Design Proposal for a

NATIONAL CANCER CENTRE, ABUJA

(providing a conducive environment for Cancer patients)

BY

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DECLARATION

I certify that this project is an original work undertaken by me and prepared in accordance with the regulations governing the preparation of projects in Department of Architecture Federal University of Technology, Minna.

Student — Date: 23/02/2000

Prof. S.O. Solanke
Supervisor — Date: 18/04/2000

Dr(Mrs) S.N. Zubairu
H.O.D. SET. — Date: 19/4/2000

CERTIFICATION

This project entitled NATIONAL CANCER CENTRE, ABUJA (A Case study on breast cancer) meets the regulations governing the award of Master of Technology (M.TECH) in Architecture of the Federal University of Technology, Minna, and is approved for its contribution to knowledge and literary presentation.

Pam

Student

23/02/2000

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Prof. S.O. Solanke
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19/4/2000

Date

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Dean Post-Graduate

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External Examiner

Date

DEDICATION

This project is dedicated to my parents Mr and Mrs Ayuba Makeri and my beloved brothers and sisters.

Equally to my wife Mrs Mary P. Ayuba and my little daughter Ann P. Ayuba though young now but live to follow my foot steps.

ACKNOWLEDGEMENT

This project has been made possible through the help and SUPPORT of many.

My profound gratitude first goes to Almighty God for giving me the opportunity to write this project.

Secondly to my Supervisor Professor S.O Solanke (Dean Set) who has acted as my Father, uncle and an elderly advice through out the project. May God continue to bless you.

I am equally indepted to the following persons, Mr. Jeremial Ayuba, Mr. John Ayuba, Mr. Noah Ayuba for their financial and moral supports towards accomplishment of this project.

This project will be incomplete if I fail to mention my able honies, Abdullahi T.S. Hassana Abu, Bukar Abdukarim, Barnabas Musa, Johnson A. Funsho, Habila Babe and the entire members of Aso Class 2000. I pray for the spirit of integration to still be with us wherever we may find ourselves.

ABSTRACT

The sole purpose of this project is to look into the need for treatment of Cancer in Nigeria. Specific events have created a large need for a Cancer therapy in Nigeria because of the ultimate death of some poor men and women with Cancer.

Cancer, as we all know, is a disorder growth of cells that multiply rapidly, causing Inflamation of organs of the body where they originated. It is a disease of global concern of which medical experts are researching seriously on its prevention and cure. It is a deadly disease responsible for over 30% mortality rate of world population.

This necessitates the establishment of this centre to undertake both research on screening and treatment of the disease. Results have shown that less than 40% of our teaching hospitals ever thought of screening and treatment of cancer in general. Therefore, the cancer centre is a proposal for the Federal Government of Nigeria which is to be located in Abuja. The Centre is to emcompass all the units mentioned below:-

* Administrative unit
* Screening/treatment unit/wards
* Laboratories
* Audoterium and other
* Supporting facilities



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1.00 INTRODUCTION

The most common event leading to diagnosis of Cancer is the discovery of a lump on the body by a patient either accidentally, or by delibrate self-examination (Hickey 1957 and Tesnicu 1977). If people are to be primary detectors of Cancer, then its logical that, they should be trained to improve their diagnostic skills, since there is a windersp-read belief that self examination on a periodic basis leads to earlier detection of Cancer, the ability to diagnosis this at an earlier age is vital (Goodmolgo 1990).

.Cancer as we all know, is a disease that arouses emotion of uncertainty and fear amongst people whenever its mentioned. Despite its fear, the disease had been on the increase.

In the past, Cancer was considered to be associated with developed countries, but nowadays, the reverse is the case. According to 'Stanley et al 1989' (a Scientist), developing countries account for approximately 2.3 million of the global'. There are about 4.6 million cancer deaths and 6.0 million new cancer cases each year. Thus, in absolute figures, it indicates that the majority of the world's cancer patients are in developing countries.

Of all types of cancers, breast cancer is the most common and leading to death in both developed and developing countries of the world. (Family Health International 1989). Although accurate data on cancer incidence and mortality are lacking in many developing countries. World Health Organisation (W.H.O.)

Scientists estimate that breast cancer accounts for approximately 15% of new cancers in women in the developing world. Our great concern is that, majority of these cancers go undiagnosed or are not caught early enough to allow for effective treatment, even if treatments were available.

Considering the fact that development of lumps whether benign or cancerous, normally start many years before malignancy step in. It may be right to suggest that lack of awareness and self examination practice is responsible for the pregression of benign tumours to full blown cases of cancer. Presently, in Nigeria, many people from observations and discussions with some, do not know about detection of cancer in the body, it is dishertening. The few that know and claim to practice self-examination are not even sure if its being correctly done. This is particularly disturbing because even the literate people that are expected to know better and serve as lay educators to others segments of the public, do not know too.

If people were awared and knowledgeable about cancer examination, it could be caught and its earlier advancement arrested immediately.

1.10 AIMS AND OBJECTIVES OF THE CENTRE

AIMS

The aim of this project is solely to create a room for both urban and rural populace who have lost hope in life due to cancer infection, to have a sense of belonging and achievements to boast on living. It is also geared toward bringing health care services to their door step.

For sure, man has to live and abide to what nature has to offer and by what he has caused with his own understanding of science. Therefore, this project is to inspect and educate people in reducing the growth of cancer in our society and also reducing the cost of transporting our cancer patients out abroad for treatment.

The aims and objectives are therefore spelt out as follows:-

AIMS:

* To sensitise government on the need to provide adequate health services, a modern cancer centre adequate health services, a modern cancer centre for human training and research.
* To provide decent health care delivery to both men and women in reducing material and morbidity rate through improved health care system.
* To create a highly functional cancer centre that will integrate pathologists all over the world.

OBJECTIVES:

* To provide a purposely designed centre that contain all necessary facilities for cancer treatment.
* To provide a permanent structure for cancer training and pfcourse research.
* To satisfy the need of the users in terms of function, circulation, organisation and free from environmental harzards.
* To provide for conducive environment for the patients through good functional, site planning and Landscaping.

1.20 MOTIVATION

At the University College Hospital Ibadan, Nigeria cancer registered a total of seventeen thousand four hundred and ninety six (17,496) cancer cases between (1960 and 1980). Nine thousand and ninety one (9091= of these number were females. These figures show that cancer is largely a woman's disease.

Family Health International (1989) reports that cancer in general, is the second most dangerous killer disease to health disease. One way of detecting cancer while its still in its early stages is through self-examination. According to Huguley(Tr) and brown (1981) Scientists self-examination on a periodic basis leads to earlier detection of cancer.

If the mortality rate of cancer is to assume downward trend, early detection promotion programmes involving the training of human beings on self-examination need to be developed. Screening centres can also contribute to mortality reduction. The present economic status of Nigeria and high cost of screening equipments, the government may not be able to set-up suffient screening or testing centres all over the country. An alterative and more promising option is for people to practise self-examination and reading of journals.

Also, due to an increase government pronouncement of making health for all in this millenium we need the motivation of our indigenous scientists to carryout an intensive treatment of cancer in Nigeria and Africa as a whole because of an increase scourage of the disease on the world chord on health grounds. It is hoped that Federal Government will support this proposal to become a reality in Nigeria.

1.30 RESEARCH METHODOLOGY

In a project of this magnitude, careful and appropriate methods are been embarked on to give a complete and precise justice to the project. The methods of research adapted for this project include:-

* Case studies: Extensive researches are done in existing cancer units of major teaching hospitals within the country.
* Oral interview: Oral Interview are aslo made through interview with prominient pathologists to ascertain the actual desire of the cancer union in the country.
* Literature Survey:- Informations are collected from reading of books, magazines, Journals, textbooks, newspapers periodicals and some published works on the existing teaching hospitals.
* Field Survey:- Reveals of the topography, vegetation, soil condition, access facilities that are available on the site are made to make justice to the project.

1.40 SCOPE AND LIMITATION

1.41 SCOPE:

Cancer has gradually left the pheriphery of the pathologist and has intruded into various fields. The detection before maturity would help in its support to life. For this reason, the scope of this project will be to the creation of highly functional and flexible design that will help in treatment and training. The scope of this project has also included:-

* Data base consideration

* Design Consideration

* Construction requirements

1.42 DATA BASE CONSIDERATION:

The project data base has been considered in terms of:-

(a) methods and techniques as regards to:-

* Grassroot interactions in the form of discussion and interviews with target users of the centres, staff of existing specialist centres like pathologist, oncologist and various expertise.

* Research into documented facts in relevant literature (both local and national interest).

* Professional and academic materials scientific data on relevant areas collected include:

* Data on the environmental comfort requirements

* Climatological Informations

*Ethongraphical Informations

* Energy resource information and methods adapted to ensure illustration and communication of data information including sketches, graphical illustrations, maps to show and emphasize events as well as other statistical representation techniques such as bar chart, pie charts and histograms.

1.43 DESIGN CONSIDERATION

In the course of this design, various specialist hospitals were visited and design consideration including:-

* functional flow and circulation

* Aesthetics

* Finishes

With the enumerated facts above, the general scope of the centre are as follows:-

* Administrative Unit which emcompasses:-

- Medical Director
- Secretary/general waiting
- Personnel
- Personal assistant
- Library/Archieves
- Boardroom
- Accounts section
- Computer room
- General reception
- P.R.O.
- Cards room
- Stores
- Cleaners
- Toilets
- Accounts
- Epedemology unit
- Haematology unit
- Chemitology unit
- Morbiod unit
- Chemical pathologist
- Sales Unit
- Oncology Unit
- Typing pool
- research library
- Histochemist
- General reception
- Other offices
- Librarian office
- Sales
- Archieves
- Head Consultancy
- Medical store
- General office
- Nurses main office
- Students office

* TREATMENT UNIT

. Operation suite including

. Doctor's changing room

. Sterilization space

. Surgical theatre (Two in number)

. Clean utility

. dirty utility

. recovery space

. Patients resting area (courtyard)

. Kitchenette

. Nurses bay

. Storages

. Dry laundry

. Wet laundry

. General toilets

. Toilets and shower

. female surgical ward

. female medical ward

. male surgical ward

. Male Medical ward

. Emergency bay

*SCREENING UNIT

. Radiation therapy

. Dark room

. Chemotherapy

. General reception

. (OPD)

. waiting area

. Chnaging rooms

. X-ray analysis

* LABORATORY UNIT

. Haemotology

. Morbid anatomy

. Chemical pathology

. Microbiology

. Laboratory attendants offices

* Audotorium for Seminars and Enlightements Campaign and lectures
* Other Supporting Facilities Including:-
  - Gate house
  - Security house
  - Generator house
  - Bore-holes
  - Water tanks
  - Waste disposal unit
  - Parking spaces

1.44 LIMITATIONS:

In carrying out this research work, so many factors came in against the progress of the work, amongst which financial constraint, also its important to mention the kind of cold receptions I got in the various places I went; because they did not allow me have the plans or even have pictures of the sites as they claimed they were security threats:

Lastly, I would like to thank my supervisor who in his love, urged me to continue with the work despite all odds and stresses during the thesis.

1.50 IMPORTANCE OF CANCER CENTRE TO ARCHITECTURAL DESIGN

There are very few places in the world where it is possible for all men and women with cancer to be treated in hospital, which is due to the fact that very few architects are good at designing hospitals, mainly because they do n ot fully understand the intricacies of the work which is done in them.

Doctors, nurses and hospital administrators are usually poor advisors because they tend to emphasize their own specialist interest and may underestimate the need of their essential services.

Designing and building a new hospital unit is rather like bearing a child. This is due to the fact that different locations which would rather refer to the modification for other parts of the tropics where the climate pattern is different.

The proposed cancer centre would make full use of both traditional and modern architectural style which will look critically at developing as well as solving major problems encountered in an hospital design.

1.60 VIABILITY OF PROJECT

The viability of having the proposed cancer centre, is of immense importance to the welfare and promoting health care services within the country. It will enhance the promotion of surgery of cancer services as well as reducing the mortality rate, illness of men and women in this country.

This project will also serve as an avenue where men and women will be lectured on self sanitory activities that cause cancer, the need for regular check-ups. So, there is an urgent need to have this type of hospital being established within the country. This can only be achieved if there is an adequate and conducive environment for infected persons.

1.70 DEFINITION OF TERMS

1.71 CANCER:- This is the term applied to a group of diseases that are produced when a single cell or a group of cells escape from the usual contrats that regulates cellular growth. These cells begin to multiply and spread. These cellular activities result in tumour or neoplasm. Some are benign while others are malignant. If their growth are not checked, they infiltrate and destroy the adjacent tissues. Its for these tumours that the term cancer is used.

1.72 GENE:- This is the basic unit of heredity. A gene consist of an ordered sequence of chemicals called nucleotides and designated by the letters A.T.C. or G.A gene is situated on one of the 23 pairs or human chromosomes. It carries instructions for the production of proteins.

1.73 MUTATION:- Any change in the normal sequence of nucleotides in a gene. A mutation can be the deletion of a nucleotide or the change of one nucleotide to another. A mutation can be inherited. If the egg or speam cell that produced the child contained a mutation.

1.74 MORBID ANATOMY (Sometimes called HISTOLOGY) or Simply (PATHOLOGY). Includes histopathology, the microscopic study of diseased tissue, and cytology, the study of individual cells. Tissue is often received from operating theatres or the postmorten room. The specimen is brought to this laboratory a 'frozen section' carried out, and the result telephoned to the operating department.

1.75 MICROBIOLOGY:- or (bacteriology) includes parasitology it is the study of the nature, life, and actions of micro-organisms, some virology may be included, but this usually forms a separate section in the larger or more specialized laboratories. Several functions such as offices and staff rooms, central wash-up, hot and cold rooms, and storage are shaved between these sections.

Patients' rooms for specimen taking are related particularly to the haematology and chemical pathology sections.

1.76 CHEMICAL PATHOLOGY:- or biochemistry is the study of the chemistry of the living tissues and fluids of the body. Much of the routine testing can be done on mechanised equipment; there is scope for associating this work with the similar routine testing of the haematology section, which can enable both to be automated by the use of a computer.

1.77 HAEMATOLOGY:- Is the study of the function and discover of blood. Part of this section deals with testing (for compatibility) of blood for transfusion received from blood donore. The blood-bank should be nearly part of it being accessible in emergency at light.

CHAPTER TWO

2.00 LITERATURE REVIEW

2.10 EVOLUTION OF CANCER

Cancer is a genetic term for wide variety of malignant neoplasms that may result in deleterious effects of the host due to their invasive and metastazising character. Cancer is a disease of the cell that is transfered to the decendants of the cell. It is recognised by the abnormal cells within a normal tissue as manifested by varying degrees of morphological disorienation, aggresive growth and invasion, with ultimate destruction of the normal cell population (Regato and Spjut 1977).

Cancer usually starts from single cell during cell division, when the chromosomes are duplicating. Mutations at this time can be very damaging and could cause alot of medical problems. One possible outcome is the growth of abnormal cells in a tissue. Due to high mutation of the chromosomes, the cells do not develop or function normally, and these cells remains unspecialised. A group of abnormal cells is formed and these continue to grow out of normal control. Those cells are then said to be cancerous and as the growth enlarges, it can spread between normal cells and damage them. International Union against Cancer (VICC 1978).

Cancers are generally said to be in one of three stages of growth. Early, or localized, when a tumour is still confined to the tissue of origin, or primary site (frequently curable); direct extension, where cancer cells from the tumour have invaded adjacent tissue or have spread only to

regional lymph nodes (Sometimes curable); or metastasis, in which cancer cells have migrated to distant parts of the body from the primary site, via the blood or lymph systems, and have established secondary sites of infection (often incurable).

Cancer is said to be malignant because of its tendency to cause death if not treated. Benign tumours usually do not cause death, athough they may if they interfere with a normal body, function by virtue of their location or size.

In general, cancer cells divide at a higher rate than do normal cells, but the distinction between the growth of cancerous and normal tissues is not so much the rapidly of cell division in the former as it is in the partial or complete less of growth restrained in cancer cells and their failure to differential into a useful, limited tissue of the type that characterises the functional equilibrium of growth of normal tissue.

Cancer may not be as autonomous as once believed. The lesions probably are influenced by the host's susceptibility and immunity. Certain cancers of the breast and prostate, for example are considered dependent or specific hormones for their existence; other cancers are dependant on the presence of specific viruses.

In Ibadan chapter of the Nigerian Cancer Society, sponsored a television promotion on breast self-examination between 1980 and 1981, and the cancer registry noticed an increase in the number of cases registered in the two years that followed this promotion programme. This was evidenced from the observation that, from 1960 to 1990, there was an annual average of 65 cases.

However, in 1981, the number rose to 83 and 97 cases respectively were registered in 1982. Presently, it is estimated that about 257 cases are expected annually.

2.12 CLASSIFICATION OF CANCER

There are two major types of cancer according to the simplest method of classification:-

- Carcinoma
- Sarcoma

Carcinoma occurs in epithelial tissues, which cover the body (the skin) and line the cavitary structures of organs (such as breast, the respiratory and gastro intestinal tracts, the gennito urinary system).

Sarcoma develop in connective tissue is called a CARCINO-SARCOMA. Cancers of the blood - forming tissues tumours of nerve tissues (including the brain) and nelanoma (a cancer of the pigmented skin cells) are classified separately.

2.13 CAUSES OF CANCER

It is known that cancer can be caused by a variety of factors acting single or in concert, but the mechanism of group of mechanisms remains unknown. Although research is still on to identify speicifically what causes cancer. It has been associated with a number of factors.

According to Piapaionnou (1974), Regato and Spjut 1977 and Vicc (1978) all scientists, cancer can be triggered by a number of environmental agents and exposure to the such chemicals as;

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According to Piapaionnou (1974), Regato and Spjut 1977 and Vicc (1978) all scientists, cancer can be triggered by a number of environmental agents and exposure to the such chemicals as;

. Ultraviolet rays from the sun

. Asbestors

. Polycylic hydrocarbons

. Ionidizing radiation from such sources as X-rays, radioactive fallout, parasites, viruses or certain chemicals and

. Several compounds contained in cigarelte smoke can cause cancer.

. It is also believed that a number of natural and man-made chemicals such as Vinul chloride asbestor and 7-napthylamine have been implicated as cancer causing in human beings.

. Research has also demonstrated the presence of genes called (ONCOGENE)' that is equivalent to those in viruses known to cause cancer. It seems that in normal cells these genes are 'silent' or not expressed, but when they are expressed, the cells become malignant.

Breast cancer especially among older women arise from the epithelium of the mammary ducts (milk channels) these cancers usually grow slowly and remain localized by connective and elastic tissue for sometime.

Among younger women, breast cancer are frequently made up of undifferentiated cells from the epithelium of the acini, the small sacklike dilations at the ends of the mammary ducts. These tumours are often advanced upon detection and the exact cell type of origin is abscured.

2.14 TREATMENT OF CANCER

With the best of modern methods, cancer in a majority of cases can be successfully treated. Today, there are Three (3) methods through which cancer can be treated. About one third of all cancer patients are cured. In some cases, a Surgical operation is done. Many patients are treated by radiation with carefully measured doses of X-ray, others ofcourse receive chemotherapy (drugs)

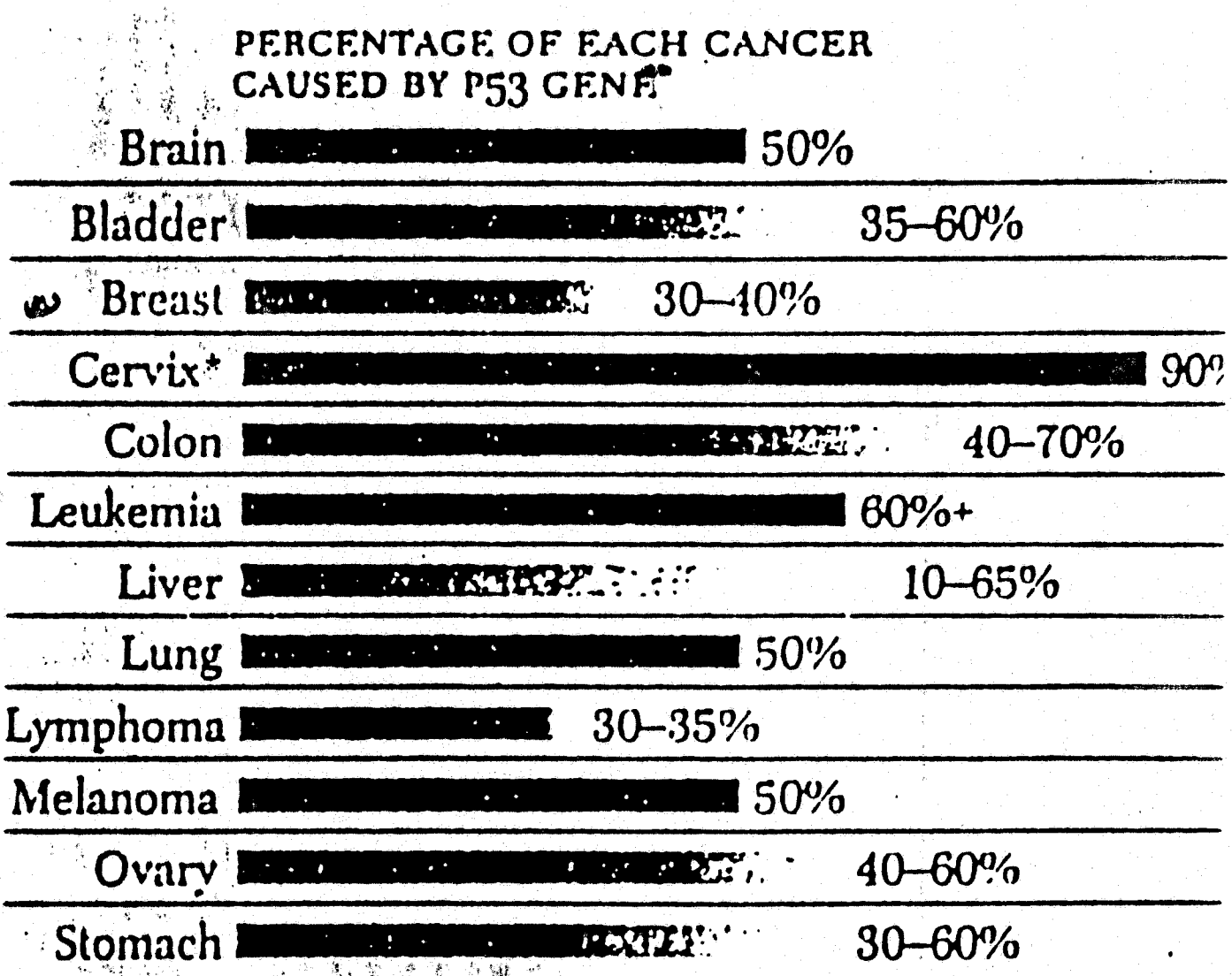
Surgery and radiation are the most effective forms of treatment. Chemotherapy - drug and hormone treatment is proving helpful in some forms of cancer. The choice of Therapy is governed by the type, location, and size of the cancer at the time of diagnosis, and general condition of the patient.

For Surgery to be curative, the operative procedure must be performed before the cancer has spread into organs and tissues that cannot be safely removed. Major advances have been made in the restoration of structure altered by cancer surgery and in the rehabilitation of persons who have undergone radical surgery.

Women who have extensive surgery for breast cancer are given treatment for restoration of muscles. Surgery is increasingly move valuable as a preventive measure in controlling breast cancer. The earlier the breast cancer is diagnosed and the sooner treatment can be implemented, the greater the chances of a successful cure. The poor success rates in treating breast cancer is due mainly to lateness of diagnosis of many of these tumours.

