DEVELOPMENT PLAN FOR FEDERAL UNIVERSITY OF TECHNOLOGY YOLA AND A DESIGN OF STAFF RESIDENTIAL AREA

M.Sc. (U.R.P.) THESIS

BY

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AUGUST, 1990

DECLARATION

I hereby declare that this thesis has been composed by myself and that it is a record of my own research work. It has not been accepted in any previous application for a higher degree. All sources of information are specifically acknowledged by means of references.

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Date:----------

CERTIFICATION

This thesis entitled Planning for Federal University of Technology Yola: A detail design of staff residential area by IBRAHIM ZUBAIRU OBADIAH, meets the regulations governing the award of the degree of Masters of Science, Urban and Regional Planning; and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This Thesis is dedicated to my
Father late Mallam Adamu Songoriba
and to my Mother Madam Nadine Adamu.

ACKNOWLEDGEMENT

The author wishes to express his profound gratitude to all academic, non-academic and technical staff of the Department of Urban and Regional Planning who have in one way or the other contributed to the successful completion of this thesis.

I am particularly indebted to my supervisor Mr G.P. Khanna who never relented his efforts in offering necessary guidance, suggestions and objective criticisms even during his leisure hours toward the success of this research work.

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I praise God for his grace who provided all my needs and saw me through this work.

A.B.U.
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ABSTRACT

The Federal University of Technology Yola was established in 1981. Since its inception, the university has been expanding a really as well as in the range of courses. This entails construction of structures and allocation of space for use

There is need therefore for a development plan as the university has none now to guide the proposed expansion programme in physical terms.

The Federal University of Technology Yola is located at the north-east side of Greater Yola across the river Benue along Yola-Mubi highway.

The existing situation was analysed and the future needs of the University determined using the recommendation derived from the analysis of the NUC standard and the existing situation in eight selected universities in Nigeria.

From the available literature, the following factors were appraised:

a) Factors governing campus planning and design such as availability of land, land characteristics, government policy etc.

b) Conceptual relationship between the campus and the town, these includes co-ordinated growth, direct fusion, partial disengagement, and total disengagement.

c) Design principles such as the ten-fifteen minute principle, a twenty-four hour principle and a continues teaching and design principle.

d) Finally conceptual relationship between the campus elements such as the close-knit type, the loose-tie, the concentric, the segrgated and the dynamic linear concepts.

DESIGN PROPOSALS

The main determining concept of the plan is to design a campus depicting the life style of the locality, conforming and enhancing the landscape.

The campus is planned using the dynamic linear concept in such a way that all functional spaces radiate away from the central administration being the public area followed by academic area being the semi-public and lastly the students and staff residential areas at the periphery being the private area all sandwiching the central administration.

Attempts have been made to produce an environment that is socially and psychologically safe for the primary users to function well.

There is also emphasis on the functional relationship of various elements of the campus with a view of achieving harmony and scale within the same environment.

There is also produced a detailed staff residential layout depicting the Hausa/Fulani town planning concept consisting of cluster Houses with Central Communal facility.

Provision of services is made in relation to the needs of the users. The Primary aim being to satisfy and compromise the differences that exist between the different groups of individuals that inhabit the layout.

Satellite villages are also proposed to be develop by private investors or government agencies to accommodate students and staff living off campus.

Finally the study contains implementation policy guide - lines for the development plan, the phasing of the development plan and a rough cost estimate of the plan.

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CHAPTER ONE

1.00 INTRODUCTION

Problems associated with campus planning date back to the tenth century when the first universities were established in Europe.

One of the most frequent and most common problems of university development is the ever increasing number of prospective students for the few available places in the universities. This problem is due to natural increase in the population.

The above problem often gives rise to the problem of how many universities should be provided in a country. In the early 20th century, Britain sought to solve this problem by establishing new universities, upgraded colleges of technology and expanding the existing universities.[1]

Nigeria also sought to solve this problem by establishing new universities in the mid 1970s and early 1980s and expanding the existing ones.

Another problem is that of the university sites. This is often very necessary with regards to expansion potentials, in view of urban sprawls.

Arising from the siting of the campus, is the problem of campus city-relationship. The question is often how to achieve a desired level of integration in terms of physical, social and cultural integrations.

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1. Dober, R.P. (1975). The new campus in Britain, Ideas and consequences for the United States, Educational Facilities Laboratory, New York. P.5

Within the campus, the question of forms of housing and design criteria that would encourage academic and social integration are often raised.

In the more developed countries of the world, attempts have been made to solve the above mentioned problems through different design criteria in development plans of the universities, such as various forms of collegiate systems used as well as the use of common facilities as meeting points. In the developing countries on the other hand, their early universities were established without any policies or forethoughts as to their growth or the method of forestalling the above mentioned problems.

In Nigeria, the problem of increased number of qualified candidates for university admission dates back to the time when early universities of Ibadan, Nsukka, A.B.U., Zaria, Lagos, Benin and O.A.U. Ife were established in the early sixties. By 1970, these six universities had an enrolment of over twelve thousand (12,000) students[2].

Between 1970 and 1980, the number of universities increased to fifteen (15) with an enrolment of over 50,000 students. By 1989, Nigeria had thirty (30) universities with an enrolment of over 173,246 students.[3] This figure excludes the military university, Kaduna and University of Abuja. This is an indication of the increased number of candidates seeking university Education. (See fig.1).

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2. Okafor, N. (1971). The development of Universities in Nigeria, p.4.

3. Federal Republic of Nigeria (NVC) Executive Dairy 1989

Inspite of this, it is only of recent that some Nigerian universities were provided with development plans, especially, the new ones had development plans on their establishment.

The aims and objectives of the universities of Technology in Nigeria according to the Vice-chancellor of the Federal University of Technology, Yola Professor Ahmed Tijani Sulaiman, can be summarised as follows:-

a) To answer the Nation's call for qualified people who are practice and result orientate, with problem-solving capability.

b) To take account of the long and short term needs of Nigeria, particularly her need to reduce the reliance on imported goods and technology.

c) To focus on courses which relate to specific, present and future technological needs.

d) To produce graduates who are truly "finished products" - ready for gainful employment in their fields of specialization, having gained sufficient practical experience during their courses.

e) To prevent a reversion to the older model of a university with a proliferation of degree courses in humanities and social sciences, already well catered for at existing institutions, but to ensure that students are still exposed to these humanising and liberalising influences.

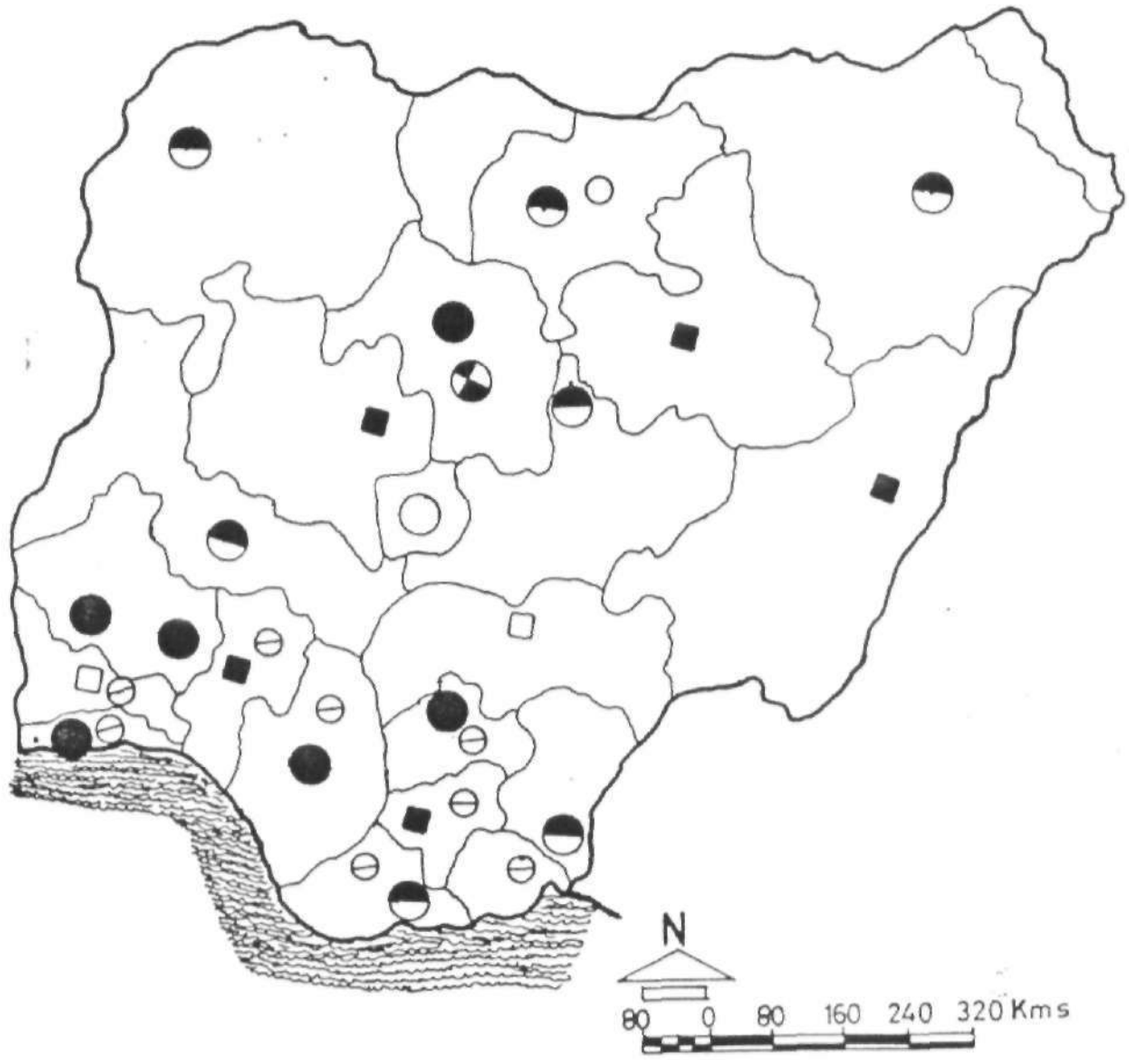


FIG. 1

LOCATION OF UNIVERSITIES IN NIGERIA

PLANNING FOR FEDERAL UNIVERSITY OF TECHNOLOGY YOLA

OBADIAH I Z
M.SC. THESIS U.R.P.
A B U ZARIA 1989

1.10 STATEMENT OF THE PROBLEM

The Federal University of Technology Yola was established in 1980 together with six (6) others at Akure, Bauchi, Owerri, Minna and Abeokuta and Makurdi (now Universities of Agriculture).

As of now, the university has no development plan. The absence of development plan notwithstanding, the university continues expanding a really and in range of courses offered.

Locational decisions of buildings and other facilities were non-the-less made in an ad-hoc-bases with little consideration for future use of space. Functional relationship between elements of the university are not discernible, especially some staff and Guest Houses at Mbamba twenty-five (25) kilometres away (see fig.6).

1.20 JUSTIFICATION FOR THE STUDY

The authorities of the university have formulated policy proposals for the expansion of the campus both in population and course structure. These proposals envisage opening of new schools which will raise the present student population from 654 to an ultimate level of 5,300 students by the year 1997.[4]

The expansion of the course structure entails the establishment of more departments such as Geology, Survey and Photogrammetry, Urban and Regional Planning,

---

4. Federal University of Technology Yola: Academic brief.

Civil Engineering, Soil Science, etc.

The spatial implication of these proposals are obvious particularly as there is need for a re-appraisal of the present use of space.

There is need therefore for a development plan to guide the proposed expansion programme in physical terms to ensure the growth of the university in a rational and coherent manner.

1.30 GOAL AND OBJECTIVES

The following goal and objectives have been formulated as a means of identifying the problems of the university and proposing guidelines for the physical development of the campus.

1.31 GOAL

The aim is to study the existing development of the university with a view to preparing a development plan of the university.

1.32 OBJECTIVES

i) To survey and assess the adequacy of the existing development for living, teaching/ Research and other facilities and services space in Federal University of Technology Yola and some other universities in Nigeria.

ii) To identify the planning and design principles, concepts and criteria employed in the development of university campuses.

iii) To evolve a development plan of the Federal University of Technology Yola.

iv) To prepare a detail layout plan of staff Residential area.

v) To propose implementation framework of the development plan.

1.40 SCOPE AND LIMITATION

The act of university campus planning and design is a wide topic which requires more in-depth study by a team of specialist in the field of planning, Architecture, Engineering, landscape design and also organizational and management expertise to carry through the process to completion that will provide a conducive academic environment.

Effort will therefore be directed to that aspect of the development plan and a detail layout plan of staff residential area, the aspect which a planner is supposed to handle within the framework of such a team of professionals.

The study therefore will focus on the determination of space requirement and the allocation of area for different uses. The campus of Federal University of Technology Yola has been in existence since 1980 and buildings and infrastructures have been going on. The existing situation will therefore to a large extent limit the scope of the design and determine a lot about the

placing of the elements.

Though the study touches briefly on campus planning issues and strategies, not all of these will be reflected in the development plan. However, the environment of the campus will be considered in relationship with its district to achieve a convenient level of integration.

1.50 METHODOLOGY

The study is basically design orientated.

It involves the analysis of the existing situation since planning for the future should be out of the experiences of the past and present.

The study was conducted by a structure questionnaire administered to some officials of the university ranging from the policy makers to the executives in their special fields from which some relevant existing data were collected.

A reconnaissance survey was initially conducted to acquant myslef with the university environment, supplemented by a detailed field survey of the area to update the existing maps of the campus and the town.

The next process is the determination of the future requirement of the university community. The university already has a projected population up to the year 1997 which has been approved by the National Universities Commission (NUC). It has a 1997 student population of 5,300 projected. There is also the projection of staff population.

An evaluation of alternative concepts of university planning and design in Nigeria was made with a view to proposing one for the Federal University of Technology Yola.

Finally on the basis of the analysis of the existing situation in Federal University of Technology Yola and some Nigerian universities, compared with the National Universities Commission recommended standard was adopted and requirements for the population at each stage of the development plan will be determined and a structure plan/ residential layout plan for staff will thus be produced.

1.60 THE STRUCTURE OF THE THESIS

The thesis is divided into seven chapters.

The first chapter deals with the introduction.

Chapter two examines Yola town, its history and that of the university. Chapter three deals with the analysis of the existing situation within the campus and other university campuses in Nigeria with a view to determining the needs of the university community.

Chapter four examines the population projections of the students and staff and the development planned for the schools and departments, on the bases of which the future requirements of the university in terms of space and facilities are determined.

Chapter five reviews the literature connected with campus planning and design principles as well as some

concepts for the development plan of the university.

Chapter six specifies the development plan. It details out the proposed land use system and internal and external links for the university and its district. It also specifies the requirement and detail layout plan of the staff residential area.

Chapter seven gives the guideline policies for the implementation of the development plan.

CHAPTER TWO

2.00 JIMETA-YOLA TOWN AND THE UNIVERSITY CAMPUS

2.10 LOCATION AND SETTING OF JIMETA-YOLA TOWN

Yola is the capital of Gongola State and is made up of three settlements physically separated by rivers, namely, Jimeta is separated from Yola town by river Cheuci, while Bajabure satelite town is separated from Jimeta by river Benue.

Jimeta the seat of government lies at the intersection of latitude 9° 15'N and longitude 12° 30'E about 8km north of Yola town. It started as a trading post for the Royal Niger Trading Company in late 1880s. It grew steadily to a population of 36,300 in 1963 census and at present has an estimated population of 71,599.[1]

Yola the traditional town on the other hand, lies at the intersection of latitude $9^{\circ}14'$N and longitude $12^{\circ}28'$E. The name Yola was derived from a Fulfulde word Yolde meaning a knoll. It was founded in 1841 by Modibbo Adama the Fulani leader who led the 19th century Jihad in the Upper Benue region and established the kingdom of Fombina popularly referred to as Adamawa. Yola the traditional settlement has an estimated population of 34,278 people.[2]

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1. Ministry of Finance and Economic Planning Yola, Statistic Division.
2. Ibid., 1, p.xi.

Bajabure satelite town where the campus is located, lies north of Jimeta town across the river Benue. It was founded in the early mid 19th century. At present it has an estimated population of 4,301.

The three (3) settlements therefore make up what is referred to as Greater Yola. Greater Yola is located along the North Eastern border of Nigeria (see fig.2). It is bounded on the north and North east by River Benue which also separates it from the Bajabure satelite town in Song Local Government area, but linked together by a bridge of 1·2km length.

Greater Yola is accessible through three Regional roads. The main regional roads of Jos-Bauchi-Yola joined at Numan by Onitsha-Wukari road. This road bye-passes Jimeta on the north of the bridge to Maiduguri.

The other regional road takes off from Yola and runs south to the Cameroon border/Republic.

2.20 PHYSICAL FEATURES

2.21 TOPOGRAPHY: Greater Yola is built generally on the watershed of the Benue which consists of undulating plains, Rocky plateau and a steep escarpment that falls sharply to the Benue River on the eastern side of the Jimeta settlement. The height ranges between 400 to over 1,000 metres above sea level.

The rocky plateau especially close to the escarpment, contains large areas of exposed rocks in Jimeta. To the south, is a poorly drained area especially close

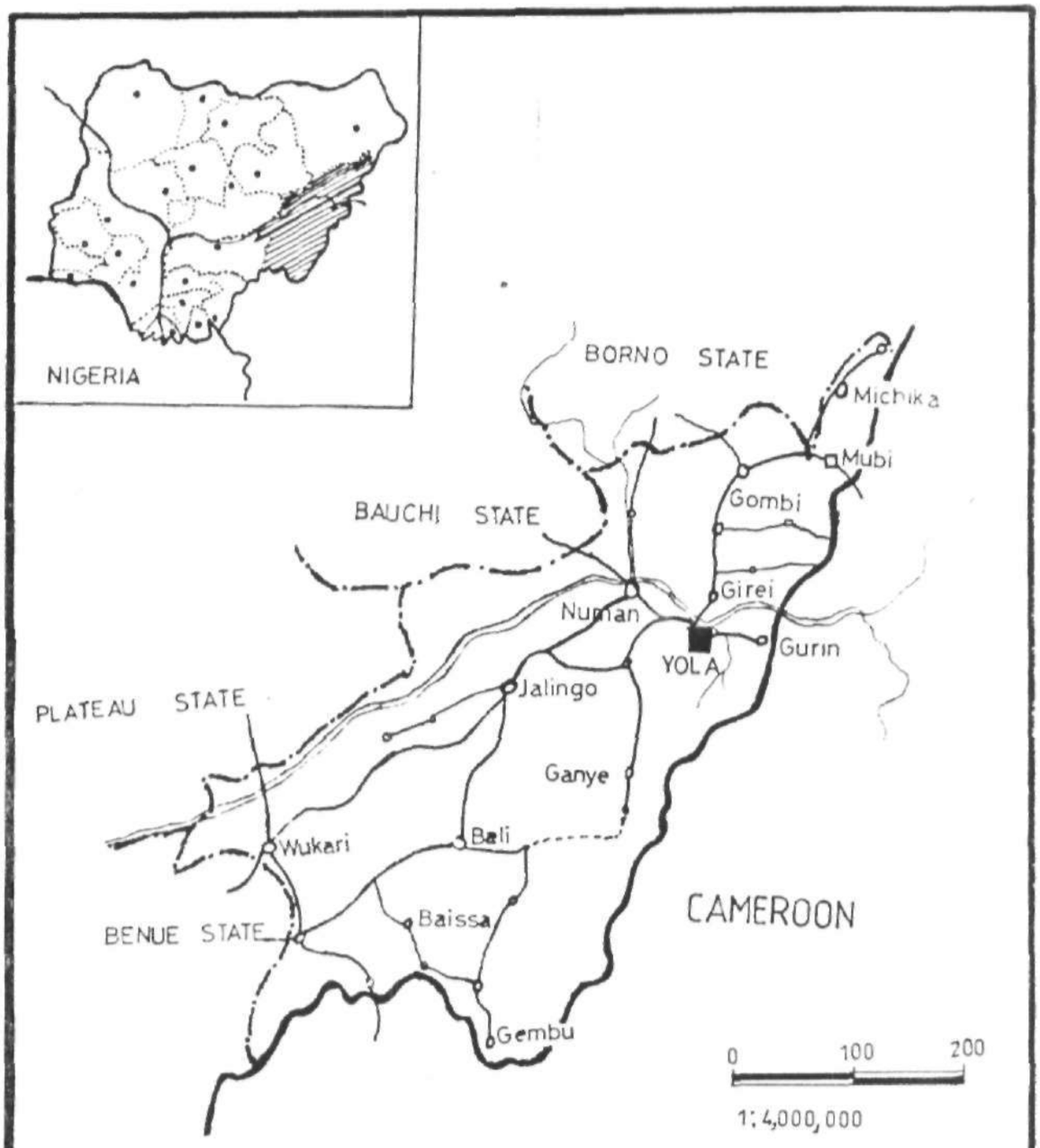


FIG 2

PLANNING FOR FEDERAL UNIVERSITY OF TECHNOLOGY YOLA

GONGOLA STATE LOCATION OF GREATER YOLA

INTERNATIONAL BOUNDARY
INTERSTATE BOUNDARY
ROADS
RIVER

OBADIAH I.Z.
DEPT. OF U.R.P.
A.B.U. ZARIA

to the river banks and worst still is the intrusion of flood-land between Jimeta and Yola drained by river Cheuci.

To the north across the bridge are alluvial deposits inform of sandstones, rocky-outcrops along the river bank particularly along the southern part of the Bajabure satelite town stretching in the north-east direction where the campus is located to Bagale Hills forest reserve.

2.22 GEOLOGY AND SOIL

Soil type is basically alluvial and varies from sandy loamy textured at the river valleys to clay soils in the hinter land. A stretch of flat-topped sedimentary rocks are noticeable to the north across the bridge on which the Gongola Television and Bridge Hotel are located.

2.23 CLIMATE

Greater Yola falls within what can be generally termed as northern Guinea region, characterised by a tropical climate. Temperatures are relatively high all year round with marked seasonal changes in rainfall and relative humidity.

The mean annual maximum temperature is 40.6^{o}C and the mean annual minimum temperatures is 21.4^{o}C (see figure 3).

Between December and March, the cold north easterly harmattan winds often accompanied with dust haze are drawn to the region. These winds are characterised by poor relative humidity and poor visibility. Day temperatures are relatively high and sometimes rise up to 41.4°C, while the night temperatures are very low and often fall to about 15.5°C in some areas.

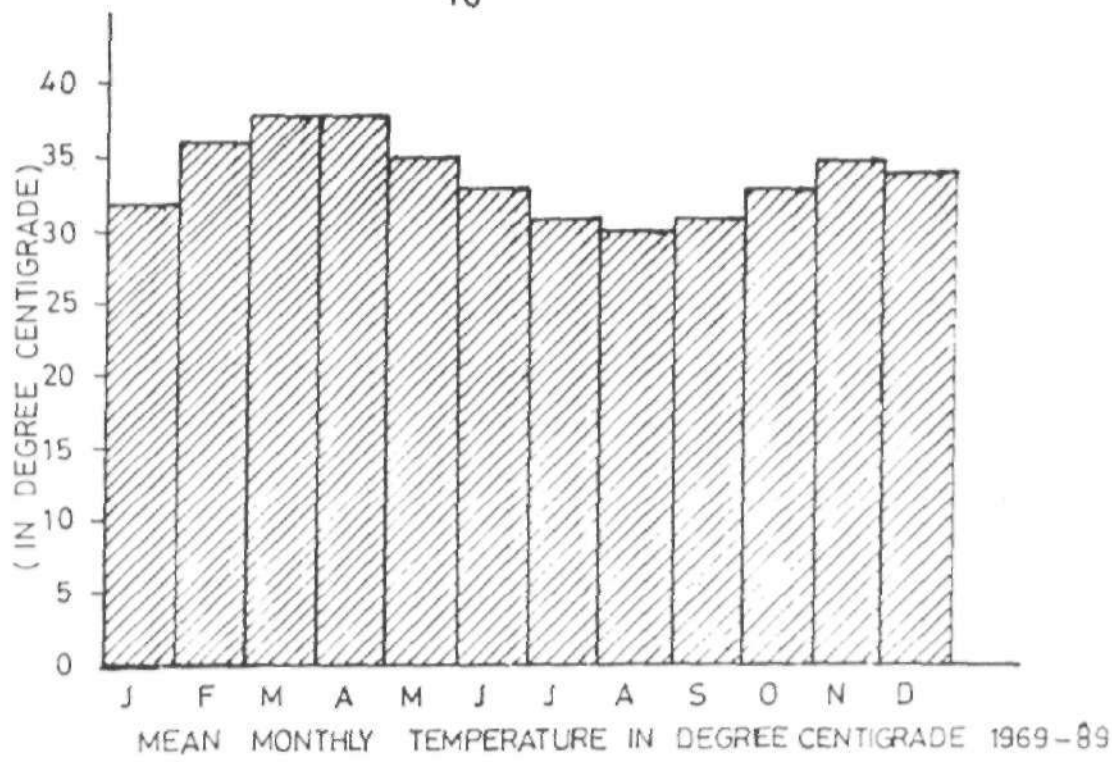
Solar radiation is generally intense and severe throughout the year.

It is also on record that maximum daily relative humidity decreases slightly about the middle of rainy season, but drops more drastically from about 95% in the month of August to less than 15% during the harmattan spell. Evapotranspiration rates are higher during the hottest period of the year about 14.8cm (see figure 4).

2.24 VEGETATION

The natural vegetation around Greater Yola falls within sudan savanna zone although relief, soil type, climate and human activities have greatly affected the vegetation in the area.

Due to cultivation at one time or the other, secondary growth and fire resistant shrubs and stunted thorny trees have taken over from the natural vegetation. There are concentrations of fairly big tall shady acacia and eucalyptus trees along the river Benue valley and around some of the settlements. (see fig.5).



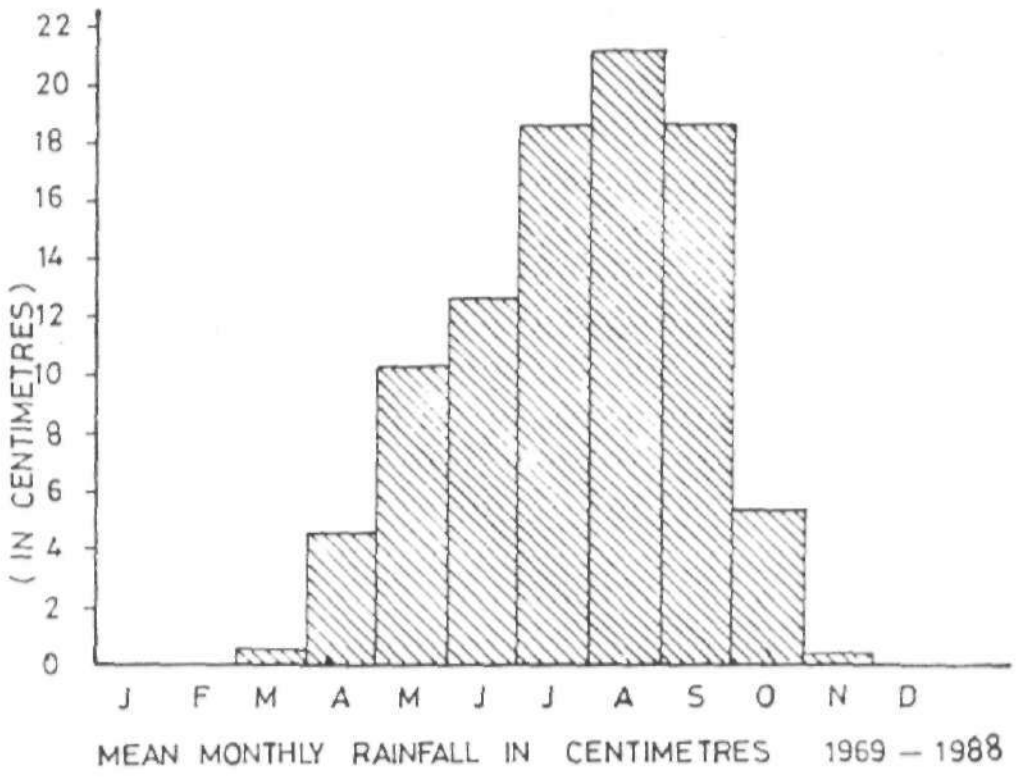
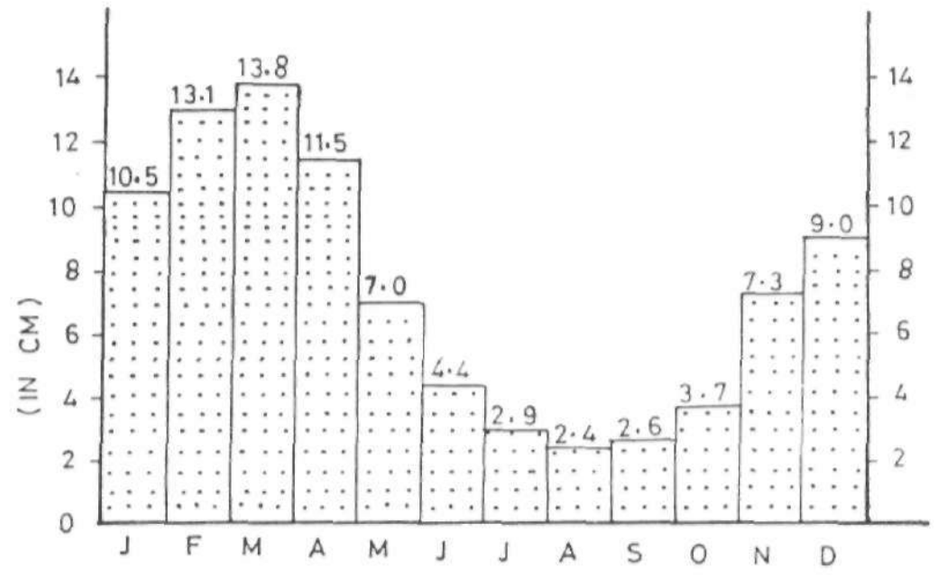


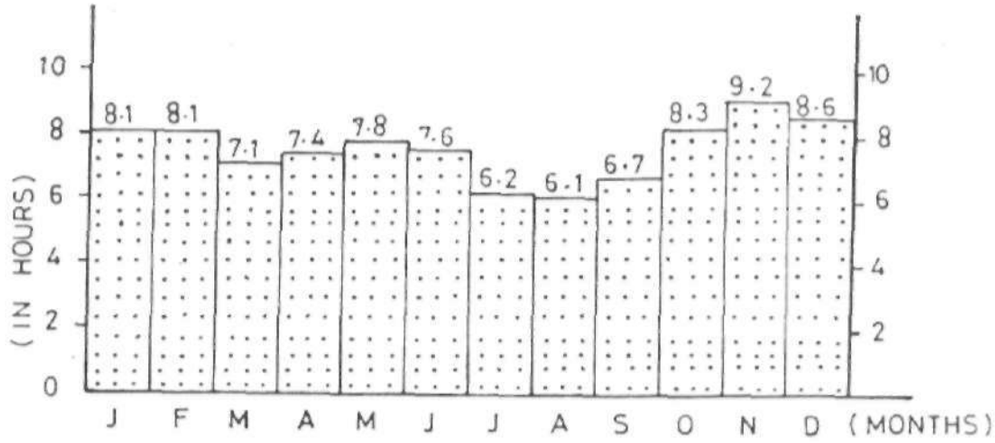
FIG. 3 Source: Meteorological Services Yola Station

PLANNING FOR FEDERAL UNIVERSITY OF TECHNOLO-

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MEAN MONTHLY PENMAN EVAPOTRANSPIRATION IN CENTIMETRES
(1969 – 1988)



MEAN SUNSHINE DURATION IN HOURS PER DAY 1969 1988

FIG. 4

Source: Meteorological Services Yola Station

PLANNING FOR FEDERAL UNIVERSITY OF TECHNOLOGY YOLA

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2.30 LANDUSE ANALYSIS OF GREATER YOLA

Greater Yola is physically divided into three (3) by Rivers Benue and Cheuci; That is the traditional Yola town, modern settlement of Jimeta and the Bajabure satelite town where the campus is located across the River Benue to the north (see fig. 6).

