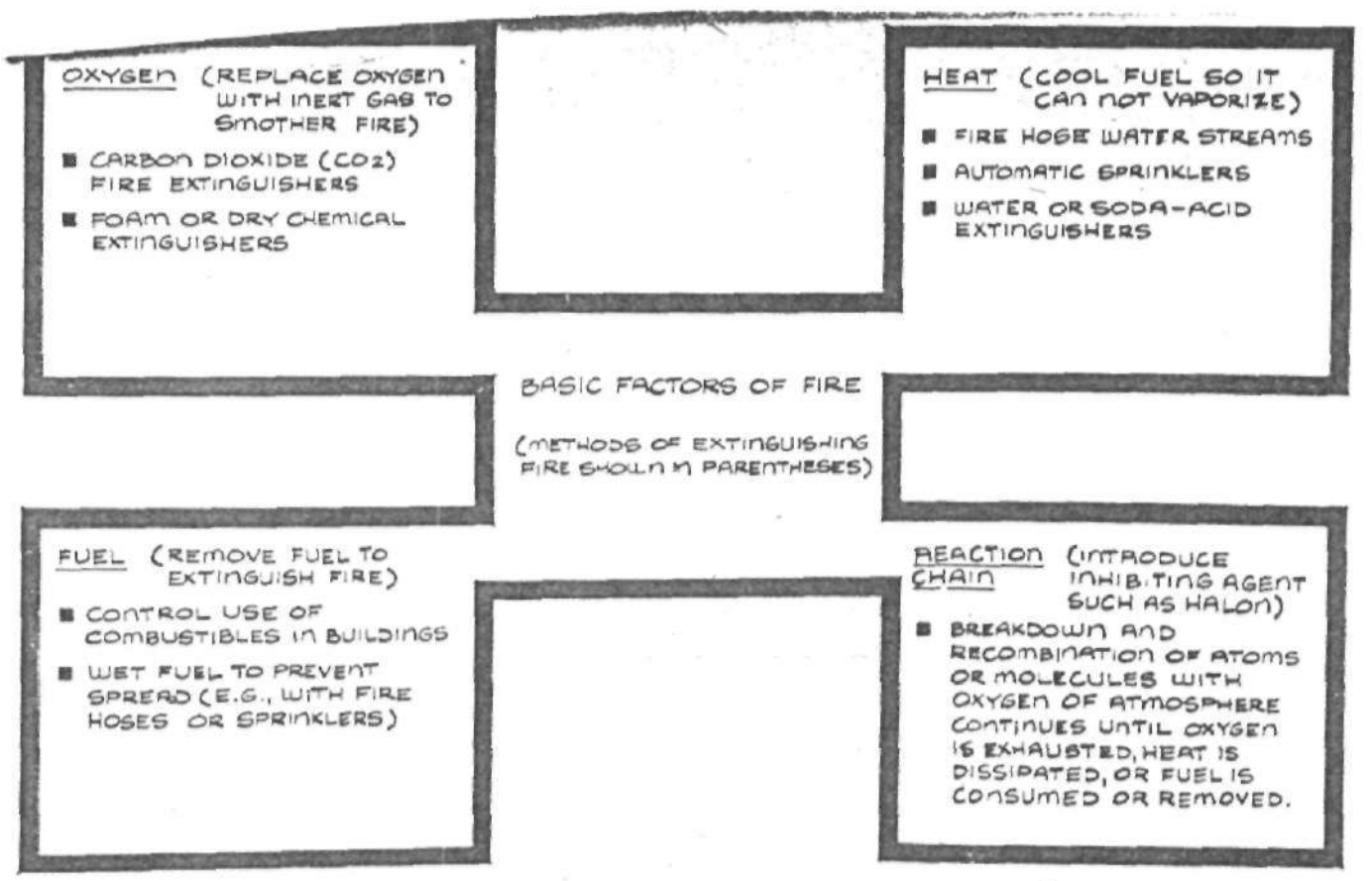
5.1 INTRODUCTION

The main aims of fire protection are or ought to be the protection of life and the preservation of essential services. Legislation and guidance plays a major role in achieving these objectives. The legislative aspect is not the concerned of this study. It is concern with the aspect of guidance in which the architect is qualified to play that role. He is the expert who translate the regulations and bye-laws into concrete reality.

This chapter will deal with the prevention and control of fire and its ricks in relation to market designs. However, the market under study in this case is the 'Katako' market at Laranto located at the Northern part of Jos Town.

5.2 BASIC FACTORS OF FIRE

The question - what is fire would be relevant in this discussion. Fire is the rapid oxidation of combustible materials and gases, producing heat and light. Fire, like all other natural phenomena, follows the laws of nature. There are three elements of fire - fuel, heat and oxygen. If any of these elements can be removed



FASIC FACTORS OF FIRE

or prevented from coming together there will be no fire. Indeed this is the basic logic or mechanism behind fire fighting equipments.

5.3 HEAT TRANSFER

Heat transfer within and between buildings occurs by convection, conduction and radiation.

(a) CONVECTION

This is heat transfer by air motion. During a fire heated air expands and moves away from the fire, exerting pressure against doors, dampers in air ducts and openings.

(b) CONDUCTION

Conduction is heat transfer through solid materials. During a fire heat can be transferred through steel beams, metal conduits, wire and ducts and so on which are good conductors of heat. Conversely, wood, mineral wool, glass-fiber, and similar materials are poor conductors of heat.

(c) RADIATION

Radiation is heat transfer by electromagnetic waves. During a fire hot surfaces can radiate heat, igniting combustibles considerable distances away.

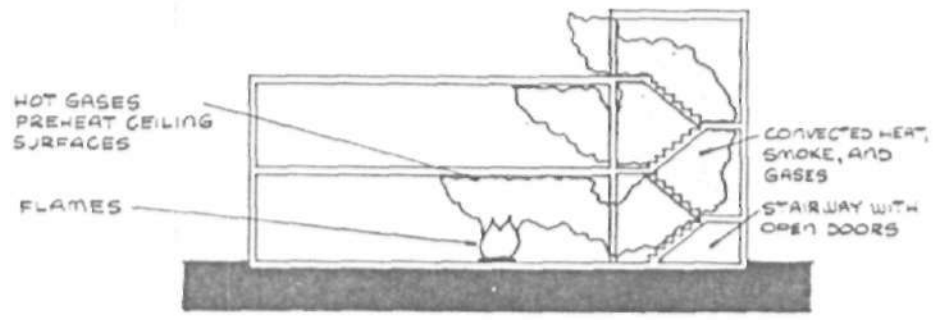
SOURCE –

BASIC THEORY—HEAT TRANSFER

Shown below are examples of heat transfer within and between buildings by convection, conduction, and radiation.

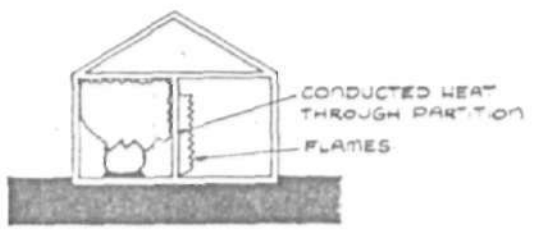
Convection

Convection is heat transfer by air motion. During a fire heated air expands and moves away from the fire, exerting pressure against doors, dampers in air ducts, and the like and penetrating the openings.



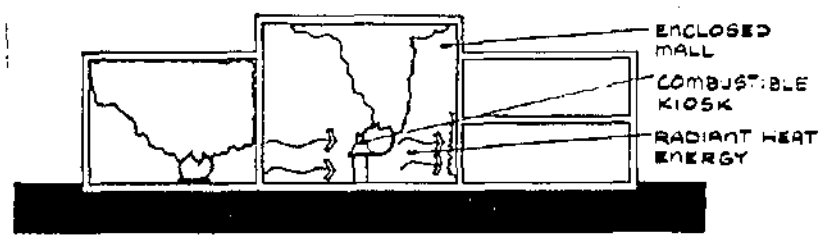
Conduction

Conduction is heat transfer through solid materials. During a fire heat can be transferred through steel beams, metal conduit, wire and ducts, and so on which are good conductors of heat. Conversely, wood, mineral wool, glass-fiber, and similar materials are poor conductors of heat.



Radiation

Radiation is heat transfer by electromagnetic waves. During a fire hot surfaces can radiate heat, igniting combustibles considerable distances away. For example, fire can leapfrog across wide malls in shopping centers by radiation of heat energy as shown by the sketch below. Radiant heat energy increases rapidly as the source becomes hotter. The radiated energy is proportional to the fourth power of the absolute temperature (e.g., °F + 460) of the source.



Note. For comprehensive tables of heat flow properties of building materials and example problem solutions, see M. D. Egan, *Concepts in Thermal Comfort*, Englewood Cliffs, N. J.: Prentice-Hall (1975), pp. 47–55. In rooms with low ceilings that are insulated by materials having low thermal conductivity (k) values, dangerous fire conditions can be reached in only a few minutes after ignition.

5.4 FLAME SPREAD

(a) VERTICAL SPREAD

Flame spread in an upward direction can be rapid as convected heat accelerates burning by pre-heating fuel above the flames.

(b) HORIZONTAL SPREAD

Flame spread in the horizontal direction is less rapid due to heat being convected away from unburned material. As a consequence, flame spread along ceilings generally is more rapid than along floors. This implies that treatment of ceilings should receive special consideration.

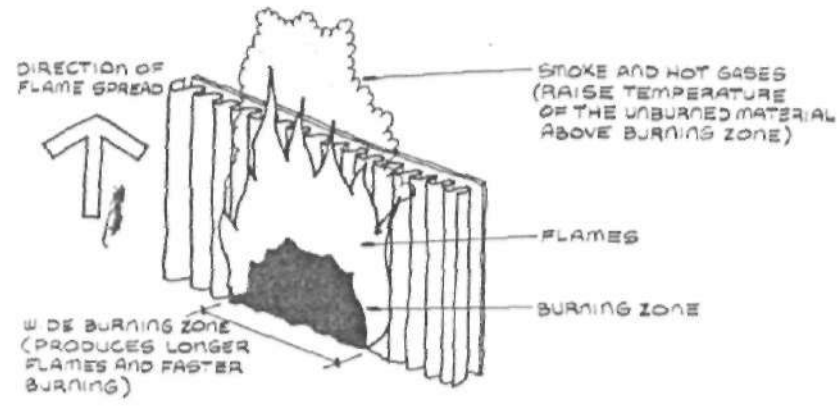
. HORIZONTAL SPREAD

BASIC THEORY—FLAME SPREAD

Often the ability to escape a building fire depends on the rate of flame spread along combustible surfaces. Shown below are examples of flame spread along thin, combustible textile curtains and plywood wall finish. Note that fabrics can be chemically treated to prevent (or retard) ignition.

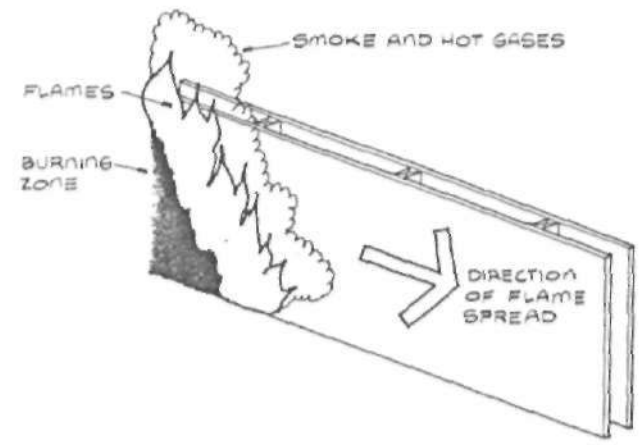
Vertical Spread

Flame spread in an upward direction can be rapid as convected heat accelerates burning by preheating fuel above the flames.



Horizontal Spread

Flame spread in the horizontal direction is less rapid due to heat being convected away from unburned material. As a consequence, flame spread along ceilings generally is more rapid than along floors.



5.6 CAUSES OF FIRE AT 'KATAKO' MARKET

A survey shows that the following have been found to be the causes of fires at 'Katako' Market since 1975.

1. Electrical Installation and apparatus
2. Smoking materials (Cigarettes)
3. Cooking stoves (Kitchens Restaurants)
4. Welding
5. Fire from Watchmen's Point
6. Unknown cause/Malicious or international ignition

The first three causes accounted for 75 percent of the total damage.

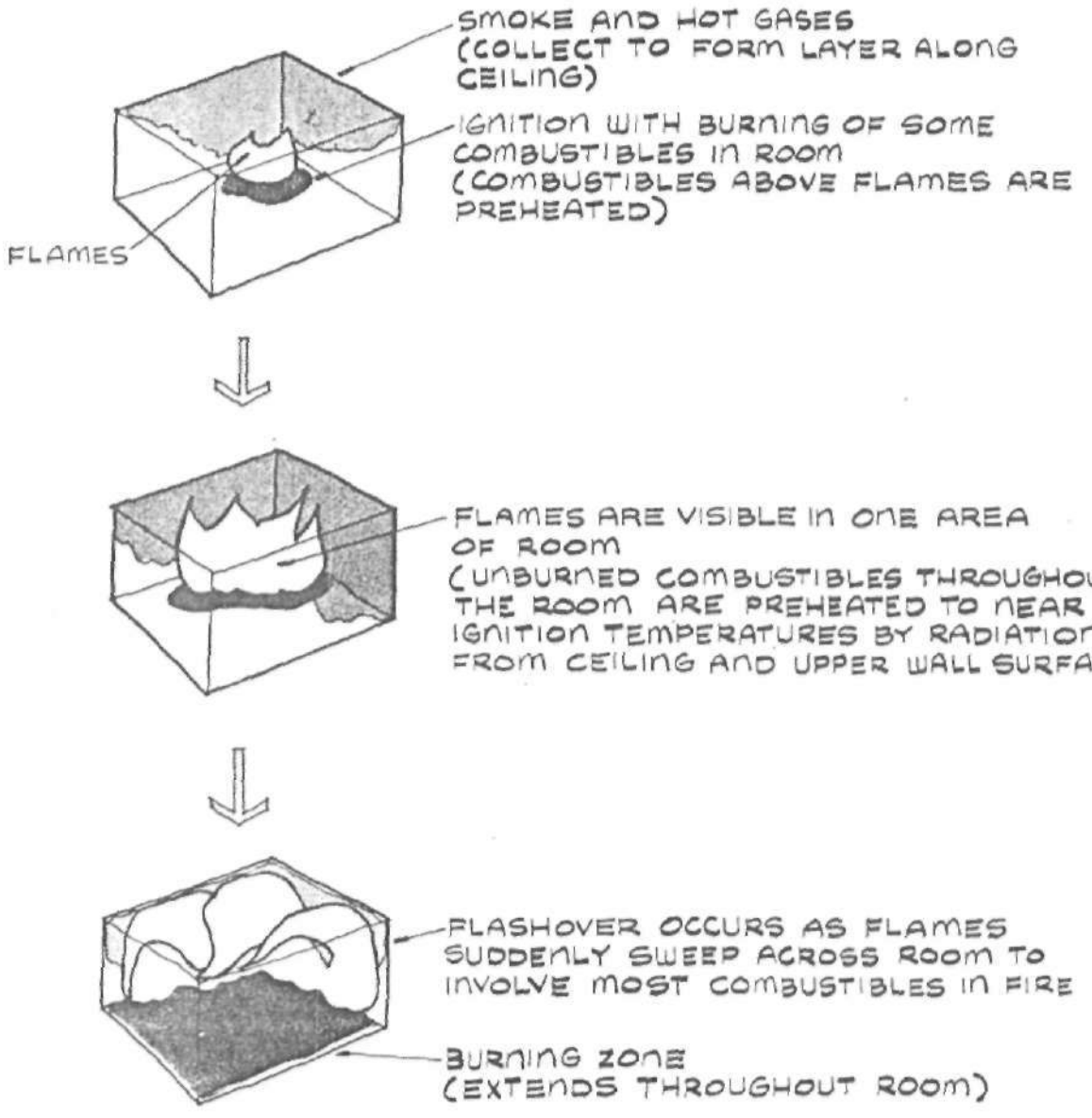
The place where the large fires started is very important as it points out where a small fire can spread unnoticed. Special attention should therefore be given to these places. These places includes:-

1. Grains sheds
2. Second hand clothing area
3. Eating places
4. Wedding area

The cause at the grain sheds was said to be fire (flash-over) from activities of the pot makers, which gradually grow unnoticed and spread as a large fire. This happened twice at the market. As for the second hand clothing, the fires were said to be caused all by

BASIC THEORY—FLASHOVER

Flashover is usually defined as the sudden and dramatic simultaneous ignition of most combustible materials and gases in a room or area. It occurs when room temperatures near the ceiling rapidly rise to 800 to 1200°F. The time between the ignition of fire in a room and flashover is critical to the safe evacuation of room occupants and to effective fire fighter rescue and suppression operations. The sketches below show the development of a typical fire in a small room. Note that well-insulated walls retard heat flow from the room and hence would reduce the time between ignition and flashover.



electrical apparatus - pressing iron. This occurred five times so far. This two areas account for about 60% of all the fires at the market.