A Good Gene Gone I

The p53 gene has been implicated in 51 human cance
some types of tumors are more likely than others to h
let loose by a crippled p53. The approximate body co

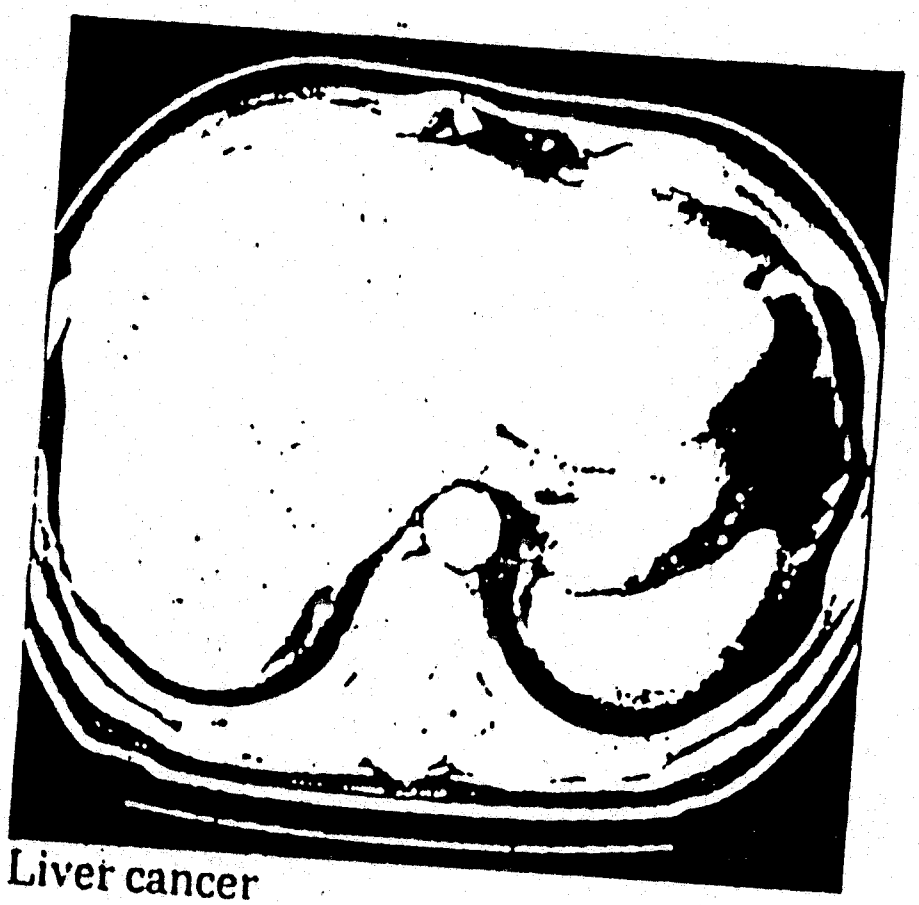


*PERCENTAGE APPLIES TO CANCER CAUSED BY VIRUS. DEATHS INCLUDE ALL FORMS OF CERV
CANCER. MICHAEL ARNOLD LEVINE, NATIONAL CANCER INSTITUTE, HUTCHINSON CANCER RE

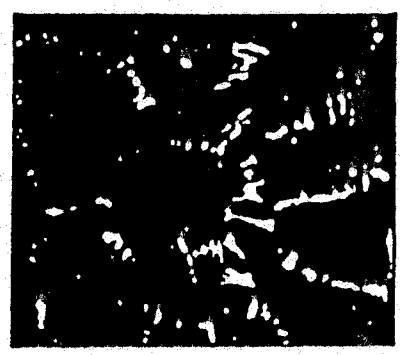
Colon cancer

Breast cancer

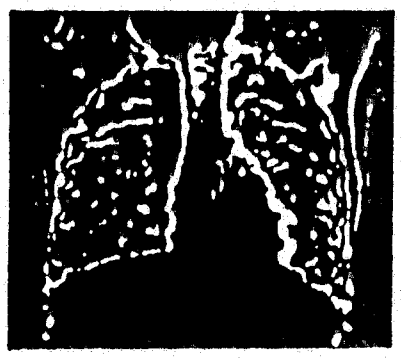
Melanoma (skin cancer)



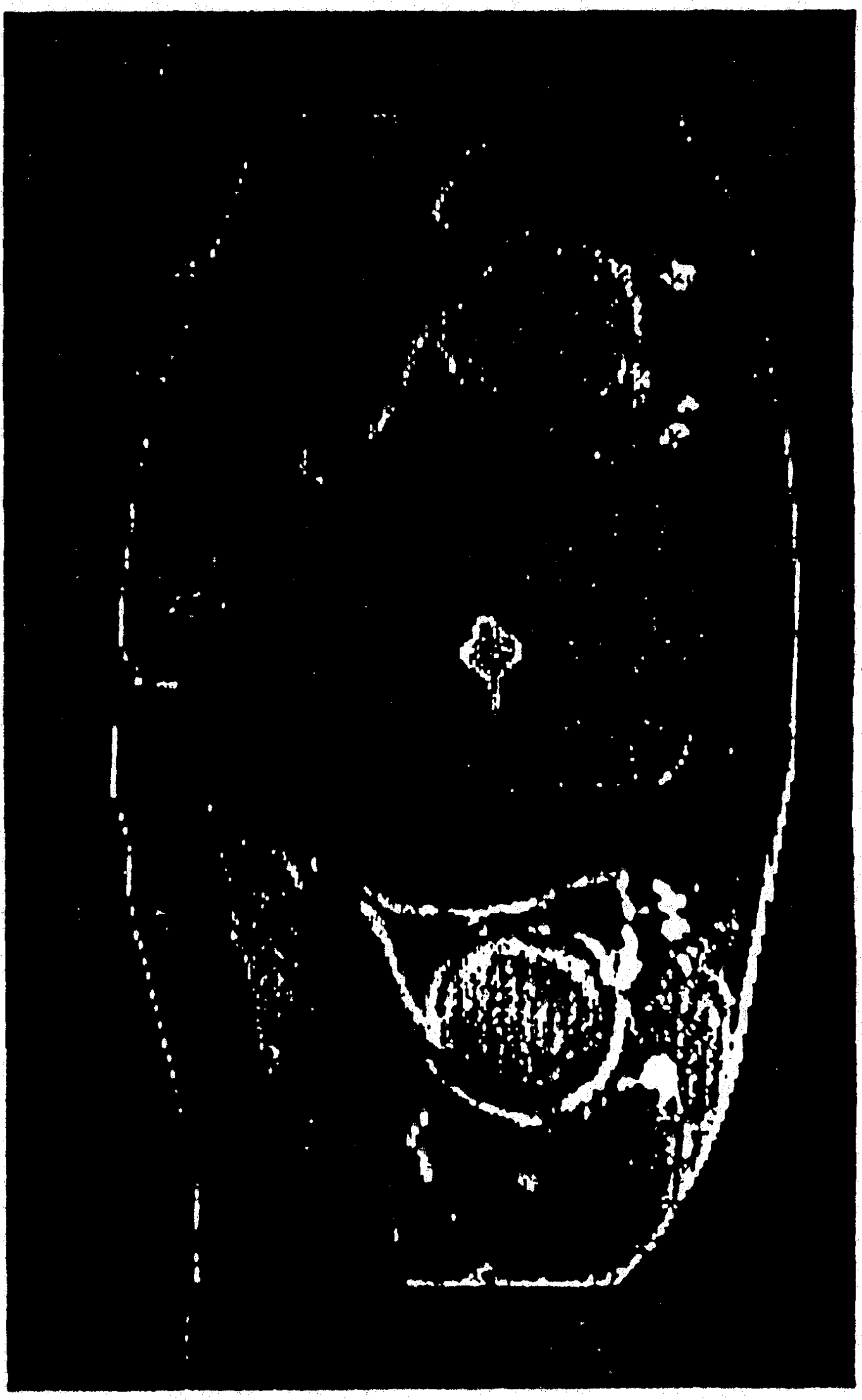
Liver cancer



Bladder cancer



Lung cancer



Cervical cancer

2.20 HEALTH CARE SERVICES IN NIGERIA

In Nigeria, the available health services are not equitably distributed. The rich and educated elite living in the urban areas have greater access to modern health care than the poor illiterate citizens living in the rural areas of the Country. Also, health personels in the country are not equitably distributed too. For example, there are probably more doctors and nurses practising in the South Compared to the Northern and middle region of the Country. These factors determine the prevalance of reproductive ill-health in different regions of the Country.

The poor state of health care services in Nigeria has been a subject of many reviews in the past. For example in 1995, the honourable minister of health, Dr. Ikechukwu Madubuike with the permission of the late Head of State and Commander-in-Chief of the armed forces of Nigeria, General Sani Abacha, conviened Nigeria's first National Health Summit to finetune previous efforts at defining our national health policy.

The Summit made recommendations on;

. Policy, Organisation and structure in the health care system
. Health Management
. Family Health and Population activities
. Human Resources development
. Food, drugs, vaccines and material manufacturing
. Supply, distribution and control
. Health Care financing
. Promotive health and operations research.

The Petroleum (Special) Trust Fund (PTF) then, also intervened by supplying drugs to some hospitals and rehabilitation of major hospital Infrastructures

2.30 TYPES OF HOSPITALS

Hospital may be classified in three (3) Principal ways according to ownership, usual length of stay of the patients and types of services provided. The classes include:-

- Length of stay
- Type of services
- Ownership

.LENGTH OF STAY:- Hospital classified according to usual length of stay of patient are two types:-
long term and short term. There is no sharp line of distinction between them, but generally, patients in short-term hospital stay an average of three weeks, while long term stay as long as one month.

.TYPES OF SERVICES:- Hospital, according to this type of classification are either general or special. General Hospitals may have a wide variety of services i.e Surgical, medical and pediatric, usually accept patient of all ages and sex. Special hospitals includes children's hospitals, maternity hospital, eye, ear, nose, cancer hospital as well as mental hospital.

.OWNERSHIP:- Patterns of hospital ownership vary widely from one country to another. Hospitals could be owned by government, private sector, voluntary organisation, business organisation, church-owned hospital.

In general, voluntary and church sponsored hospital predominate among those that provide care for victims of accidents, general acute illness and maternity patients.

2.40 FUNCTIONS OF HOSPITALS

The functions or services of hospital comprises of many parts since hospital is an Institution that provides medical care and other services to the sick or injured person functions of hospital can be summarised into the following:-

- Divisions
- Medical
- Nursing
- Social services
- Medical records
- Education and research

DIVISIONS

In addition to the medical and nursing staff, other important hospital divisions include social services, education, research and medical records. Like any other hospitals buildings also have departments concerned with house keeping, plant operations, laundry and food preparation.

MEDICAL:

Medical services of hospital are organised in such a way that we have medical or surgical specialty as a clinical division under a chief of service. Each patient is the responsibility of a single physician, called the attending physician, who makes the diagnosis and chooses a plan of treatment. Other physician may be involved either as consultants or advicers.

NURSING:

Nursing services are essential to care for the personal need of patients, to assist the doctors in their diagnosis and treatment, and periodically to record their observations of patients. A recent development in nursing is progressive care, in which patients are cared for, arranged and staffed according to the degree of patient disability and intensity of care required. Basically, there 3 levels of care are involved.

. Limited care

. Intensive care

. Intermediate care

SOCIAL SERVICES:

Many hospitals offer social services to other patients i.e they arrange for the care of children whose mothers are in the hospital receiving intensive care or treatment prior the recovery time.

MEDICAL RECORDS:

In almost all hospitals, medical records are kept for each patient, these records are kept for at 25 years. Each record contains a description of patients' illnes or injury, doctor's diagnosis and methods of treatment, laboratory reports, X-rays as well as nurses observations.

EDUCATION AND RESEARCH

Hospital provides education facilities for their medical staff i.e doctor's and nurses.

Review of medical records and medical libraries. Some hospitals also conduct school of nursing and programmes for specialized training.

2.50 ORGANISATIONAL STRUCTURES OF HOSPITAL AND SPECIALISED CENTRES

The organisational structure of all hospitals, specialised centres and research Institutions regardless of ownership and type, are very similar. A governing board of directors, selects a board of trustees or board of directors, selects an executive head, usually called on administrator or medical director.

Most Organisational Structure of hospital includes:-

. Programmes

. Location

. Distribution of beds

. Operating rooms

. Laboratories

. Ambulatory care and outreach services.

Reporting to the executive head of the hospital are the various division, such as house keeping, food services, plant operation, nursing, medical records, laboratories, pharmacy, blood blank and accounting. The doctors are usually considered as medical staff or among the organisational structure.

Whatever their administrative organisation and however they are financed, all system of health centre delivery comprise a range of institutions which at least in theory,

are graded according to their degree of sophistication and specialization and the level of care that they can provide.

There are three main levels that can be identified and are usually termed primary, secondary and tertiary.

. Primary care embraces all the general health practise services educational, preventive and curative, that are offered to the population at the point of entry into the system.

. Secondary care comprises the care provided by more specialized service to which people are refered by the Primary Care Services.

. Tertiary care include highly specialized services not normally found at secondary level.

2.60 HOSPITAL PLANNING

Hospital planning could be said to be the factor of determining patient care, services and designing. Arrangement of buildings and their equipments too, provide efficient means of attending to the need of patients. Maximum utility of the facilities, comfort, personel and lowest possible expenditure of funds to attain the required standard of services are main considerations.

Hospital by the middle of the 20th century had become a complex institution, designed to give the best possible care to the patients throug the use of the advanced medical techniques.

Almost every hospital now serves as a thresdfold function, namely:-

- To aid and support the medical professions in giving care to the sick.
- To provide opportunities for training in the health service profession.
- To provide facilities for medical research on the cause and care of diseases.

The three functions designated below

- Medical care
- Training and
- Research, form the basis element of the proposed centre.

2.70 HOSPITAL ARCHITECTURE

The provision of the care and shelter for the sick is the foundamental requirements of community life, and arrangement to satisfy the requirement have been present in some form throughout history.

Based as they are on-elemental human needs, such arrangements have always been closely linked with the economic and social virtues of life.

Hospital, an Institution providing medical care, and other services for the sick, injured persons cannot be over-emphasized. The hospital design and architecture have come a long way in history, this can be grouped into two broad categories:-

- Early hospital and
- Middle ages hospital

Early Hospital:

This is dated as far back as 3rd century B.C in the Buddist Community in India. Temples were probably the earliest Institution concerned with the care of the sick. Example is the temple of Asclepius at Epidaurus had accomodations for these who sought for help. The development of Institutions for Civilians was paralleled by the creation of Military hospital and eventually, under the influence of Christianity motives of believe, entered into the creation of public hospital.

. Under the middle ages was the concept of a need for social assistance in case of sickness or other misfortune was highly developed.

Most hospitals during the period were created and built by rulers and public offices. This could be dated as for back as the 9th century built at this period includes:-

. Caliph Hamn at-Rashid hospital in Baghdad

. Caliph at - Muktadir hospital in Belgorad

2.80 ORGANISATION AND MANAGEMENT OF THE PROPOSED CENTRE

The organisation and management of the proposed cancer centre is dependant largely on the number of facilities and staff to run the day to day activities of the centre. For example, a cancer centre which is to be located in Abuja, enlighten and make quick use of its facilities, and complicated cases from the rest of the Community who will be brought to the centre.

CHAPTER THREE

3.00 GREATING A CONDUCIVE ENVIRONMENT FOR INFECTED PERSONS

3.10 INTRODUCTION

The ultimate client of the hospital architect is the patient. While it is most important to give an appropriate environment to those who spend all their working life in the hospital. The designer has to make a place which help to reduce patient's anxiety and which give them aesthetic pleasure and material comfort.

Also, the prime planning objectives in hospital design is to seek a balanced compromise between maximizing hospital efficiency and maintaining adequate respect for patient's personal needs, both physical and psychological. Foremost among patients' need (other than medical and therapeutic care) are the minimizing for fear, boredown, and the fear that they have lost complete control over their lives.

It is perhaps important that the primary purpose for a conducive environment for infected persons for any patient is through getting to the hospital, checking into the hospital, receiving a proper diagnosis and treatment, having an acceptable recovery environment, and finally getting discarged within a minimum of strain as pleasant and convienient as possible. Though, an environment as we know, is considered as being made up of human and physical components. Therefore, the followings are considered in the design of this proposed cancer centre:-

With passive cooling, temperatures are actually lowered and not just be minimized as it's the case with heat avoidance. Passive cooling also includes the use of ventilation to shift the comfort zone to higher temperatures.

In many climates (Nigeria inclusive) there will be times when the combined effort of heat avoidance and passive cooling is still not sufficient to maintain thermal comfort. For this reason a third level of response in the form of mechanical equipment is usually required. This equipment must only cool what heat avoidance and passive cooling could not accomplish.

3.30 PASSIVE COOLING SYSTEMS

The passive cooling system use as much as possible natural forces, and energies. And the goal is to create thermal comfort during the summer (over-heated period), we can either cool the building or raise the comfort zone sifficiently to include the high indoor temperature. Therefore five methods of passive cooling are:-

3.31 COOLING WITH VENTILATION

. Comfort ventilation:- Ventilation during the day to increase evaporation from the skin and thereby increasing thermal comfort.

. Convective cooling ventilation at night to precool the building for the next day.

3.32 RADIANT COOLING

. Direct radiant cooling: a building's roof structure cools by radiation at the night sky.

. Indirect radiant cooling: radiation to the night sky cools a heat transfer fluid, which then cools the building.

3.33 EVAPORATIVE COOLING

. Direct evaporation: water is sprayed into the air entering a building. This lowers the airs temperature but raises its humidity.

. Indirect evaporative cooling: evaporation cools the building without raising the indoor humidity.

3.34 EARTH COOLING

.Direct coupling: and earth sheltered building looses heat directly to the earth.

. Indirect coupling: air enters the building by way of earth tubes.

3.35 DEHUMIDIFICATION WITH A DESICANT: Removal of latent heat.

It is very important to note that there are not only two very different ventilation techniques but also that they are mutually exclusive:

Comfort ventilation brings in outdoor air, especially during the day time when temperatures are at their highest. The air is then passed directly over people to increase evaporative cooling on the skin. Convective cooling is quite different. With this technique cool night air is introduced to flush out the heat of the building. While during the day, very little outside air is brought indoors so that heat gain to the building can be minimized.

3.40 BASIC PRINCIPLES OF AIR FLOW

To design successfully for ventilation in the summer or wind protection in the winter as applicable to my site like Abuja, the following principles of air flow are understood:-

Reason for air flow:- Air flows either because of natural convection currents, caused by differences in temperature, or because of differences in pressure.

Types of air flow:- There are four basic types of air flow: Laminar, separated, turbulent, and eddy currents.
Air flow changes from laminar to turbulent when it encounters sharp obstructions such as buildings. Eddy currents are circular air flows induced by laminar or turbulent air flow.

Inertia:- Since air has some mass, moving air will tend to go in a straight line. When forced to change direction air streams will follow curves and never right angles.

Conservation of air:- Since air is neither created nor destroyed at the building site, the air approaching a building must equal the air leaving the building. Thus, lines representing air streams should be drawn as continous.

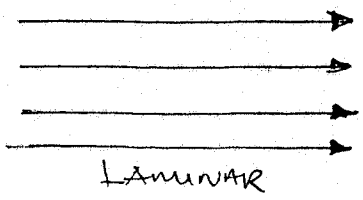
High and low pressure areas:- As air hits the windward side of a building it compresses and creates a positive pressure(+). At the same time air is sucked away from the leeward side, thus creating a negative pressure(-).

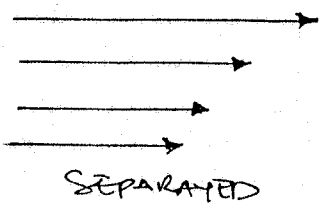
3.50 AIR FLOW THROUGH BUILDINGS

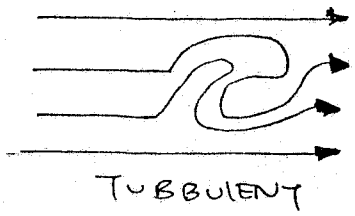
The factors that determine the pattern of air flow through a building are pressure distribution around building, direction of air entering windows, size, location, details of windows and interior partition detals.
The factors are as follows:-

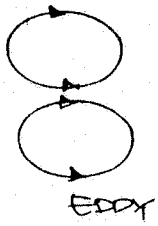
. Site conditions

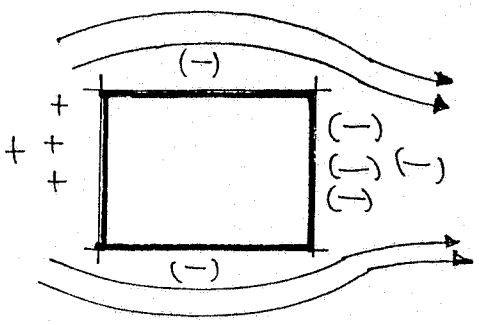
* THE FOUR DIFFERENT KINDS OF AIR FLOW TO BUILDINGS

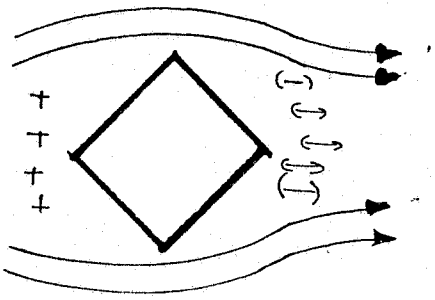




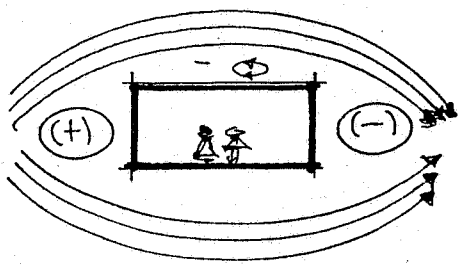


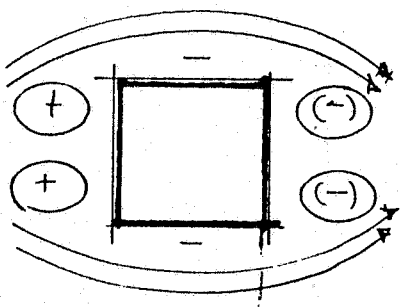






AIR FLOWING AROUND A BUILDING WILL CAUSE UNEVEN POSITIVE AND NEGATIVE PRESSURE AREAS TO DEVELOP.





TURBULENCE AND EDDY CURRENT OCCUR IN THE HIGH AND LOW-PRESSURE AREAS ROUND A BUILDING. THE EFFECTS ARE SEEN ON THE NEXT PAGE.

FIG 3.40 AND 3.50 SHOWING PRINCIPLES OF AIR FLOW THROUGH BUILDINGS.

- Window Orientation and wind direction
- Window locations
- Fin walls
- Horizontal overhangs and air flow
- Window types
- Vertical placement of windows
- Inlet and Outlet sizes and location
- Insect screens
- Fans
- Partitions and interior planning

3.51 SITE CONDITIONS

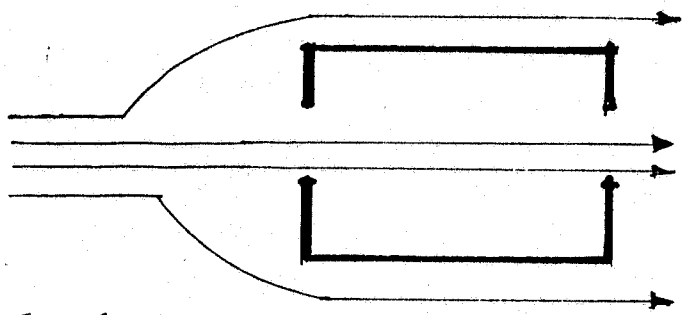
Adjacent buildings, walls, and vegetation on the site will greatly affect the air flow through a building because heating and cooling of a building are very much affected by the site and community in which the building is located.

In climates with very hot summers and mild winters, shade is more desirable than solar access. Wind is also an important factor in varnacular design. When there is too much wind and the temperature is cool, then wind breaks are common, and windbreaks of dense vegetation are most common. On the other hand when the climate is warm and humid, cross-ventilation is very desirable.

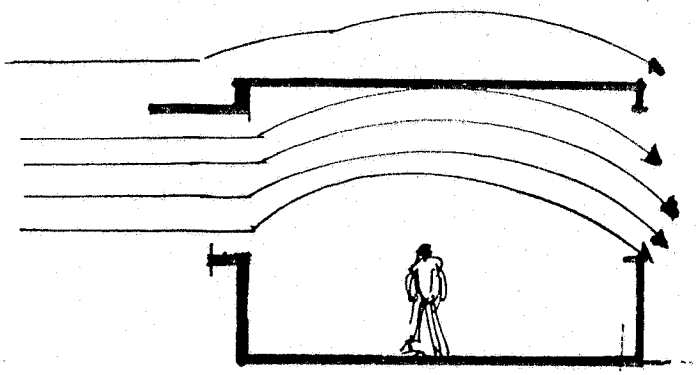
3.52 WINDOW ORIETATION AND WIND DIRECTION

Wind exert maximum pressure when they are perpendicular to a surface, and the pressure is reduced about 50% when the wind is at an oblique angle of about 40°. However, the indoor ventilation is often better with the oblique winds because they generate greater turbulance indoors as seen below.

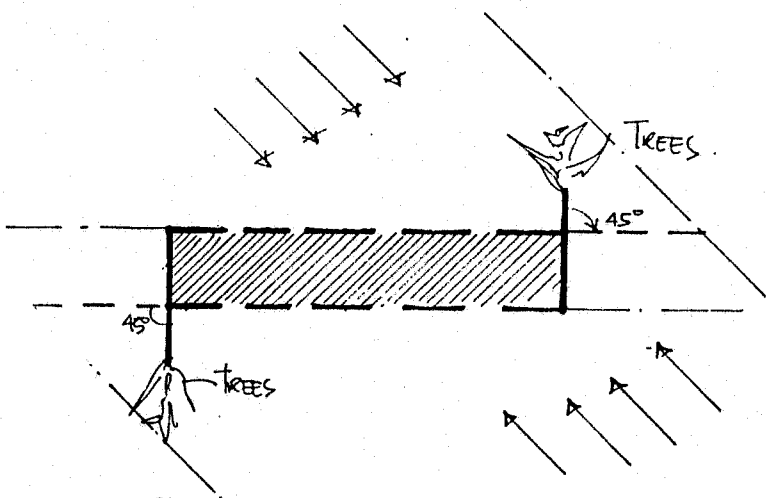
FIGS 3.52 AND 3.53 SHOWING THE WINDOW ORIENTATION AND WIND DIRECTION.



CROSS-VENTILATION BETWEEN WINDOWS ON OPPOSITE WALLS IS THE IDEAL CONDITION.



A SOLID HORIZONTAL OVERHANG PLACED HIGH ABOVE THE WINDOW STRAIGHTEN OUT THE AIR STREAM.



DEFLECTING WALLS AND VEGETATION CAN BE USED TO CHANGE AIR FLOW DIRECTION SO THAT THE OPTIMUM SOLAR ORIENTATION CAN BE MAINTAINED.

Usually indoor ventilation is better from oblique winds than from head-on windows, because the oblique air stream covers more of the room.

In most climates the need for summer shade and winter sun calls for and east-west orientation of a building. Even when winds are east-west, the solar orientation usually has priority, because winds can be deflected much more easily than the sun.

3.53 WINDOW LOCATIONS

Cross-ventilation works so well because air flows from a strong positive to a strong negative pressure area located in opposite walls. Ventilation from windows on adjacent walls may be either good or bad depending on the pressure distribution, which varies with wind direction.

Ventilation from windows on one side of a building can vary from fair to poor depending on the location of windows. Since the pressure is greater at the centre of the windward wall than at the edges, there is some pressure difference in the asymmatric placement of windows, while there is no pressure difference in the symmetric scheme.

3.54 FIN WALLS

Fin walls can greatly increase the ventilation through windows on the same side of a building by the changing the pressure distribution. Each window must have only a single fin.

The placement of windows on a wall not only determines the quantity but also the initial direction of the incoming air.

The off-centre placement of the window gives the air stream an initial deflection, because the positive pressure is greater on one side of the window. Therefore, to further ventilate the occupants, the air steam should be deflected in the opposite direction. A fin wall can be used to change the pressure balance and thus the direction of the air stream.