The old town Yola which was surrounded by a wall, developed concentrically around the traditional administrative, cultural and commercial centre comprising the Lamido's palace around which the Sharia court, the Central Mosque, Reading Room and Local Government Offices are concentrated.

The old town also houses Government Teacher's College, Technical College, College for Legal Studies, School of Nursing and Midwifery, Upper Benue River Basin Development Authority, the University staff Housing at Mbamba and some financial institutions outside the wall city.

The modern town Jimeta on the other hand is physically separated from Yola town by river Cheuci and from Bajabure satelite town by River Benue.

The town has developed along Lamido Aliyu way, (Main street) Mubi road, Bishop street, Aliyu Mustapha way, Hospital road and the Banksroad, and recently along Jimeta-Yola road where the State and Federal Secretariats are located. The linear strip along these roads are mainly devoted for commercial activities.



Montane Vegetation
Intermediate Highland Vegetation
Rain Forest Savanna
Guinea Savanna
Sudan Savanna
Sahel Savanna
Derived Savanna

20 0 20 40 KM

SCALE 1 : 2000 000

SOURCE: Master plan for Bajabure satellite town 1980

FIG. 5
VEGETATION MAP OF GONGOLA STATE

PLANNING FOR FEDERAL UNIVERSITY OF TECHNOLOGY YOLA

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The main residential areas on the other hand include the Karewa G.R.A., old G.R.A. Dogire G.R.A., Luggere, Rumde, Nassarawo, Demsawo, Damilu, Dobeli, and Bekaji Housing estate.

Along Jimeta-Numan road are industries such as Faro Bottling Company, Inter-State Flour Mill, etc., the Air Port and Government Institutions.

Across the Bridge over River Benue to the north, there is the Bajabure Industrial Complex, comprising the Nima Foam Industry, and Gongola Brewery. Others are Gongola television and the Federal Housing Estate.

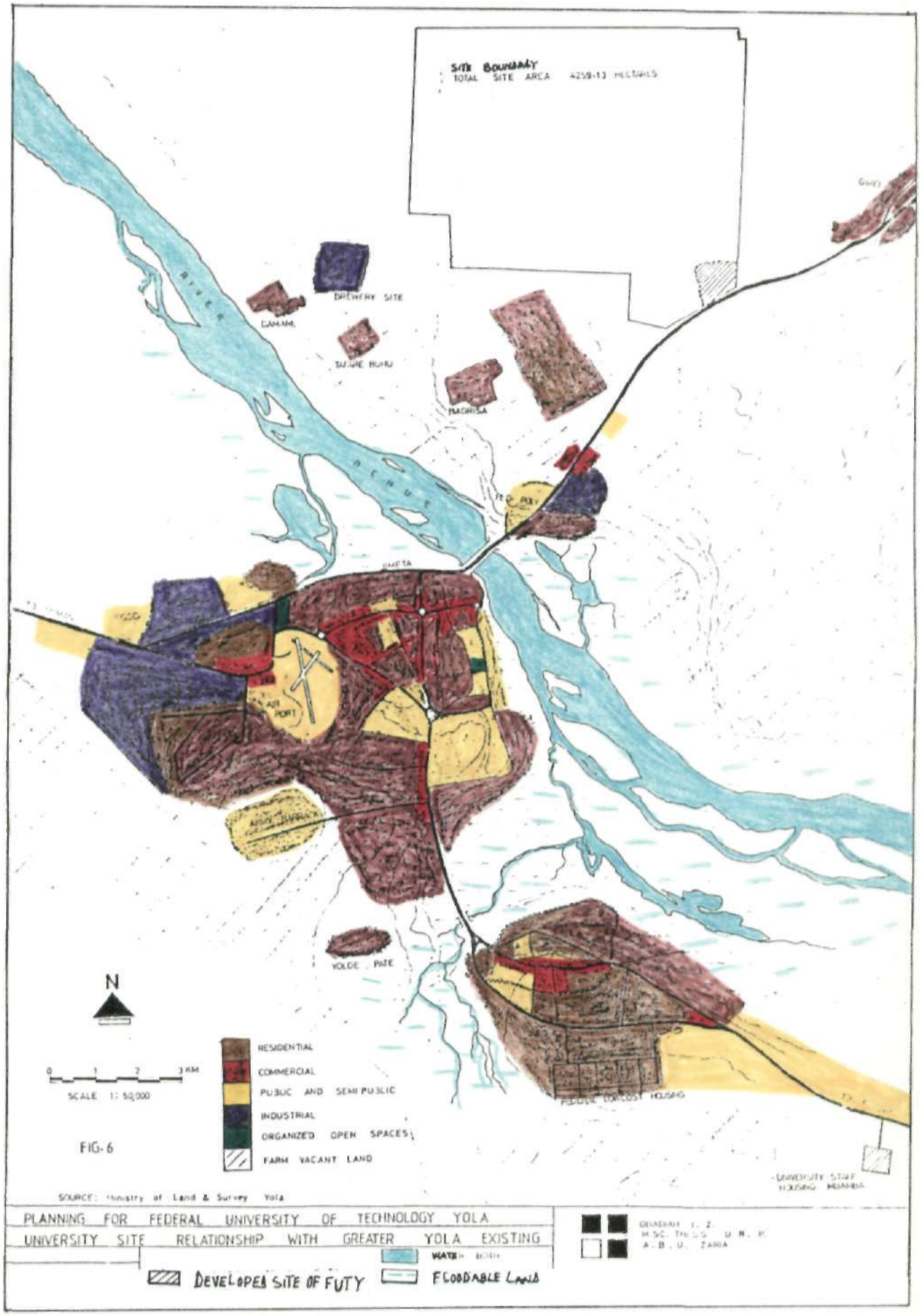
2.40 THE ESTABLISHMENT OF THE FEDERAL UNIVERSITY OF TECHNOLOGY YOLA

In response to the Nation's need for a greater supply of skilled technical and professional manpower, the Federal Government decided to create seven technological universities in Nigeria. The location of these institutions were done with the following two factors in mind.

a) To assist in modifying economic concentration and inbalance in the national economy.

b) To extend social benefits throughout the nation by providing higher educational opportunity in states without such facilities.

With the above factors in mind, the civilian Government announced the establishment of seven new Federal Universities of Technology in 1980 to expedite technological development in the country in which Yola was one.


SITE BOUNDARY
TOTAL SITE AREA 4259·13 HECTARES
RIVER BENUE
BREWERY SITE
GAMAM
JAMBE BURU
MADRISA
AIR PORT
YOLDE PATE
N
0 1 2 3 KM
SCALE 1: 50,000
RESIDENTIAL
COMMERCIAL
PUBLIC AND SEMI PUBLIC
INDUSTRIAL
ORGANIZED OPEN SPACES
FARM VACANT LAND
FIG. 6
SOURCE: Ministry of Land & Survey Yola
PLANNING FOR FEDERAL UNIVERSITY OF TECHNOLOGY YOLA
UNIVERSITY SITE RELATIONSHIP WITH GREATER YOLA EXISTING
DEVELOPED SITE OF FUTY
FLOODABLE LAND

The Federal University of Technology Yola started in 1981. In October 1982, the University opened its door to its first undergraduates.

With the coming of the Military to power in December 1983, the Federal University of Technology Yola was merged with the University of Maiduguri and was named Modibbo Adama College, University of Maiduguri Yola Campus.

In January 1988, the Federal Military government again announced the demerger of the university and it reverted back to its former name and status - Federal University of Technology Yola.

2.50 LOCATION OF THE CAMPUS AND LAND ACQUISITION

The Campus is located at the North-Eastern part of Greater Yola about 15km from Jimeta, along Yola-Mubi road. It occupies about 4,259.13 hectares of land inherited from the Federal Polytechnic site already surveyed and fenced.

2.60 GROWTH OF THE UNIVERSITY.

2.61 ACADEMIC GROWTH

The university took off with three schools and an institute in 1982 namely:-

a) School of Science and Technology Education
b) School of Earth and Mineral Sciences
c) School of Management Sciences
d) Institute of Secretarial Technology.

Following the merger with the university of Maiduguri in 1984, the school of Earth and Mineral Sciences and the Institute of Secretarial Technology were scrapped, the School system abolished and Faculty system adopted. As a result, the campus then had two Faculties, viz:-

a) Faculty of Science

b) Faculty of Social and Management Sciences.

In January 1988, when the Federal Military government announced its demerger from university of Maiduguri, the university reverted back to its school system with the following schools:

a) School of Science and Technology Education

b) School of Environmental Sciences.

In addition, the following schools are proposed to take off in the 1989/90 academic session:

a) School of Engineering and Engineering Technology

b) School of Agriculture and Agricultural Technology.

Within the existing schools, were found such new vocational courses as science laboratory Technology Training programme (SLTTP) mainly for Laboratory attendants.

i) School of Science and Technology Education.
This school was established in 1982/83 academic session with the following departments:

a) Biology

b) Chemistry

c) Physics

d) Mathematics

e) Operational Research

f) Science Education

g) Technology Education.

In addition, the proposed department of Geology will take off in the 1989/90 academic session.

ii) School of Environmental Sciences. This school was also established in 1982/83 academic session with only one department, that is Geography. But the following departments are to take off as follows:

1989/90 Academic session:

a) Department of Urban and Regional Planning

b) Department of Survey and Photogrammetry.

1990/91 Academic session

a) Meteorology

b) Industrial design.

1991/92 Academic session

a) Architecture

b) Building

c) Quantity Surveying.

iii) School of Engineering

This is one of the proposed new school that will take off in the 1989/90 academic session with the following departments:

a) Civil Engineering

b) Electrical Engineering

c) Mechanical Engineering

d) Chemical Engineering

e) Agricultural Engineering.

iv) School of Agriculture and Agricultural Technology. This is another school that will take off in the 1989/90 academic session with the following departments:

a) Animal Science, Fisheries and Wildlife.

b) Crop Production and Horticulture

c) Forestry and Range Management

d) Soil Science

e) Agricultural Economics and Extension.

2.62 STUDENT POPULATION

The University started with 128 students and 36 Academic staff in 1982/83 academic session. By 1988/89 session, the university had a student population of 691 (see table one).

TABLE 2.1.1: SHOWS THE GROWTH OF THE STUDENT POPULATION

YEAR	UNDERGRADUATE	DIPLOMA	REMEDIAL	TOTAL
1982/83	53	8	67	128
1983/84	82	10	81	173
1984/85	66	-	85	151
1985/86	168	-	68	236
1986/87	239	-	225	464
1987/88	529	-	570	1,099
1988/89	444	36	211	691

Source: University Authority.

Though the student population grew from 128 in 1982/83 academic session to 691 in 1988/89 academic session, it is observed that there was a drop in the growth rate of 14.6% between the year 1983/84 and 1984/85 academic sessions when the university was merged with university of Maiduguri. On the other hand, the university witnessed a growth rate of 136.9% between 1986/87 and 1987/88 academic session due to the introduction of the Remedial Arts. But with the demerger of the university from University of Maiduguri and the abolition of the Remedial Arts programme, the growth rate dropped to 37.1% in 1988/89 academic session.

6.63 THE STAFF

The staff population grew from 36 Academic Staff, 51 Senior Administrative and Technical Staff and 107 Junior Staff in 1982/83 academic session to a total of 104 Academic Staff, 73 Senior Administrative and Technical Staff and 380 Junior Staff by 1988/89 academic session.

6.64 STRUCTURAL GROWTH

The university inherited the Federal Polytechnic site with three partially completed hostels, one refectory and a twin lecture Theatre. With the movement to the site, pressure for space requirement become eminent and thus the university embarked on the construction of more structures which include the Administrative block, two Hostels for males and five for females, New School of Science Blocks, Library, Eight Guest Houses, Fifty-four Senior Staff Houses at the permanent site, six Guest Houses and twenty Senior Staff Houses at Mbamba. At present, there are two lecture blocks underconstruction and many more are in the pipeline especially for the newly proposed schools.

CHAPTER THREE

3.00 ANALYSIS OF THE EXISTING SITUATION

3.10 SITE STUDIES

3.11 LOCATION AND LAND AREA

The permanent site of about 4,259.13 hectares land area is located on the northern periphery of Greater Yola at a distance of approximately 15 kilometres from the Police round about Jimeta. The site is bounded by Yola-Mubi highway in the south, farm lands in the East and West and River Girei in the north east.

3.12 NATURAL FACTORS

The site area is mildly undulating with occasional outcrops of rocks. The greatest amount of exposed bedrocks being in the south of the site. It is however anticipated that they should not pose any problems in building operations on the site.

The mildly undulating nature of the site can be observed from the profiles shown in (fig. 7). There are four minor and seasonal streams that drains the site; one in the north east corner of the site another in the eastern part of the site and the others in the south western and south eastern part of the site.

The site has a gentle slope of 1% towards the north west and north east, loosing about 65 metres in altitude from the highest point of 235 metres in the south east to two natural drainage ponds in the north east. This

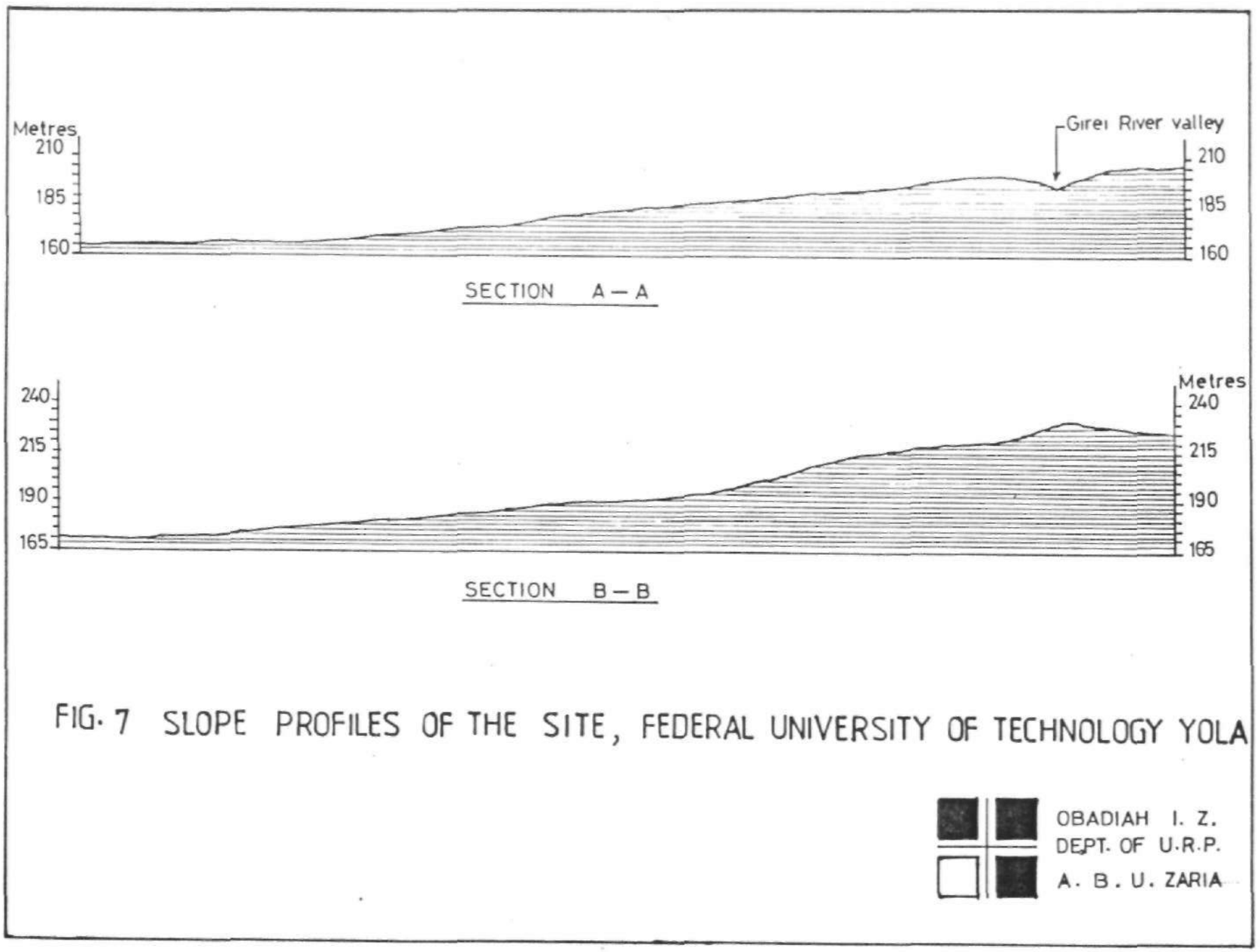


FIG. 7 SLOPE PROFILES OF THE SITE, FEDERAL UNIVERSITY OF TECHNOLOGY YOLA

will facilitate natural surface water drainage to a small seasonal stream carrying the water off the site. The highest point about 235 metres is located in the south-eastern corner of the site adjoining Yola-Mubi highway, while the lowest point of the site is located in the North-western corner of the site (see fig. 8 & 9).

The site generally has soil identified as sandy loam textured soils.

The surface soil is greyish brown loamy sand with strong crumby structure.

Considering the building activity and provision of infrastructure, the soil should not pose any problem.

The site has some fully grown trees mainly Tamarindus, Acacia, Eucalyptus and some fire resistant shrubs and stunted thorny trees. The Valley areas are comparatively greener with some grass cover and bushes that rise to about 0.5 to 2 metres. It is recommended that at the time of Architectural designing and landscaping, the existing trees should be preserved as far as possible so as to trap noise, dust and other pollutions as well as the heat from the sun (see fig.10).

3.13 RAINFALL AND WIND

The seasonal rainfall adds colour to the vegetation, changing it from brown, pale or yellow in the dry season to green in the wet season.

Two different types of airmasses pass through the site, one from the North-east mostly dry and continental

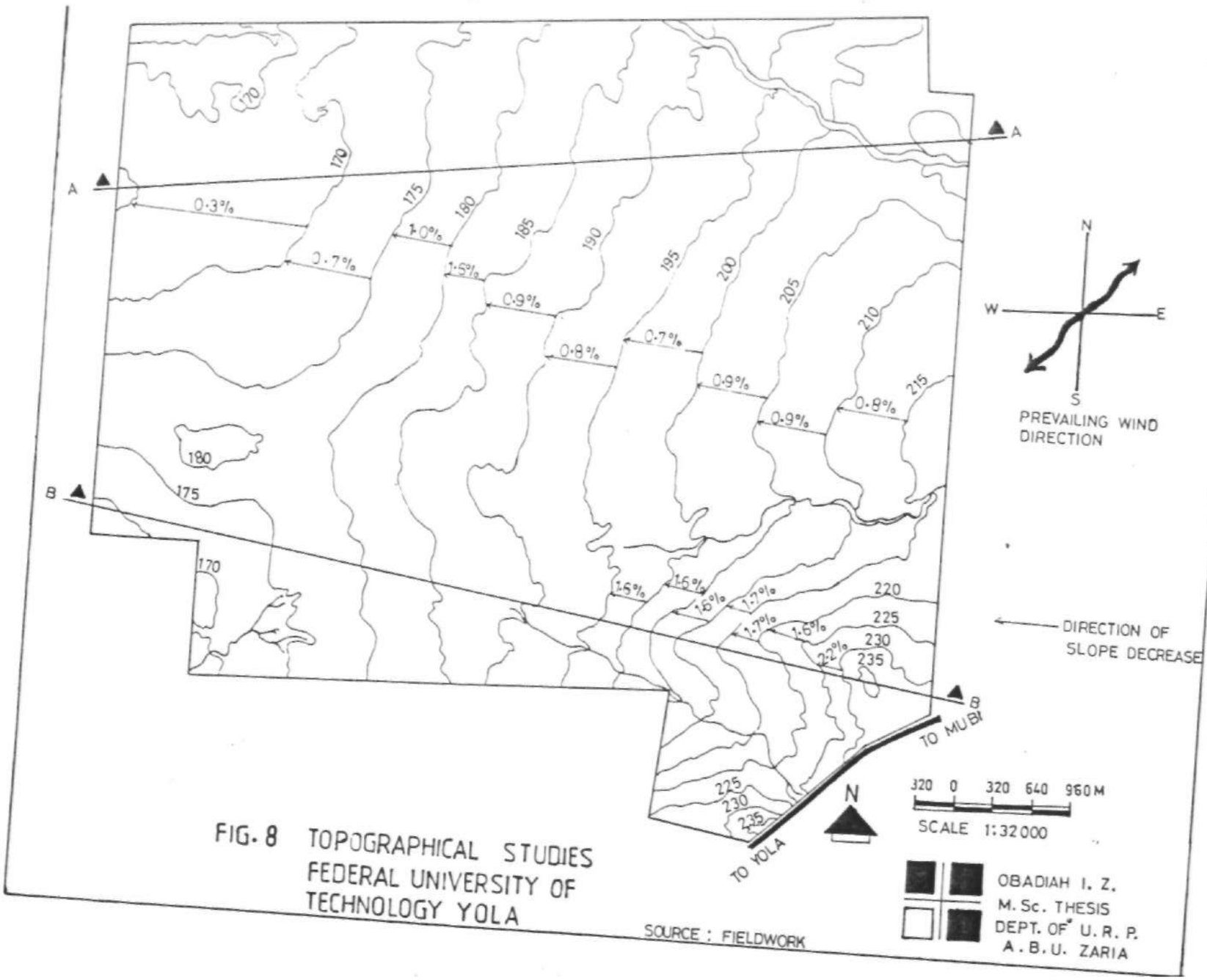
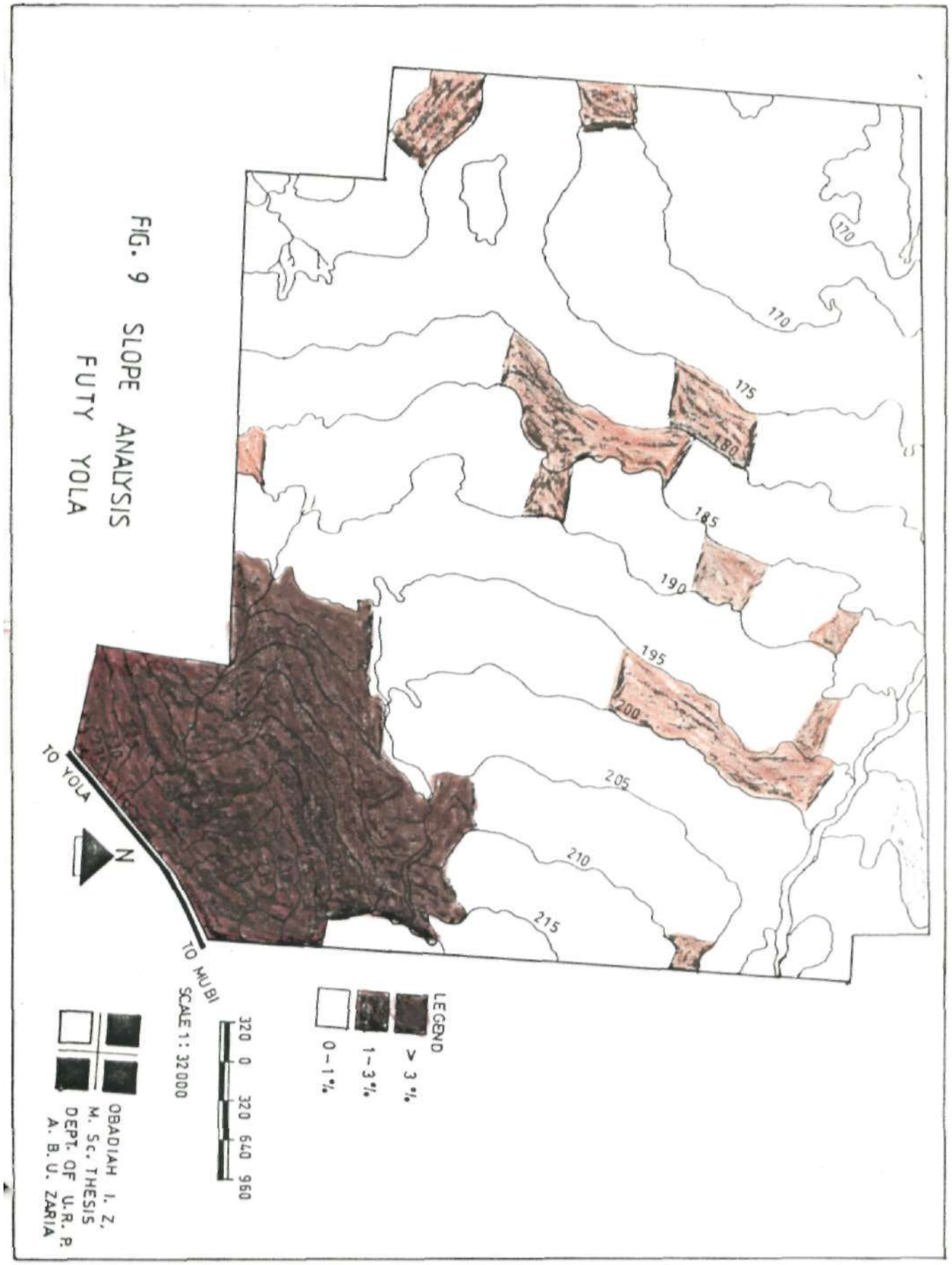


FIG. 8 TOPOGRAPHICAL STUDIES FEDERAL UNIVERSITY OF TECHNOLOGY YOLA

SOURCE : FIELDWORK


FIG. 9 SLOPE ANALYSIS
FUTY YOLA
170
170
175
180
185
190
195
200
205
210
215
TO YOLA
N
TO MUBI
SCALE 1: 32000
320 0 320 640 960
LEGEND
> 3 %
1-3 %
0-1 %
OBADIAH I. Z.
M. Sc. THESIS
DEPT. OF U.R.P.
A. B.U. ZARIA

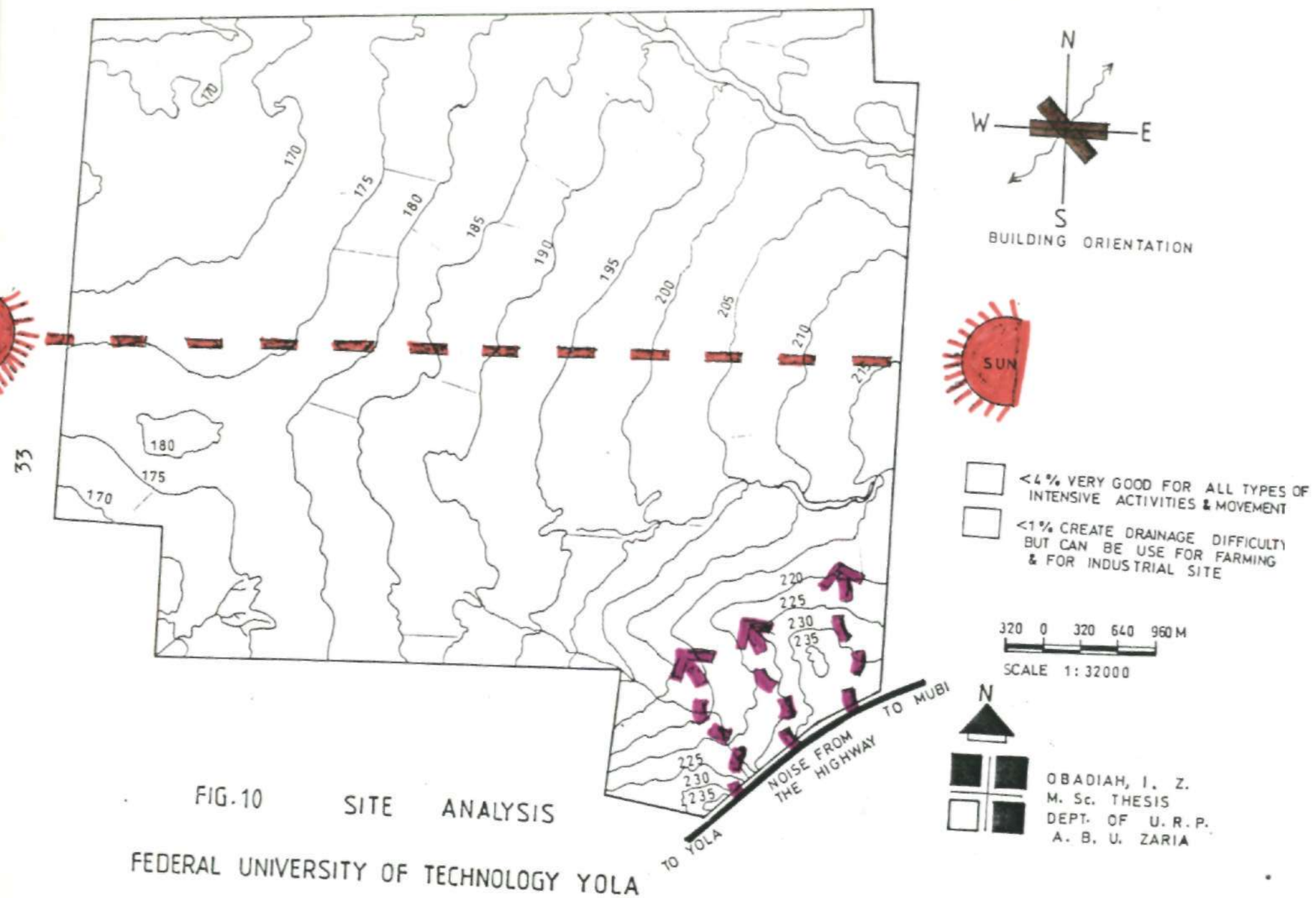


FIG. 10 SITE ANALYSIS

FEDERAL UNIVERSITY OF TECHNOLOGY YOLA

in origin known as the Tropical Continental airmass or the harmattan wind. And the other over the Atlantic from the south mostly warm, the equatorial maritime in nature (see fig. 11).

The movement of these two airmasses over the region, are responsible for changing the seasons.