When studying the time at which large fires occur it has been shown over the years that they all start between 1800 and 0600 hrs (6.00 p.m. - 6.00 a.m.) than during day time hours. However, the general cause of all the fires ARE:

NEGLECT AND IGNOREANCE

However, the possibility of arson (non-accidental) exist. Arson is the crime of deliberately setting fire to property. This can be taken to be as due to a desire to gain from the fire outbreak - stealing or because of a grudge or envy against an individual or group of persons. There are various form of reasons to this kind of action.

SPONTANEOUS IGNITION

Materials and commodities which are highly combustible and subject to spontaneous ignition at the market includes:

1. Saw-dust
2. Oily materials - vegetable and animal oils
3. Clothing (Second hand)
4. Waste, Rags and Sacks.

5.7 BEHAVIOUR OF FIRE IN CONFINE SPACES

The understanding of the behaviour of fire in confine spaces is an essential step towards an effective design controlled measures against fire outbreaks. A survey conducted shows that majority of fires at 'Katako' market starts and develop in confine spaces (Stalls) before its spread.

Fire moves vertically by convection and can spread laterally along ceilings. Combustion generates gases as well as heat and smoke. Hot gases and smoke, if confine, will tend to rise filling the entire stall. As most of the fires at the market occurs during the period of (1800 - 0600 hrs), when there is no activities at the market. There are no people during that period except the few watchmen around. Thus the concern at this point is the protection of the building or market contents and the structure itself. Therefore the gases (toxic) and smoke would have no much serious damaging effect on the contents and the structures. The serious matter here is the heat.

The hot gases and heated ceiling and upper wall surfaces radiate energy down to the unignited materials below in the room (stall). The closer the ceiling is to the burning materials, the more heat it can radiate. Thus ceiling and wall finishes that are combustible will have a significant influence on the fire growth and

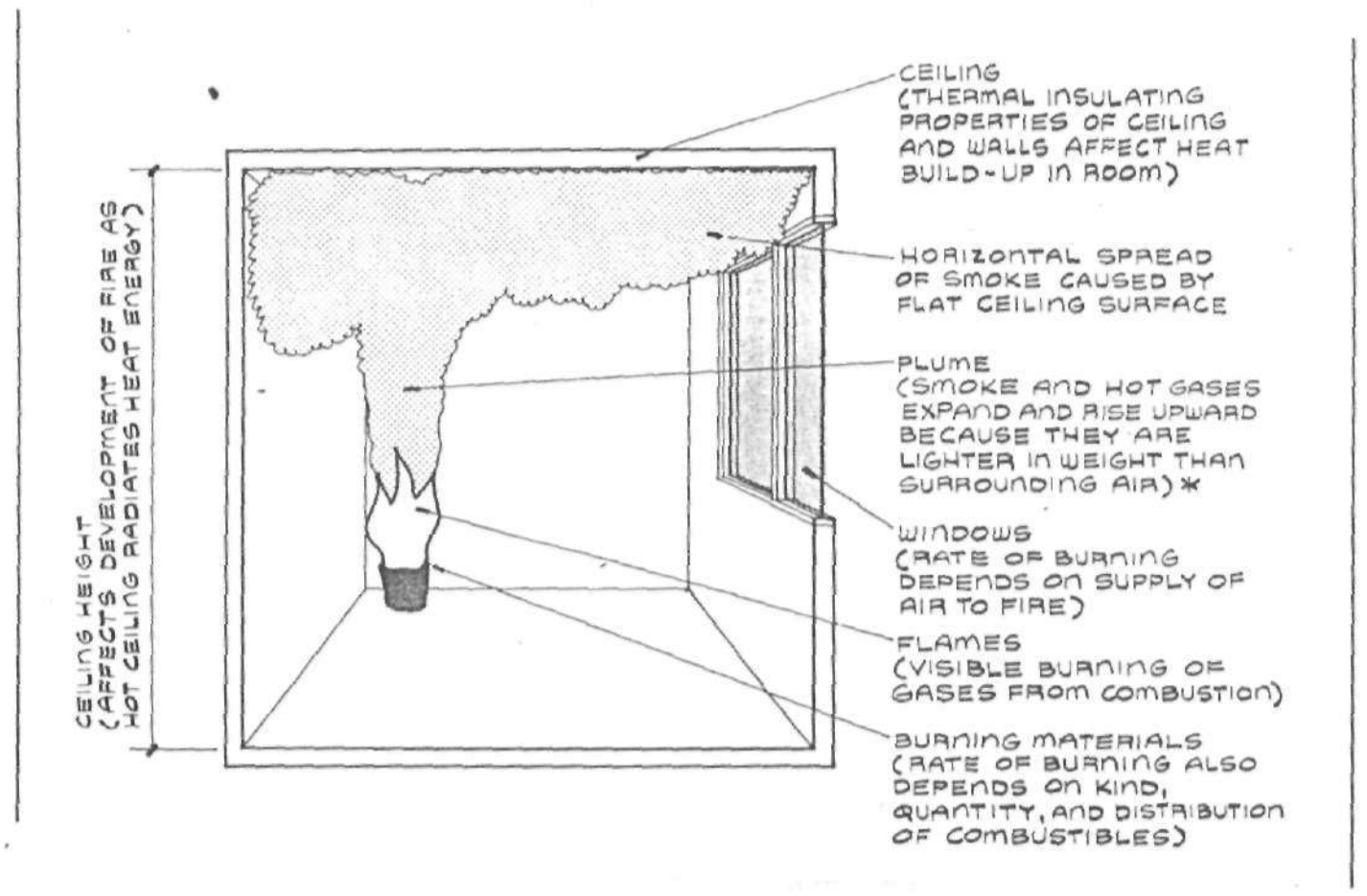
spread.

Firstly, the role of the architect here is to use interior finishes (both on ceilings and walls) that have high resistance to fire and also to put a considerable distance between the ceiling and the combustible contents below in the market stalls.

Secondly, he is to confine the fire only within its area of origin without allowing it to grow and spread. This is called compartmentation.

Of course, this is not to say that the smoke and toxic gases are no problems. But the fact is that they do not pose immediate danger to the contents and the structure. They can be allowed to escape through roof vents.

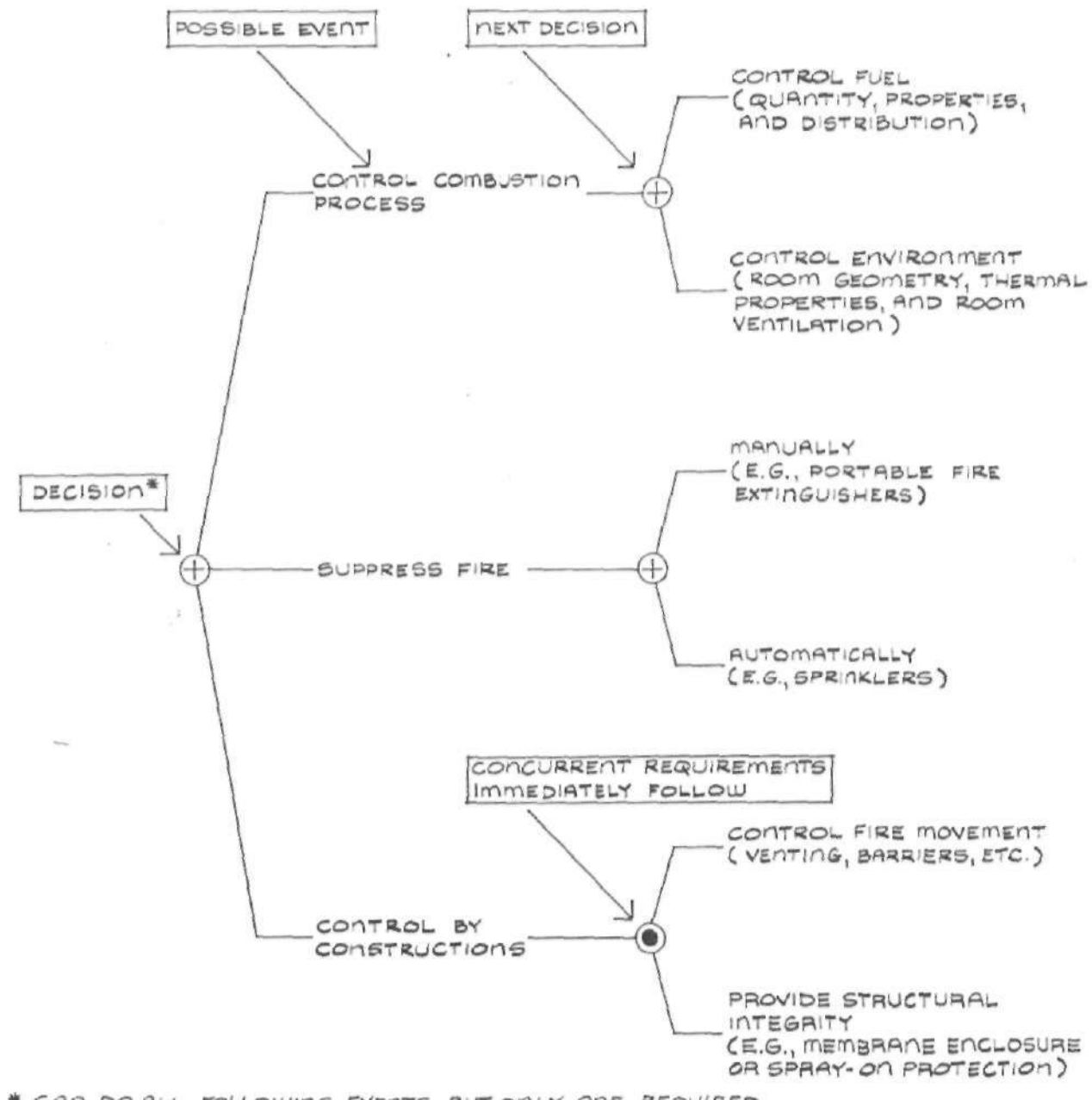
As stated earlier that fire can only occur if there is fuel (Combustible materials), oxygen and heat. Architect can do very little to reduce the oxygen contents of buildings, but fuel can be excluded or modified by the use of non-combustible materials. Heat flow can also be excluded or retarded and thus disallow ignition by thermal radiation heat and energy sources must be concealed from combustible materials and also by designing structures capable of resisting fire for a considerable period.



FIRE BEHAVIOUR IN CONFINE SPACES

BASIC THEORY—DECISION TREES

A "decision tree" is a network diagram consisting of two basic parts: decisions and results or events. The tree (possible events branch out like the limbs of a tree) shows the potential consequences of a series of decisions. It can be applied to building firesafety situations by identifying fire factors and emphasizing their interrelationships. For example, the diagram below is concerned with deciding what are the alternate methods for controlling a building fire (i.e., control combustion process, suppress fire, or control by constructions).



Note: A detailed building firesafety decision tree is included in the appendix.

5.8 METHODS OF FIRE CONTROL AT THE MARKET

There are various methods of fire control namely:-

1. Control by design and construction
   - Protection of structural members
   - Fire resistance of elements
   - Fire stop openings
   - Panel vents and shafts.

2. Controlling the combustion Process
   - Thermal properties of elements
   - Air supply for combustion
   - Room volume, shape and ceiling height.

3. Automatic Suppression
   - Fire detection and alarm warning
   - Automatic sprinkler systems
   - Halow Systems
   - Carbon dioxide systems
   - Form Systems.

4. Manual Suppression
   - Portable fire extinguishers
   - Stand pipe fire hoses
   - Fire department personnel and equipment

The first method is the principal concern of this study followed by the second and last methods. However, the third method will be examined where necessary.

5.9 STRUCTURAL FIRE PRECAUTIONS

FIRE COMPARTMENTS

A fire compartment is a space bounded by the elements of construction into which it is difficult for hot gases, smoke, flame and fire to enter or leave. A fire compartment has three function namely:-

1. By limiting the size of a compartment the amount of fuel is restricted and the amount of available oxygen is restricted and so the severity of a fire is limited.

2. By creating a compartment that will be constructed so that it will reduce the time before smoke and fire can enter into it and so a lot of goods and commodities could be saved.

