A REDEVELOPMENT PROPOSAL FOR VOM GENERAL HOSPITAL, JOS

BY

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M.Se./ENV DES/15670/9498

A THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL
AHMADU BELLO UNIVERSITY, ZARIA, IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE AWARD OF
MASTER OF SCIENCE DEGREE IN ARCHITECTURE

DEPARTMENT OF ARCHITECTURE
FACULTY OF ENVIRONMENTAL DESIGN
AHMADU BELLO UNIVERSITY
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OCTOBER, 1999

DECLARATION

I, SHU'AIBU, Abdullahi Bello, do hereby declare that this thesis was researched and documented by me under the supervision of my Supervisor, Arc. Mas'ud Abdulkarim, and that it has not been presented in any previous application for a higher degree.

All sources of information have been duly acknowledged.

ABDULLAHI BELLO SHU'AIBU

07-09-2022
DATE

CERTIFICATION

This is to certify that this thesis, titled "A Redevelopment Proposal for Vom General Hospital", was researched and written by SHU'AIBU, ABDULLAHI BELLO under my supervision, and that it satisfies the requirements for the award of Master of Science degree in Architecture of the Ahmadu Bello University, Zaria, and is approved for its contribution to knowledge.

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DEDICATION

I wish to dedicate this Giant Stride by me

This humble contribution to knowledge

To my brother Moh'd Lawan Bello

For seeing me through the university

Morally, financially and otherwise

AND

Also to my parents for their understanding

For my long absences from home

For their moral support through my life

For those silent prayers.

ACKNOWLEDGMENTS

Bismillahi - Rahmani - Rahim.

My profound gratitude to Allah (SWT) for the Rahma He bestowed upon and for seeing through to this day.

I Wish to start by acknowledging the efforts of my supervisor Arc. Mas'ud Abdulkarim for taking time out of his tight schedules to guide me through this thesis. I wish to also express my gratitude to Dr. B. W. Qurix for his relentless efforts t

My gratitude also to my parents Alh. Bello Shu'aibu and Malama Hadiza for their moral support and understanding and for those silent prayers.

I wish to thank my brothers Moh'd Lawan Bello and Hassan Bello Namtari (Busy Boy) and the entire members of my family for their unflinching support and encouragement.

I am also indebted to my friends and school family without whom this journey might be longer, tougher and rougher: Musa Ahmed (Mr. P.), Hamza Mai (Dokta), Abubakar A. Isma'eel (Dr. Gentle), Uncle Ribs, Suleiman Tahir, Don Nash, Motsi.

Special mention must also be made of Dr. Sahabi, Ramatu Abdu - Aguye (RM II and the family), Yasir Fuard, who believed in me and made this period fun after all hazzles.

Shehu Rufai, Sham, Abubakar Sambo G (Peacock), Yusuf Major, Mahmud A. Aliyu, Raji Mahmoud.

Alhamdu Lillahi Rabbil Alamin.

ABDULLAHI BELLO SHUAIBU

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ABSTRACT

'All architecture proposes on effect on the human mind, not merely service to the human frame"

- *JOUNRUSK1N*

The need to develop our hospitals to meet the growing health care need of our people cannot, at this point of our national development, be over emphasised. This basically is due to the threat of extinction posed to n\an by diseases, some of which are termed incurable but of which patients at the same need some medical attention. Yet our hospitals arc in such a deplorable and pitiable state that one wonders at their ability to cure a single disease. This thesis examines the need for the redevelopment and improvement of our hospitals with special reference to Vom General Hospital in Vom, Jos, Plateau State.

Vom General Hospital was built in the early part of this century (1922) by two British Missionaries. Rev. Dr. and Mrs P.W. Barnden. The hospital, located in Vom, was initially meant to cater for the health care need of the people of Vom and its surrounding environment but with the growing discontent for the poor services rendered by government, hospitals and the exorbitant rates charged by private clinics and also due to the awareness of their efficiency and the high quality services they render, people troop in from different parts of the country and the West African sub-region and the Cameroon to receive medical attention there. This calls for the need to redevelop and upgrade the standard of the hospital to meet the growing need of the people.

The author of this thesis proposal has observed the absence of some vital infrastructural facilities in the hospital, of which this thesis examines the need to provide them. These include an up-to-date adjunct diagnostic facilities, maternity, emergency and multi-clinics and an improvement on nursing facilities (wards).

CHAPTER ONE

1.0 INTRODUCTION

1.1 PROBLEM DEFINITION

The urge to expand and redevelop a hospital more often than not arises from the need for more beds, yet one aspect of redevelopment, which is too often overlooked, is that any sizeable increase in the number of beds should be accompanied by a corresponding increase in the size of many supporting departments. Apart from the need to increase the patient bedding capacity in Vom General Hospital, there is also the need to provide some vital infrastructural facilities and hospital services, which are presently not available in the hospital. These facility/services include: the maternity unit, emergency unit, multi-clinics, centralised adjunct diagnostic and therapeutic facilities, improve the services department, etc.

Circulation is another problem in Vom General Hospital (VGH). Travel distances are too long especially between the nursing units and the peripheral adjunct diagnostic services provided at the outpatient department. Centralising these services will help reduce the travel distances and improve upon their efficiency. Lack of central sterilisation supply unit and adequate and functional surgical suite has also affect the quality of services provided by VGH.

This thesis will look at these problems critically and proffer solutions, among which is the provision of these basic infrastructures and incorporating modern scientific and medical equipment. Provision shall also be made for recreational facilities for stress relief. The design is to make adequate utilisation of the natural environment. Space organisation and maintenance are of paramount importance in the design.

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1.2 AIMS AND OBJECTIVE

The aims and objectives of this thesis are:

- Upgrading and redevelopment of the hospital to meet the requirements of a standard modern hospital.
- Co-ordination of the various functional units of the hospital to enhance effective functioning and running of the hospital.
- Improvisation of the most up-to-date scientific and medical equipment and method of health care delivery.
- Utilisation and integration of the environment in health care provision.
- Provision of accommodation facility for relatives of patients and their activities.
- Provision of sport facility for better patient management.

1.3 MOTIVATION

This research work was first of all motivated by my intrinsic attachment to the medical profession generally and the need to help people who are physical and / or mentally ill to become normal again. This has motivated me into researching and examining ways of improving the standards of our hospitals which are in a states of partial or total dilapidation and disrepair. The need to do this thesis research work on Vom General Hospital in particular was motivated by the location of the hospital and the present state of affairs of the hospital: the misuse and disuse of spaces which started when government took over the hospital from the missionaries – COCIN.

There is also the case of over-crowing of both patients and their relatives, which need to be addressed by the design. Plans on the pipeline to redevelop the hospital by its

management gave me the final impetus to conduct my research and carry out this thesis on Von General Hospital.

1.4 RESEARCH METHODOLOGY

The procedures employed in conducting this research work include the following:

- Indept survey and analysis of the existing situation at the Vom General Hospital.
- Interviews and discussions with the staff and management of the hospital and their patients and patients' relatives.
- Case study of some existing hospitals.
- Data from Books, journals and other materials related to the subject.

1.5 SCOPE AND LIMITATION

The scope of this work shall cover the upgrading and redevelopment of existing facilities and the provision of some basic infrastructures, which, at the moment, are not available in the hospital. This later includes Central Administration, multi-clinic for dentistry, eye clinic, ENT, gynaecology maternity, CSSU, additional theatre radiology dept, emergency unit etc. The research shall also proffers an effective and functional design proposal to address space allocation and organisation and circulation requirements of the hospital.

The work shall be constrained by laws and policies governing the redevelopment and upgrading of hospitals and other laws related to hospitals, and land development. Financial limitation shall properly be considered

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 HISTORICAL DEVELOPMENT OF HOSPITALS

2.2 THE HEALTH CARE DELIVERY SYSTEM

Food, clothing and shelter have been identified as the primary needs of man. However health is another primary need that is a contributing factor to man's physical and social development. The World Health Organisation (WHO) defines health as a state of complete physical, mental and social well being and not merely the absence of disease or infirmity.

Health is wealth and a healthy nation is said to be a wealthy nation. Provision of adequate and effective health care delivery services to the populace is therefore of paramount importance for the socio-economic development of any nation. This is so because, health reduces the suffering of the people and increase their productivity quotient.

The health care delivery system is therefore divided into three to obtain optimum functionality. These are:

i. Primary health care

ii. Secondary health care

iii. Tertiary healthcare

2.1.1 Primary Health Care

The ALMA-ATA Declaration on primary health care of 1978 in Alma–Ata, capital of Kazath Socialist Republic (Russia), co-sponsored by WHO and UNICEF, declared that primary health care is the key to the attainment by all peoples of the world by the year 200, of a level of health that will permit them to lead a socially and economically productive life. Primary health care has been defined as the essential health care made universally accessible to individuals and families in the community by means acceptable to them, through their full participation and at a cost they can afford. It is a person's first contact with health care services at community level and serves as a nucleus for the campaigns of preventive medicine through educating people on sanitation and basic personal hygiene.

The health sector should therefore place emphasis in primary health care especially in developing countries where majority of the populace lives in rural areas and lack basic personal hygiene. Three factors responsible for health problems in developing nations as identified by World Health Organisation are:

i. Poor hygiene

ii. The tropical climate

iii. Over crowding.

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The primary health care function at grass root level through intensive campaign of health education, sanitation and other preventive practices. It enables:

i. Direct contact of the health worker with the rural populace for health education

ii. Delivery of immunisation (EPI) and other health practice (e.g. ORT).

iii. Total coverage in terms of geographical spread and population in the country.

Primary Health Care sector consists of mobile clinics, dispensaries, primary health centres, rural hospitals etc.

2.1.2 SECONDARY HEALTH CARE

These are health centres (hospitals), which cater for patients with various degrees of illness and, unlike the primary health care, the emphasis is on curative medicine. They are generally referred to as General Hospitals because they are large enough to provide medical services for all but (the more esoteric) specialist services. They treat all forms of diseases that may not require specialist services like neuro-surgery or acute orthopaedic therapy.

The general hospital can be identified from the diagnostic and therapeutic facilities in the outpatient care division, which cover almost all branches of medicine. Patients with complications are referred from health centre to general hospital. General hospitals vary in size in terms of hospital beds, which range from 100 beds to over 500 beds.

Emphasis is on the outpatient division of the hospital and treats variety of diseases, those most prevalent and of relatively short duration.

2.2.3 Tertiary Health Care

This basically consists of the specialist and the teaching hospitals. The specialist hospital is one that is devoted to some one or group of related disease, the treatment of which usually requires protracted periods. It specialises in the diagnosis and treatment of only one branch of medicine. Specialist hospital serves as referral hospital and offers

highly specialised services and training of personnel in that particular branch of medicine. The growth and development of medicine and medical technology led to specialisation in the field of medicine, especially as a result of the resultant inability of general hospitals to cope with diseases, complex functions and responsibilities.

The teaching hospital is another of the tertiary health care and provides not only patient care services but also training of postgraduate and undergraduate medical students. It is usually attached to a university medical school and serves the following functions:

i. Curative care

ii. Teaching

iii. Research

The teaching hospital is a compromise between the needs of the patient and those of the medical student and comprises the hospital operations proper, teaching facilities and research facilities.

> *"What characterises the teaching hospital is its use as the workshop where students physician learns the actual practice of his art, where he works under highly qualified clinicians, observing and studying, and under their instruction and supervision takes part in the care of patients"*

The medical school in Nigeria is divided into clinical and pre-clinical research where the pre-clinical research takes place in the university, while the clinical research takes place in teaching hospitals.

2.3 THE HOSPITAL AS A SYSTEM

The hospital is an extremely complex system consisting of large number of physical, human and technical elements, all of which are devoted to providing an output,

which is difficult, if not impossible to measure in purely quantitative term. In fact, any hospital may be visualised as a macro-system comprising a large number of subsystems, which are quite complex within themselves and in terms of their interaction with each other. This interaction occurs in a wide variety of ways, but the net result is that the totality of a hospital is greater than the sum of its individual parts. This is one factor, which makes the study of hospitals so difficult.

The internal workings of a hospital is sometimes perceived as the complex symbiotic relationships of organisms in an ecosystem, each of which cannot survive and function well without the existence and full participation of others in the ecosystem.

There are basically four divisions in a hospital system, which are intricately interwoven in their functional relationships. These are

i. the outpatient care division
ii. the inpatient care division
iii. the auxiliary service division
iv. adjunct diagnostic and therapeutic services

These sub-systems can further be subdivided into smaller micro systems, each of which work in relation to others to achieve the hospital's objectives which are patients' care, public health, teaching and research.

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2.3.1 Outpatient Department (OPD)

The outpatient department is that section of the hospital with allotted physical facilities, regularly scheduled hours and personnel in sufficient numbers assigned for the

established hours to provide for care of patients who are not registered as inpatients, receiving physicians, dentists and allied services. There are three types of outpatients:

(i) General outpatient (GOPD)

(ii) Referred or special outpatient (SOPD)

(iii) Emergency and casualty outpatient (ECU)

(i) **The general outpatient:-** This is a patient receiving diagnostic and therapeutic services as an outpatient for other than emergency conditions, and who has not been referred for such services by his attending physician.

The outpatient is a person receiving general or emergency diagnostic therapeutic or preventive health services provided by the hospital facilities of health programme, and who is at that time not registered as an inpatient.

(ii) **Referred or special outpatient:-** This is a person directly referred by his attending medical practitioner for specific diagnostic or treatment procedures, for other than emergency condition.

(iii) **Emergency and casualty outpatient:-** This is a patient requiring emergency services, who is ambulant.

2.3.2 The Inpatient Division

This is the place where hospitalised patients are accommodated from admission to discharge. It is considered to be the most important unit of the hospital.

Florence Nightingale was the first to study the problems of ward design in 1859 and made recommendations in her book *Notes on Hospitals*. These recommendations

were accepted by hospital planners, and given world-wide recognition for the subsequent seventy years.

The patients need to be segregated into smaller units in the general ward. Separate single rooms need to be provided for:

(i) patients with contagious infections

(ii) critically sick and dying patient.

A nursing unit with good visual contact with patients should be provided and close to this should be treatment rooms, etc.

> *"It is considered almost axiomatic that the only proper nursing care is that in which the nursing staff virtually do nothing but administer to the patient."*

2.3.3 Ancillary Services

The ancillary services division serves as the hospital's supporting facilities for efficient patient care both in the outpatient and inpatient care divisions. It comprises the following departments:

(i) Central sterile supply department (CSSD)

(ii) Kitchen

(iii) Laundry

(iv) Incinerator/boiler/generator

(v) Maintenance workshop

(vi) Mortuary

Vehicular access is necessary to the above departments since they are serving as services department and there is constant flow of men and materials (equipment) which is

not of direct or immediate medical relevance. It is also important to treat them as separate buildings for noise control and to check against the risks of fire outbreak.

2.3.4 Adjunct Diagnostic and Therapeutic Services

These are services departments that offer diagnostic and therapeutic services. Adjunct specialised facilities such as the clinical laboratories aid the physician in diagnosis. The adjunct services include the following departments:

(i) Pathology department (clinical laboratories)

(ii) Radiology department

- diagnostic x-ray
- radiation therapy

(iii) Surgical suite

(iv) Pharmacy

(i) **Pathology department:-** This is a collection of laboratories concerned with detecting and finding the pathological causes of disease and include blood bank, urine and stool test labs, etc.

(ii) **Radiology department:-** This consists of two departments which make use of the x-ray in diagnosis and therapy. The diagnostic x-ray is concerned with the diagnosis of ailments using the x-ray, e.g. to find the nature and location of bone fracture. The radiation therapy uses radiation to treat ailments, e.g. use of radiation to treat cancer by bombarding the cancer cells with gamma radiation.

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(iii) **Surgical suite:-** the development of antiseptic, in the 19th century and anaesthetic led to spectacular achievements in the field of surgery. A surgical suite is a unit consisting of a number of operating theatres with ancillary accommodation, providing the most effective therapeutic services in the hospital.

(iv) **Pharmacy:-** The pharmacy department has an in-house pharmacists who recommend drugs after diagnosis by the physician and supply the necessary drugs. The pharmacy is basically concerned with the provision of drugs to the patients.

2.4 THE CONTEMPORARY HOSPITAL AS A FUNCTIONAL INSTITUTION

> *"To sick people, it (the hospital) is a place where they will receive treatment; to catering and domestic staff, it is a special kind of hotel with certain number of meals to be provided and rooms to be cleaned. The engineers and the maintenance staff see it as a premise to be lit and kept in good repair. To all the staff it is a place of employment and to some – doctors, some nurses and perhaps others – a temporary home. For all these people, a hospital may be primarily a building or collection of buildings with these various uses."*

The fundamental objective of hospital in the health care delivery system is the provision of adequate and efficient patient care services for the community. The perception of hospitals as merely functional institution with set objectives can be attributed to the fact that hospitals function like most complex institutions with multiple and varied departments working together in harmony to achieve its fundamental objectives, both structurally and in terms of its organisation and management. Like the

university system with objective of research and learning, the hospital is another complex institution, the function of which is the provision adequate patient health care service and other related needs of the community.

Although the provision of patient care is a fundamental objective of the hospital system, the hospital also caters for other services which are equally important and without which the patient care services may not be effectively available. According to Nierenberg, R.N.J. and Janovic, F. (1979), *"no matter how 'big' the surgeon, how eminent the consultant or how experienced the nurse, you (patient) are not going to receive the attention and consideration you would like (in a hospital). The reason is simple: the hospital is an institution. It is designed for hundreds, in some cases thousands, of people: to care for some, to train others, to provide research opportunities for still others. You soon learn that you are only one very tiny part of that picture."*

Therefore, the hospital can be perceived as a complex functional institution designed to provide various services and opportunities for the community. There are four basic functions of the hospital: (i) provision of adequate patient care; (ii) training health workers; (iii) research; and (iv) public health.

(i) **Patient care:-** The primary objective of a hospital is the provision of adequate and efficient health care services to the community at an affordable cost. This is often described, in economic sense, as hospital's "product". This product or service is achieved by bringing together men, money and materials in a structural environment, with the patient as the focal point of their attention.

The efficiency of a hospital, its success or failure is strictly measured by the quality of its patient care services. There are two types of patients in the hospital:

(a) the outpatient, and

(b) the inpatient.

It is the aim of the hospital to keep patients (people) away from it (i.e. by providing effective health care services to them) or at least keep as outpatients.

(ii) **Research:-** Most, if not all hospitals conduct research although the type and level of their research may vary. Some hospitals, especially specialist hospitals, devote all its research to one particular field, e g. cancer or neurology, while others are broad based and conduct research in various fields of medicine and medical technology.

(iii) **Teaching:-** This primarily is the function of the teaching hospital which train both undergraduate and postgraduate medical students in the field of practical medicine, and other hospitals train paramedical staff in their various fields. Teaching hospitals are usually affiliated to a university.

(iv) **Public health:-** It is becoming increasingly clear that hospitals play a pivotal role in determining the condition of public health. This is achieved by educating and enlightening the populace on health matters, especially on sanitation and basic personal hygiene and what to do in the event of an epidemic outbreak.

2.5 THE HOSPITAL AS A THERAPEUTIC ELEMENT

Sometimes the hospital (building) in itself plays a vital role on the psychology of the patient to help improve the healing processes, hence the perception of a hospital as a therapeutic element enhancing the quick recovery of the sick. This is sometimes referred to as an element of psychotherapy.

The general planning of the hospital layout, use of landscape elements and aesthetic composition, interior arrangement of furniture and equipment, comprehensive use of architectural elements, etc all work (in harmony) on the mind of the patient to impress a definite perception of the hospital environment, and this consequently influence his confidence in the hospital. For example, use of adaptive materials in hospitals regulates the microclimate and enhances the therapeutic abilities of the hospital (in psychotherapy). Colours, especially white and cream are essential ingredients that are expected of a hospital finishing. All these conjure up to give the hospital the impression of a therapeutic ailment; a place where the sick find health and solace not only in the diagnosis and treatment offered by doctors but also in the comfort offered by the surrounding environment. This is particularly true in the case of psychiatric hospital where adequate landscaping and visual aesthetics of the general environment enhances quick (psycho) therapy of the patient.

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2.6 TYPES OF HOSPITALS

The contemporary hospitals can be classified into four basic categories depending on the type of service they render and level of its sophistication. These are:

(i) General hospital

(ii) Specialist hospital

(iii) Community hospital

(iv) Teaching hospital

(i) **General hospital**

This is sometimes referred to as regional hospital, and caters for patients with various degrees of various illnesses. They are referred to as general hospitals because they are large enough to provide medical services for all but (the more esoteric) specialist services. They sometimes refer patient for completion of their treatment to specialist hospitals and are referred to by health centres.

The sizes of general hospitals are measured in terms of bedding capacity, ranging from about 200 beds to well over 1,000 beds. The majority of the new general hospitals are planned with between 500 beds and 800 beds, although the current nucleus hospitals are planned as viable first phases of 200 beds to 300 beds.

(ii) **Specialist hospital**

A specialist hospital is one that is devoted to one or group of related diseases, the treatment of which usually requires protracted periods. It specialised in the diagnosis and treatment of one branch of medicine, e.g. psychiatry, and offers highly specialised services and training in that particular branch. It serves as a referral hospital. Specialist hospitals are sometimes affiliated to a university, e.g.

(a) National Eye Centre, Kaduna

(b) National Orthopaedic Hospital, Kano

(c) Psychiatric Hospital, Aro

The constant discoveries in medicine and changes in medical technology resulted in specialisation in the fields of medicine and consequent specialisation in hospitals. Also, the inability of the general hospitals to function adequately in carrying out their

functions and burdens of responsibility has aided in the evolution and development of specialist hospitals.

(iii) Community hospitals

These are small hospitals, which are sometimes referred to as health centres. They are usually of 50 to 150 bedding capacity and are staffed by the community, local or state government, and offer less comprehensive medical, nursing and technical services. They provide for patients transferred from the village dispensaries for medical cases where home circumstances prevent domicilliary care and for some longer stay *geriatric* patient. A few also include maternity unit.

(iv) Teaching hospital

This is the most sophisticated of the hospital categories and it provides for the training of undergraduate and postgraduate medical students. They invariably contain significant research facilities. In this type of hospital, number of beds does not indicate level of sophistication.

CHAPTER THREE

3.0 REDEVELOPMENT FACTORS

Redevelopment can be defined as the process of improving the condition of an existing situation either by repair or expansion and upgrading (modernisation). Redevelopment of the hospital arises usually because the total problem is seldom envisioned initially and it can be said to be a resultant of two forces or factors:

(i) functional obsolescence

(ii) physical obsolescence

Obsolescence here means the inability of the hospital to render its services adequately and effectively due to these two forces. The urge to expand arises most commonly from demands for more beds than are available while the urge to upgrade and modernise may not make its appearance until much later, perhaps not until the new additions reveal how much the old buildings need to be modernised. Most of the problems of redevelopment may become apparent only after the more obvious parts of the problem have been analysed. Thus, the redevelopment project, when faced initially, may appear to be of one kind and size, only to be revealed later as much larger and more complex than was first thought.

Because of their complexity, hospital buildings tend to become obsolete sooner than many other types of buildings. Physical obsolescence can be caused by depreciation and deterioration of the building structure including materials, furniture and equipment, deferred need for physical improvement, etc, while functional obsolescence may result from demands for beds, education, changes in medical practices, etc.

3.1 PHYSICAL OBSOLESCENCE

No matter how well a building is being maintained, some essential physical features may be lacking in them at present because some of these features may not have been thought of as essential and may therefore not be provided in the initial planning of the hospital. These may hinder the effective operations of the building. Physical obsolescence occurs as a result of the inability of the building to perform its required functions which may be due to poor maintenance culture, which may result in depreciation, physical plant of material characteristic which do not conform to current minimum standards and codes, or otherwise detract from the safety and comfort of the building inhabitants, inadequacy of the building to meet the hospital's future pragmatic objectives. External arrangement of building elements may preclude an ideal arrangement of space for the needs of the hospital today.

Generally, physical obsolescence may be classified into two broad categories, viz.:

(a) Depreciation, and

(b) Spatial needs obsolescence.

(a) Depreciation obsolescence

Depreciation and dilapidation of a building are caused by lack of proper, adequate and timely maintenance. Depreciation is the reduction in the functional value of the building due to age, etc while dilapidation is the reduction in its physical value due to lack of repair and maintenance. Depreciation occurs so gradually that it is hard to know when they are strong enough to generate action because they occur over a long period of

time. Dilapidation on the other hand may occur over night due to some unforeseen forces which could destroy whole or parts of the building or due to lack of proper maintenance of the building.

Another factor for depreciation and dilapidation is the generating force of deferred needs, which have accentuated over time. There are many reasons for these happening, most common of which is the lack of regularly budgeted funds for minor improvements.

(b) Spatial need obsolescence

Spatial need obsolescence is the obsolescence of the building into terms of the spatial needs of the hospital, inability of the building to provide spatial needs of the hospital. It is said to occur when the hospital building cannot adequately accommodate the spatial requirements or needs of the hospital. This may be due to community growth, demand for more beds etc. Community growth and demand for more beds are closely related and may sometimes by interchanged. These forces or factors sometimes come from the public (opinion) or more often from the medical staff, reflecting public demand and sometimes through hospital administrators reacting to high occupancy. Developments in medical technology may render some physical feature of the hospital obsolete.

Physical obsolescence generally speaking, is the obsolescence or inability of the building to perform its physical functions, which may hinder the functional or smooth running of the hospital. Consequently, this, more often than not, results in functional obsolescence.