There are four (4) seasons experienced in the region (see fig. 11).

a) The Dry season winter harmattan. Period lasting from November to February.

b) The Hot Season from March to April;

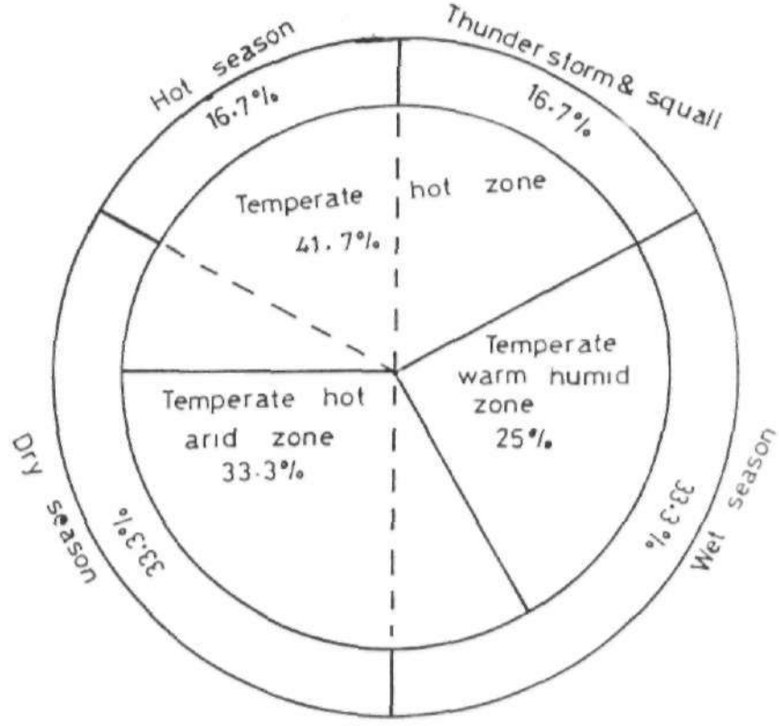
c) Thunder storms and squalls from May to June;

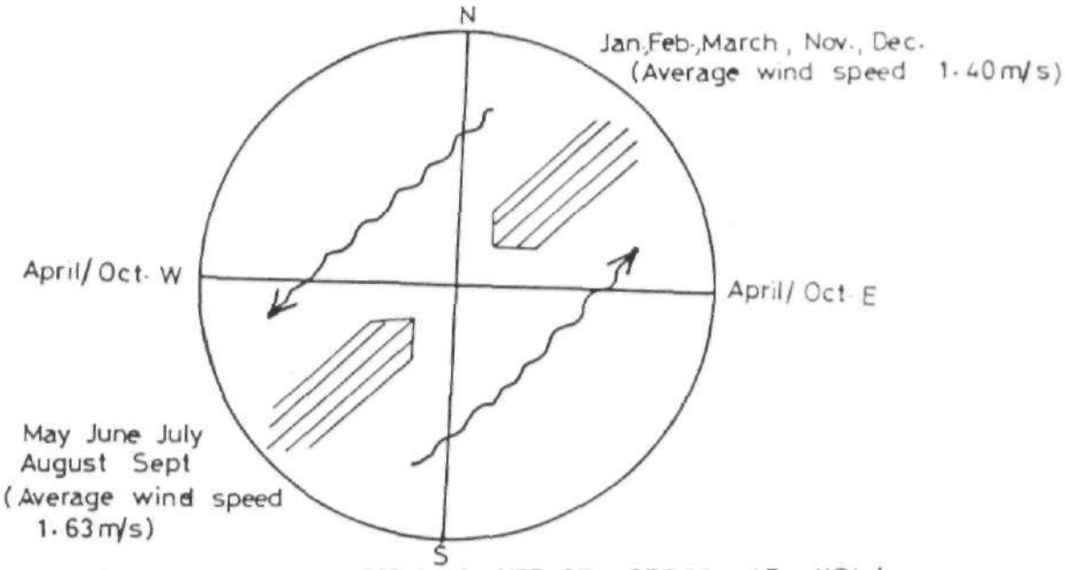
d) Wet season from July to October.

3.13.1 THE DRY SEASON

At the start of the season, relative humidity falls from 70% in October to less than 40% in November. With the stabilization of the North easterly winds, there is daily fluctuation of temperatures from 20°C to 35°C with clear sky and variation of sunshine hours from 7 to 9 hours (see fig. 4).

Clouds sometimes appear in the afternoon and disappear at night due to the already moist soil coupled with heat. Frequency of dust haze increases as the season moves with the relative humidity falling further to 34% in January. The tropical continental airmass which is dry in nature





PREVAILING WIND DIRECTION & AVERAGE SPEED AT YOLA.

FIG. 11 Source: Meteorological services Yola station.

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becomes steady and forms major part of general circulation of air known as the Harmattan usually characterised by suspension of fine dust particles in the air due to surface turbulence. Visibility at this period becomes poor and the sun's rays do not reach the surface, thus lowering the minimum temperatures to 15°C in January and net radiation to 50-52 cal/cm^2 per day.

3.13.2 THE HOT SEASON

This season starts with the advancement of the inter-tropical convergence zone northwards. This is because the maritime arimass tries to conquer the space, thus wind directions sometimes remain south-west or change to north-east. April is the hottest month of the season, temperatures sometimes rise to 41.4°C with less air movement.

3.13.3 THE THUNDER STORMS SEASON (MAY-JUNE)

This season starts with the occurence of squally winds especially when the easterlies undercut the maritime airmass which transforms local cumulus clouds to cumulonimbus clouds with associated brief heavy showers, gusty winds and subsequent low air temperatures. Humidity rises from 60% in May to over 70% in June. Due to the increase in cloud cover, sunshine hours also decrease.

3.13.4 THE WET SEASON (JULY-OCTOBER)

With the pushing of the inter-tropical convergence zone to the north, squally winds become less frequent and

cloudiness increases causing a reduction in sunshine hours to 6 hours in June and to only 5 or less in August. Correspondingly, rainfall increases from 12.5cm in June to 20.9cm in August with average wind speed of 1.62m/sec. Rainfall also decreases considerably in October. Relative humidity on the other hand goes on decreasing from 85% in August to 67% in October.

October is considered a transitional month in which with the North-east trade winds, relative humidity falls and with south-west winds it tries to increase rapidly again. This"tug-of-war" goes on until the North-east winds takes control of the area by the end of October from where the dry season starts with the fall of relative humidity and rise in temperatures.

3.14.0 COMFORT ZONE

This is defined as that range of thermal sensation in which the majority of normal healthy persons usually 80% feel thermally comfortable, neither distracted by feeling too hot nor too cold. The comfort zone varies from group to group, as a result of differing habit of dress, seasonal acclimatisation, sex, age and daily activity pattern which vary considerably from one culture to another.[1]

Generally the acceptable upper and lower limits of thermal comfort suggest that the comfort zone lies somewhere

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1. National Universities Commission Standard guide, 1977.

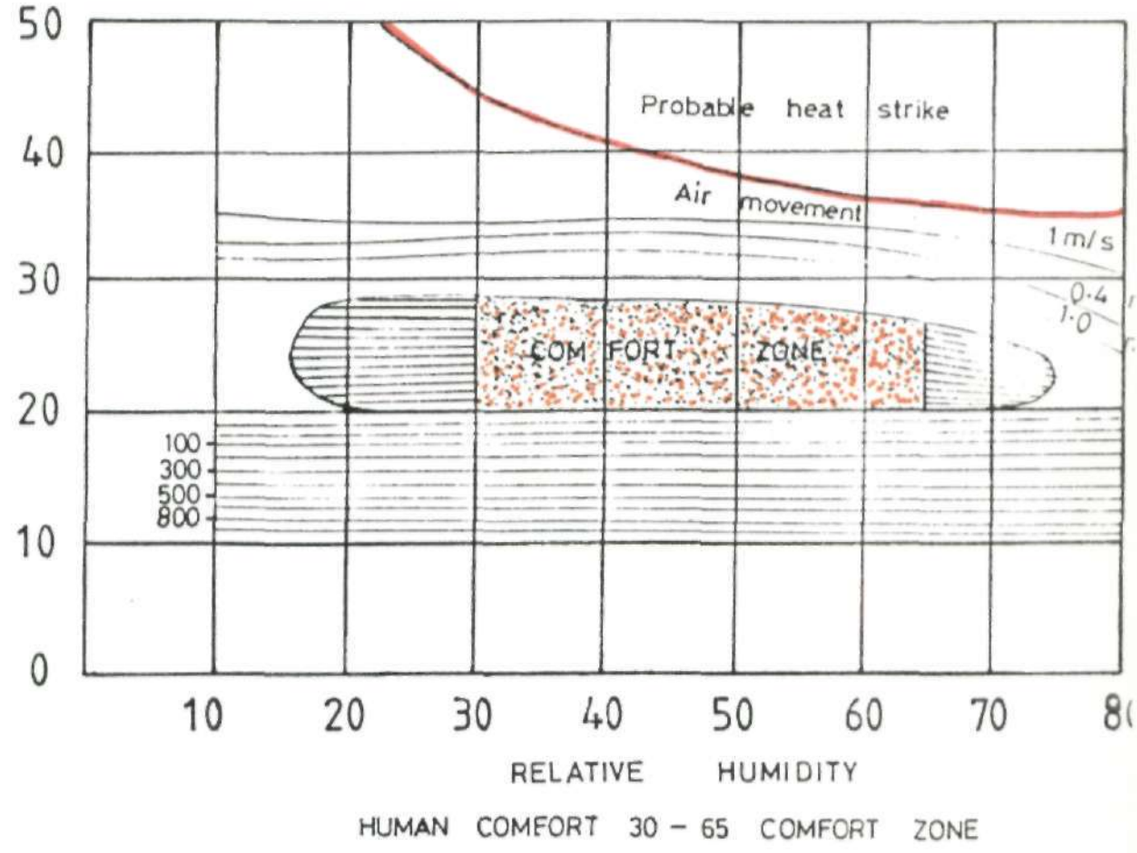


FIG. 12 BIOCLIMATIC CHART FOR YOLA

SOURCE: ZARIA MASTER PLAN.

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between 22°C and 27°C corrected effective temperature, with air velocity of 0.15m/sec. to 1.5m/sec.

The upper limit of comfort zone can be extended either by adding moisture in the higher temperature range or by natural means e.g tree planting, vegetation, pools, fountains and lakes. While the lower limit can be extended by reducing direct and reflected radiation and by insulation.

Because of the basin lake nature of Jimeta topography, the combination of temperature and humidity, results in a situation of "heat trap effect" such conditions reduce the level of human comfort. But as for the campus site, its high elevation makes it less susceptible to this condition as it is located on a higher and plain ground thereby making it less likely to be uncomfortable (see fig. 12 and 7).

3.150 DESIGN IMPLICATIONS OF THE CLIMATIC FACTORS

3.151 RAINFALL AND HYDROGRAPHY

From the calculation of the catchment area of the stream north of the development site, it is observed that the average depth of the stream is 1.5 metres, while the expected volume of rainstorm that would be drained into the stream from immediate catchment area, using the 69.1mm amount of rainfall received on the 8th September 1988 being the maximum rainfall received per day in that

year is 7.184 cm^3. This therefore shows that the stream is capable of draining the storm water off the site. In addition the general slope of the entire university site is to the west while the development site is in the south-east, as such there would be no threat of flood around the development area of the university. (see fig.13).

Another area of concern is the wide range of relative humidity. Any activity requiring constant humidity must be performed within controlled environmental facilities.

There are also possibilities of squally winds with destructive consequences to buildings especially at the early development of the campus, hence the need to adequately reinforce joints especially between foundation and walls, walls and root members, etc.

Fast settlement of thin dust film must be avoided on the inclined surfaces to prevent decolouration. To this end, dust film must be taken into consideration during the preparation of the colour schedule.

In view of the direction of prevailing winds, there is need to orient the buildings with their long side facing north-south to increase ease of shading and cross ventilation.

Also plant trees to provide wind breakers and to increase shade of the buildings and the surrounding ground to reduce the air temperature near the buildings and at the sametime shade the buildings from solar radiation and penetration.

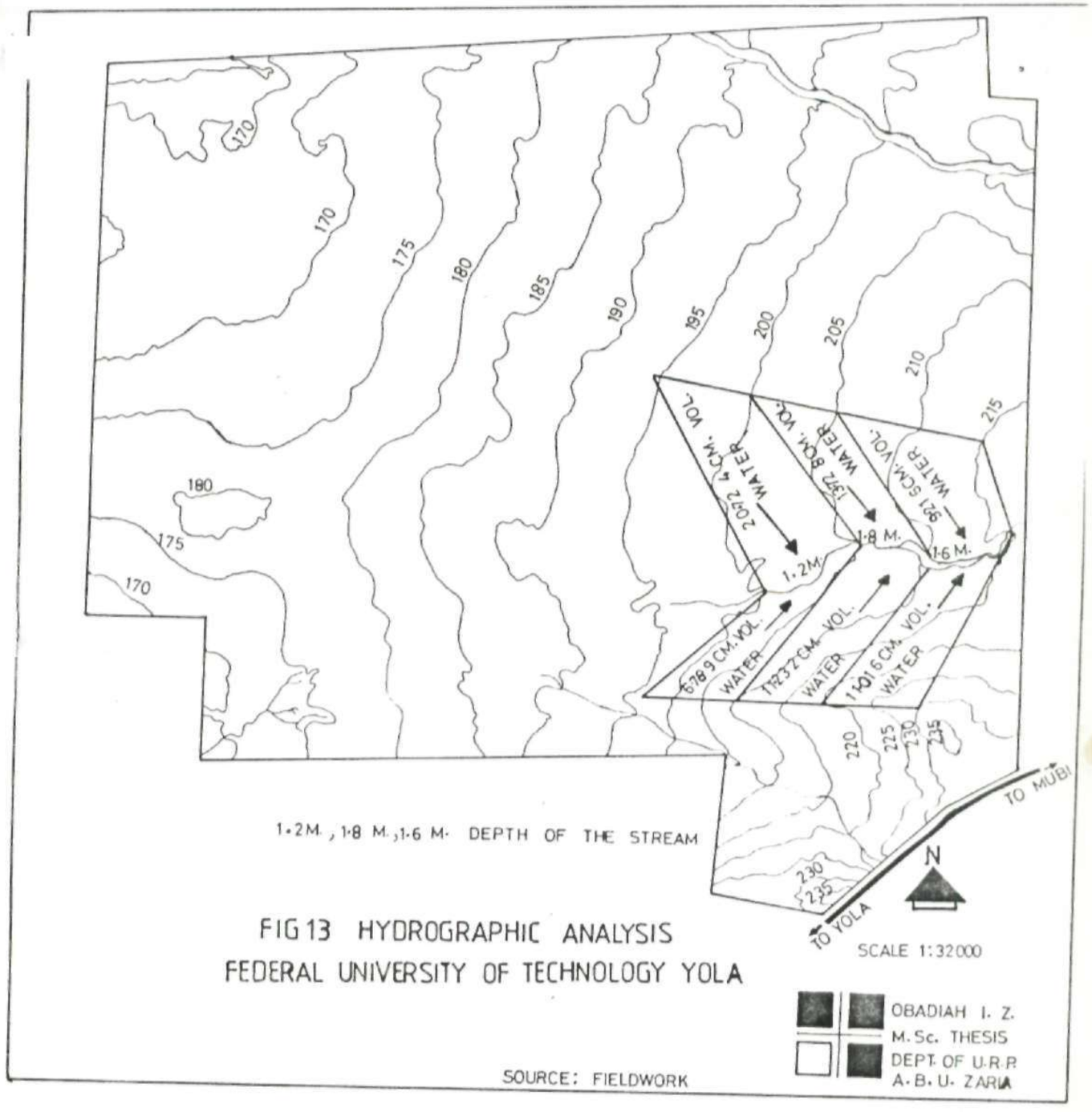


FIG 13 HYDROGRAPHIC ANALYSIS
FEDERAL UNIVERSITY OF TECHNOLOGY YOLA

There will also be the need to paint the exterior of the buildings with light colour to reflect sunlight.

Finally cooling effect in form of water bodies can be introduced to provide a micro-climatic condition that will reduce air temperature around the site.

3.16 OTHER FACTORS

Virtually the whole site is being used for farming. There are also settlements such as the Gokra Village at the extreme north west, Wuro Modibbo in the north, Ungwan Hamidu in the west, Bagalchi in the south west and Gimpawo in the south.

The road linkage of the site with the town as of now is adequate. There is one vehicular track that cuts across the site to link Gokra village with Bagalchi. Apart from this, there are also a few footpaths which can be ignored (see fig.1).

This human factor should be given desired attention by the university authority, because of the impact it will have on the security of the campus. Policy of integration should be adapted and measures such as security check points employed at all the access roads and footpaths to reduce theft of university properties.

3.20 THE RELATIONSHIP BETWEEN THE UNIVERSITY AND THE TOWN

As for the integration by dissemination of ideas, the relationship is still weak due to the age of the university. For apart from the staff school which serves the university



PLATE 1 ACCESS TO CAMPUS SITE YOLA – MUBI HIGHWAY

and the town communities, the university also runs 5 year diploma courses in Basic science and Integrated Science for Laboratory Technologists and its Diploma and certificate courses in secretarial Technology which was started in 1982/83 academic session but stopped in 1984/85 academic session. Other activities that bring the town and campus communities together are symposia and conferences occasionally organised by the university.

Apart from the integration by dissemination of ideas, there is the physical integration though also weak due to the distance one has to cover from the town to the campus both in terms of travel time and cost. Secondly the major road that links the university and the town, runs across a bridge with a Toll gate where motorist pay the gate fee for using the bridge before allowed to pass. (see plate 2).

Another factor is the absence of facilities like indoor games, zoological gardens and other recreational activities that will bring the two communities together. However, the campus community does go out to the town for shopping, but that is about all that takes them out apart from visiting friends and relatives.

In terms of transportation, the main means of public transport are taxis and buses from Girei and beyond to Yola. Sometimes the Gongola transport service (Sunshine Express) does operate in the morning and during closing working hours. However, most of the higher cadre of the university staff have their cars.





ATE 2 THE TOLL PLAZA AT THE BRIDGE TO THE CAMPUS SITE

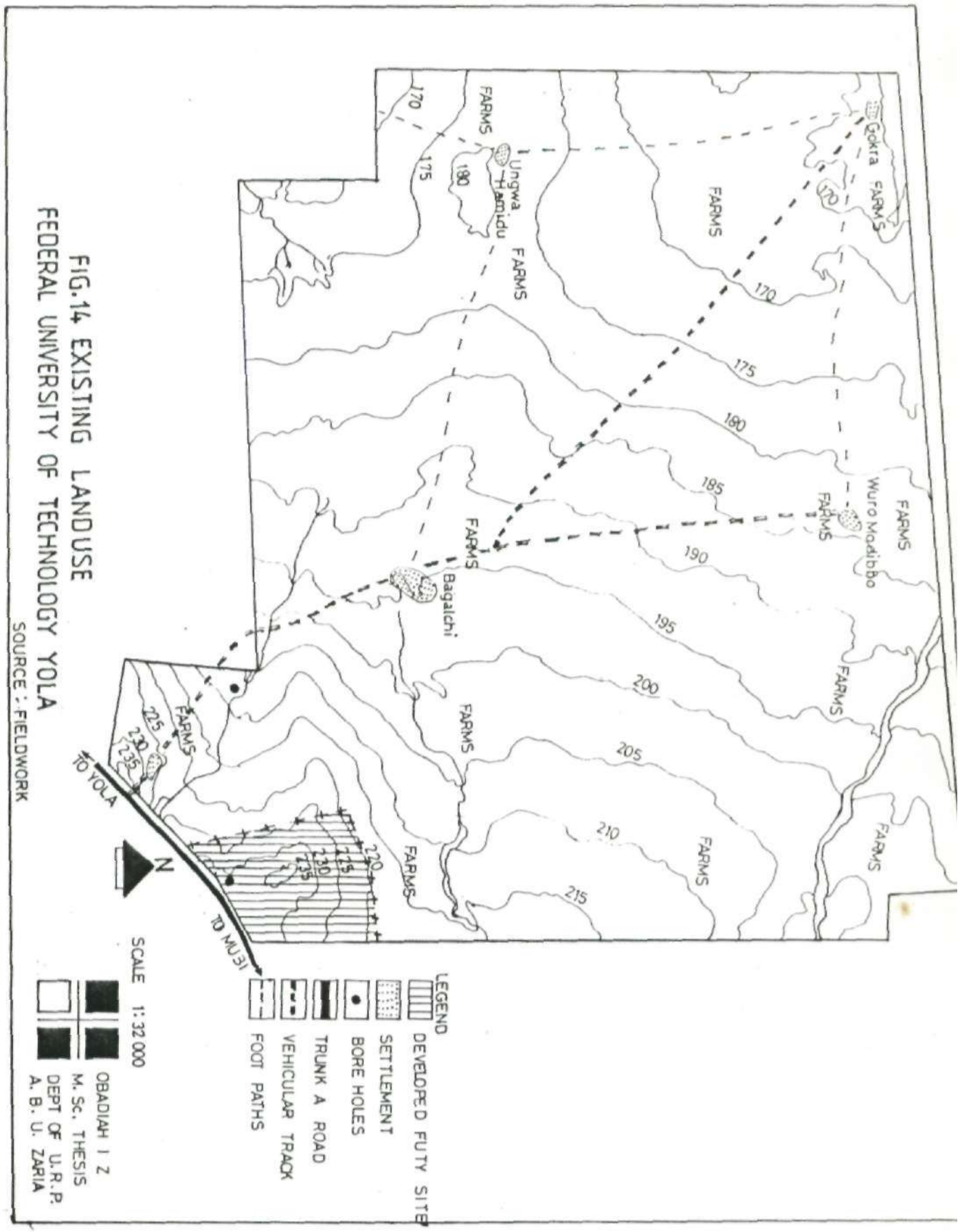


FIG. 14 EXISTING LANDUSE
FEDERAL UNIVERSITY OF TECHNOLOGY YOLA
SOURCE : FIELDWORK

3.30 THE RELATIONSHIP OF ELEMENTS WITHIN THE UNIVERSITY

The campus is supposed to bring together people with different aptitudes skills and specializations where individuals live and work together for the advancement of the universal body of knowledge. However in the process of achieving this principle, there is always a problem.

The relative positioning of the schools/departments was not well co-ordinated. Though in some few cases there is an attempt to arrange the facilities based on the related subjects that have common courses to be attended by students, yet such an arrangement has its short-comings e.g. it minimises the possibilities of greater interaction between students of different disciplines in the campus. But with careful planning, a compromise could be reached which while not sacrificing the convenience of interrelated courses, attempts an inter-disposal of the departments to encourage interaction.

Another area of concern is the location of common facilities which are supposed to be at the centre such as the library, Dining halls, Bookshop, Health centre etc. so as to bring students from different disciplines together for greater interaction. In the Federal University of Technology Yola, this has not been achieved, for example, the Health Centre and the old library, are both located close to the Female Hostels. The new library on the other hand forms part of the school of science building inbetween the male Hostels. While the only existing lecture theatre

is located far from the academic area. All these facilities are supposed to be centrally located for the campus community.

It is also observed that the construction of twenty (20) senior staff Houses and six (6) Guest Houses at Mbamba about 25 kilometres from the permanent site is another area of concern, because this location has completely isolated those staff members living there from both students and their colleagues living at the permanent site, (see plate 3).

Another aspect is the use of common facilities by both staff and students of the campus. In Federal University of Technology Yola, students and staff residence though linked, those facilities that ought to draw staff and students together in an informal way are lacking. There is need therefore to explore possibilities of this informal interaction so as to give the university community a wider opportunity for associating with one another.



PLATE 3 STAFF HOUSING AT MBAMBA

TABLE 3.1.1: ANALYSIS OF ACADEMIC SPACE

SCHOOL	POP	TOTAL USABLE AREA	BALANCING	TOTAL	EXISTING (% OF THEM)
School of Science and Technology Education	408	3737.3	2055.5	5792.8	3822(66%)
School of Environmental Science	35	296.1	162.8	458.9	111(24%)
Remedial Science	211	949.5	547.7	1497.2	1350(90%)
	654	4981.9	2766	7748.9	5283(68%)

The National Universities Commission (NUC) in its standard Guide for universities, published in 1977, stipulated minimum standards for various elements within the campuses, using the requirements for the Full-Time-Equivalent (FTE) students.

For ease of comparison and quick appreciation of the situation in Federal University of Technology Yola at present, the existing situation is set side by side with recommended minimum standards in the table above.

From table 3.1.1 above, it is clear that there is acute shortage of teaching space. The total floor area required for such a student population going by NUC standard is 7748.9 square metres, but only 5283 square metres (i.e

68.2%) is available.

The balancing area on the other hand is the area made available for facilities both inside and around the buildings such as circulation, toilets, stair case, etc, parking and landscaping usually calculated as a percentage of the useable areas. As for the departments, it is usually 55% of the total area. As far as the balancing area is concerned, there is no problem in Federal university of Technology Yola, for there is enough open spaces between buildings (see fig. 15).

3.40 ACADEMIC SUPPORT FACILITIES

The existing situation as regards the academic support facilities is shown in table 3.2.1 below. From the table, it is clear that facilities like Assembly hall, computer centre, shopping centre, indoor sports, conference centre, staff common rooms and out-door theatre are non-existent. But others like the central Administration, library, Dining hall, Health Centre, Auditorium, have more space than specified.

The Main Library which is one of the most important facilities is slightly 189.4m^2 (i.e 14.6%) more than the current need, with a 3,000 seating capacity. At present, it has 15,000 volumes of books, but it is expected to accommodate about 200,000 volumes of books when fully operational.

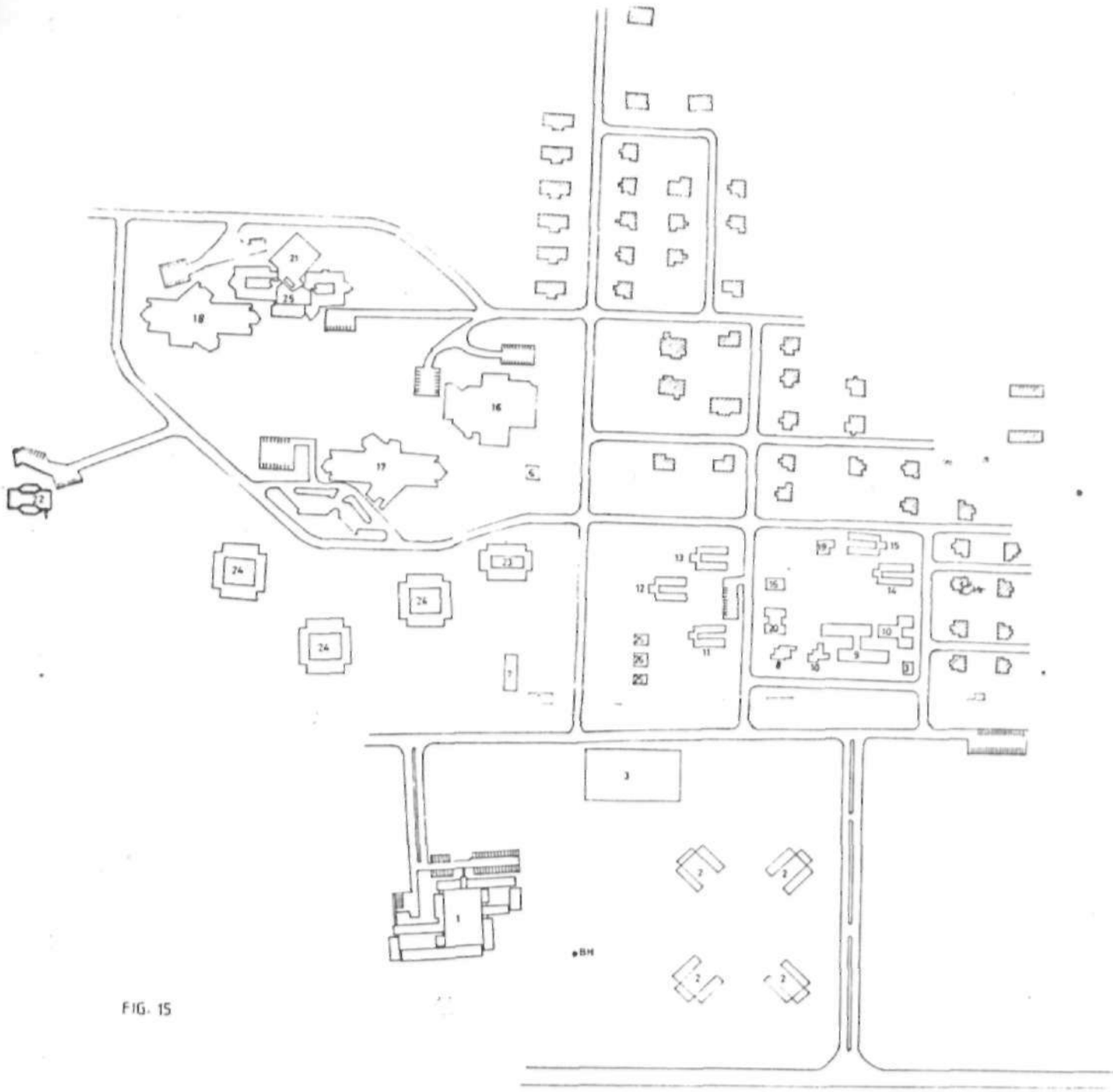


FIG. 15

1 ADMINISTRATION BLOCK
2 GUEST CHALETS
3 MAINTENANCE YARD
4 STAFF SCHOOL
5 SECURITY OFFICE
6 GENERATOR HOUSE
7 STORE
8 OFFICE BLOCK
9 LABORATORY BLOCK
10 CLASSROOM BLOCK
11 HOSTEL A FEMALE
12 HOSTEL B "
13 HOSTEL C "
14 HOSTEL D "
15 HOSTEL E "
16 REFECTORY BLOCK
17 HOSTEL A² MALE
18 HOSTEL A³ MALE
19 HEALTH CENTRE
20 OLD LIBRARY
21 NEW LIBRARY
22 LECTURE THEATRE
23 LECTURE ROOMS
24 LECTURE ROOMS UNDER CONSTRUCTION
25 SCHOOL OF SCIENCE
26 WATER TANKS
STAFF HOUSING

N

FIG. 15 EXISTING LAY OUT FUT Y

OBADIAH I. :
M.Sc. THESI
DEPT. OF U.F

TABLE 3.2.1: ANALYSIS OF ACADEMIC SUPPORT FACILITIES

FACILITIES	NUC $_2$ STDSM FTE	USEABLE AREA	BALANC-ING	TOTAL	EXISTING (% OF THEM
Library	1.25	817.5	286.1	1103.6	1293(+)-14.6%
Large Hall	0.20	130.8	65.4	196.2	-
Administration	0.40	261.6	143.9	405.5	3861.8(+)89%
Conference Centre	0.10	65.4	26.2	91.6	-
Refectory	0.55	359.7	179.9	539.6	1374(+)61%
Computer Centre	0.10	65.4	26.2	91.6	-
Students common Rooms	0.76	497.0	248.5	745.5	-
Shopping Centre	0.25	163.5	24.5	188.0	-
Central Store	0.20	130.8	65.4	196.2	187(-)(5%)
Health Centre	0.05	32.7	18.0	50.7	215(+)(76%)
Auditorium	0.75	490.5	318.8	809.3	990 + (18%)
Staff Common Rooms	0.35	228.9	114.5	343.4	-
Indoor Sports	0.20	130.8	39.2	170.0	-
Out-door Theatre	0.04	26.20	14.4	40.6	-

TABLE 3.3.1: RESIDENTIAL ACCOMMODATION

TYPE	FTE STUDS/ STAFF	STUDENTS M2 STAFF (HA)	USEABLE	BALANC-ING	TOTAL	EXISTING (%)
Students (75%)	654	10.20m^2	5003.1	5003.1	10006.2	9408.5(-) (6%)
Senior Staff (75%)	172	0.20(HA)	34.4		34.4	15.22(-) (126%)
Junior Staff (15%)	380	0.03(HA)	11.4		11.4	-

Table 3.3.1 above shows that the useable floor area required according to NUC standard for such a population of students is 10,006.2m^2, but the existing floor area in all the Hostels is only 9408.5m^2 that is a short fall of 597.7m or (-6%). This thus explain why in some cases 3 students occupy a room meant for 2 students, though this is because the university has decided to accommodate all students instead of the 75% recommended by National Universities Commission, But if we are to go by the newly introduced National Universities Commission's policy on student accommodation which demands that only 33⅓% of the students should be accommodated, the existing situation can be said to be adequate.