3. Again it give more time to salvage much of the goods and make it easier for occupants to escape.

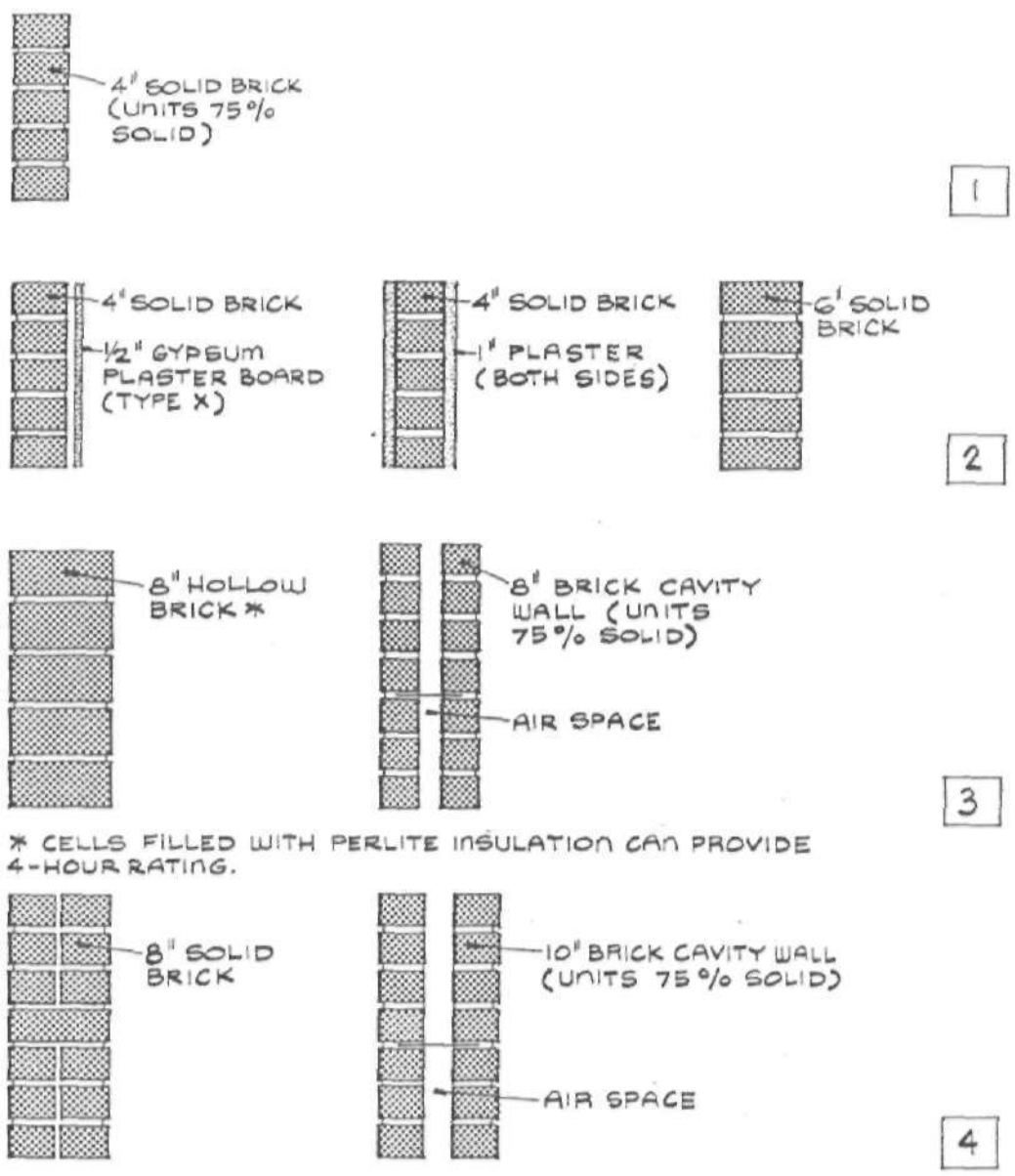
It is very important to remember that in creating fire compartment, one must be sure that early detection of fire and that the means of giving warning are of the highest order.

5.10 AUTOMATIC FIRE DETECTION INSTALLATION

Early detection of fire and alarm warning are essential to prevent loss of property at the market. This is very important at the market because most of the fires

BUILDING MATERIALS AND CONSTRUCTIONS—FIRE RESISTANCE FOR BRICK WALLS

Shown below are fire-resistance ratings in hours for various brick load-bearing walls.



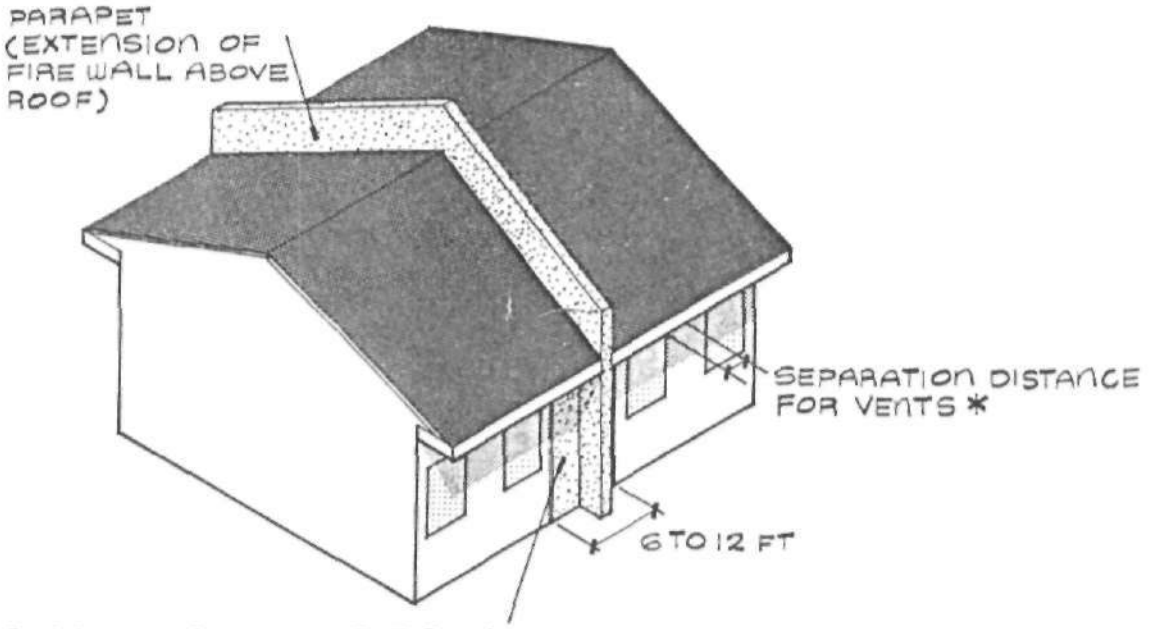
Note: Where combustible members (e.g., wood joists, beams, girders) are framed-in to 2 hour and greater wall constructions, subtract 1 hour from the rating shown above. There should be at least 4 in. of brick between the ends of the combustible members and the opposite face of the wall.

REFERENCE

Gross, J. G. and H. C. Plummer, "Principles of Clay Masonry Construction," McLean, Va., *Structural Clay Products Institute*, 1970.

FIG. 5.7

BUILDING MATERIALS AND
CONSTRUCTIONS—FIRE WALLS (Continued)



*VENTS LOCATED IN THE SOFFIT OF ROOF OVERHANG SHOULD BE AT LEAST 3 FEET AWAY FROM VERTICAL PROJECTIONS OF ADJACENT WINDOW AND DOOR EDGES.

Note: In apartments, condominiums, and so on, fire walls should extend beyond exterior walls to separate combustible balcony constructions.

106- FIG. 5.8

develop and growth when the market is closed.

Included with the automatic detection of fire, there must always be the automatic transmission of the alarm to the fire fighting service. Detection of fire alone is not sufficient, but that the consideration of how, and how soon, can action be taken to ensure that fire fighting operation will commence is also vital. No matter how efficient is the detection of a fire and the transmission of the alarm, the system is of no value unless rapid action is taken to extinguish the fire.

Smoke detectors should be located on ceilings near the centre of the space or upper wall surfaces.

5.11 SMOKE VENTING

Venting is the removal of smoke, toxic gases and heat from buildings to provide tolerable conditions close to the fire. This relevant to the market as the possible combustion of materials and goods produces a lot of smoke and toxic gases.

ROOF VENTING

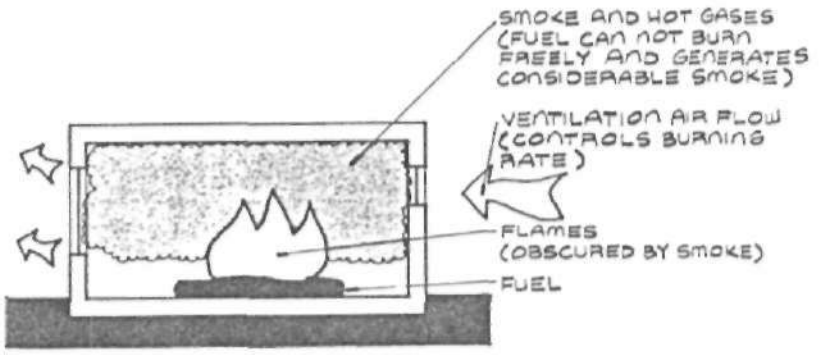
Openings in roofs can be used to remove smoke and hot gases so that exit routes will not become blocked and fire fighters can locate the fire.

BASIC THEORY—VENTILATION AND FUEL CONTROLLED FIRES

The major factors that determine the rate of burning in a building compartment or confined area are the fuel load and the ventilation. The fuel load from building furnishings can vary from room to room and change with time. It is, therefore, difficult to predict if a fire will be ventilation or fuel controlled. Consequently, fire-resistance requirements for buildings should be determined by assuming that the more destructive ventilation controlled fire will occur.

Ventilation Controlled

Where the fuel load is considerable and the ventilation poor (e.g., basements, theaters, buildings with small areas of fixed, sealed glazing), the rate or period of burning can be prolonged as it will be controlled by ventilation. When windows break, the fire will spread and the rate of burning will increase.



Fuel Controlled

Where the fuel load is small and the ventilation sufficient (e.g., buildings with very large window openings), the fire will be controlled by the surface area of the fuel. Fuel controlled fires are of short duration and the room temperature is not excessively high due to infiltration of cooler outdoor air. In multistory buildings with low ceilings, however, flames can spread from floor to floor through exterior openings. With high ceilings, flames would be confined to the room.

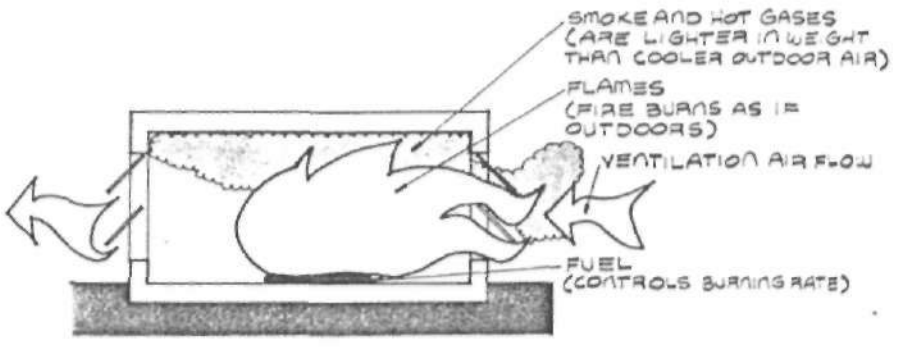


FIG. 5.9

5.12 MECHANICAL PROTECTION SYSTEM

The various mechanical protection systems commonly in use are either for first aid or full-scale protection. It is not the concern of this study with the first-aid (Hand appliences) systems, as the case is to deal and attack fully developed fire. This requires full scale protection. Included in this systems are:-

1. Hosereels
2. Sprinkler systems
3. Dry pusers
4. Wet risers
5. Other fixed installations - hydrants

As far as this study of the 'Katako' market is concerned only hosereel and probably sprinkler systems will be considered as the case may be. This is purely for economic reasons. Because most these installations are every expensive to install and maintain.

Most or all these apparatus requires constant supply of water for their operation. Thus, it is important to use possible water sources available at the market.

5.13 FIRE PROTECTION - SITE PLANNING

1. Fire apparatus should have clear street or road access into the market, with adequate clear road widths and turning

2. Site access into the market should be co-ordinated with the placement of lighting and utility poles, stalls, and trees.

3. An adequate water supply for fire fighting operations, fire hydrants should be located at street intersections and at points along streets so that spacing between hydrants does not exceed 90 metres. Locate hydrants away from trees, posts, fences or any other obstructions.

4. Well-lighted streets can help fire fighters quickly locate fire hydrants during nightime operations.

5. Adequate separation distance should be provided particularly between areas with high fire risks and areas with less risks. This is to prevent fire spread. In this case of Katako market solid barriers between areas will be proposed, as too much distances between areas would uneconomical for constraint on the land.

6. Storage and trash removal of combustible materials particularly saw-dust from the timber section is a source of fires.

CHAPTER SIX

6.0 EXISTING ROADS NETWORKS WITHIN AND AROUND THE MARKET

6.1 THE MAJOR ROAD (MALLAM KURE STREET)

There is only one major road that runs from north to south. This road runs through the market and divides it into two unequal sections, this road can be classified as secondary road and all other service roads join this road at various points. The importance of this road is, it links the market with Jos Main Town to the south and also provides a gate way out of Jos to the North linking the market with a ring road.

The road, generally is bordered by the market stalls. However, there are unauthorised hawkers who encroaches on the road, making it narrow thereby congested and untidy. On the eastern section there are five access roads and one on the western part that link the road with the market.

6.2 ACCESS ROADS

It is significant to mention here that this chapter pays particular attention to the circulation of vehicles, people and goods with regards to these access roads, mentioned above. The elements of this movement-roads, pedestrian paths, sidewalks,

parking, loading and unloading bays and stall entrances are so closely related that they must be treated as elements of a single system in which capacity is the major design determinant.

The access roads are connectors. They connect the market with the outside. They both serve pedestrian and vehicular traffics operating within and inside the market. The access roads are characterised by rocky outcrops; are dusty, poor drainage and are narrow - can't allow two vehicules on opposite directions to pass. To make the situation more worst vehicles are parked or stand on both sides of the road. Motorist into and out of the market spend unnecessary delays, because of congestion.

Mallam Kure Road serve as a major spine of the whole Laranto Quarters and not only the market. It is a collector road carrying traffic from the city centre to the market area and also connecting the market with the Bauchi Ring Road.

The road is about 10.0 m wide. It lacks drainage and the road edges are not defined.

6.3 PEDESTRIAN PATHS

There is no organised system of footpath and pedestrian crossings, and pedestrian paths. People just

pass through trading and commercial places and in some place path just end in space leading to no where. The paths are not defined.

There has to be a defined systems of pedestrian paths and crossings. Vehicular and pedestrian routes should be separated to protect the pedestrian from vehicular harassment.

6.4 PARKING SPACES

Parking facilities is another problem for the market. With the exception of the timber section which have some organised parking area - there is no other organised parking space throughout the market. Private cars and buses and idle trucks just park by the road sides - thereby making the narrow road more narrow and congested.

The number of parking spaces required in a market depends on the size of the market, size of the incomes of the customers (Onokerhoraye, 1982) and (Vagale, 1972).

TABLE 6.1 NUMBER OF PARKING SPACES/HECTARE IN MARKET PLACES

TYPE OF MARKET	NUMBER OF PARKING SPACES/HECTARE
MINOR	24-36
MAJOR	36-48

SOURCE -

PUBLIC SERVICES IN NIG. URGAN CENTRES -

ONOKERHORAYE (1982)

6.5 LOADING AND UNLOADING BAYS

There is no organised space for loading and loading vehicles. Trailers and trucks just stand by the road sides for delivery and loading. They consequently blocked the visibility of the incoming motorist. They also take up almost half of the road thereby forcing motorist to move only on one side of the road. This results in confusion and traffic conjection thereby causing unnecessary delays and stresses. (See fig (picture no.....))

. PROPOSALS

1. Segregation of pedestrian from vehicular traffic.
2. Provision of parking facilities, delivery bays, and bus stands at selected points.
3. Provision of define accessibility in and out of the market.

6.6 TRAFFIC SURVEY AND ANALYSIS

(a) INTRODUCTION

There are three basic kinds of movements at Katako Market. These are:-

1. Vehicular Movement
2. Pedestrian Movement
3. Goods Movement

The movement under consideration is basically horizontal movement. The success of this exercise will depend on people's ability to move freely and comfortably within the market and to enjoy the experience of being there. This require the application of design principles to integrate activities and transportation. Such is the main purpose of this chapter.