3.55 HORIZONTAL OVERHANGS AND AIR FLOW

A horizontal overhang just above the window will cause the air stream to deflect up to the ceiling, because the solid overhang prevents the positive pressure above is from balancing the positive pressure below the window. However, a gap of 6 inch. or more in the overhang will allow the positive pressure above it to affect the direction of the flow. Placement of the overhang higher on the wall can also direct the air streams down to the occupants.

3.56 WINDOW TYPES:

The type and design of the windows have a great effect on both the quantity and direction of the air flow. Double hung and sliding windows do not change the direction of the air stream they do block at least 50% of the air flow. Casement windows deflect the air stream from side to side and they can act as fin walls when they swing outward. For this purpose hopper Jalousie windows are used which is very important in hot and humid climates like Nigeria.

VERTICAL PLACEMENT OF WINDOWS

The purpose of the air flow will determine the vertical placement and height of windows. For comfort ventilation, the windows should be low, at the level of the people in the room.

INLET AND OUTLET SIZES AND LOCATION

Generally the inlet and outlet size should be about the same, since the amount of ventilation is mainly a function of the smaller opening. However, if one opening is smaller, it should usually be the inlet, because that maximizes the velocity of the indoor air stream, and it is the velocity that has the greatest effect on comfort.

Although velocities higher than the wind can be achieved indoors by concentrating the air flow, the area served is of course decreased the inlet opening not only determines the velocity, but also determines the air flow pattern for the occupants.

3.57 FANS

Usually wind is not always present in sufficient quantity when needed, and usually there is less wind at night than during the day. Thus, fans are usually required to augment the wind.

There are three quite different purposes for fans. The first is to exhaust hot, humid, and polluted air. This is part of the heat avoidance strategy.

The second is to bring in outdoor air to either cool the occupants (comfort ventilation) or cool the building at night (convective cooling).

The third purpose is to circular indoor air at these times when the indoor air is cooler than the outdoor air.

3.58 PARTITIONS AND INTERIOR PLANNING

Since the depth of a room has little effect on ventilation, windows placed on the short walls of a rectangular room ventilate a much larger area than do windows placed on the long walls. A high ceiling does allow stratification to occur, which is beneficial in the summer.

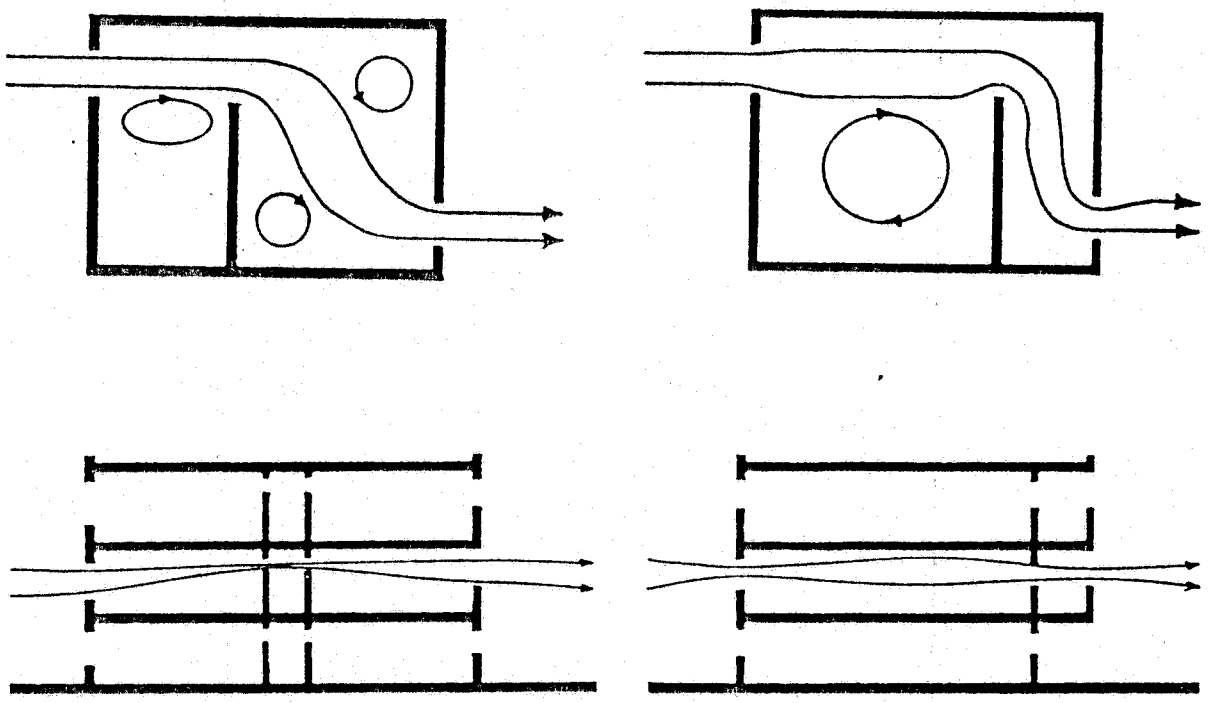
Open plans must especially in the wards, are preferable because partitions increase the resistance to air flow and thereby decrease total ventilation.

3.60 HEATING

In most buildings, mechanical equipment is required to carry the thermal loads still remaining after the techniques of heat rejection/conservation and passive cooling/heating have applied. However, with the proper design of the building, as described in the previous parts of this write-up. The size and energy demands of heating and cooling equipment can be quite small. Since the heating and cooling equipment is bulky and must reach into every space, it is an important concern for the architectural designer.

3.61 HEAT LOSS

The major channels of heat loss are transmission infiltration. Heat is lost by transmission through the ceiling, walls, floor, windows and doors. Heat flow by transmission occurs by a combination of conduction natural convection and radiation. The proportion of each depends mainly on the particular construction system.



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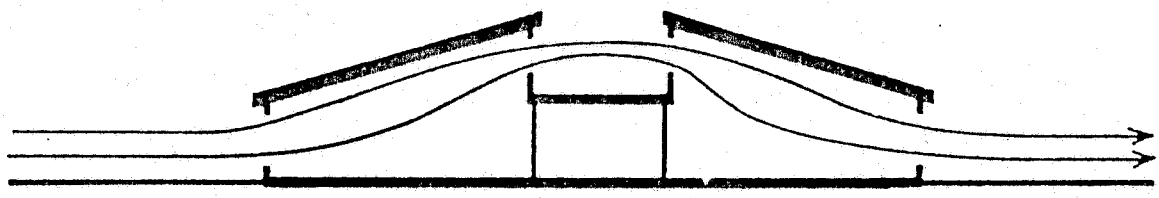
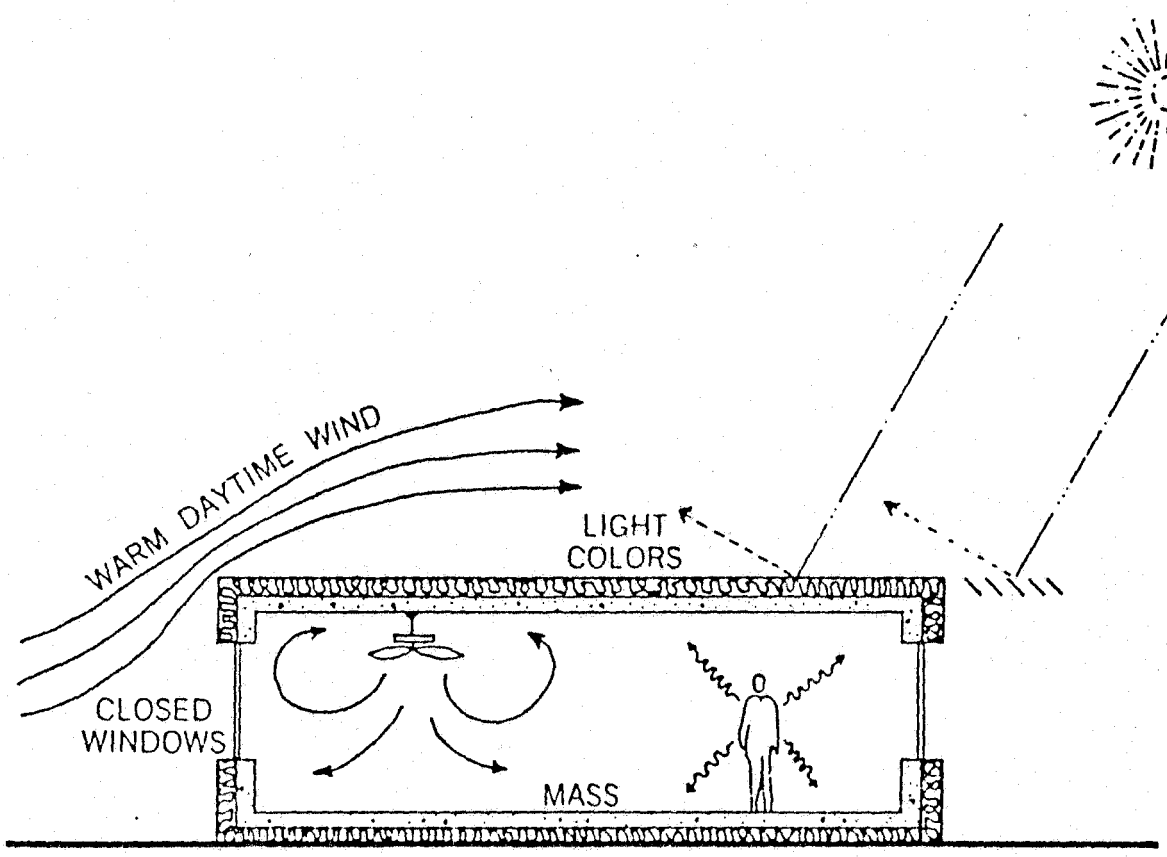


SECTION

FIG 3.58 EXPLAINS THE DEPTH OF A ROOM WHICH HAVE EFFECT ON VENTILATION. OPEN PLANS MOST EXPECIALLY IN THE WARDS WHERE PATIENTS STAY, ARE PREFERABLE BECAUSE PARTITIONS INCREASE THE RESISTANCE TO AIR FLOW AND THEREBY DECREASE TOTAL VENTILATION

FIG. 3·61 AND 3·62 SHOWING HOW HEAT CAN BE LOST AND GAINED THROUGH THE USE OF INSULATING MATERIALS WHICH MAKE THE INSIDE ~~ABEY~~ WARM AND COLD DURING ~~SUMMER~~ AND WINTER PERIOD RESPECTIVELY. THIS IS ACHIEVED BY THE USE OF THE FOLLOWING FORMULA :—

$$\text{HEAT LOSS OR GAIN} = \frac{\text{AREA} \times \text{TEMPERATURE DIFFERENCE}}{\text{THERMAL RESISTANCE}}.$$



The actual transmission heat loss through a building skin is given by the following formula:-

$$\text{Heat loss} = \frac{\text{Area X Temperature Difference}}{\text{Thermal Resistance}}$$

Thus, we can minimize the heat loss with the use of a compact design (minimum area), common walls (no temperature difference across walls), and plenty of insulation (large thermal resistance).

Heat is also lost by the infiltration of cold air through cracks around windows and doors. Ventilation heat loss is very much like infiltration except that it is a controlled form of air exchange. Not only sensible but also latent heat (water vapour) is lost with infiltration and ventilation.

3.62 HEAT GAIN

Although heat gain to a building is similar to heat loss, there are some significant differences. The similarity is in the heat flow through the building envelope due to a temperature difference between indoors and outdoors. The differences are primarily due to the load from internal heat sources, the effect of thermal mass, and of course the action of the Sun Explanation are shown on both heat loss and gain on figures 3.61 and 3.62.

The heat gain from the Sun comes in two separate channels. The first is the direct heat gain through the windows. This solar gain is controlled by shading which is explained on 3.60. The second component of solar heat gain is a consequence of the surface heating of opaque surfaces. Dark colours absorbs a large amount of solar radiation and get quite hot.

Light colours produce much lower surface tempteratures, and the heat gain through roofs and walls with light surfaces is about 50% of that from dark colours (75% for medium colours). As in winter, heat gain by transmission can be minimized by the use of compact forms, common walls, and plenty of insulation. These factors are very important both summer and winter.

3.63 INSULATION MATERIALS

In general "the more insulation the better" is a good principle to start with for a number of reasons: Insulation is relatively inexpensive, it is very durable, it functions both summer and winter, and it is much easier to install during initial construction than to retrofit later.

Among the many characteristics of insulating materials, one of the most important is thermal resistance, since that will determine the thickness required. Other important characteristics of insulating materials are moisture resistance, fire resistance, and physical strength.

Most insulating materials work by creating miniature air spaces. The main exception is reflective insulation, which uses larger air spaces faced with foil on one or both sides. This material acts mainly as a radiation barrier. The metal foil, which is usually aluminium, is both a poor emitter and absorber of thermal radiation.

The first layer of foils stops about 95% of the radiant heat flow. Additional layers of foil help little except to create additional air spaces which will reduce the convection heat flow.

SUMMER HEAT GAIN THROUGH THE ROOF CAN BE REDUCED AS MUCH AS 40% BY USE OF A RADIATION BARRIER (FOIL)

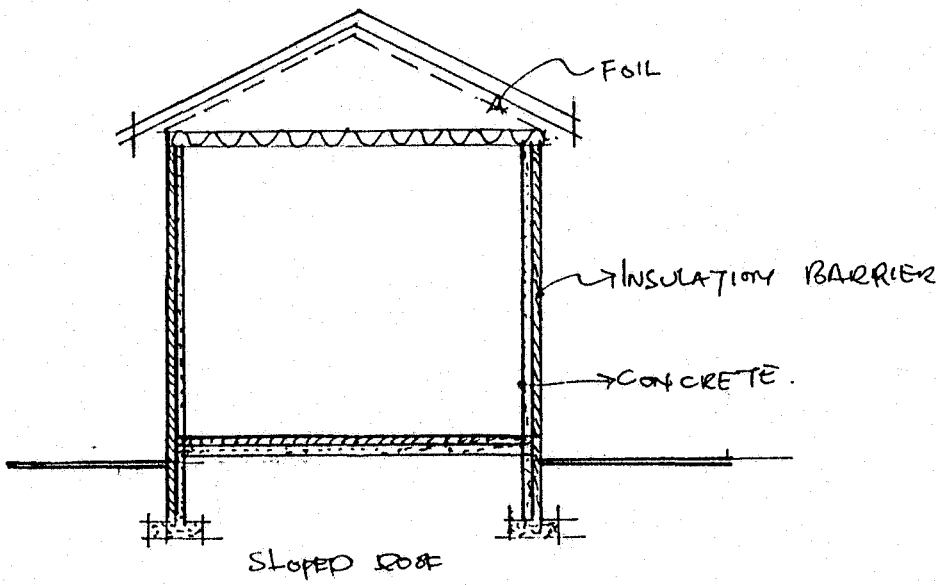
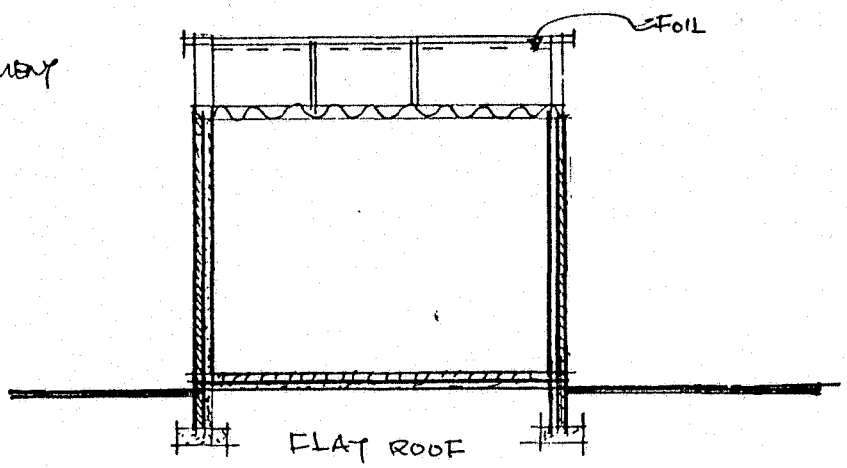
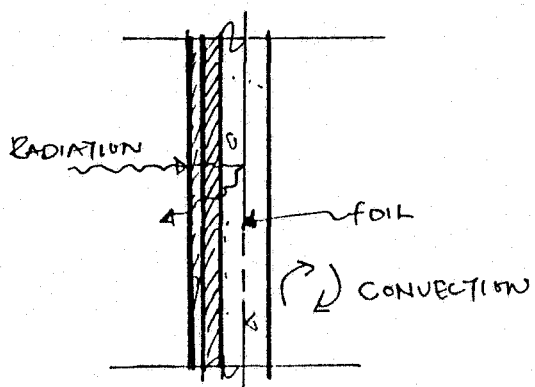


FIG 3.62
SHOWING PLACEMENT OF FOIL.





* THIS FOIL WHEN PLACED IN THE CENTRE, OF AN AIR SPACE IT WILL ALSO SLIGHTLY REDUCE HEAT FLOW BY CONVECTION.

Although radiation is dependent of orientation of the air space and direction of heat flow. As a result, the resistance of air spaces and reflective insulation varies greatly with location in the structure.

The best application for a radiation barrier is in hot climates like Nigeria just under the roof which normally reduces as much as 40%. The foil is attached to the under side of the rafter to create two air spaces each facing a radiant barrier. Or it is suspended to create two foil faced air spaces. This is best discribed in the diagrams below.

INSULATING WALLS, ROOFS AND FLOORS

The total thermal resistance of a wall roof, or floor construction is simply the sum of the resistance of all the component parts determining the total resistance of a wall or roof section is useful for comparing alternatives, for code compliance, and for calculating heat loss which have been calculated before.

WALL COATING:- Various types of reflective coating are possible. A silver coating (any polished metal) will reflect both visible, short-wave infrared, and long wave infrared radiation. Besides reflecting solar radiation it also has a higher Rgvalue because it reflects radiant heat back in the summer and back in during the winter. This kind of coating is appropriate for buildings that need year round protection from the sun like this cancer centre.

INSULATING MATERIALS.

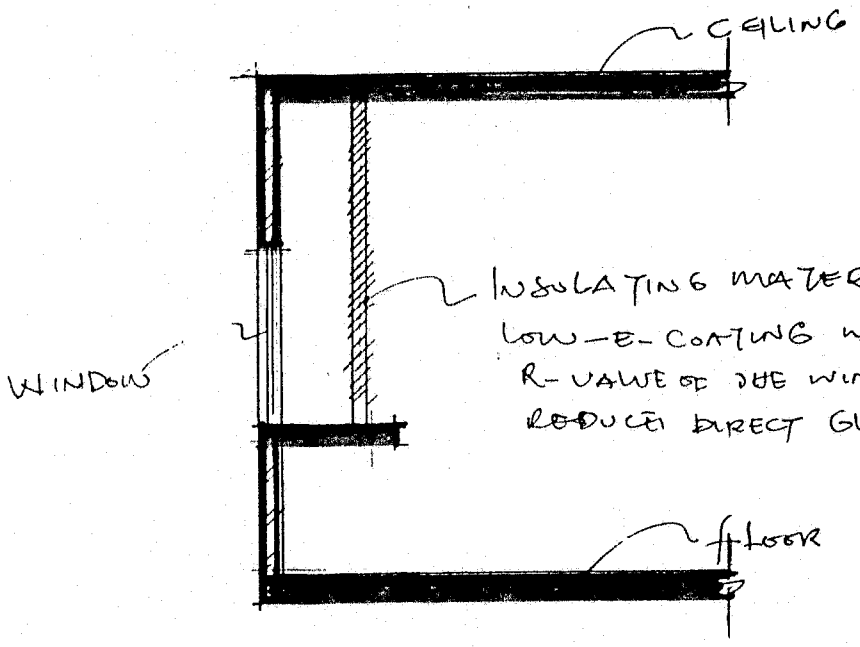
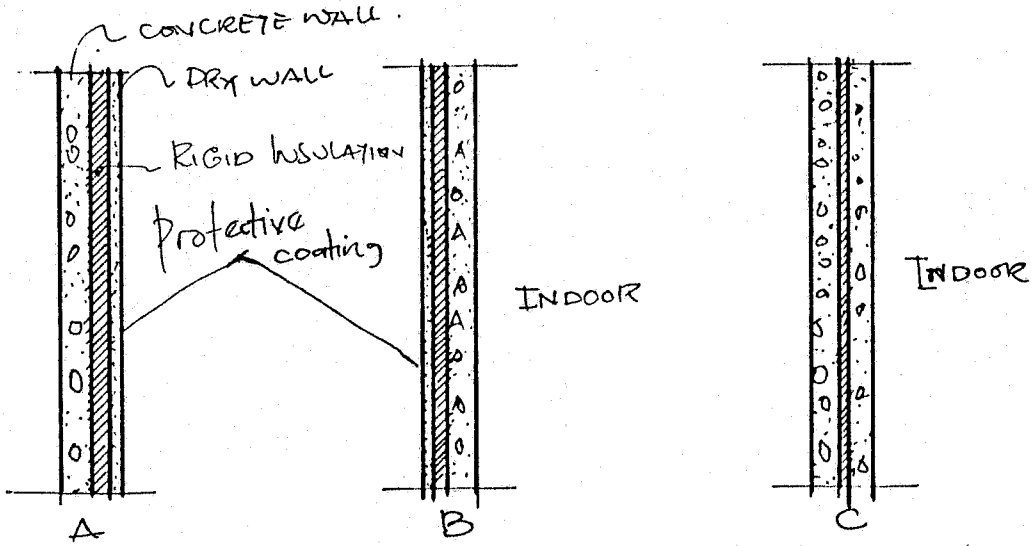


FIG 3.63 SHOWING PLACEMENT OF INSULATING MATERIALS ON WINDOWS AND WALLS.



THE PLACEMENT OF MASS RELATIVE TO THE INSULATION.

(A) MASS ON OUTSIDE: GOOD FOR FIRE AND WEATHER RESISTANCE AND GOOD FOR APPEARANCE.

(B) MASS ON ~~OUTSIDE~~ INSIDE; GOOD FOR CONVECTIVE COOLING AND FOR PASSIVE SOLAR-HEATING

(C) MASS SANDWICH: FOR BENEFITS OF A AND B BUT LESS OF EACH.

* B USED IN THE PROPOSED DESIGN.

CHAPTER FOUR

4.00 CASE STUDY INTRODUCTION

Since independence, there has been important improvement in the state of Nigerians health services with private sectors touring over where the government's resources have been over-strectched. The situation is far from satisfying to health authorities. The high incidence of killer diseases such as cancer, heart disease, combined with alarmingly high mortality rates have aroused fears, in the face of other epidemics. By 1990, Ministry of Health Officials announced an Intensification of public education campaigns on the issue of cancer detection and self-examination, this was an air time on television stations in the Western parts of the world.

It will be recorded that most recently, has there been an attempt by the country at actually achieving tangible results in health need could be catered for in a modern environment. The plan of these buildings reflect enormous change in attitudes that had come about the creation of Ministry of health and human services.

4.10 SELECTION CRITERIA

The case studies carried out represent a little faction of the health care buildings and probably much more less than the total health buildings in Nigeria. The field of health care are represented in many types of buildings and a cross-section of these, including specialist hospital have been selected.

. Maternity, surgical

. Wards, post-natal, pre-natal & neo-natal

. Mortuary service

. Maintenance, & power

. Physical Therapy:- Rehabilitation through physiotherapy. stroke patient inclusive.

. Comprehensive up-to-date laboratory services: Including tiver function test (L.F.T), random sugar, cholesterol.

. Motuary services: For preservation of the dead within and outside the hospital.

Other fields of medicine departments which includes:

. Operation theatres

. Administrative

. Orthopeadic wards for women

. Catering/staff department

. Pharmaceutical, outpatient, laboratory and examination room.

. Physiotherapy and X-ray department

. General wards.

MERITS

. The strategical location of the hospital at the outskirts of Minna enhances its efficiency and accessibility to users.

. The hospital has the advantage of very good arrangement of site circulation, in that all service traffic and most ambulances are separated completely.

. The layout of the hospital ensures a complete separation of out-patient and inpatient circulation with diagnostic, X-ray and physiotherapy being the only department shared by out-patients and inpatients.

- Orthopaedics:- All diseases of bones, joints, muscles, ligaments, nerves and tendons.
- Tranmatology:- Treatment of all forms of injuries from accidents and other mishaps, including sports injuries.
- The hospital is well ventilated by the use of natural lightening and courtyards.

DEMERITS

- The corridors leading to the departments are not enough
- There is no distinction between service car park and public parking lots.
- There is only one main entrance into the hospital, there is the possibility for a clumsy traffic flow.

4.30 FAMILY SUPPORT PROGRAMME (FSP) HOSPITAL, ABUJA

The Family Support Programme (FSP) national women and children hospital (NWCH) at Abuja was commissioned by the former first Lady Dr.(Mrs) Maryam Abacha. It is a referal hospital, a centre of excellence, to cater for the general and specialised medical needs of women and children in particular. It is located in the Central area of the Capital City, it has a capacity of 200 bed. The hospital scope comprises of:-

- Oncology, paediatric
- Catering, laundry
- Out patients/emergencies
- Laboratory, pharmacy, blood banks
- Multi-clinics
- Radio diagnostic
- Radio therapy, physio therapy

. The hospital layout also ensures the most direct route between the supply department and the main users.

. The hospital surroundings is well landscaped and have paved and covered walkways.

The hospital is supervised and maintained under the Ministry of Women Affairs in conjection with Ministry of Health.

MERITS

. The layout of the hospital ensures a complete separation of out-patient and in-patient circulation.

. The hospital is centrally located, which makes it easily accessible.

. The hospital layout ensures the most direct route between the service entrance and main entrance.

. The hospital has a well landscaped surroundings with paved and covered walkways.

. The hospital has a well Organised traffic both human and vehicle flow.

. The layout of the hospital has enable it have a cross-ventilated atmosphere.

DEMERITS

. No commercial parking space

. No distinction between staff parking and public parking

. Absences of recreational area

. The hospital lack basic infrastructures such as water point and gas station.