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3.2 FUNCTIONAL OBSOLESCENCE

Functional obsolescence is the obsolescence of the hospital in terms of services and processes (functions) it provides to the community. While physical obsolescence is concerned with the physical characteristics of the hospital plant, functional obsolescence is concerned with the functional features, that is, factors which affect the facility's ability to serve as an efficient workshop for personnel and a supportive environment for both personnel and patients, i.e. the physical side is concerned with the building and the functional side considers how they are or can be used. The functional obsolescence is concerned with (its) physical features of the hospital (building).

Functional obsolescence purports to some degree the plants adaptability to present and expected future functions, the operational efficiencies allowed, or inefficiencies caused, and comfort or discomfort of building inhabitants, related to environment afforded. Its emphasis is on people and processes rather than physical mechanisms. Unfortunately a hospital that has had excellent maintenance and has deteriorated only slightly can still be functionally obsolete. Drastic changes in hospital use are forcing radical changes in the organisation of some departments. Most hospitals find it difficult, if not impossible, to fit additional services that have become their responsibility that are usually necessary for increased functions. These changes and additions could be in the form of changes in hospital policy and administrations, regulations, methods of medical care practice and financing, medical technology, additional facilities for research and development, education, etc.

(i) Changes in regulations and policies may render a hospital or part of it obsolete. These changes are brought about by agencies which have to with the licensing

and/or approving the operation of the nospital, viz.: health department, ministries of health, fire department, labour unions, insurance companies, etc. Many of these agencies periodically inspect the plant and specify improvements to meet their standards. These policies and standards for improvement may render some parts of the hospital obsolete before the improvement is done and consequently other parts may not show their level of functional obsolescence until after the first improvements.

(ii) Changing methods of medical care practice and financing have also, over the years, brought a high degree of specialisation into the hospital, a tremendous development of the professional adjunct services, proliferation of technical aids especially in transportation and communication, the gradual elimination of social differences in hospital care, and increasingly the inclusion of doctor's offices and other outpatient facilities in or near the hospital. Continual improvements in hospital operating methods also induce modernisation.

(iii) Research and education programmes can lead to significant support and to demands for space. Medical education is especially significant in teaching hospitals and hospital residency programmes in medical specialities are well established. As the clinical and basic sciences expand their areas of joint efforts, such graduate programmes can easily, spread to other parts of the hospital for both research and education. This segment of event calls for expansion and modernisation of an existing hospital is to cater for these functions. There is also the case of training paramedical personnel, i.e. adjunct services as the hospital grows and expands.

(iv) Recent developments in medical technology have resulted in radical changes in hospital organisation and function. The improvement, development or invention of medical facilities (equipment) may render the existing ones obsolete. This may call for the modernisation of the hospital to accommodate such technologies.

It is therefore the duty of the architect to study the above forces to define functional problems which detract from operational efficiency, patient care and convenience of building inhabitants; evaluate traffic flows and physical relationships; determine the space inefficiencies in terms of current requirement; study the need for alteration, expansion and modernisation based on feasibility study findings; and make recommendations as to alternative future uses of the structure as a whole, plus various departmental areas, i.e. making a detailed feasibility survey which will provide the detailed information that will be required so as to undertake the redevelopment process.

3.3 HOSPITAL SIZE

This is another factor of redevelopment that require the urgent attention of the hospital planning team. Number of beds and supporting services to a large extent determine the size of a general hospital. Because it is clear that bed count is no measure of the adequacy of the supporting services or facilities, and as institutions take up broader responsibilities in maintaining the health of the population as a whole, the ratio of beds to population becomes increasingly undependable scale because it does not tell anything about the supply of diagnostic and treatment facilities that serve the occupants of the bed, or about facilities for prevention and rehabilitation or for treating ambulant patient or for

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exploring the frontiers of medicine – i.e. research – all of which are facilities in rapidly increasing demand in proportion to the number of bed.

Although crude and undependable in contemporary hospital planning, yardsticks like number of beds (i.e. beds/1000) are necessary in order to define the general outlook or magnitude of the hospital structure. They are useful in checking whether the results of other methods of estimating needs (usually projections of utilisation experience) are actually realistic and at the same time, adequate to the social purposes that underlie medical planning.

The incompleteness or inadequacy of sizing up a hospital based on number beds can be from the variation there is as a result of community differences such as sex, age distribution, marital status, degree of urbanisation etc. Some countries have already established standards for hospital planning based on the above factors. For instance, Switzerland has established its standard hospital planning at 13.6 bed/1000 of its population, while Egypt has 3 bed/1000. The Nigerian medical association has considered the problem of low technology and medical personnel in the country and therefore recommended 2 bed/1000 in rural areas and 3/1000 population in urban areas. The American government uses 10 bed/1000 population in getting its standard planning guide.

The World Health Organisation (WHO) has recommended the following bed distribution in hospitals:-

i.	Medical Wards	24%
ii.	Surgical Wards	33%
iii.	Obstetric Wards	19%
iv.	Paediatric Wards	15%
v.	Others	9%
Total		100%

3.4 LAYOUT AND CIRCULATION PATTERN

It is important for the architect to carryout an architectural feasibility survey to define exactly how to modernise the existing facility. Careful study of the existing situation will facilitate proper functional arrangement of the expected facility. Existing plans, where available, is to be studied as a source of architectural evaluation but where such drawings are not available, it is necessary for the architect to measure the building and bring out its plans. Using this, redevelopment programme can be carried out adequately.

It should be expected in a redevelopment programme that the gross floor areas of the existing building are inadequate and therefore need to be expanded. As mentioned earlier, alteration or expansion of one part will in turn affect other parts. For instance, expansion or modernisation of the housing system will in turn require the expansion or modernisation of other sub-systems of the hospital like the adjunct diagnostic and therapeutic departments. The remodelling proposal should therefore take these into consideration and try to functionally marry the layout of the existing features into the expected future remodel. Where demolition is required, temporary accommodation for the existing function should be provided.

Circulation is another important factor to consider in the redevelopment programme of a hospital, as it is a very important force in the set-up of a hospital complex. Without proper circulation planning in a hospital, functional relationships of the different units will be hindered. There are two basic types of circulation (traffic) patterns in a hospital, viz.: vehicular and pedestrian circulation.

(i) **Vehicular circulation:-** For conveying equipment, personnel and patients should involve crossing of the paths of as few people as possible because passers-by are a source of possible cross infection in the hospital. Separate entrances could be provided so that traffic separation would be achieved starting from without to within the hospital. Outpatients and inpatient traffic should be separated as well as service traffic from the rest.

(ii) **Pedestrian circulation:-** This should be carefully evaluated in terms of adopted criteria (i.e. distances, directness, degrees of separation, etc). Pedestrian traffic is patronised by almost everybody in the hospital – inpatient, outpatient, physicians, visitors, paramedics, etc. Pedestrian traffic is important in evaluating the route efficiency.

3.5 EXISTING BUILDINGS SITUATIONS

Some conditions are always given as reasons for replacing an existing facility with new ones. These conditions include fire and safety limitations, structural conditions, obsolescence etc. Yet rarely are these conditions so extreme as to present a clear-cut

issue. A balancing of the residual value of the existing against the advantages and cost implications of the new buildings must therefore be achieved.

Consequently, detailed studies of the existing facilities should show their adaptability to future uses. There are two alternatives for existing space; either to continue in its present use or to convert it to other uses. The most economical plan changes the use of existing spaces to other less demanding functions, as, e.g. from central sterile supply to storage or from emergency use to offices. Thus the more expensive departments are modernised by moving them to new quarters, while the departments with less exacting requirements are housed in modernised quarters calling for a minimum change.

Where a department is to be shifted, the new space is built first, then the department is moved into it, then the space thus vacated is remodelled for its new use, and so on. But in a case where no shift is involved, the department must either be moved to temporary quarters while modernisation of its entire space is undertaken, or else the modernisation is done a few spaces (rooms) at a time at much greater cost in time and inconvenience. Advantages and disadvantages of salvage versus replacement of existing building must be objectively evaluated and with due caution too. Thus, the whole process finally involves at least four separate but related steps.

(i) Determine the adequacy of existing space in all departments for serving the present number of hospital beds and appraise the physical condition of existing building for continued use.

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(ii) Calculate additional space required making up present deficiencies. Thus related and replace space in old buildings which the appraisal indicates should no longer be kept in use.

(iii) Calculate additional space needed in all departments to cater for the proposed additional hospital beds.

(iv) Calculate the additional space for some supporting departments, which may be justified, e.g. stores, kitchen, laundry, etc.

Safety and comfort of the patient is of paramount importance in hospitals and must be duly considered by the hospital planner. Functional relationship of individual units and circulation pattern should be assembled in such a way as to promote effective nursing care and reduce the spread of infection.

CHAPTER FOUR

4.0 CASE STUDIES

4.1 PANKSHIN GENERAL HOSPITAL

This hospital was chosen for case study because of its location being near and similar to that of Vom Hospital. Also considered are the similarity in climatic factors and cultural background of the people of both environments.

Pankshin General Hospital was conceived during General Yakubu Gowon (rtd) regime in 1971.

4.1.1 Location

The hospital is located at the outskirts of the Pankshin Local Government headquarters, about 3 km away due to lack of appropriate site and also in close proximity to secondary schools and the Advanced Teachers College, Pankshin.

4.1.2 Approach

The hospital is approached through a sub-arterial road which leads to it and divides into two. The first leads to the hospital complex and the other to the staff quarters, maternity unit, services area and the mortuary. The road leading to the complex leads directly to the car park, which is used by both the public and hospital staff.

4.1.3 The Nursing Units (Wards)

All inpatients are accommodated in the nursing units. The wards are modular in form which can easily be repeated when the need arises. The maternity ward is located

far away from other wards to the extreme northwest end of the hospital complex with access road leading to the mortuary and service departments for vehicular access. There is no specified isolation ward for infectious diseases.

Despite its functional lineage with the wards, the surgical suite is located far away from them.

4.1.4 Adjunct Diagnostic and Therapeutic Facilities

The OPD is closest to the entrance gate as one approaches the hospital complex. Outpatients are diagnosed and treated at the OPD while those with serious ailments are admitted into the nursing units (wards).

The OPD consists of the following functions:

(i) The reception section where patients are received and card issued for consultation.

(ii) The casualty section, where emergency treatment service rendered.

(iii) The centre at which continuation treatment is provided for patients who have been discharged from the hospital.

(iv) The consultative centre for specialist investigation and treatment which cannot be efficiently given at home but does not necessitate hospital admission, and to which patients from the local government council may be referred.

Within the OPD is the pharmacy at the northwest end where medications are collected by the ambulant patients and by the staff for use of the patient care or nursing units (wards). The pharmacy location within the OPD ensures short distance travels by the patients and restricts patient travel within the periphery of the hospital.

The laboratories and radiology departments are located around the OPD for additional diagnosis. An operating room within the OPD allows for minor operations. All these facilities constitute what is known as adjunct diagnostic and therapeutic facilities.

4.1.5 Service Departments

The service departments consist of the kitchen, the laundry and the central stores. These are grouped on one side adjacent to but a little far away from the wards. Their location adjacent to the wards is very important, since they give direct services to them. Travel distance is therefore shortened and consequently labour is saved.

Central store is a bit far from the pharmacy it serves but close enough to kitchen and laundry which gives it better vehicular access.

4.1.6 Administration Department

This is located adjacent to OPD and opposite the emergency unit and is easily accessible. It is also kept to the periphery, as it does not render direct service to the patients.

4.1.7 Circulation

The two types of circulation, i.e. vehicular and pedestrian have been properly separated to avoid traffic conflict. The internal circulation (pedestrian) is by covered walkways, which lead to each of the departments.



OPHTALMIC SHOP

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The hospital complex is planned as a pavilion type, which elongates as it grows. The circulation pattern follows the nature of this planning.

4.1.8 Expansion

The site is big and allows for future expansion especially the nursing units (wards). However, expansion can be bi-directional (as far as wards are concerned) since the site is bounded on all sides by a fence.

In summary, the hospital planning as a whole can be said to be quite workable and well articulated. The departments are grouped according to and consisting of related facilities.

4.2 MURTALA MOHAMMED HOSPITAL, KANO

4.2.1 Historical Background

The hospital was originally designed in 1925 for a bed capacity of between 80-190 beds. The hospital was moved from its Fagge temporary site to its present location in 1929 and services were immediately rendered to the populace.

4.2.2 Location

The hospital is situated in Fagge, Fagge Local Government Area of Kano State. It is located in a busy commercial area of Fagge and bounded by school on one side and residential buildings on the other sides.

4.2.3 Approach

The hospital is approached through a major access road, which leads directly to the parking area around the administration building and the male OPD. On the far left is the ENT clinic and on the right is the female OPD.

4.2.4 Design Concept

The concept of the hospital was that of pavilion plan that can be stretched and still satisfy the acceptable functional and environmental criteria. The hospital's spontaneous expansion does not follow any planning principles or rational relationship within the units so developed. The entire buildings were scattered around the site layout.

4.2.5 The Nursing Units

The nursing units or wards are arranged haphazardly behind the administrative block with no proper planning considerations, although each ward is located as neat as possible to the adjunct diagnostic and therapeutic facility serving it. The wards are separated into male and female and accessible both by pedestrian and vehicular circulation. The maternity ward located far away from the rest and the infectious diseases wards is even further and demarcated.

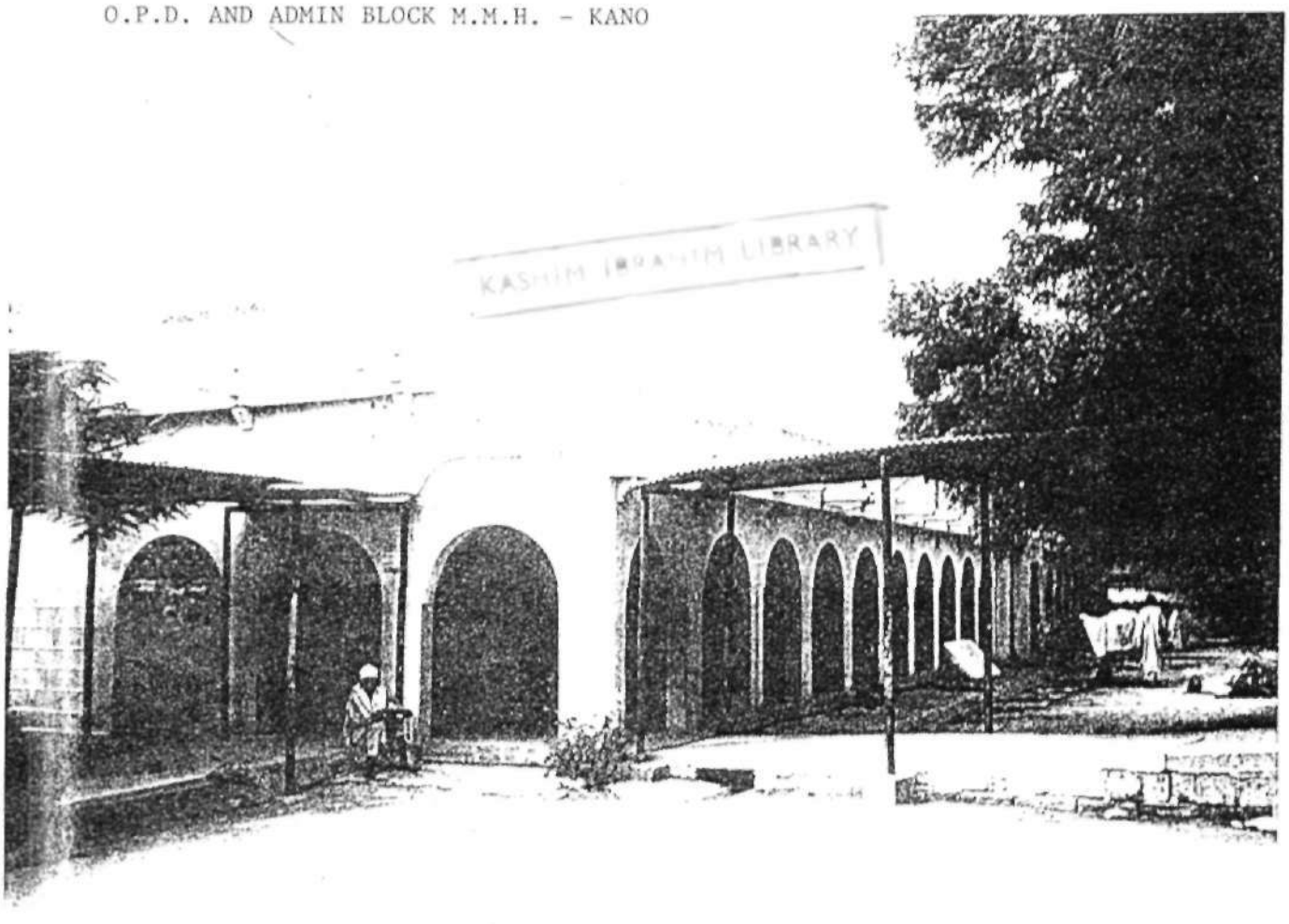
4.2.6 Other Facilities

These include facilities like the adjunct diagnostic and therapeutic facilities which consist of the pathology, oncology, radiology departments, pharmacy, OPD, etc. and service facilities consisting of the kitchen, laundry, dining section, central storage etc.

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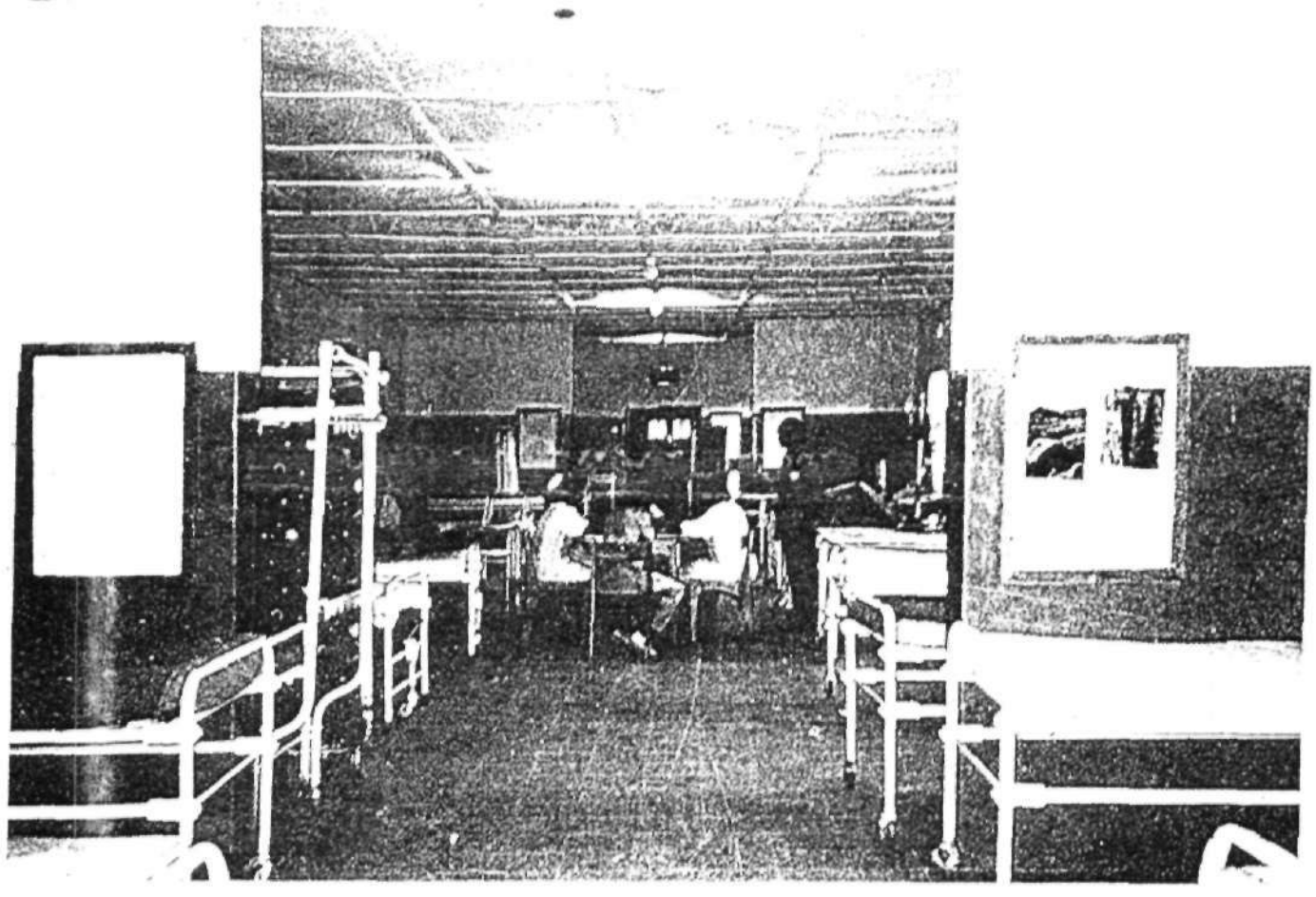
O.P.D. AND ADMIN BLOCK M.M.H. - KANO


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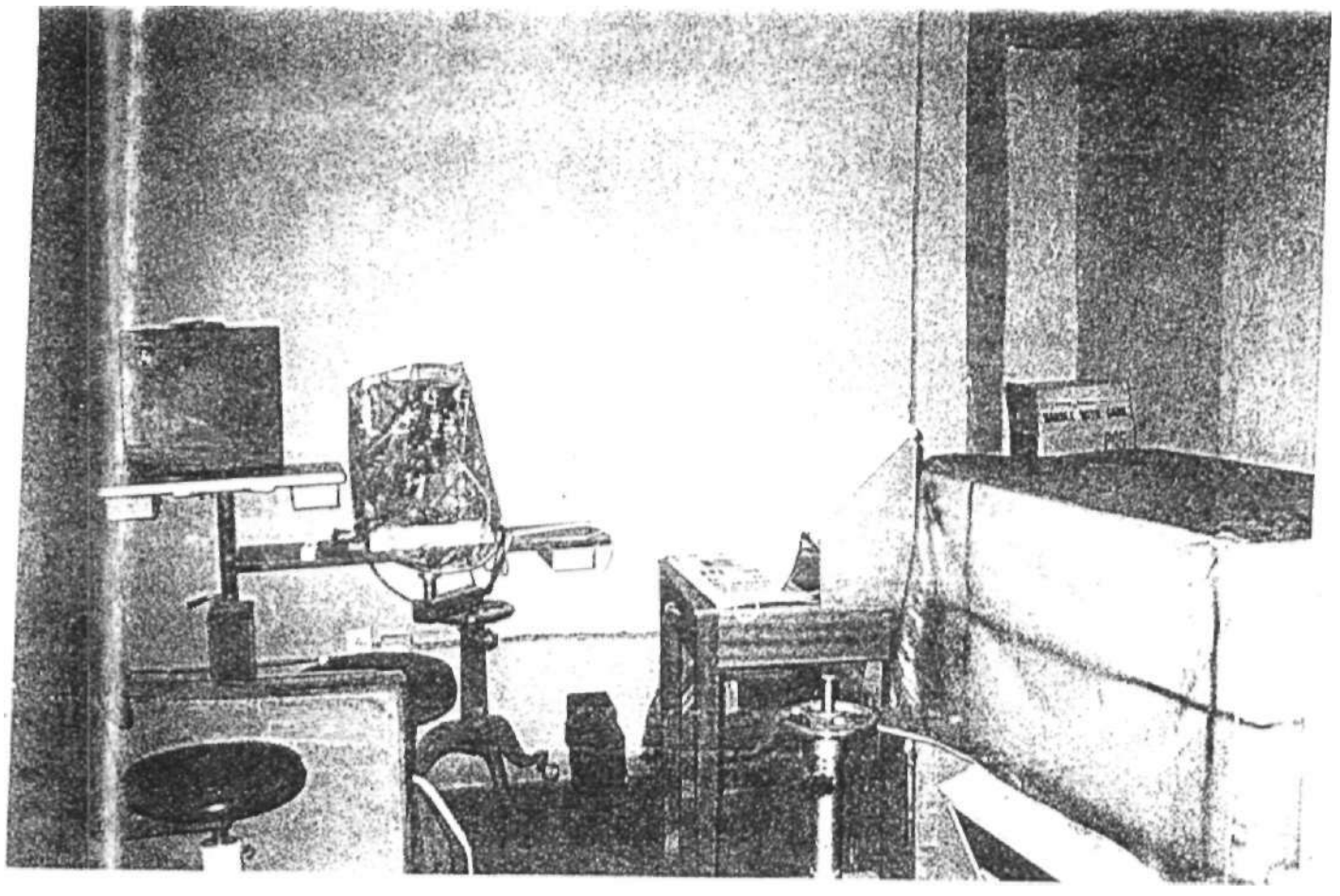
MEDICAL WARDS M.M. HOSPITAL KANO



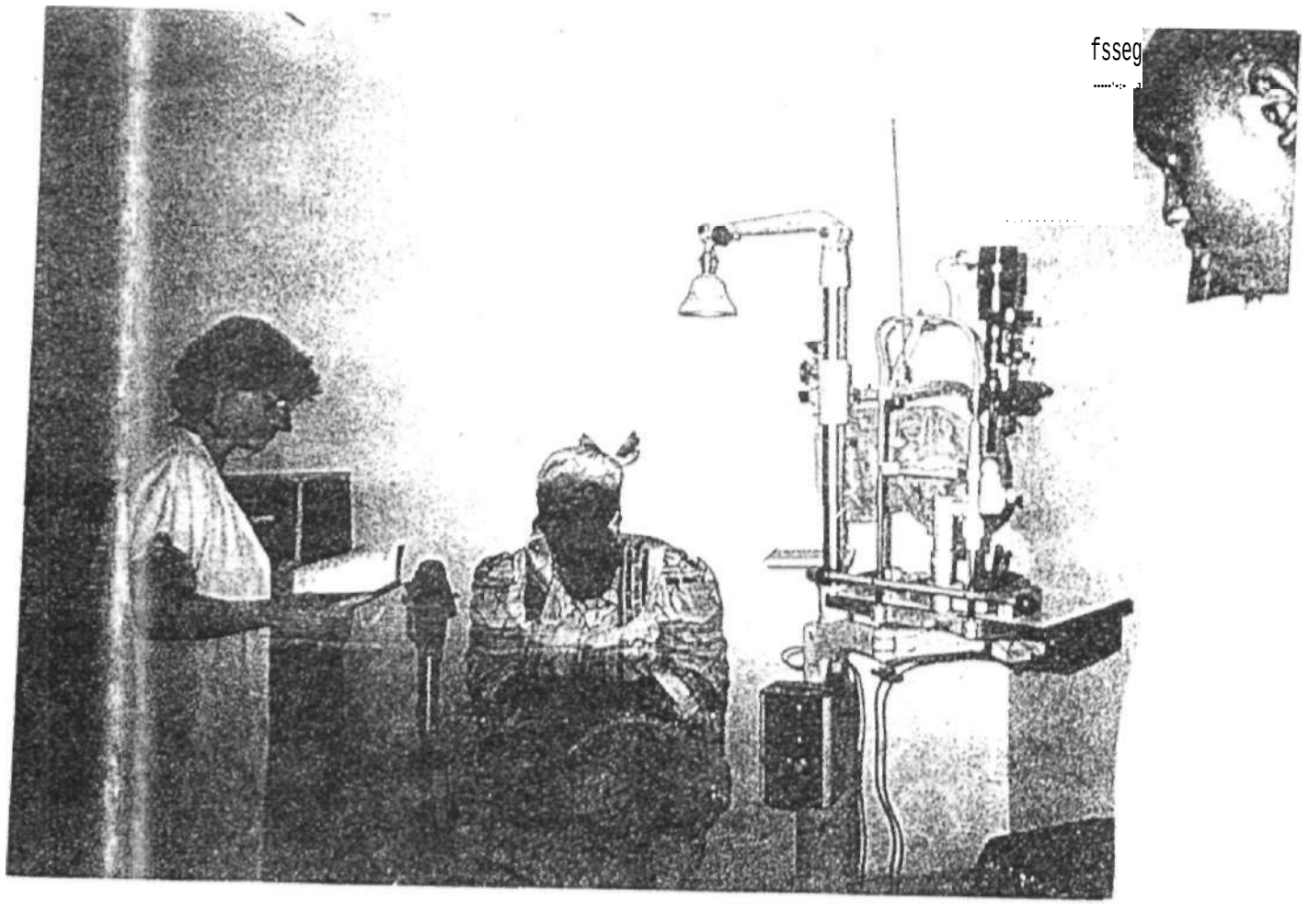
MALE MEDICAL WARD



NURSES STATION



OPHTHALMIC LABOTORY



EYE CLINIC

These facilities are scattered around the hospital complex with no particular regards to hospital planning principles.