(b) . EXISTING CONDITION & POOR CIRCULATION

Of the nearly 10,000 persons entering the market on a typical business day, 18% percent come by private cars, 40 percent by buses and trailers, 30 percent by taxi, 10 percent walks all the way and 2 percent by other means. At the crucial peak hour between 9 a.m. and 12 noon about 7,000 people enter the market of whom the majority enter by taxis and buses.

The trip of a typical person on shopping venture from his taxis or bus door to the street, along the sidewalk through to the market, and finally down into the market stalls is slow, crowded and unnecessarily stressful.

The following tables are traffic surveys taken on a typical day of the week along the major access to the market (Mallam Kure Street).

6.7 TRAFFIC VOLUME

(a) DATE - MONDAY - 25 FEBRUARY 1991

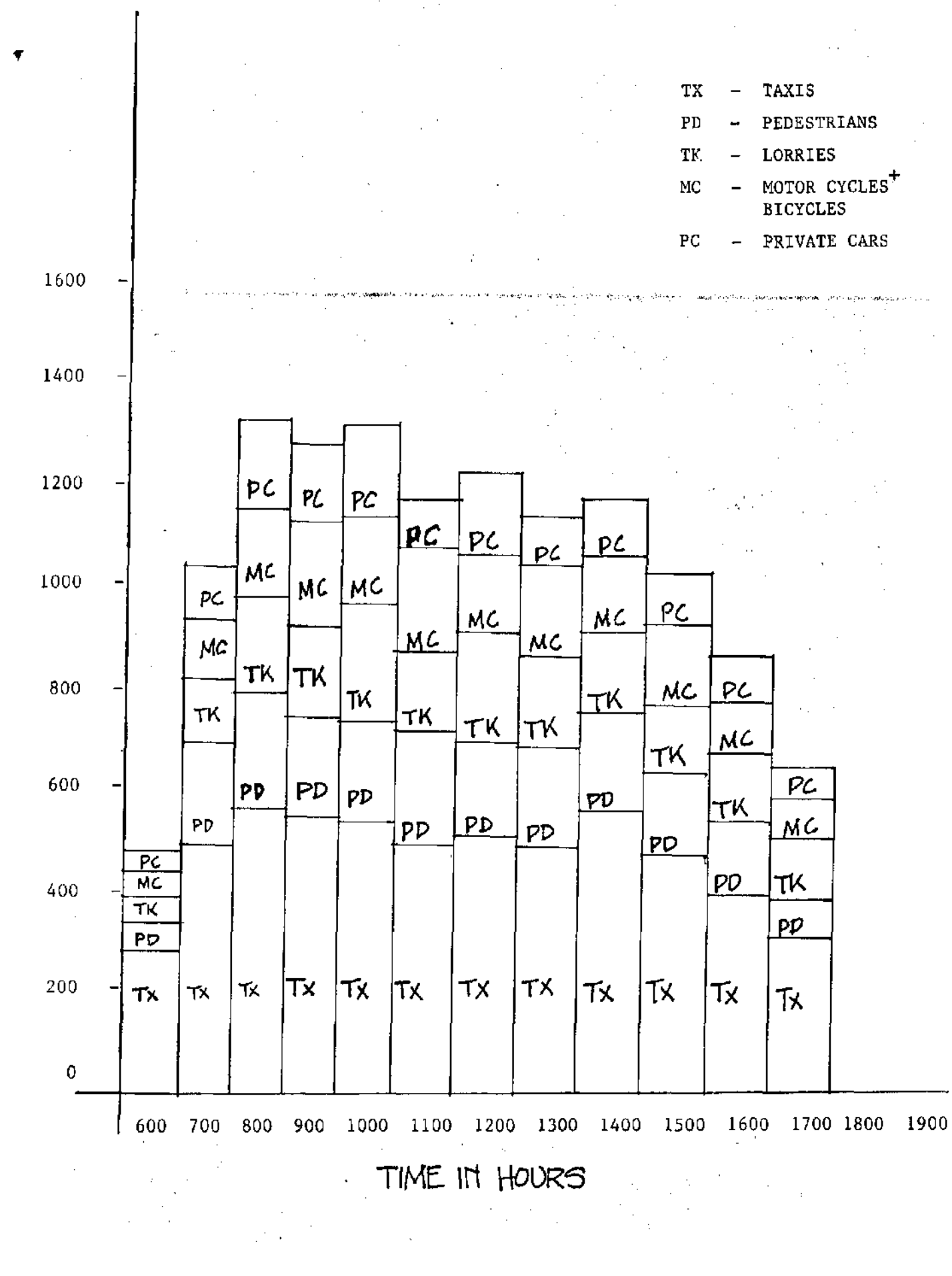
PLACE - MALLAM KURE STREET LARANTO JOS

LOCATION - KATAKO MARKET ENTRANCE

TABLE 6.2 TRAFFIC FLOW

	HOURLY FREQUENCY				
TIME	TAXIS	PRIVATE CARS	LORRIES	CYCLES	PEDESTRIANS
600-700 HRS	265	35	50	38	84
700-800 HRS	489	92	128	107	209
800-900 HRS	565	171	191	166	231
900-1000 HRS	542	165	204	192	183
1000-1100 HRS	547	164	237	155	199
1100-1200 HRS	486	114	173	183	228
1200-1300 HRS	495	137	163	198	242
1300-1400 HRS	467	118	155	173	228
1400-1500 HRS	540	111	156	154	204
1500-1600 HRS	433	105	144	146	183
1600-1700 HRS	398	82	127	112	136
1700-1800 HRS	282	61	102	86	101

SOURCE - Author's field Survey (Feb 1991)


TX - TAXIS
PD - PEDESTRIANS
TK - LORRIES
MC - MOTOR CYCLES+ BICYCLES
PC - PRIVATE CARS
1600
1400
1200
1000
800
600
400
200
0
600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900
TIME IN HOURS

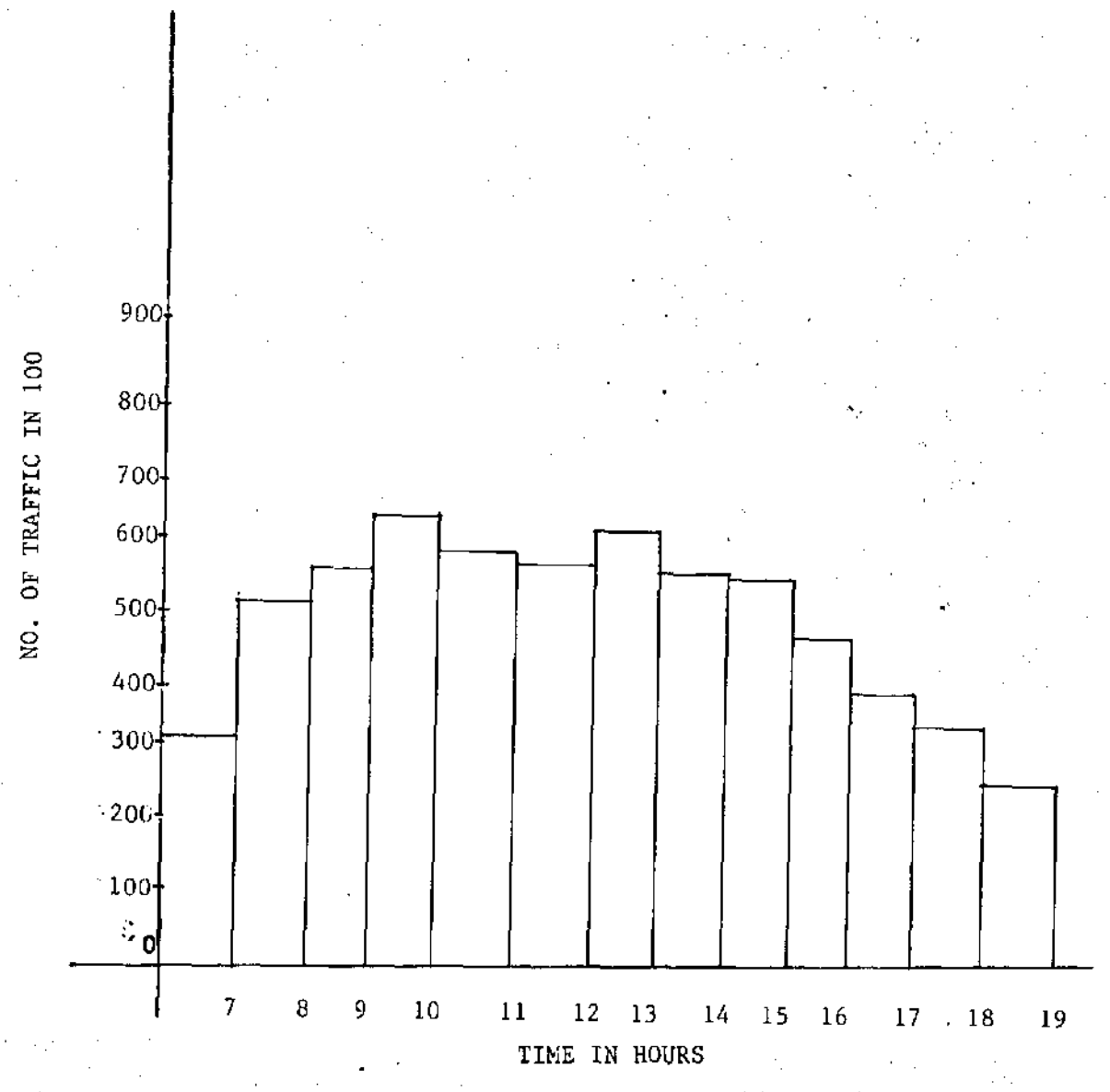
(b) DATE - SUNDAY 3RD MARCH 1991

PLACE - MALLAM KURE STREET JOS

LOCATION - KATAKO MARKET LARANTO, JOS.

TABLE 6.3 HOURLY TOTAL TRAFFIC FLOW PATTERN

HOURS	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900
NO. OF TRAFFIC	304	507	554	645	597	592	617	570	552	475	400	324	256

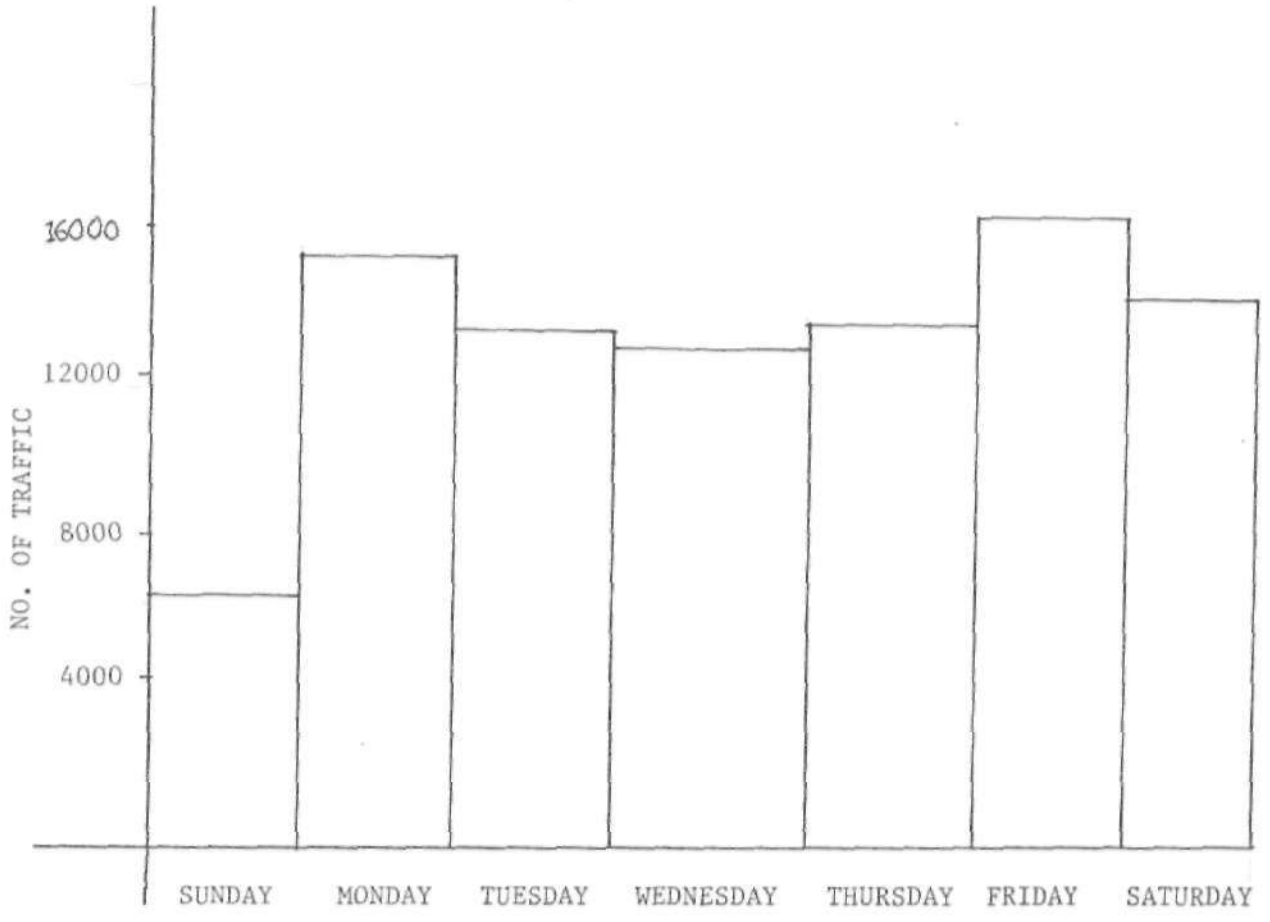


(c) PLACE - MALLAM KURE STREET JOS

LOCATION - KATAKO MARKET ENTRANCE LARANTO JOS

TABLE 6.4 DAILY TRAFFIC FLOW

DAY	TAXIS	PRIVATES	TRUCKS	CYCLES	PEDESTRIANS	TOTAL
FRIDAY	5368	2690	2306	3350	2559	16281
SATURDAY	6490	751	922	1525	4930	14618
SUNDAY	2699	950	727	880	1173	6429
MONDAY	5657	2110	1680	2562	3255	15264
TUESDAY	5228	2005	1230	2350	3006	13819
WEDNESDAY	5309	1872	1391	1732	2256	12760
THURSDAY	5028	2015	1095	2250	2985	13373



DATA - Author's field Survey

(d) DATE WED. 6TH FEBRUARY 1991
PLACE - MALLAM KURE STREET (NORTHERN END)
LOCATION - APATA-LARANTO JUNCTION

TRAFFIC FLOW

TABLE 6.5

HOURLY VEHICULAR AND PEDESTRIAN

TIME	TAXIS	PRIVATE CARS	TRUCKS	CYCLIST	PEDESTRIAN
6-7 AM	48	62	57	41	115
7-8	108	188	72	78	144
8-9	105	195	69	72	197
9-10	95	177	54	84	206
10-11	91	194	66	77	214
11-12 NOON	87	137	68	71	222
12-1	74	107	71	68	219
1-2 PM	80	101	67	67	197
2-3	65	130	64	70	203
3-4	61	118	60	66	185
4-5	68	104	59	67	147
5-6	62	98	61	58	101