. There is no special cancer treatment unit.

4.40 GWAGWALADA SPECIALIST HOSPITAL, ABUJA

The hospital came into being out of the desire to provide expert tertiary health care services to the inhabitants of the Federal Capital Territory. It was commissioned on 5th May, 1992 by the Former President General Ibrahim Babangida(Rtd). It is only the tertiary health care institution in the Federal Capital Territory. It is also a referred hospital. It is located at the outskirt of Gwagwalada along Dubi-Izom road.

The following services are available:

- Medicine
- Surgery
- Gynaecology/obstetrics
- Paediatrics
- Dental Surgery
- Clinical psychology
- Opthalmology
- Dermatology
- Orthopaedics
- Surgery
- Urology
- Pathology
- Anaesthesiology
- Radiology
- Microbiology

Other hospital's diagnostic services include:-

. An X-ray department with facilities for basic radiography, fluoroscope constrast investigations for gastroenterology, including venography, Anteriography, urology and ultrasonography sector plus linear scanning.

. Other services also include the physiotherapy department which has facilities for physical therapy, electrotherapy and a modern gymnasium for physical exercise and those with weight problem.

MERITS

. The hospital has a well orgnaised traffic flow both human and vehicle.

. The layout of the hospital has enable it have a cross-ventilated atmosphere.

. The hospital has covered walkways and corridors linking one another.

. There is a complete separation between the out-patient and in-patient circulation.

. It present location in Gwagwalada enhances its efficiency and accessibility to users.

. The hospital environment is well landscaped

. Recreational facilities are available

DEMERITS

. There is no distinction between staff and public parking

. The hospital has only one entrance which might constitute traffic problem.

. There is no definable unit for cancer treatment.

4.50 ANALYSIS OF CASE STUDIED

In sufficient can parking spaces and location of cooking activities within the wards were lacking. Expansion possibility also not visible. In the proposed cancer centre, the following points will be considered to achieve flexible and functional design criteria.

- Simplicity of design, in form and functionality
- Good circulation within the hospital
- Good location of car parking facilities in order to enhance free flow of traffics and thus not to allow the car park compete with entrance view.
- Spacious design, gives sense of belonging and am atmosphere of comfort.
- Cheerful environment, removing the stress associated with hospital experience and recuperation so that the patient can feel at home.

CHAPTER FIVE

5.00 PHYSICAL AND SOCIO-CULTURAL BACKGROUND

5.10 LOCATION

The geography of Nigeria is characterized by three large Plateau areas divided from one another by the troughs of Niger and Benue rivers.

Along the Sea Coast stretches an alluvial plain bulges out into the Attantic occean where the Niger Delta with its intricate pattern of water courses penetrates it. The characteristic vegetation of the Coastal plain - is a dense tropical forest. This is replaced by various types of Savannah Vegetation as the plateau upland rise from the coastal plain. Moving North, the climate becomes nearly desert. The site selected by the location Committee and defined in the 1976 FCT decree is a 3,000 square kilometer area South of Abuja surrounded by Niger, Kaduna, Nassarawa and Kogi States.

Four major rivers flow Southward in the Niger-Benue through either the FCT or adjacent to it. The Gurara river flow through the territory along its Western edge. Its watershed drains most of the territory in the Niger. To the West and North of the territory lies the largest of the tributary of the Niger. Between the Kaduna River and the FCT lies the Jatau river. East of the territory lies the Okwa river.

A high ridge of hills lies between the territory and the Okwa Valley.

Large, relatively uninhabited areas like between Kaduna and the Federal Territory and the West of the territory. Immediately North and North West of Abuja towards Minna are farming areas, over the ridge to the east in Okwa valley are extensive farming areas in the vicinity of Keffi.

Within this general geographic context, the FCT itself consists of tilted plain rising from Elevation 300 feet in the South west corner to above 2,000 feet at the Northeast corner, rising out of this tilted plain are numerous rocky knobs and inselbergs and several ranges of low mountains. This kind of landscape also charaterizes large areas of the region surrounding the territory. In areas over-looking the Niger-Benue low lands, the hills change to flat-topped laterite capped mesas.

5.20 CLIMATIC CONDITIONS

Abuja, the Capital of Federal Republic of Nigeria is located just North-east of (9°N, 7°E] on the geographical Coordinate system. Situated in the middle-belt of the country, it is also located along the Southern scarp of the North-Central and Jos Plateau, in the Niger Basin just North of the confluence of the Niger-Benue rivers. Abuja,s position relative to other geographical location around Nigeria, makes it a better site for the nation,s Capital, both for administrative and defensive purposes.

Abuja, being located in the middle-Belt region of Nigeria experience a continental type of climate. This is to be expected for its fairness from the sea, as the effect of continentality on

climate is highly marked within the West African sub-continent. The seasonal statistics for the climatic elements also show the variation that testify to the continentality of the region in relation to climate. A comfortable living environment is what this region offers and this is based on the aspects of the environment which reduces heat and the effect of humidity, and protection from rain and dust.

5.21 RAINFALL

Rainfall is seasonal in the Abuja area, rainy season normally spans the period of the month of April through October and the remaining part of the year are dry months. As with most tropical locations, rainfall depth is about 1,500mm in a year within a duration of about 200 days in a year (Iloeje, 1981]. Mean monthly distribution shows a concentration of four months with 60% of the annual rainfall in the months of July, August and September.

5.22 TEMPERATURE

Abuja, being located in the lowland Niger basin is one of the hottest places in Nigeria. Mean annuak temperature register beyond 27°C. Although mean annual temperature are generally high, spring and autumn (March/April and October/November respectively] temperature records the highest.

MEAN MONTHLY RAINFALL

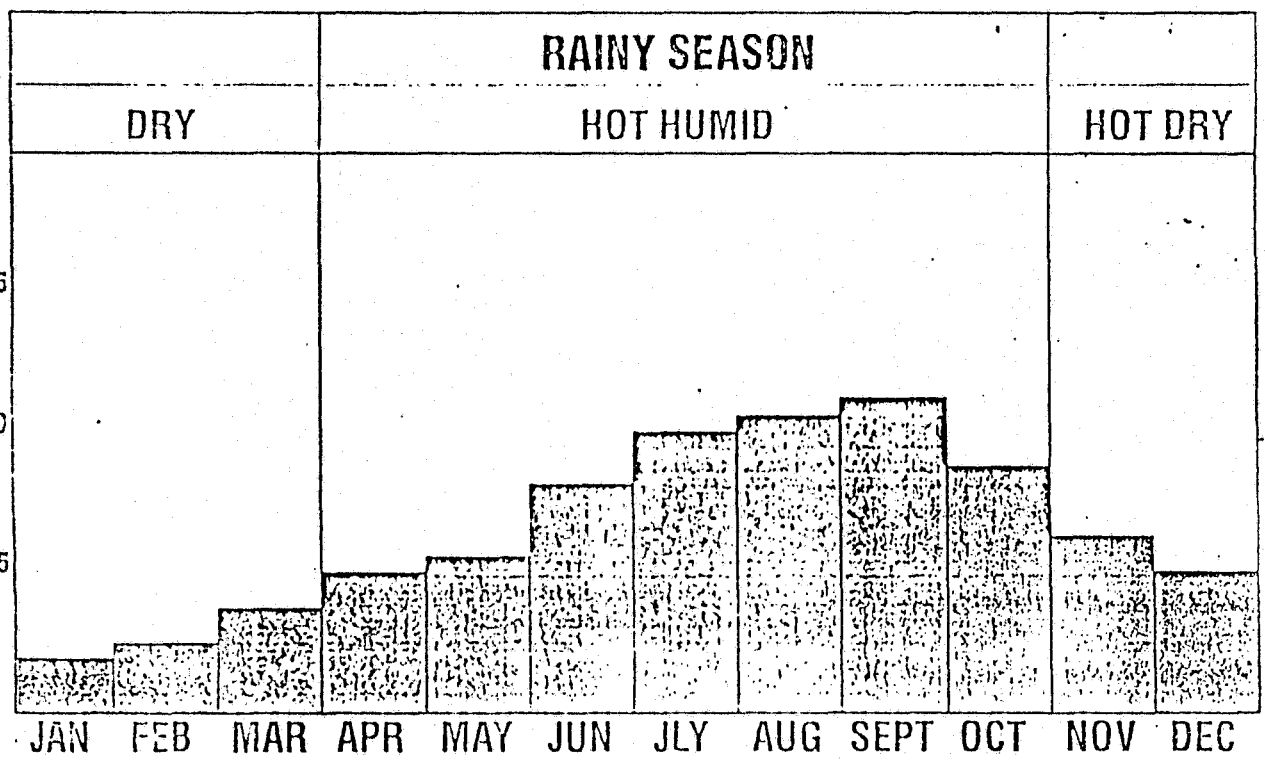


Fig 5.21

These maxima are as a result of the relative position of the over head sun in relation to its North-South seasonal tranmigration during the course of the year. Annual range of temperature is about 8°C, with minima in January and August. It is cool in the night through the morning and hot in the afternoons. The mean daily range of temperature is about 15°C, with summer temperature maxima in excess of 35°C *Jarratt, 1976].

5.23 HUMIDITY

Humidity is a measure of water vapour content in the atmosphere. The Abuja area experiences marked seasonal fluctuations of humidity, in accordance with the changes in the seasons. During the dry season, the relative humidity values are in the range of 60-80% (Iloeje, 1981]. These differences in seasonal humidities are as a result of changes in the prevailing wind systems during the course of the year. The winter harmattan winds originates from the Sahara desert and are therefore dry, giving rise to the dry season during the period, November through March. By April, there is a shift in the wind patterns and the moist South western which originates from the South-Atlantic ocean replaces the harmattan winds. It is the seasonal humidity changes that account for the wet season, and the uncomfortably high temperature experienced in the Abuja area.

5.24 PRESSURE

Pressure is the weight of air on the ground. Seasonal changes in mean temperature affect this weight, as high temperatures of the summer season lead to the rising of air

MEAN MONTHLY TEMPERATURE

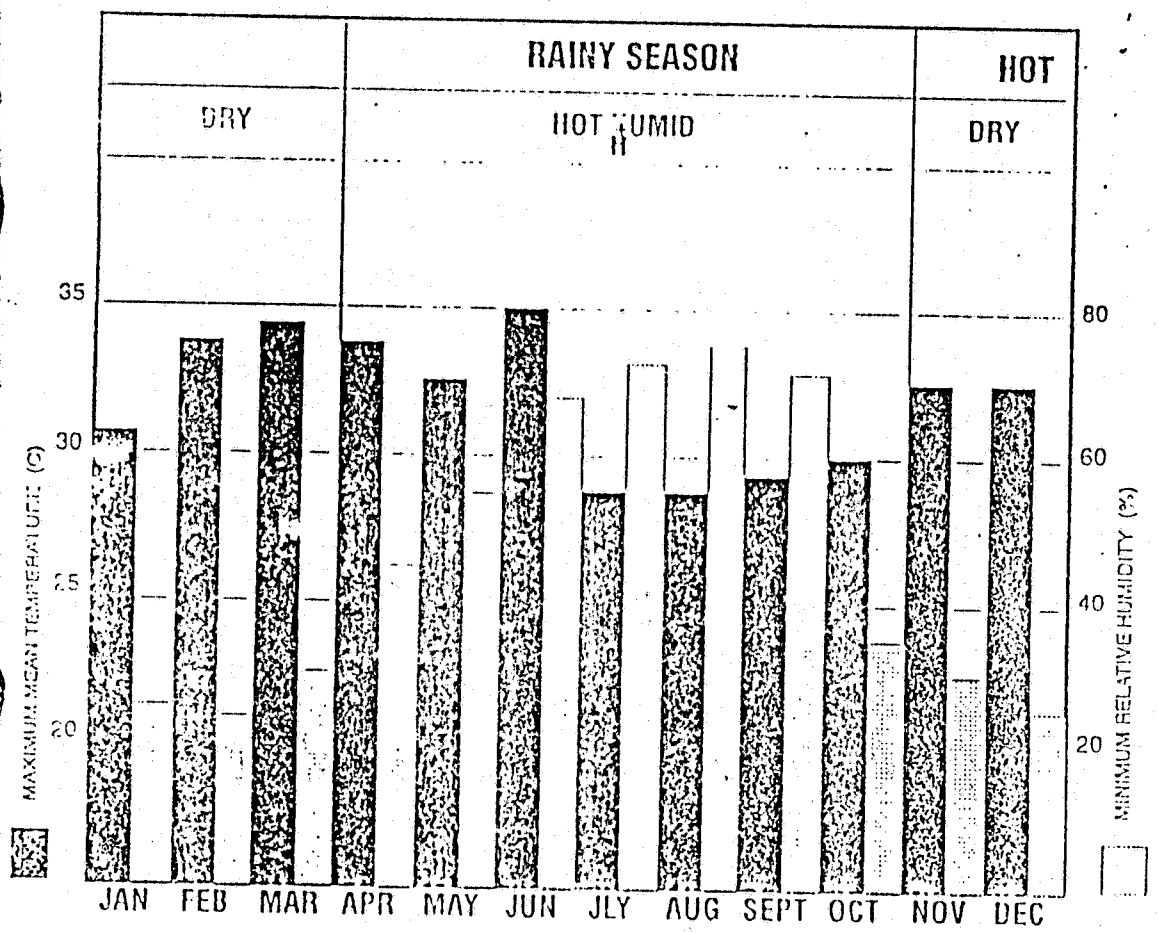


Fig 5·22

MEAN MONTHLY HUMIDITY

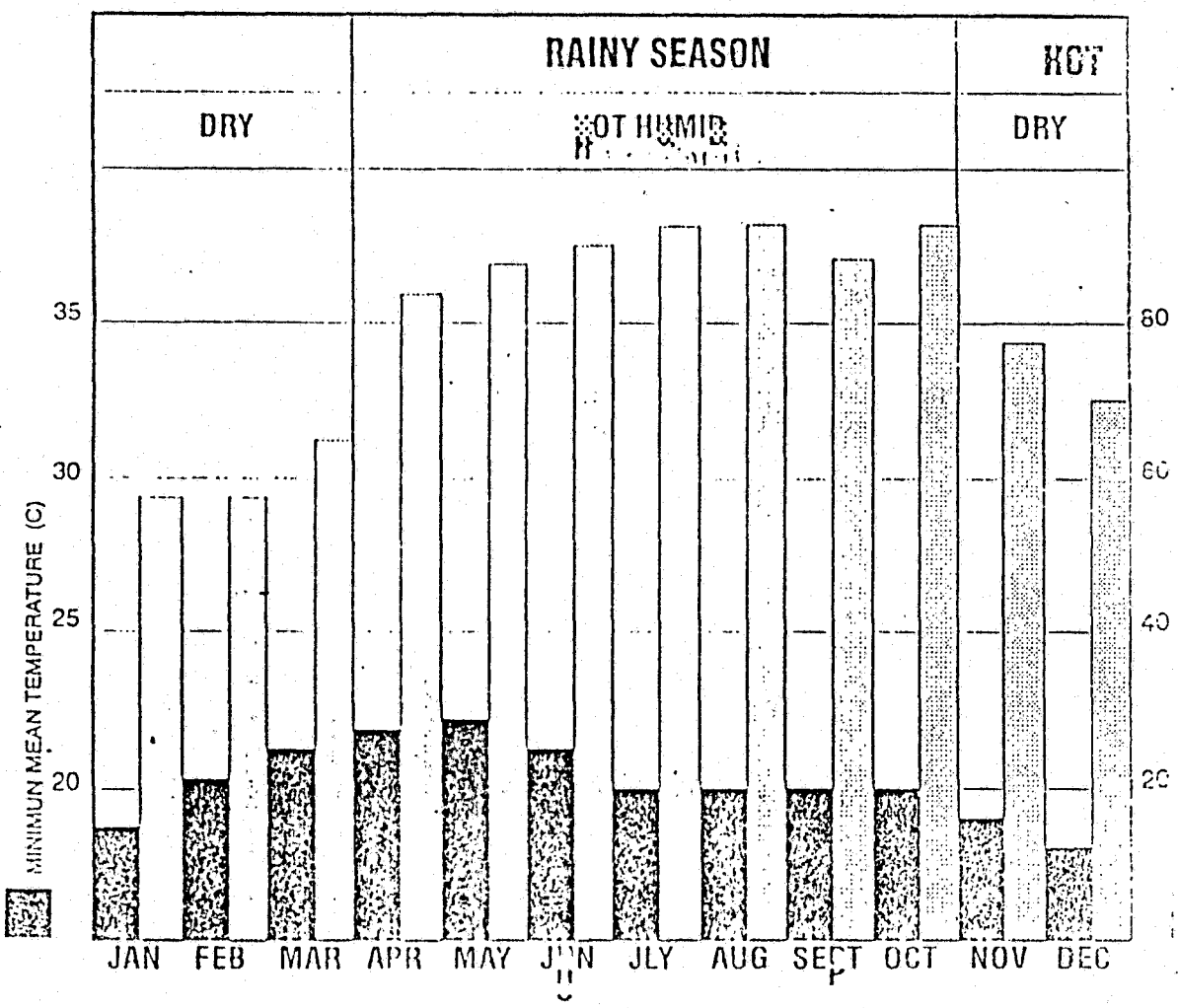


Fig 5.23

parcels leading to low surface pressures while low temperatures of winter to high pressures. During the summer season, the sun migrates towards the Northern latitudes and situation are hotter during the season of the overhead sun. Abuja latitudinal position is around 9°N and therefore comes under generally low pressure during summer seasons. A belf of relatively much lower pressure which migrates in synchrony with the sums poleward-equator ward journey in the course of the year runs across Nigeria and other West African Countries (the inter Tropical discontinuity]. It is during the periods when this belt falls on the Abuja area and when its position is to the North of Abuja that the wet seasons are normally experienced. This is attributed to the fact that the moist South-westernly winds from the Atlantic ocean that gives rain is able to traverse the West African - Sub-continent. Thus Abuja experiences wet season when pressure are generally low at or North of it location and dry season when the low pressure belt moves South of the location.

5.25 SUNSHINE

In terms of sunshine and cloud cover in Nigeria, there is a general increase in the total hours of sunshine further North from the Atlantic coast. This is because of the greater amount of cloud coverage in the South on an annual basis. The Federal Capiatl City is estimated to be exposed to about 2,500 sunshine hours annually (Mabogunje, 1977]. The greater portion of this figure is obtained during dry season.

MEAN MONTHLY SUNSHINE DURATION

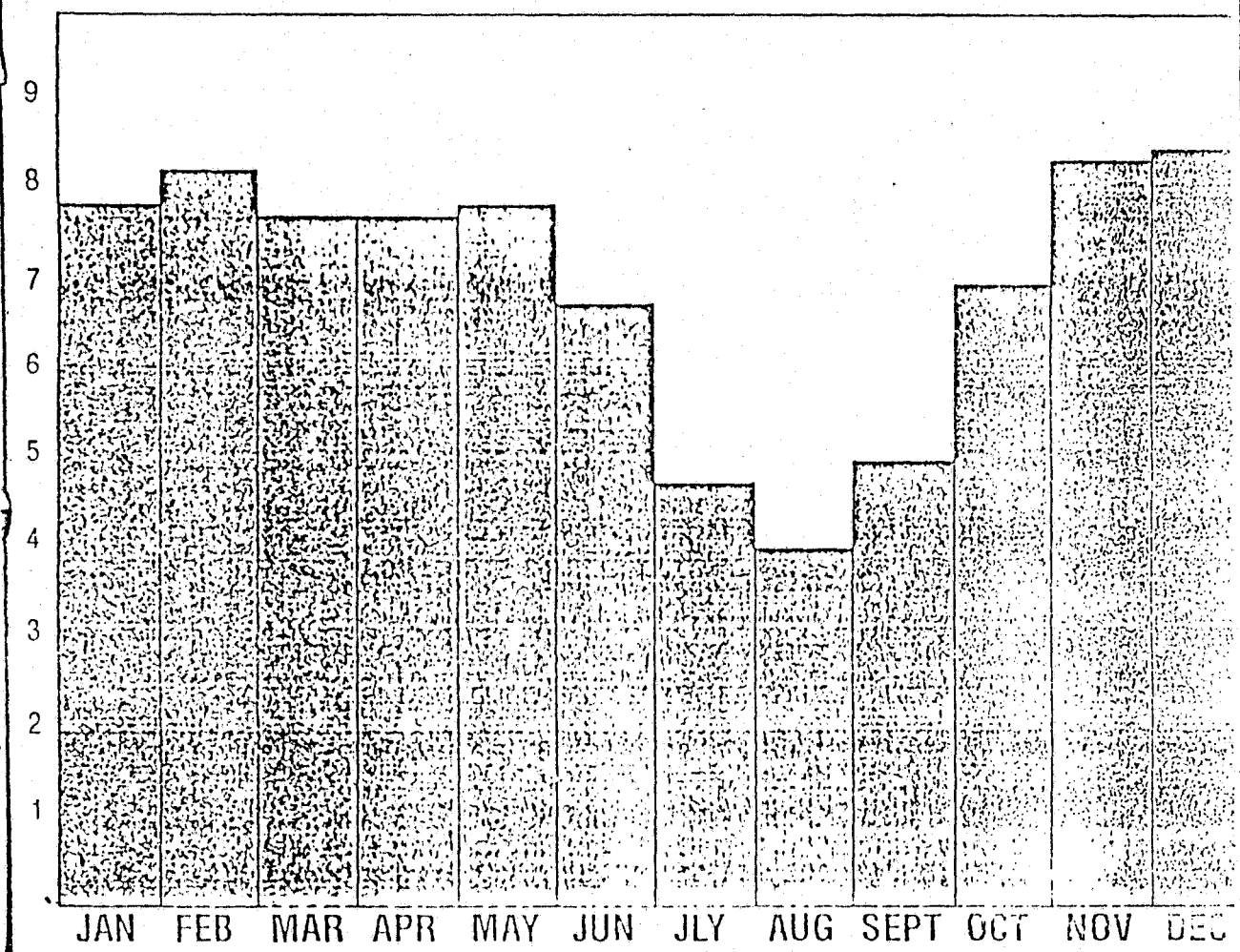
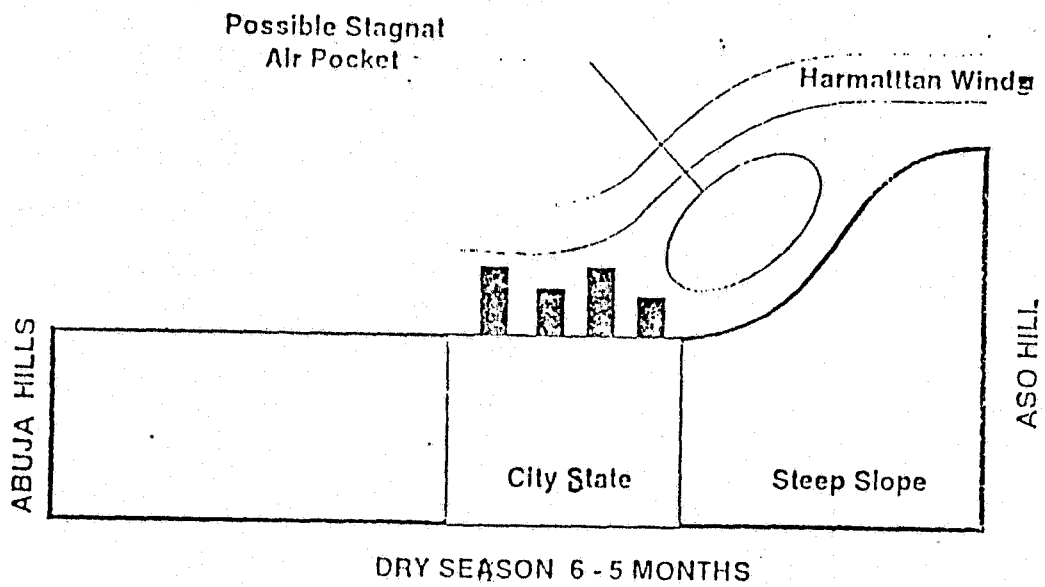
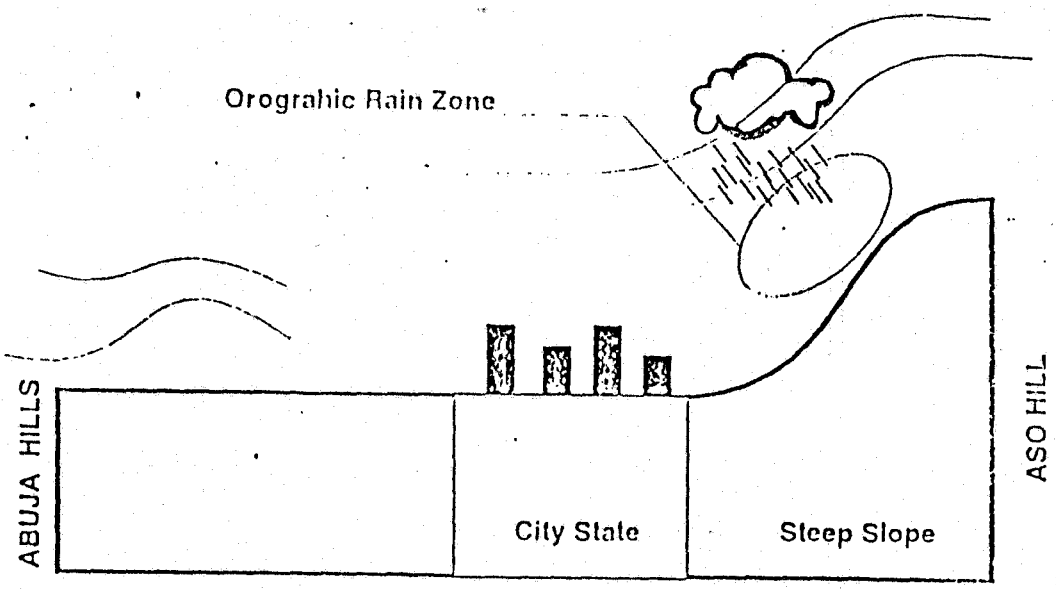


Fig. 5·25



DRY SEASON 6 - 5 MONTHS



WET SEASON 6 - 7 MONTHS

31

Fig. 5.26

In the wet season however there is an increased cloudness and during the month of August, sunshine hours reduces greatly, leading to temperature inversions in the mornings. This leads to mist or fog in the entire city.