As for the senior staff accommodation, only 15.22 hectares of land is available instead of the recommended 34.4 hectares by the National Universities Commission, that shows a short fall of 19.18 hectares or (-126%). This therefore goes to explain why majority of staff are either quartered in rented Houses in the town or are forced to make arrangement for their accommodation on their own.

But as for the intermediate and Junior staff, 11.4 hectares of landspace is recommended by the National Universities Commission standard for their accommodation, but as of now, none of the intermediate and Junior staff is quartered by the university.

TABLE 3.4.1: ANALYSIS OF THE EXISTING SITUATION IN SOME OTHER UNIVERSITIES AND FEDERAL UNIVERSITY OF TECHNOLOGY YOLA

DESCRIPTION	CAMPUS ELEMENTS AS PERCENTAGE OF TOTAL AREA				
	CENTRAL ADMINIS-TRATION	SUPPORT SERVICES	TEACHING/ RESEARCH	STUDENTS HOUSING	STAFF HOUSING
A.B.U. Zaria	2.0	8.6	13	3.2	73.2
UNIJOS	2.4	8.0	12.4	4.2	72.3
NSUKKA	1.8	6.5	9.8	3.8	78.1
UNIPORT HAR-COURT	1.8	5.8	12	3.8	76.7
USMAN DANFODIO	2.0	7.0	13	3.7	73.8
O.A.U. IFE	1.0	5.8	11	4.0	78.2
UNIBENIN	1.5	6.2	10	5.5	79.3
UNILORIN	2.0	6.4	11.4	4.8	74.7
FUT YOLA	2.2	2.3	3.0	5.4	87.1
AVERAGE OF EXISTING SITUATION	1.9	6.3	10.6	4.3	77.0
NUC STANDARDS	1.0	2.0	10.0	14.0	73.0

Source: A.B.U., Bilwa, NUC Standards, Fieldwork.

Table 3.4.1 above, shows the general area use of the major elements of the nine (9) universities. These figures are expressed as percentage of total area of each university excluding the farm areas. From the table, it is clear that none of the universities was able to conform with the NUC recommended standard for space demands for most of the major elements of the campus. e.g. NUC recommended 1.0% for the central administration, but the existing situation in these universities, apart from Obafemi Awolowo University Ife, is more than 1.0%. The same situation also applies to support services where the NUC standard is 2.0%, but in all the above universities, the percentage ranges from 2.3 in Federal University of Technology Yola to 8.6% in A.B.U. Zaria.

As for the teaching/Research area, apart from Yola, Nsukka and university of Benin which has 3.0%, 9.8% and 10% respectively, all the rest has 11% and above which is more than 10% recommended by NUC standards.

The situation is different for students Housing where the percentages ranges from 3.2% in A.B.U. Zaria to 5.5% in University of Benin as against the NUC recommended standards of 14%. This situation may be attributed to the high-rise nature of student Housing of which occupies small space.

Finally, the situation in all the universities above shows that existing staff Housing areas are in excess of utilizable demand as against 73% recommended by National Universities Commission standards.

TABLE 3.5.1: ANALYSIS OF USABLE AREA PER FULL-TIME - EQUIVALENT STUDENT IN FOUR UNIVERSITIES (1988/89) AND PROPOSALS FOR ACADEMIC AREA FOR FEDERAL UNIVERSITY OF TECHNOLOGY YOLA

	A.B.U. ZARIA	UNIJOS	UNILORIN	UNIVERSITY OF PORT'CO'T	N.U.C. STANDARD M2/ STUDENT	RECOMMENDATION M2/STUDENT
ARTS AND SOCIAL SCIENCES	3.4	4.0	2.9	4.1	2.8	3.0
AGRICULTURE	11.2	-	14.1	-	12.0	14.0
ADMINISTRATION	1.8	-	-	-	3.4	1.2
EDUCATION	5.2	4.6	3.2	5.0	5.5	5.0
ENGINEERING	7.0	-	12.3	11.7	10.60	12.0
ENVIRONMENTAL DESIGN	7.5	7.8	9.6	10.2	9.50	9.50
LAW	1.8	2.5	-	-	3.4	2.5
HUMAN MEDICINE	4.0	7.0	15.1	14.8	15.0	15.0
PHARM. SCIENCE	5.0	3.1	-	8.2	9.0	8.0
VET. MEDICINE	12.0	-	-	-	15.0	14.0
SCIENCE	4.0	6.2	9.0	8.5	9.0	9.0

Source: NUC, Field Work

Table 3.5.1 above shows the analysis of the existing academic space for Full-Time-Equivalent students in Ahmadu Bello University Zaria, University of Jos, University of Ilorin, and University of Port-Harcourt.

This analysis is done side-by-side with the National Universities Commission recommended standard for ease of comparison and quick appreciation of the situation obtainable in these universities. Based on this therefore, a recommendation is made for academic area for Federal University of Technology with the following in mind. The potential for future expansion of each schools/department. Secondly to avoid problem of lack of enough space experienced in other universities.

TABLE 3.6.1: ANALYSIS OF USEABLE AREA OF ACADEMIC SUPPORT SERVICES PER FULL-TIME-EQUIVALENT STUDENT IN FOUR UNIVERSITIES 1988/89, AND PROPOSALS FOR FEDERAL UNIVERSITY OF TECHNOLOGY YOLA

DESCRIPTION	A.B.U. ZARIA	UNIJOS	UNILORIN	UNIVERSITY OF PORT-HARCOURT	N.U.C. STANDARD M^2 STUDENT	RECOMMENDATION M^2 /STUDENT
CENTRAL ADMIN.	0.74	0.52	0.65	0.50	0.40	0.50
CONVOCATION SQUARE	-	-	-	-	-	-
SHOPPING CENTRE	0.21	0.18	0.25	0.24	0.25	0.25
AUDITORIUM	0.15	0.13	0.12	0.11	0.10	0.12
LIBRARY	1.25	1.0	1.20	1.23	1.25	0.25
CENTRAL STORE	0.20	0.12	0.16	0.14	0.15	0.12
STUDENT CENTRE	0.54	0.50	0.55	0.61	0.76	0.55
COMPUTER CENTRE	0.04	0.05	0.21	0.20	0.10	0.20
ESTATE DEPARTMENT	1.15	1.10	1.20	1.12	0.43	1.20
STAFF SCHOOL	0.24	0.23	0.26	0.25	0.24	0.25
FILLING STATION	0.12	0.14	0.18	0.20	0.25	0.20
POWER STATION	0.04	0.02	0.03	0.012	0.04	0.04
CENTRAL LAUNDRY	0.05	0.03	0.02	0.04	0.03	0.04
TELEPHONE EXCHANGE	0.016	0.011	0.01	0.012	0.01	0.012
CONFERENCE CENTRE	1.25	0.20	0.12	0.10	0.10	0.10
STAFF CENTRE	0.30	0.25	0.27	0.24	0.35	0.25
INDOOR SPORTS	0.53	0.30	0.22	0.20	0.20	0.20
TEACHING HOSPITAL	2.5	2.1	2.0	2.3	0.05	2.0
OUTDOOR THEATRE	0.4	0.02	0.04	0.05	0.06	0.04
LARGE HALL	0.43	0.26	0.24	0.25	0.20	0.25

Source: NUC and Field Work

Table 3.6.1 above shows that none of the universities was able to conforms with the National Universities Commission standard in view of this therefore, the recommendation adopted from the analysis is made in cognizance with the location of the university site, its physical character and need.

TABLE 3.7.1: ANALYSIS OF USEABLE AREA PER STUDENT OF RESIDENTIAL AREA IN FOUR UNIVERSITIES 1988/89 AND PROPOSALS FOR FEDERAL UNIVERSITY OF TECHNOLOGY YOLA

DESCRIPTION	A.B.U. ZARIA	UNIJOS	UNILORIN	UNIPORT HARCOURT	NUC STANDARD HA/ STAFF	PROPOSAL IN HA/ STAFF
STUDENTS LIVING AREA	14.2	11.20	12.50	12.10	10.20	12.5
COMMON ROOMS	0.56	0.55	0.61	0.50	0.57	0.55
DINING ROOMS	0.60	0.42	0.48	0.50	0.55	0.50
KITCHENS	0.50	0.38	0.45	0.50	0.45	0.50

Source: NUC, Field Work

TABLE 3.8.1: ANALYSIS OF GROSS AREA PER STAFF OF RESIDENTIAL AREA IN FOUR UNIVERSITIES 1988/89, AND PROPOSAL FOR FEDERAL UNIVERSITY OF TECHNOLOGY YOLA

DESCRIPTION	A.B.U. ZARIA	UNIJOS	UNILORIN	UNIPORT HARCOURT	NUC STANDARD HA/ STAFF	PROPOSAL IN HA/ STAFF
SENIOR STAFF	0.40	0.16	0.18	0.20	1-0.2	0.18
I. & J. Staff	0.06	0.03	0.04	0.05	0.03	0.05

Source: NUC, Field Work

Table 3.7.1 and 3.8.1 above, shows the analysis of the students and staff existing residential area per students in square metres and per staff in hectares respectively. From the two tables, it is clear that none of the universities have conformed with the National Universities Commission standard; and thus, proposals made is in anticipated need of the university of Technology Yola and its physical characteristics of the site.

3.50 EXISTING UTILITIES, SERVICES AND FACILITIES

3.51 WATER

The main source of water supply at the campus site, is the two Boreholes sunk by the university authority.

According to the Director of works, the two boreholes at present produces a total of 576,000 litres for 10 hours daily for the campus population of 1,078 people. This then gives a per-capita consumption of 534 litres. This figure therefore shows that there is an excess water consumption per-capita as against National Universities Commission (NUC) recommended 200 litres per day per capita.

3.52 ELECTRICITY

The campus gets its power supply though the main power line from Jimeta town.

The campus has 3 transformers of 2,500 k.V.A. capacity each, while the 4th one is under installation. Apart from this, there is also a stand-by plant generator of 500 K.V.A. capacity to compliment power failure from the town main line.

3.53 EDUCATIONAL FACILITIES

The university has a staff school that occupy an area of 636.3m^2 as against the National Universities Commission (NUC) recommended 2.5 hectares. This therefore shows a deficiency of 2.436 hectares.

3.54 HEALTH SERVICES

The campus has a Health Centre that covers an area of 260m^2 as against National Universities Commission (NUC) recommended floor area of 293m^2. This shows a shortfall of 33m^2. The centre also has 3 emergency admission beds for emergency cases as against a minimum of 20 beds recommended by NUC.

3.55 RELIGIOUS FACILITIES

The campus has one small mosque and no church.

Religious activities such as the Friday prayers are carried out in Girei town, while Sunday service and evening service for christians are conducted in classrooms.

3.56 POSTAL SERVICES

The campus at present has no post office or postal Agency. All postings of letters etc. are done through the mail runner in Jimeta main post office or any courier offices in Jimeta.

3.57 POLICE SERVICE

There is no police post on the campus. The university security men are responsible for security matters regarding the campus.

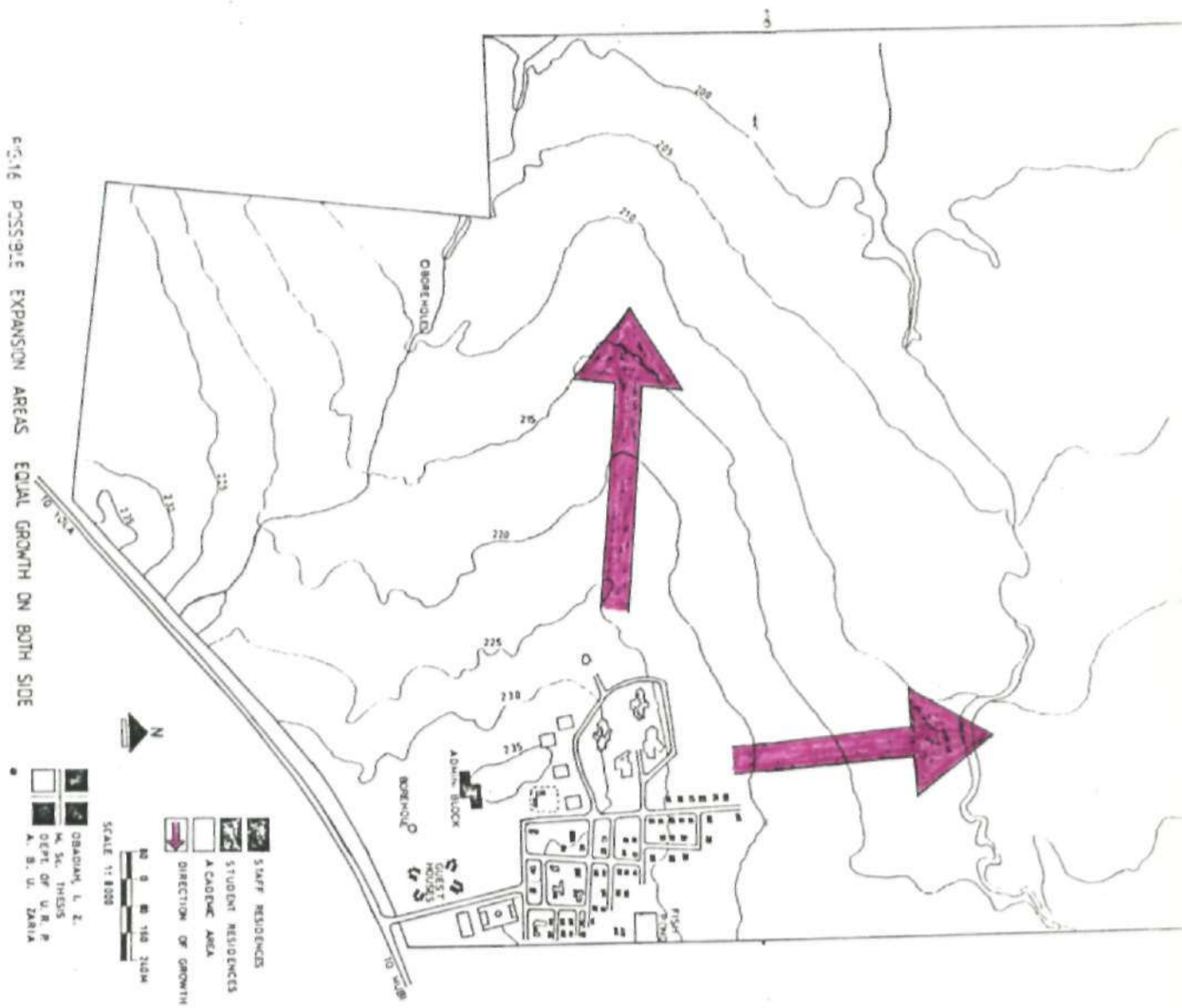
3.60 POSSIBLE EXPANSION DIRECTIONS

The alternative directions of expansion of the campus is indicated in (fig. 16). The alternative growth considers North and West thrust of the main growth points with no thrust to the East and South because of the boundary constraints.

These directions of expansion, will give ample opportunity for parallel development either northwards or westwards. The north-western part of the site can be developed for the proposed school of Agriculture, Agro-Allied Industry and other related activities to the north because of the presence of river Girei and other streams.

However, the ample spaces inbetween the existing buildings, could be utilised for further structural development, that is to say, redensification could be one of the approaches in the development of the university.

Whichever approach is adopted, it is obvious that the existing buildings, roads and other infrastructural facilities will constitute some constraints and therefore determine to some extend the nature, shape and direction of expansion of the campus (see fig.16).


FIG 16 POSSIBLE EXPANSION AREAS EQUAL GROWTH ON BOTH SIDE
STAFF RESIDENCES
STUDENT RESIDENCES
ACADEMIC AREA
DIRECTION OF GROWTH
SCALE 1:1 8000
OBADIAH, L. Z.
M. Sc. THESIS
DEPT. OF U.R.P
A. B. U. ZARIA
N
BOREHOLE
ADMIN. BLOCK
GUEST HOUSES
BOREHOLE
205
210
215
220
225
230
235

CHAPTER FOUR

4.00 THE PROJECTION AND THE FUTURE REQUIREMENT

4.10 THE STUDENT POPULATION

Plans are made for people, likewise provision of facilities, utilities and services are in proportion to the population. This is necessary because lack of consideration will lead to inadequacy or under utilization of such provision.

According to the Academic brief prepared by the university Authority, the Federal University of Technology Yola is to have a total of 5300 Full-time students by the year 1997 which is the maturity stage. This figure is for the envisaged 26 departments of the four (4) schools.

TABLE 4.1.1 PROJECTED GROWTH OF THE STUDENT POPULATION

YEAR	UNDERGRADUATE	POSTGRADUATE	REMEDIAL	TOTAL
1989/90	1320		500	1820
1990/91	2180		"	2680
1991/92	3150		"	3650
1992/93	3870	50	"	4420
1993/94	4310	100	"	4885
1994/95	4470	150	"	5070
1995/96	4510	200	"	5160
1996/97	4550	250	"	5300
1997/98	4550	250	"	5300

Source: Abstract from Academic brief of FUTY Projection.

On the basis of this projections, the university is to have 5300 student enrolment by the year 1997 as its stabilization population. From the table, it shows that the undergraduates section has an average growth rate of 8.5%, while the Postgraduate section has an average growth rate of 13%. As for the Remedial Section, it maintains a yearly enrolment of 500 students every academic session. The table below shows the enrolment of undergraduate students by schools by year.

TABLE 4.2.1: FULL-TIME-EQUIVALENT STUDENTS NUMBER PER SCHOOL OF STUDY

YEAR	SSTE	SES	SEET	SAAT	TOTAL
1989/90	1194	126	-	-	1320
1990/91	1326	472	180	200	2180
1991/92	1886	514	350	400	3150
1992/93	1990	780	520	580	3870
1993/94	1830	1040	660	780	4310
1994/95	1802	1228	660	780	4470
1995/96	1722	1348	660	780	4510
1996/97	1722	1388	660	780	4550
1997/98	1722	1388	660	780	4550

Source: Abstract from Academic brief of FUTY

SSTE = School of Science and Technical Education
SES = School of Environmental Science
SEET = School of Engineering and Engineering Technology
SAAT = School of Agriculture and Agricultural Technology.

TABLE 4.3.1: STAFF POPULATION PROJECTION

YEAR	FTE STUDENT	ACA. STAFF	SNR. ADMIN.	SNR. TECH. STAFF	I & J STAFF
1988/89	654	94	40	33	380
1989/90	1320	182	36	60	607
1990/91	2680	268	54	89	893
1991/92	3650	365	73	122	1217
1992/93	4420	442	88	147	1473
1993/94	4885	488	98	163	1628
1994/95	5070	507	101	169	1690
1995/96	5160	516	103	172	1720
1996/97	5300	530	106	177	1767
1997/98	5300	530	106	177	1767

Source: Abstract from the Academic brief FUTY.

The table above shows the projection of staff population for the proposed development plan period. The projection is based on the student/Academic staff ratio, Academic staff/senior Administrative staff ratio as prescribed by the National Universities Commission standard guide. The basic computation was based on the following:-

Academic Staff/student ratio 1:10

Senior Administrative Staff/Academic Staff 1:5

Senior Technical Staff/Academic Staff 1:3

Intermediate and Junior staff ⅓ of the total students enrolment.

As for the growth rate, the Academic staff growth rate for the period 1990 to 1995 is 10.7% and 1.3% for the 1995 to 1997.

The Senior Administrative staff shows a growth rate of 10.7% between 1989 to 1995 and also 1.3% between 1995 to 1997. The same growth rate is also seen for the Senior Technical Staff.

The Intermediate and Junior Staff on the other hand shows a growth rate of 10.7% between 1989 to 1995 and 2.2% for the remaining period 1995 to 1997.

4.20 ORGANIZATION AND DEVELOPMENT OF SCHOOLS AND DEPARTMENTS

Two new schools of Engineering and Agriculture are to take off within the development period with a total of ten (10) departments.

Apart from the two new schools to be introduced, the University has new Academic programmes and departments, while some of the departments it started with have been phased out (see table 4.4.1 below for the proposed reorganizations in the departments).

TABLE 4.4.1: SCHOOL/DEPARTMENT

	EXISTING DEPARTMENTS											
	1988/89	1989/90			1990/91			1991/92				
		1	2	3	1	2	3	1	2	3		
School of Science and Technical Education.	7	-	1	8	-	-	8	-	-	8		
School of Environmental Science	1	-	2	3	-	2	5	-	3	8		
School of Eng. & Eng. Tech. *	-	-	5	5	-	-	5	-	-	5		
School of Agric. & Agric. Tech.*	-	-	5	5	-	-	5	-	-	5		
Accounting	1	1	-	-	-	-	-	-	-	-		
Finance & Banking	1	1	-	-	-	-	-	-	-	-		
Economics	1	1	-	-	-	-	-	-	-	-		
Business Management	1	1	-	-	-	-	-	-	-	-		
Mech. Automobile Tech.	1	1	-	-	-	-	-	-	-	-		
Electric/Electronics	1	1	-	-	-	-	-	-	-	-		
TOTAL	14			21			23			26		

Source: Field Work 1989.

* New Establishment

1 Department phased out

2 Department Introduced

3 The new situation.

It is therefore clear from the above table that all the proposed expansions in the schools and departments are to take place within the first phase of the development plan period from 1989 to 1995. The feasibility of this proposals depends to a greater extent on the availability of funds to the university especially at this period of structural Adjustment Programme (SAP).

It is envisaged that by 1991/92 academic session, all the proposed departments will take off, while by 1995/96 academic session, all the schools would have developed postgraduate degree programmes in most of the disciplines. In addition there exist independent Research units and teaching support units that are not covered by the academic facilities and departments, these include system research/ Development unit, Agro-Industrial/Development units, Division of General Studies and Technology Development Centre.

4.30 THE SCHEDULE OF REQUIREMENT

The schedule of requirement is drawn from the knowledge gathered from the foregoing analysis of projections.

The basis for computing Academic space requirements are the total number of student enrolment for that future date. The standards of the net useable area for each department per student is used as contained in the N.U.C. guidelines but modernised to suit the requirements of FUTY. Added to this is the balance Area (i.e circulation space, parking, toilet, etc.) equal to 55% of the total floor area. And depending on the nature of the departments, their height

factors, that is the number of floors a building can have $\left(\text{H.F.} = \frac{\text{TOTAL FLOOR AREA}}{\text{GROUND FLOOR AREA}}\right)$ vary from 1.25 in Technology/ Engineering departments to 1.5 or more in departments like Mathematics, Biology, Geography, History etc. where there are no heavy laboratories or workshop equipments.

For the calculation of site areas, a coverage of 25% is adopted uniformly in all academic department tables, 4.5.1 to 4.9.1 detail out the total floor Area, plinth Area and Site Area for each school and department. The total site area required by the end of the development period for all the academic department is 71.35 hectares.

TABLE 4.5.1

SCHOOL/DEPARTMENT 1989/90

	POP	RECOMMEN-DATION STUD M^2	USEABLE AREA	BALANCING AREA	TOTAL	HEIGHT FACTOR	PLINTH AREA	SITE AREA WITH 25% DEPT. M^2	COVERAGE SCHOOL	(HA)
BIOLOGY	100	9	900	495	1395	1.5	930	3720		
PHYSICS	100	9	900	495	1395	1.5	930	3720		
CHEMISTRY	100	9	900	495	1395	1.5	930	3720		
MATHEMATICS	100	4	400	220	620	1.5	413.3	1653.2		2.314 (HA)
OPERATIONAL	100	4	400	220	620	1.5	413.3	1653.2		
GEOLOGY	40	9	360	198	558	1.5	372	1488		
SCIENCE EDU.	110	5	550	302.5	852.5	1.5	568.3	2273.3		
TECHNICAL EDUC.	110	9	990	544.5	1534.5	1.25	1227.6	4910.4		
GEOGRAPHY	80	9.5	760	418	1178	1.5	785.3	3141.2		
U.R.P.	40	9,5	380	209	589	1.5	392.7	1570.8		.60348 (HA)
SURVEYING PHOTO.	40	8	320	176	496	1.5	330.7	1322.8		

SCHOOL OF ENGINEERING

CIVIL ENG.	40	12	480	264	744	1.25	595.2	2380.8		
ELECT. ENG.	40	12	480	264	744	1.25	595.2	2380.8		
MECH. ENG.	40	12	480	264	744	1.25	595.2	2380.8		1.1904 (HA)
CHEM. ENG.	40	12	480	264	744	1.25	595.2	2380.8		
AGRIC. ENG.	40	12	480	264	744	1.25	595.2	2380.8		
A F W	40	14	560	308	868	1.25	694.4	2777.6		
C.P.H.	40	14	560	308	868	1.25	694.4	2777.6		
A.E.E.	40	14	560	308	868	1.25	694.4	2777.6		1.3888 (HA)
S.S.	40	14	560	308	868	1.25	964.4	2777.6		
F.R.M.	40	14	560	308	868	1.25	964.4	2777.6		
SCH. OF REMEDIAL STUDIES	500	4.5	2250	1237.5	3487.5	1.5	2325	9300		0.93 (HA)

TABLE 4.6.1

SCHOOL OF SCI. & TECH. EDUCATION 1990/91

	POP	RECOMM. M2 STUD.	USEABLE AREA	BALANC-ING AREA	TOTAL	HEIGHT FACTOR	PLINTH AREA	SITE AREA WIT. 25% DEFT. M^2	COVERAGE SCHOOL
BIOLOGY	130	9	1170	643.5	1813.5	1.5	1209	4836	
PHYSICS	130	9	1170	643.5	1813.5	1.5	1209	4836	
CHEMISTRY	130	9	1170	643.5	1813.5	1.5	1209	4836	
MATHEMATICS	130	4	520	286	806	1.5	537.3	2149.2	
OPERATIONAL RESEARCH	130	4	520	286	806	1.5	537.3	2149.2	
GEOLOGY	80	9	720	396	1116	1.5	744	2976	
SCIENCE EDUC.	150	5	750	412.5	1162.5	1.5	775	3100	3.1132 (HA)
TECHNICAL EDUC.	140	9	1260	693	1953	1.25	1562.4	6249.6	
GEOGRAPHY	120	9.5	1140	627	1767	1.5	1178	4712	
U.R.P.	80	9.5	760	418	1178	1.5	785.3	3141.2	
SURVEYING & PHOTO.	80	8	640	352	992	1.5	661.3	2645.3	
METEOROLO-GY	40	9.5	380	209	589	1.5	392.7	1570.8	
INDUSTRIAL DESIGN	40	9.5	380	209	589	1.5	392.7	1570.8	1.364 (HA)
SCHOOL OF ENGINEERING									
CIVIL ENG.	80	12	960	528	1488	1.25	1190.4	4761.6	
ELECT. ENG.	80	12	960	528	1488	1.25	1190.4	4761.6	
MECH. ENG.	80	12	960	528	1488	1.25	1190.4	4761.6	
CHEM. ENG.	80	12	960	528	1488	1.25	1190.4	4761.6	
AGRIC. ENG.	80	12	960	528	1488	1.25	1190.4	4761.6	2.3808 (HA)
A.F.W.	80	14	1120	616	1736	1.25	1388.8	5555.2	
C.P.H.	80	14	1120	616	1736	1.25	1388.8	5555.2	
A.E.E.	80	14	1120	616	1736	1.25	1388.8	5555.2	
S.S.	80	14	1120	616	1736	1.25	1388.8	5555.2	
F.R.M.	80	14	1120	616	1736	1.25	1388.8	5555.2	2.7778 (HA)

TABLE 4.7.1

SCHOOL OF SCIENCE AND TECH. EDUCATION 1991/92

	POP	APPRAISED REG. STUD.M²	USEABLE AREA	BALANCING AREA	TOTAL	HEIGHT FACTOR	PLINTH AREA	SITE AREA WITH 25% DEPT M²	COVERAGE SCHOOL
BIOLOGY	160	9	1440	792	2232	1.5	1488	5952	3.8919 (HA)
PHYSICS	160	9	1440	792	2232	1.5	1488	5952	
CHEMISTRY	160	9	1440	792	2232	1.5	1488	5952	
MATHEMATICS	160	4	640	352	992	1.5	661.3	2645.2	
OPERATIONAL RESEARCH	160	4	640	352	992	1.5	661.3	2645.2	
GEOLOGY	120	9	1080	594	1674	1.5	1116	4464	
SCIENCE EDUC.	180	5	900	495	1395	1.5	930	3720	
TECHNICAL EDUC.	170	9	1530	841.5	2371.5	1.25	1897.2	7588.8	
GEOGRAPHY	160	9.5	1520	836	2350	1.5	1570.7	6282.8	2.571 (HA)
U.R.P.	120	9.5	1140	627	1767	1.5	1178	4712	
SURVEYING & PHOTO.	120	8	960	528	1488	1.5	992	3968	
METEOROLOGY	80	9.5	760	418	1178	1.5	785.3	3141.3	
INDUSTRIAL DESIGN	80	9.5	760	418	1178	1.5	785.3	3141.3	
ARCHITECTURE	40	9.5	380	209	589	1.5	392.7	1570.8	
BUILDING	40	9.5	380	209	589	1.5	392.7	1570.8	
QUANTITY SURVEY	40	8	320	176	496	1.5	330.7	1322.8	

SCHOOL OF ENGINEERING

CIVIL ENG.	120	12	1440	792	2232	1.25	1785.6	7142.4	3.5712 (HA)
ELECT. ENG.	120	12	1440	792	2232	1.25	1785.6	7142.4	
MECH. ENG.	120	12	1440	792	2232	1.25	1785.6	7142.4	
CHEM. ENG.	120	12	1440	792	2232	1.25	1785.6	7142.4	
AGRIC. ENG.	120	12	1440	792	2232	1.25	1785.6	7142.4	

1991/92

	POP	APPRAISED RECOMMEND. STUD. M^2	USEABLE AREA	BALANCING AREA	TOTAL	PRINTH AREA	SITE AREA WITH 25% DEPT. M^2	COVERAGE SCHOOL
A.F.W.	120	14	1680	924	2604	2083.2	8332.8	4.1664 (HA)
C.P.H.	120	14	1680	924	2604	2083.2	8332.8	
A.E.E.	120	14	1680	924	2604	2083.2	8332.8	
S.S.	120	14	1680	924	2604	2083.2	8332.8	
F.R.M.	120	14	1680	924	2604	2083.2	8332.8	