Summarily, the inadequacy of applying the basic principles of hospital planning has created unnecessary confusion in the general layout of the hospital. This is due to the fact that the various units are scattered around the site haphazardly and therefore there is no consideration for functional relationship between the individual units of the hospital. Travel distances are long thereby increasing labour and reducing staff efficiency.

Lack of centralisation of the adjunct diagnostic and therapeutic facilities has also created unnecessary labour as patients and staff have to move from one end of hospital to another to co-ordinate their services.

The location of the hospital in such a busy area has its merits and demerits; the merit being that it is close to people and the demerit is that noise and confusion happening outside could be brought in. Safety is minimal especially in times of crisis.

4.3 FSP NATIONAL HOSPITAL FOR WOMEN AND CHILDREN, ABUJA

4.3.1 Introduction

This hospital was chosen for research study to show a comparative study of the contemporary hospital architecture and planning principles. This is because it is the latest state of the art hospital in the country and one of the best in Africa in terms of planning, structural composition and equipment. It was designed by Habitat Associates, Kaduna and built and equipped by Julius Berger and Philips respectively. It was conceived by the

former first lady Mrs Maryam Abacha to cater for the health care needs of women and children only. It was commissioned early this year and started scanty operations.

4.3.2 Location

The FSP National Hospital for Women and Children is situated in the Garki area of the Federal Capital Territory, Abuja.

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4.3.3 Design Concept and Planning

The design concept is what the architects called the "spine" design in which the adjunct diagnostic and therapeutic facilities are arranged in a row or spine at the centre with multi-clinics/labs emergency and administration on the one side of the spine and the ward clusters on the other side. The multi-clinics/labs block and the emergency block are a polygonal one-storey building with a central courtyard each. In between these is the rectangular one storey central administrative block.

All the adjunct diagnostic and therapeutic facilities including the theatre suite are rectangular and arranged along the spine known also as the "Hospital Street" while the ward clusters are star shaped. The service facilities, which consist of the kitchen, laundry, dining, central stores and maintenance departments and the maternity are arranged together west side of the layout.

4.3.4 The Nursing Units (Wards)

The ward clusters are the furthermost from the approach so as to reduce noise and traffic influx. There are two one-storey ward clusters; one for women and one for

children. The nurses station is centralised in the general ward, which is at the middle while private wards are arranged along the tips of star cluster. A covered walkway links the wards to the adjunct diagnostic facilities both on ground and first floors. A ramp links the diagnostic facilities to first floors of the both wards for patients who are unable to climb staircases. The private wards consist of one or two-bedroom. All wards are properly lighted and well ventilated (air-conditioned).

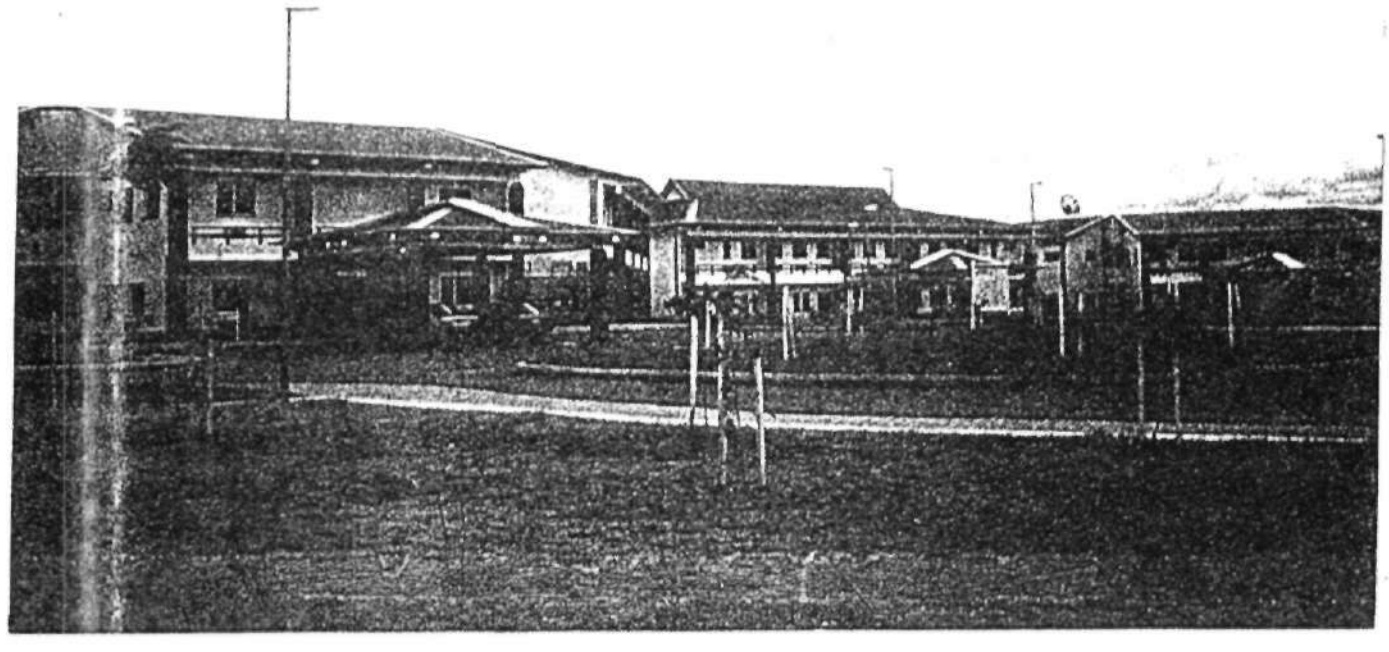
4.3.5 OPD/Admin

The OPD consists of the multi-clinics/labs and emergency blocks. These are identical one-storey polygonal shape situated on both sides of the rectangular admin block. They consist of consulting rooms, treatment rooms, laboratories (e.g. pathology), pharmacy and offices on the multi-clinics block and the emergency block consist of also the offices, pharmacy, labs, two small operating theatres, and treatment rooms. It has a double banking system with corridor at the middle and functional spaces on either side. Use of glass enhances proper lighting and ventilation. Circulation is not restricted.

The administrative block consists mainly of offices and conference rooms with the reception desk and security post at the entrance. A covered walkway connects the multi-clinics/labs, administrative building and emergency unit together and to the diagnostic facilities and ward clusters behind.

4.3.6 Adjunct Diagnostic and Therapeutic Facilities

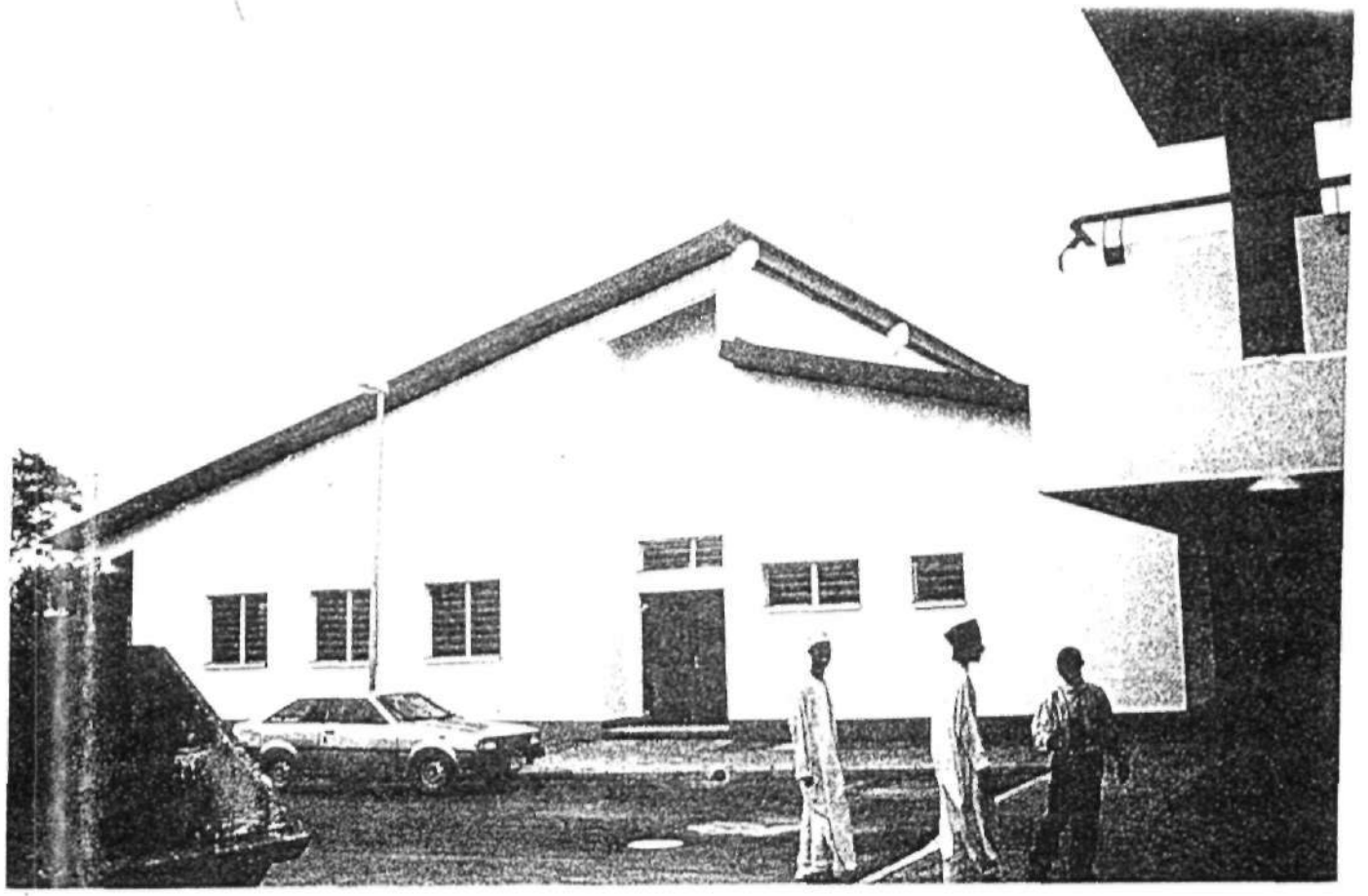
These are arranged in a row along the spine called hospital street. It consists of the theatre, oncology dept, pathology, dialysis, radiology, physiotherapy etc. They form



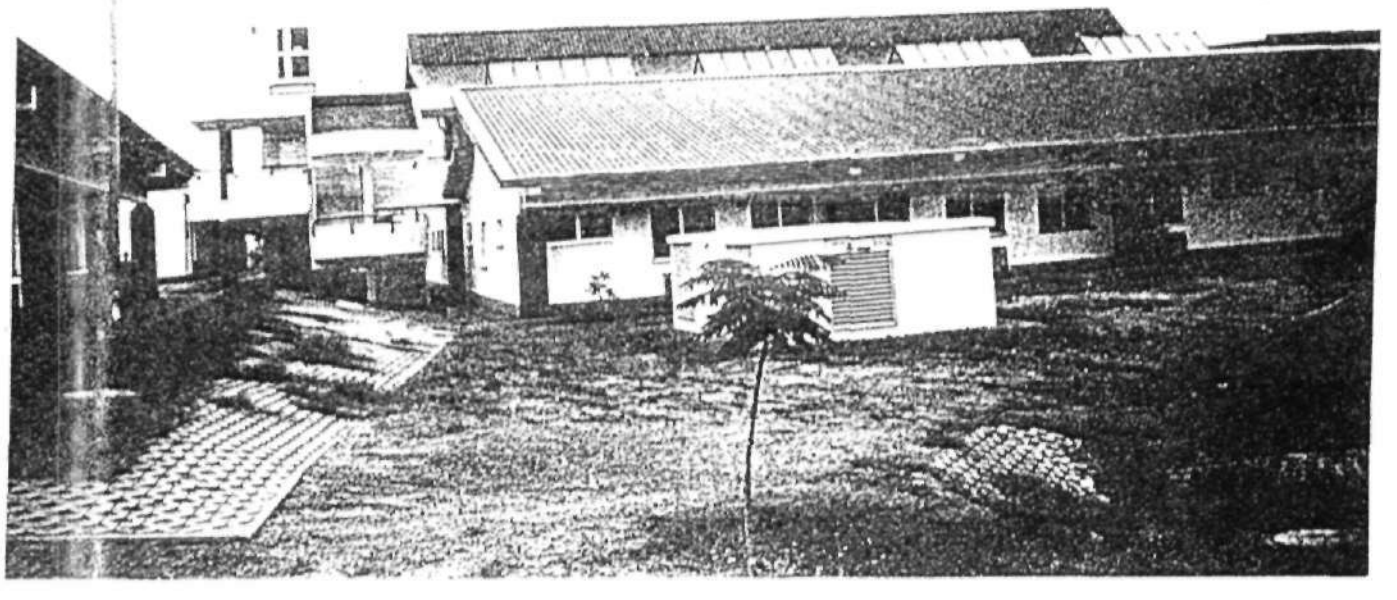
VIEW OF F.S.P. HOSPITAL ABUJA



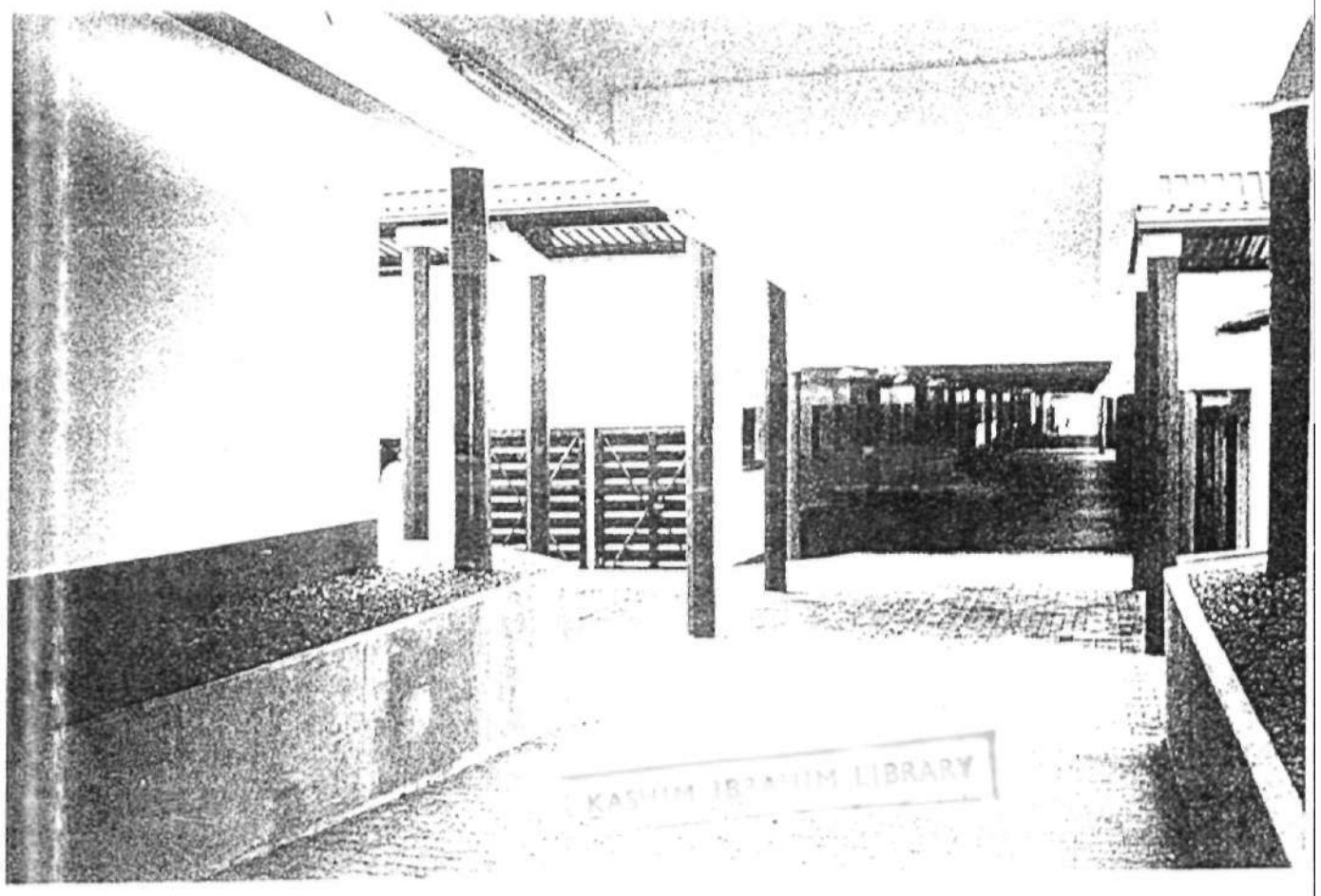
ADMINISTRATIVE BLOCK F.S.P. ABUJA



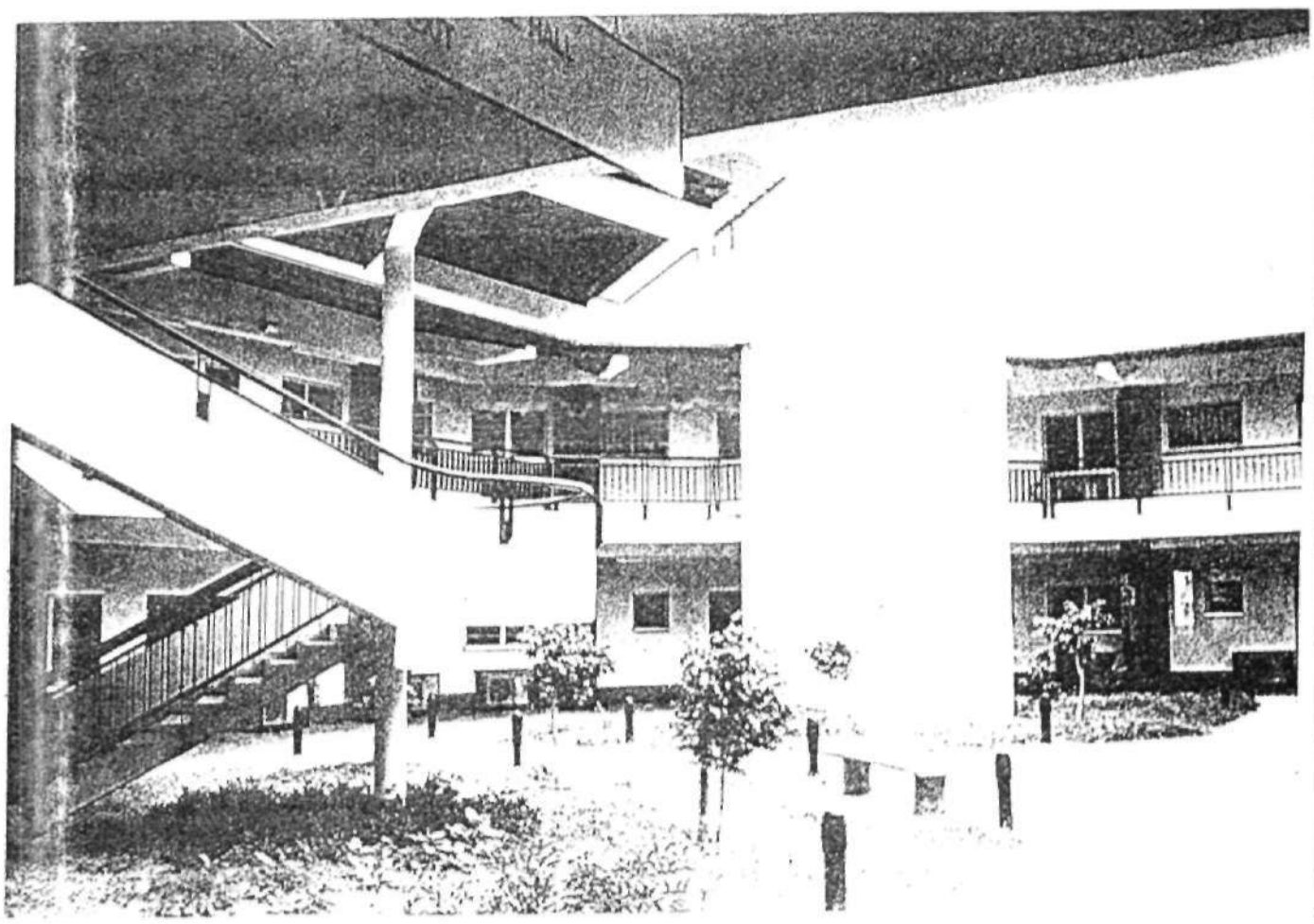
AUXILLARY FACILITIES(KITCHEN & LUNDARY) (F.S.P.)



REAR ELEVATION OF PATHOLOGY LAB. (F.S.P. HOSPITAL)



WALK WAY WITH ADJUNCT DIAGNOSTIC LABS. (F.S.P. HOSPITAL)



INTERNAL COURTYARD MARYAM BABAGIDA BLOCK (F.S.P. HOSPITAL)

the natural link in the functional flow between the OPD/admin section and the nursing units (wards).

4.3.7 Services Department

These are located on left side immediately on entering the complex and have a separate entrance for circulation co-ordination. It consists of store, kitchen, laundry, power-house, dining, etc.

4.3.8 Circulation

The two types of circulation have been distinctly separated so as to reduce confusion by interference of either pedestrian or vehicular circulation or vice versa. The vehicular circulation is kept at the periphery and adequate parking spaces have been provided for visitors/patients and hospital staff. The main parking lot is directly in front of the admin building while others are provided just before the entrance gate and another in front of the service department and the mortuary.

The main pedestrian circulation is by the hospital street from which branch other streets linking the various units (departments) of the hospital together. There is direct route from the units in front (multi-clinics, admin and emergency) to the ward clusters at the back via the hospital street. These streets make for an easy accessibility to various units by the patients/visitors. Within the buildings, circulation is mostly by close corridors on either sides of which are the functional units. Staircase are easily accessible and a ramp has been provided to link the ground floor section of the hospital street to the first floor of another open corridor linking the two ward clusters.

4.3.9 Landscape

There is a clear attempt at creating an elaborate landscaping within the hospital environment. The two types of landscape elements have been properly utilised here: hard and soft landscape. The hard landscape elements have mostly been used in the approach side of the building. These include the walkways, kerbs, etc. The use of courtyard system in the complex has provided good spaces for soft landscaping. Well-trimmed and maintained lawns can be seen all around both within and without the courtyards. Trees are scanty within the complex itself, but the lawns and hedges have adequately taken care of that. These landscape elements give a feeling of confidence to the patients coming into the hospital for treatment.

4.3.10 Design Appraisal

(i) There is adequate relationship between the different functional units of the hospital.

(ii) Appreciable aesthetic quality due to distinct configuration of building and use of aesthetic elements.

(iii) There is proper and efficient internal or pedestrian circulation.

(iv) Vehicular movement is restricted to periphery to enhance patient unrestricted movement.

(v) Adequate consideration for zoning; services zone away from hospital facilities.