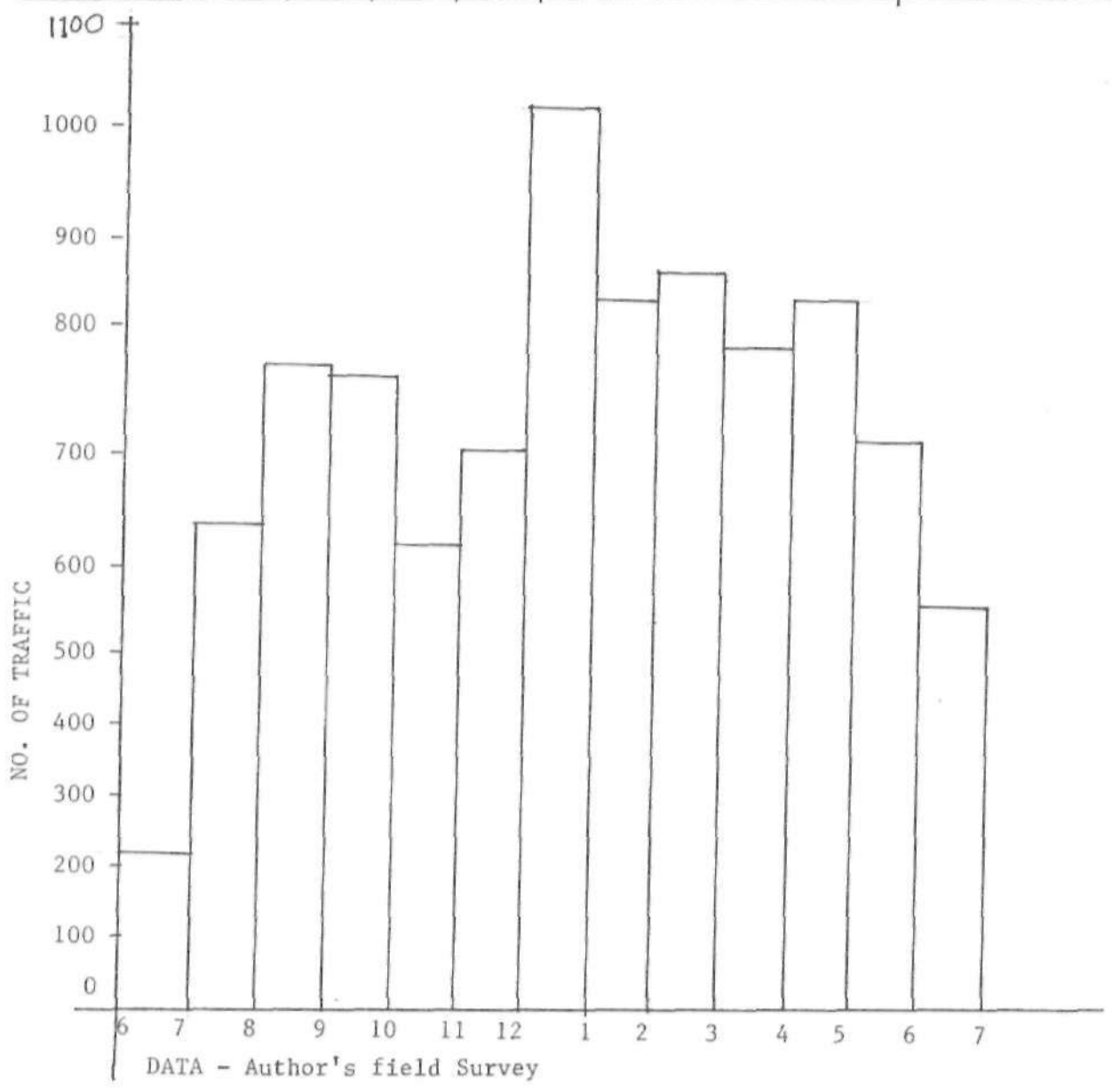
(e) DATE - 6TH FEBRUARY 1991

PLACE - MALLAM KURE STREET (NORTH END) LARANTO

LOCATION - APATA-LARANTO JUNCTION

TABLE 6.6 HOURLY TOTAL TRAFFIC FLOW PATTERN

HOURS	6-7	7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7
NO. OF TRAFFIC	237	634	788	784	614	703	1032	825	867	793	845	715	560

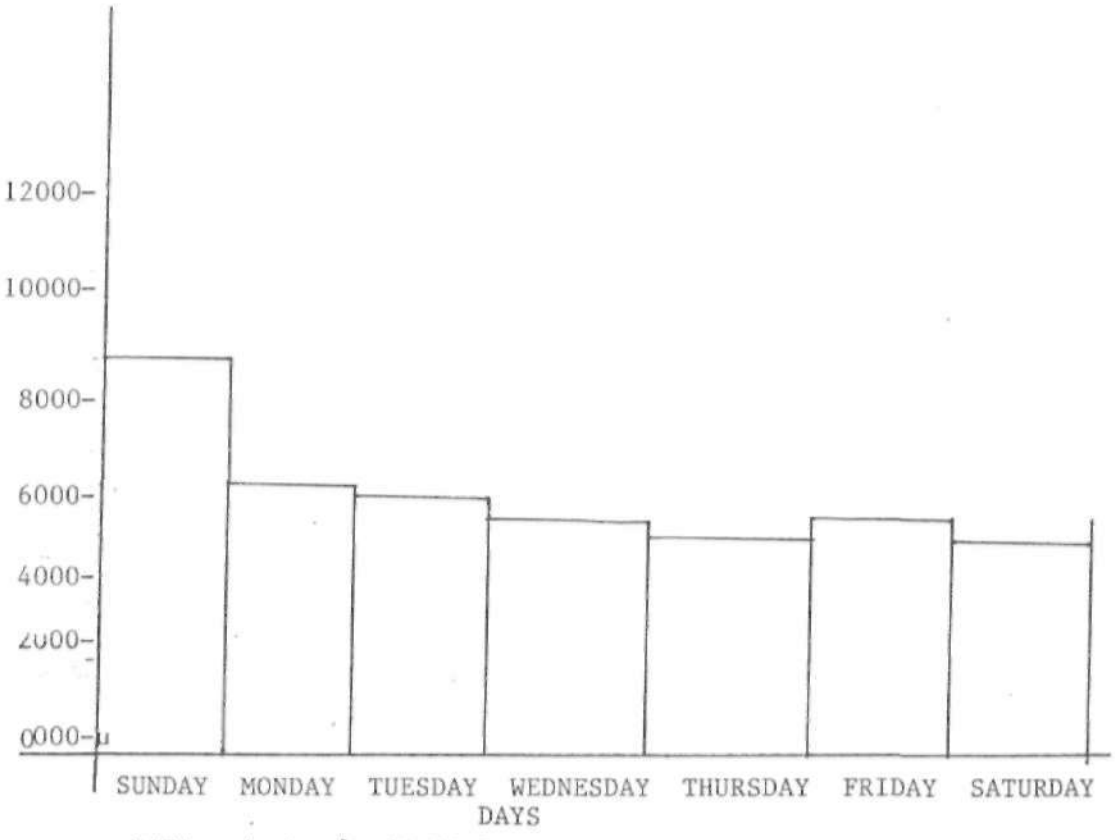


(f) DATE - 4TH MARCH, 1991
PLACE - MALLAM KURE STREET
LOCATION - APATA LARANTO JUNCTION

DAILY TRAFFIC FLOW

TABLE 6.7

DAYS	TAXIS	PRIVATE CARS	TRUCKS	CYCYLISTS	PEDESTRIANS	TOTAL
FRIDAY	995	1385	512	1002	2034	5928
SATURDAY	664	1216	723	717	1759	5079
SUNDAY	344	764	332	1904	5560	8904
MONDAY	944	1524	742	813	2144	6167
TUESDAY	896	1625	731	791	2103	6146
WEDNESDAY	926	1551	750	819	1826	5875
THURSDAY	836	1761	681	745	1612	5635



DATA - Author's field Survey

6.8 ROAD USERS

(a) PLACE - LARANTO

LOCATION - MALLAM KURE STREET JOS

TIME - 900 HRS - 1130 HRS

TABLE 6.8

TYPE		TOTAL	REPRESENTATION	% OF TOTAL
A	TAXIS	35979	139.97^{o}	40.0
B	PRIVATE CARS	12393	48.20^{o}	13.3
C	TRUCKS	9351	36.40^{o}	10.1
D	CYCLISTS	14657	57.02^{o}	15.8
E	PEDESTRIAN	20164	78.40^{o}	21.8

(b) PLACE - LARANTO

LOCATION - MALLAM KURE STREET JOS

TIME - 1200 HRS - 1430 HRS

TABLE 6.9

TYPE		TOTAL	REPRESENTATION	% OF TOTAL
1	TAXIS	5608	48.50^{o}	13.5
2	PRIVATE CARS	9826	84.96^{o}	23.6
3	TRUCKS	4471	38.66^{o}	10.7
4	CYCLISTS	6791	58.72^{o}	16.3
5	PEDESTRIANS	14935	129.17^{o}	35.9

TABLE 6.31 SITE AREA AND COVERAGE OF MARKETS

TYPE OF MARKET	SITE AREA (HA)	PERCENTAGE COVERAGE	POPULATION SERVED
MINOR	82-2.05	30-35	10,000 - 20,000
MAJOR	2.07-8.2	25-30	50,000
REGIONAL	8.2	20-25	VARIABLE

DATA - ANATOMY OF TRADITIONAL MARKETS IN NIGERIA VAGALE (1972)

SUGGESTED SETBACKS FOR MARKETS FROM DIFFERENT TYPE OF ROADS

TABLE 6.11

TYPE OR ROAD	SET BACK (M)	CARRIAGE WAY (M)	RIGHT OF WAY (M)
MAJOR ACCESS	12-15	24	14
COLLECTOR STREET	9-12	18	10
LOCAL STREET	6-9	9-12	9
1ST ORDER WALKWAY	-	6-10	-
2ND ORDER WALKWAY	-	3-6	-
3RD ORDER WALKWAY	-	5M (DISTANCE BETWEEN TWO OPPOSITE STALLS	

DATA - ANATOMY OF TRADITIONAL MARKET IN NIGERIA VAGALE (1972)

TABLE 6.21 NUMBER OF PARKING SPACES/HECTARE IN MARKET PLACES

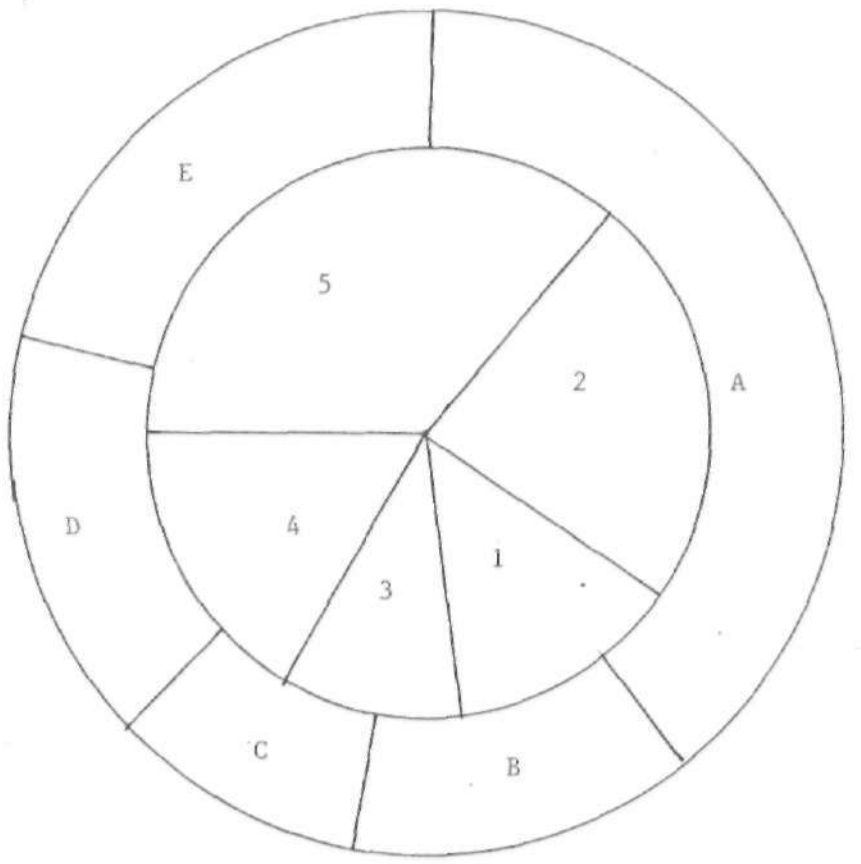
TYPE OF MARKET	NUMBER OF PARKING SPACES/HECTARE
MINOR	24-36
MAJOR	36-48

DATA -

PUBLIC SERVICES IN NIGERIAN URBAN CENTRES - ONOKERHORAYE (1982)

KEY

1 AND A = TAXIS
2 AND B = PRIVATE CARS
3 AND C = TRUCKS
4 AND D = CYCLISTS
5 AND E = PEDESTRIAN



DATA - Author's field Survey

CHAPTER SEVEN

7.0 DESIGN ANALYSIS

7.1 CLIMATIC DATA

7.1.2 RELATIVE HUMIDITY

TABLE 7.1 TABLE FOR AVERAGE DAILY AM, PM READINGS 1977 - 1990

MONTH	JAN	FEB	MARCH	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
AM	26.5	22.7	30.5	50.2	66.3	77.9	83.6	85.9	81.3	68.6	41.9	30.9
PM	12.9	11.0	13.3	26.6	41.0	56.9	66.3	70.9	63.0	42.9	26.7	18.6

OBSERVATION

a. The highest relative humidity (RH) of 85.9% is not far from the optimum value of 75%.

b. Only the month of April, May, June are in the comfort zone.

c. Lower relative humidity value below 30%.

THE INFLUENCE OF THE R.H. ON THE DESIGN

(i) Its effect on thermal comfort physically and physiologically.

(ii) Changes in moisture content of the building material hence their conductivity is affected.

(iii) The moisture content of the material also affect its thermal insulation.

7.1.2 WIND FORCES

The table below shows the mean frequency polygon for wind forces

TABLE 7.2

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
CALM	5	4	4	7	4	6	7	6	10	10	6	7
1-10 KNOTS	22	19	17	16	18	23	22	23	20	24	18	16
11-21 KNOTS	7	6	10	9	8	4	2	2	2	3	4	4
22-33 KNOTS	-	-	-	0.1	0.73	0.2	-	-	0.2	-	-	-

1 KNOT = 0.25 M/S

Comfort Zone = 0.1 - 0.33 m^2

Comfort zone fluctuates around 'The Calm' graph line

Hence period of discomfort is prevalent

The table below shows the annual mean of daily wind directions (frequency)

DIRECTION	NORTH	NE	EAST	SE	SOUTH	SW	WEST	NN
TOTAL	1770	863	1124	1481	1818	2538	520	257
MEAN	161	79	102	136	165	231	47	23

OBSERVATIONS

a. Wind from the south-west (SW) is more dominant.

b. The dry wind mostly comes from the north and north-east.