TABLE 4.8.1

SCHOOL OF SCIENCE AND TECH. EDUCATION 1993/94

	POP	APPRAISED RECOMMEND. STUD. M^2	USEABLE AREA	BALANCING AREA	TOTAL	HEIGHT FACTOR	PLINTH AREA	SITE AREA WITH 25% DEPT. M^2	COVERAGE SCHOOL
BIOLOGY	160	9	1440	792	2232	1.5	1488	5952	
PHYSICS	160	9	1440	792	2232	1.5	1488	5952	
CHEMISTRY	160	9	1440	792	2232	1.5	1488	5952	
MATHEMAT-ICS	160	4	640	352	992	1.5	661.3	2645.3	
OPERATION-AL RES.	160	4	640	352	992	1.5	661.3	2645.3	
GEOLOGY	160	9	1440	792	2232	1.5	1488	5952	
SCIENCE EDUC.	180	5	900	495	1395	1.5	930	3720	4.0407 (HA)
TECH. EDU.	170	9	1530	841.5	2371.5	1.25	1897.2	7588.8	
GEOGRAPHY	160	9.5	1520	836	2356	1.5	1570.7	6282.8	
U.R.P.	200	9.5	1900	1045	2945	1.5	1963.3	7853.3	
SURVEYING & PHOTO.	160	8	1280	704	1984	1.5	1322.7	5290.8	
METEOROLO-GY	160	9.5	1520	836	2356	1.5	1570.7	6282.8	
INDUSTR-IAL DESIGN	160	9.5	1520	836	2356	1.5	1570.7	6282.8	
ARCHITEC-TURE	120	9.5	1140	627	1767	1.5	1178	4712	
BUILDING	120	9.5	1140	627	1767	1.5	1178	4712	4.5385 (HA)
QUANT. SUR.	120	8	960	528	1488	1.5	992	3968	
CIVIL ENG.	200	12	2400	1320	3720	1.25	2976	11904	
ELECT.ENG.	200	12	2400	1320	3720	1.25	2976	11904	
MECH.ENG.	200	12	2400	1320	3720	1.25	2976	11904	
CHEM.ENG.	200	12	2400	1420	3720	1.25	2976	11904	
AGRIC.ENG.	200	12	2400	1420	3720	1.25	2976	11904	5.952 (HA)
A.F.W.	160	14	2240	1232	3472	1.25	2777.6	11110.4	
C.P.H.	160	14	2240	1232	3472	1.25	2777.6	11110.4	
A.E.E.	160	14	2240	1232	3472	1.25	2777.6	11110.4	
S.S.	160	14	2240	1232	3472	1.25	2777.6	11110.4	
F.R.M.	160	14	2240	1232	3472	1.25	2777.6	11110.4	5.5552 (HA)

TABLE 4.9.1

SCHOOL OF SCIENCE & TECHNICAL EDUCATION 1996/97

	ROP	APPRAISED RECOMMEND. STUD.M2	USEABLE AREA	BALANCING AREA	TOTAL	HEIGHT FACTOR	PLINTH AREA	SITE AREA WITH 25% DEPT. M^2	COVERAGE SCHOOL
BIOLOGY	160	9	1440	792	2232	1.5	1488	5952	
PHYSICS	160	9	1440	792	2232	1.5	1488	5952	
CHEMISTRY	160	9	1440	792	2232	1.5	1488	5952	
MATHEMATICS	160	4	640	352	992	1.5	661.3	2645.2	
OPERATIONAL RESEARCH	160	4	640	352.	992	1.5	661.3	2645.2	
GEOLOGY	160	9	1440	792	2232	1.5	1488	5952	
SCIENCE ED.	180	5	900	495	1395	1.5	930	3720	
TECHNICAL EDUCATION	170	9	1530	841.5	2371.5	1.25	1897.2	7588.8	4.0407 (HA)
GEOGRAPHY	160	9.5	1520	836	2356	1.5	1570.7	6282.8	
U.R.P.	200	9.5	1900	1045	2945	1.5	1963.3	7853.2	
SURVEYING & PHOTO.	160	9.5	1280	704	1984	1.5	1322.7	5290.8	
METEOROLOGY	160	9.5	1520	704	1984	1.5	1570.7	6282.8	
INDUSTRIAL DESIGN	200	9.5	1900	1045	2945	1.5	1963.3	7853.2	
ARCHITECTURE	240	9.5	2280	1254	3534	1.5	2356	9424	
BUILDING	160	9.5	1520	836	2356	1.5	1570.7	6282.8	
QUANT. SURV.	160	8	1280	704	1984	1.5	1322.7	5290.8	5.4561 (HA)
CIVIL ENG.	200	12	2400	1320	3720	1.25	2976	11904	
ELECT. ENG.	200	12	2400	1320	3720	1.25	2976	11904	
MECH. ENG.	200	12	2400	1320	3720	1.25	2976	11904	
CHEM. ENG.	200	12	2400	1320	3720	1.25	2976	11904	
AGRIC. ENG.	200	12	2400	1320	3720	1.25	2976	11904	5.952 (HA)
SCHOOL OF AGRICULTURE									
A.F.W.	160	14	2240	1232	3472	1.25	2777.6	11110.4	
C.P.H.	160	14	2240	1232	3472	1.25	2777.6	11110.4	
A.E.E.	160	14	2240	1232	3472	1.25	2777.6	11110.4	
S.S.	160	14	2240	1232	3472	1.25	2777.6	11110.4	
F.R.M.	160	14	2240	1232	3472	1.25	2777.6	11110.4	5.5552(HA)

TABLE 4.10.1

LAND REQUIREMENTS FOR ACADEMIC SUPPORT UNITS/DEPARTMENTS 1990-1997

FACILITIES	APPRAISED RECOMMEND STUD.M² E.T.C.	BALANCING AREA %	USEABLE AREA	BALANCING AREA	TOTAL	HEIGHT FACTOR	PLINTH AREA	SITE COVERAGE %	SITE AREA M²
CENTRAL ADMIN.	0.50	55	2650	1457.5	4107.5	3	1369.2	20	6845.8
LIBRARY	1.25	35	6625	2318.8	8943.8	1.5	5962.5	23	17887.5
LARGE HALL	0.20	50	1060	530	1590	1	1590	20	7950
AUDITORIUM	0.12	65	636	413.4	1049.4	1	1049.4	20	5247
CONFERENCE CENTRE	0.10	45	530	238.5	768.5	1	768.5	25	3074
HEALTH CENTRE	0.10	55	530	291.5	821.5	1	821.5	25	3286
DINING HALL	0.50	50	2650	1325	3975	1	3975	25	15900
COMPUTER CENTRE	0.20	40	1060	424	1484	1	1484	25	5936
STUDENT COMMON ROOMS	0.55	50	2915	1457.5	4372.5	1	4372.5	33	13117.5
STAFF COMMONRCOM	0.25	50	1325	662.5	1987.5	1	1987.5	33	5962.5
OUT-DOOR THEATRE	0.20	55	1060	583	1643	1.25	1314.4	25	5257.8
INDOOR SPORTS	0.20	30	1060	318	1378	1.25	1102.4	25	4409.6
SHOPPING CENTRE	0.25	15	1325	198.8	1523.8	1.25	1219.04	25	4876.2
CENTRAL STORE	0.12	50	636	318	954	1.25	763.2	33	2289.6
AUDIO VISUAL	0.10	40	530	212	742	1.25	593.6	25	2374.4
ESTATE DEPARTMENT	1.20	15	6360	954	7314	1.25	5851.2	25	23404.8
FILLING STATION	0.20	15	1060	159	1219	1.25	975.2	25	3900.8
STAFF SCHOOL	0.25	50	1325	662.5	1987.5	1.25	1590	25	6360
TOTAL			33337	12524	45861		36789.14		13.81 HA

The basis of computation of land requirement for Academic support facilities, the 5,300 number of students has been used.

The balance areas as recommended by the NUC standard guidelines, e.g. balance area for central Administration is 55%, this is so to cater for circulation space needed for staff and the large number of visitors.

On the other hand, the balance area for the Library is only 35%, this is because reading room is part of circulation itself. As for the other facilities, this is detailed out in table 4.10.1.

However, the number of storeys and site coverage varies in a few cases depending on the characteristics of the facilities. For example, the central Administration is planned to have a Height Factor of 3 with only 20% site coverage. The provision of more height and wider area would help to evolve an imposing design with adequate foreground of open spaces. On the other hand, Health Centre, Central Store etc. are only 1.25 storey high with 25% to 33% site coverage for obvious reasons of functionality.

Table 4.10.1 details out the area requirements by the various facilities with a total of 13.81 hectares.

4.40 REQUIRED LAND AREAS FOR OTHER FACILITIES

The total ground areas required for each of the facilities as recommended by NUC standard guidelines are generally adopted with few modifications e.g. ground area for Botanical Garden is changed from 5 hectares to 6 hectares, power plant from 0.13 to 0.2 hectares etc.

A total of over 526.41 hectares is proposed for the facilities.

TABLE 4.11.1

FACILITY	GROUND AREA IN HECTARES
Farm	500 HA
Botanical Garden	6
Zoo	5
Security & Fire fighting	3
Sewage Treatment Plant	2
Power Plant	0.2
Car Park	10
Telephone Exchange	0.06
Central Laundry	0.15
Places of worship	Ad-hoc

Source: NUC Standard Guidelines for Nigerian Universities, Field Work.

4.50 RESIDENTIAL AREA REQUIREMENTS

4.51 STUDENTS RESIDENTIAL AREA REQUIREMENT

According to the university Authority, the location of the university in relation to Yola town, makes it inadvisable to enrol large number of students who will reside off-campus at the initial stage. However effort

will be made to provide accommodation for a greater number of students up to its maturity stage to enhance the quality of university experience through increased interaction between learning and the student life beyond the classroom. To this end, at maturity, $\frac{2}{3}$ of the student population will be accommodated.

The useable area standards used for calculation of area requirements is based on the proposals that were made in the preceeding discussion of chapter three. Accordingly a total of 17.2 hectares is projected as the land requirement for the student Hostels.

4.52 STAFF RESIDENTIAL AREA REQUIREMENTS SENIOR STAFF

The residential land area computation is based on the NUC Policy of accommodating $33\frac{1}{2}\%$ of all Senior staff on the campus at the average rate of the proposed one hectare gross area for each Household. The plot area is computed at 25% site coverage. Based on the computation therefore, a total of 196.56 hectares is required for the Senior Staff Housing by the end of the plan period.

TABLE 4.12.1 LAND AREA REQUIREMENT FOR STUDENT AND STAFF RESIDENTIAL AREA

DESCRIPTION	PROPOSAL	B.A.	H.F.	FLOOR AREA	PLINTH	SITE AREA
Bed space	12.5	50%	3	99375	33125	13.25 HA
Dining Hall	0.50	"	1.25	3975	3180	1.272
Laundry	0.50	"	"	"	"	1.272
Common room	0.55	"	"	4372.5	3998	1.3992

DESCRIPTION	AREA REQUIRED FOR	GROSS AREA M^2	SITE COVERAGE %	SITE AREA HA
Senior Staff	273 Household 33½	1800	25	196.56
Intermediate and Junior Staff	194	500	33	29.25
TOTAL				225.81

4.53 INTERMEDIATE AND JUNIOR STAFF RESIDENTIAL AREA

The proposed Gross Area for this category of staff is 500m^2 based on which the land requirement was computed using the 11% of the total number of intermediate and Junior staff as recommended by the NUC standard guidelines based on the computation therefore, a total area of 29.25 hectares is required for the I & J staff Housing by the year 1997.

4.60 OTHER AREAS

4.61 ROADS AND PEDESTRIAN AREAS

The Areas for Roads, Tracks and footpaths generally constitute 15% to 20% of the developed areas in institutional campuses. In view of this therefore, 18% is proposed for the Federal University of Technology Yola which is equivalent to 337.60 hectares of land.

4.62 FARM

According to the NUC standard guidelines, 400 hectares of land should be reserved for farming. In view of this therefore, 500 hectares of land is proposed for teaching and basic farms, while a total of 1000 hectares of land is proposed for commercial farming including fish ponds to suplement the revenue base of the university (see summary table for the details).

TABLE 4.13.1 SUMMARY OF SCHEDULE LAND REQUIREMENTS BY MAJOR CAMPUS COMPONENTS (1989-1997)

DESCRIPTION	AREA IN HECTARES
Central Administrtion	4.81
Teaching and Research	71.35
Support Services and Facilities	41.41
Student Residences	17.19
Staff Residences	225.81
Sports and Recreational Areas	15.00
Farms	1500.00
Roads and Pedestrian Areas	337.60
Developed Area existing	86.12
Reserved Area for expansion	1959.84
TOTAL	4259.13

From the table, a total of 2,299.29 hectares has been calculated for the major campus components including the existing developed area. An additional area of 1,959.84 hectares of land is reserved for expansion needs, This provision takes into consideration the fact that the university has been planned for 5,300 students but can expond if need be.

4.70 UTILITIES AND SERVICES REQUIREMENTS

4.71 ELECTRICITY

The National Electric Power Authority NEPA is expected to meet up with the power demand of the campus as the need

arises. The campus is already connected to the National Grid through the local NEPA installations in Jimeta. This supply is however complemented by power generating plants to take care of power failure from NEPA network. There are three transformers within the campus for converting the 11KV to 415V for the use of the campus.

4.72 WATER SUPPLY

The campus has two boreholes which supplies 576,000 litres of water for ten (10) hours daily for over 1000 people. That is to say 576 litres per capita per day. This therefore shows that as now, supply is satisfying demand.

With a projected population of 10,243 for the campus for the year 1997 and an estimated water consumption rate of 200 litres/capita/day for Resident staff (including their Households), 100 litres/capita/day for students and 60 litres/capita/day for the day time population in the core area.

In addition to the above, the water demand for fire fighting is computed at the rate of 2500 litres per minute for a period of 4 hours i.e 600,000 litres is to be reserved for this purpose.

In view of the above consumption rate therefore, the water requirement of the campus is computed as follows:

3968 x 200 = 793600 for estimated number of staff

5300 x 100 = 530000 for students

1000 x 60 = 60000 for day time population at the core

4 x 150000 = 600,000 for fire fighting

TOTAL 1,983,600 litres

It therefore means that the campus need 1,407,600 litres of water to complement the present supply. To meet the demand, there would be need to sink more boreholes or to dam the Girei river or any of the streams especially the one north of the present developed site. In the alternative, the campus should be connected to the Jimeta town Water Board to meet the demand.

4.73 WASTE WATER DISPOSAL

The campus has no central sewerage system. There is therefore the need to take an urgent steps to provide sewer systems, soak-away pits so as to be able to cope with the increased volume of waste water affluent in view of the anticipated increase in the campus population.

CHAPTER FIVE

5.00 AN APPRAISAL OF PRINCIPLES AND CONCEPTS FOR CAMPUS PLANNING AND DESIGN IN NIGERIA

5.10 LITERATURE REVIEW ON UNIVERSITY PLANNING PRINCIPLES

Campus planning and town design have a great deal of similarity and other analogous problems in which a highly enmeshed environment has to be created over a long period with probably a considerable life expectancy.

To understand the principles of university planning therefore, it is necessary to briefly discuss the factors governing the principles of campus planning because they offer both the planner and designer some basic challenges which influence the physical form the campus may take. In campus planning, there are some prominent problems that have to be resolved. These issues are problems of provision of working, living, studying and recreational facilities such that the campus can function effectively.

5.11 FACTORS GOVERNING UNIVERSITY PLANNING AND DESIGN PRINCIPLES

The following factors are very important in the development plan of a university campus.

5.12 THE RELATIONSHIP BETWEEN THE CAMPUS AND THE TOWN

The University Milieu is expected to be the product of the total environment, be it social, cultural, economic or physical in which it is sited. This therefore means that there is need for considerable investigation of the

socio-cultural and geographical context of the region, district or town where the campus is to be located; others are research into the local vegetation and adoptable exotic breeds that would be incorporated into the campus landscape; and the analysis of forms and building relationship in their setting so as to match with the social and academic ideals of the university.

5.13 THE INTERNAL RELATIONSHIP BETWEEN THE CAMPUS ELEMENT

This factor suggests that the university system is a society of individuals living together for the advancement of learning and dissemination of knowledge. It therefore means that the society should embrace the Academic staff, students and non-Academic staff who work together to extend the limits of knowledge. In planning terms, it requires the campus core to be within the reach of its community, and the working/learning and living areas should be in harmony. In view of this, there is need for the plan to be compact and to have a good internal communication to facilitate contact between people, capable of growing without disintegration and to provide for a clear hierarchy of identifiable and related groups from the individual to the whole, so that each person and group can identify his own unique position in the campus consequently for the university to have sufficient cohesion to operate as a community.

5.14 ADVANCEMENT IN KNOWLEDGE AND TECHNOLOGY

The university is referred to by this factor as a meeting place of different aptitudes, skills and specializations. In planning and design terms, it requires that the campus core be compact but without congestion to ensure an ease of dialogue and communication between component parts of the campus for the advancement of knowledge and technology. It is also pertinent to provide socialization points and a strong core to enhance meeting and to stimulate maximum interaction without causing congestion.

5.15 FLEXIBILITY

This factor recognises the dynamic and changing role of the university as a living organism. In view of this, it therefore requires change in the university programme to meet the emerging needs of the society and social structure, by embracing cultural technological changes of the society and shifts in manpower needs. There is need to make provision in the design for easy growth and flexibility of use.

In planning and Architectural terms, the university development plans and the details of their constituent parts should be adaptable to change when the need arises.

5.16 AVAILABILITY OF LAND

There should be enough land for the various elements and the relative space each occupies for effective function of the campus and more so to accommodate future expansion.

5.17 SITE CHARACTERISTICS

A thorough site analysis is to be made for site suitability in view of the variation in the topography, geology, soil, drainage and other physical characteristics of land. This is because such variations, do affect the physical development on the site.

5.18 ACCESSIBILITY

An ideal site for campus development is one that is accessible to the town and other surrounding land uses, preferably on a regional road.

5.19 GOVERNMENT POLICY

Government policy on Education does affect the amount of funds available for campus development. It may also affect the availability of land either due to delay in compensating displaced persons at the acquired site or that the land is not made available by the government.

5.20 CONCEPTUAL RELATIONSHIP BETWEEN THE UNIVERSITY AND THE TOWN

There are five basic concepts with regards to this relationship.

5.21 CO-ORDINATED GROWTH

In this concept, the campus is treated as a district. It focuses on the town centre and maintains a contiguous campus.

Disadvantages:- due to piece meal acquisition of land, private residences may develop very close to the campus thereby creating irregular shape of the campus and

making it difficult for further acquisition of land for expansion. The greater the economic success of such cities, the more problems they pose for the campus as a result of increasing competition for valuable central area site and the consequent pressure on its boundaries.[1] Example of such universities in Nigeria are university of Nigeria Nsukka, Jos, Lagos and Maiduguri.

5.22 PARTIAL DISENGAGEMENT

In this concept, the university is separated partially from the town either as a result of deliberate planning policy or latterly after a formerly remote campus location may have generated such a sprawl to become a district within the city.

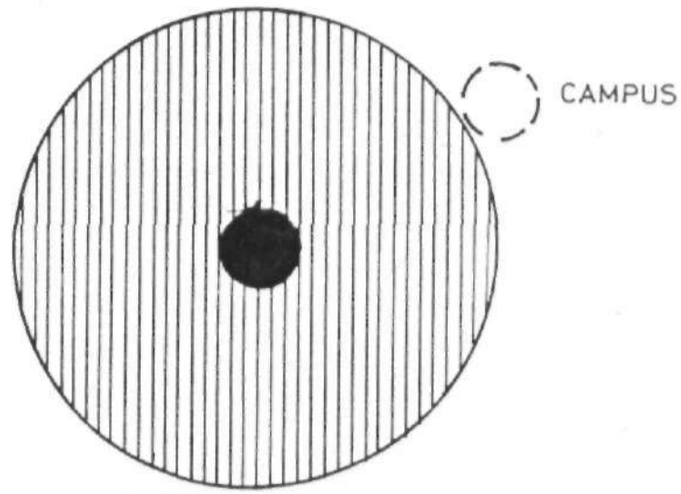
Though the campus community may find it easy to meet their need due to their close proximity to commercial centres in the city, this type of location allows expansion in only one direction and thus hinders its growth. University of Lagos and most older universities in Nigeria display such characteristics partially (see fig. 17).

5.23 DIRECT FUSION

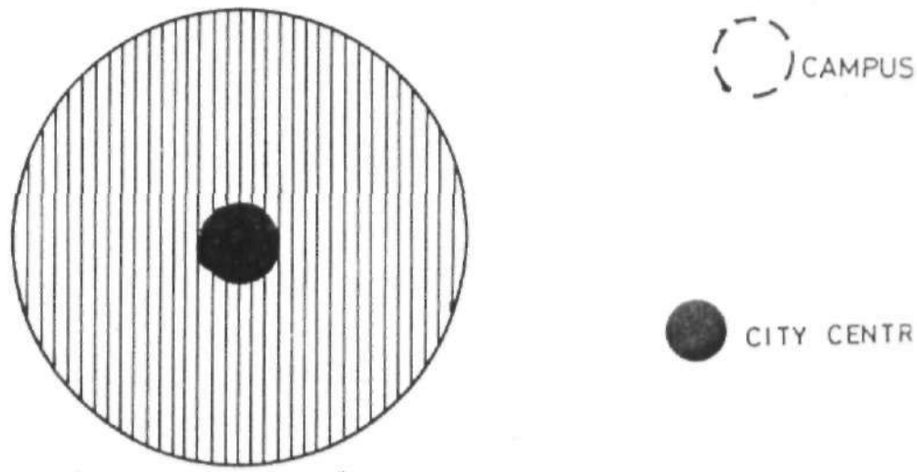
This concept has been referred to as the dispersed structure and the poly-structure. In this location, the town and the campus are so integrated that one cannot distinguish between their land uses easily. Though this relationship maximises integration between the campus and the town, however the needed interaction between the students and staff of various faculties or colleges are sacrificed

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1. Jordan J. (1968). "University Development Plans- Analysis of Function" in Architectural Journal Information Library 31/1/1968.

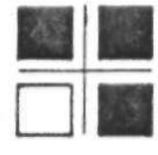


PARTIAL DISENGAGEMENT



TOTAL DISENGAGEMENT

FIG. 17 CAMPUS/CITY LOCATIONAL ALTERNATIV



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almost for the interaction with the city, likewise the conveniences of administration in particular and Academic work to some extend are lost as a result of dispersed facilities.

Examples of such universities are A.B.U. Zaria and Lagos in Nigeria. Oxford and Cambridge in Britain adopted this relationship (see fig.18).

5.24 TOTAL DISENGAGEMENT

According to this concept, the campus is entirely separated from the city. In England, such concepts were utilized during the 1960s and universities were located "out in the field".[2] This is the most common practice in Nigeria.

Though this location may offer conducive atmosphere for academic pursuit and enough land for development, but may create the problem of isolation and becomes difficult to solve the short term gains of convenience and long term goal of integration into the city (see fig.17).

5.25 THE MULTI-CAMPUS

The difference between this and dispersed structure is that it has two or more campuses.

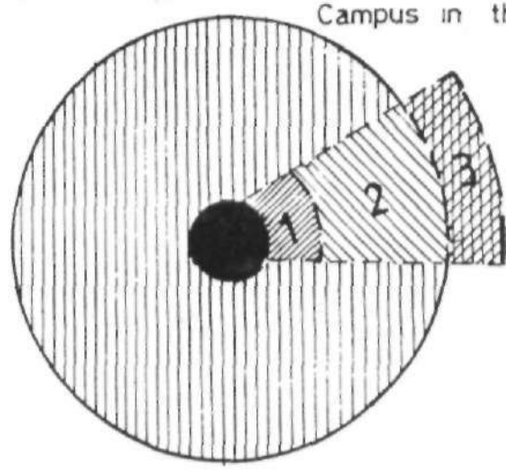
Some of the disadvantages are loss of administrative convenience, sacrifice of the integration between the students and staff of various disciplines. Examples are A.B.U., Zaria and Lagos. (see fig. 18).

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2. Jordan J. (1968), ibid., p.99.

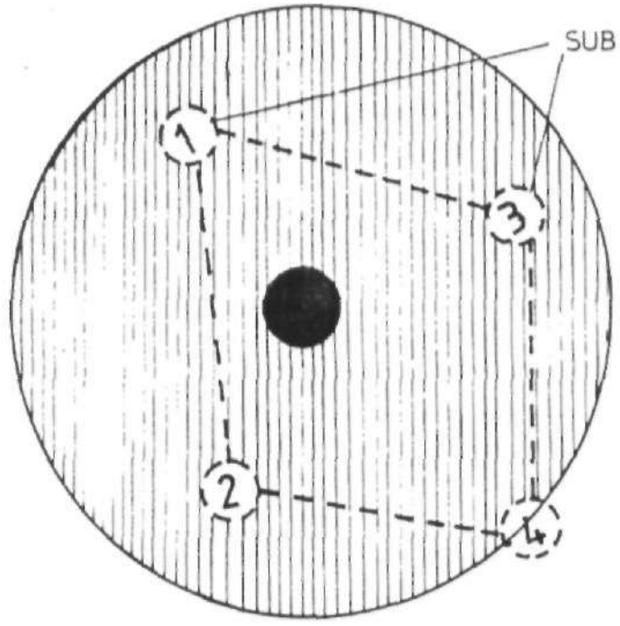
DIRECT FUSION

Campus in the heart of the city



1 Residential zone
2 Academic zone
3 Recreational zone
e.g. University of Ibadan

MULTY CAMPUS UNIVERSITY



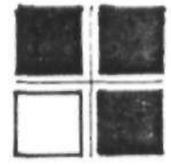
- Each Campus should be self sufficien
- Convenient for off Campus Student

Example: A.B.U. Zari

CITY CENTR

THE CAMPUS / CITY LOCATIONAL ALTERNATIVES

FIG. 18



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A. B. U. ZARIA

5.30 CAMPUS PLANNING AND DESIGN PRINCIPLES

5.31 CONTINUOUS TEACHING AND DESIGN PRINCIPLES

This relates to the issue of flexibility, compactness and coherentness of the core. It therefore entails that the campus should not spread unnecessarily over-space, but express itself as an entity by being compact and coherent in its layout.

Uses naturally given character of the site where each structure contributes to the spatial quality of the whole set up and lastly uses court-yard planning by completing space by space and keeping access to possible future expansion site.

5.32 TEN-FIFTEEN MINUTE PRINCIPLE

This gives due regard to the pedestrian convenience by ensuring that it does not take more than 10-15 minutes to walk from one part of the campus core to another including studentsresidence. This is because movement between Halls of residence, teaching/research areas, Central administration, supporting services and socialization points are principally pedestrian.

The cores of the university of Jos, Ilorin, Calabar, Bayero, Maiduguri and Port-Harcourt are patterned on this principle with pedestrian orientation though that of Port-Harcourt is interrupted by vehicular traffic at some points (see figure 19).

5.33 A TWENTY-FOUR HOURS PRINCIPLE

This calls for a rational location of the various elements of the campus to ensure a continuous use of the

campus core so as to avoid a "ghost" situation after working hours. It therefore requires the location of student residences close to the core area, 24 hours Library Services and facilities for sports to ensure a cohesive atmosphere of the campus community.

Examples of universities where this principle is weakly developed includes A.B.U., Zaria, O.A.U. Ife, Benin, Ibadan, Lagos and Nsukka.

5.40 CAMPUS PLANNING ELEMENTS

In any campus planning, four principal activity areas are often identified.

i) The central Administration;
ii) The Teaching and Research Area;
iii) The Students and staff Housing Area
iv) The Support Service Area; otherwise known as maintenance or Estate department, etc.

The central Administration constitutes administrative block, campus Bookshop, the main assembly hall, the Senate/ academic buildings and in some cases convocation squares and some shopping facilities.

The Teaching and Research and the Central administration areas have been variously referred to as the campus core.

The way these elements are related in space determines the overall form the campus takes. Their spatial relationship also determines the degree of interaction between the campus community.

In view of this therefore, the concept of spatial relationship between these d elements is a very important and fundamental planning decision that needs to be reached in the process of campus planning, though factors such as site, climate, functional requirements, educational aims and objectives, materials, technology, designers, philosophy and clients aspiration do affect campus forms.

5.50 CONCEPTUAL RELATIONSHIP BETWEEN THE CAMPUS ELEMENTS

5.51 THE CLOSE-KNIT TYPE

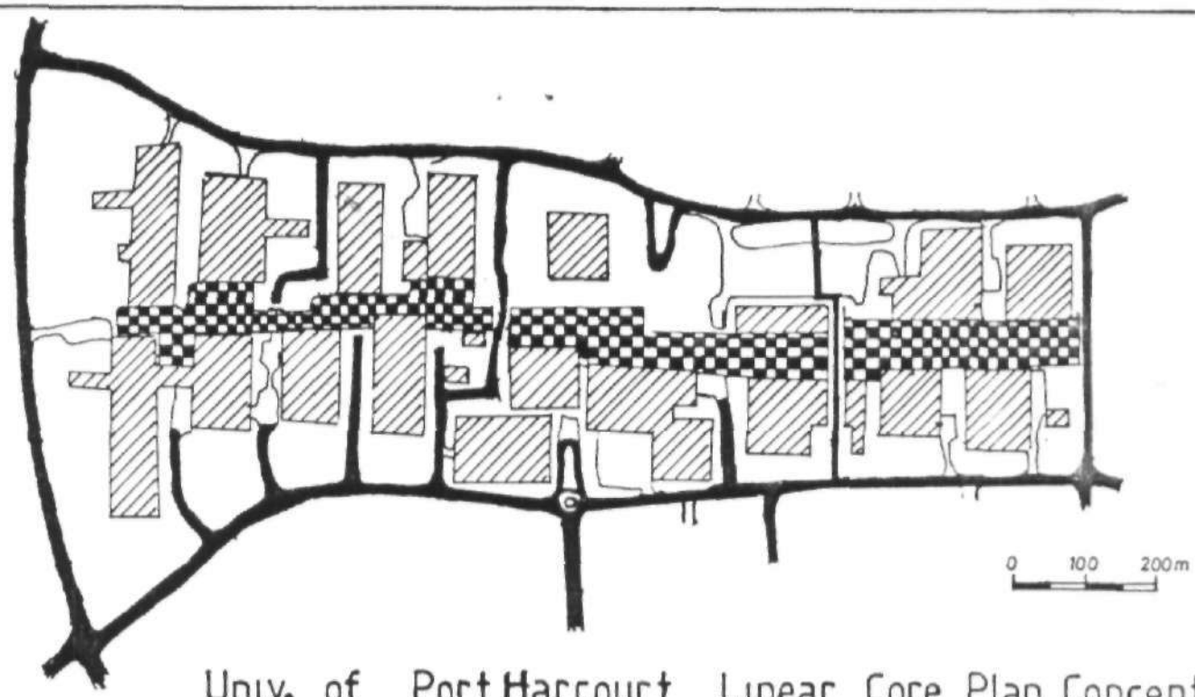
This type is largely collegiate in approach with each unit being largely self-sufficient with weak interaction between members of the units.

Advantages of this type are that it could be easily incorporated into the city structure in the form of dispersed campus; High level of interaction within each campus. But on the other hand it creates low level of interaction between colleges due to physical distance, and duplication of facilities, utilities and services.

Examples are York University in Britain, A.B.U., Zaria and University of Lagos in Nigeria (see fig. 20).