(vi) Adequate provision for parking spaces.

(vii) Adequate provision for future expansion.

4.4 YORKSHIRE DISTRICT HOSPITAL, UK

4.4.1 Background Information

The hospital's contract was tendered in July 1971 and works began on site in October same year. It was planned to initially accommodate 800 beds and eventually over 1000 beds are accommodated. The accommodation includes accident and emergency, outpatients, x-ray, pathology; rehabilitation, pharmacy and education departments. New facilities include operating theatres, isolation wards, kitchen, dining, non-resident staff changing facilities, boiler house, workshops and chapel.

4.4.2 Site Planning

The site was a sports ground (8.3 hectares) accessible only from its eastern boundary, lying within working distance of York Ministry and some industrial developments. Four hundred car spaces are distributed around the building and landscaped into their surroundings for the site covers approximately 50%. Access from Wiggington Road is simple and direct, comprising a single entrance and exit for all staff, patients and visitors to the hospital and a separate entrance/exit for goods traffic to the service area.

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4.4.3 Design Concept

The design of the Yorkshire District Hospital is based on the concept that the simplest diagram for an extendible building is one where the primary communication route or "spine" as they are called is a straight line from which secondary communication links to departments and branch out at right angle. These communication links or

corridors are open-ended so that the departments may extend differentially. The resulting spine and pavilion plan is characteristic of the concept of "indeterminacy" consistently advocated by its designers and many of its underlying objectives anticipated the design strategies adopted for "Harness" and later for the "Nucleus" hospital concept although these were developed in a different and more formalised context.

4.4.4 Hospital Facilities

This four-storey ward block contains approximately 800-beds with 240 beds on each of the upper floors made possible by combining end-to-end two entirely self-contained groups of 120 beds. Each of these 120 beds groups has a central core of lifts and contains from linked 30-bed ward units with the single rooms grouped in the cross links to give some nursing flexibility The hospital wards are generally compartmentalised to give a degree of privacy and control.

The operating department is a two-storey building with barrier changing facilities at ground level and ten major operating suites above with a direct link to the surgical wards. The Theatre Sterile Supply Unit (TSSU) is also at the upper level to supply the theatres as well as the remainder of the hospital. Below the theatres is the intensive care unit, non-resident staff changing and a 14-bed short stay ward.

The accident and emergency department is a single storey structure with links to the operating department for major surgical works, to intensive care unit and the short stay ward where patients can be kept under supervision for short periods without being admitted into the hospital. Radiology department is one-storey and accessible from OPD and from wards via the hospital street.

The OPD is a large two storey building containing general clinics at ground floor connected by a ground staircase from the reception area and a lift to special clinics and clinical investigation area at first floor, all of which are accessible to the wards. The outpatients' record section is directly accessible from the outpatients' reception area.

The admin block is the highest building which contain the admin instruction and training school for nurses. First floor is for reception and waiting while second to fourth floors from the admin offices and last two floors for nurse straining school.

The labs are in a four-storey building and consist of standard labs module designed to be fully serviced within their own space and wholly flexible and demountable. The pharmacy and dispensary are at ground floor level. The service department comprising the kitchen, dining and central stores are grouped together at the end of the hospital street from which supplies are distributed to all parts of the hospital complex by hand trolleys or a motorised train system.

Typical floor plans of the wards are shown in the next page.

4.4.5 Merits

(i) Efficiency is achieved as a result of high degree of articulation of the various departments (the hospital beings a low-rise complex).

(ii) Problems of internal circulation reduced to barest minimum as a result of vertical travel distance (which is done by lifts and staircases).

(iii) Time and labour are saved by automation.

(iv) Clear and logical layout.

(v) Simple and direct entrance

(vi) Volume per floor area is kept low.

(vii) An appealing architectural form is achieved which is pleasant to the eye and the demonstration of a technically and functional versatile solution to hospital design embodying a capability for change to degree beyond most and possessing a humane interior environment never far from an outside view.

4.4.6 Demerits

(i) The major problem of this vertical concept is expansion.

(ii) Lighting and ventilation are mostly done by artificial means.

(iii) No laundry service is provided for the complex.

(iv) Automation is expensive and creates joblessness.

(v) High degree of maintenance is required.

LIBRARY

4.4.7 Conclusion

Going by the analysis above and the advantages and disadvantages of this type of hospital (vertical design concept), this type of design concept can be said to be unsuitable for the Nigerian situation. Rather, the spine and pavilion type of not more than two storeys (low rise) and expanding horizontally will be most suitable, i.e. low rise spine and pavilion plan that can be stretched and still satisfy acceptable functional and environmental criteria.

4.5 KHYBER MEDICAL TEACHING HOSPITAL UNIVERSITY OF PESHANAR, PAKISTAN

4.5.1 Architect

Isadore and Zachary Rosenfield in collaboration with Noor Quayum and Co. Consulting Engineers and Architects.

4.5.2 Location

This hospital is located along the historic road coming into the Indian sub-continent, from the Khyber passing through Peshanar in West Pakistan. Pakistan is Third World (developing) country in Asia.

4.5.3 Description

The hospital is located in a place that has long been deficient in doctors, nurses and hospital facilities. It was built with an initial capacity of 500 beds. It is a radial (polygonal) structure with core planned to expand peripherally without altering relationship within the or between the diagnostic, therapeutic and nursing departments.

Locations for future development are indicated: hostel for self-care, a long-term hospital and rehabilitation centre with training facilities. Also included is a school of nursing, residential quarters, and a service area. A tunnel passes under the Khyber road thereby linking the hospital with the rest of the medical teaching facilities.

4.5.4 Appraisal

(i) Efficient internal circulation

(ii) Possibility of expansion

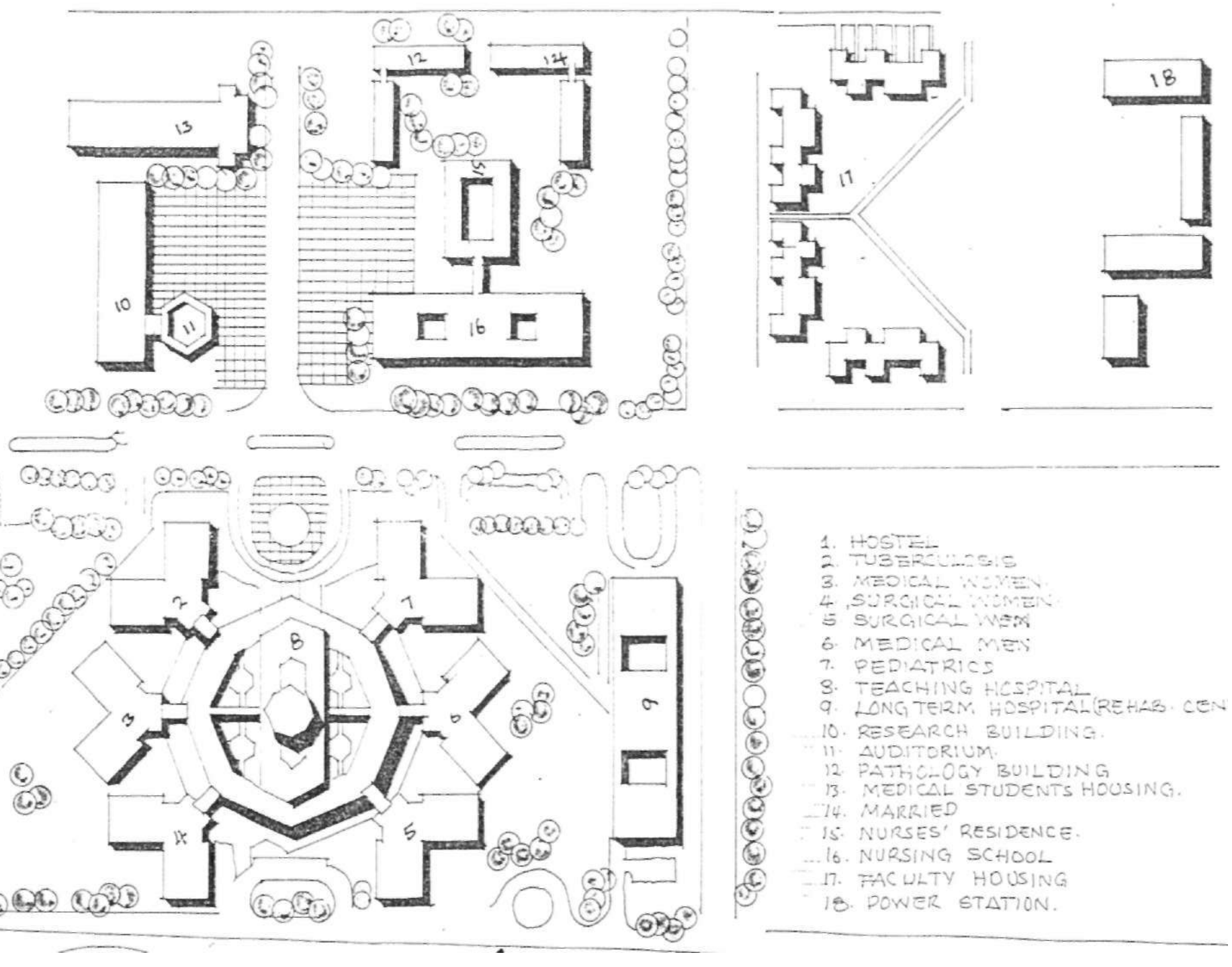
(iii) Appreciable aesthetic quality

(iv) Core planned to expand peripherally without affecting inter-departmental relationship

(v) Vehicular circulation restricted to periphery to enhance patients unrestricted movement.

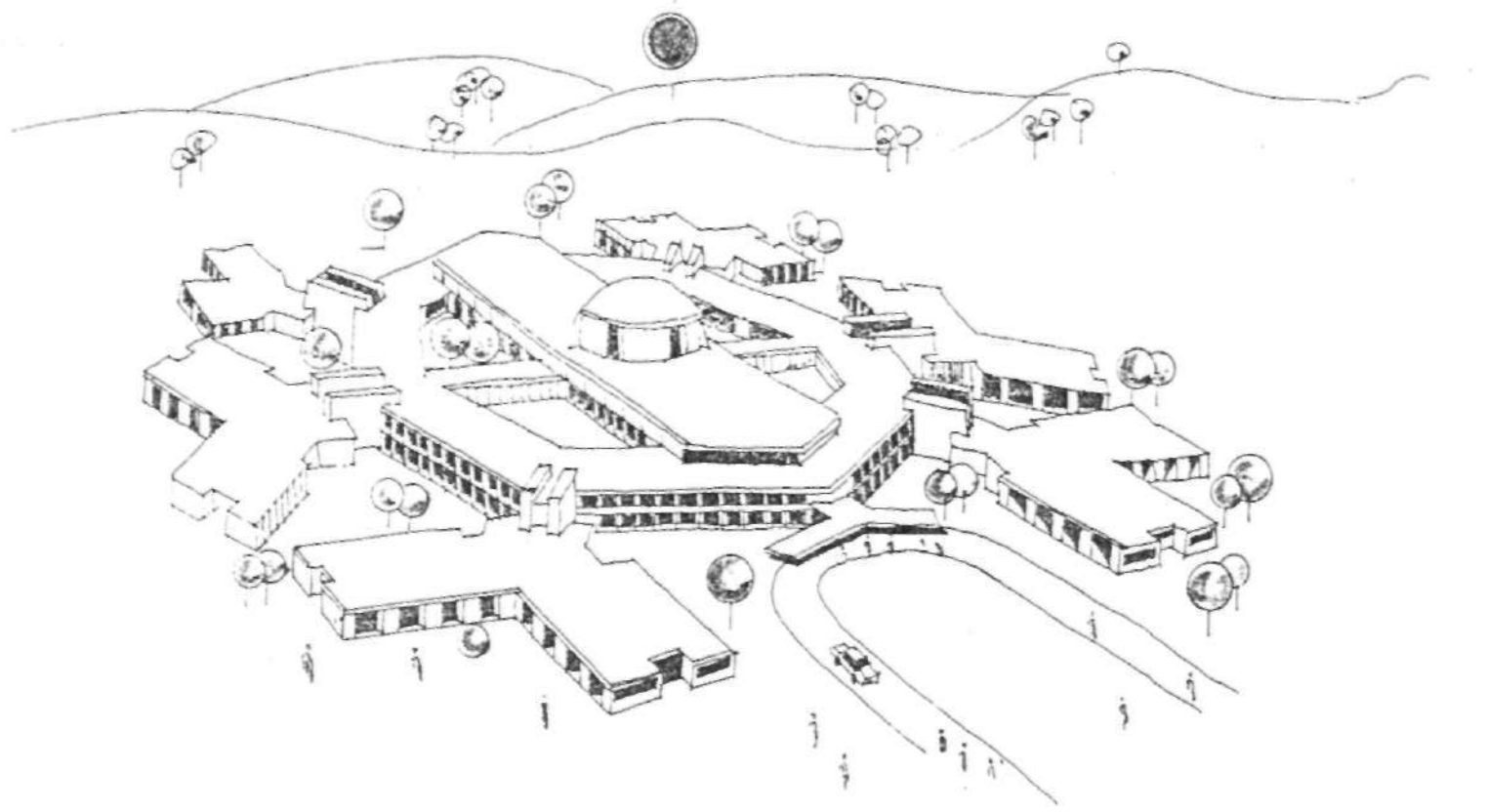
4.5.5 Maintenance

The basic infrastructural problem in this hospital is almost all due to poor maintenance. These include sewage blockage, plumbing works, peeling off of paints, blown off roofs, etc.



1. HOSTEL
2. TUBERCULOSIS
3. MEDICAL WOMEN.
4. SURGICAL WOMEN.
5. SURGICAL MEN
6. MEDICAL MEN
7. PEDIATRICS
8. TEACHING HOSPITAL
9. LONG TERM. HOSPITAL (REHAB. CEN
10. RESEARCH BUILDING.
11. AUDITORIUM.
12. PATHOLOGY BUILDING
13. MEDICAL STUDENTS HOUSING.
14. MARRIED
15. NURSES' RESIDENCE.
16. NURSING SCHOOL
17. FACULTY HOUSING
18. POWER STATION.

TEACHING HOSPITAL, UNIVERSI



PERSPECTIVE

CHAPTER FIVE

5.0 ANALYSIS OF EXISTING SITUATION

The provision of effective healthcare services is an important aspect of our socio-economic development. But the provision of health care is generally expensive. Hence services at Vom General Hospital even though is subsidised is not completely totally free of charge. The hospital was initially meant to cater for the health care needs of the people of Vom and its surrounding villages but lately, people from different parts of the country come for treatment.

Two British missionaries, Rev. Dr. and Mrs. P.W. Barnden, set up the hospital in the early part of this century. There was a gross misuse and disuse of spaces when the Federal Government took over the hospital in 1975. This has resulted in dilapidation of the hospital and its physical and functional obsolescence. This was done by haphazard re-assignment of functions to the various unit/departments of the hospital. Presently, many structures are either obsolete completely or grossly inadequate in meeting the desired services. The present bed distribution is shown below:

(i) Male medical ward - 23

(ii) Female medical ward - 28

(iii) Female surgical ward - 28

(iv) Male surgical ward - 28

(v) Children's ward (paediatrics) - 47

(vi) Maternity (female) - 35

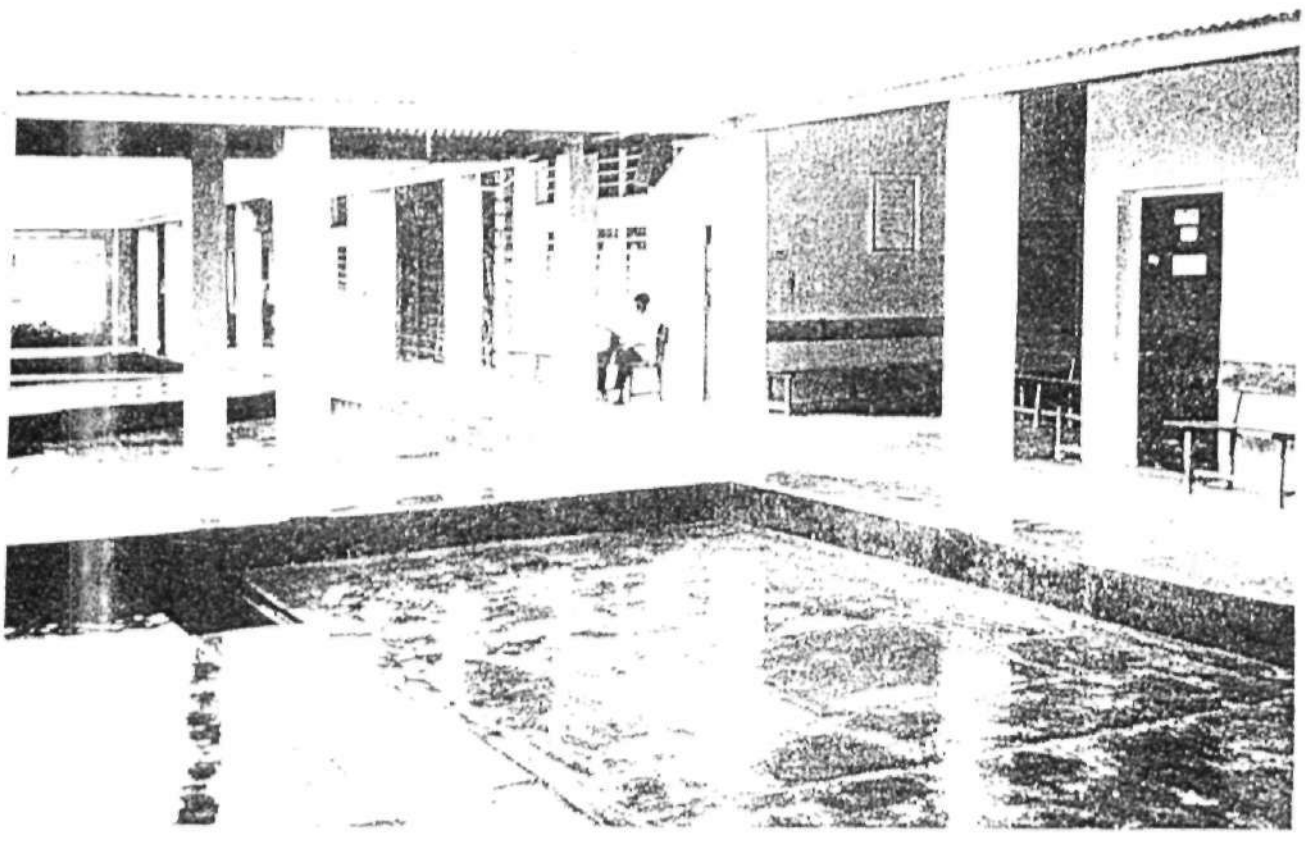
(vi) Amenity

The current admission rate is between 12 and 18 per day.

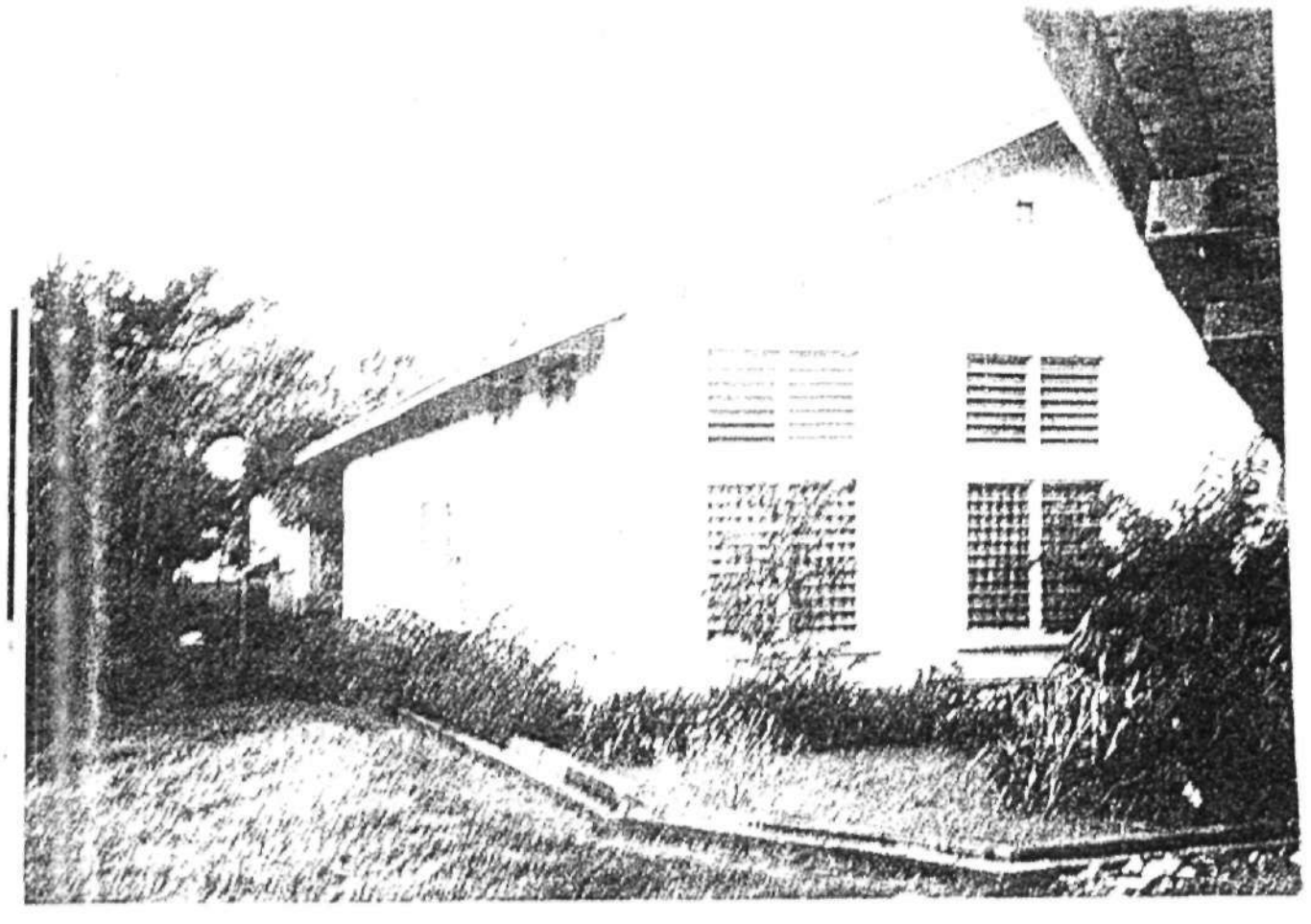
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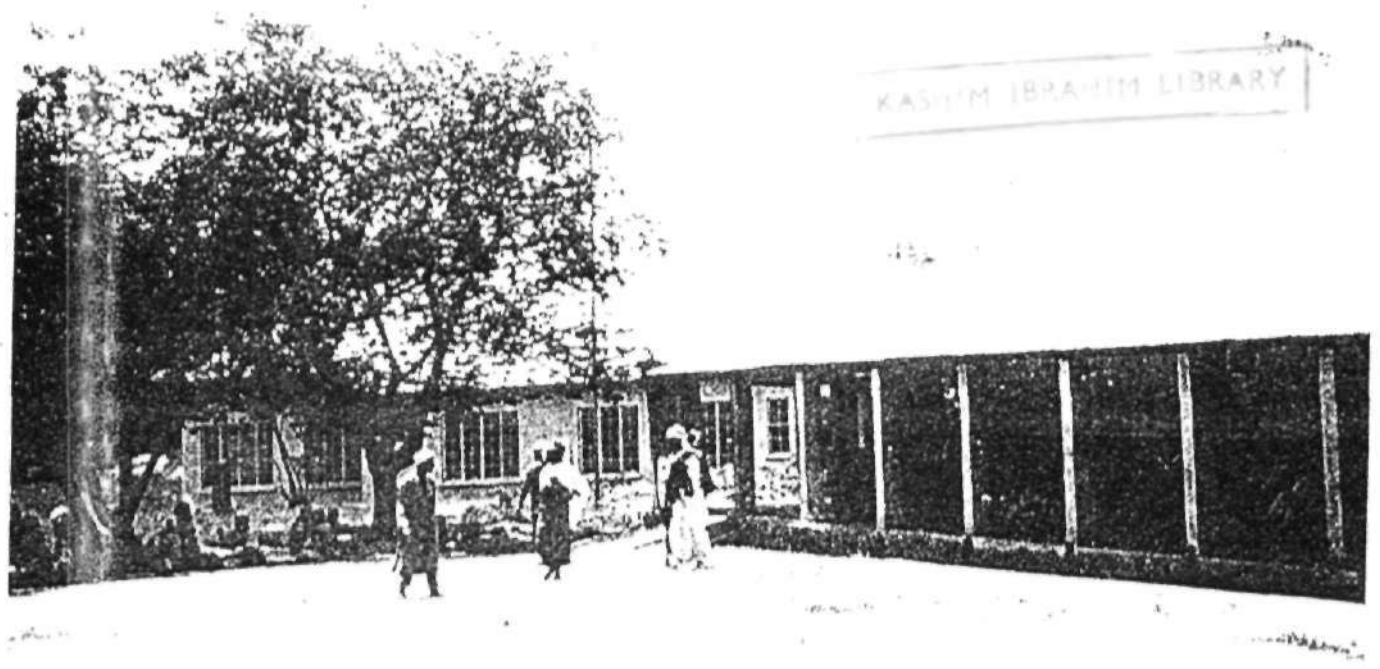
ADMIN BLOCK/O.P.D. (V.C.H.)



O.P.D. COURTYARD (V.C.H.)