5.26 WIND/DUST

The major air masses dominating the climate of the FCT (Abuja) are:-

. The tropical maritine air mass (S.W)

. The tropical continental air mass (N.E).

Each air mass brings along its own wind, the tropical maritine air mass being predominantly wet while the continental air mass being dry and dusty.

5.30 GEOLOGY AND TOPOGRAPHY

5.31 TOPOGRAPHY

The general relief of the abuja area is more or less undulating. Being located along the edge of Northern Plateau and within the sedimentary basin of the Niger Trough, the area is marked by gentle rises and falls of the land. There are numerous inserbergs rocks scattered around the land such as the wide open lands.

The Central City of Abuja is situated in the Gwagwa plains which is one the North eastern section of the FCT. The general elevation of this plain is about 305m in the West to 610m in the east within the area of the new city. But because of wideness of the plain, the average slope is less than 15%.

Steep faced inselbergs and other granitic clusters occupy about 8% of the total plain areas, and are generally bare and rocky. The Gurara plain and other plains like the Iku-Gurara plains in the west, and the Robo plains in the South are surrounded by chains of hills and ridges.

5.40 GEOLOGY

As already noted in the earlier section, there are large plains with granitic out crops, and the plains being surrounded by chains of hills. These are described as older sedimentary rocks and an intrusion of younger igneous rock, within the Federal Capital City itself the major underlying rocks are categorized as below:

. Metamorphic Rock of Schist along ridge tops at the eastern edge of the site migmatite, underlying much of the of the city site, and Gneiss, underlying the Usman river valley in the North west portion of the city.

. Igneous Rock of large intrusive masses forming dissected zones of the Zuma-Bwari-Aso hills and outerop of Gwagwa plains.

. Sedimentary rock of large alhrium, consisting largely of sound and local deposit of clay. It is also a common feature throughout the territory.

The above rock structure has not presented any major geotechnical constraints to any structure proposal for the capital city over most of the site.

5.33 SURFACE WATER

The net work of streams, valley and depressions covering the Capital city site spreads out in a fair shape, draining the crescent of development area.

Flood-plains are located along all intermittant and permanent steams. The overal plan of the city has been developed to accomodate these runoff problems. They city has been organised in watersheds associated with the major streams flowing into the Usuma river. Urban development has been located so as to cause minimum interference with the natural drainage.

5.34 SOILS

Generally, the soils underlying the capital site is better than other surrounding territories. Being mere fertile and successful landscaping of public areas and streets. The soil is predominantly derived from granitic guiess and migmatite, and their suitability for developed land use varies with depth, occurence of iron pan, texture and erodibility, runoff potential and drainage. Constraints for foundation, and other utilities occur where soils are shallow, or poorly drained.

Based on the preliminary data available in Abuja, Master plan shows that the soil in the Capital is well drained and shows not much constraint for construction.

5.4 VEGETATION

The vegetation type in the Abuja area, like most other places within the middle belt zone is that of the Sudan Savannah.

Although there was a great destruction of the city. There was also a plan to preserve the natural cover in some places where it become unnecessary to remove them in order to reduce degradation patches of lands within the new city were left forested. Some other which were cleared for agriculture with part later turned to shrub Savannah, in addition along the courses of the streams. This was to protected string, the rainy season would continue to be accomodated by the natural channels. There are patches of rain forest in few locations within the plains, at the foot areas of rocky hills and in deep river valleys.

Adjacent to the city woodlands are also being preserved for their value as aesthetics and recreation sources for their ameliorating effects on climate as well as for their fuel and industrial value.

5.50 SOCIO-CULTURAL FACTORS

5.51 HISTORY AND HISTORICAL BACKGROUND

Many centuries before the establishment of British rule in Nigeria, the major spatial units of administration over which traditional rule presided were empires, emirates and Kingdoms. In the Northern part of Nigeria, the major unit of administrations were emirates.

The Emirs, unlike their counterparts in other part of the Country, exercise more religious rights than judicial powers deriving from the Socio-political nature of Islamic Culture and low.

In spite of the fact that their boundaries were not finely indicated nor recorded in any map of the traditional administrative units largely formed the modern administrative boundaries for the two main reasons.

The old units contained relative ethnic groups that invariably shared similar cultural backgrounds except where certain powerful but different groups.

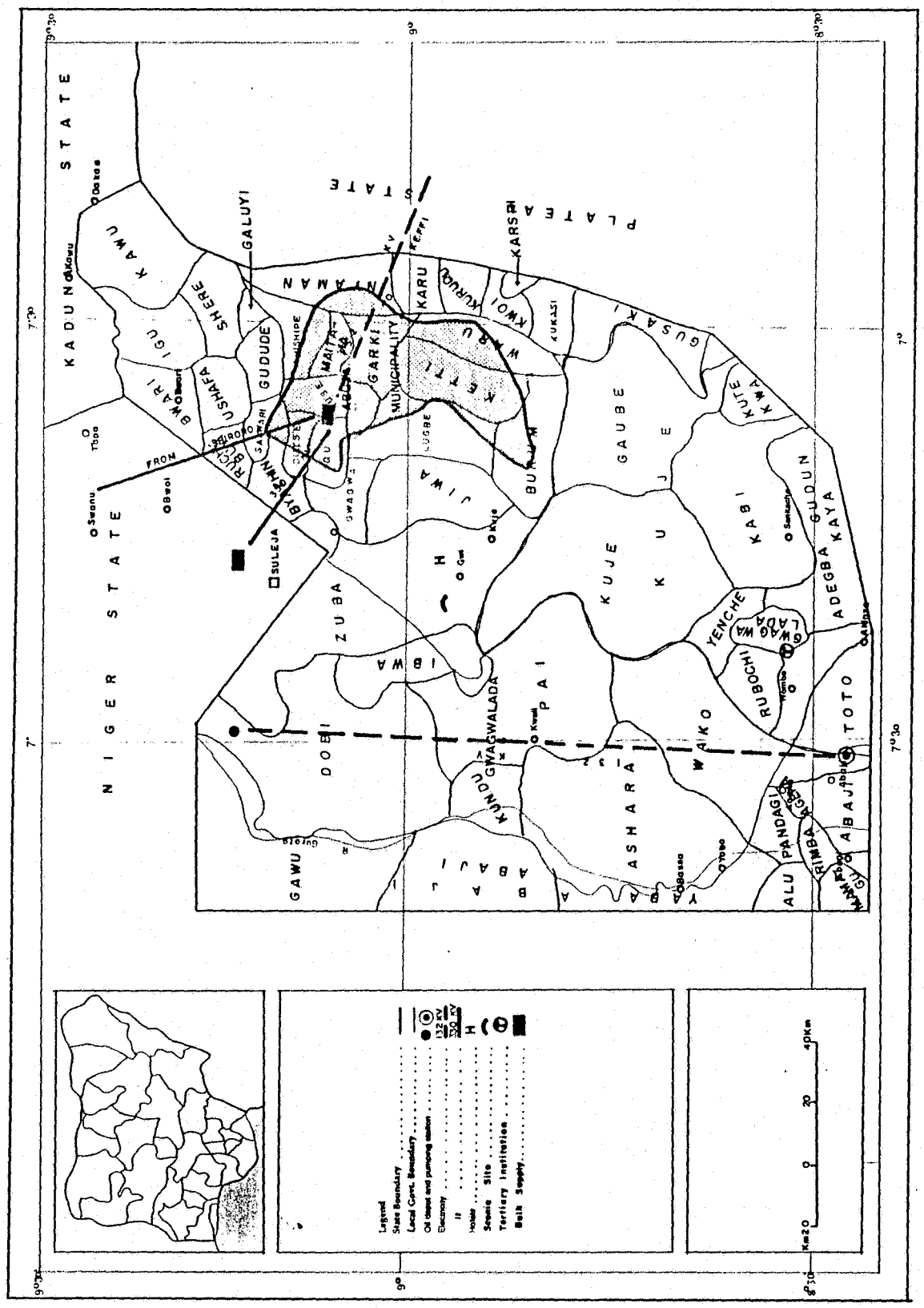
. Other administrative units had often contained certain sentimentalities engendered by common historical experiences and aspiration.

The Gwari people dominate the Abuja area and are surrounded by the Igbira and Idoma people to the South, Nupe to the West, Hausa and Fulani people to North.

5.52 SOCIAL AND POLITICAL STRUCTURE AND SETTING

Abuja which is located in the guinea savannah core of Nigeria was built to satisfy Colonial administrative and economic needs. Due to her central position, she cuts across several languages and cultural groups, thus resulting in high migration rates, traditional markets and modern commissaries, medical facilities, commercial services, religion facilities eg. the mosque and ecumenical centre (church) in maitama, recreational facilities. Public services such as primary, secondary, and tertiary education, libraries, postal facilities, police and fire facilities, social amenities like pipe borne water, electricity and municipal waste disposal.

33.1.3 FEDERAL CAPITAL TERRITORY – SOCIAL INFRASTRUCTURE MAP



As a result of the diverse cultural groups found in Abuja, trade and crafts are of relevance in preserving the cultures of the people. The women's centre is known for the crafts made, sold there.

Also, the development of Abuja has led to the building of a very good transport network to allow for easy movement across the Country and inter-state. An international airport was also built for use by people coming to work in Abuja from foreign or places within the Country.

Abuja was designed to be a viable urban environment for the seat of the National Government and full range of supporting and complementary activities. Today, Abuja has become the political centre with all headquarters for all Ministries being located there.

5.53 ECONOMY AND COMMERCE

Likr other places, commerce in Abuja covers business, household and personal services required to supply goods and services to its population. Abuja consists of retail establishments and traditional forms complying the government policies on provision of space Infrastructure, licensing, patterns of enterprenuership and goods distribution, nationally and locally.

Traditional markets of two types exist in Abuja. The first is a central market located in the central area of Abuja (Wuse) served by direct truck access from the peripheral highways and within walking distance of the transit spine.

The second is a local facility located in each district centre of the city. The final scale of commercial services comprise of informal trading and service industries.

5.54 DEMOGRAPHIC DATA

Three key characteristcis of the year 2000 population were developed to determine such planning factors as number of housing unit required, service facility requirement such as school and health facilities. These characteristics are age/sex distribution; the number of households and the anticipated income distribution for the year 2000 population. In determining these characteristics, the extrapolation was based on the latest available statistics.

5.55 TRANSPORTATION AND TRAFFIC FLOW

There are two distinct categories of transportation services which must be provided to insure a viable and efficient national capital for Nigeria. The first of these deals with the provision of facilities to accomodate the daily functioning of the capital city itself. Roads, streets, public transport services and a myriad of auxiliary facilities and services required to provide for the diverse movement of people and goods essentially for the operation of any major urban area. The second category of transport services are those required to allow the new capital to interact with the rest of the world in fulfilling its national function. Air service, inter-regional highways rail road and trucking services are major elements of this component of the total transport system.

These two elements of the transport system over-lap in terms of facilities, services and function to form a continuum of transportation services for Abuja and its environs.

5.56 EXISTING LANDUSE AND FUTURE TREND

The Master Planning process which shaped the Capital City program around the objectives and issues of the definition of a basic orgnaisational structure for the city.

A new national capital design as a viable urban environment for the seat of national government and the full range of supporting and complementary activities.

An overall land use pattern continued to a crescent-shaped site defined by developable land above elevation of 1200ft in the Gwagwa plains below the escarpment surrounding the outer area of the crescent shaped site including the bold promontory of the Aso hills.

There are currently estimated to be as many as 300,000 FCT resident in 500-600 villages. Most of the smaller settlements have no road access and are totally without services. Relocation is recommended on the capital city site, the game reserve area, the water reservior, the air port area and key FCT access prints. For the remaining settlement a special dempstrategy has been suggested. This strategy is based on the following principles;

. Reinforce the existing larger and more accessible village and town, such as Gwagwalada, Datia and Dagara as Satellite towns and service provisions.

. Establish a zone for economic development with controlled land use along A-2 in conjunction with the regulation of agric, forest, extractice and construction industry activities.

. Economise the natural consolidation of smaller and less accessible villages by strategic distribution of services and infrastructure and relocation policy.

. Provide and improved standard of public services.

CHAPTER SIX

6.00 SITE ANALYSIS

6.10 THE DESIGN CRITERIA FOR PHYSICAL AND CLIMATIC HARMONY

'Dr. Wale Odeleye' (a environmentalist) pointed out that "climate, culture and economy are though the ages, the great determinants of architecture and building". History of architecture equally stresses that people learn by habit and custom to provide buildings that will help to modify the external climate, satisfy their functional religions and social needs and be affordable to their economic capacity. It follows that the art of building and quality adaptation of local materials and methods to their economic, social and cultural needs.

'Rudoffsky(ii) (an environmentalist) describes in detail how several generations of man in different climatic regions, hostile or benign have adopted their habitations to modify rigours of the climate.

Nigeria is no exception to these architectural basis. The different regional and traditional dwelling types have been evolved over the years to suit the different climate. Three major climatic types are however distinguisable in Nigeria as adapted by Odeleye in discussing appropriately to Nigeria building practice.

.Hot dry

.Temperature humid

.Hot wet

The inhabitants of these different climatic zones have over the years and consciously or unconsciously developed certain generalized architecture types to suit the particular micro-climate.

Like Abuja, which falls under the warm temperate zone, an equivalent of the Savannah or upland type of climate. The architectural requirements include sun and wind protection as well as shades at day time. Hence, greater emphasis on the roof construction other than on walls.

6.20 LOCATION OF SITE

The chosen site is the Bwari district of the Federal Capital City. The Bwari district is situated North-west of the City, ajacent to the Abuja municipality. The site is on the North east of Bwari. The site is also on the outskirt of the town where it will be easily accessible because of the major road that passes in front of it.

View form of the site is generally good and interesting with a vast expense of bush green field. Also the site is not in an obscure area as it can be seen from the main road.

6.30 SITE CHARACTERISTICS

The effect of the site geographical factors on design can be over emphasized. The most relevant being soil, topography and the vegetation.

6.31 SOIL/TOPOGRAPHY

The soil is predominantly derived from granitic guiess and migmatite and their suitability for developed land use varies with depth.

By observation, the entire site is of relative flat terrain. The building designs will seldom exceed a strong structure, to allow for stability. It will also go along way to ensuring simple and economical but very functional foundation and structural constructions.

The flat terrain nature will pose no particular problem in terms of design and consequent constructions. The drainage network will be based on artificially created concrete cast channels that will be designed to slope towards the main drainage system. The various building types that will be designed will strive at avoiding.

. The harmful effect of moisture on building finishing materials, especially the floor and parapet walls.

. The deteriodration of the soils load bearing capacity.

6.32 AREA OF SITE: The site couvers a total area of 20,000 hectares of land including an area for future expansion.

6.40 ACCESS AND CIRCULATION

The site is easily accessible from the city. This is possible by the construction of secondary feeder road which is tapped from the Abuja-Suleja road. With the effective network of well planned both tarred and untarred roads currently existing within Bwari, access, to the site is very viable as it is presently linked-up. Access from other towns are easily reached by vehicles.

6.50 UTILITIES

Security lightings are provided at strategic points within the site, water hydrants are located also at strategic points within the site. Drainage are constructed to avoid flood on the site. All underground cables are well concealed.

CHAPTER SEVEN

7.00 DESIGN CONCEPT AND CONSTRUCTION

7.10 CONCEPT:

The rudiments of designing process involves varied valid techniques models, paradesign and idioms. Certain thoughts about architectural design are derived from problem analysis or at least initially prompted by it. These thoughts and ideas which may be general and rudimentary in character both requires and must embrace further developments in the search for successful architectural solution to certain and specific problems.

Concept is the first fundamental ideas about building morphology and forms. An architectural concept is an inital generalized idea that can be expanded and developed to accommodate a rich complexity resulting from an analysis of problems derived from a project situation. Edward, T. While, in his book-'Concept source') observes that traditionally architectural concept have been the designer way of responding to the design situations presented in the program.

They have been the means for translating the non-physical problem statement into the physical building product. The concept of a project can therefore be described as the Prime-Organisers, Central themes, critical factors or problem essence that exist within the project situation or within the designers perception of the problem situation.

An architectural concept suggests a specific way that progmatic requirement, context and belief are brought together and reflected in a design. The above statements constitute the basis of reasoning that evolves the design of the porposed cancer centre. The centre is aimed at being representative of what the people want; Imaginative in projecting what might be; and realistic in recognising what is possible. A way of representing what a particular people want by ensuring the continuity of what they value.

The concept used for this project is Canonic approach. The centre consists of about four basic units namely. Administrative unit, treatment unit, laboratory unit and Auditorium. This is done by finding their relationship with each other. Equally, the functions in each unit, are analysed and their relationships between functions considered in this project name, hot, warm and cold with letters H, W, and C designated for each respectively. From the analysis of the functions in each unit, functional relationship triangles are made for each of the four units in a graphical form using the letters H, W and C. From these function flow triangles, functional flow diagrams are made also by indicating the linkages between these functions. In all, an integrated triangle of function is derived.

The making of the functional flow diagram utilizes the functional relationshp triangles as see below.

Project Components

* Administrative unit
* Laboratories unit
* Treatment unit/screening unit
* Auditorium
* Auxiliary facilities

Therefore: in-planning the site of the centre, the relationship is derived below:-

. Administration				1	
.. Laboratories	H			2	
. Treatment unit	H	C		3	
. Auditorium	C	C	C		4
. Auxiliary facilities	C	W	C	W	5

Also, in planning the functions in each unit the same procedure is used.

7.20 DESIGN

The task of making successful building is the primary concern of every architect. This is best achieved from full understanding of his client's ~~belief~~ brief, analyzing the project, getting the concept which looks into solving building forms, material and building techniques. The site environmental impact and consideration determines the functionality of the chosen form and it's subsequent Orientation on the site.

The design as a project is one of many parts; from functional analysis to conceptual evolution, sketch development and appraisal and ultimately, the final design proposal.

The need for cancer centre in the Country cannot be over-emphasized due to the fact that non of our teaching hospitals have a real cancer therapy unit and also considering the fact that people have to be knowledged on this global issue. In conceptualizing the design of this centre, it was firstly recognized as having the potential to attract a large number of specialists within the Country and as such the main aim in the design is flexibility and functionality.

7.30 MATERIAL AND CONSTRUCTION

7.31 MATERIAL

Materials as far as architecture is concerned, are the physical elements whose use and manipulation crystallize into physical realization of the ideas in a design.

The obligation of the architect, whether in training or practice is therefore enourmously connected with the development, manufacture and close study of efficient building materials as well as integration into practice. Basically, the architectural and building requirements for material and products are classifiable functional requirements; aesthetic requirements, and economic requirements.

The act of selection of construction materials for any type of construction (building) need a lot of considerations. For a cancer centre like this, some of the considerations may be classified into economical, mechanical and finishings.

Economic consideration in the use of materials, are based on cost maintenance, fire resistance, durability and replaceability. Building materials are characterized by distinct properties of strength, stiffness and elasticity, density or hardness, resistance to wear caused by physical or chemical action, fire resistance and conductivity.

The most effective structural materials are those which combine elasticity with stiffness. Elasticity is the ability of a material to deform under stress (bend, stretch or compress) and return to its origional shape. Every material has its elastic limit beyond which it will permanently deform or break. The stiffness of a material is a measure of the force required to pull or push a material to its elastic limit.

Most building materials are manufactured in standard sizes. The stock sizes may vary slightly between manufacturers and should be verified during the design and planning phase.

7.40 CONSTRUCTION

7.41 SITE CLEARANCE

This is the first step in any construction work which commences after the signing of the contract between the client and the contractor. Site occupation takes effect immediately after, but not before site clearance. The site is cleared of any dirt, shrub and grass in readiness for construction activities. It is imperative to carry-out site analysis and surveys before site clearance. This is to ascertain soil type, bearing capacity, drainage and slope. A site plan must have been designed from which all trees and shrubs, outcrops and builders and all other obstructions in the appropriate, places.

a site office established including materials storage and some form of fencing is done around the site to ensure adequate security.

All available infrastructure eg. electricity, water, access roads, telephone lines are fixed to site and materials for construction are now brought on to site in readiness to start construction activities.

7.42 FOUNDATION

The foundation system of a building, its sub-structure is a critical link in the transmission of building loads down to bearing ground. Bearing directly on the soil, the foundation system must not only distributed vertical loads so that settlement for the building(s) is either negligible or uniform under all parts of the building. It also has to anchor the super-structure of the building against uplift and racking forces. The most critical factor in determining the foundation system of a building of the type and bearing capacity of the soil to which the building load are distributed.

The foundation footing is designed to rest directly on the soil and support specific portion of the building on the engineer's specification. Care is taken in designing the footing system so that the building are transmitted directly to the soil without exceeding the bearing capacity of the soil. For any foundation design, it is desired by the engineer to be on the statistical calculations and other considerations on-

. Soil type and bearing capacity

. Lateral loading from soil and ground water

. Building load and distribution system

. Lateral bracing provided by basement, ground slab and first floor slab system where applicable. For this design, these have been taken into consideration and an allowance have given for the expansion and contraction of building materials which occur in response to normal temperature changes in the form of Expansion joints to prevent distortion, cracks and breaks in the building materials where applicable. These expansion joints provide a complete separation of materials and allow free movement while maintaining at the sametime, the weather - lightness and water lightness of the structure.

CONCRETE AND MASON

Concrete is a mixture of stand, gravel, crushed rock or other aggregates held together by a hardened paster of cement and water. This mixture when properly proportioned, is at first a plastic mass that can be cast into a pre-determined size and shape. Upon hydration of the cement by the water, concrete becomes stone like in strength, hard and durable. Characteristics of concrete can vary through a wide range depending on the characteristics of the ingredients and proportions of the mixture. The techniques used for mixing, placing, finishing and curing can also affect the quality of the concrete.

Masonry on the other hand refers to man-made units which are formed hand hardened into modules building units. Masonry units (tiles, blocks and bricks must be laid up in such a mass to act as an entity.

Masonry is structurally effective in compression. The three basic types of concrete blocks are; load-bearing, non-bearing and hollow non-load bearing units. Sand and gravel are the aggregates used in concrete blocks which can be manufactured in many shapes to satisfy various construction conditions.

The design of the centre employs the use of both concrete and masonry in the construction of walls and floor units.

7.50 STRUCTURAL FLOORS

Understanding the type and magnitude of the forces acting on a building and how the building might deform when acted upon by these forces give significant dues as to how best to resolve the forces with building's structural system.

Sturcturally, the floor system must transfer these loads laterally to either beams and columns or to bearing walls, while providing at the sametime, lateral support for adjacent walls. Since a floor system must support traffic, durability, resistance to wear and ease maintenance, are critical factors in the selection of the floor system and its finish the suggested floor finishes for the centre are as follows:-

- 50mm O/A Thickness in-situ terrazo finish to approval on cement sand-screed including ebonite strips bay size $1m^2$ for all the laboratories.
- Pre-cast concrete slabs to B.S 368 laid on sand and pointed in 1:4 cement mortar for all lobbies and courtyards.
- 50mm O/A 1:3 cement sand-screed treated with approved surface hardener with armoured strips enbeded before the cement mortar for all operating suites and the wards.

. 50mm O/A 1:2½ Granolithic screed for all administrative offices.

7.51 WALL SYSTEMS

These are building's primary vertical planer elements. They may be bearing planes of homogenous or composite construction or they may be composed of linear bearing elements (posts and columns) with non-structural panels filling in between them. How these walls and columns support either floor or roof systems above and how they are supported in turn by wall, floor systems below is determined by the structural compactibility of these systems and the type of connection and materials used. Wall elements can also serve structurally as shear walls which provide lateral stability along the direction of their planar surfaces against horizontal and racking loads as may be caused by wind forces.

External walls serve as a protective shield against external conditions for a building's internal spaces. The external skin is applied in the centre with the wall structure to be durable, resistance to wear and the elements (sun, wund and rain) for the infected persons. The exterior wall is also the point at which the point of control of air, moisture and water vapour flow take place.

Internal walls in their own parts are either load bearing or non-structural and serve as dividers and defining elements of space, visuall and accoustic. For cancer therapy equipments and cancer patients, the wall surfaces must be wear resistance, moisture resistance colour and texture compatible with the wall system.

The following wall finishes are used for the centre.

- Apply texture paint on 15mm smooth rendering
- 1 cool printer and 20 at emulsion of 15mm smooth rendering for the laboratories.
- Prime and point 2 coats glass oil paint on 15mm smooth rendering.
- Apply sandtex mat finish on 15mm smooth rendering for wards and operating suites.
- 150 x 150 glazed ceramic tiles to B.S. 1281 bedded and joined in 1:3 cement mortar for the administrative block offices.

Also the walls of the proposed centre are cement sand block with luminous wall panels to prevent direct glare or excessive brightness to patients.

The radiotherapy unit laboratories walls are doubled with insulation material to avoid penetration of ultraviolet rays into the neighbouring units. Light coloured santex wall finishes are recommended for the exterior wall finishes to enhance its beauty.

7.52 DOOR AND WINDOWS

Doors and windows provide for physical, visual and light penetration into and through a building's interior while enclosing interior space and maintaining the continuity of the building's skin. Visually, door and window openings are major compositional element in a wall and can be seen either as punched openings(with the wall plane maintaining its integrity or as separating elements (voids) between sections of wall.

From an exterior point of view, doors and windows are important compositional and scale giving elements up a building's facade. The manner in which they break up a building's surface affects the massing, visual, height, scale and articulation of the building's major planes, whether filling spaces within a skeleton structural frame or pucturing a masonry wall. The size, proportion and location of doors and windows in a building must be carefully planned for, so that adequate rough opening with properly sized lintels can be built into the structure's wall systems.