Its influence on the design

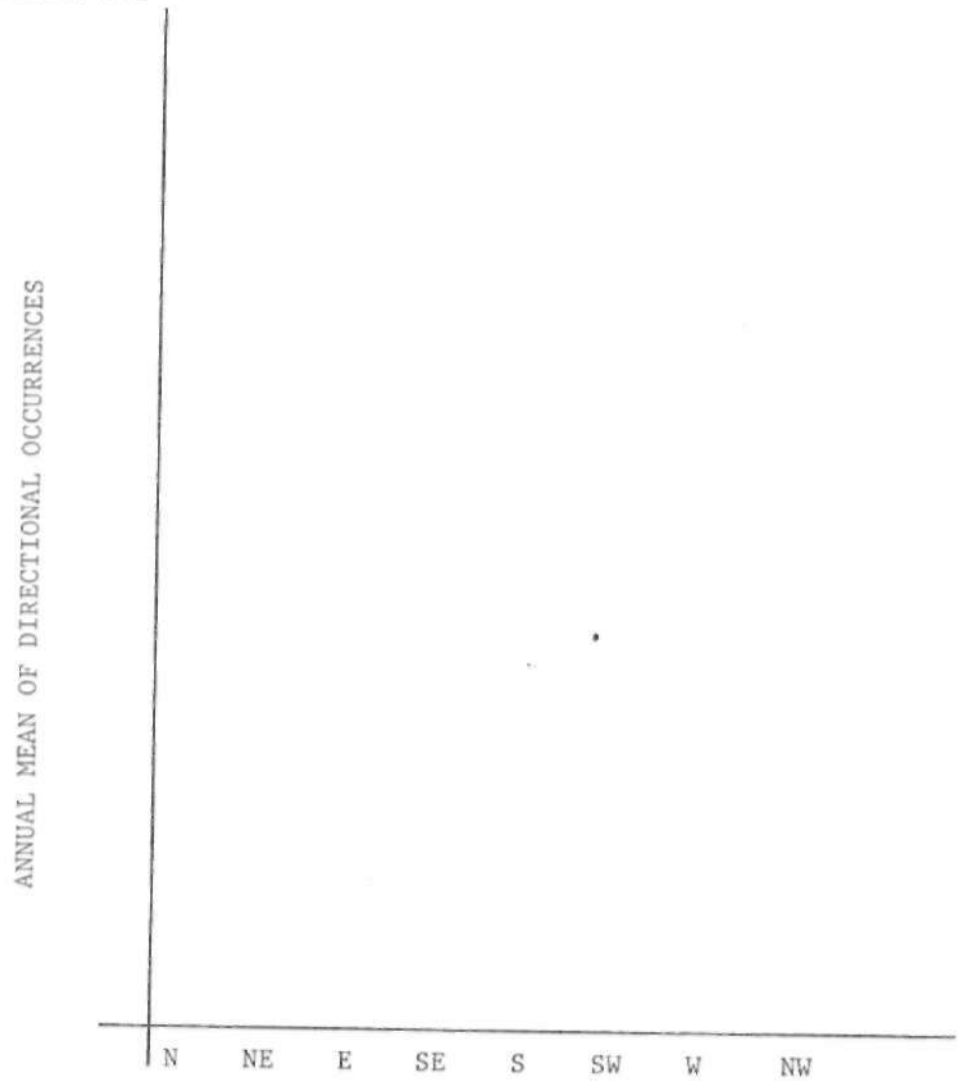
(i) External resistance of finishes and other external surfaces

(ii) Air changes infiltration through openings

(iii) The positioning of openings.

ANNUAL MEAN OF DAILY WIND DIRECTIONS (1977 - 1990)

DIAGRAM 7.1



There are two dominant prevalent winds - the north-east which brings hamattan and dust from the desert and the south-west winds from the ocean, bringing a cooling effect.

7.1.3 TEMPERATURE

Table below shows the mean daily maximum and minimum temperature (1977 - 1990).

TABLE 7.3

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
MAXIMUM	29.1	31.5	33.10	33.5	32.0	28.0	25.5	22.2	23.9	25.0	26.6	24
MINIMUM	13.1	14.6	15.6	17.5	16.0	14.6	13.5	12.1	11.8	10.9	10.0	9.1

OBSERVATIONS

a. Most times of the year there is a thermal comfort.

b. As a result of the high elevation of the Jos Plateau, average annual temperatures are lower than those of the surrounding planes, with March and April as the hottest month while July, August and September, as the coldest months.

7.1.4 RAINFALL

The table below shows the monthly average values of daily rainfall in mm (1977 - 1990)

TABLE 7.4

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC
(MM)												
RAINFALL	0.13	0.29	2.09	5.08	11.09	31.07	36.56	45.95	25.40	6.01	6.013	0.01

OBSERVATION

a. Very high rainfall between June and August with an average of 37.86 mm

b. About 90% of the rain falls on the six months between April and September and the rain usually comes in thunderstorm of high intensity particularly in the beginning and towards the end of the rainy season.

In designing for Jos consideration must be given to site and roof drainages.

7.1.5 SUNSHINE HOURS

The daily mean hours (1977 - 1990)

TABLE 7.5

MONTH	JAN	FEB	MAR	APR	MAY	JUNE	JUL	AUG	SETT	OCT	NOV	DEC
HOURS	9.00	9.10	8.00	7.30	7.50	6.50	4.50	3.10	5.50	8.10	8.50	8.30

OBSERVATION

a. Very long of sunshine hours between October and March.

7.1.6 CONCLUSION

As can be seen from the climatic conditions of Jos, buildings on the Plateau require less cooling agents like fans and air-conditioners. This is because of the cooling nature of the environment for most part of the year. Thus the use of concrete and steel as a building material is only appropriate, since the thermal radiation of the environment is minimal. Concrete and steel also withstands the washing

effects of the thunderstorm which bring along driving rains.

7.2 SITE ANALYSIS

7.2.1 Location of the Site

The market is situated at Laranto quarters in northern part of Jos town. To the northern and southern sides it is bordered by a seminary and a primary school respectively, and to the east it is limited by river valley and hills while to the west is residential settlement. However, the major access road to the market has divided the site into two unequal parts.

7.2.2 Size and Shape of the Site

The existing size of the market is 11.50 (HA). However, an expansion to the east has been proposed which will increase the size to 13.3 (HA).

The site is divided into two unequal parts. The major area is rectangular while the other part which is smaller is basically a square of (150m x 150m).

7.2.3 Existing Features on the Site

The present 'Katako' market contains an estimated number of 2612 stalls, constructed with zinc roofing sheets and timber post.

7.2.4 VEGETATION AND TOPOGRAPHY

There are few scattered trees within the market.

The site slopes gently toward the eastern direction.

TABLE 7.6

7.2.5 SCHEDULE OF ACCOMMODATION

7.2.5.1 COMMERCIAL UNIT	STALL SIZE	(M^2)	DENSITY OF TRADER PER STALL
LOCKED UP SINGLE	4.50 x 4.50	20.25	1-2
LOCKED UP DOUBLE	4.50 x 9.0	40.50	1-3
TIMBER SHED	4.50 x 9.0	40.50	1-3
MACHINE WORKSHOP	4.50 x 9.0	40.50	4
TRUCKS BODY BUILDING	4.50 x 3.35	16.87	4
FURNITURE WORKSHOP	4.50 x 4.50	20.25	3
HARDWARE	4.50 x 4.50	20.25	1-2
GRAIN SHED	4.50 x 4.50	20.25	3
PALM OIL	4.50 x 3.35	16.87	3
HOUSEHOLD GOODS	4.50 x 4.50	20.25	1-2
SECOND HAND GOODS	4.50 x 4.50	20.25	1-2
ALUMINIUM POT MAKERS	4.50 x 3.37	16.87	4
METAL BOX MAKERS	4.50 x 3.37	16.87	4
FISH AND MEAT	4.50 x 3.37	16.87	1-2
VEGETABLES AND FRUITS	2.25 x 3.37	7.58	1-2
7.2.5.2 ADMINISTRATION UNIT			
MARKET MANAGER	3.75 x 3.75	11.35	
ASST. MANAGER	3.75 x 2.25	7.58	
TECHNICAL SUPERVISORS	2.25 x 2.25	5.06	
ACCOUNTANT	3.75 x 2.25	7.58	
GENERAL OFFICE	4.50 x 7.0	31.50	
COMMITTEE ROOM	4.5 x 7.0	31.50	

	SECURITY ROOM	2.25 x 2.5	5.06
7.2.5.3	FACILITIES		
	INFORMATION UNIT	4.5 x 9.0	40.50
	HEALTH CLINIC	11.0 x13.0	143.0
	FIRE UNIT	15.0 x 27	405.0
	WATER TOWER	18.0 x 9.0	162.0
	COURT	15.0 x27.0	405.0
	BANKING FACILITIES	15.0 x27.0	405.0
	REFUSE COLLECTION POINT	9.0 x 9.0	81.0
	PARKING FOR IDLE TRUCKS	45.0 x75.0	3375.0
	WATER FAUCETS	20 NO.	
	TOILETS	120 WCs	1 WC ^{s}/30 PERS.
	RAMPS AND STAIRCASES		
7.2.5.4	RECREATIONAL FACILITIES		
	CANTEENS	18.0 x18.0	324.0
		16x7 (2)	224.0
		9x9 (2)	162.0
	OPEN COURTYARDS	27.0x27.0 (4)	2916.0
		18.0x18.0	324.0
		63.0x63.0	3969.0

7.2.5.5 ROADS

The total area covered by roads alone is 18350m^2 (1.8 Ha.)

i.e 13.6%

The total site coverage is 133200 m^2 (13.2 HA)

This represent 7.3% of the total Laranto area

The total area of Laranto quarters is

1800000 m^2 (180 HA)

7.2.5.6 PARKING SPACES

The peak hour is between 9 a.m. - 11 a.m. daily

Number of cars parked before 9 a.m. are

= 100 cars

Cars parked between 9 a.m. - 11 a.m/

= 300 cars

Those cars that leave during the peak period

= 230 cars

Required number parking spaces

$$= 100 + (300 - 230) \times \frac{150}{100} \quad \text{(Allowing for 50\%)}$$

$$= 170 \times \frac{150}{100}$$

= 255 Parking spaces

The proposed number of parking spaces provided is 269 spaces.

7.3.0 DESIGN CONCEPT

In the previous chapters, planning problems have been identified at the Katako market. In view of the problems and on the need to modernize the market, planning and design proposals have been, based on the following objectives:-

(a) To provide for more stalls in the market.

(b) To propose cluster of stalls to effect optimum use of space to cater for future needs of the market.

(c) To provide adequate parking and loading bays.

(d) To zone the market efficiently.

(e) To articulate design with the choice of material and construction technique to provide adequate reduction in the wide spread of fire.

(f) Reorganise the circulation and vehicular entrance into the market to ease the existing traffic congestion.

(g) To propose efficient and hygienic structure with adequate utilities and amenities.

The design has been based on the principle of segregating vehicular and pedestrian traffics. This is achieved by providing parking facilities at the periphery within the market from where pedestrian movement starts and move through the gates into the commercial areas.

Separate parking for taxis and buses where provided at strategic points to reduce the traffic congestion at the market, in addition to the provision of loading bays and parking for idle trucks.

The second design principle is based on functional units in the market. The market is segregated into three basic areas.

(i) Food stuff area

(ii) Non-food trade area

(iii) 'Manufacturing' area

These various areas where connected by the provision of network of roads and pedestrian routes.

Another element which is also considered in the design is the courtyard. It is used to create micro-climate and to act as a focal point within the market. This is more enhance by the provision of landscape elements around the courtyards and the location of supporting service and facilities like canteens, administration, banks just to mention a few.

The market generally has been treated as a unit, by using roofing to cover the various commercial areas for the purpose of creating a shopping atmosphere under all conditions of the weather and

climate.

The concept of the 'Katako' market is basically a rectilinear concept adopting the basic rectangular shape, changing levels in rythm to the nature of the functional areas. The concept is conducive and straightforward in terms of functionality and economy of space.

The circulation within the market is well defined by continuous through passages leading through the stalls and terminating at the courtyard or at the sides or rather at the facades of the market building. This aspect of the design makes the space within the market dynamic to some extent in terms of continuity.

Goods ramps are situated at strategic positions of the market to enhance the movement of goods from one level to another within the market complex.

Refuse depots are situated at stragegic arms of the market complex to enhance proper disposal of solid waste.

Toilets, refuse depots, recreational and other supporting services are situated in a singular row for efficient disposal of wastes and drainage from

these services. This function is enhanced by the provision of service bays for collecting vehicles.

The general layout has been guided by the zoning principle where the bulky commodities like timber, grains, house hold utensils are located close to the loading bays to make easier the problem of moving the commodities to their selling points within the market.

General drainage shall be by means of covered drains. Since the market site slopes to the east the drains are towards the eastern direction. The main drains are 750 mm wide by 1000 mm deep while the secondary and minor drains are 650 mm wide by 550 mm deep.

Trees as a means of landscape are proposed, located at regular intervals along the major pedestrian routes, the peaking lots, the courtyards and at the entrances of the market.

Major walkways are of 3 m wide and are open to the sky, while the minor walkways are 2.25 m wide and they connect the various stalls to the major walk-ways.

7.3.1 STALL ARRANGEMENT AND LAYOUT PRINCIPLES

The stalls are arranged with at least one side facing the walkway. The stalls are arranged in a grid of 9.0 x 9.0 m^2. They are in a unit containing four stalls which are divided by light-weight non-bearing burnt brick partition walls.

There are four types of stalls excluding storage spaces:

	SIZE	AREA USE
TYPE A -	4.5 x 4.5	-Second hand goods -Household utensils -Part of grain area -Pot and box makers -Part of palm oil
TYPE B -	4.6 x 9.0	Timber section Machinery Part of grain area
TYPE C -	3.37x3.37	Meat and fish Part of palm oil section Vegetable and fruits
TYPE D	1.5 x2.25	Kiosks

7.3.2 APPEARANCE

The physical appearance of the proposed Katako market is that of a simple concrete structure with aesthetically pleasing elements.

7.3.3 ADMINISTRATION

An areas has been provided for the administrative section of the market with the recognition of the need for an effective administration of the market which will see to the smooth running of the market affairs.

7.3.4 RECREATIONAL FACILITIES

The design has proposed a total of eight canteens in the market.

7.3.5 OTHER FUNCTIONS

There are provisions provided for some facilities which are important for the functionality and smooth operation of the market. These include

(i) BANK

(ii) COURT

(iii) HEALTH CLINIC

(iv) FIRE UNIT

(v) SECURITY

7.3.6 STRUCTURE

A simple structure is proposed. It is just columns and beams with steel trusses for the roofing. There are not load-bearing walls. Only non-load bearing burnt brick wall used as partition.

7.3.7 MATERIALS

The choice of materials proposed for the construction of the market was done based on certain factors such as availability, durability, technology, resistivity of fire and other properties were carefully considered.

All the materials proposed are locally available. These include cement, stone as aggregates, steel bars, burnt brick and amiantus roofing sheets.

The materials are durable with simple technology and choosen to give a 'Modern' touch of aesthetics and to blend with the environment and landscape.

7.3.8 CONSTRUCTION

The construction will be done in phases.

PHASE I

The construction of the food stuff area. This will be executed in stages

(i) Only grain section will first be constructed

(ii) The construction of the palm oil and the

wet area.

PHASE II

The construction of the [illegible]-food trade section

(i) The house hold goods section

(ii) The second hand goods section

PHASE III

The construction of the timber area

PHASE IV

The construction of the 'Manufacturing' section

(i) The construction of pot and box makers

(ii) The truck body building section

(iii) Parking for idle truck section.