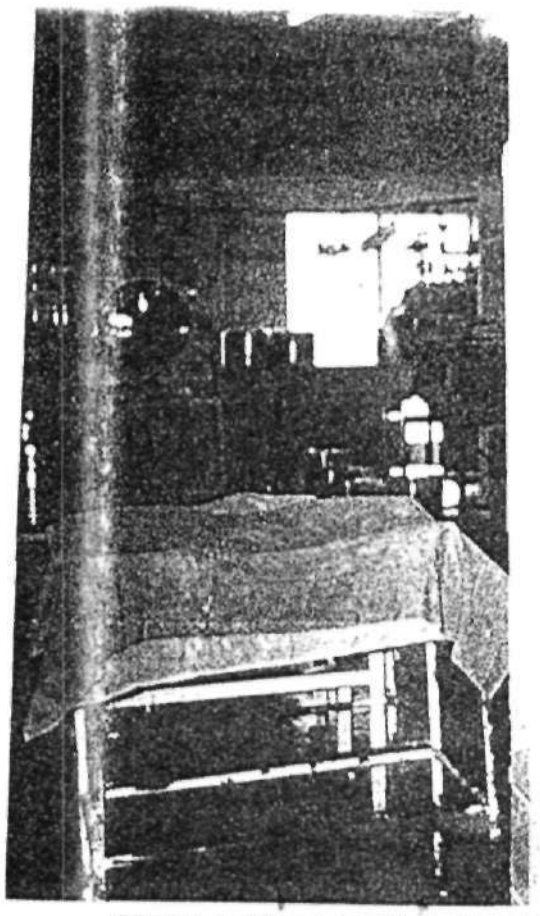


THEATER (EAST SIDE ELEVATION)

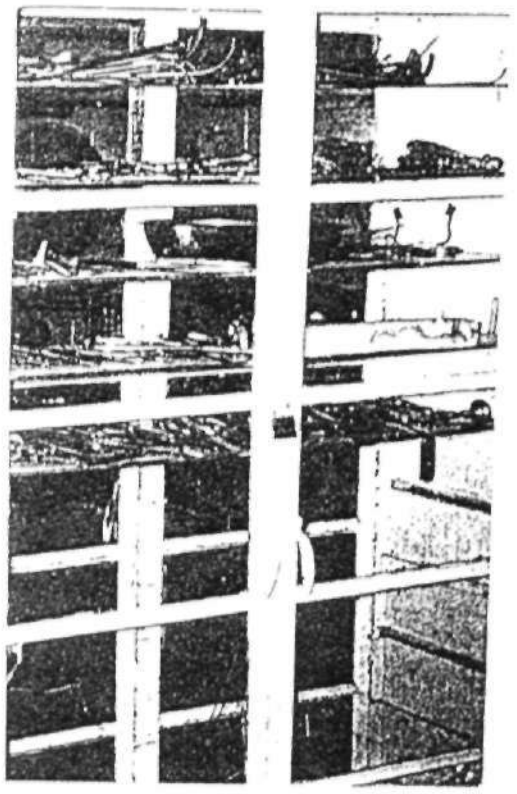


SURGICAL WARD V.C.H.

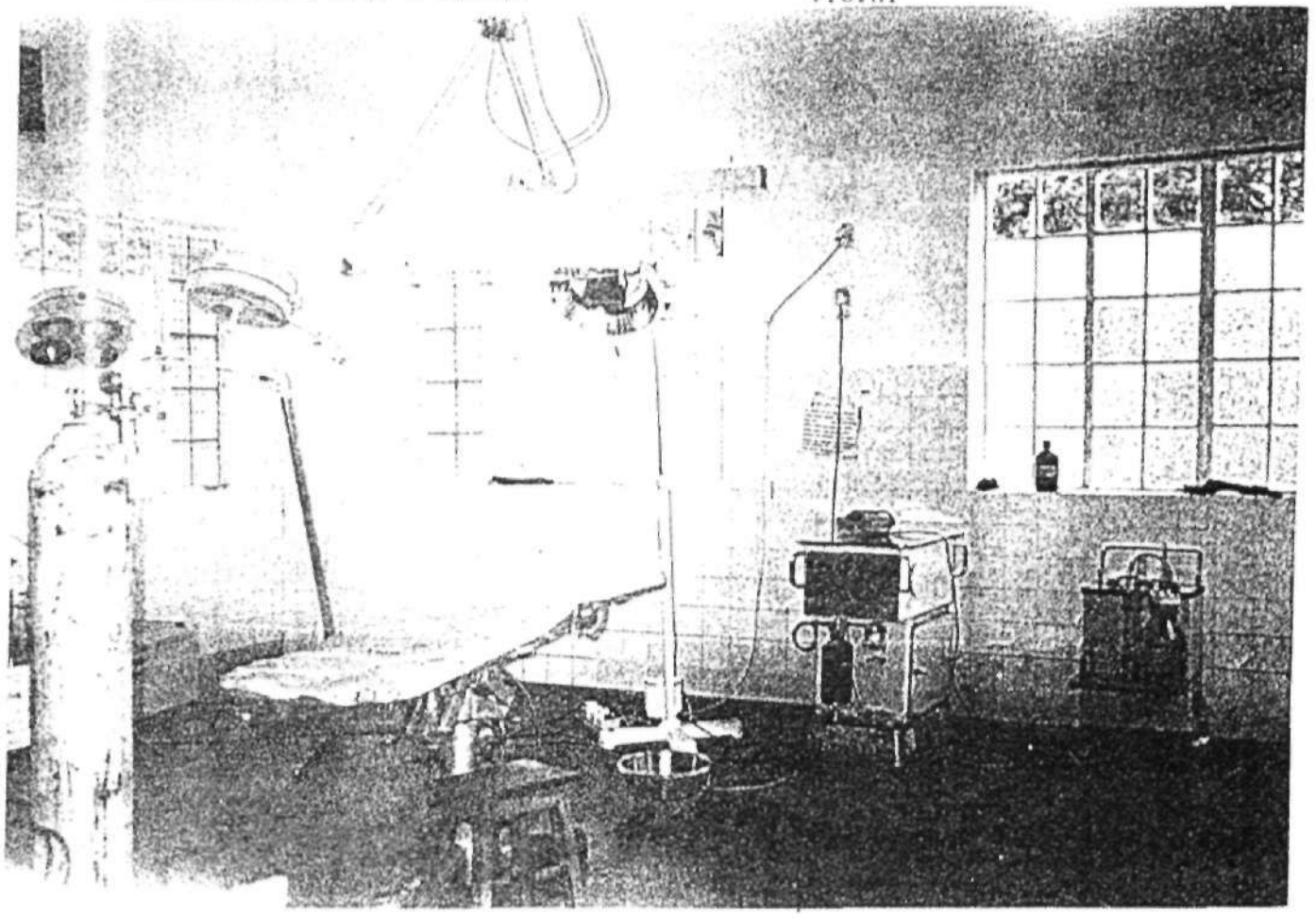
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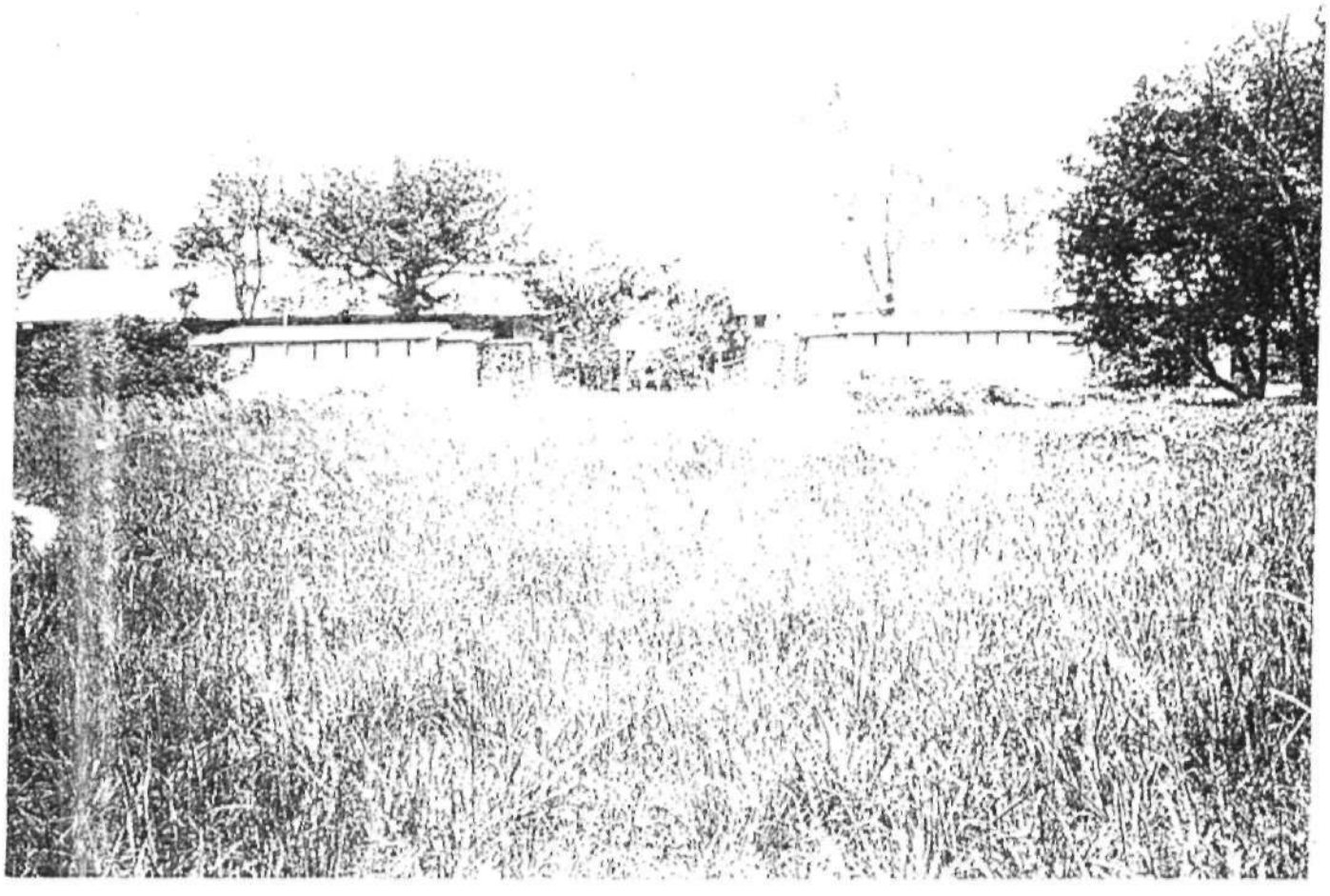
STERILIZATION UNIT & STORES



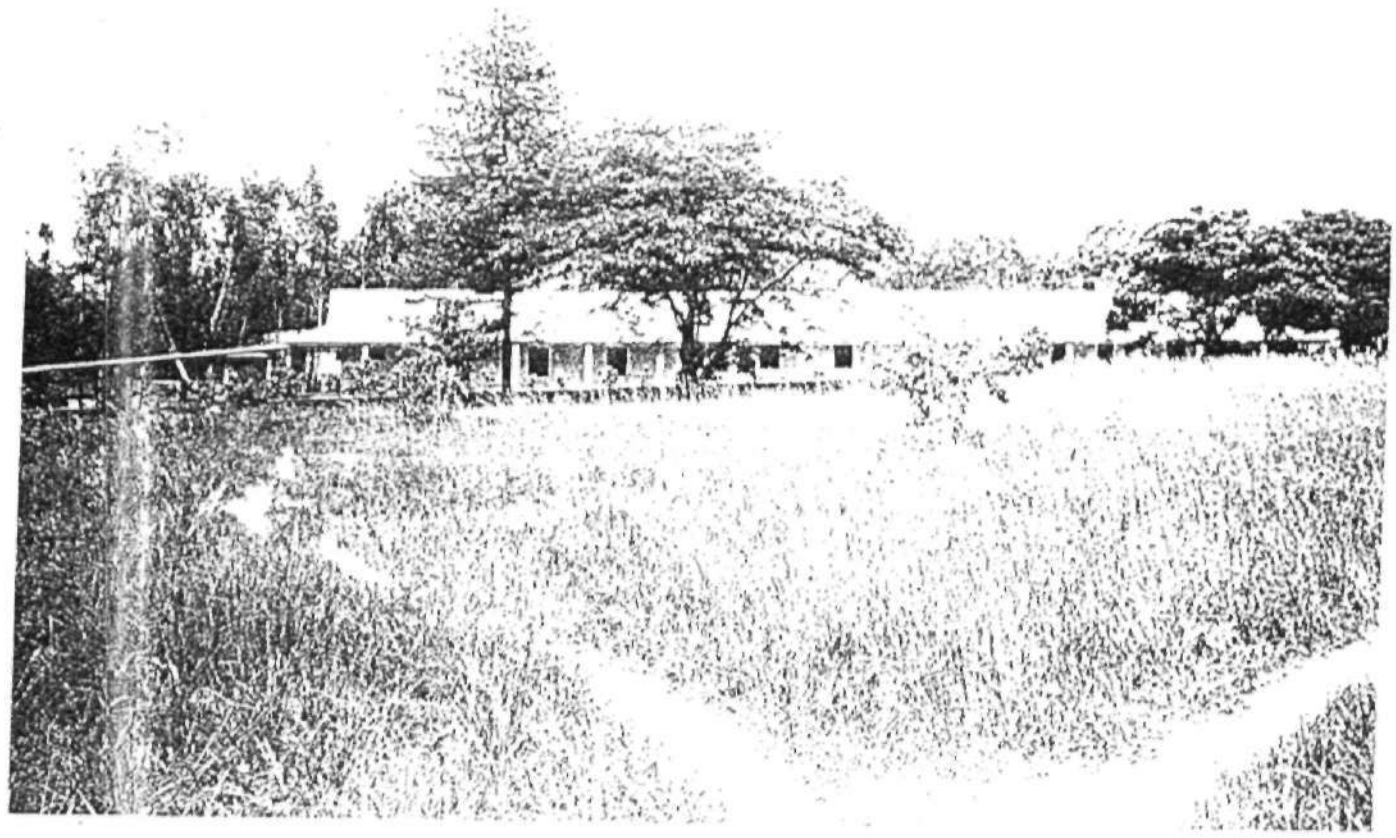
V.C.H.



OPERATION ROOM: (THEATER) V.C.H.



SITE SHOWING REAR VIEW OF O.P.D.



SITE SHOWING MALE MEDICAL WARD V.C.H.

5.1 SITE LAYOUT AND ACCESSIBILITY

The hospital site is located almost directly in front of the Vom main motor park and accessible directly from the main road that comes from Jos into the Vom town. The general hospital layout is based on a radial (or circular) concept. A circulation corridor in form of a ring road connects all the various individual units together. There is a very large central courtyard which could be used for future expansion.

There is the problem of some of the units especially wards which are far away from other functionally interconnectable units like the adjunct diagnostic units. The placement of the only functional operating theatre on one side, i.e. between male surgical and female surgical wards makes the travel distance from other units longer as there is no direct access to them. This is due to the radial nature of the corridor connecting all the units with no walkways/passages across the large central courtyard to link directly to other units. Visitors' vehicular circulation is terminated at the parking lot at the gate in front of the OPD while staff parking is right behind the OPD on the left. Pedestrian circulation is generally by the 2.4 m wide covered corridor.

5.2 ADJUNCT DIAGNOSTIC AND TREATMENT FACILITIES

These are generally located at the approach except for the operating theatre, which is placed between the male and female surgical wards. They include the pathology labs, radiology, OPD, pharmacy, surgical suite, etc.

5.2.1 The Surgical Suite

This is located between the male and female surgical wards on the hospital main corridor. It was initially proposed to contain two surgical operating suites with two theatres each but presently contains only one room each for both major and minor surgical cases respectively. It is indeed not enough for a hospital of this size.

The surgical suite has provisions for changing where those involved in the operation can change. There is also a large sterilisation room, which contains the storage facility. There is no provision for post-anaesthesia recovery room. Patients are therefore wheeled directly to the nursing wards after operation. There is also no provision for toilet facility and scrub room and slice room, etc.

5.2.2 Outpatients Department

The outpatient department has been appropriately placed at the entrance (gate) of the hospital complex. This has provided easy access to all new comers to the hospital, be they visitors, workers or most importantly outpatients. Due consideration has been given to both vehicular and pedestrian circulation. Consulting and examination rooms form the most important aspect of the outpatient department. The number of consulting rooms, which is just four is highly insufficient for a hospital of this size catering for a population of over 280,000 (1994 estimate).

Another important aspect of the OPD is the waiting spaces prior to consultation. This is suppose to form the bulk of the OPD but the waiting areas in VGH OPD is very small which has people littering around the corridors of the hospital OPD and this

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generally results in congestion of the corridors. This is because most of the consulting rooms open unto corridors.

The only available toilets in outpatients department are grossly inadequate and ill-maintained. There is a small eye centre (clinic) in the general outpatient department. The services rendered by this clinic is inadequate probably due to lack of well designed clinic for specialised services of the clinic.

There is also the problem of the OPD being slightly too close to the main gate of the hospital complex. This could lead to overcrowding of the little available space.

5.2.3 Clinical Laboratories (Pathology)

This department is one of the most important of the adjunct diagnostic facilities. This is because all the tests conducted in the hospital are carried out here whether it has to do with blood, urine or stool tests.

The pathology lab is relatively too small for the number of patients coming for test from both the outpatients department and the inpatient nursing units. There is no provision for toilet facilities; both staff and patients use OPD toilets. This hinders the effectiveness of the staff and has forced patients to bring urine or stool for investigation from home which is highly inconvenient. There is no provision for waiting, so patients are forced to hang around the corridor in front of labs. This has hindered circulation space. Lack of provision for ECG, EEG and BMR has rendered the department incomplete as these essential activities form the latest modern technological advancement in medical pathology.

5.2.4 Radiology Department

This consists of a very small room meant only for x-ray diagnosis of ailments. It also contains a small room changing with no toilet facility for either staff or patients. Obviously, it was an office or consulting room which was converted to x-ray room. There is no provision for therapeutic radiology, e.g. Fluoroscopy and radio-isotopy. This department is therefore considered inadequate both in terms of space appropriation and equipment as it does not meet modern standards of a modern radiology department. There is no scanning machine, MRJ, ultra-sound machines, etc. which are an important aspect of modern hospital radiology.

5.2.5 The Pharmacy

This forms an important aspect of the adjunct diagnostic unit. This is because the bulk of and most important form of treatment in the hospital is via **chemotherapy** (i.e. drug therapy) and pharmacy is the place where such drugs are dispensed. The pharmacy sometimes manufacture its own drugs. Drugs from the pharmacy are sold to patients at a prescribed rate. The bulk of the hospital income therefore comes from the pharmacy.

The pharmacy is located in the outpatient department at the far end of the right side of the OPD. It consists of the bulk storage, dispensary and preparation room. It is placed close to the cashiers so that one pays for the prescribed drugs at the cashier before collecting the drugs at the pharmacy. The bulk storage is very close to compounding (preparation) room and dispensary for efficiency. There is no provision for toilets and the waiting area is small for patients to queue up for drugs.

5.2.6 Central Sterilisation Supply Unit (CSSU)

There is no provision for central sterilisation supply unit in Vom General Hospital.

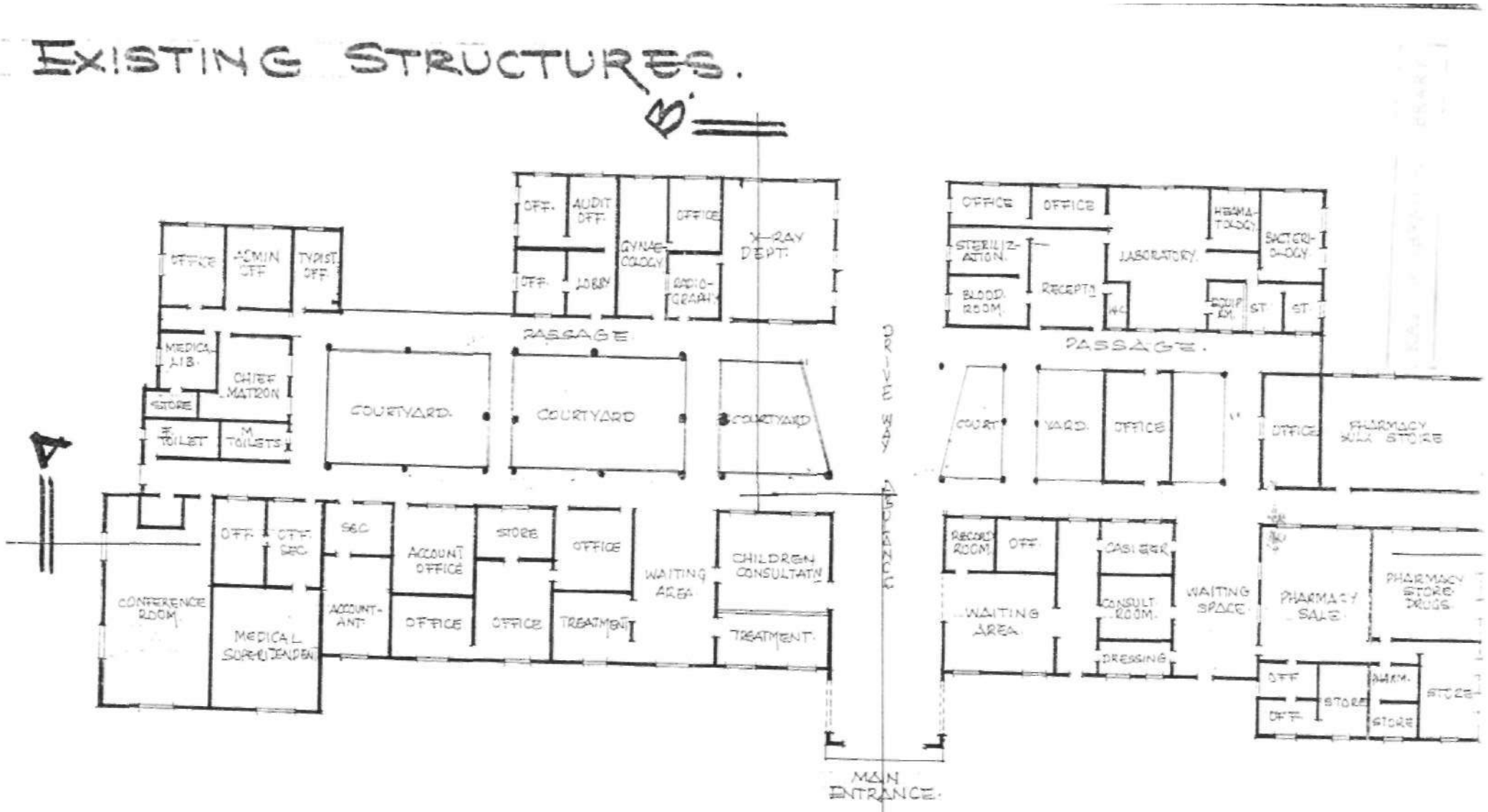
5.2.7 Administrative Block

This is located in the OPD and consists of a few offices for the general administration of the hospital complex. These include the general office, chaplain's office, medical director's office, secretaries, accounts offices, the chief matron's office, records office, etc.

5.3 THE NURSING UNITS (WARDS)

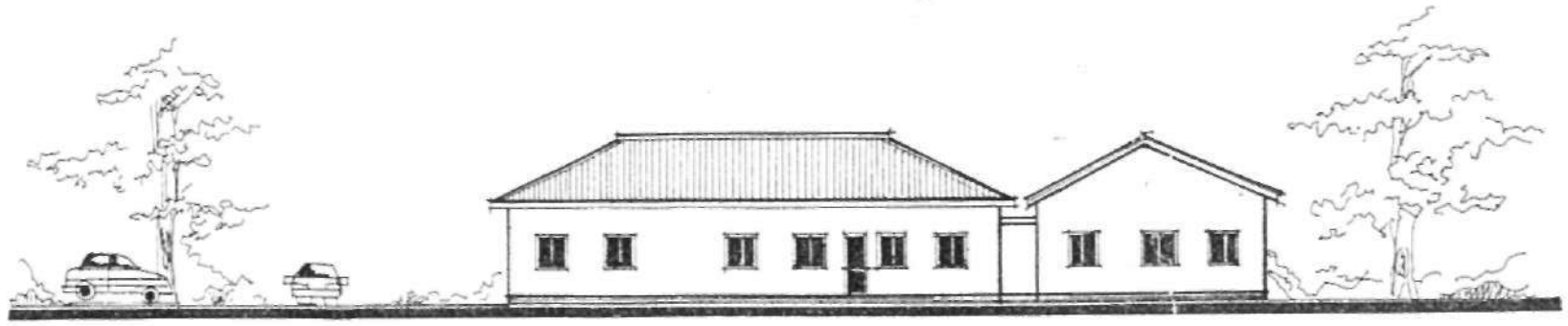
The nursing units consist basically of the inpatients accommodation. These are termed as hospital wards. There are seven (7) wards which form the nursing units. These are male and female surgical wards, male and female medical wards, paediatrics ward, and male and female amenity wards. Female amenity ward is converted to maternity due to lack of proper maternity ward. The wards are arranged in a polygonal manner along the hospital street (as shown in figure below). The four main wards (male and female medical, and male and female surgical wards) are a prototypical rectangular design with a bed capacity of 28 beds each. It is divided into three sections (as shown below). The central (main) section consists of eight beds on either side of the nurses station which is centralised. On either side of the main section consist the smaller sections which is screened from the main section by a wall with an archway for access. These smaller sections consist of six beds each with three beds on either of the opposite walls. There is

EXISTING STRUCTURES.