The choice of doors and windows affect not only the physical appearance of a building, but also the natural lighting, ventilation, view potential and spatial quality of a building and the users.

In this regard, the doors and windows for the centre are made of five resisting materials. Also, anti-theft alarm and burglar proof are fixed to the doors and windows to create a conducive environment for the infected persons.

7.53 ROOFING SYSTEM

This is primarily sheltering element protecting the interior spaces of the building from the natural elements. It also control the flow of water, water vapour, heat and air. In addition, it is also structured to carry its own weight as well as live load such as rain and wind. As such, the roofs for the proposed centre are fire resistance, and are compatible with walls.

Economic of maintenance and erection, durability and potential heat loss and gain are considered in the choice of roofing materials. The form of the roof is a critical element in the visual image of the building of the centre. As such the buildings are deck and roofed with long span aluminium roofing sheets which will help eliminate ultraviolet rays presnet in sunlight. The courtyards too are covered with translucent fabric glass in order to shed the cancer patients who might wish to stay outside. The translucent membrance provide a very diffused low glare light source and buildings that are not properly air-conditioned.

7.54 CEILING

It is a material that provide a finish surface. It is usually in the form of boards or tiles that are applied directly or suspended from the underside of roof. Ceiling materials may be of wood or mineral fibre with perforated, patterned, textured or finished surfaces that absorb sound. For this reason, the ceiling material for the centre are composed of mineral fibre with perforated surface in order to absorb sound. The ceilings are also suspended to provide a plenum space for mechanical duct work. electrical conduit plumbing, and recessed light, fixtures.

The depth of the plenum is done according to the space requirements of the utilities and the required floor to ceiling height of the internal spaces. This type of ceiling also integrate the functions of lighting, air distribution, fire protection and accoustical control to minimize the depth of the ceiling. Equally, translucent fibric glass is laid before the ceiling to absorb dust particles in order to produce a sterile environment for the medical facilities.

7.55 WOOD

Wood offers strength, durability, light weight, easy workability, natural beauty and warmth to sight and touch. It is used as a construction material in different ways, because of its differing quantities. There are two major classes of wood soft and hard wood.

soft woods are the evergreens and are used for general construction such as scaffolding, form work and general temperary structures during construction, while the hard woods come from decidous or broad leaf trees and are maily used for flooring, panelling, furniture and interior decorations.

Wood has been employed in this centre for interior cladding, worktops in laboratories, furnitures, interior finishes and other interior decoration.

7.56 GLASS

Glass is a chemically inert, transparent, hard, bittle material. It is used in building construction in various forms. It is also used commonly to glaze a building's window, as it is being used in the design of the centre. There are basically three types of glass namely;

- Sheet glass
- Float glass
- Plate glass

The variations of these three basics are many and include:

- Heat absorbing glass
- Tempered glass
- Safety laminated glass

. Wired glass and

. Insulating glass

All these have been specified in the centre for application in windows whereover applicable. Some are fixed while others are adjstable.

7.57 CERAMIC TILES

These are relatively small surfacing units made of fired clay and other ceramic materials. This ceramic provides a permanent, durable, water proof and easily maintained surface for interior walls, floors and ceilings. Tips of ceramic tiles differ according to material composition, manufacturing process. Finish and degree of verification (measure of the tiles density and absortivity).

For the purpose of this project, ceramic tiles are applied over sound control, dimensionally stable masonry walls, set with ceramic adhesives mostly in toilets, bath rooms, laundries, changing rooms and kitchens; depending on the use of the particular area. The appearance of ceramic tiles with surfaces depend on tile size, laying pattern, finish and colour. Tiles used on the walls of toilets, shower stalls, kitchens laundry are of glazed variety while unglazed tiles are used on the floor for their non slippery performance. The choice of the tiles have been because ease of maintenance, durability and beauty.

7.58 PAINT FINISHES

The purpose of a finish is to protect, preserve or visually enhance the surface to which it is applied.

Paint generally refers to an opaque or clear film forming material that acts as a shield or barrier between the material and those elements or conditions that adversely affect or deteriorate it. Depending on its end use, the paint film must resist deterioration due to sunlight, heat, temperature variations, water or moisture vapour, decay, chemical and physical abrasion. Paint may also serve to make surfaces more sanitary, improve heating and lighting effects and promote human comfort and safety. When using paint, the psychological effects of colour and texture must be considered. Certain colours may be stimulating, while others are relaxing.

Light colours are used in this design to reflect light, relaxing, brighten interior spaces and increase visibility as well as create interest inform and space for the patients.

7.59 ROOFING SHEETS

Corrugated sheet material may be used as a structural, self supporting roofing, spanning between linear support members. Long span aluminium sheets are used for this construction. The manufacturers of such sheets would be consulted for material specification, sizes, finishes, colour, spanning capability and application details.

The support systems consist of only steel to enhance the overall appearance of the building's because of the restrictions placed on the elevations due to the location and use of the centre. Other materials used are:-

. Pre-stressing bar (steels)

. Angle cleats

. Steel sections for roofing

. Clay perferated bricks

. Water for mixing and cleaning purpose.

All materials used for this construction have undergone thorough inspection in order to create a conducive environment for the patients.

Equally, other structural materials have been discussed in chapter three.

7.60 SPACE REQUIREMENT

7.61 ADMINISTRATION

This is the core of the complex. This has direct links to every part of the units. It has two different entry areas. One from the reception and the other from the staff/service entrance at the back.

Facilities	No.	Area
. Medical director	1	6x8 = 48m^2
. Personal Assistant	1	6x6 = 36m^2
. Waiting area	1	6x6 = 36m^2
. P.R.O	1	6x6 = 36m^2
. Archieves/Gallery	1	6x8 = 48m^2
. Sales unit	1	6x6 = 36m^2
. Personel officer	1	6x6 = 36m^2
. Accounts	1	6x6 = 36m^2
. Head Consultancy Services	1	6x6 = 36m^2
. Toilets	30	2x4 = 8m^2
. Board room	1	6x12 = 72m^2

Facilities	Nos.	Area
. Students room	1	6x6 ≙ $36m^2$
. Librarian	1	6x6 = $36m^2$
. Computer room	1	6x12 = $72m^2$
. Nurses office	1	6x6 = $36m^2$
. Offices	10	6x6 = $36m^2$
. Stores	4	2x4 = $8m^2$
. Medical store	1	6x8 = $48m^2$
. Records unit	2	6x6 = $36m^2$
. Registry unit	1	6x6 = $36m^2$
. Morbiod unit	1	6x6 ≙ $36m^2$
. Epedemotology unit	1	6x6 = $36m^2$
. Chemical pathologist	1	6x6 = $36m^2$
. Oncology	1	6x6 = $36m^2$
. Haemathology	1	6x6 = $36m^2$
. Histochemist	1	6x6 = $36m^2$
. Chemitology	1	6x6 = $36m^2$
. Maintenance office	2	6x6 = $36m^2$
. General waiting	1	6x12 = $72m^2$
. Reception	1	6x8 = $48m^2$
. Library	1	6x10 = $60m^2$

7.62 LABORATORIES/SCREENING UNITS

. Haemotology	1	9x21 = $171m^2$
. Morbiol anatomy	1	9x21 = $171m^2$
. Chemical pathology	1	9x21 = $171m^2$
. Microbiology	1	9x21 = $171m^2$
. Dark room	1	5x6 = $30m^2$

.	Store chemotherapy	1	5x6 = 30m^2
.	General reception/waiting	2	9x12 = 108m^2
.	Changing rooms	2	2x6 = 12m^2
.	Laboratory attendants	12	3x4.5 = 13.5m^2
.	Radiation therapy	1	9x12 = 108m^2
.	X-ray analysis	1	5x6 = 30m^2
.	Radiographer	1	3x4 = 12m^2

7.63 TREATMENT UNIT

.	Female medical ward	1	7x21 = 147m^2
.	Female surgical ward	1	7x21 = 147m^2
.	Male medical ward	1	7x21 = 147m^2
.	Male surgical ward	1	7x21 = 147m^2
.	Operating suite	2	7x18 = 126m^2
.	Kitchennete	2	3x7 = 21m^2
.	Nurses bay	4	3x7 = 21m^2
.	Laundry	4	3x7 = 21m^2
.	Patients outdoor sitting	4	6x15 = 90m^2
.	Toilets	29	2x1 = 2m^2

7.64	. Auditoriun	1	18x26 = 468m^2
	. Toilets	10	2x10 = 20m^2
	. Stage	1	2.5x9 = 22.5m^2
	. Urinal	6	2.5x2.5 = 6.25m^2
	. Changing room	2	22.5x7 = 17.5m^2
	. Office	1	4x4.5 = 18m^2
	. Store	2	3x4 = 12m^2

CHAPTER EIGHT

8.00 'DESIGN' (SERVICES)

8.10 ELECTRICITY AND LIGHTING

Electrical systems furnish light, heat and power to run a building's machines. The electrical body that controls and distribute this power to the points of utilization of its power supply. All equipment used should meet the underwriter's laboratories (UL) standards.

The power supply authority should be notified of the estimated total electrical load requirements to confirm service availability and co-ordinate the location of the service connection, service switches and switch board. A transformer may be necessary to switch from the supply voltage to the service voltage. An overhead service connection will be used as it will help to save cost, be accesible for maintenance and carry high voltage over long runs.

Electrical conductors will be run within concrete floor systems for convenient access to floor and ceiling outlets. Light fixtures and wall switches are usually the most visible parts of an electrical system and they will be located for convenience, easy access and in co-ordination with visible surface patterns. Wall plates for these devices will be of insulating plastics for safety.

The centre will be supplied National Electric Power Authority (PLC NEPA) supported by powerful standing generator for surgical operation purposes.

All cables would be constructed underground. Since the backbone of a centre like this is constant supply of electricity, for this reason, power supply to this centre should be steady in nature.

The Independent power supply (generators) consisting of two diesel generator set, will alternate in their use, with one acting as back up for the other as a standing only.

8.20 HEATING, COOLING AND VENTILATION

Heating, ventilation and air-conditioning systems, condition the interior spaces of a building for environmental comfort of the occupants as well as the equipments. Factors that may be controlled by the mechanical systems include:-

a) Temperature of the surrounding air

b) The mean reclinate temperature of surrounding surfaces

c) The relative humidity of the air.

d) Air motion

Air temperature equipments are also affected by the age group of the building, the equipments and the level of their activity.

The location of heating and cooling outlets depends on the size and proportions of the space, its areas of heat loss and gain, its wall, ceiling and floor construction finish. The type of outlet used depends on its placement within the space, its heating or cooling capacity, dimensions and appearance.

For this centre, a conditioned environment is very necessary for the preservation of the comfort of its users. A controlled air-condition system is been designed for the entire various units. To conserve energy, natural ventilation shall still be encouraged in all possible areas of the complex.

The excess carbondioxide, water vapour, odour and air pollutants that accumulate in a building must be exhausted. At the same time an equal amount of fresh air must be introduced to replace the exhausted air. The air should be exhausted where the concentrate of pollutants is greatest (e.g laboratories) the air pressure in these areas should be kept slightly below that of the rest of the building to prevent the contaminated air from spreading.

Normally, about 10% of the air circulated for heating or cooling will be outdoor air. Under certain circumstances much larger amount of outdoor air are introduced.

Operating rooms in hospitals use 100% outdoor air to prevent the explosion hazard from the anesthetic. Outdoor air can also be used for cooling when its temperature is at least 15°f below the indoor temperature.

8.30 WATER SUPPLY

Water supply is essential for human consumption, sanitation and comfort. The efficient disposal of fluid waste and Organic water is critical to maintain sanitary conditions within a building and in the surrounding area.

Water supply should be in the high quantity and at the proper flow rate pressure and temperature. Water supply systems work under pressure. The service pressure of a water system must be great enough to absorb pressure, losses due to vertical travel and friction as the water flow through pipes and fittings and still satisfy the pressure requirements of each building fixture. The water pipes should be rust and corrosion resistant.

To avoid the clogging of pipes or equipment, water may have to be treated for hardness and excessive acidity.

The Sanitary drainage system depends on gravity flow and will require large pipes and adequate installation space. All this will be properly taken care of and the layout of the sanitary drainage will be straight forward and direct with properly sloped horizontal runs and angular connections.

Water supply in this area is by public Council and thus, there can be no direct control over the quantity, rate or quality of water supplied until it reaches the building site, hence the provision of a water storage tank and treatment facilities minimum standards and requirements are adhered to in order to ensure adequacy in use.

All the plumbing work in laboratories, operating threatres, toilets, changing rooms will be cancealed inside duct with service outlet in case of any repairs.

Provision will also be made for a water supply system that will be based on a borehole. Water will be pumped into a storage tank and may undergo treatment if found necessary by laboratory test.

8.40 DRAINAGE AND SEWAGE DISPOSAL

All rain water shall be channelled down through well designed drain pipes. There will be a water treatment plant at the service area of the site to treat wastes. All water are channelled in there for treatment.

8.50 REFUSE DISPOSAL

The waste from all sanitary fixture of the centre will be collected into storage collect pits equipped with sewage and shedge pumps. This pumps will pressize waste by pressire pits into the sewage treatment plant. The plant will house the septic tanks, creation tanks, shedge removal equipment, chlorination equipment. The treatment affluent will be piped into a central treatment plant.

8.60 ACOUSTICS

This may be defined as the Science of sound Including its production, transmission and control of its effect. The acoustics design of a space involves the reinforcement of desirable sounds and the control of undesirable noise. The acoustics of a room is dependent on its shape, form, volume and the nature of its surfaces.

The Control of noise and sound within any building is very improatnt, the way the sound moves in the room, how it affects the outside. All should be well planned to ensure comfort within the buildings.

Acoustic elements shall effectively be used to control noise e.g the planting of trees and shrubs as butter zones. On the inside, the use of acoustic ceilings to control internal noise, positioning of door and window openings, shape of building.

The main sources of sound and noise from the centre will be basically from human activities as well as from mechanical services in the workshops, water supply and drainage.

8.70 FIRE SAFETY MEASURES

Fire can be defined as the rapid oxidation of a substance producing heat and gas. It is composed of three elements namely fuel (gas, solid or liquid), heat and oxygen.

There are three general classes of fire. The natural, accidental and incendiary causes. Natural causes may be due to lightening and other related factors due to force majuere. Accidental causes are due to one or all of such factors as inextingushed cigarette stubs faulty electrical appliances, inflammable liquids coming in contact with oxidising agents. Incendiary causes are those intentionally caused by people.

Fire safety precautions in buildings is one of the major requirements for judging the functionality of a building structure. The predominant risk in hospitals to human life especially in hospitals where occupants are ill and unmobile.

The safety measures against fire outbreaks are divided into two major groups the preventive measures and control measures.

FIRE SAFETY

Preventive measure	control measure
schematic design precautions	fire control equipments.

In the schematic design stage, a (of precautions have to be implemented.

This measures are:-

1) Selection of fire Resistant materials
2) Position of fire escape routes
3) Zoning of fire prone facilities
4) Construction methodology
5) Size of egrss doors.

In selecting building materials, emphasis should be laid on their fire resisting abilities. The British standards for fire safety states that building materials should be able to withstand fire for a minimum of 2 hours to allow evacuation of the building. This suggests the use of materials such as steel for roofing members instead of timber, the use of reinforced concrete slab for fire prone areas. The use of mud blocks, brick and sandcrete blocks are also recommended for walls. The positioning of the fine escape is also of great importance. Hospital design are of two types, the vertical monoblock and the horizontal pavillion. For the horizontal pavillion, distance to nearest exits should not exceed 24m to the courtyard or to the outside open space. For the vertical monoblock it should not exceed 18m to the nearest escape route. Also the escape stairwells should be sealed of with self-closing doors but should have open low balustrades in order to allow proper ventilation since smoke caused by fires are great hazards. In hospitals for the blind or mentally disturbed hand rails should run along walls leading to nearest exits which should not exceed 12m in order to aid fast escape of occupants.

Zoning is also imperative in the planning stage. Fire prone areas such as kitchens, dinning halls, laboratories.(Science laboratories in schools and research laboratories in hospitals), maintenance workshops should be completely detached from other facilities so as not be a risk to other facilities.

The creation of a buffer zone or place of refuge is also necessary. This should be in form of an open hall leading to an exit.

Construction methods refers to the technique adopted in building. The roofing technique plays a major role in aiding or otherwise a fire. The need for compartmentatlization of the roof is important. Each functional space or wing should be roofed separately with a parapet wall in between them in order to contain the fire and reduce the risk of spread.

The size of egress doors depends on the estimated occupancy of the building. The occupancy of the building should not exceed the total size of the egress doors. Each egress doors should not be less than 1800mm in width and should have self closing doors for easy evacuation of the building.

The control measures refers to the use of fire extinguishers. The availability of portable fire extinguishers within each determines the survival or otherwise of the building occupants. The distance portable fire extinguishers should not exceed 24m. As for stand pipe and hose system, distance should not exceed 40m between each standpipe. The provision of water hydraut outlets at strategic points on the site is also important to act as a cerver for the fire department. These hydrauts should be connected to a reliable and permanent source of water supply e.g water tanks. Other control measures include the provision of sprinkler systems within the building. Since this system is automatically activated, it can help control the fire before the arrival of the fire department. Also drenchers are located on external walls around the perimeter of the building.

This automatically comes on at a certain preset temperature if there is a fire in an adjoining building which poses a risk. It is imperative that these fire control measures are implemented especially in Nigeria where the efficiency of existing fire departments can not be guaranteed, and that cancer therapy equipments are generally very expensive and the information kept here are very vital.

8.80 SECURITY

The security or lack of it in any building also play a vital role in the general success of the building occupants need to have a sense of security to ensure maximum productivity. Perimeter fencing and a gate house with security men are provided to ensure adequate control of movement. Considering the fact that instruments that are going to be used in this centre are very expensive, and vital information will be stored in this centre, therefore, their safety is very important. Various security systems are to be employed in the centre to prevent theft.

The entire security network is through the use of Digital Automated Video Intrution Device (DAVID) that is the security system that makes use of sensor-cables that are buried in the ground at strategic points, and when an untruder matches it, the sensor cable sends a signal which can be monitored on cathode ray tube screen in the security room, also the sensor cables will ignite the security alarm inform of sound which will alert everybody in the centre.

CHAPTER NINE

9.00 AESTHETIC, GENERAL APPRAISAL AND CONCLUSION

9.10 AESTHETICS

Architecture form any facet of evolution, is principally a subjective practice. There are no hard and fast rules of designing processes but there are different possible approaches effectively employed to arrive at appealing and satisfactory design proposal.

Also for any design to be successful, it has to look beautiful, and for an architect to achieve this, various parameters have to be considered, ranging from the site condition, neighbouring building, method of construction and type of materials to be used. Architecture is not just a building alone, but a building in relation to its surrounding pattern (natural and man made). In the process of this design, integration of existing building adjoining the proposed centre was put into consideration, also roads and natural features like general topography of the site, trees and shrub were put into consideration.

Vertical elements were used on the elevation to break the monotony of horizontality. Also, balancing the harmony were achieved through the duplication of elements on the opposite sides with different elements in the middle to break the monotony.

The beauty in a building depends on the aesthetic value given to it by the designer. There is therefore the need to incorportate some elements in the design to bring out the beauty, both in the interior and exterior of the building. During elevation projection, elements were carefully chosen to influence the beauty of the elevation.

9.20 GENERAL APPRAISAL

The form of any hospital design like this cancer centre, is basically guided by elements of functionality, circulations and basic application of architectural standards because of its uses.

The prime planning objectives in hospital design should be to seek a balanced compromise between maximizing hospital staff efficiency and maintaining adequate respect for patients' personal needs, both hospital and psychological. Foremost among patients' need are the minimization for fear and the feeling that they have lost complete control over their lives.

This design, through its concept and philosophy is attempting to fulfil the outlined goals, aims and objectives creating enough facilities, functional requirements, careful planning for the patients, within and outside the buildings.

Natural ventilation and lighting through lobbies walkways are made possible through courtyards. The general landscape is simple but creative through the utilization of both natural and man-made features married together careful planning to provide for them a place where they can feel at home.

9.30 CONCLUSION

A design out put is the result of the design input, a fulfilment of what has originally been set out to do. From inception of this project, critical emphasis had been based on the functionality, circulation and flexibility. These have been achieved through effective planning, intensive analysis of data collected from case studies and research on medical work.

All these, at the end have given a comprehensive result which is the design of this cancer centre at Abuja.

Cancer research methods in general, keep changing every-day as invention of new ideas keep progressing. As such, the design has been made flexible in order to make it adaptable to new developments.

It is also believed that the primary purpose of any hospiatl facility is to serve the patients. As such, the centre is recommended to go into partnership with foreign centres in order to help update their equipments and researches.

To this end, it is hoped that project of this kind will help to educate our men and women on the importance of this cancer centre.

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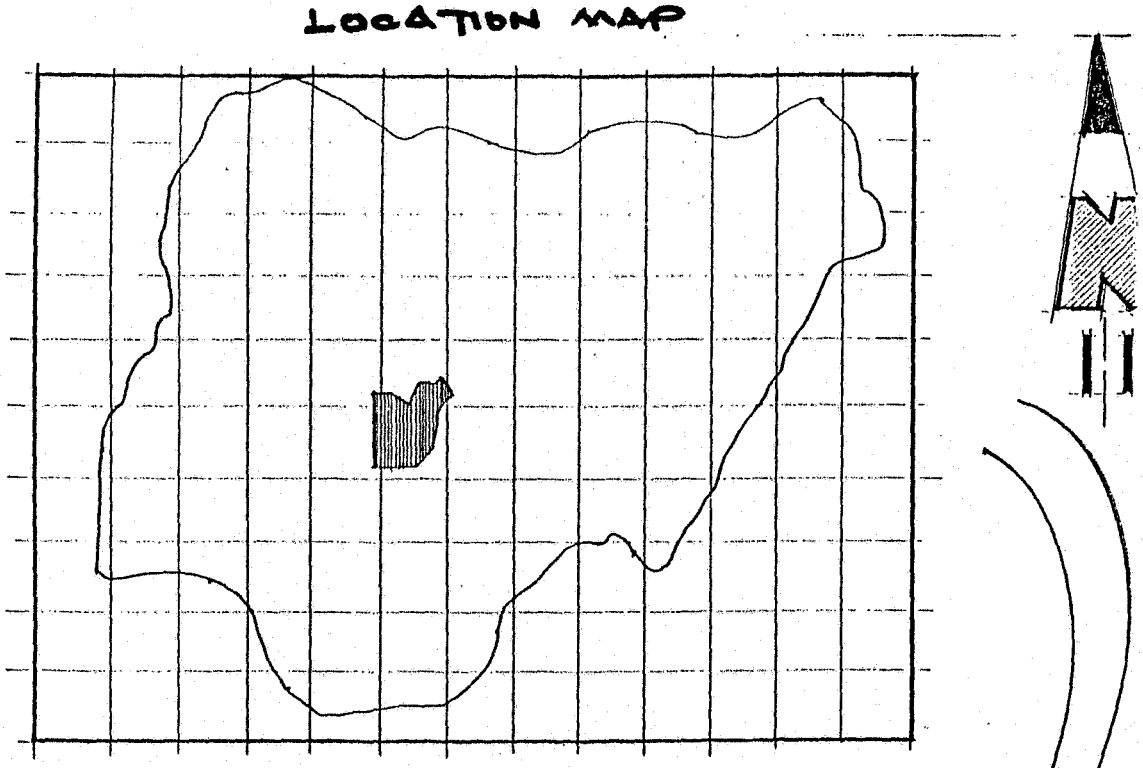
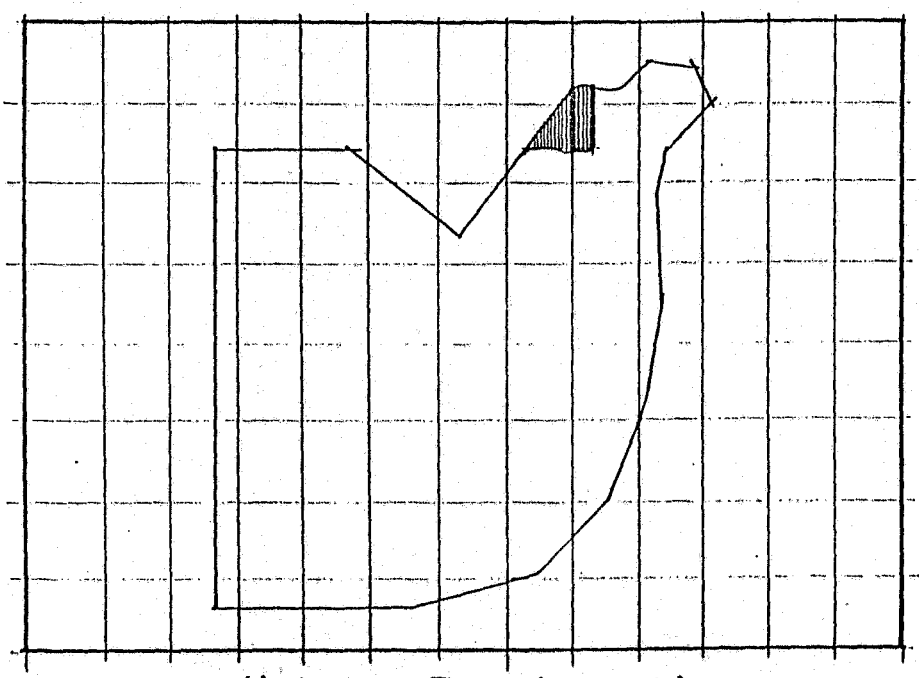
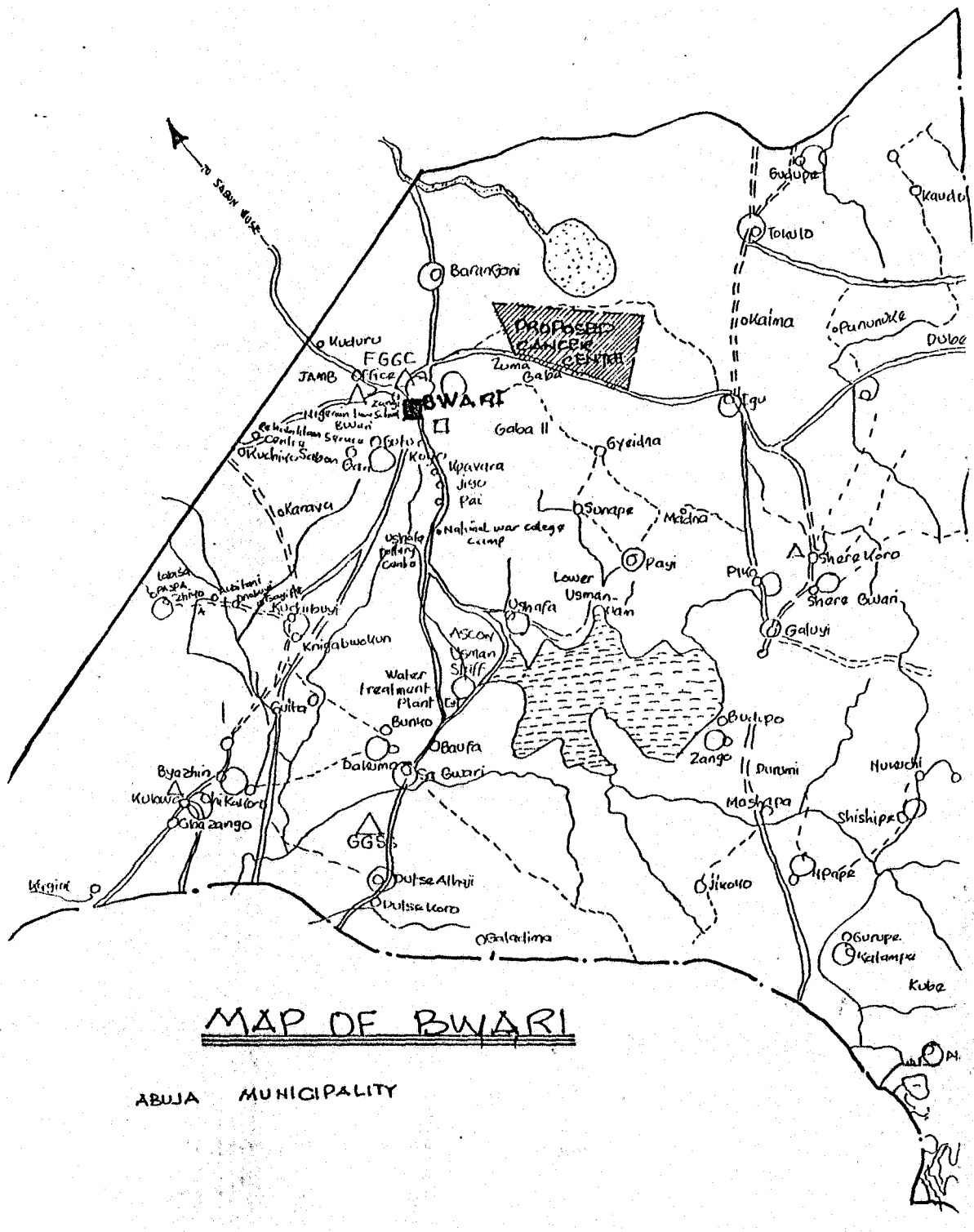
LOCATION MAP