All the constructions in the various area will be executed in stages and bids. The first stage must be fully completed and occupied before proceeding to the construction of the next stage.

This is necessary so that the number of trades and traders displace at a time will not be large and constitute settlement or accommodation problem.

The 'manufacturing' area (southern end of the market) will be used as the temporary accommodation for any of the displace trades at a time.

7.3.9 WATER SUPPLY AND FIRE FIGHTING

Water supply include an elevated water tower with associated pumping station. This provides water for both fire fighting and market use. Supplies are provided to conveniently located standpipes and fire-fighting hydrants are placed at strategic locations. Consumption is based on a requirement of 45 litres per person per day catering for traders and customers. Fire fighting is designed to provide a pressure of 6.9 bars at the hydrants and a water flow of 2,300 litres per minute from any two adjacent hydrants.

7.4.0 DRAINAGE

Surface water within the market area is collected by means of covered concrete channels discharging into peripheral drainage ditches. The concrete covers are removable to facilitate clearing and maintenance of the channel drains.

Surface water drainage is designed to cater for a maximum rainfall of 130 mm per hour corresponding to a one in five year storm.

7.4.1 ELECTRICAL SERVICES

Electrical services provided comprise of security flood lighting to the whole market. Interior lighting and small power outlets are provided to selected areas.

7.4.2 FOUNDATIONS AND ROADS

Foundations and ground slabs are constructed in reinforced concrete. Ground slabs are provided with deep edge beams to safeguard against erosion. Blindingconcrete is provided under foundations and edge beams. A heavy duty polythene membrane is provided under all ground slabs. Expansions joints are provided at a regular distance of 30 m.

Roads, car parks and other tarred areas are constructed from well-graded compacted laterite. The road construction comprises a base course over a sub-base laid on the sub-grade material. Tar spray and granite chippings are used to form the surface dressing.

7.4.3 FINANCE

The most important determinant of any implementation strategy is the financial aspaelt. This concern the question of who to provide the money and from what source. The financing of the new 'Katako' market construction should be done by the Plateau State Government and the Jos Local Government Council. The money can be got through loans from banks or other financial institutions either within or outside the country. Private organisations should also be encouraged to participate in the programme.

TABLE 7.8 The Average volume of in-coming goods in Tons daily

MARKET UNIT	QUANTITY (TONS)	PERCENTAGE %
TIMBER	105	27.81
GRAINS	140	37.08
PALM OIL	35	9.27
SECOND HAND GOODS	55	14.56
HOUSE HOLD GOODS	35	9.27
BOX MAKING	2.5	0.66
POT MAKING	5	1.32
TOTAL	377.5	100

DATA - AUTHOR'S FIELD SURVEY

TABLE 7.9 The average volume of out-going good in tons daily

MARKET	QUANTITY (TONS)	PERCENTAGE %
TIMBER	40	22.40
GRAINS	70	39.21
PALM OILS	15	8.40
SECOND HAND GOODS	35	19.60
HOUSE HOLD GOODS	15	8.40
BOX MAKERS	2.5	1.40
POT MAKERS	1.0	0.56
TOTAL	178.5	100%

DATA - AUTHOR'S FIELD SURVEY

7.4.4 CONCLUSION

A critical analysis of the existing problem in market places in Nigeria shows that they are faced with the problems of fire outbreaks, insanitary conditions small or limited site area coverage, insecurity, dust, lack of facilities, utilities and services lack of adequate number of stalls and storage facilities. Others include lack of parking spaces, poor drainage and non-durable construction materials.

Population growth and increase rise in trading and commercial activities will call for more demand in market establishments in rural and urban areas. It is then imperative for architects, planners and administrators to find final solutions to the persistent problems existing in markets.

Peoples' life style is changing. The traditional open market is fast disappearing. People need a space where they can carry their trading and commercial activities under all weather conditions. They need security for their goods and merchantile. They also want some essential services and utilities close to their commercial place if not within. These includes banking, health and judicial services. Utilities like toilets, water supply and electricity are important.

Therefore, the future trend is towards a market complex incorporating the essential services and utilities mentioned above. A good example, is the Jos main market building.

The proposed Katako (Laranto) Market has been planned and designed with the above fashion as the guiding principle.

The market offers more commercial and employment opportunities to the people. Movement of goods and people is made easy and convenient.

Landscaping has been introduced as a new dimension in market designs, element of landscape like trees, courtyards and planting has been used by the designer to introduce nature in the market. These will act as breathing places in the market. However, there more to be done in this area of landscaping in market as this is just an attempt or rather a scratch on the surface.

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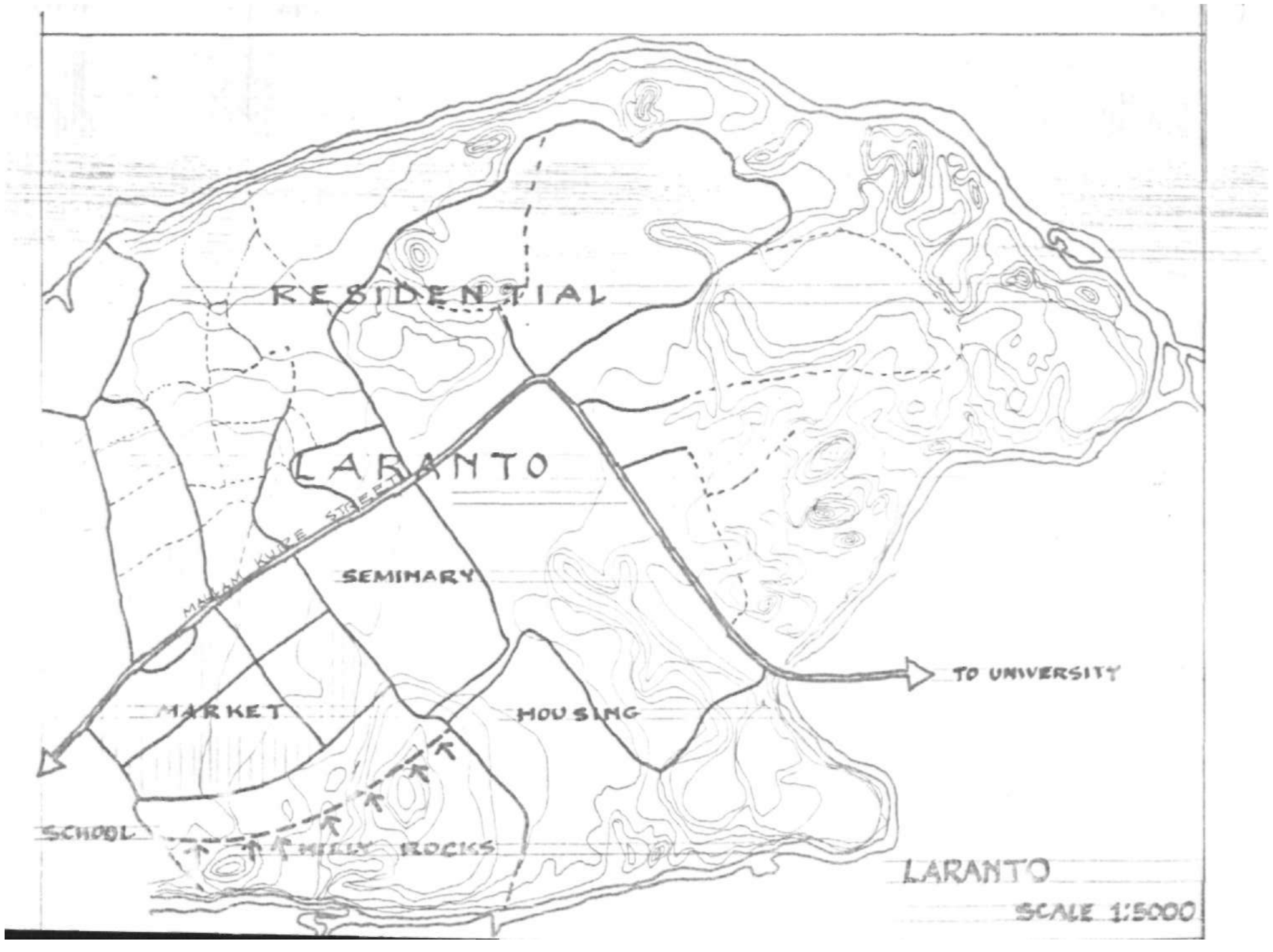
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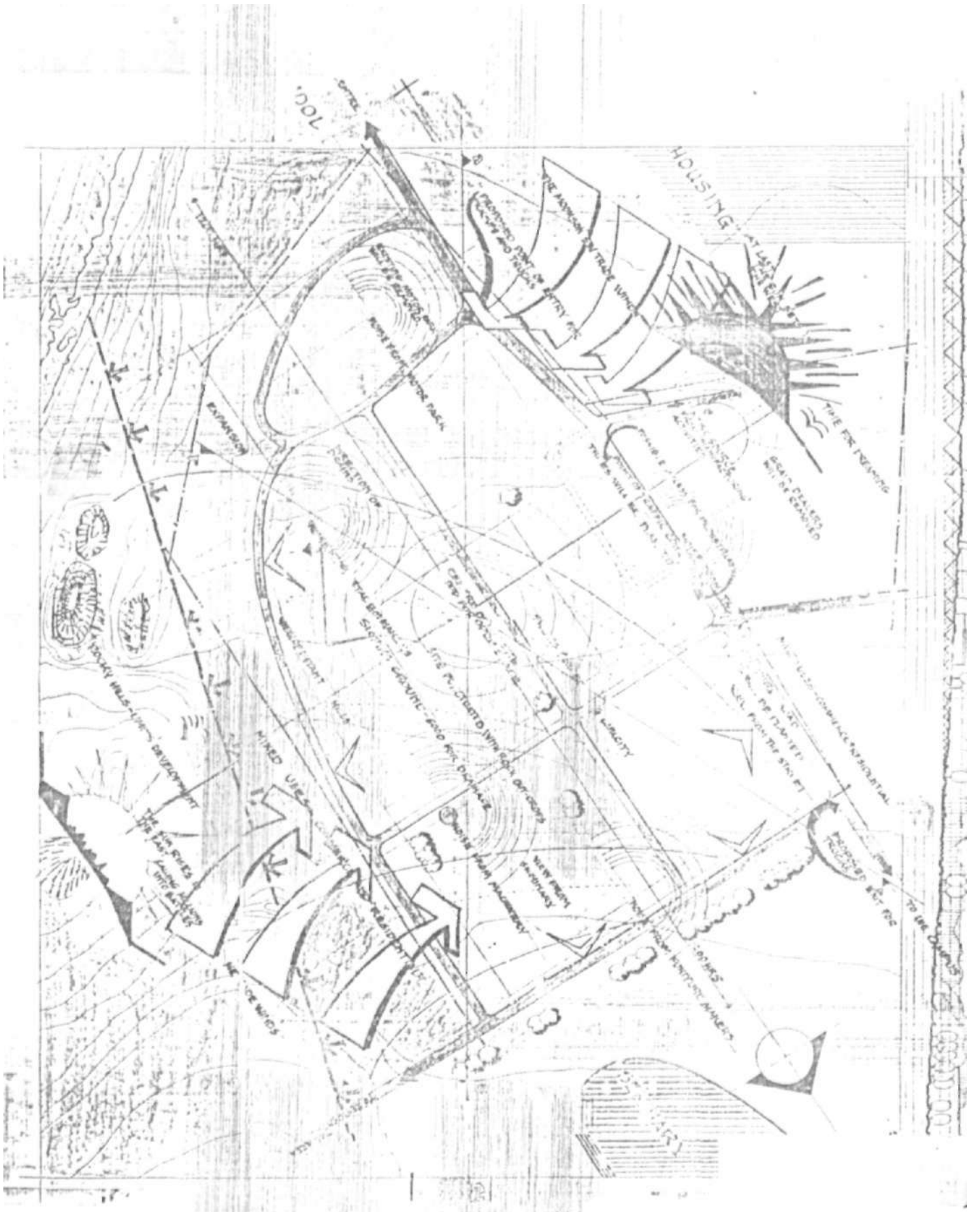
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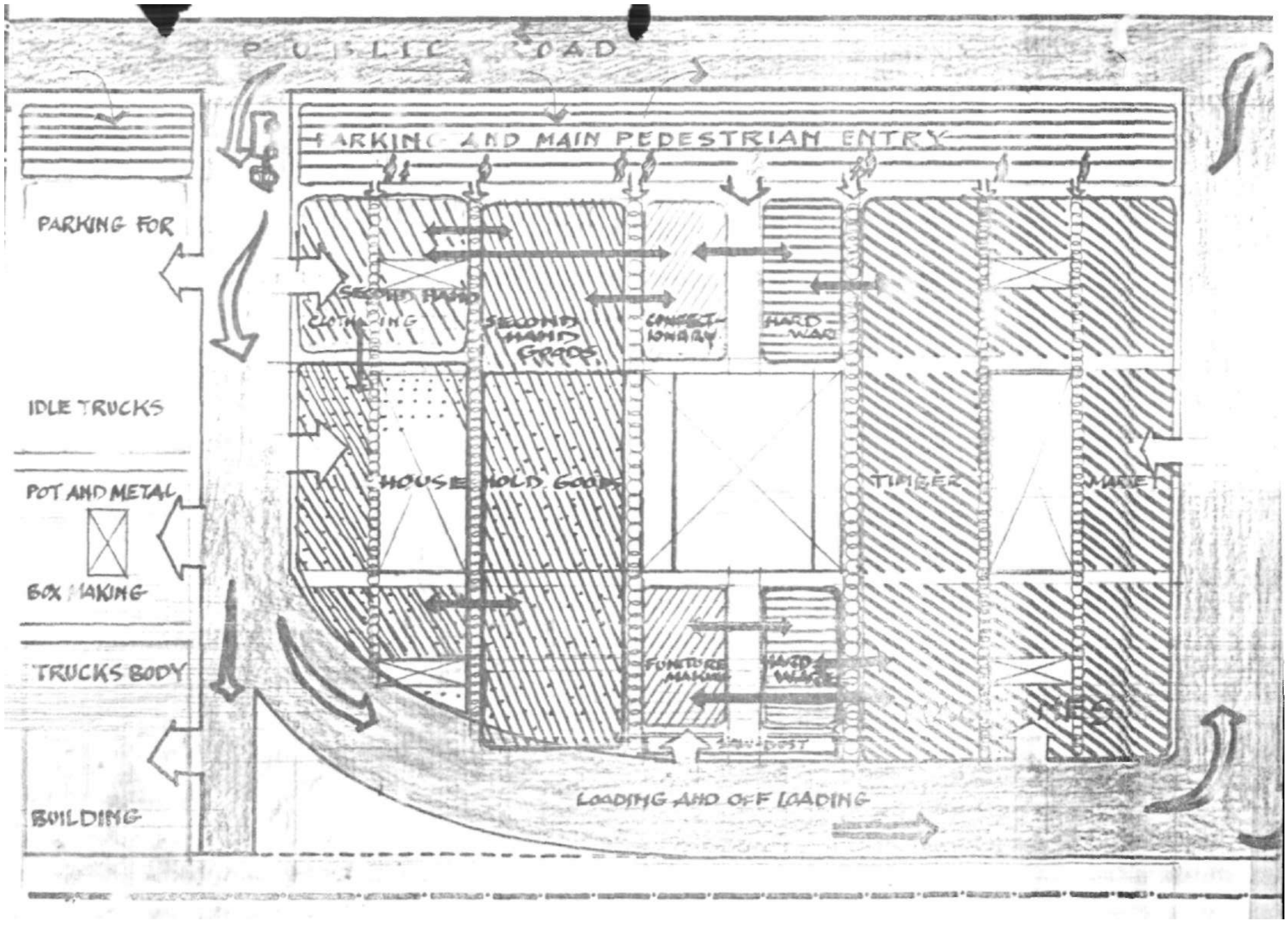
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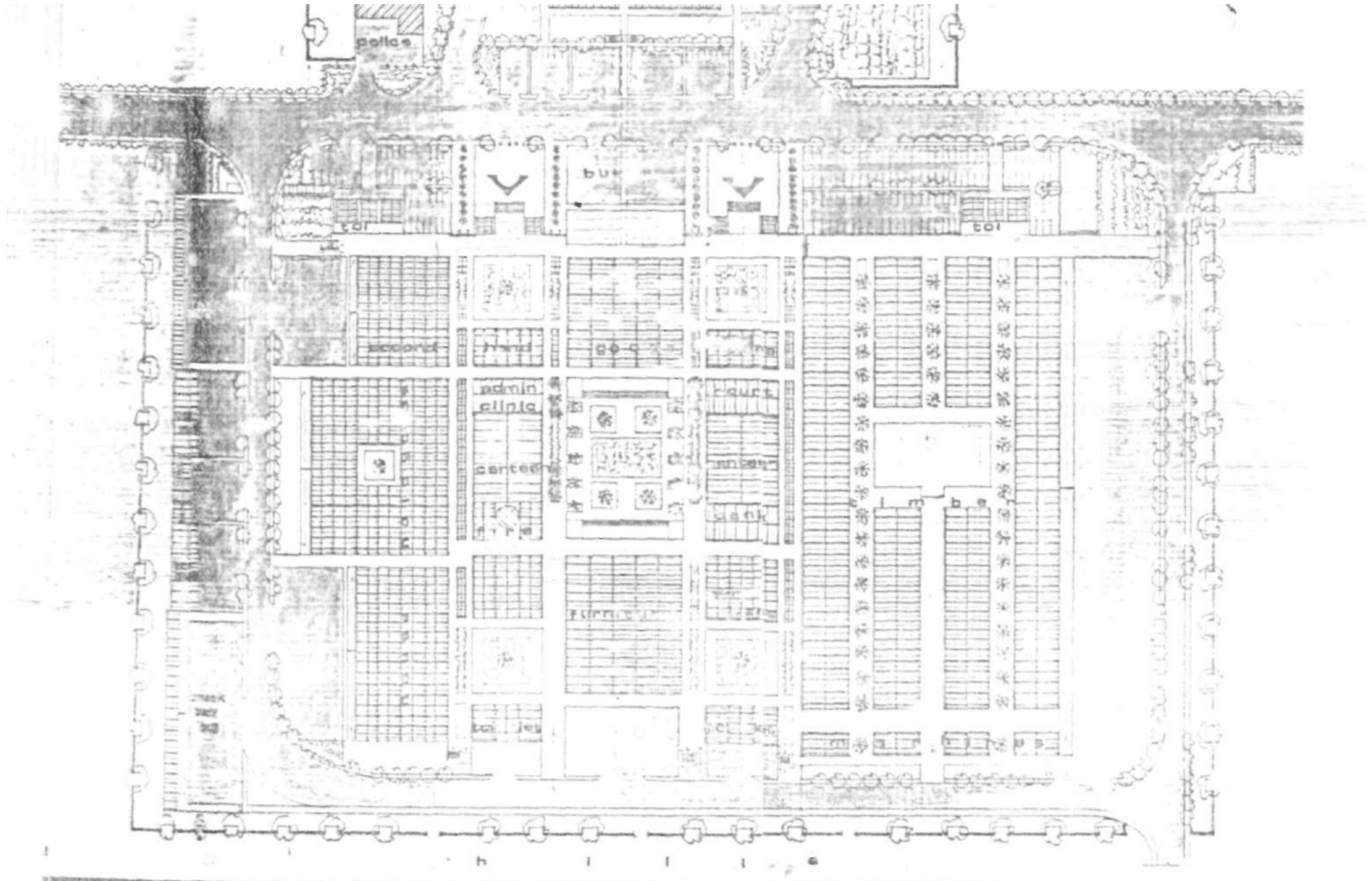
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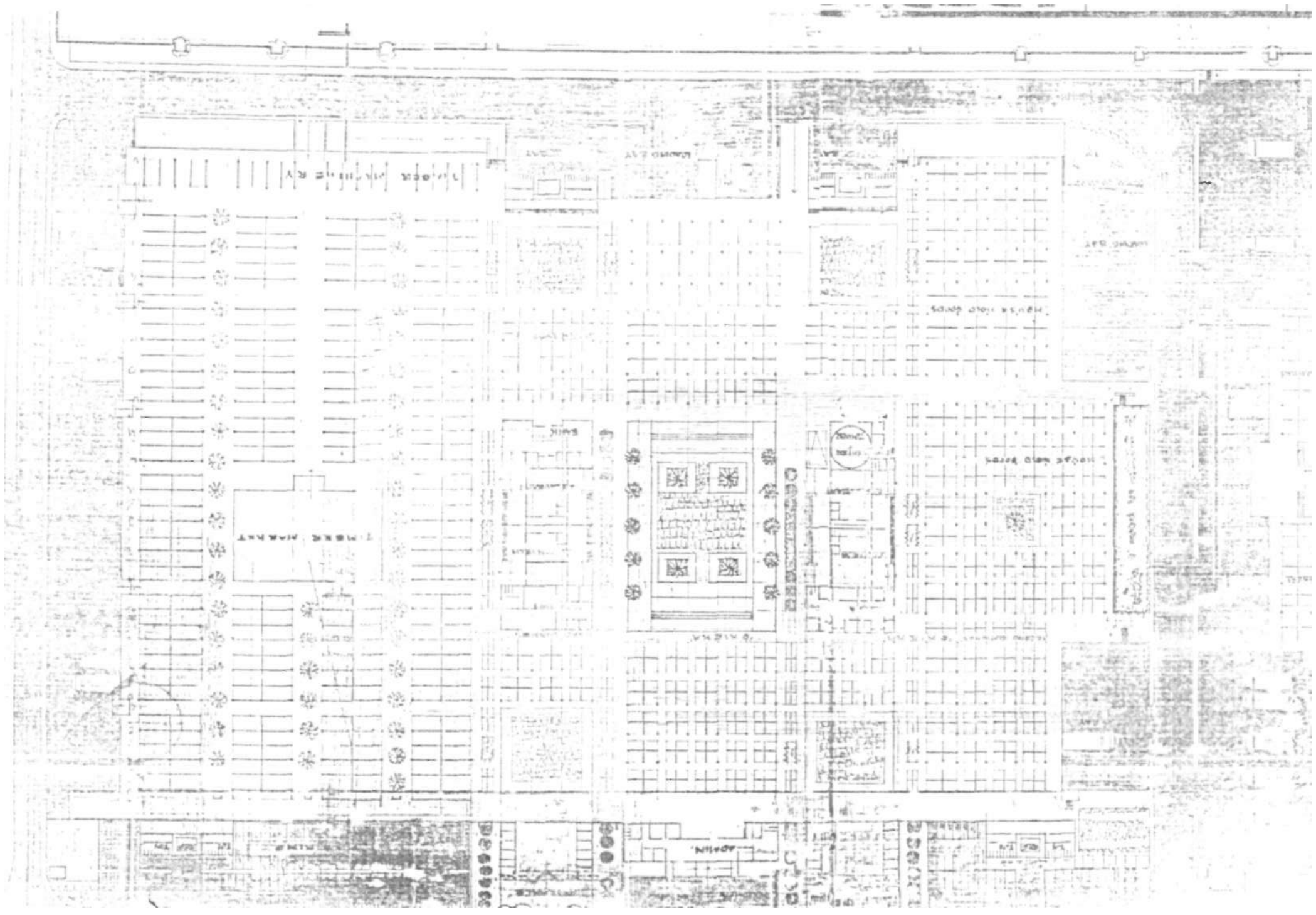
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RESIDENTIAL
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EXPANSION