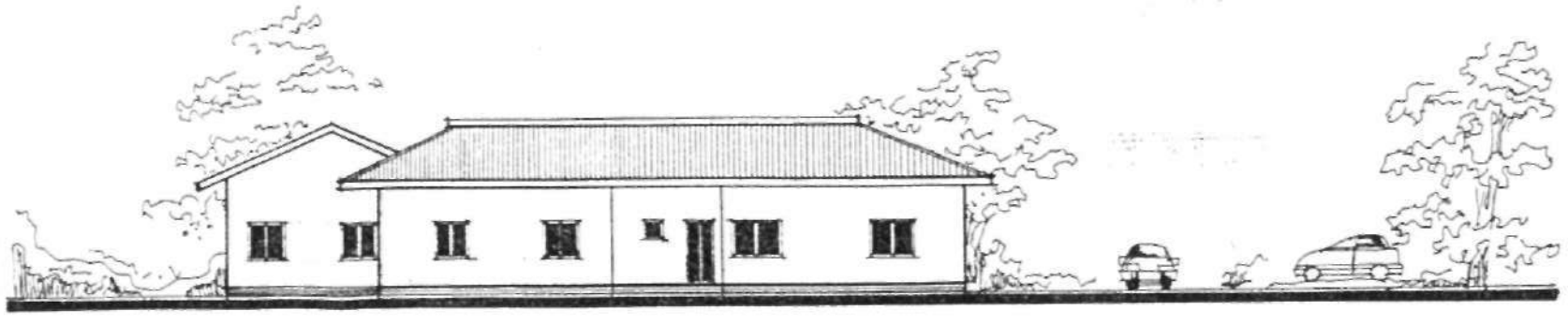


GROUND FLOOR PLAN..

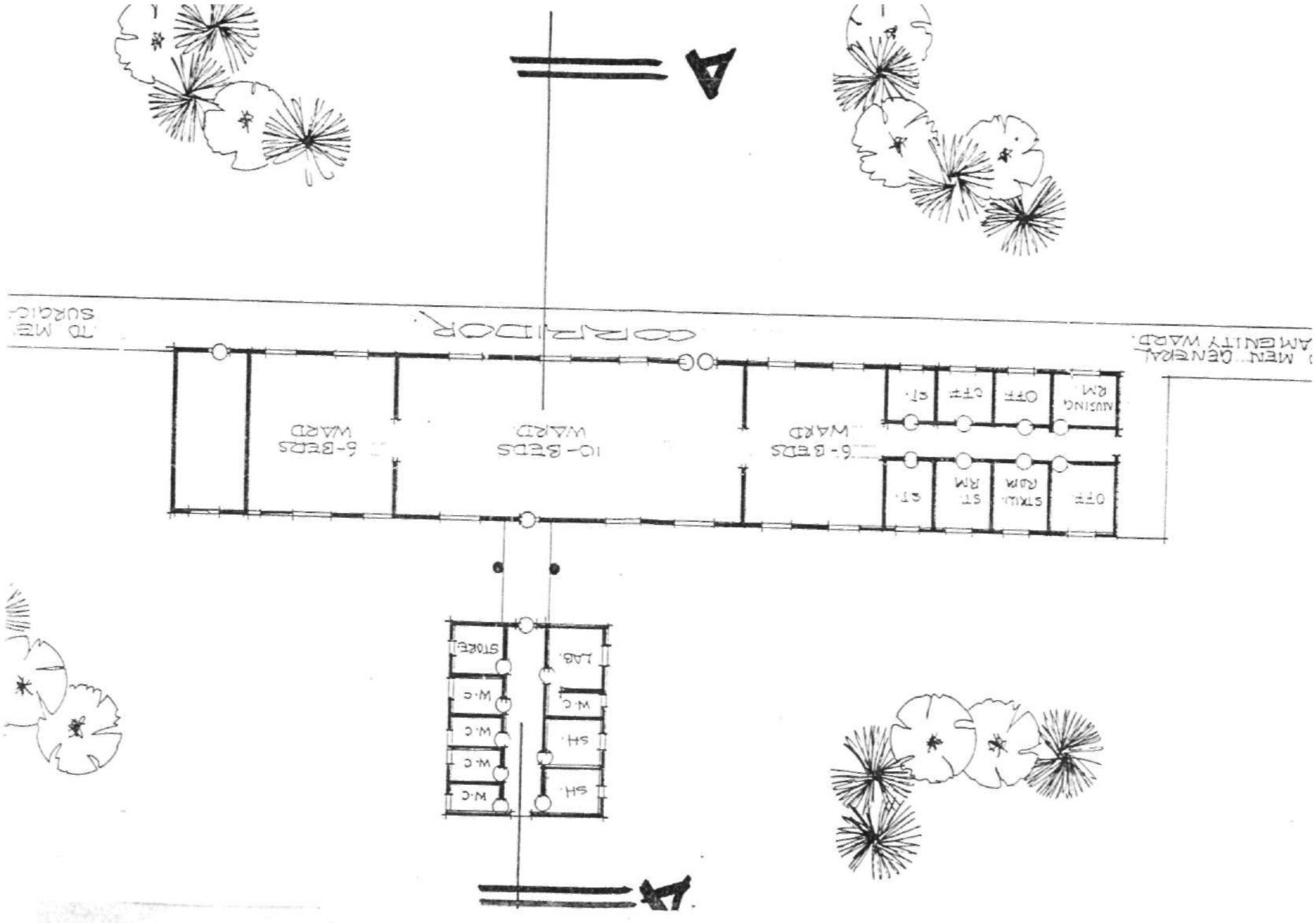
NORTH..

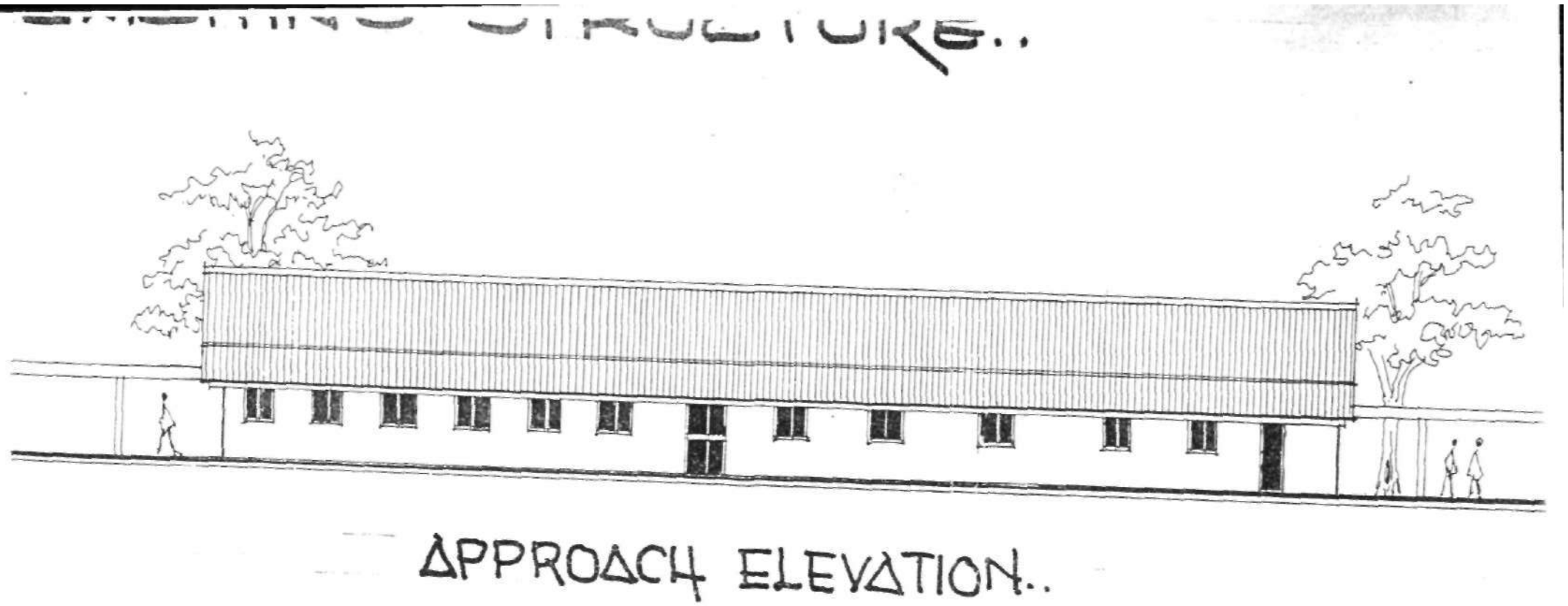


NORTH-EAST ELEVATION..

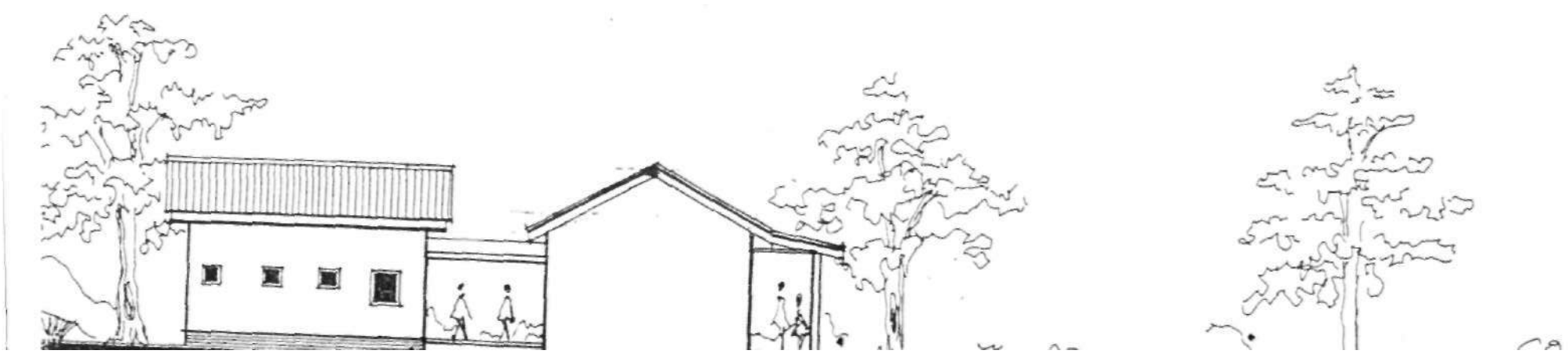


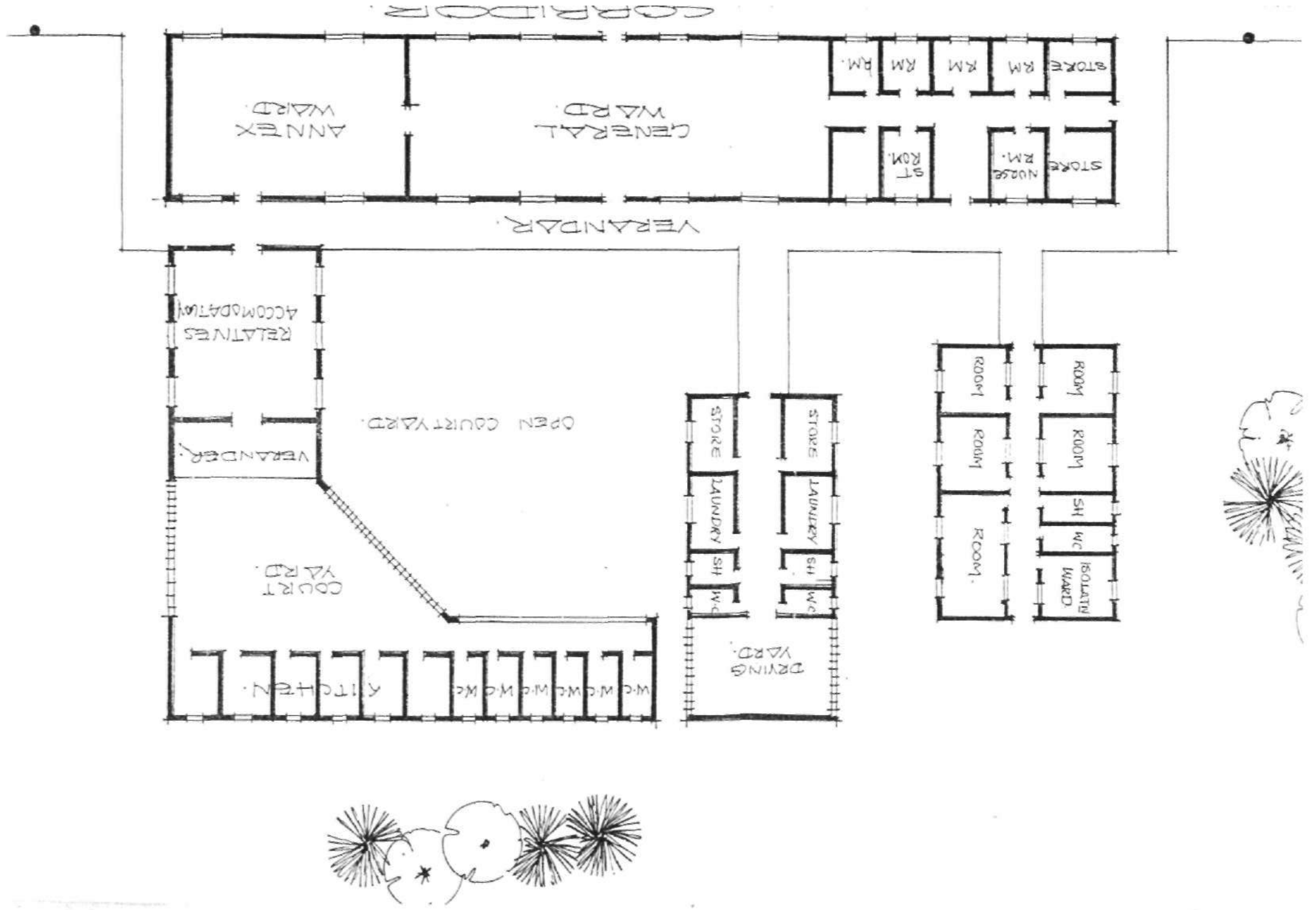
SOUTH-WEST ELEVATION..

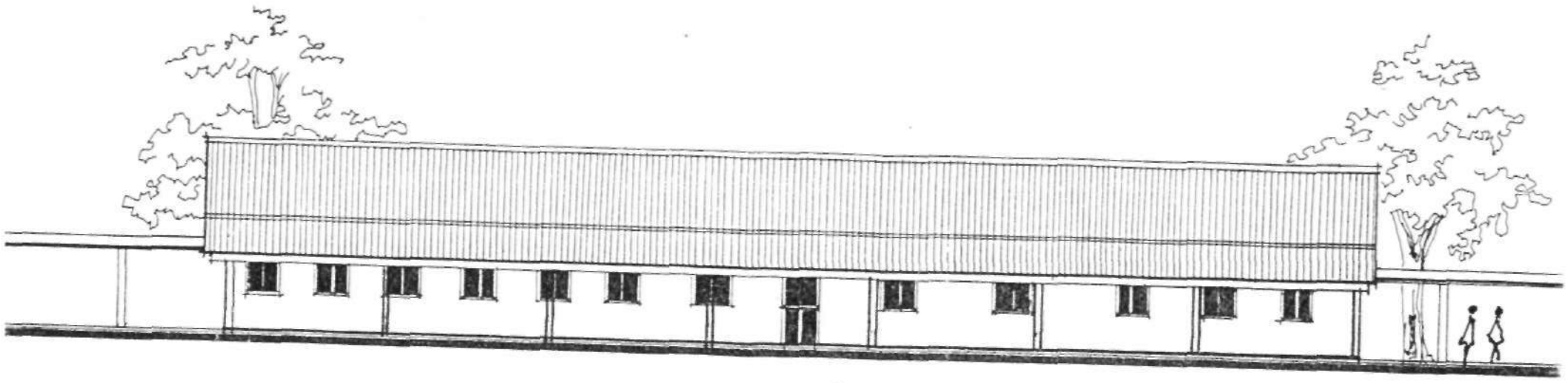

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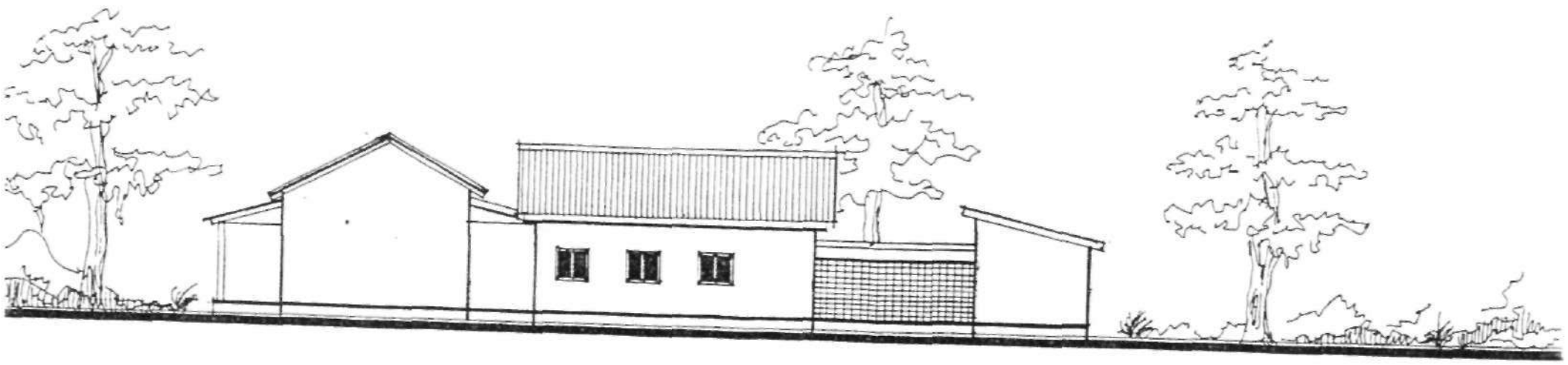
APPROACH ELEVATION..

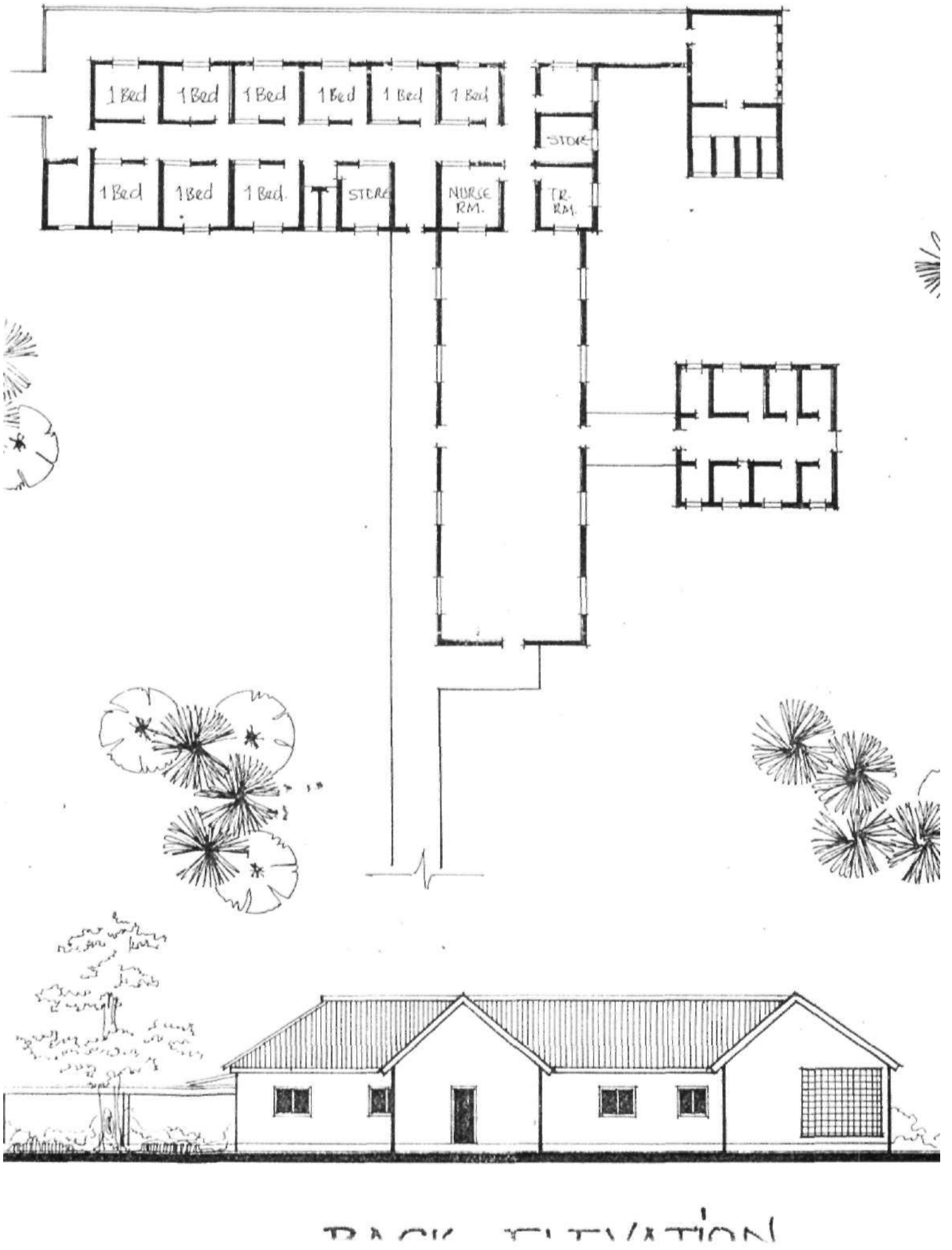



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VERANDER.
COURT YARD.
KITCHEN.
W.C
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LAUNDRY
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STORE
LAUNDRY
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WC
DRYING YARD.
ROOM
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WC
ISOLATED WARD.



APPROACH ELEVATION..





BACK ELEVATION

no provision for private rooms as the few single rooms there are used as offices. The location of nurses station at the middle of the ward can increase the efficiency of the nurses as travel distance within the ward is minimal. The main drawback is the location as they (wards) are far from adjunct diagnostic and therapeutic facilities, e.g. pharmacy and pathology departments. This prolongs travel distance by both staff and patients and reduces efficiency and increases labour and the cost of running the hospital.

The paediatrics ward is located just after the pharmacy on the right side of the hospital complex. This has a bedding capacity of about 47 beds including 5 Nos. 1 bed private rooms for single and double beds. The nurses' station is also located at the middle to ease nurses' activities. Patients' relatives are provided with accommodation with toilets and cooking spaces adjacent to the paediatrics accommodation. Laundry is also located very close to this as shown in the figure below.

The male and female amenity wards are also a prototype L-shaped design which consist of the main ward and other smaller wards including private wards. These wards are located farthest in the hospital complex, yet its access is only through the main hospital street. This has made travel distance for doctors, nurses, visitors and patients alike long. This will invariably reduce efficiency of services rendered to these wards. Provision will therefore be made in the redevelopment scheme for a parking lot directly behind these wards for easy vehicular access.

5.4 SERVICES DEPARTMENT

Services department is a set of service units that provides services for the smooth running of the hospital. These services range from power supply to catering service.

There are four service units that make up the service department. These are kitchen/dining, laundry, maintenance shop and the general stores.

5.4.1 Kitchen/Dining

The kitchen/dining is located at the far east end of the hospital almost directly behind the female amenity ward. It shares wall with the laundry and consist only of two rooms for dining and cooking/washing respectively. Cooking is done by ordinary fire wood (mostly outside in front of the kitchen). The dining consist of one slightly big room with worn out dining furniture. The dining room is hardly used by patients.

The kitchen uses centralised tray service in distributing food to the inpatients. Dirty plates are collected by trolleys from the various nursing units and transported back to the kitchen for washing through the hospital corridors. A provision is not made for separate cool and dry stores, thus all foodstuff are stored together. The kitchen is therefore considered ill-equipped and lacks supporting compartments for efficient services.

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5.4.2 Laundry/Tailoring

This is attached to the hospital kitchen on the far end of the hospital complex. The laundry department caters for all laundry services needed by the various hospital departments. Washing is done manually while drying is done outside. The laundry consists of the washing and ironing rooms and a store. After ironing is done, clothes are kept within the ironing compartment until they are collected by the appropriate

departments of the hospital as there is no storage space for that and the hospital has no central sterilisation department where clothes should have been taken to.

5.4.3 Maintenance Unit

The maintenance unit consists of a relatively small workshop for the maintenance units. This being mechanical, electrical, carpentry, etc. it is located very close to the laundry/kitchen and the mortuary. It is relatively small and lacks the basic requirement of a modern well-equipped hospital maintenance unit.

5.4.5 General Stores

There is no such provision as general stores for the services department as such goods are stored at the departments requiring them.

5.5 MORTUARY

The mortuary is located adjacent to the maintenance unit, almost directly behind the female amenity ward on the far eastern end of the hospital complex. The building is a bungalow type, which is old looking and dilapidated. It consists of the……..

CHAPTER SIX

6.0 CLIMATIC DATA

6.1 INTRODUCTION

Vom General Hospital is located in Vom, which is just 28 km from Jos, Plateau State capital, and has an almost exact climatic conditions. Jos has a location of latitude 09°57'N and longitude 08°35'E with an altitude of 1159 metres above sea level and lies within the tropics. Climatic conditions such as wind velocity and direction, temperature, rainfall, relative humidity and solar radiation are factors that affect the functionality of the building and an architect should utilise these information in his design. All data here are collected from the University of Jos meteorological station. Design considerations are based on analysed data of ten years (1982-1992).

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6.2 LOCATION

Vom is located in Jos South Local Government Area of Plateau State. Jos South Local Government lies in the northern part of Plateau State. It lies between 1,200 metres and 1,500 metres above sea level, and is generally characterised by rocks.