5.52 THE LOOSE-TIE CONCEPT

The central Administration is located at the centre, while the Academic area, facilities and Residential areas locate at the opposite sides of the central Administration thereby giving it a focal location. As a result of this, separate development of each activity area and flexibility needed for future expansion are ensured. But the rigid



Univ. of Port Harcourt Linear Core Plan Concept

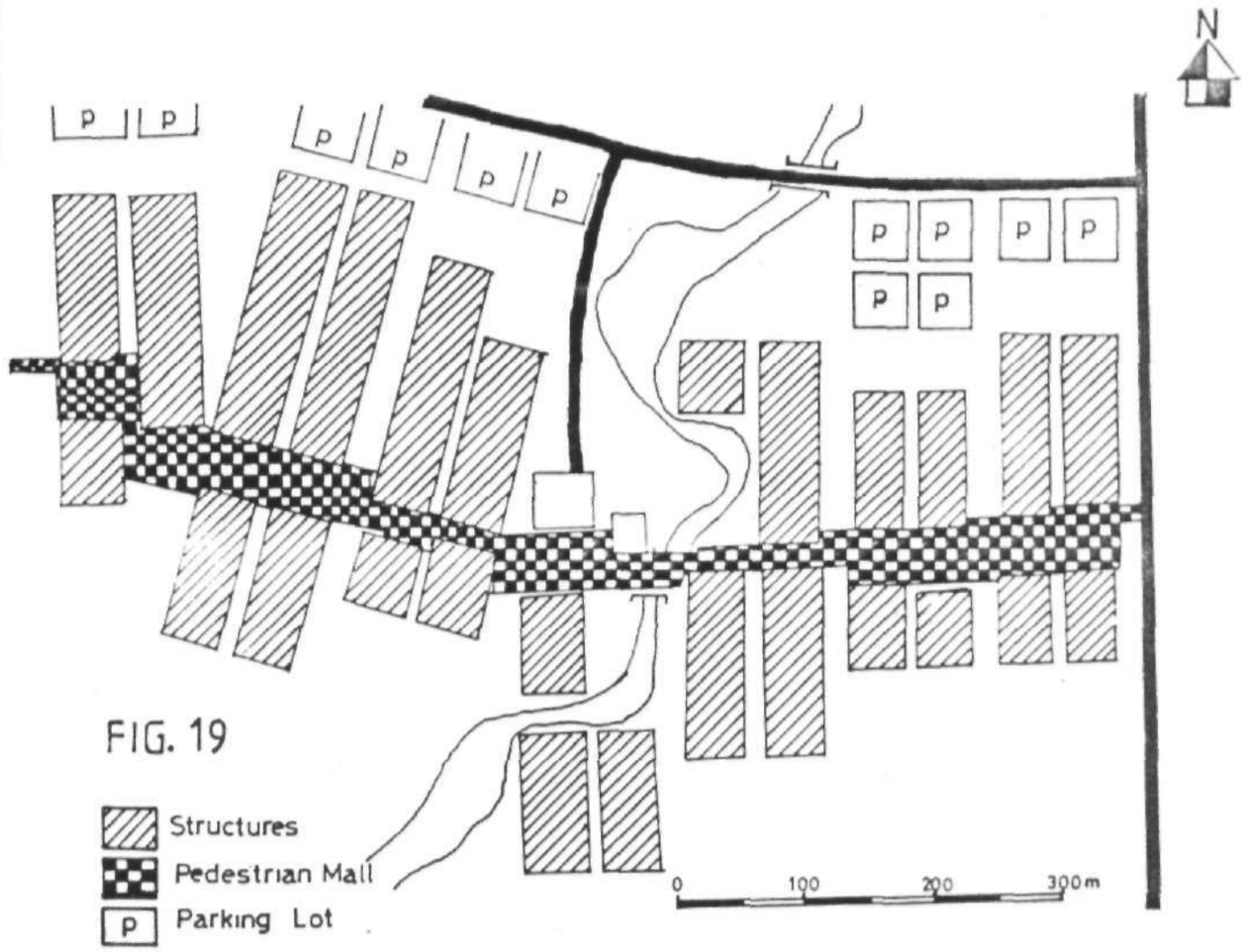


FIG. 19

Univ. of Jos Linear Core Plan Conce

Source: Univ. of Port Harcourt Master Plan and Ayorinde, M. A.(1981)

CAMPUS CORE PLAN CONCEPT

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m.sc. thesis

nature of location of staff and student Housing areas reduces high level of interaction after working hours.

Also the need for daily journey to work is dominantly evident especially to the disadvantages of the students. This concept has the attraction for the various components to grow independently, while the whole system is inturn capable of early functioning with minimal expenditure.

This is the setting in Oxford, Cambridge both in Britain. Ilorin, Jos, Usmanu Danfodio Sokoto in Nigeria. But the Nigerian case is in combination with the Ring Concept. (see fig. 20).

5.53 THE RING CONCEPT

This type is commonly found in Nigeria. In this concept, the campus elements are located progressively away from the central administration. First, the academic area, then the student Housing and lastly staff Housing at the periphery. This arrangement gives a long and impressive approach leading directly to the public area, semi-public and then to that of privacy. It limits visitors to the public area.

An interesting characteristic of this type is that it makes it impposible to go from one area of use to another without coming in contact with at least one completely academic or social character on the way.

It encourages social interaction, good mixing and usage of facilities and has a great potential of spreading overlarge areas. But the concept has a rigid characteristic and not easily expansible.

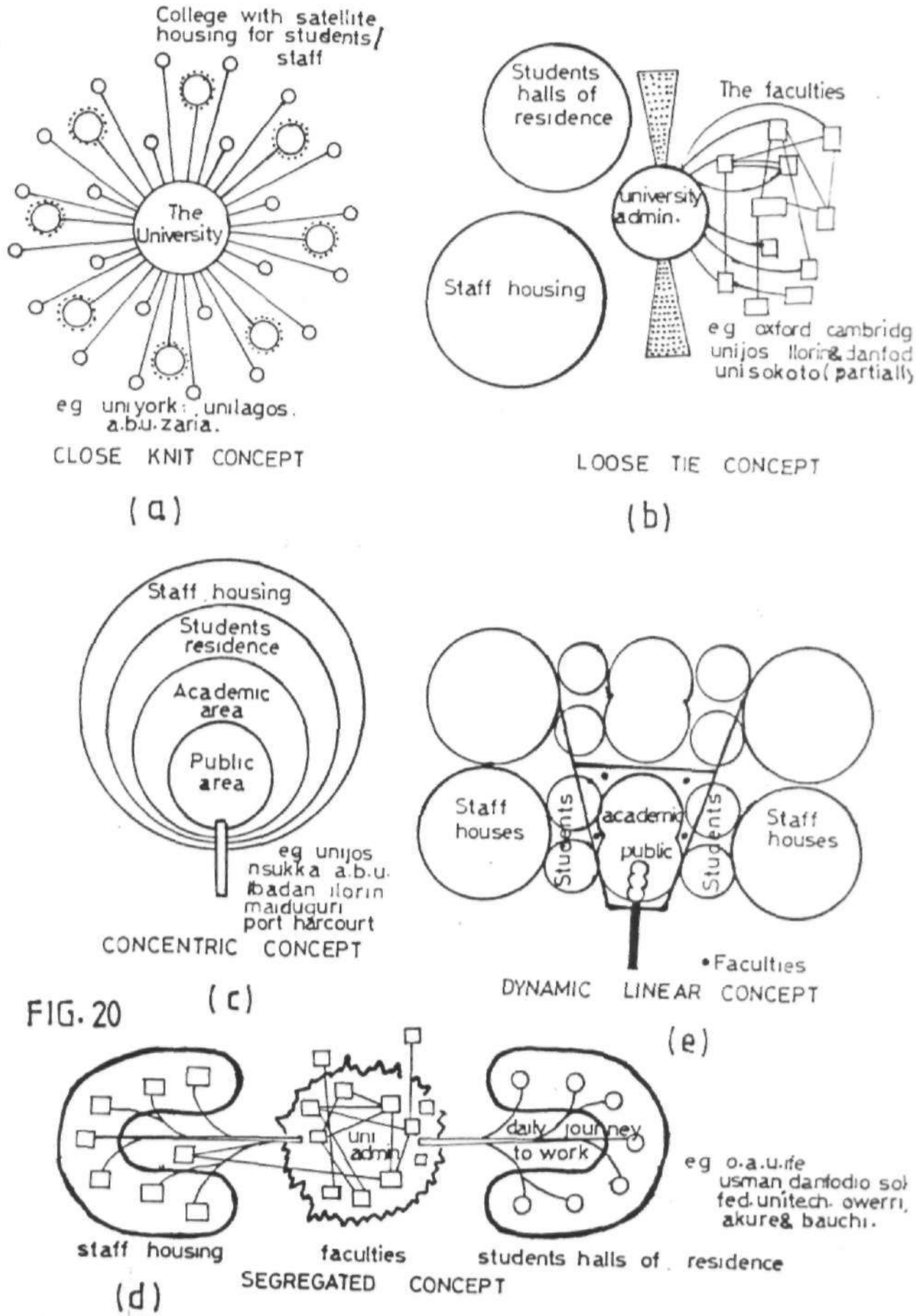


FIG. 20

Source: Federal polytechnic Abuja Master Plan (1986)

CONCEPTS OF INTERELEMENT RELATIONSHIP

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Examples are Universities of Jos, Ibadan, Ilorin, Port-Harcourt and Maiduguri. (see fig. 20).

5.54 SEGREGATED CONCEPT

The Central Administration and the Teaching/Research areas are centrally located, while the staff and students Residences are located in semi-circles on the opposite sides of the focal point.

A very minimal level of student/staff interaction is the situation, and there is the need for a daily journey to work for both staff and students.

Another disadvantage is that if there is need for the expansion of the central administration, the initial concept may be disrupted.

Examples are O.A.U. Ife, Federal University of Technology Akure, Owerri, Tafawa Balewa Bauchi, Usman Danfodio Sokoto and most civic Universities in Britain. (see fig. 20).

5.55 THE DYNAMIC LINEAR CONCEPT

The concept demands the location of the campus on one site. It seeks to ensure maximum interaction between elements of the campus and promotes the physical development of the campus, academic and social programmes with minimum cost of investment, hence under this model, duplication of infrastructures is inhibited.

This concept is not only dynamic and flexible, but also offers ample provision for accessibility and interaction between the elements of the university system. (see fig. 20).

5.60 THE NIGERIAN CAMPUSES: PLANNING CONCEPTS, PRINCIPLES AND PRACTICE

Considering the spatial relationship between campus elements, three of the 1970s Universities (Jos, Maiduguri and Port Harcourt, are patterned on the Ring type of concepts.

The Usman Danfodio University Sokoto is patterned after the segregated concept. While that of Ilorin is patterned on the combination of Ring and Loose-Tie concept.

Off the five 1960s Universities analysed; three of them are largely organic i.e A.B.U. Zaria, Nsukka and Lagos. The first two however give an overall impression of the Ring type concept, while Lagos University shows a tint of the close-knit concept, deriving from almost self-sufficient Faculty of Education. The O.A.U. Ife on the other hand is patterned on the segregated concept; while university of Ibadan is purely the Ring type concept. (see fig. 21, 22 & 23).

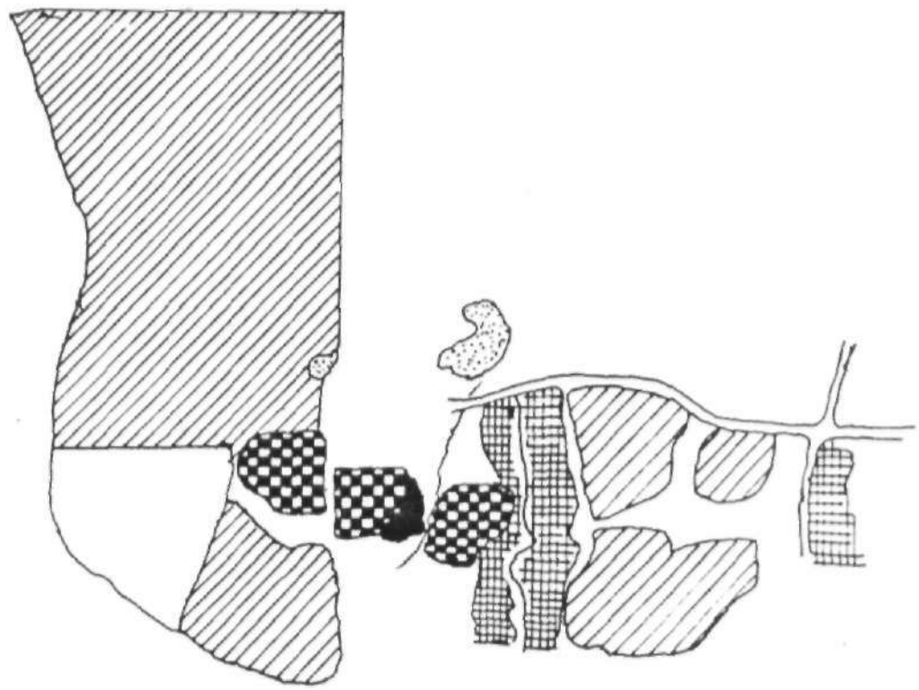
5.70 APPRAISAL OF ALTERNATIVE CONCEPTS OF THE DEVELOPMENT PLAN

Whichever concept is adopted in the planning of the Federal University of Technology Yola, the site condition, the land requirements and the existing development on the site will have one constraint or the other on the concept, because of the locational decisions of the academic, administration, staff and student residential areas and some supporting facilities.

In view of the above reasons, three alternative concepts are hereby presented with a view to selecting one

UNIVERSITY OF JOS

Combination of ring & loose tie concepts



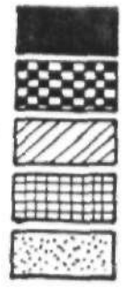


FIG. 21

SOURCE: Ayorinde M. A. (1981)

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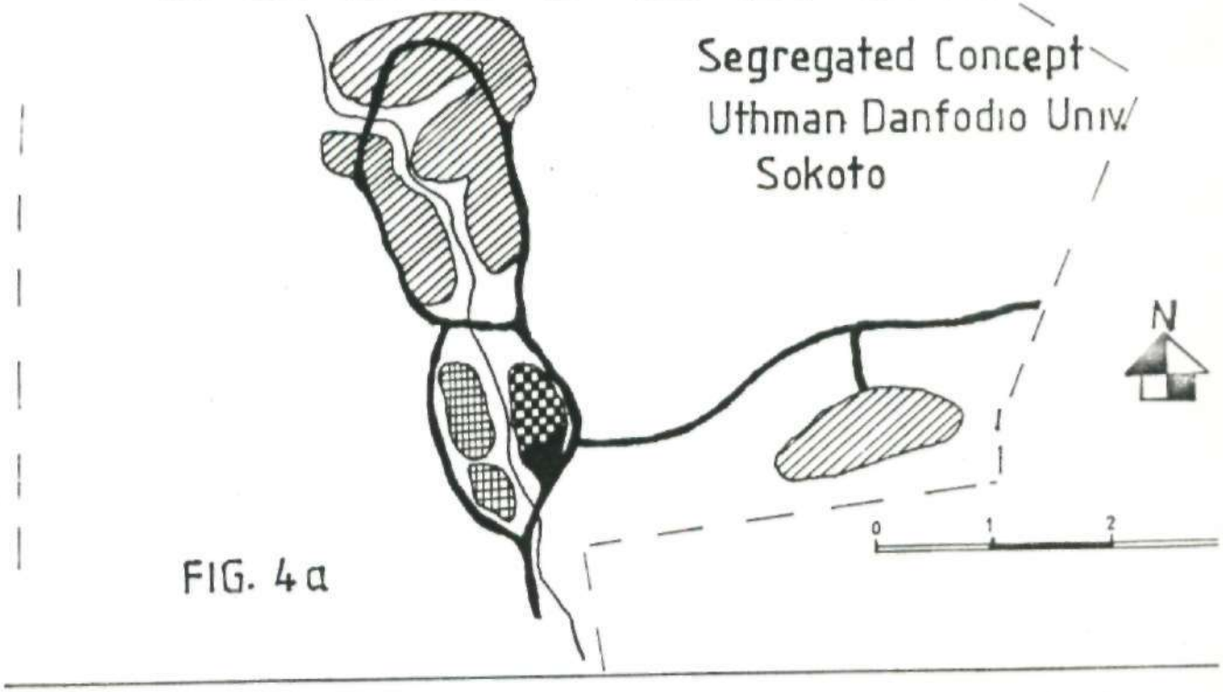
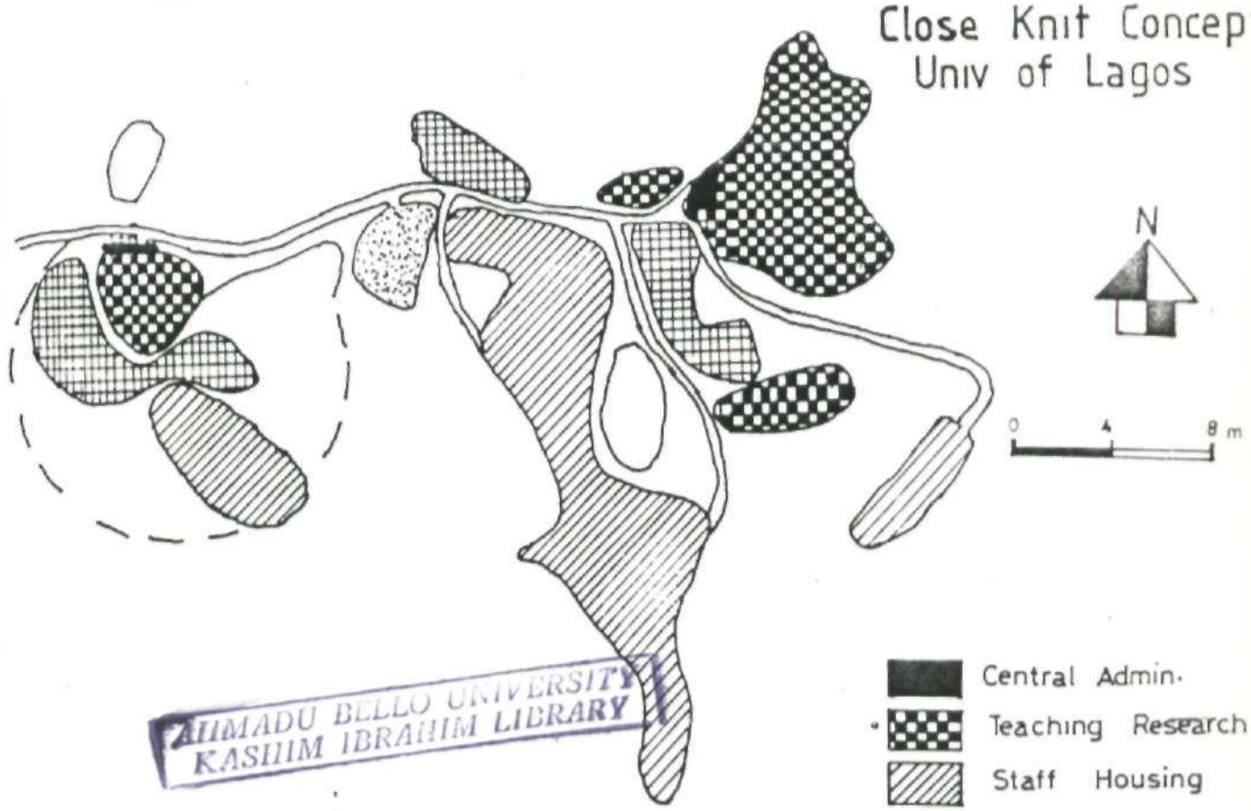


FIG. 4a



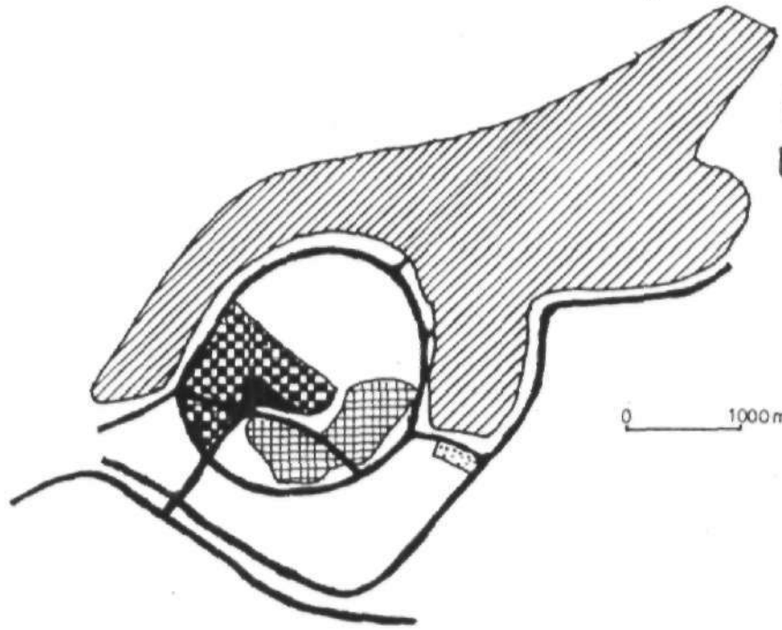
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KASHIM IBRAHIM LIBRARY

FIG. 22

Source: Ayorinde, M. A. (1981).

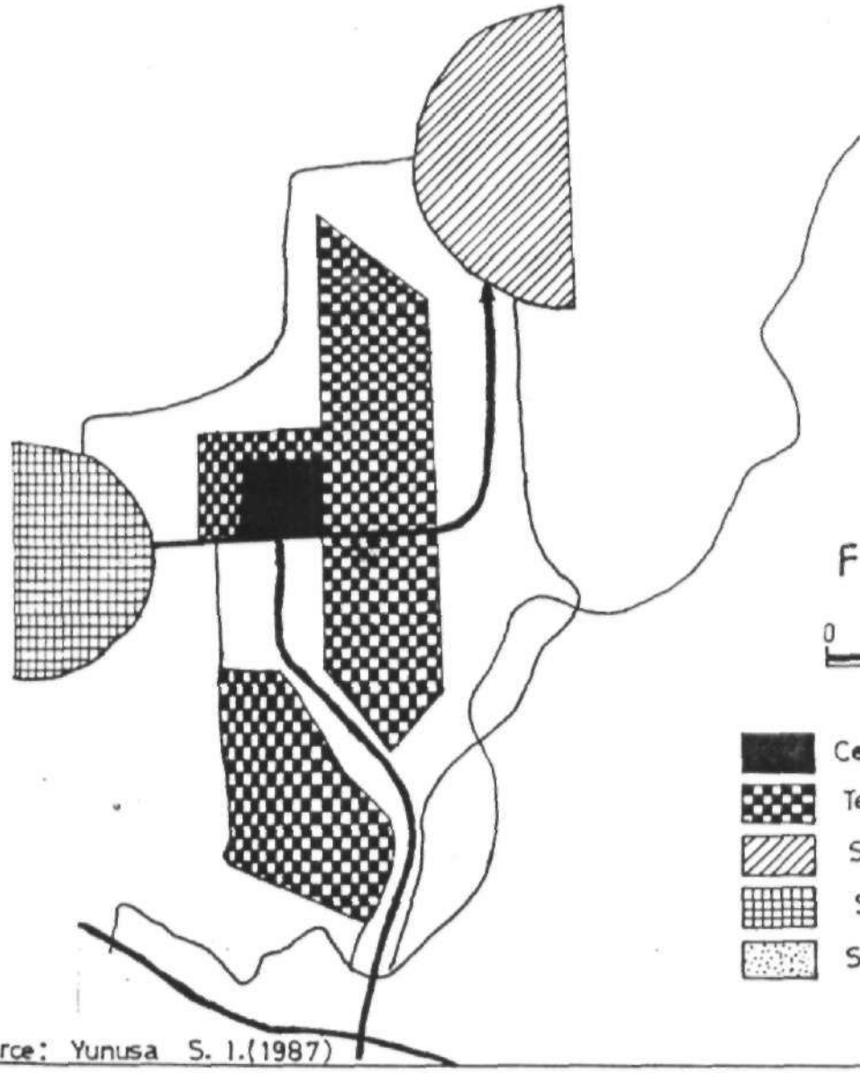
CONCEPT OF INTERELEMENT RELATIONSHIP

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Ring Concept
Univ. of PortHarcou

Source: University of Port Harcourt Master Plan (1978)



Segregated Concep
O. A. U. Ife

FIG. 23

0 5 10M

Central Administration
Teaching / Research
Staff Housing
Student Housing
Services

Source: Yunusa S. I.(1987)

CONCEPT OF INTER ELEMENT RELATIONSHIP

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for further detailing. The first alternative is a concentric concept. The second is a dispersed linear concept, while the third is a dynamic linear concept.

5.71 ALTERNATIVE CONCEPT A

This concept demands the location of the campus on one site.

The concept is characterised by an impressive bold approach which leads directly to the public area in which common facilities are located.

The land use of the campus in this concept are arranged progressively in the following order. The public area being the central administration, followed by the semi-public which is the academic area and then the private area being the residential area for both students and staff at the periphery.

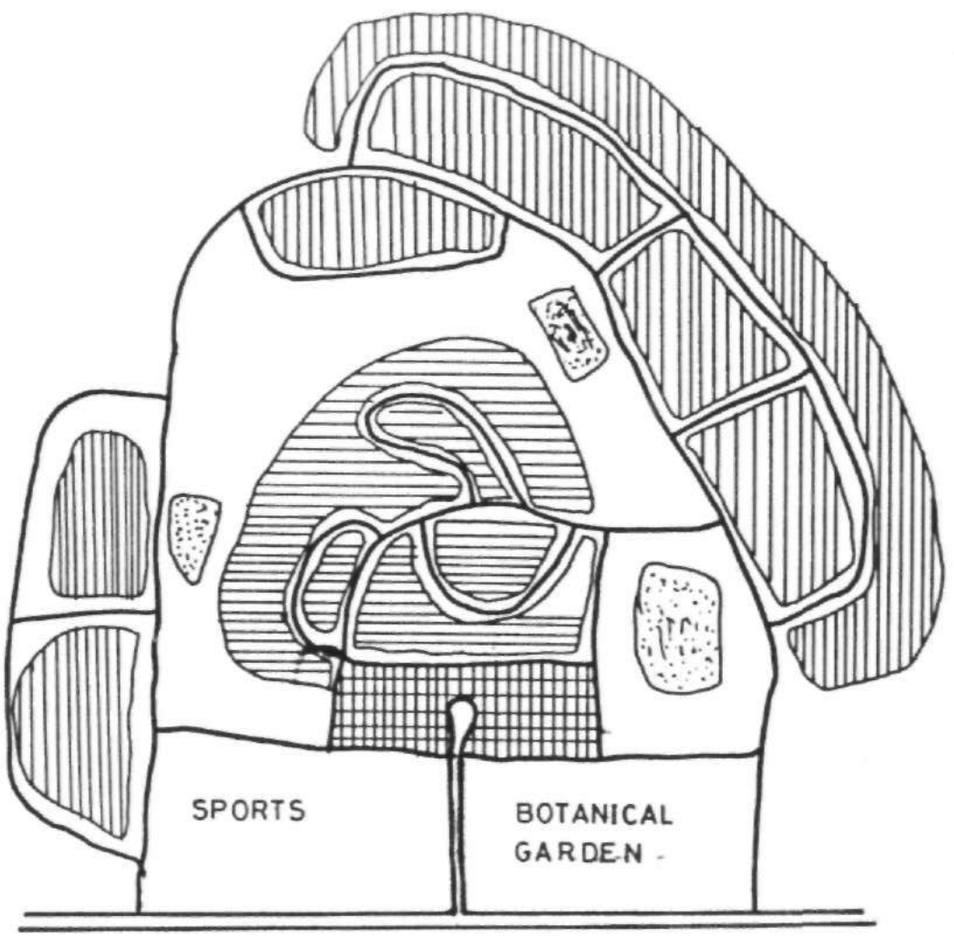
The land use arrangement of this concept limits visitors to the public area.

This concept encourages social interaction, good mixing and usuage of facilities. It has great potential of spreading over large area and is so designed that it makes it possible for one to come in contact with at least one completely academic or social character on the way as you go from one area of use to another.

But the disadvantage of this concept is its rigid nature that may inhibit expansion.

Apart from being rigid, the concept may not comfortably accommodate the existing development on the site. This is because the pattern of road network will be a constraints to

ALTERNATIVE A CONCEPT



KEY

STAFF

STUDENTS

ACADEMIC AREA

SPORTING FACILITIE

N

FIG. 24 CONCENTRIC CONCEPT

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ZARIA

its application, likewise the location of Central Administration, Library, School of Science, Female Hostels etc. Because of these factors, this concept is therefore not favoured. (see fig. 24).

5.72 ALTERNATIVE CONCEPT B

In this concept, the Central Administration building is so located that it is conveniently accessible to all the staff and students and also visitors. Apart from the central administration, other major landuse elements constituting the campus are arranged in a flexible alternate linear form.

This concept ensures a reasonable degree of co-ordination and proper integration of uses thereby ensuring functional relationship.

Also in this model, apart from the public area being the hub of the campus for interaction, it enhances mobility that makes way for high degree of social and academic contacts between students and staff of different schools, departments and facilities.

But on the other hand, the dispersed and linear nature of the concept may limit a high level of interactions between staff and students of different schools, departments, facilities and living. It may also create long distance to be covered by pedestrians either to their work place, school or living. The campus may also spread unnecessarily overspace.

Finally the concept may not fit into the site in view of heavy concentration of staff Housing on one side.

In view of the above factors, this concept is not favoured. (see fig. 25).

5.73 ALTERNATIVE CONCEPT C

This concept demands the location of the campus on one site, this is never the case with other concepts except concentric concept.

In this model, the landuse of the campus are arranged in a molecular blocks, each having its central administration in the centre, and sandwich by academic area, followed by students and staff residential area at the periphery.

Some of the advantages of locating the campus on one site as demanded by dynamic linear concept includes; the provision of common facilities in one place which ensures maximum interaction between elements of the campus. It enhances mobility that make way for high degree of social and academic contacts between staff and students.

It promotes the physical development of the campus and social programmes with minimum cost of investment. Apart from the above advantages of this concept, the concept is more related to the site development, this is because it can accommodate the existing development, segregate the residences and at the same time allows for expansion of all the elements of the campus northwards.