MAP OF NIGERIA



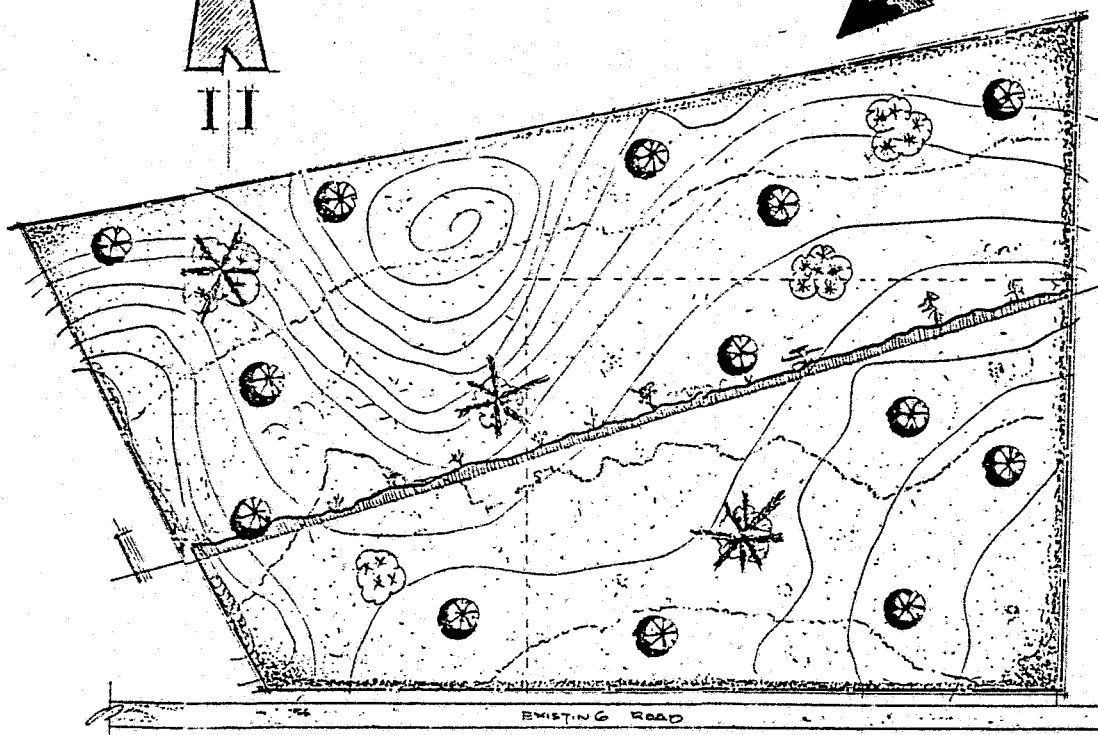
MAP OF ABUJA



MAP OF BWARI

ABUJA MUNICIPALITY

SITE ANALYSIS



N

E

TRADE WIND
- IT BRINGS HARMATTAN
- ALWAYS DRY, COOL, DUSTY
- IT COMES FROM NOV. TO FEB.

EAST

SUNRISE

VEGETATION
VEGETATION IS VERY GENTLE SO, NO NEED FOR MUCH EXCAVATION ON SITE

CLIMATE.
HEAVY RAINS AROUND THE MONTHS OF JULY AND SEPTEMBER FOR DOUBLE MAXIMA - GENERALLY A HUMID AREA.

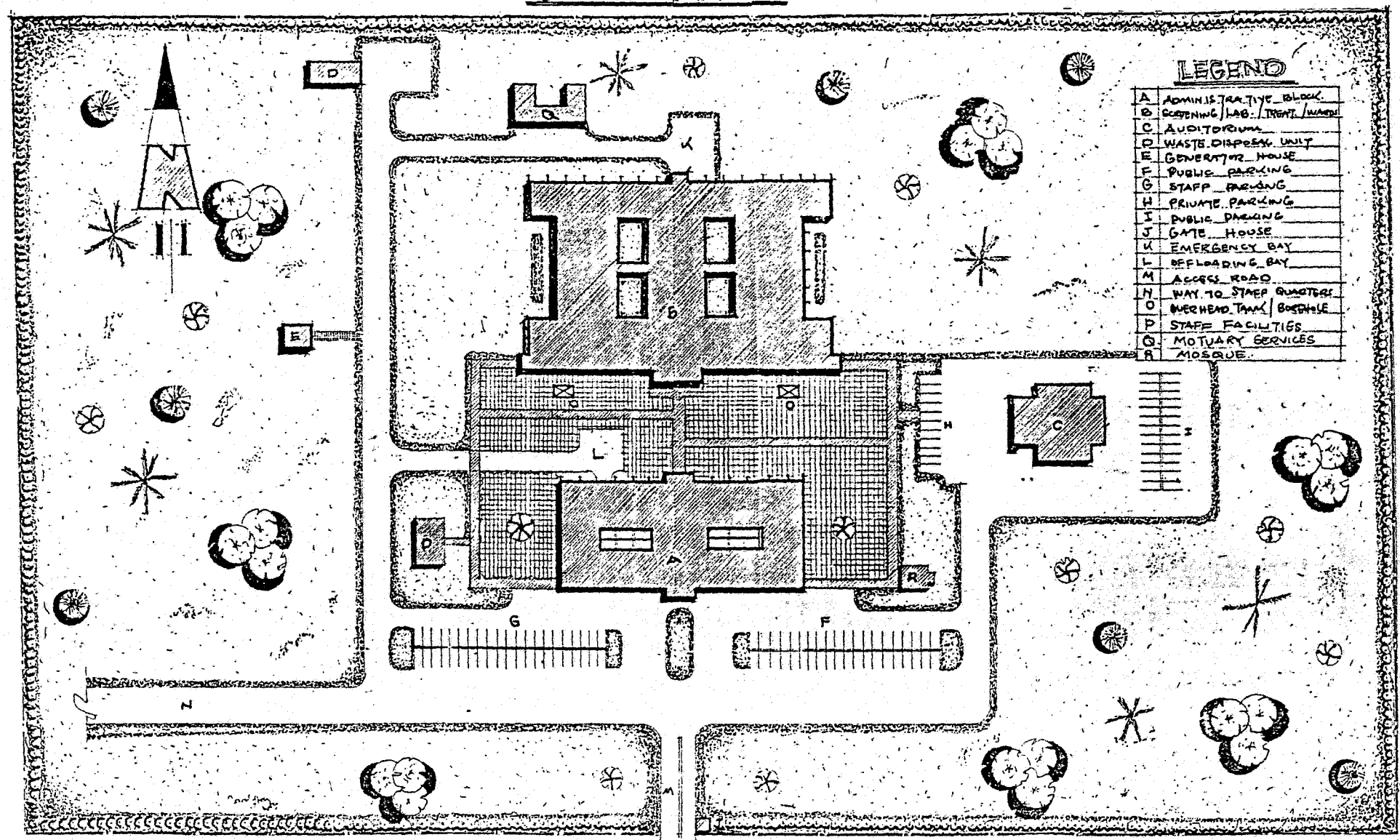
TOPOGRAPHY
THE LAND IS GENERALLY GENTLE AND SLOPES SOUTHWEST

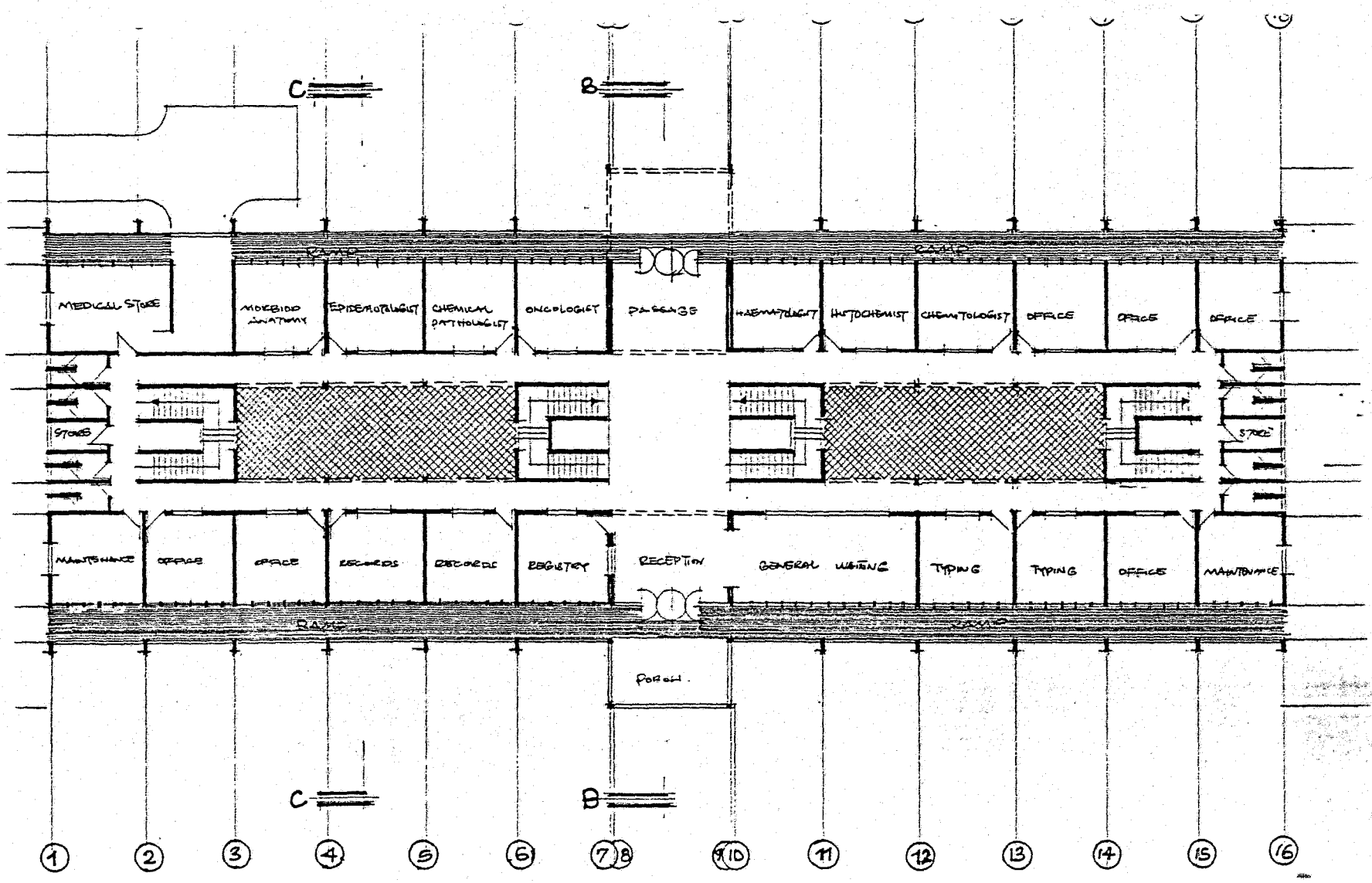
SW TRADE WIND
- BRINGS RAIN
- ALWAYS HOT AND HUMID
- IT COMES FROM APRIL TO OCTOBER.

WEST

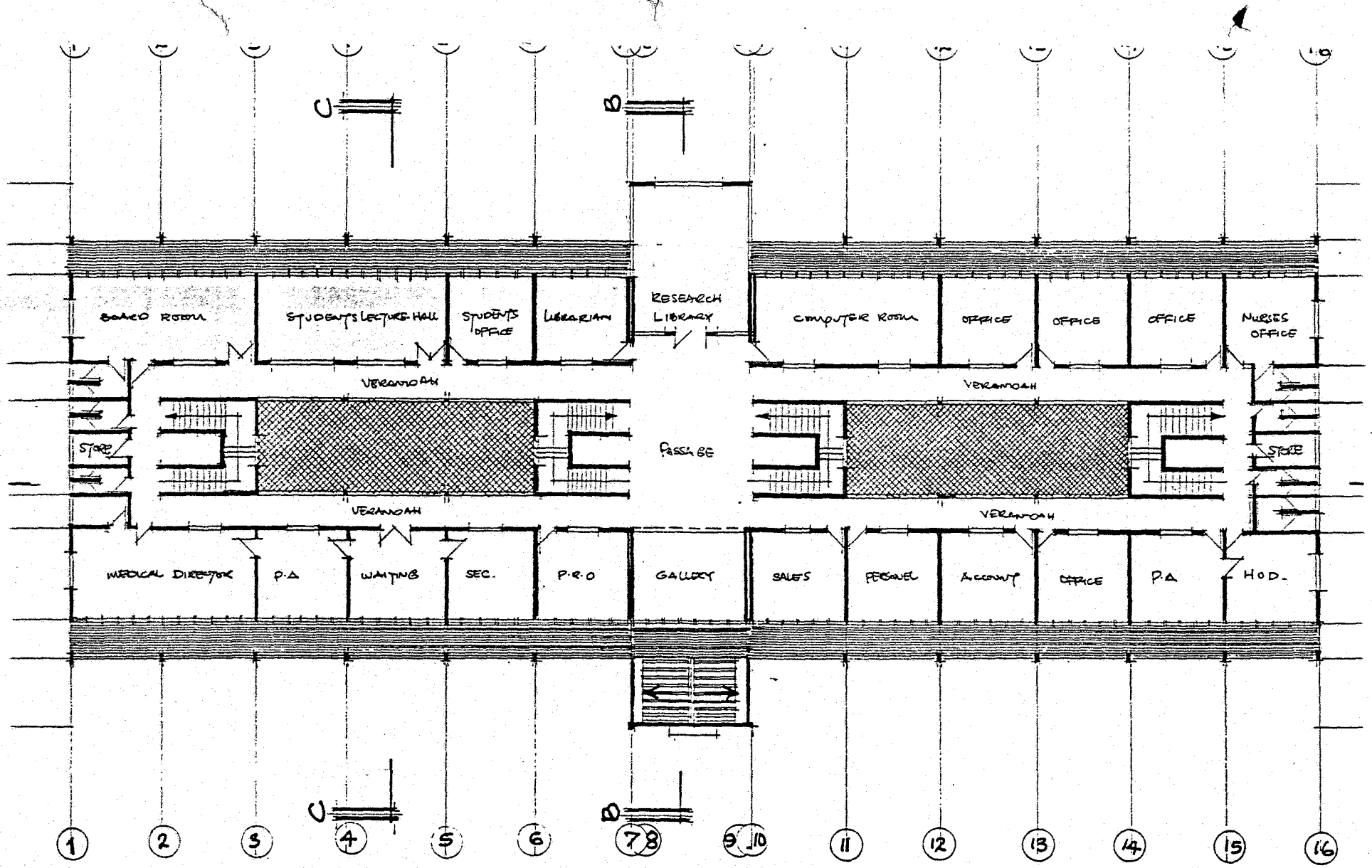
SUNSET

SITE PLAN

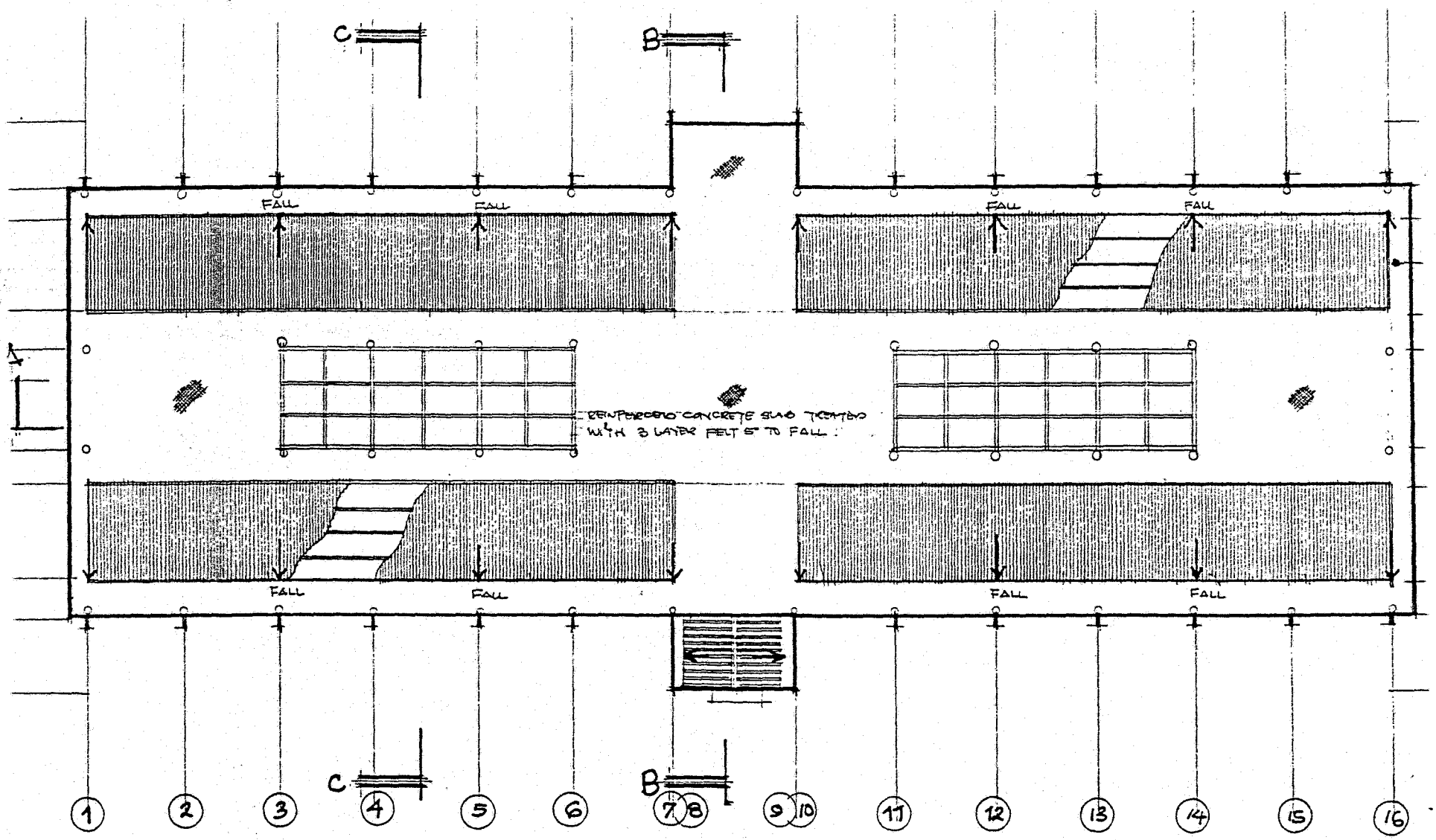

LEGEND
A ADMINISTRATIVE BLOCK
B SCREENING / LAB. / THEAT. / WARD
C AUDITORIUM
D WASTE DISPOSAL UNIT
E GENERATOR HOUSE
F PUBLIC PARKING
G STAFF PARKING
H PRIVATE PARKING
I PUBLIC PARKING
J GATE HOUSE
K EMERGENCY BAY
L OFFLOADING BAY
M ACCESS ROAD
N WAY TO STAFF QUARTERS
O OVERHEAD TANK / BOREHOLE
P STAFF FACILITIES
Q MOTUARY SERVICES
R MOSQUE



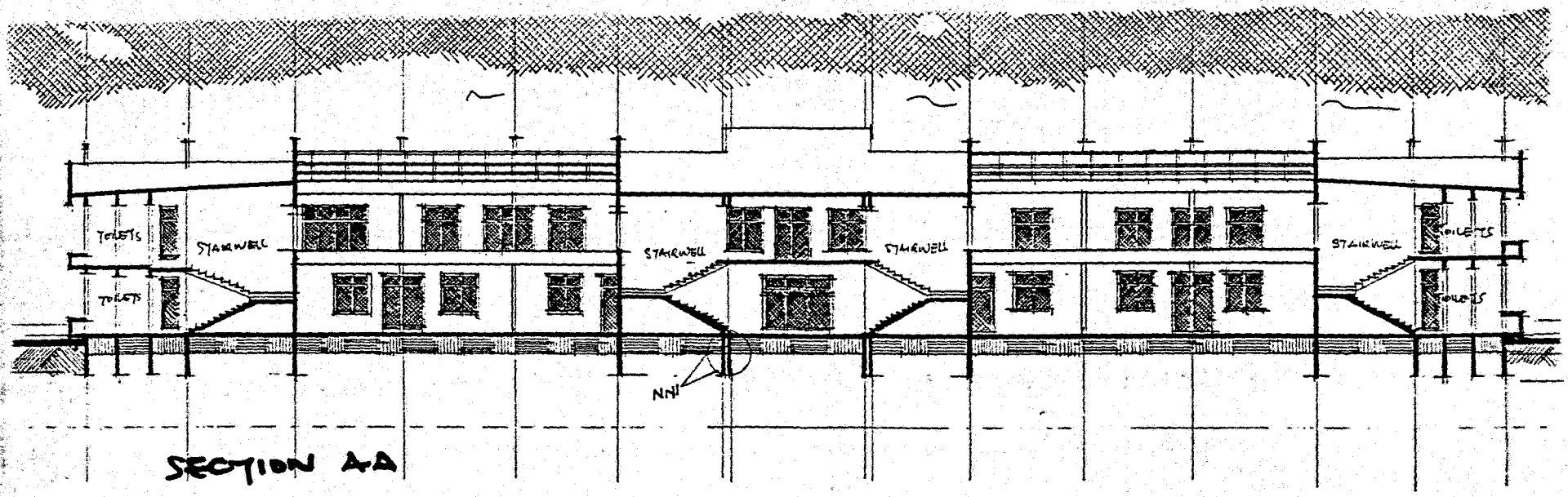
• GROUND FLOOR PLAN



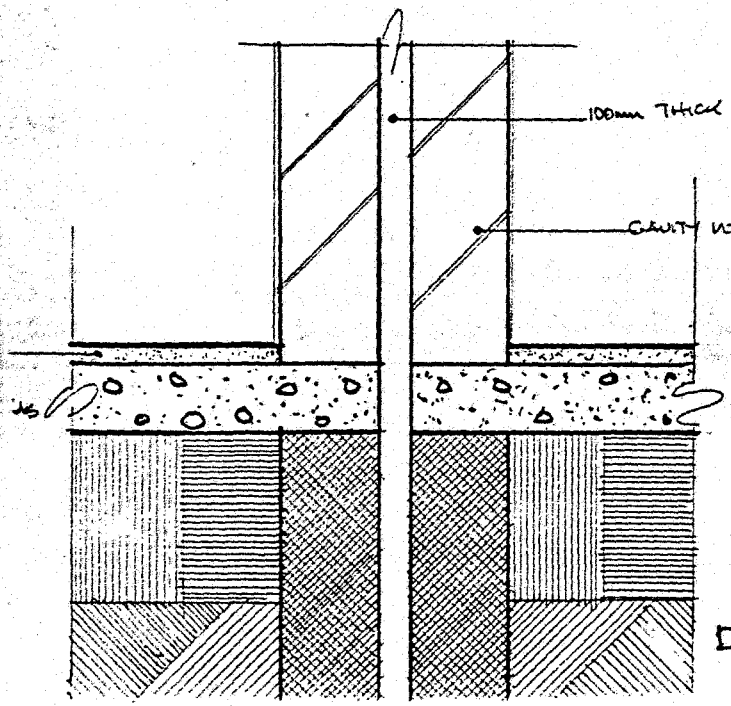
• FIRST FLOOR PLAN


C
B
FALL
FALL
FALL
FALL
REINFORCED CONCRETE SLAB TREATED WITH 3 LAYER FELT 5" TO FALL
FALL
FALL
FALL
FALL
C
B
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