6.3 RELIEF

Vom lies in the southern part of the Jos plateau which is in the crystalline uplands of northern Nigeria. The high planes or uplands as have come to be known, represent major exposure of crystalline rocks in the north. The major relief characteristic of Vom and in fact the whole of the Jos plateau is the rocks.

6.4 RAINFALL

The Jos plateau, like other parts of the country, experience two seasons: wet and dry seasons. The wet season stretches from April to October and dry season from November to March. The annual average stand at about 1,400 mm while the months of July and August experience the most rainfall, sometimes up to 48 hours.

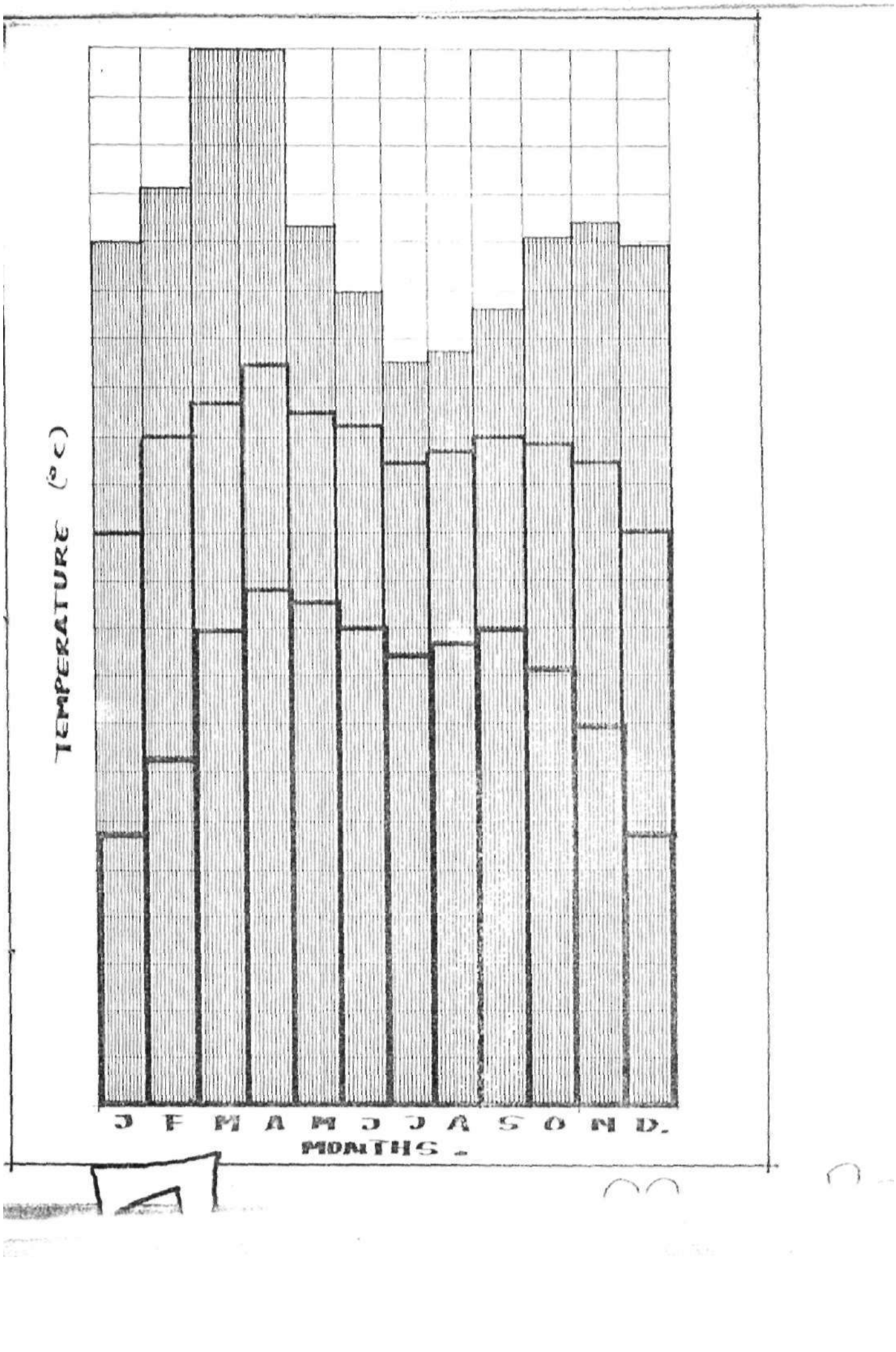
6.5 TEMPERATURE

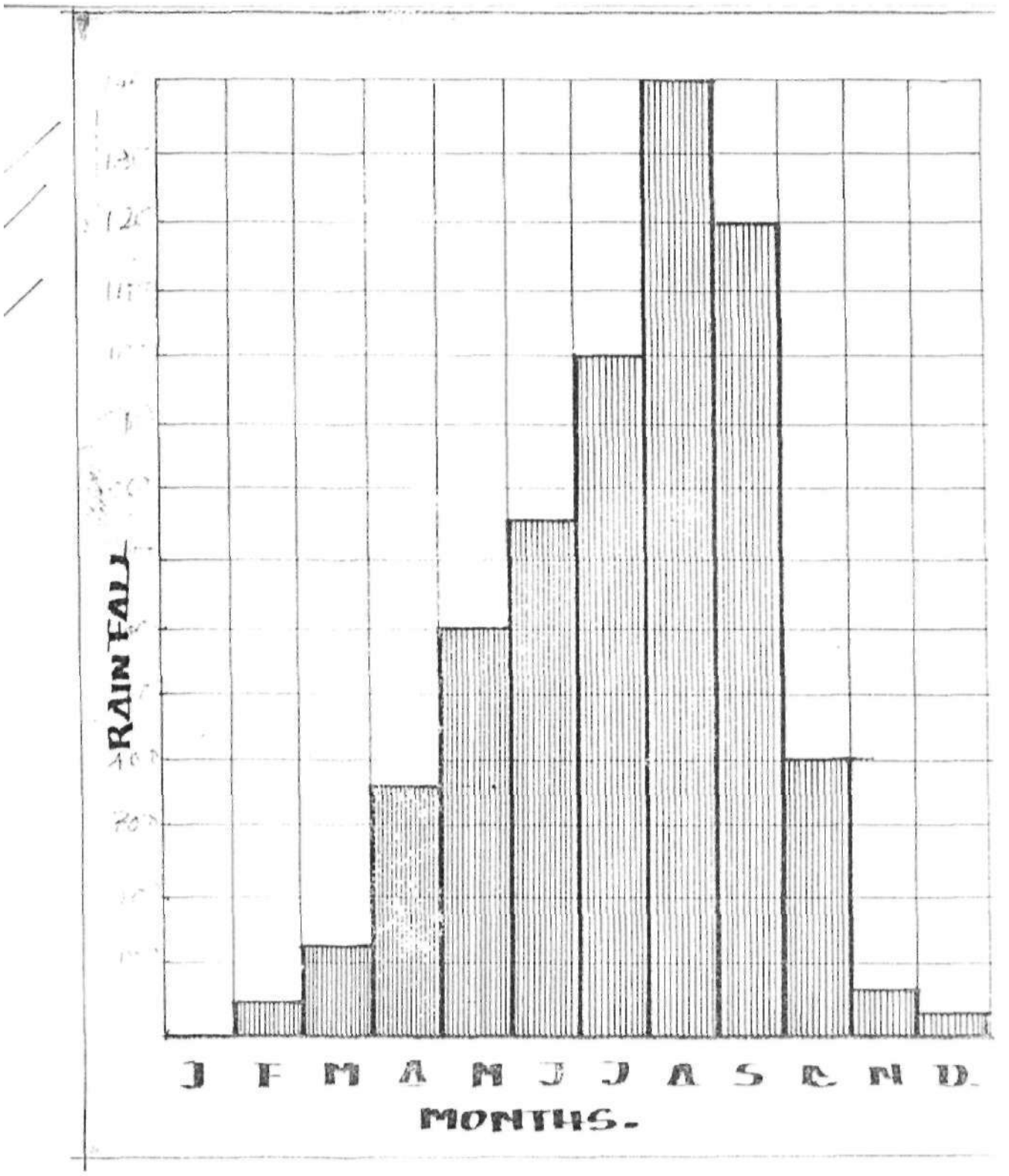
Compared to other parts of the country, the temperature on the Jos plateau is low, mainly due to its high altitude. It experiences its lowest temperature during the months of December, January and February, which can sometimes fall as low as 8oC. It is warmest in the months of March and April with temperature rising over 32oC. The thermal comfort limits for Jos area are 17oC-25oC in the day times. The highest mean maximum temperature is 31.3oC. The lowest mean monthly minimum is 12.7oC. Radiation is usually influenced by humidity in the air.

6.6 RELATIVE HUMIDITY

Human sensibility temperature is greatly affected by relative humidity. Humidity recorder at the University of Jos, Vom Veterinary Research Institute, Heipang and Barikinladi meteorological stations indicate that relative humidity is, on the average, highest during the rainy season, sometimes as high as 90%, and at the peak of the dry season fall as low as 10%. The interplay of temperature and relative humidity factor determine comfort or otherwise or the human beings involved would be high temperature and low humidity as occurs in the dry season. The general effect is dessication.

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TEMPERATURE (°C)
J F M A M J J A S O N D.
MONTHS.


RAIN FALL
J F M A M J J A S O N D
MONTHS.

Months.
J F M A M J J A S O N D.
Humidity.

The relationship between temperature and relative humidity at 0700 hours (7.00 am) and 1600 hours (4.00 pm) is given by the diagram below.

6.7 SUNSHINE

Records show that there are longer days than nights during the dry season. The plateau experiences highest sunshine hours between the months of November and February, which is sometimes as much as up to 10 to 11 hours per day. The least amount of sunshine is recorded in August with an average of about four hours per day.

6.8 SOLAR RADIATION

In human conditions, radiation is felt as air temperature. Radiation is usually influenced by humidity in the air. Planning would be used to offset the effects of the northeast trade winds. Effective landscaping elements can be used to offset solar radiation. Proper orientation of the entire structure on the layout is also necessary.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean Annual
Rain-fall (mm)	2.3	2.8	26.2	89.1	202	228	279	321	215	92	3.6	1.8	1413

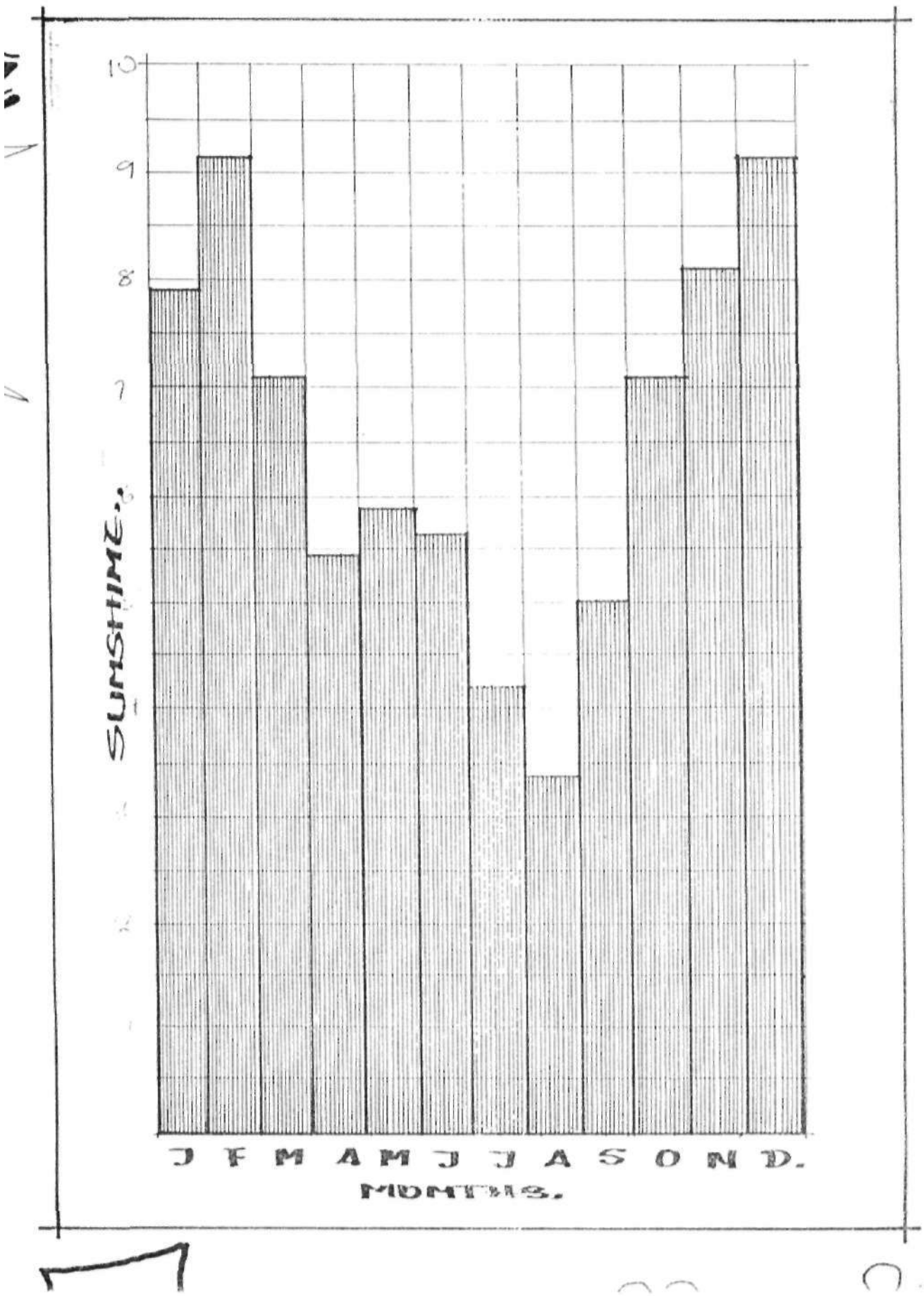
Fig. 6.1: Mean Monthly and Mean Annual Rainfall.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp. (oC)	20.7	22.1	24.3	23.3	23.1	21.1	20.2	20.0	21.0	21.8	21.9	20.5

Fig. 6.2: Mean Monthly Temperature.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean Annual
6.00 am (%)	33	40	45	66	88	92	95	97	76	86	51	4	69
12.00 Noon (%)	14	17	18	24	46	62	71	76	63	45	21	17	39

Fig. 6.3: Mean Monthly and Mean Annual Relative Humidity at 6:00 am and 12:00 Noon.


10
9
8
7
SUNSHINE.
J F M A M J J A S O N D.
MONTHS.

7.0 HOSPITAL DEPARTMENTS AND THEIR FUNCTIONS

The following are the departments found in a general hospital and which will make up Vom General Hospital.

1. Inpatient Nursing Units

This comprises the wards and any inpatient accommodation facility.

2. Adjunct Diagnostic and Therapeutic Facilities

This comprises

(i) Outpatient department

(ii) Accident and emergency department

(iii) Radiology department

(iv) Pathology department

(v) Pharmacy department

(vi) Operating theatre

(vii) Maternity

(viii) Multi-clinic: Dental, Ophthalmic, ENT, etc.

3. Supporting Services Department

(i) CSSU

(ii) Catering

(iii) Maintenance

(iv) Mortuary

(v) Housekeeping

(vi) Laundry

(vii) Central store

7.1 INPATIENT NURSING UNITS

This, in general terms, is referred to as the inpatients' accommodation from the time of admission to discharge in the hospital. The inpatient nursing unit is the most important unit in the general hospital, followed closely by the adjunct diagnostic and treatment facilities. They are categorised by services into:

- Surgical nursing units
- Medical nursing units
- Paediatrics nursing units
- Obstetric nursing units
- Amenity wards

These are also the wards found in VGH, except for a well-defined obstetric nursing unit.

7.1.1 Principles of Ward Design

(i) The nurses should be able to observe the greatest possible number of beds from the nursing station.

(ii) Travel distance from nurses' station to beds should be minimised.

(iii) The number of beds controlled by one nurse should be between the range of 20 and 28.

(iv) Isolation of patients for clinical reasons and for reasons of privacy calls for sufficient number of single room.

(v) Patients' sanitary facilities should be related to groups of bed areas instead of being centralised in one area.

Figure below shows the various forms of ward design.

7.1.2 The Patients' Bedroom

There is no space in the hospital as important as the patient's bedroom in its lasting impression. It forms the centre of his life during an extremely difficult period of his life. For most if not all of the times, it is his sleeping bedroom, library, reception for visitors, dining room, etc. all in one. For all patients it becomes the one fixed reference place away from home. There is no multipurpose space in the hospital more demanding in its design refinements than the patients' bedroom.

Factors that affect the room design include, among others, comfort and privacy, nursing aids, and desired character of the environment. The most ideal form of patients accommodation is the one-bedroom type for comfort, privacy, isolation, flexibility, etc.

7.1.3 Bed Layout

(a) Nightingale's open ward layout:- These wards were open and designed to accommodate 30-40 beds, with bed so arranged that the head of the patient is against the internal window wall, i.e. bed in perpendicular to the external wall.

Merits:

i. Cross ventilation

ii. Ample visibility of patients

iii. Low construction and maintenance cost

Demerits

i. Danger of cross infection

ii. Lack of privacy

iii. Difficulty in controlling the microclimate to suite all patients.

(b) Rig's ward layout:- Most of the difficulties of the Nightingale's ward are overcome by the Rig's ward. It is named after Rig's Hospital of Copenhagen, Denmark, where it originated.

Beds here are arranged such that the heads of the patients are against the partition walls, subdividing the open ward into bays. See Figure.

Time saver standard for building types gives bedroom sizes as follows:

i. Single bedroom - 10.87 – 15 m2

ii. Two-bedroom - 14.59 – 19.51 m2

iii. Four-bedroom - 28.61 – 37.25 m2

Major differences are found in depths from inside of external wall to room side of corridor partition.

i. Single bedroom - 4.420 m

ii. Two-bedroom - 4.572 m

iii. Four-bedroom - 6.604 m

The width of the single and double bedroom is 3.5 m max. or less, depending upon furniture requirement.

7.1.4 Nurses Station

The nurses station is, in most designs, the organisational hub of the nursing unit. It is the working and control centre of the unit, and, in addition to its medical functions, the nurses station controls the movement of visitors and handles all patients' correspondences while in the unit. It is also the most important place at which the nurse call system register, where all paper work is done, and where all staff report at change of shift. The station should be centrally located near the main entrance for control of all public movement into the unit.

Facilities in the nurses station include

(a) Control desk

(b) Medical records and drugs trolleys

(c) Nurses' lockers and toilets

(d) Drug storage (including refrigerators and cupboards)

(e) Charting desk

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7.1.5 Medication Room

This is considered to be an integral part of the nurses' station because of the frequent use by nurses. It can be a small alcove with shelves for keeping medication and counter for preparation of all medicines before they are taken to the patients' room.

7.1.6 Examination and Treatment Room

This is considered to be of great importance in the nursing unit. The need for examination and treatment room arises because there is a need to reduce the risk of cross-

infection, if most procedures are done, not in the open ward where the danger of scattering bacteria is unavoidable, but in the more strictly controlled conditions of a special room. Privacy and convenience of treatment and examination are provided here. Thus procedures that cannot be done in a patient's bedroom such as surgical dressings, etc. can be done there. The doors should be high and wide and room size should not be less than 17 m^2.

7.1.7 Toilets and Bathrooms

Each isolation or intensive care room should have a toilet, a bathroom, wash hand basin and shower for aseptic reasons. The United States Public Health Service (USPHS) recommends as a minimum, one toilet for every four patients and four showers for each patient care unit.

7.2 ADJUNCT DIAGNOSTIC AND THERAPEUTIC FACILITIES

This division/section of the hospital render secondary services in that they aid the physician in diagnosis and treatment, are given only on his prescription, or perhaps continually as a standing order, and are interested in him with the aid of the specialist involved.

The doctors who direct these adjunct services advise the patients doctor and not the patient himself. The facilities here include radiology, pathology (labs), physical medicine (OPD), pharmacy, etc. Supplementary diagnostic and therapeutic aids such as electro-cardiography (ECH), basal metabolism (BMR) and electroencephalography (EEG) are usually grouped with the labs or radiology.

These adjunct facilities should be accessible to both inpatients and outpatients. This is particularly important for radiology, which serves the emergency.

7.2.1 Radiology

The main function of this department is the production of photographic films of various parts of the body (through x-ray techniques) for use in diagnosis.

Due to the high penetration power and harmful nature of x-rays, rooms where they are used need special protection, e.g. lead or barium plaster finishes.

There are two major circulation patterns in radiology department: (i) patient and (ii) x-ray films for processing. The major requirements for flexibility in the design for (i) are good patients supervision and reduction of staff walking times. The design for (ii) depends to a large extent on the type of film processing method in use.

There is a strong relationship with accident and emergency department and outpatient department.

There are two main types of x-rays: (i) diagnostic and (ii) therapeutic x-rays (radiation therapy).

7.2.2 Pathology Department

This, together with the radiology department, form the prime of the adjunct diagnostic and therapeutic facilities and also the busiest. It is concerned with investigation of specimens taken from patients – blood, urine, stool, tissue, etc. by laboratory techniques for confirmation of diagnosis. Clinical divisions include haematology, histology, morbid anatomy, bacteriology, virology, clinical pathology,

microbiology, etc. Laboratory work is carried out in self contained sections of large open areas of the laboratory and smaller spaces of offices etc. Common support facilities such as glass wash up are shared by the units.

The major design consideration is the allowance for growth and change. This would indicate ground floor locations, planning should not inhibit anticipated change in the balance of space between one clinical area and the other. Reallocation of space without much disruption can be effected be grouping large, open laboratory, areas together. Services to bench units (water, drainage, electricity, piped gases, etc) should not be a hindrance to the rearrangement of individual technicians workspace. Services could be provided in a service spine and free standing bench units.

The department is quite heavily engineered. Unpleasant or contaminated air from fume cupboards should not blow in the direction of kitchen and theatre (operating) as these need clean air intake. The strongest relationship is with OPD as many outpatients visit the lab to give specimens. If the pathology department is sited in the industrial zone, there should be a specimen collection area in the OPD. Good relationship also exist with supply department of the hospital.

7.2.3 The Surgical Suite

The surgical suite is perhaps one of the most important units of any hospital, and it is very complex both in terms of design and planning and in terms of effective functioning. For higher functional performance and better organisational output, it is advisable to centrally locate the theatre(s) or if there is more than one, locating each near the units it serves. This will give centralised services, thus more economical.

For proper aseptic control, there is need for a rigid separation of "clean" and "dirty" traffic. This indicates a two corridor system which imposes limitations on the plan form of the department. The three major circulation patterns are patients, staff and supplies (including theatre supplies). The shape and content of individual clusters of operating theatre and its auxiliary rooms also has a major effect on the planning of the department.

The surgical suite requires a greater floor-to-floor area than any other department in the hospital. This is because total air-conditioning with filtered supply and refrigeration is required. The department primarily serves the inpatient nursing units. If possible, there should be close, horizontal relationship to the surgical wards. A quick access from accident and emergency department is also necessary. There is also a strong relationship with the CSSU.

The length of time and seriousness of the operation can vary from minutes to hours, which in turn affect both the size and numbers of operating rooms needed. In addition to the surgeon and the anaesthesiologist and nurses who are in the room, the pathologist and radiologist might be called in for consultation.

Operations can be classified into five categories:

i.	General surgical	-	64%
ii.	Orthopaedic	-	14%
iii.	Eye and ENT	-	10%
iv.	Gynaecology	-	6%
v.	Cystoscopy	-	6%
	Total	-	100%

7.2.4 Outpatient Department (OPD)

This is about the largest department in the hospital complex in terms of floor area. It provides consultation, investigation, diagnosis and treatment for patients who require little or no recovery services afterwards and are not admitted to acute ward. This department is often a patient's first introduction to the hospital except where the patient comes through the emergency. Most patients attend sessions as specific clinics by appointment receive initial diagnosis and treatment, e.g. injections. The department should be located close to the main entrance to the hospital, convenient to pedestrian approach. It should be conveniently associated with the diagnostic and therapeutic facilities.

The main function of the outpatient department is to keep patients out of the beds of the inpatient department. Its functions include:

(a) Reception – where patients for admission can be examined.

(b) Consultative centre – for specialist investigation and treatment which cannot be efficiently given at home but which does not necessitate hospital admission.

(c) Casualty department – where emergency treatment is rendered.

(d) A centre at which continuation treatment is provided for patients who have been discharged from the hospital.

(e) Immunisation.

(f) Public health education.

The OPD offers its services to the following clinics:

(i) General medical

(ii) General surgical

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(iii) Paediatric

(iv) Psychiatric

(v) Ante-natal

(vi) Orthopaedic

(vii) ENT

(viii) Gynaecology

(ix) Eye and dental

(x) Immunization

Element of this department include:

- Reception and waiting
- Consulting and examination rooms
- Treatment rooms (dressing and injections)
- Specialised clinics
- Toilets (for both staff and patients)

7.2.5 Pharmacy

The main function of the pharmacy is the dispensing of drugs to inpatients, nursing units (wards), departments and outpatient department. Facilities should be provided for goods reception and storage, assembling of individual ward orders, preparation of small quantities of special sterile products, e.g. eye drops, and a special dispensing counter issuing out prescriptions to outpatients. It can be suitably located on the ground floor, since it must be related to internal and external supply routes and to the OPD.

Its flammable store is to be shaped with other departments, e.g. pathology, and should be separated from the main hospital building. Among items stored in pharmacy are controlled drugs, poisons, and drugs liable to misuse. For this, special security precautions ought to be made against intrusion and theft and alarm systems should be provided.

7.2.6 Emergency Unit

This department provides 24 hour all year round services for accident and medical emergencies. It provides life saving services needed immediately upon admission before it can be properly determined which hospital section should receive the patient. Functions include reception, treatment (including follow-up treatment), resuscitation, etc.