In terms of relevance to the socio-cultural environment, this concept has some elements of our traditional wall cities

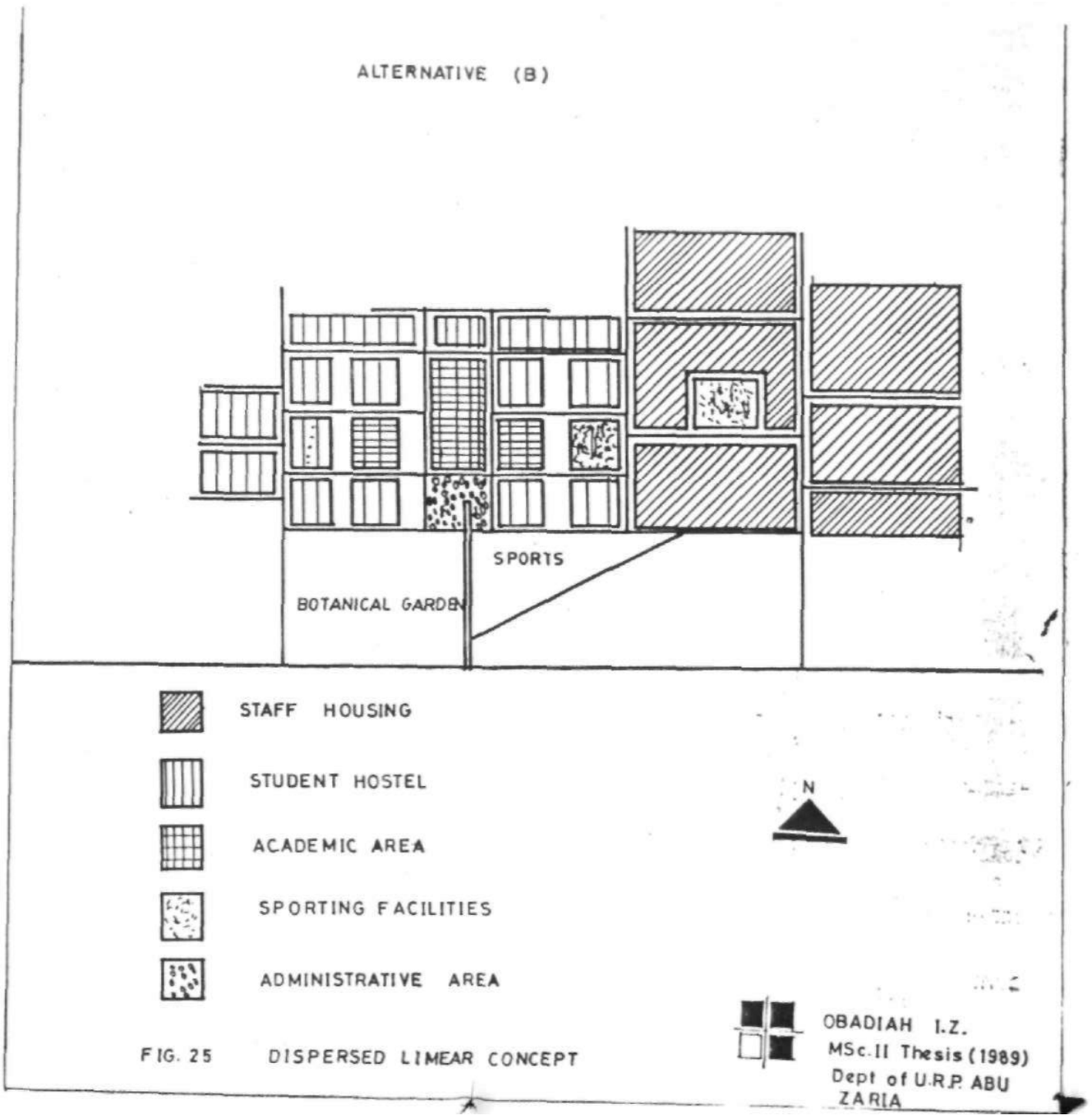


FIG. 25 DISPERSED LIMEAR CONCEPT

with its central hub being the Emir or the Oba palace sandwiched by the academics and students/staff residential areas at the periphery.

In view of the advantages of this concept and its relation to the site development, it is more acceptable and therefore preferred for the development plan of the Federal University of Technology Yola. (see fig. 26).

ALTERNATIVE C CONCEPT

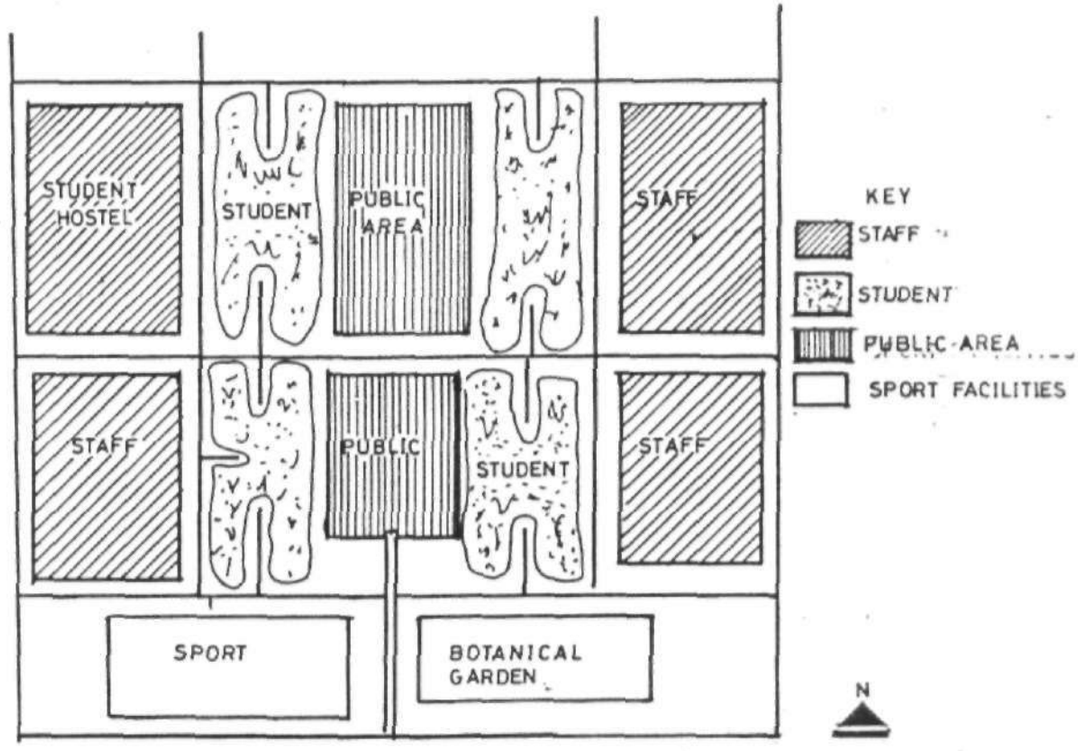


FIG. 26 DYNAMIC LINE CONCEPT

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CHAPTER SIX

6.00 THE DEVELOPMENT PLAN

The general landuse pattern is detailed out in two adopted dynamic linear concepts where some major landuse elements of the campus are given alternative space location such as the academic space, the students residential area, Botanical garden, some supporting facilities, Road network and the Agro-Allied Industrial estate.

Since only one of these plans will be adopted for implementation, it is therefore desirable and necessary to evaluate the two alternative development plans so that the best alternative plan can be identified for further detailing.

For the purpose of evaluation of the best alternative plan for further detailing, weights have been assigned to some factors that forms the basis for the preparation of the alternative plan as tabulated in table 6.1.1. The plan with the highest score is the best for implementation.

Table 6.1.1: EVALUATION OF ALTERNATIVE CAMPUS DEVELOPMENT PLANS

DESCRIPTION	ALTERNATIVE A	ALTERNATIVE B
1. Site consideration	3	3
2. Circulation and Parking	3	2
3. Inter-relationship of various activity areas	2	1.5
4. Functional relationship of various elements	2	2
5. Incorporation of the existing development	2.5	2.5
6. Visual characteristics	2.2	2
7. Accessibility of the Industrial estate to the high way	2.5	1.5
TOTAL	17.2	14.5

The analysis of the scores reveals that alternative 'A' with the highest score is the preferred plan for development. This alternative defines a different public area and the approach to the campus is more direct. It leads into a greater portion of the existing public area and relocation of functions and changes of uses will be less.

It gives room for expansion northwards and ensures the continuity of the design concept.

The location of the academic area removes it from noise pollution from heavy trucks in the highway.

The approach in concept A emphasises the concept of integration of all activity areas by its efficient road network. (see fig. 27).

Alternative B also defines a different public area. However it claims a larger area for the public area. In this concept the Agro-Allied Industrial estate is so located inside that accessibility to the highway becomes difficult. (see fig. 28).

6.10 THE PREFERRED DEVELOPMENT PLAN LANDUSE

The landuse system of the development plan is composed of five clearly defined activity areas:

i) The Central Area with administrative offices and all the academic departments;
ii) Hostels, Dining Halls and Students use areas;
iii) Residential Areas for staff;
iv) Support facilities and services Area;
v) Green Areas for recreation and other uses.

The location of the above elements on the site is guided by the functional relationship they have with each other.

The planning also takes into account a meaningful fusion of the activity pattern and the movement system to ensure efficient day to day function of the campus.

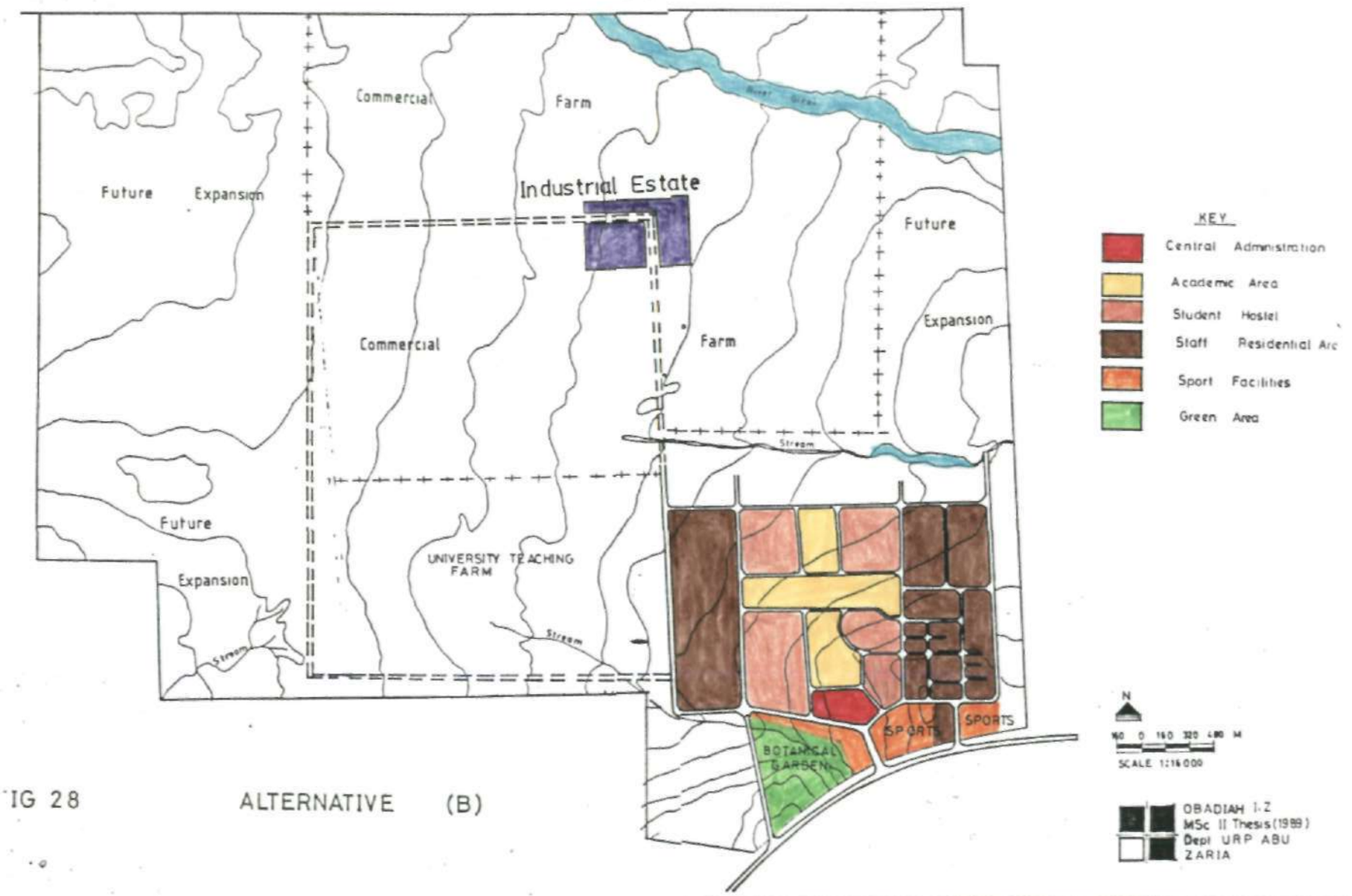


FIG 28 ALTERNATIVE (B)

i) THE CENTRAL AREA

As depicted in (fig. 29) an impressive and bold road leads to the public area where facilities used by both the university and the outside communities are located.

Dominant in the public area are the administration building, large hall convocation square, auditorium, computer centre, central cafeteria, bookshop, shopping centre, student centre complex and the proposed central monument. Because of the nature of the intense interaction expected to be generated by this area, the pedestrian precinct is given more attention.

One of the most emphasised buildings in the Central Area is the Central Administration block at the Centre of the area and directly approached by the main access road. Located nearby are the services and facilities as mentioned above. Since these places are frequented by all, they are planned to form the nucleus of the Central Area, with the academic area located on both side of the area.

ii) THE TEACHING AREA

The academic area is located north of the Central Area. However, relocation of function and charge of use are to be carried out. In this process, the former administration block and some lecture rooms are to House the Research Institute.

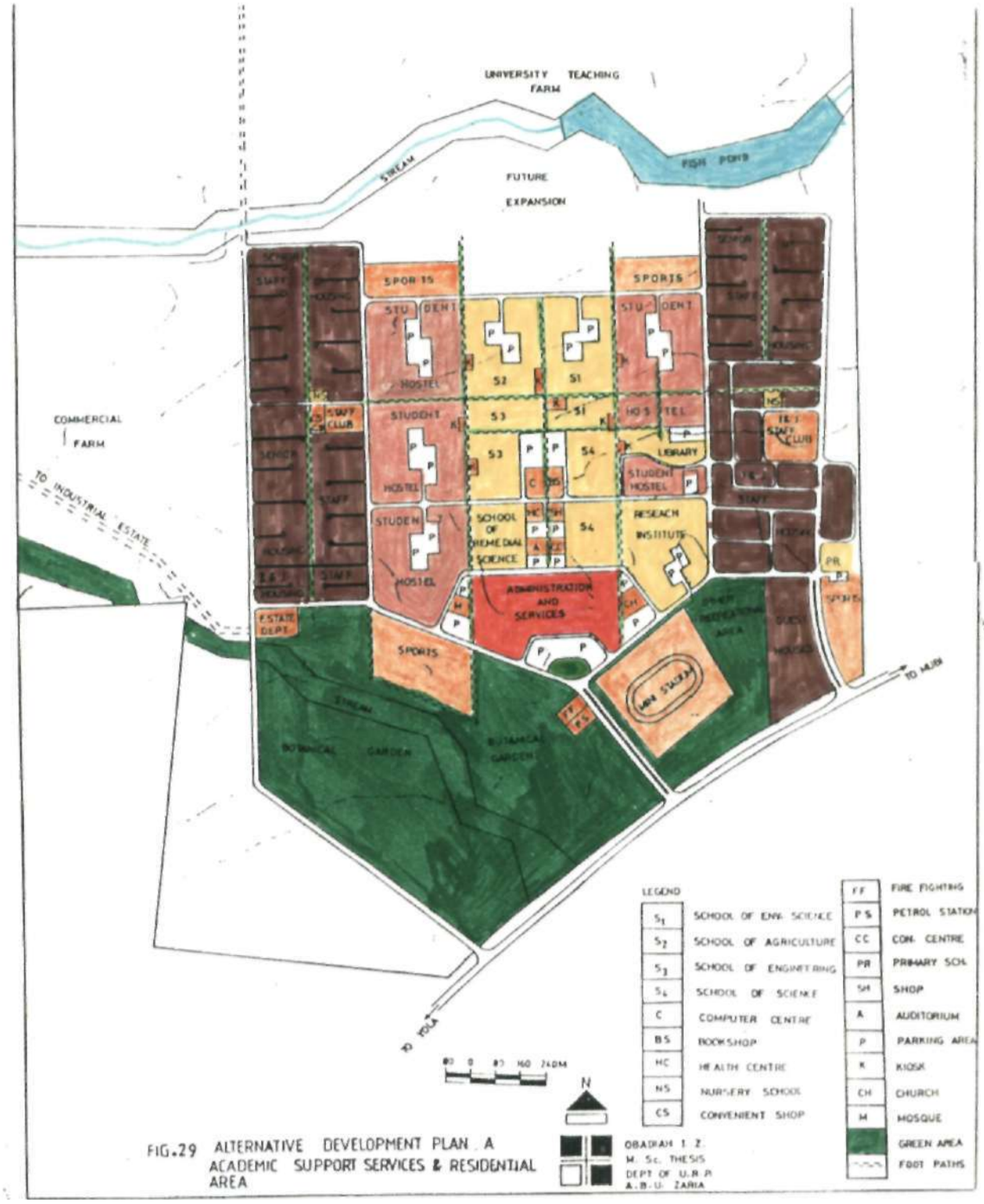


FIG.29 ALTERNATIVE DEVELOPMENT PLAN A ACADEMIC SUPPORT SERVICES & RESIDENTIAL AREA

iii) THE STUDENTS RESIDENCES AND COMMON FACILITIES

Requirement for student residence can be met by redensification of the present area occupied by male Hostels and converted into female Hostels. Expansion can be done northward for male Hostels, while at the sametime Hostels for males are to be located west of the central/academic Areas.

iv) THE STAFF RESIDENTIAL AREA

The present staff Housing East of the developed site can expand northward to accommodate some senior staff while the existing two bedroom and some three bedroom houses are to be allocated to intermediate and Junior Staff.

West of the site adjoining the student Hostels is another site for staff Housing. Intermediate and Junior Staff are to occupy the extreme southern part while Senior Staff are to occupy the northern part of the area. The residential area is planned considering the relationship of the living, work and pleasure areas in the campus, for wholesome functional operational efficiency of the university.

6.20 UTILITIES, FACILITIES AND SERVICES

Utilities, facilities and services are planned for in the development plan as contained in the schedule of requirements in chapter IV. Their envisaged network, location and size are in relation to the activity pattern, site condition and physical layout of structures.

6.21 UTILITIES

All network of water supply, sewerage and power distribution are alligned either along the roads or through

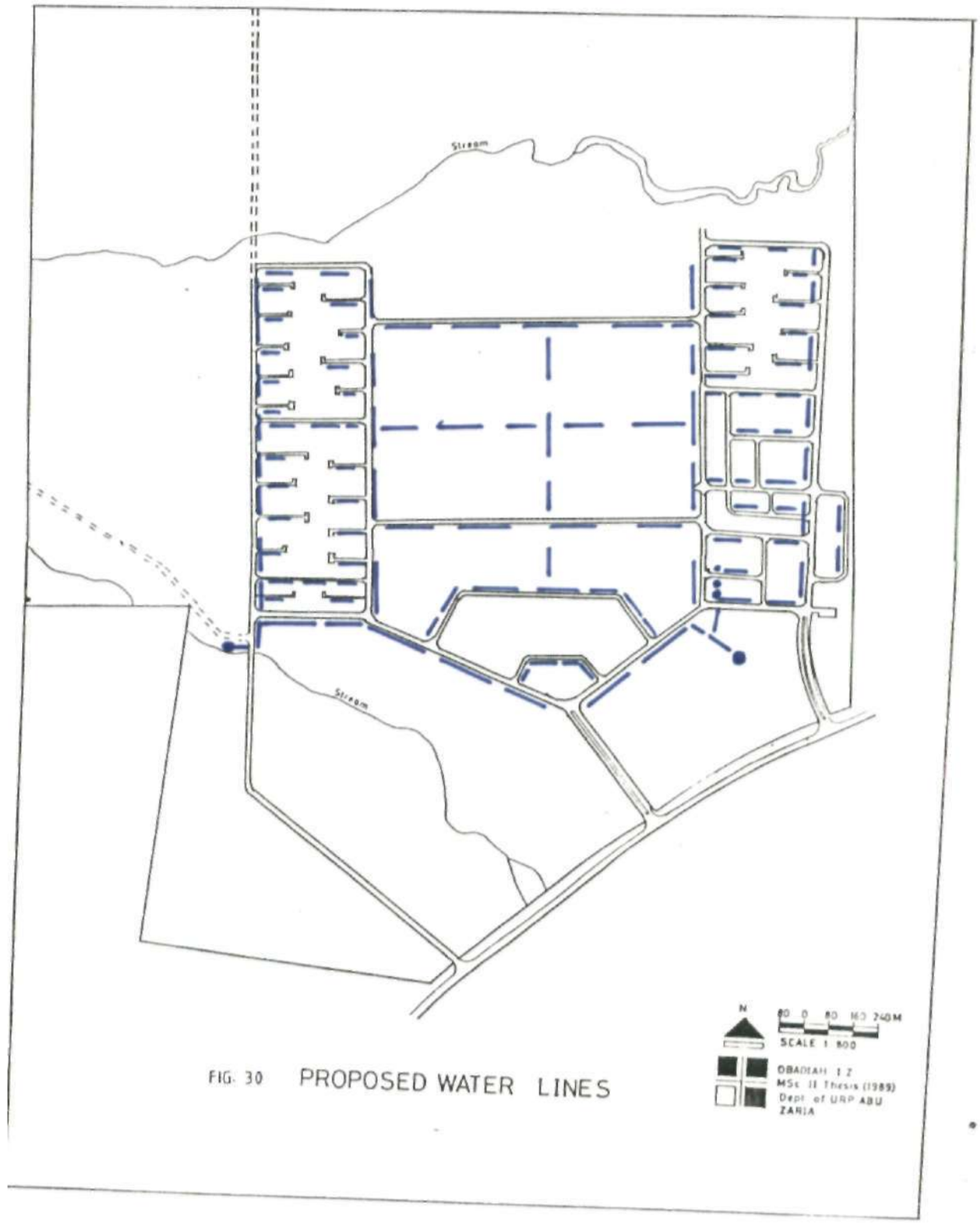


FIG. 30 PROPOSED WATER LINES

c) POWER

It is expected that electricity to the university campus will be supplied by the National Electric Power Authority (NEPA) at high voltage of 33KV or 11KV.

The injector station located south of the development site is strongly recommended to have an independent supply network from the local network so as to minimize overloading. From the injector station, a low voltage line of 415 volt are to be laid underground to distribute power to the central Area; students Hostels, academic area, support facilities zone and all parts of staff residential areas. It is suggested that stand-by generator should continue to be made available to meet the needs of sensitive areas of the campus like the computer, library, administration building etc. in the event of power failure. (see fig. 32).

d) TELEPHONE

The campus should be linked with the town for its telephone services for both internal and external communication. If feasible the telephone lines should be the underground network system with a view to enhancing the aesthetic outlook of the campus environment and to protect the cables against external hazards. (see fig. 32).

6.22 FACILITIES

a) Sporting Facilities

Common sport facilities for the students are provided

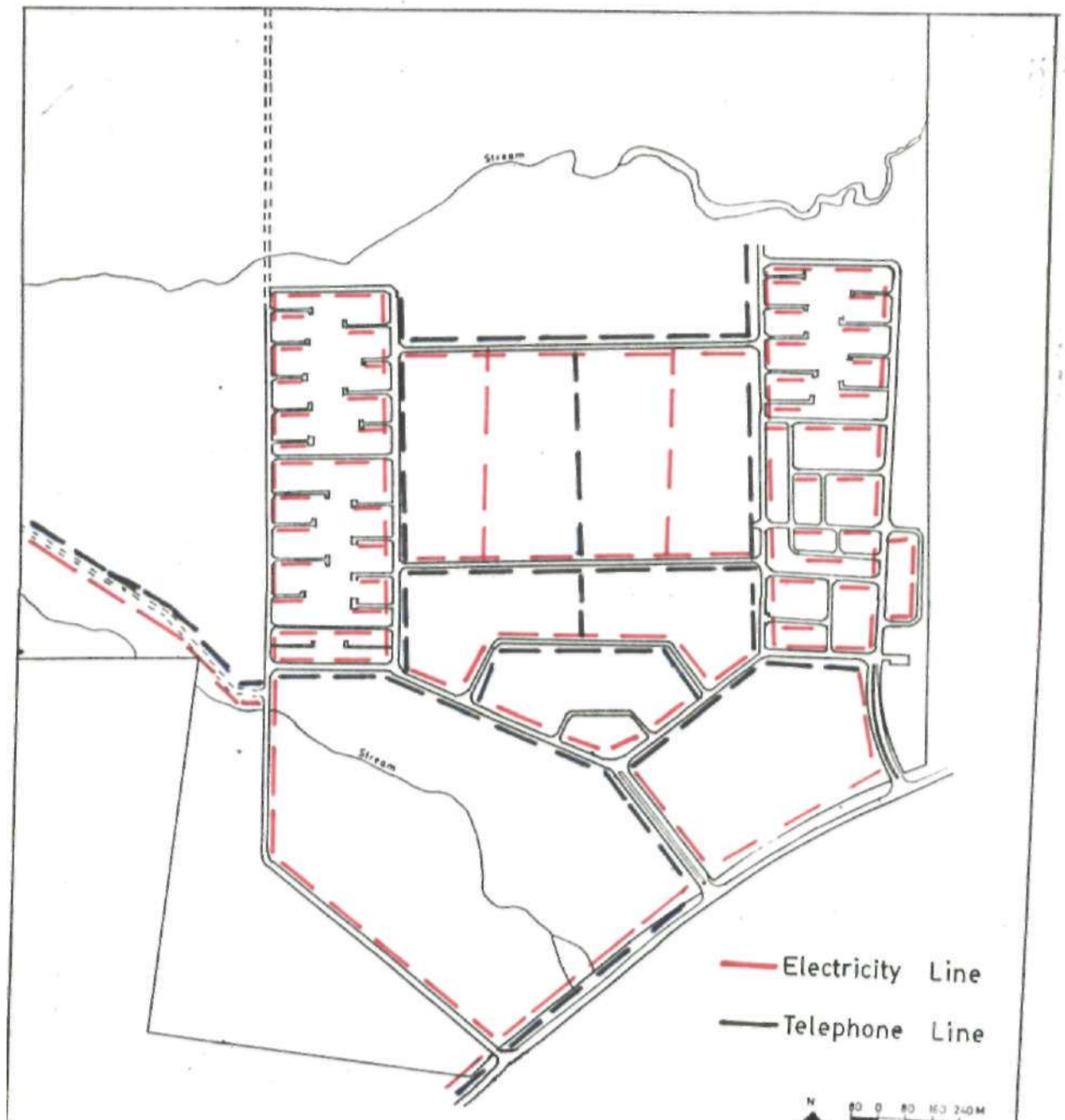


FIG. 32 ELECTRICITY AND TELEPHONE NETWORK

in the southern part of the campus especially the mini-stadium, sport hall with sufficient space for expansion, parking and feeling of openness in the south-eastern part of the campus. Other smaller games and sport fields are provided in the northern part of the campus for future expansion and at the hostel level within their premises.

Staff clubs both for senior and intermediate/Junior staff. Swimming pools and other recreational facilities are provided in the staff residential areas. Both the residential areas have organised green spaces as well as informal leisure areas for active and passive recreation for all the age groups.

However a bigger leisure area is planned along the streams north and south of the development site for the entire campus community.

b) Religious Facilities

A Church and a Mosque are planned for within the campus located on the opposite side of the central administrative area.

c) Commerce

The provision of a standard Bookshop in the campus, shopping centre is an attractive force. Also such facilities as pharmacist shop to be located close to the Health Centre, good quality clothing store, cafeteria, post office a Bank etc. will attract people from the town.

d) Health Facilities

An expansion of the Health Centre of the University is necessary if it will throw its doors open to outside

patients. In view of this therefore, a new site for the Health Centre for medical care of the campus community is proposed north of the central administration accessible from the central Area and the Residential Areas.

e) Educational Facilities

The university has a primary school located at the extreme south east of the site. Children from the town attend the school, but constitute less than 20% of the pupils. The low number may be attributed to both the physical distance of the site from the town and the differential fees charged by the university which is higher for non-university community members. For a greater degree of integration, a higher percentage of pupils from the town should be encouraged. Two Nursery schools are also proposed. One in the Senior Staff residential area in the west and the other in the Eastern side near the intermediate and Junior staff area.

There is also need to organise extra-mural classes for non-university community members to serve as an important wheel for integration.

f) The Security, fire-fighting and petrol filling station are sited in the southern part of the development site.

6.30 ROAD NETWORK

Four hierarchy of roads have been proposed for the campus.

Already the main access road to the campus from the highway is a dual carriage way with central verge (40

metre Right-of-way). However the proposed new main access to the campus is also a dual carriage way with a central verge joining the Yola-Mubi highway about a quarter of a kilometre west of the junction of the present main entrance with the highway.

The new main entrance about 40 metres of right of way (R.O.W.), will have a gate depicting Head of a Bull with horns. This road leads directly to the monument to be sited infront of the central administration building in a round about (see fig. 33).

Other buildings that are accessible to this road are the mosque, the Church, assembly Hall, convocation square and other buildings of the central core including the academic area. But this road is planned to be use mostly by visitors on ceremonial occasions.

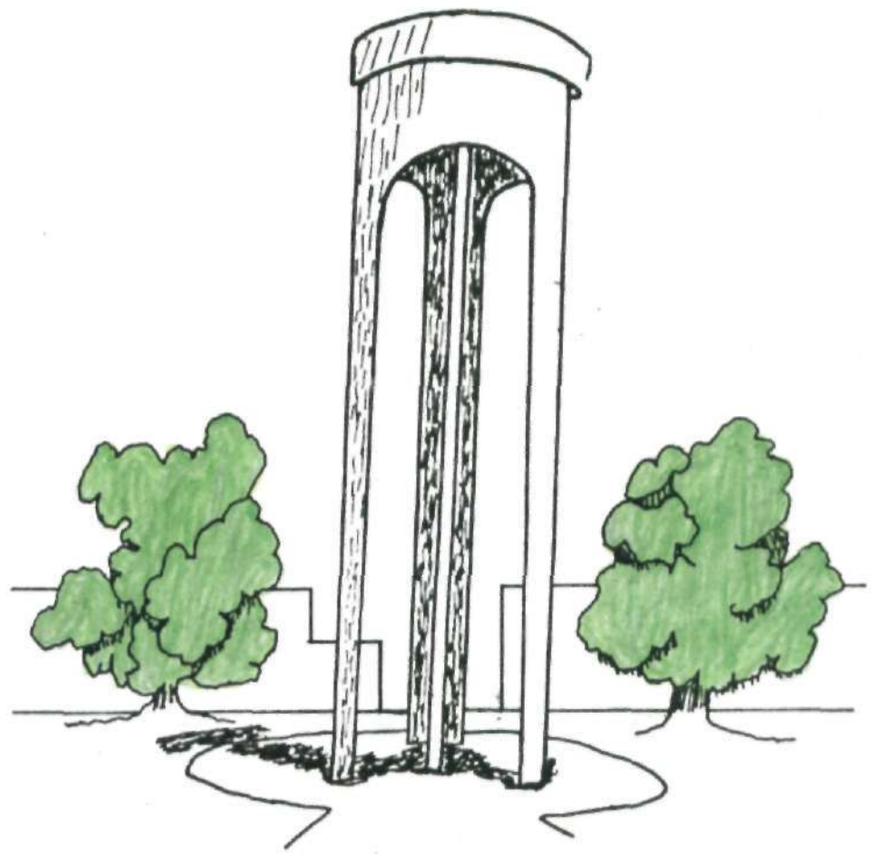
The other access road to the site branches off from the highway about half kilometre west of the main entrance to the campus from Jimeta side. This is the first entry to the campus from the town and provide easy access to the Estate Department staff Housing, Agro-Allied Industrial estate etc.

The proposed main entrance road is to have elaborate, street furniture with street lighting, hedges, trees foot path and covered concrete drainage just like the existing main entrance. Fig. 35 shows the cross section of the road.