• ROOF PLAN

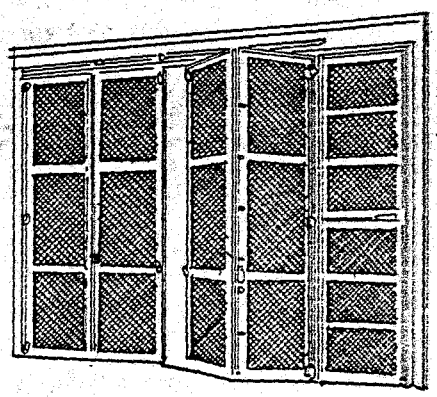


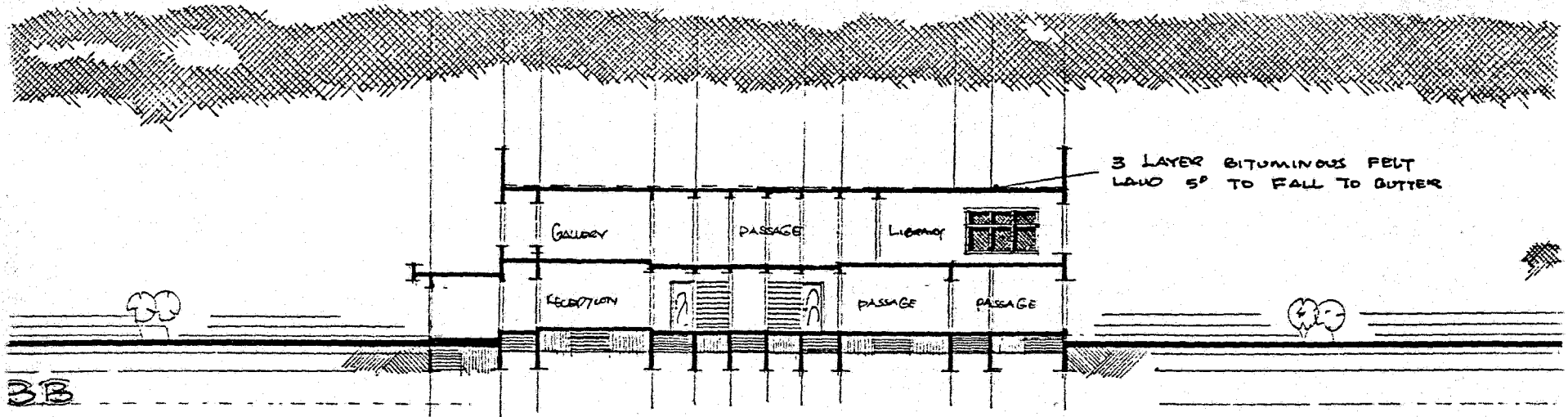
SECTION AA



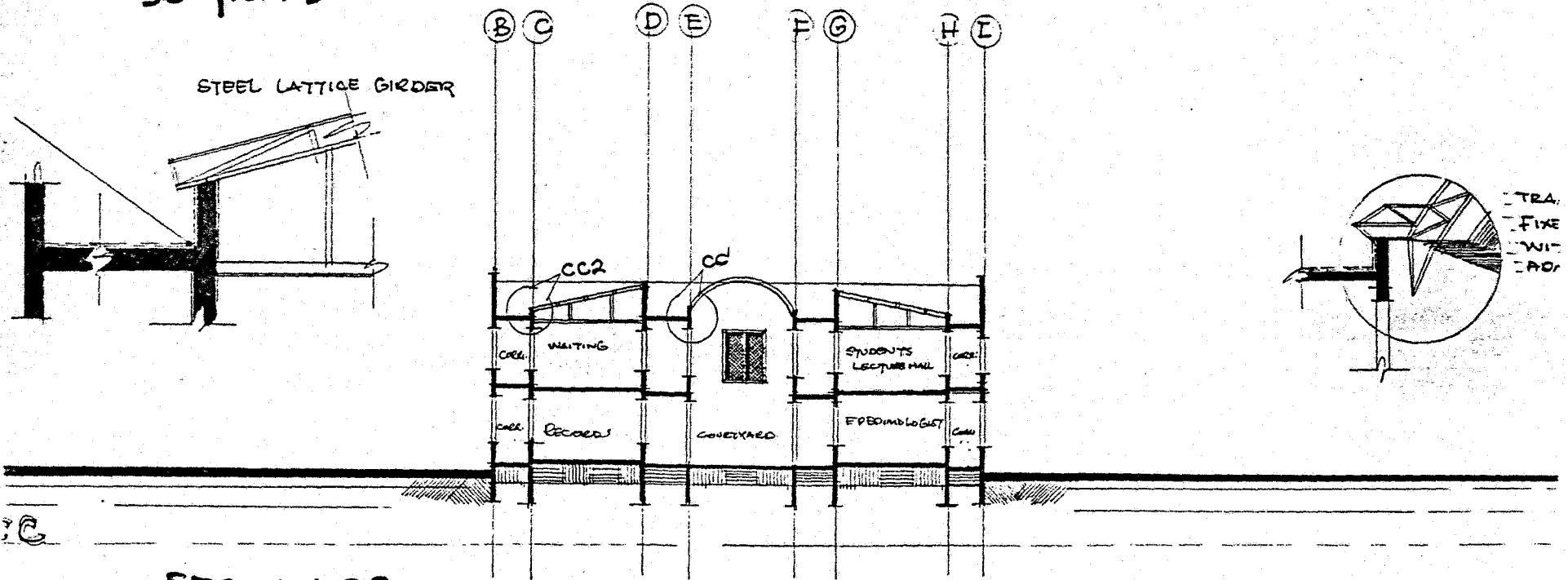
DETAIL AT NN'

FOLDING DOOR DETAIL

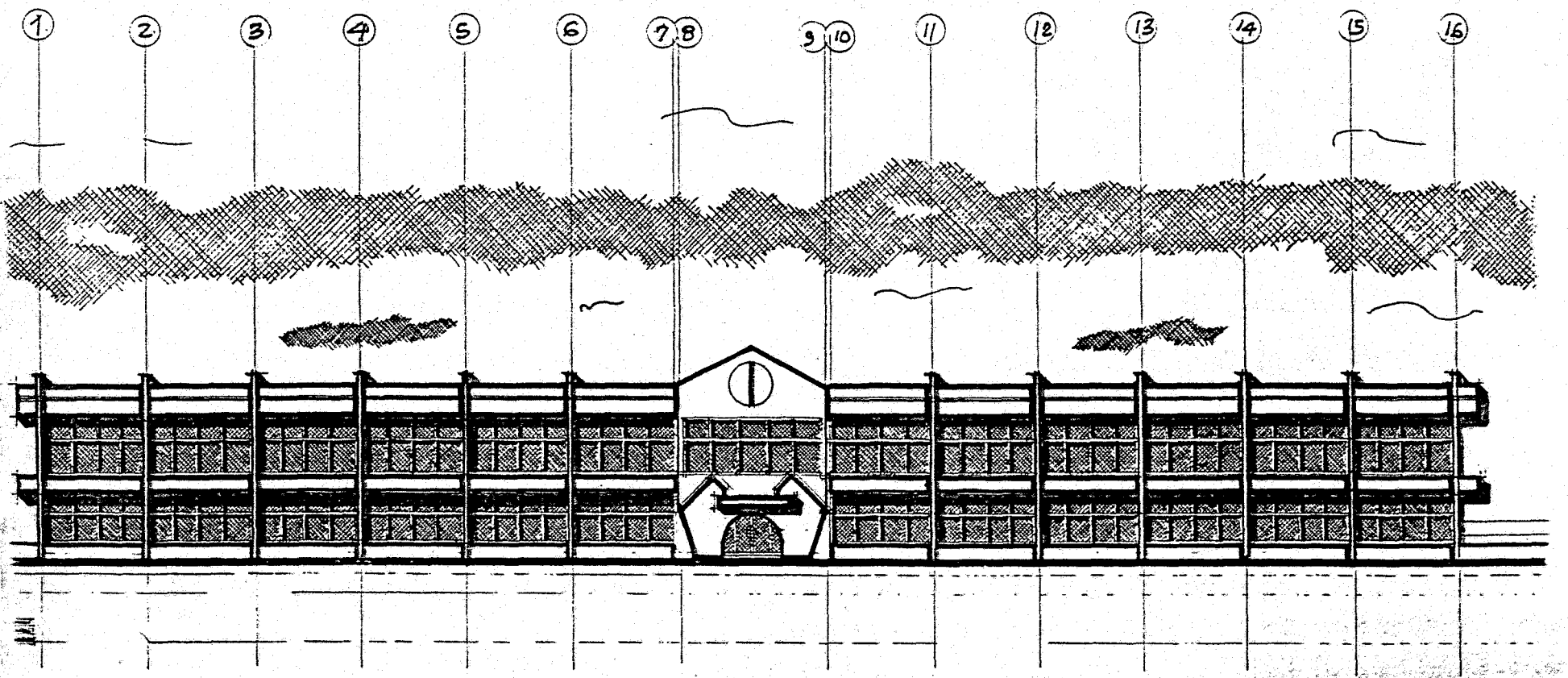




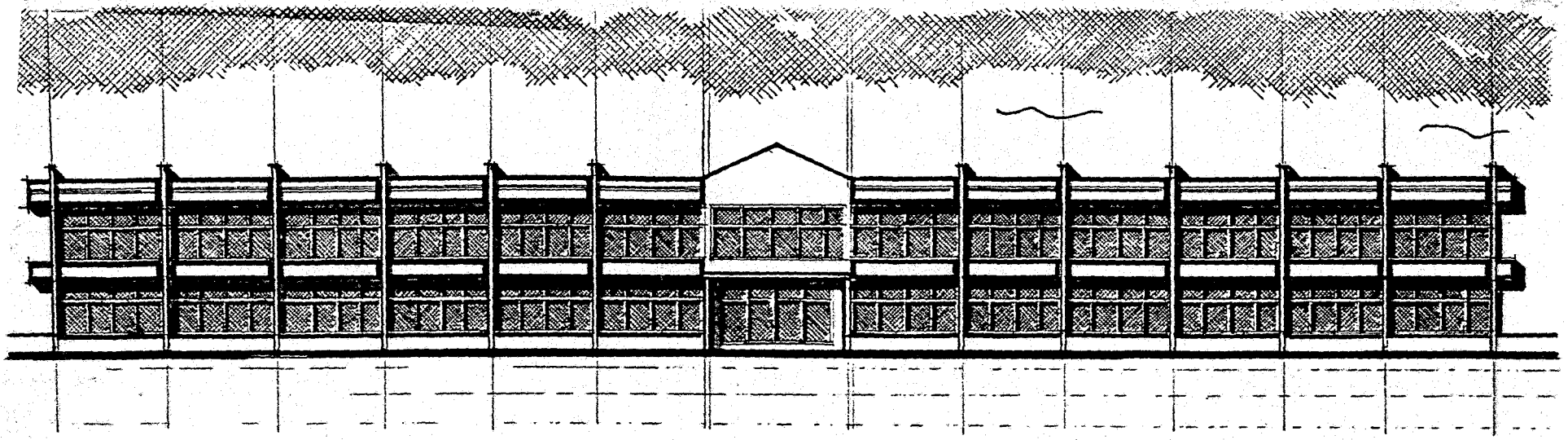
SECTION BB



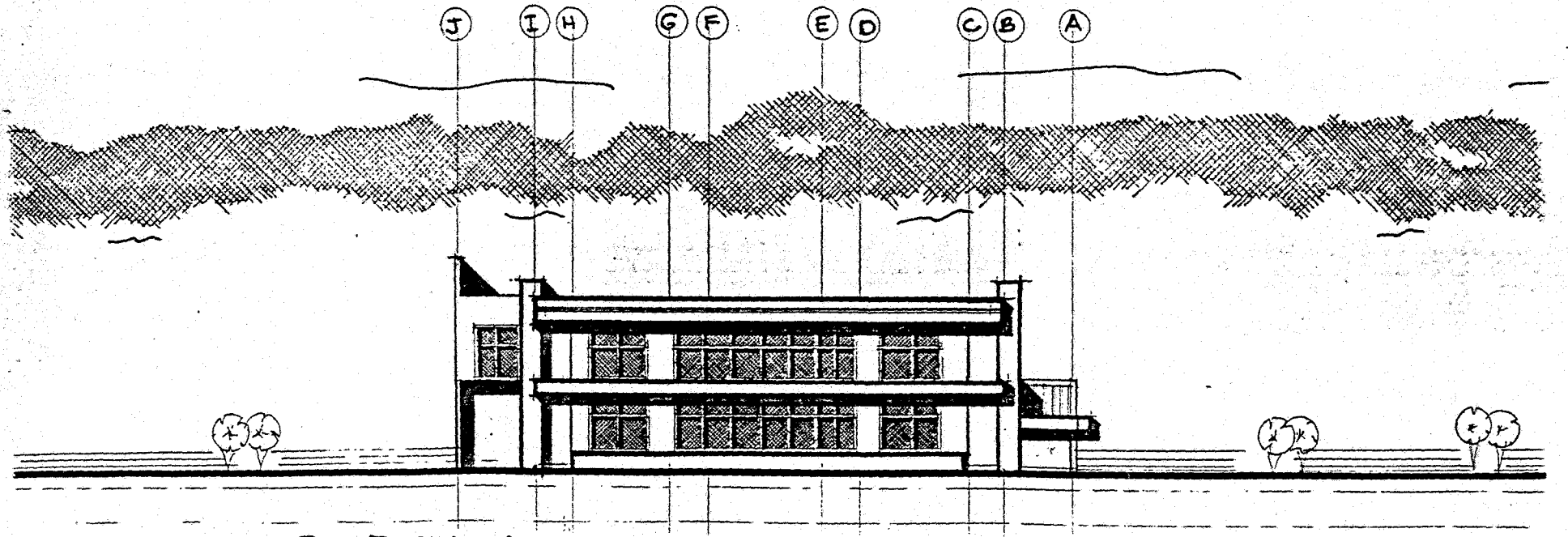
SECTION CC



• APPROACH FACADE.

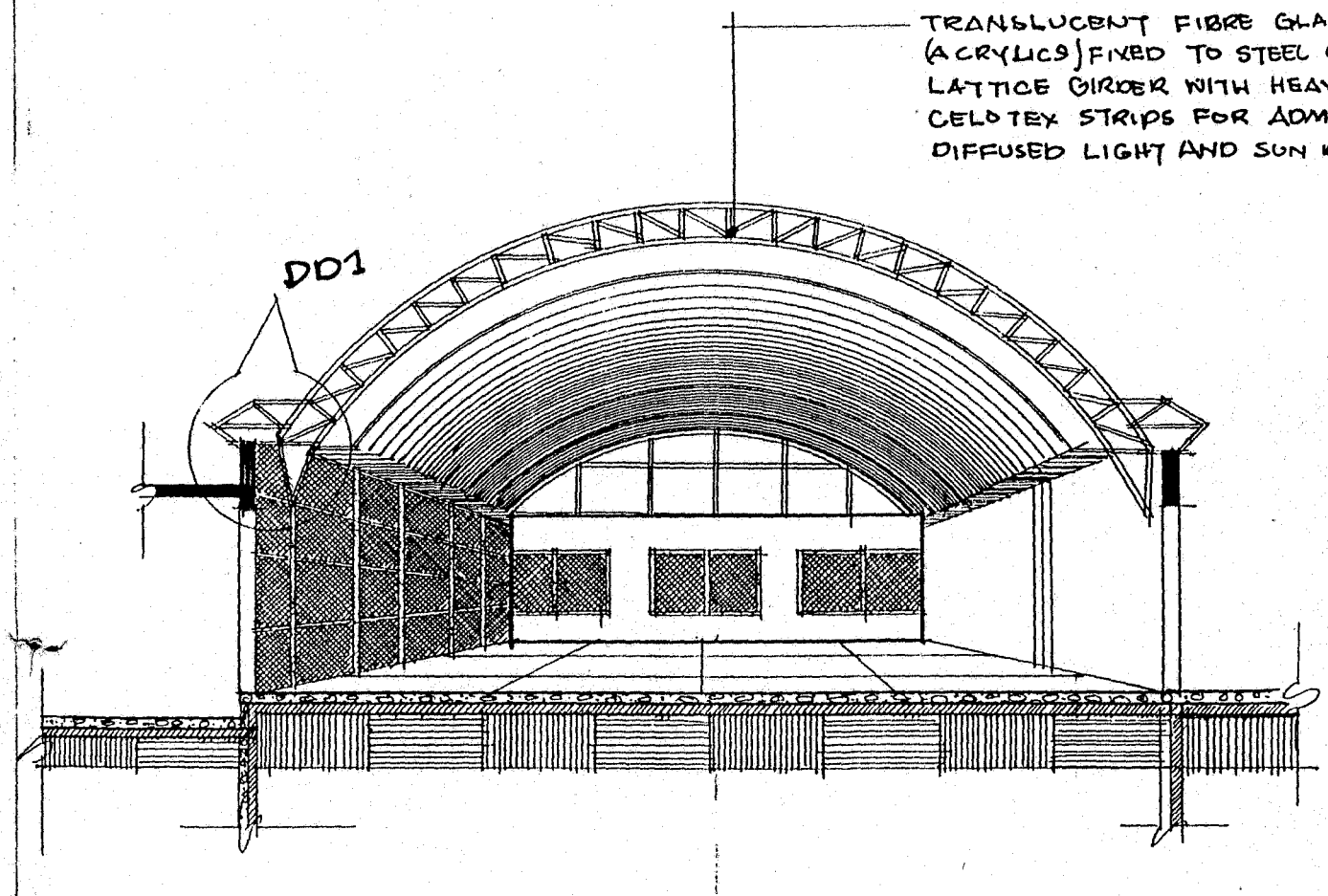


• REAR FACADE



• TYPICAL SIDE FACADE

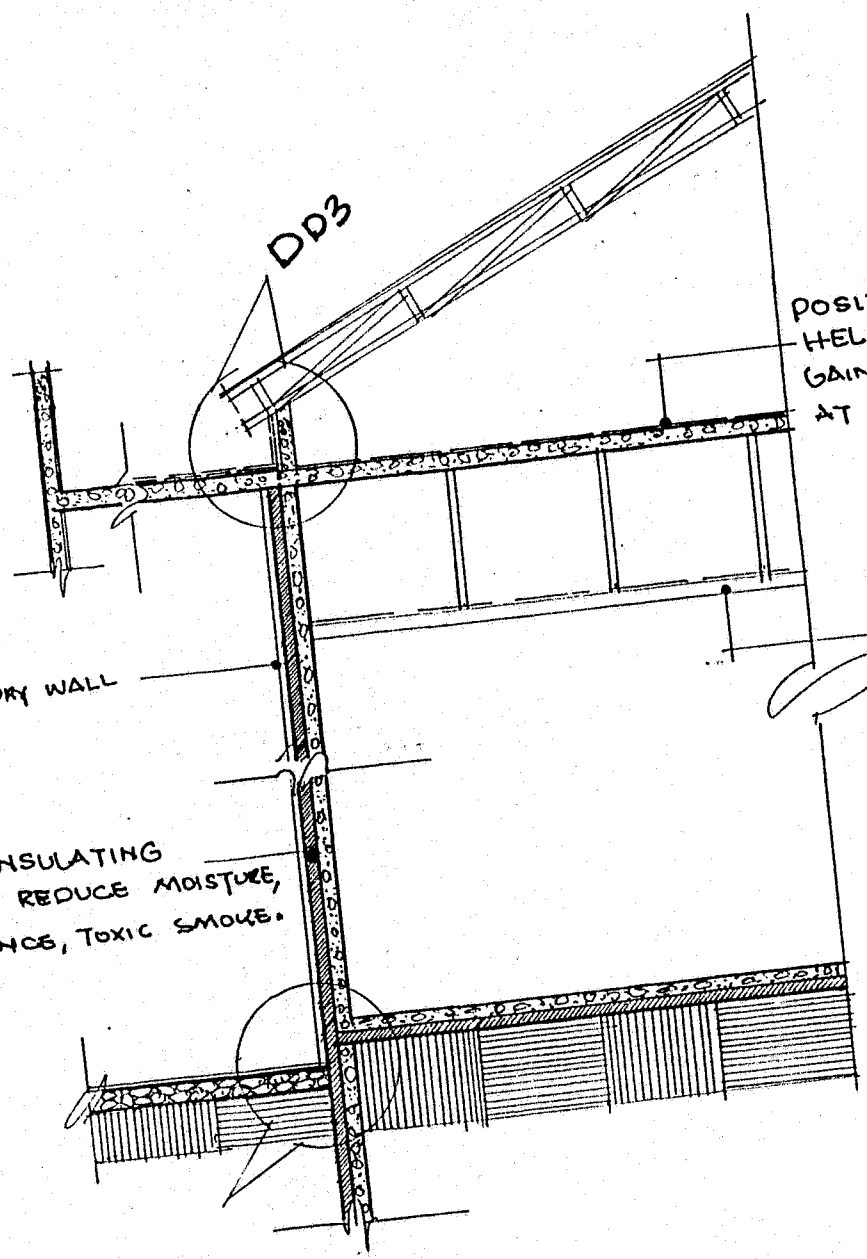
AILS



DETAIL AT DD1

SHOWING PATIENTS RESTING PLACE OUTDOOR

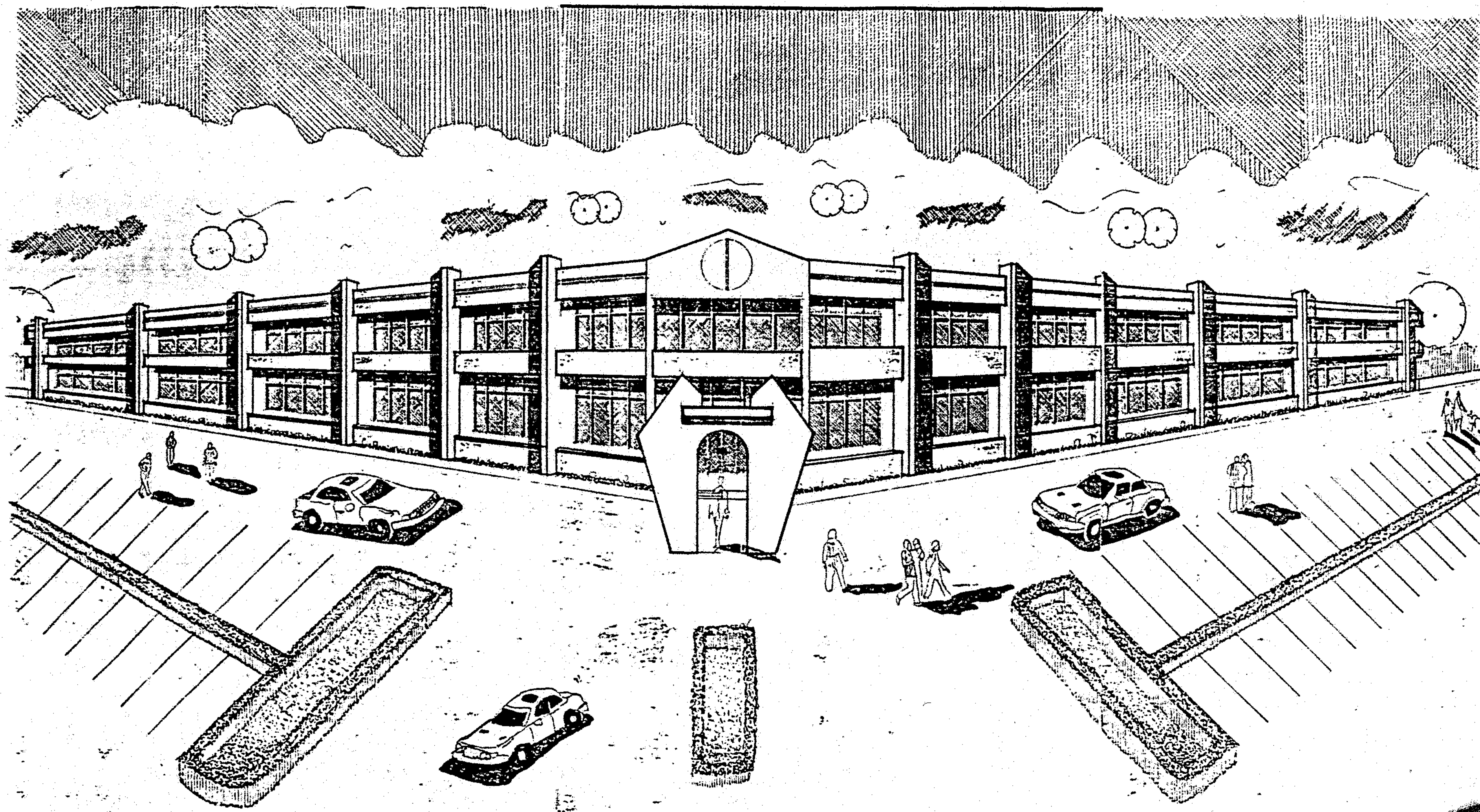
COURSE	ARC 621



AIL AT DD2

	AYUBA PHILIP
NO	92/2840
	ARCHITECTURE
	600 LEVEL
T	M. TECH.

GANGER



PERSPECTIVE (ADMIN)