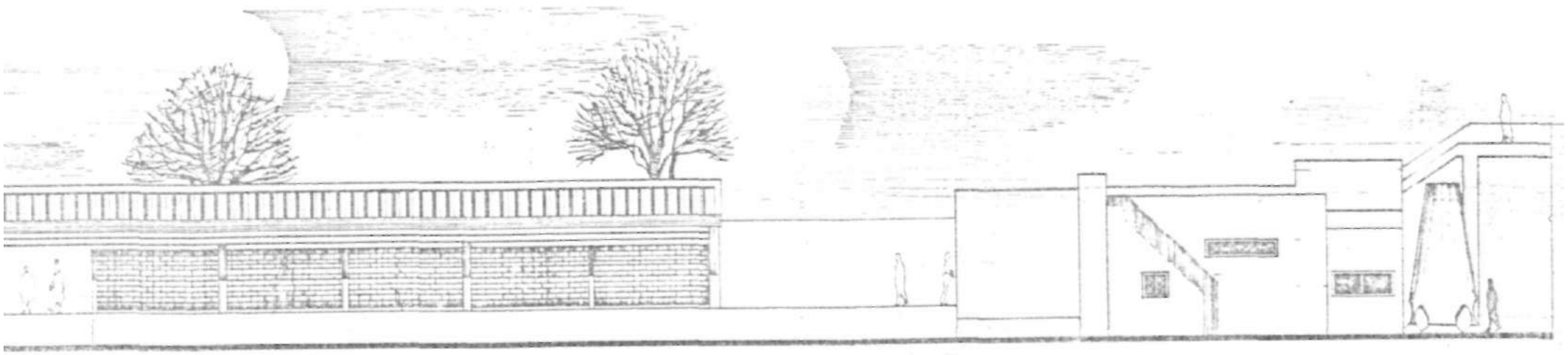

PUBLIC ROAD
PARKING AND MAIN PEDESTRIAN ENTRY
PARKING FOR
IDLE TRUCKS
POT AND METAL
BOX MAKING
TRUCKS BODY
BUILDING
SECOND HAND CLOTHING
SECOND HAND GOODS
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MARKET
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HARD WARE
LOADING AND OFF LOADING

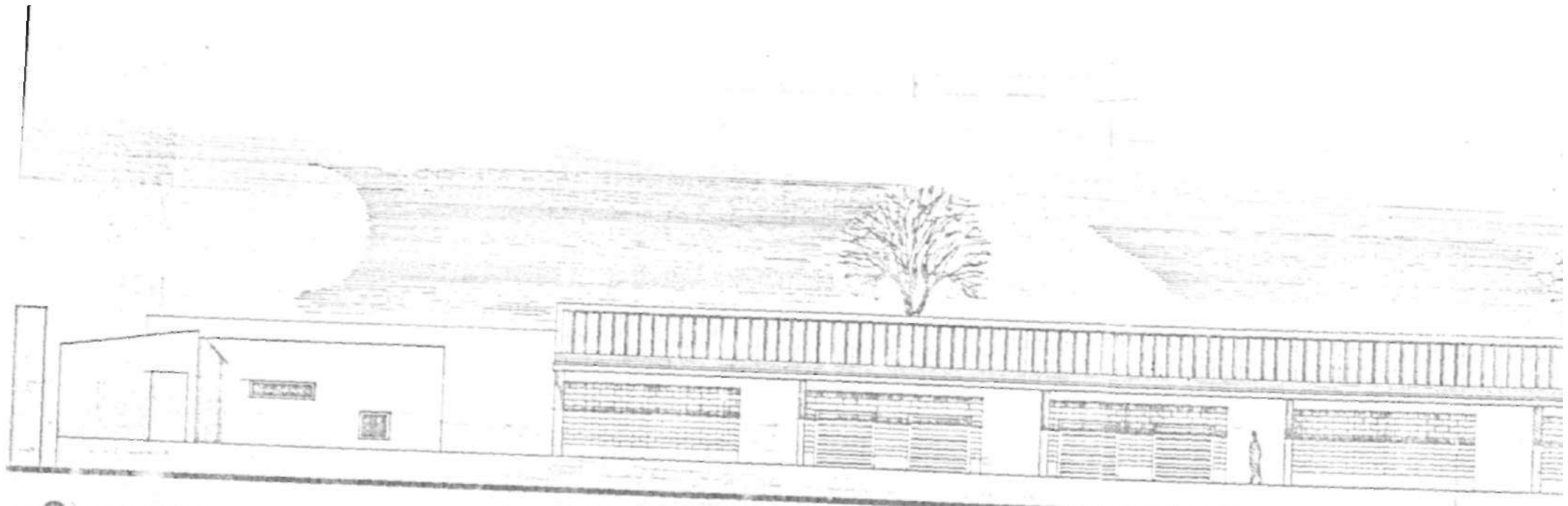

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WEST ELEVATION

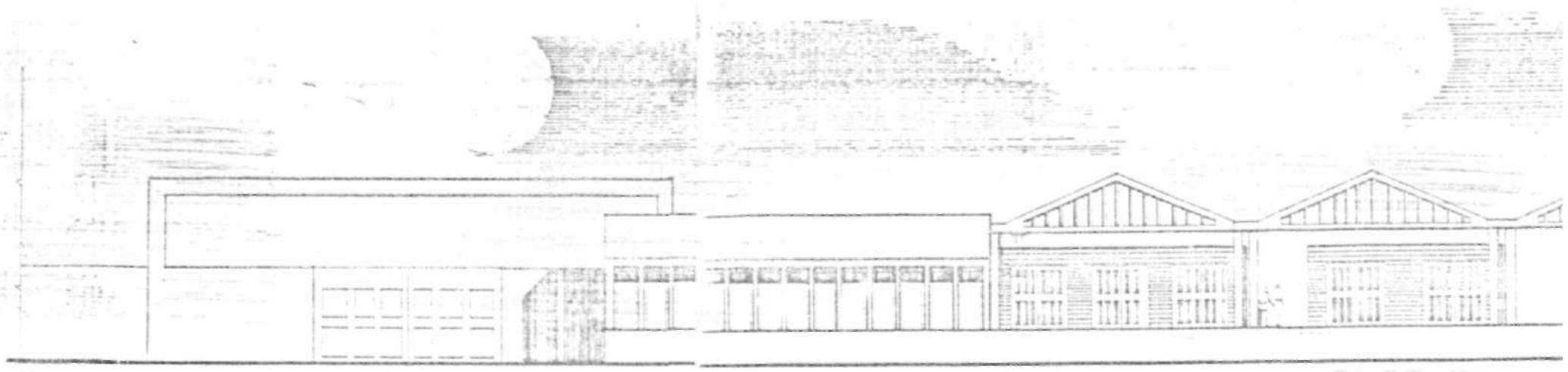




SOUTH ELEVATION

ADAMI A.S.
DEPARTEMENT ARCHITECTURE
ABU ZAFIA

MASTER WORKSHOP



EAST ELEVATION

1:100

ADAMU A.S.
DEPARTMENT OF ARCHITECTURE
ABU ZARIA.

M.SC. THESIS
1991

LOCATION
studio market for ibs