The first peripheral road from the town side is to have all elements but smaller in size and less pronounced.



SUGGESTED MAIN ENTRY GATE



SUGGESTED CENTRAL MONUMENT

FIG·33 PLANNING FOR FEDERAL UNIVERSITY OF

OBADIAH I. Z.
M. Sc. THESIS
DEPT. OF U.R.P.

The next hierarchy of the roads is the distributor - road network connecting primary areas with the campus. This category is proposed to have 24 metres right of way. This roads sandwich both the academic and residential areas of the campus. The next hierarchy is the service roads of 16 metres right of way, that connect all the ele- elements of the campus. In addition pedestrian/Bicycle circulation network together with the green system have been provided. The Central spine of the campus from the Central Administration area in the south to the north is recommended purely for pedestrian way. Likewise the central spine of the staff residential area is also recommended purely for pedestrian way.

Provided at strategic points are facilities like Kiosk, restaurants, shops, canteens and organised open spaces along the pedestrian ways.

Lastly the fourth hierarchy of roads are the access roads. This provide access to the individual buildings or group of buildings about 8 metres right of way. (R.O.W.) (see fig. 34).

Generally, the vehicular movement within the campus are confined to restricted areas where they are needed most. (see fig. 35) for the cross sections of the roads.

6.40 THE GREEN SYSTEM

Provision for greenery includes areas for the university teaching Commercial/Basic farms. These are for agricultural purposes.

Other system of greenery within the central administration Area, Academic Area, Residential Areas for both

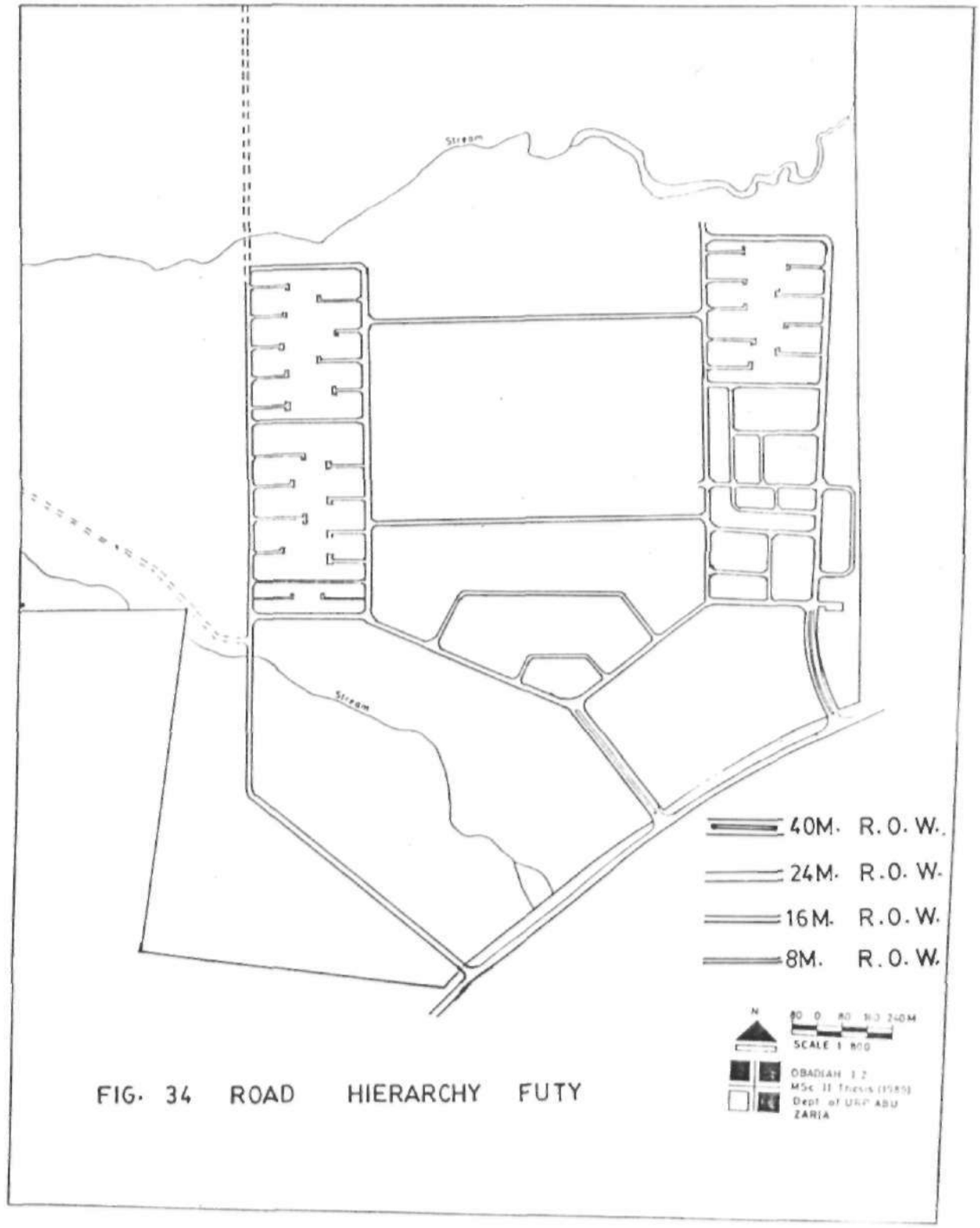
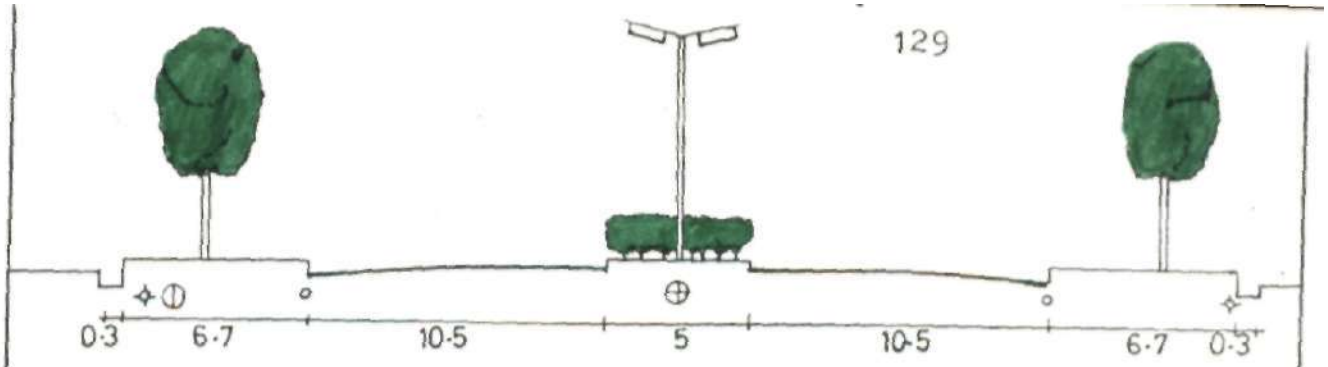
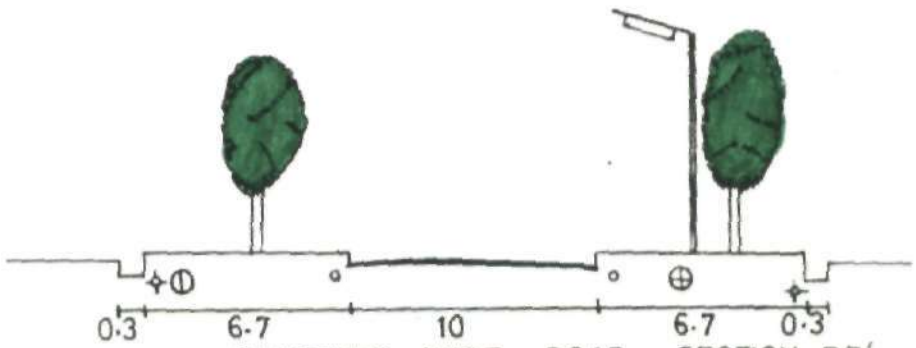


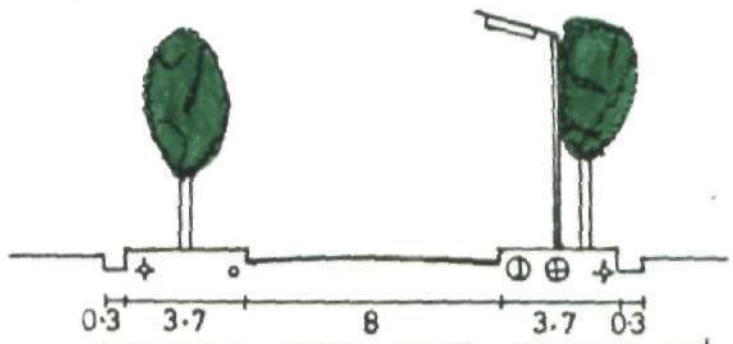
FIG. 34 ROAD HIERARCHY FUTY



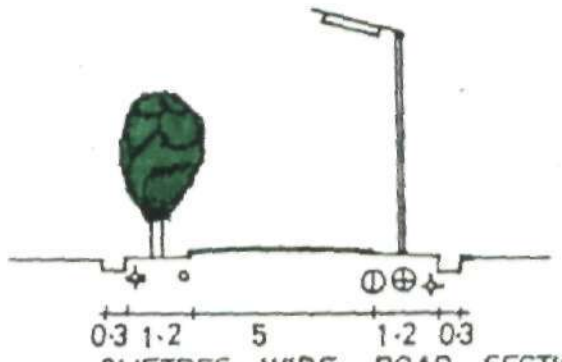
40 METRES WIDE ROAD SECTION A A'



24 METRES WIDE ROAD SECTION BB'



16 METRES WIDE ROAD SECTION CC'



8 METRES WIDE ROAD SECTION DD'

⊕ Electric Lines

✧ Water Lines

Ⓣ Telephone Lines

∘ Sewage Lines

Open drains

Scale 1: 2000

FIG·35 FEDERAL UNIVERSITY OF TECHNOLOGY YOLA
ROAD CROSS SECTION

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DEPT. OF U.R.P.
ZARIA

students and staff and support facilities, are provided with the following objectives:-

i) To produce in effect a mutual 'open air conditioning system through the manipulation and use of existing trees, plants, landform, waterscape and the buildings.

ii) To Protect motorist and Pedestrian from sun glare and heat.

iii) Others are to reduce solar radiation, lower air temperature, to absorb and reflect heat, upholding of ecological balance and improving micro-climate.

iv) They also help in insulation of noise sources, reduction of discomfort of dust - laden harmattan winds.

v) Lastly the provision of contrasts and variety in the campus landscape.

Some of the ecological suitable trees and plants used in the landscape plan includes Albizzia Africana, Bombax Buonoponense (Red silk cotton) Azadirachta Indica (Neem), Casuarina Equisetifalia (She Oak), Dalbrgiasissio (Shisham) Eucalyptus citriodora (Lemonscented Gum), Eucalyptus Rostrata (red gum), Mangitera Indica (Mango), Tamarindus Indica (Tamarind), Acacia Seyal, Bauhinia Purpurea, Jarcaranda, Parkinsonia Aculeata, Prosopis Julieflora, Securidaca (Violet tree), Solanum Macranthum (Potato tree). Others are Acalypha Milkesiana, Adenium Obesum (Harmattan Jewel), Loota Aegyptica, Antigonum leptopus, etc.

Plants of low and medium heights as well as grass in selected areas especially in the staff residential areas and the sports and playfields meant for students and staff, should be maintained for these purposes, because they conserve moisture and reduce the reflected sun glare around buildings.

6.50 DETAIL DESIGN OF STAFF RESIDENTIAL LAYOUT

Housing is the second most important necessity of life after food.

A shortage of residential accommodation could become the biggest single bottle neck in the years ahead.[1] The University Grants Committee Report in 1970 recognised this problem in Britain, but made no promises about the provision of finance to solve it. And without accommodation for university staff of all kinds, as well as for students, there can be no university.[2]

In view of the above therefore, the Federal University of Technology Yola should be highly residential in character. This is because, the living environment is vital to the individual members of the university community especially considering the physical location of the campus from the town.

Secondly the location of some staff Housing at Mbamba almost 25km. from the site is not helping the accommodation matter either as majority of those staff accommodated there have abandoned them in preference to renting their own private accommodation in Jimeta which is nearer the campus site. This is so because commuting to the place

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1. Birks, T. (1972). Building the new Universities, p.25
2. Birks, T., (1972). Ibid. p.25

of work by the staff living at Mbamba quarters is very difficult and expensive couple with other inconveniences they have to undergo, now that it is no longer easy for a civil servant to own or maintain a car at this sappy times of inflation and dwindling economy. It is therefore advisable to change use of the Houses there into commercial Guest Houses or in the alternative dispose them to interested individuals, or groups.

The type of concept used for the design of the layout is the cluster concept both for senior and intermediate/ Junior staff, while the road network system is the cul-de-sac types.

Unlike in the monotonous grid-iron plots, this technique preserves the beauty of the natural land. It relate the houses better to each other and to the site, while at the sametime provide more open space at least cost.

The Cluster Scheme reduces the cost of streets and utilities and leaves approximately half the total site for recreation which is not the case with conventional plans.

In cluster scheme, every house abuts on a park or open land. Although normal sub-urban densities are maintained, the rural character of the land is preserved. There is also less monotony in the appearance of the development and better living qualities are provided all at less cost than inconventional sub-divisions.

The common land provided in the cluster are either treated as a park or play ground, or it could be left in its natural state especially if wooded, rocky or otherwise

attractive in appearance.

The most important criteria in such a site is the way the space are organised in order to facilitate those social functions that characterises the inhabitants.

The parents need to observe their children while they work.

The cluster is also designed to give a sense of identity and belonging to each other, privacy, psychological comfort and intimate relationship between the various members of the cluster through sharing common open space and other facilities, in each case they recognise and know their neighbours and their children play together.

It is also so designed to be in harmony with the culture of the locality, that is the Hausa/Fulani cluster system.

Each cluster is to be supported by common facilities and amenities in proportion to its size and location within the community e.g. common parking areas, children play areas, Adult sitting areas, gardening plots, refuse collection points, common entrance point, etc.

Each of the cluster forms an interconnecting element of the larger community and at the sametime comprehensible as a group of families within the community both in the senior and Intermediate/Junior Staff residential areas.

Two Nursery schools are proposed to take care of the two residential areas, while the existing staff school is to absorb the product of the two Nursery schools.

Staff clubs are also proposed for both senior and Intermediate and Junior staff. That of the Senior staff

is in the residential area in the west while that of intermediate and Junior staff is in the existing residential area in the east with facilities like Convenient shops, Lawn Tennis Court, parking lot and a swimming pool especially for the senior staff.

6.51 CIRCULATION AND PARKING

Vehicular movement within the layout are of three hierarchies. The outer roads are the collector roads of 20 metres right of way. These roads sandwiches the two layout.

The second roads are the service roads about 16 metres right of way (R.O.W.) this cut across the layout dividing it almost into two and the one serving as a boundary between senior and Intermediate and Junior staff.

The third hierarchy are the access roads. These provide access to the individual buildings or group of buildings about 8 metre right of way.

All the Access roads are cul-de-sac roads. It is so designed to take care of the residents and the visitors to the area will also find it easy to locate their friends houses. And considering the 396 width of the layout, it may not cause any problem of communication among the residents.

Generally the vehicular movement within the layout are confined to restricted areas where they are needed most.

In addition, the central spine of the two residential layout are reserved purely for pedestrian movement/cycle tracks.

6.52 OPEN SPACES

Each of the opposite cluster is oppened to another by different hierarchies of open spaces and strongly linked through a system of pedestrian movement paths.

Open spaces are to be landscaped with grasses, hedges and shrubs to give aesthetic quality and to help reduce noise, air and dust pollution at the sametime moderate the micro-climate of the environment.

Seats are to be provided in form of slabs for relaxation and for other cultural activities.

Other open spaces are for children play fields tot-lots etc.

Generally, the open spaces provided are for passive and active recreational activities to take care of different age group of staff and their families (see fig 36 and 37).

6.60 SATELLITE VILLAGES

In view of the Federal government policy on staff and students accommodation of 33⅓% and ⅔ respectively on our campuses, couple with the physical location of the campus site from Jimeta town, it is therefore necessary to encourage the development of satellite villages to take care of off-campus staff and students.

The idea of satellite villages for universities have been tried in Britain as a solution to the housing problem of universities particularly the civic universities.[3] It was used in the university of Manchester where Fallowfield was developed for staff and student residences. In their case, it was more or less a second campus because it housed

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3. Dober R.P. (1965) The New Campus in Britain. Educational Facilities



FIG 36 STAFF RESIDENTIAL LAYOUT



FIG. 37 STAFF RESIDENTIAL LAYOUT

only students and workers of the universities with an administrative block, and communal facilities like dining hall etc. established by the university; while the students and staff members were housed in groups based on sex, age, marital and educational status.

However as a means of achieving integration between Federal University of Technology Yola and its environment, satellite villages are proposed at Bajabure opposite the Federal Housing Authority Estate and at Songare near Girei. These villages as envisaged are to be radically different from Fallowfield experience in Britain in order to achieve our objective of integration. The site of the villages are also proposed closed to the existing settlements to achieve greater integration, avoidance of creating an island for them and for easy economic provision of communal facilities/giving the students a taste of societal life for which they were being prepared.

Secondly the development of the satellite villages shall be by private developers and not the university authority in form of housing estate. The idea however should be reflected in the administration's policy on housing its staff and student and therefore play the role of encouraging the private developers, while the Gongola State Urban Planning and development Board shall be the body directly responsible for planning and co-ordinating the development of the satellite villages.

CHAPTER SEVEN

7.00 IMPLEMENTATION OF THE DEVELOPMENT PLAN

For the effective implementation of the plan, the physical planning unit of the university should monitor and supervise the project of the plan on the site and where feasible should directly execute the project using its in-house staff. This unit presently headed by a civil engineer is to be responsible to the Development and Implementation Committee to be chaired by the Vice Chancellor with membership of heads of departments of Engineering, Building and Environmental Studies. The Registrar and Bursar should also be members of the committee.

The terms of reference of this committee could be mainly to overseeing of the plan implementation, approval of all projects, variations and changes. The committee should be in turn responsible to the university council, the supreme governing body of the university.

7.10 THE PHYSICAL PLANNING UNIT

The unit is presently headed by a Deputy Director of Planning with Civil Engineering background. Other staff members include an Architect, Quantity Surveyor and Clerk of works at various levels. There is need to have a physical planner in the unit. The unit therefore should be charged with the responsibility of the following:

a) To ensure that individual projects Architectural, civil engineering etc.) are strictly within the framework of the development plan.

b) To provide data, physical guidelines and such other information that the construction firm(s) may from time to time require.

c) Prepare detail layout for any area to be developed within the framework of the provisions of the development plan.

d) Implement or review the development plan when the need arise with the approval of the Development and Implementation Committee.

e) To advise the contract awarding authority of the university on suitability of Tenders, competency of the contractors and consultants.

f) The physical planning unit of the university should work in co-operation and consultation with the following bodies, Gongola State Urban Planning and Development Board, Gongola State Utilities/Water Board, NEPA, NITEL, Song Local Government, Federal Housing Authority, Ministry of Education and Private Individual and firms, so as to ensure co-ordinated approach towards the development of the university and its environment.

7.20 LAND ACQUISITION

The university already has enough land acquired from the Federal Polytechnic about 4,259.13 hectares. This is more than enough the need of the university for its development.

7.30 SATELLITE VILLAGES

The land for this need should not be acquired by the university authorities, rather it should be left for private developers to acquire and produce the houses or the Government to erects housing estates in such places as already done by the Federal Housing Authority at Bajabure Satellite town.

The university and its environs should be accorded the status of a district by the Gongola State Urban Planning and Development Board and to provide it with necessary facilities, services and utilities.

7.40 WATER SUPPLY AND SEWAGE DISPOSAL

A self sufficient water supply system is planned by the university along with three boreholes and additional two are on the pipeline.

Because the Urban Planning Board may not extend its services to the campus, it is therefore recommended that the university authority should make its internal arrangement for waste collection, treatment and disposal.

7.50 INDUSTRIAL AREA

The development of this area will require the co-operation of the Gongola State government, and the Federal Ministry of Agriculture and Natural Resources.

7.60 TRANSPORTATION, COMMUNICATION AND OTHER UTILITIES AND SERVICES

The envisaged four categories of road network system of the campus is to be developed by the university authority.

Their development must keep pace with the development of other infrastructure - academic, residential and supporting services and facilities. The major roads should be open-ended to allow for expansion of the campus.

The university authority, Gongola State Transport Service and private individual should co-operate to provide Bus/Taxi services to solve the transportation problem presently experienced by both the staff and students of the university and even the visitors to the campus.

Postal services and telecommunication systems are to be developed and installed by NIPOST and NITEL, to link the campus and the outside community, while power is to be supplied by NEPA.

7.70 PHASING IROGRAMMING

There are to be three phases for the gradual implementation of the development plan which also correspond with the three year National revolving plan periods recently introduced by the Federal Military government.

7.71 Phase I 1990/91 - 1992/93

In this phase it is proposed to start with the full development of the public area which is the focal point of the university with the development in addition to the central administration block the Computer Centre, Auditorium, Central Library, Convocation Square, Commercial/Shopping Centre etc. Also work on the schools whose academic programme are newly established are to be given priority,

likewise the construction of the main access dual carriage road to link the central administration from the high way.

The first phase will also see the development of residential accommodation to take 2,680 students and a total of 1,304 staff. Thus giving an overall population of 3,984 to be provided accommodation during this phase. Also the ring road to link all the residential areas and the central area is to be completed. Others are the access roads to areas to be developed in the first phase.

Work is also to start on the site for the new schools of Engineering, and Agriculture.

Electricity distribution lines, Telephone network, water main, drainage channels and sewage system will be developed to keep pace with other developments. At the end of the period, a total of over 151.76 hectares of land is to be developed.

7.72 Phase II 1993/94 - 1995/96

Additional Hostels/Houses to accommodate 5,160 students and an additional 1,259 staff members are to be developed within this period.

The school of Science and the Library are to be relocated to give way for additional Hostels.

The development of 1,500 hectares of teaching and commercial farms will start and is expected to continue to the last phase. Other projects to be implemented during the second phase includes Agro Allied Industrial area, staff Centre, Petrol filling station, Mosque/Church, Peripheral roads to link the Industrial area, teaching/commercial farms

areas. Two more boreholes to be sunk and a water tanker of 5,000 cubic metres capacity to be installed near the central administration block.

The satellite villages at Songere and Bajabure is to be completed within the period.

7.73 Phase III

It is expected that at the end of this phase the campus will be fully developed to its maturity for a student population of 5,300, senior staff population of 813 and Intermediate and Junior staff population of 1767.

Within the final phase, the remaining projects proposed are to be completed. Also apart from the modifications of the plan that may arise as a result of changing goals and priority of the university, at the end of the plan period, the situation should be reviewed in the light of the experience and any need for further expansion, that should be effected in the plan.

7.80 GUIDELINES AND POLICIES ON BUILDINGS AND OTHER STRUCTURES

It is absolutely mandatory to seek every possible means of reducing construction costs while maintaining construction quality. through:

a) Production of extremely accurate working drawings that is a step-by-step specification of the order of work to be done by contractors. Infrastructural elements such as plumbing, electric fitting are to be installed as the building is constructed.

b) Alternative materials must be investigated to yield an array of economical choices e.g. new ways

of fabricating and working with mud brick have been devised which makes this an appropriate and viable building material, that is combining concrete and mud bricks. Also self-help programmes like involving students in the building process especially those from building and engineering departments.

c) Improved system of roofing must be explored in an otherwise very expensive building. Roofing to represent 50% or more of the total cost. Tiles can be used in place of galvanised metal roofing because it is economical and durable.

d) Also Building forms will reduce cost e.g. Rowbuilding may be desirable alternative instead of the present free Standing Houses especially for Junior staff housing.

It is recommended that the administration building should have 150% floor area ratio. And in the academic areas, all buildings should have 150% floor area ratio.

After area ratio of 200% is recommended for the building of student residential areas, while the kitchen and dinning halls may attract between 50-100% floor area ratio. As for the staff, a floor area ratio of 100% is recommended for 60% of the quarters to be built on campus and 150% for the remaining 40% of the staff houses to be built. The students residence is to be made up of a series of storey buildings organised around the central facilities in each hall of residence.

And finally buildings should cover a gross grand area of not more than 50% of its plot size.

7.90 FINANCING THE DEVELOPMENT PLAN

Universities are known not to be profit making institutions, as such the funding of the development plan will be the direct responsibility of the Federal Government, through its agent, the National Universities Commission (N.U.C.) more so as education is regarded as a social service in Nigeria. This issue of funding was rightly stated in the Newswatch Magazine January 1989 issue "National Universities Commission is finding solution to the problems facing the country's universities especially inadequate funding which has continued to frustrate their physical development and the standard of their academic facilities". In view of this therefore, the Federal Government is expected to make funds available for the implementation of the development plan once accepted and approved.

Gongola State Governments and its agents like Urban Planning Board, Ministry of Works, Ministry of Agriculture should partly assist in the development of the industrial estate and some housing at the satellite villages.

Other sources of finance should be from companies, private individuals, loans from financial institutions etc. Incentives should also be given to such bodies to finance the development of industries, satellite villages and other support facilities.

The university should also explore other avenues of revenue through endowment funds, and other donation, establishment of consultancy services and Research and a full fledged commercial farms.

The Church and Mosque should be financed by the communities concern with the assistance of the University where feasible.

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APPENDIX A-1: FEDERAL UNIVERSITY OF TECHNOLOGY YOLA: PRELIMINARY COST ESTIMATE FOR THE DEVELOPMENT PLAN, 1990 - 2,000

A - BUILDING WORKS

ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	AMOUNT
1.	Schools and Academic Departments	231,595	M^2	500	115,797,500
2.	Non-Academic Depts. and Units including facilities	45,861	M^2	450	20,637,450
3.	Add 2.5% for gardens and other sundry items	-	-	-	3,410,874
4.	Students Hostels	132,500	M^2	600	79,500,000
5.	Staff Residential Buildings	2258100	M^2	400	903,240,000
6.	Add 2.5% for open spaces	-	-	-	24,568,500
	TOTAL	-	-	-	1,147,154,324
	Add 5% contingencies	-	-	-	57,357,716
	Add 5% for Professional fees, and sundry items	-	-	-	57,357,716
	TOTAL				1,261,869,756
B.	WATER SUPPLY SYSTEM				
1.	150mm diameter cast-iron pipe mains laid and jointed	6,320	M^2	60	379,200
2.	100 mm diameter cast-iron distribution pipes laid and jointed	5,400	M^2	45	243,000
3.	Add 15% for assessories and sundries	-	-	-	93,330
4.	30-40mm diameter galvanised	6,360	M^2	30	190,800
5.	Add 15% for assessories and sundries	-	-	-	28,620
6.	Allow a lump sum of ₦500,000 for the Excavation and back filling trenches to receive pipes, pumping stations with installations				500,000
7.	50-60m deep boreholes complete with pumping equipment and installation	2	M^2	100,000	200,000

ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	AMOUNT
8.	Allow a lump sum of ₦750,000 for the construction of a water treatment plant comprising aeration, filteration and disinfection units complete with fittings and assessories	-	-	-	750,000
	TOTAL	-	-	-	2,384,950
	Add 2.5% Contingencies	-	-	-	59,624
	TOTAL	-	-	-	2,444,574
C.	SEWAGE DISPOSAL SYSTEM				
1.	500mm diameter asbestos cement (main sewer) pipe laid and jointed	4,920	M	100	492,000
2.	Add 15% for assessories and sundries	-	-	-	73,800
3.	300mm diameter asbestos cement (main sewer) pipes laid and jointed	5,840	M	80	467,200
4.	Add 15% for assessories and sundries	-	-	-	70,080
5.	200mm diameter asbestos cement (collection sewer) pipes laid and jointed	6,465	M	60	387,900
6.	Add 15% for assessories and sundries	-	-	-	58,185
	TOTAL	-	-	-	1,549,165
	EFFLUENT TREATMENT PLANT (2 - TANKS)				
7.	Pit Excavation and disposal of excavated material	2,500	M^3	15	37,500
8.	Concrete	200	M^3	300	60,000
9.	Reinforcement	20	ton	2,000	40,000
10.	Form work	1,500	M^2	30	45,000
11.	Add 15% for assessories and sundries	-	-	-	27,375
	TOTAL	-	-	-	209,875
	TOTAL	-	-	-	1,759,040
	Add 2.5% Contingencies	-	-	-	43,976
	TOTAL	-	-	-	1,803,016

D. ROAD NETWORK

ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	AMOUNT
1.	4-Lane bitumen - surfaced roads including all necessary earthwork, base course and surfacing	220	M^2	500	110,000
2.	2-Lane bitumen - surfaced roads including all road necessary earthworks, based course and surfacing.	3616	M^2	500	1,808,000
3.	Excavation for road-side drainage channels	1584	M^3	15	23,760
4.	Concrete in base-lining to drainage channels	845	M^3	180	152,100
5.	Solid blockwork in side lining to drainage channels	1690	M^2	45	76,050
6.	Add 20% for culverts, road signs and other sundry items				433,982
	TOTAL				2,603,892
	Add 2.5% contingencies				65,097
	TOTAL				2,668,989
E.	PARKING AREAS				
1.	Parking areas surfaced with tar-macadam and granite, chippings including all necessary earthworks and base course	2076	M^2	100	207,600
2.	Add 10% for concrete kerbs and other sundry items				20,760
	TOTAL				228,360
	Add 2.5% contingencies				5,709
	TOTAL				234,069
F.	ELECTRICITY SUPPLY				
1.	Transformers	2	No	50,000	100,000
2.	Generator	1	No	500,000	500,000
3.	The general cost for labour, recticulation, mains and street lighting is about ₦9,000 per hectare	713.17	HA	9,000	6,418,530
	TOTAL				7,018,530

APPENDIX A-2: SUMMARY OF COST ESTIMATE

	DESCRIPTION	ESTIMATED COST (₦)
A	Building works	1,261,869,756
B	Water Supply System	2,444,574
C	Sewage disposal system	1,803,016
D	Road Network	2,668,989
E	Parking Areas	234,069
F	Power Supply System	7,018,530
	GRAND TOTAL	1,276,038,934

APPENDIX B: QUESTIONAIRE ON CAMPUS SURVEY

1. NAME OF THE UNIVERSITY: ----------
2. STUDENTS POPULATION 1989/90 SESSION: ----------
3. STAFF POPULATION: (i) SENIOR STAFF: ----------
   (ii) JUNIOR AND INTERMEDIATE: ----------

RESIDENTIAL ACCOMMODATION

4. (a) EXISTING FLOOR AREA FOR STAFF: ----------
   (b) EXISTING FLOOR AREA FOR STUDENTS:----------
5. EXISTING PERCENTAGE OF UNIVERSITY ELEMENTS:
   (a) CENTRAL ADMINISTRATION:----------
   (b) SUPPORT SERVICES:----------
   (c) TEACHING/RESEARCH:----------
   (d) STUDENTS HOUSING:----------
   (e) STAFF HOUSING:----------
6. EXISTING FLOOR AREA FOR EACH ACADEMIC DEPARTMENT:----------
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7. EXISTING FLOOR AREA FOR EACH SUPPORT SERVICES:----------