External access for emergency ambulance should be a design priority and there should be separate entrances for walking and stretcher patients. Direct access to x-ray department and the fracture clinic of OPD should be provided. There is also the need for quick access to main operating theatre suites and the intensive care unit. Major treatment rooms are essential for minor surgical operations.

7.2.7 Maternity Nursing Unit

This unit is technically more of a therapeutic facility than diagnostic. It is a nursing unit for pregnant women and accommodates pre-natal women, mothers and their new babies. Due to the nature and ways of delivery in the hospital, maternity units are generally closely related to surgical operating and obstetric delivery suites. There is the need to provide, in the maternity, a nursery which caters for infants and new born who

are ill or whose mothers are not well enough to return home or those babies that are born premature.

> *"Because it is one of the areas in the hospital where patients are most vulnerable to infection, the nursery should be planned to provide the best means for the care, safety, and welfare of the infants."*

The maternity consists among others, nursery, delivery suite, labour rooms and recovery rooms.

(1) Nursery:- The nursery is the nursing unit in the maternity where new born babies with diseases are taken care of. There are two types of nursery layout in hospital design:

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(a) Centralised nursery

(b) De-centralised nursery

(a) Centralised nursery: In this type of nursery, new borns are accommodated centrally away from their mothers. The babies may be taken to their mother from time to time in their bassinets. The floor area requirement for centralised nursery is 2.5 m2 to 2.8 m2 space per bassinet and no more than eight infants should be placed in one nursery. This is to reduce the chances of spread of diseases particularly infant diarrhoea, which when started may spread through all the nurseries. It is also believed that one nurse can only take proper and effective care of not more than eight babies. It also reduces the chances of cross-infection.

(b) De-centralised nursery: This type of nursery is broken into smaller groups of infants with their services immediately adjoining their mother's rooms. Thus, the infants do not have to be carried great distances through the

corridor. Sometimes special arrangement is made for placing the infant together with their mothers. This is called Rooming-in. Provision should also be made for isolation and premature infants.

(2) Labour rooms:- These are rooms in which pregnant women who are about to deliver (in a few hours) are admitted.

> *"Labour rooms should provide maximum comfort and relaxation for the patient and should have facilities for examination, preparation, and observation."*

Single bed rooms are much more preferable as labour rooms because they provide greater privacy, separate infectious patients and may permit husbands (fathers' room) to visit the patient during labour.

(3) Delivery room:- This is where the pregnant mother delivers. Therefore every facility for the welfare and safety of the mother and her new born should be incorporated here. Major consideration include the immediate availability of equipment and supplies, built-in protection against anaesthetic explosion, auxilary electrical system in case of power failure, an adequate air-conditioning system, and finishes that promote aseptic conditions, shelves and built-in cabinets should be minimised. A view window between the delivery and scrub-up area is necessary so that doctors can view patients while scrubbing.

(4) Recovery room:- This is the post-natal room where mothers rest and recover some of their strength after the ordeal of child birth. Recovery time usually lasts from one to three hours. The recovery room is a necessary facility in the maternity delivery suite. It provides a location for recovering patients, frees the delivery and labour rooms for clean up prior to occupancy by another patient,

concentrates patients in similar conditions, and facilitates the special nursing care required.

Requirements

- provision for easy movement of stretches
- separate entrance and exit is advisable
- space for nurses' desk, instrument chart, a waste receptacle
- a lavatory
- observation areas, etc.

(5) Nurses station:- This is the administrative and control centre of the maternity unit. The nurses station is usually responsible for admitting patients who are admitted directly to the labour delivery suite.

7.3 SUPPORTING SERVICES DEPARTMENT

The service department in a general hospital provides a secondary service to the patient since their services are not medical but only aid to support the medical services rendered by the hospital. These services are however no less essential than the professional departments described above, but are usually considered separately because little of their activities involve medical supervision.

The services department consists of the following units:

(i) Maintenance unit

(ii) Kitchen/dining

(iii) Laundry/tailoring

(iv) CSSU

(v) Mortuary

(vi) House-keeping

(vii) Central stores

7.3.1 Maintenance Unit

This unit deals with the day-te-day maintenance of the hospital building and equipment. The following are the sub-functions of the maintenance unit:

(i) Electrical systems for lighting, communications, motors, air-condition and controls

(ii) Carpentry, masonry, plastering, floor covering, roofing, structures

(iii) Painting and furnishing

(iv) Elevators, where used

(v) Borders, pumps, rubbish disposal

(vi) Phone switchboard, heavy equipment, mail service, watchman, etc.

Note that it is not all of these functions that are found in every general hospital.

7.3.2 CSSU (Central Sterilisation Supply Unit)

This is a very important part of the service department. Traditionally, it was part of the surgical operating suite because most of the sterile supply were used there, but recently it has been grouped with other service departments to establish centralised control of the distribution of all goods and because the personnel involved in it must not be trained nurses.

All items which have been returned from departments are cleaned, assembled, put up in packs, sterilised and stored for distribution.

7.3.3 Laundry

The laundry handles all linen washing, mending, distribution, etc. The process involves the following steps:

Collecting ⟶ Sorting ⟶ Washing Extracting⟶ Drying and Ironing ⟶ Folding ⟶ Storing ⟶ Distribution

Elements of a hospital laundry include·

(i) Main washing area

(ii) Collecting and sorting space

(iii) Mending (tailoring) room

(iv) Clean linen store

(v) General store

(vi) Dry work area for ironing and folding

(vii) Office space for supervisor and clerks

(viii) Distribution area

7.3.4 Kitchen/Dining

The kitchen is responsible for serving food mostly to inpatients and sometimes to the hospital employee. It relies on the central store for receiving all food items and storage of non-perishable goods until drawn for use.

Location should take into consideration vehicular access especially vans and lorries conveying food items for use by the department. Storage, food transportation and distribution are all carried out by this department. There are three methods of food distribution – centralised, decentralised and combined.

Elements of the kitchen include:

(i) Stores

- Cold store for meat and fish
- Vegetable cold store
- Equipment store
- General store

(ii) Preparation area for cooked food

(iii) Cooking and serving area

(iv) Trolleys washing and parking

(v) General wash-up space

(vi) Office for catering officer

(vii) Changing room

(viii) Toilets

(ix) Staff rest room

(x) Refuse and garbage disposal

7.3.5 House Keeping

This takes care of the linen, does all the cleaning, and generally gives maid services. Distribution of soap, tissue paper, towels are generally done by this

(housekeeping) section of the services department maid service, done by women and limited to daytime work and relatively light tasks, is distinguished from painter service. This later includes washing and washing floors, replacing and clearing shades and blinds, washing windows and the like.

Refuse disposal is an important aspect of housekeeping. Element of this section include:

- Floor cleaners' store for keeping all clearing equipment
- Central workroom
- Storage for supplies
- Office for housekeeper
- Restroom for cleaners, etc.

7.3.6 Central Stores

The central store is the hospital main store for the collection, storage and distribution of goods purchased in bulk quantities only to be used in small quantities. These goods include sterile goods for CSSD; special hospital or service equipment, drugs, linens, etc. The store is usually subdivided into several categories of smaller store spaces for different types of goods.

(a) The main central store receive and store all bulk, non-perishable foodstuff. Shelves and platform are designed for cases in bulk lots. All housekeeping supplies – new linen, utensils, etc are stored in the central store.

(b) All perishables for the kitchen will be received by the store clerk and cross checked by dietician.

(c) Certain special items like pipes and wire for use in maintenance may go to the appropriate shop for storage and use. Other special items like bottled gases, volatile liquids, and special hospital equipment go to the storage places provided for them, e.g. CSSU. The CSSU serves the following: surgical suite, maternity, emergency, nursing units, OPD, etc.

(d) Separate storage space for equipment awaiting re-use or repair and these should be under the store clerk's control.

(e) Receiving room with shelves.

(f) Workspace for outgoing goods.

(g) Offices for store clerks and supervisors.

Accessibility (vehicular) to the central store is very an important consideration in the design.

7.3.7 Mortuary

The mortuary deals with the reception of corpses from wards and refrigeration of same until they can be collected by relatives and undertakers for burial. It is also concerned with carrying out post-mortem examination to confirm or establish the cause of death. Provision should therefore be made for post-mortem table.

Mortuaries should be located on the external or outer side of the hospital complex so as to screen undertakers vehicles.

CHAPTER EIGHT

8.0 DESIGN REPORT

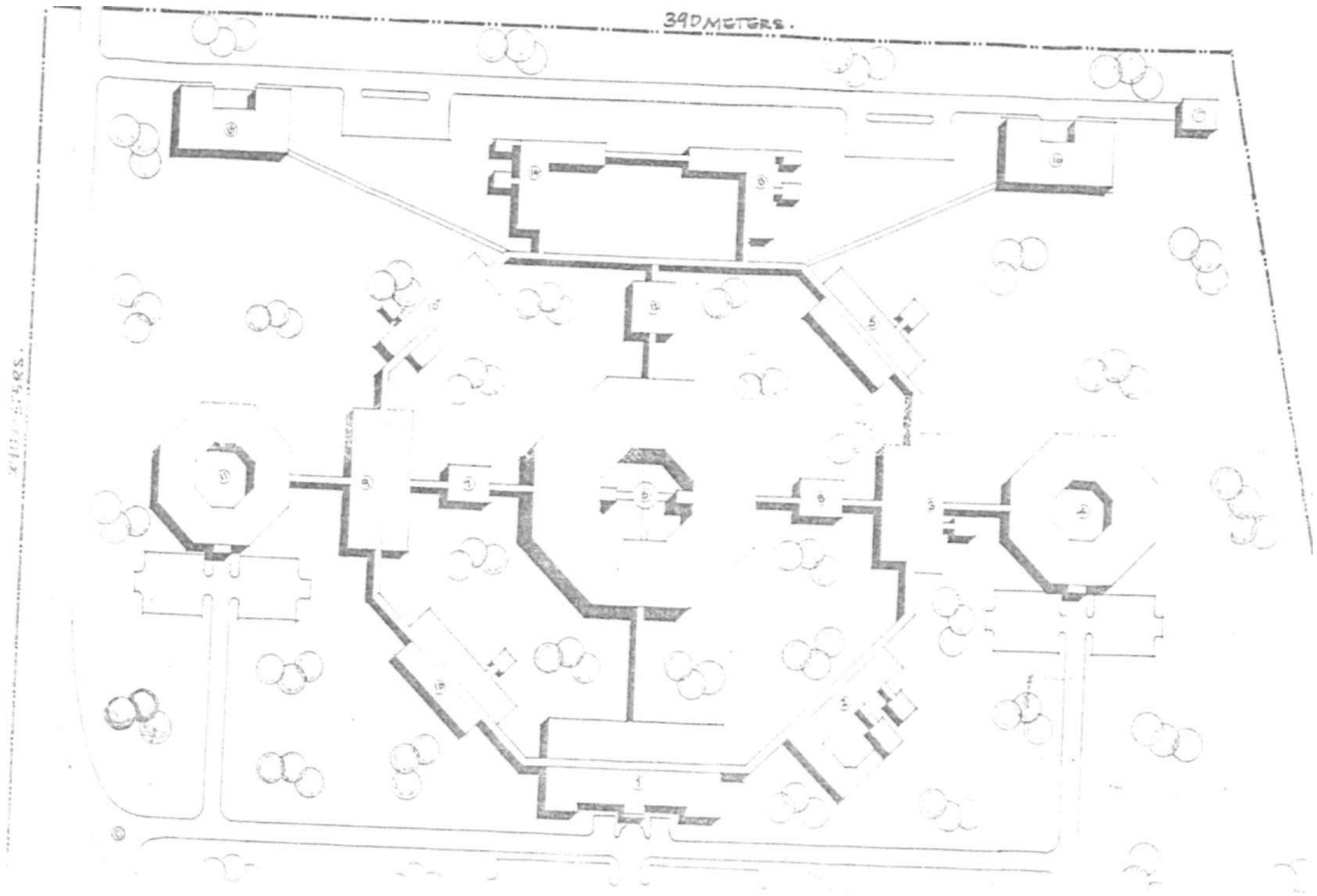
8.1 INTRODUCTION

Since this thesis research work involves a redevelopment scheme, the first approach towards the design was taken by visiting the hospital complex and giving a thorough appraisal of the existing situation (facilities available). Subsequent visits were paid to the hospital to either verify or confirm the physical and functional condition of the existing structures. Interviews were carried out with staff, patients and patients relative which enable me to come up with this workable design.

As mentioned earlier, this thesis aims at proposing a redevelopment scheme for Vom General Hospital with the sole aim of designing a hospital that will satisfy medical and spatial needs of a modern general hospital and which will adapt to the ever changing medical profession and technology.

8.2 DESIGN CONCEPT

The concept of this design was developed based on the original concept of the existing facility. Centralised multiclinic and surgical/sterilisation services was the central focus of this design. In-depth analysis and consideration was given to circulation which form the guiding principle of the design. The nursing units were spread around the multiclinics and surgical suites/CSSU for easy circulation. This was aimed at saving steps for both patients and staff especially nurses. On the far left is the maternity which is linked to maternity ward and on the far right the emergency unit linked to the male


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surgical ward. Both of these units are outside the circular (polygonal) form achieved by spreading the nursing units around the multiclinics (as shown in the figure). Vehicular and pedestrian circulation was as much as possible separated.

8.3 CIRCULATION

One of the basic considerations in this design is the circulation and circulation pattern in hospitals was greatly analysed. Vehicular and pedestrian circulation was as much as possible separated. Goods and human circulation too were separated.

> *"Separate all departments, yet keep them all close together; separate types of traffic, yet save steps for every body; that is all there is to hospital planning."*

The site initially had two accesses, one leading to the hospital complex and a second leading to the doctors' quarters. The redevelopment scheme has improvised two more access: one each to maternity and emergency respectively. The main entrance to OPD had been retained and improved upon. All access comes directly from the Jos road that passes directly in front of the hospital complex.

The main entrance is centralised and leads directly to a parking space in front of the OPD. Vehicular circulation for that entrance is terminated at the parking lot which is spread on both left and right sides. A car or ambulance can park in front of the OPD and stretchers can be rolled to any part of the hospital from there along the corridors.

The western or left entrance leads to the maternity ward. This is meant to separate (and reduce) the traffic on the OPD entrance as both the OPD and maternity are separate and busy hospital units. A parking lot in front of the maternity terminates vehicular circulation on this entrance.

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The third entrance (which is the second added) is on the eastern or right side of the hospital complex and leads to the emergency unit. The original road leading to doctors' quarters is retained and redesigned to also serve the service department and mortuary.

Pedestrian circulation is spread on the polygonal form of the site layout (as shown in figure). Along the hospital street, the corridor starts from the general OPD and branch into three: the corridor on the right leads to paediatrics nursing unit, then to male surgical unit, first surgical suite, etc. The left corridor leads to maternity ward, female surgical ward, second surgical suite and links to the right corridor at the amenity wards to form a ring road. The central walkway leads to the multi-clinics which is at the centre of the polygon. From the multi-clinics, corridors lead to the various functions surrounding like the CSSU, surgical suites, OPD, etc.

8.4 RETAINED INFRASTRUCTURE

8.4.1 Nursing Unit

Of the existing facilities, only the nursing units retained their original structural form with little alterations or additions. The prototypical wards (male and female medical and surgical wards) have been partitioned to make it more or less compartmentalised. This compartmentalisation is into two eight-beds and two six-beds ward compartments. New structure has been added on the other side of the corridor to make it double-banking. The new structure is a compartmentalised nursing unit which due to economic consideration, is made for two beds instead of one with toilet facility each. One bedroom compartmentalisation is only in the amenity wards.

The paediatrics ward has retained its original structural form without any major alteration while the amenity wards have been compartmentalised into one-bedroom and double-banking.

8.4.2 Outpatient Department

Most of the structural facilities in this department have been retained. Formerly, it was a ground floor structure but the redevelopment programme has had added one floor to make it a one-storey building. This is meant to incorporate a well-organised administrative office and a well developed outpatient services. Most of the services have been divided into male and female sections.

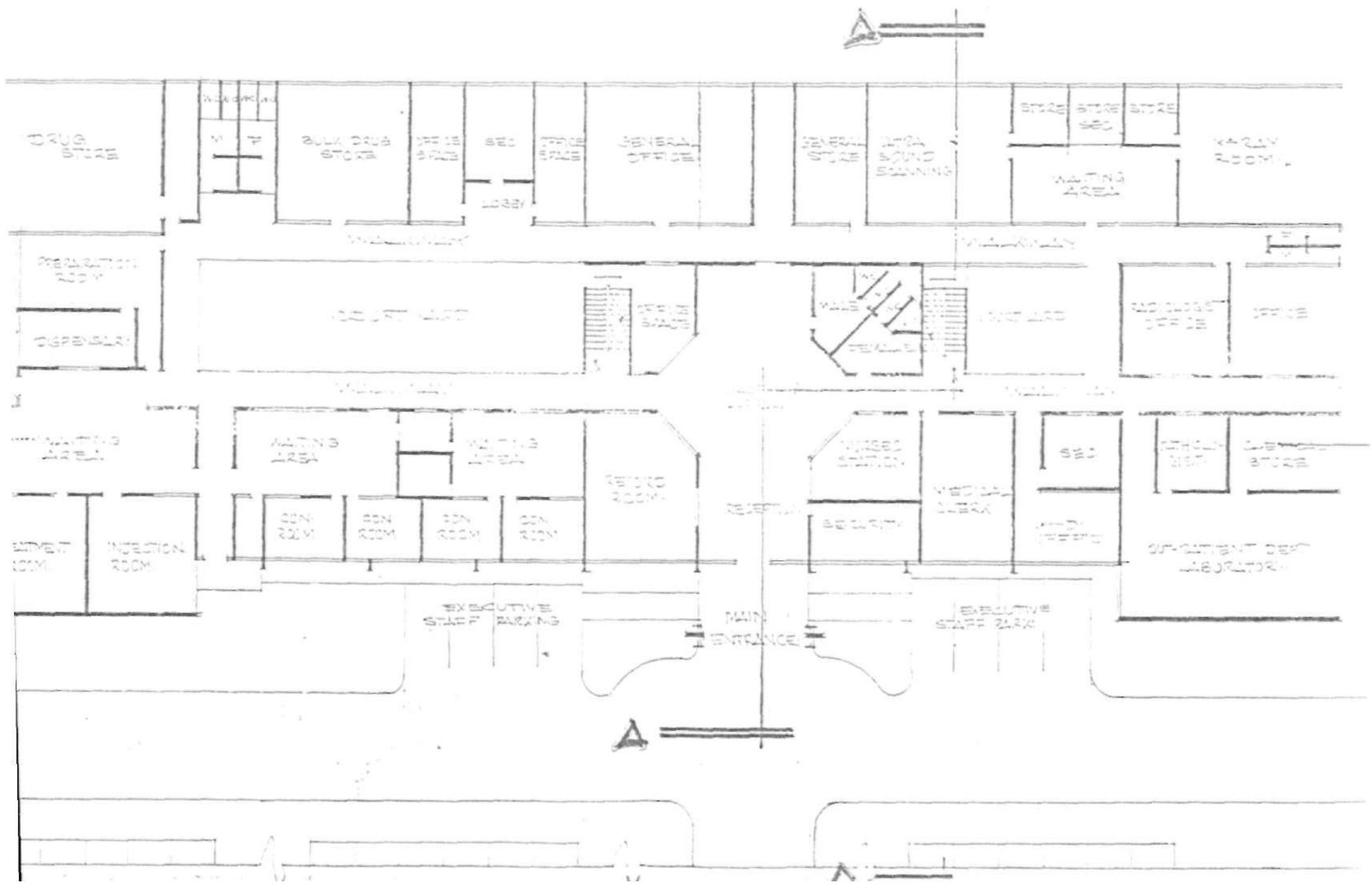
8.4.3 Paediatric Section

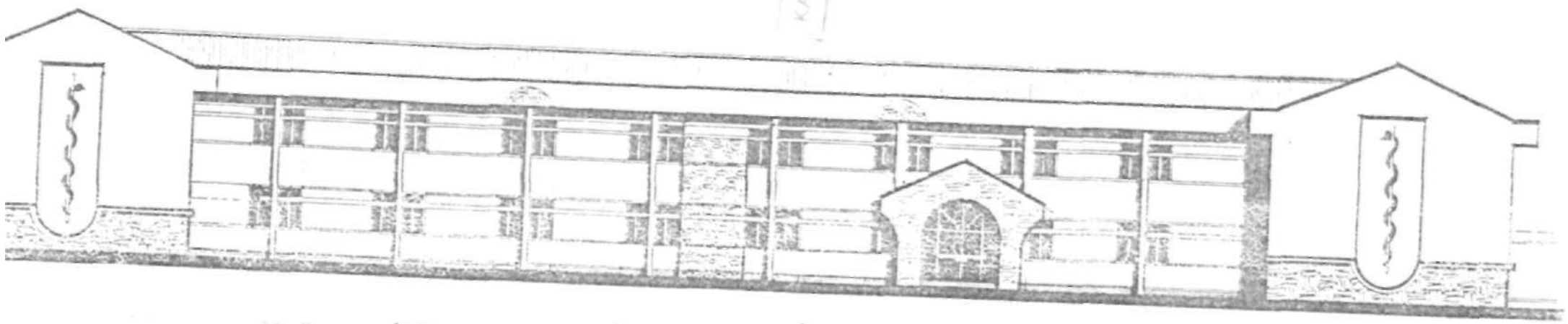
Virtually nothing has been altered in this structure because it satisfies the requirements of a standard modern day general hospital paediatric unit. Apart from the nursing units themselves, there is a provision for the patients' relatives and their activities like cooking, accommodation and toilet facilities. This consideration is due largely to the nature of the patients, i.e. being little children who cannot adequately take care of themselves without their parents presence.

8.4.4 Residential Quarters

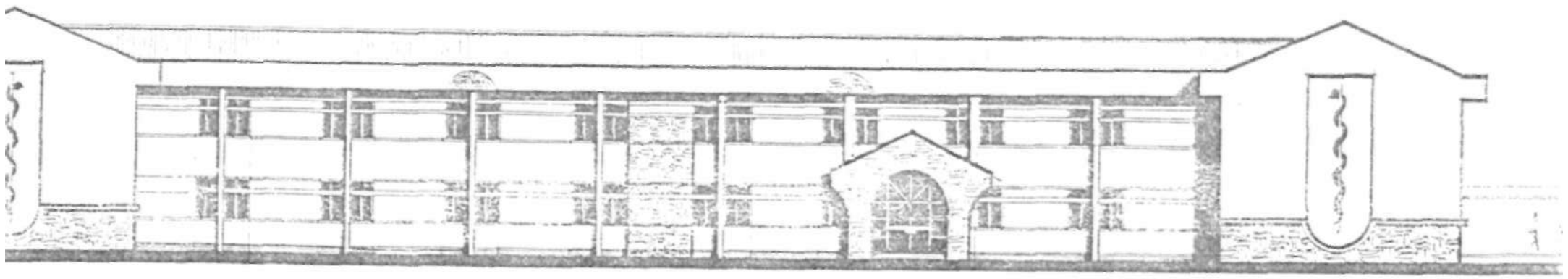
This redevelopment scheme is not concerned with the redevelopment of the residential quarters. The author of this thesis feels the residential quarters is another

GROUND FLOOR PLAN..

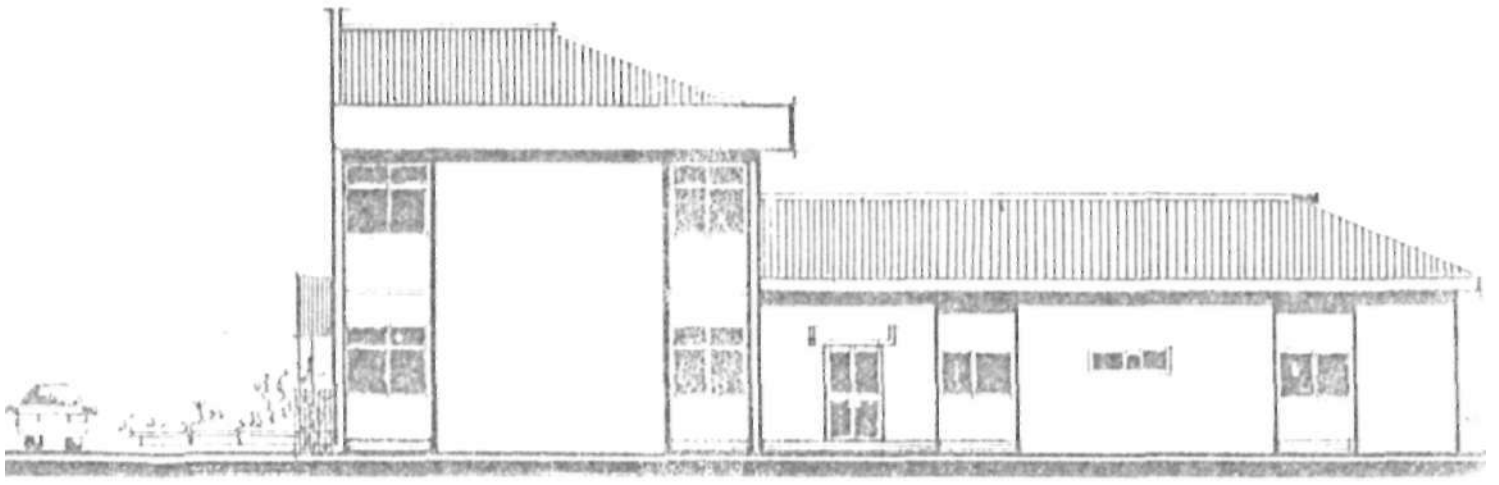




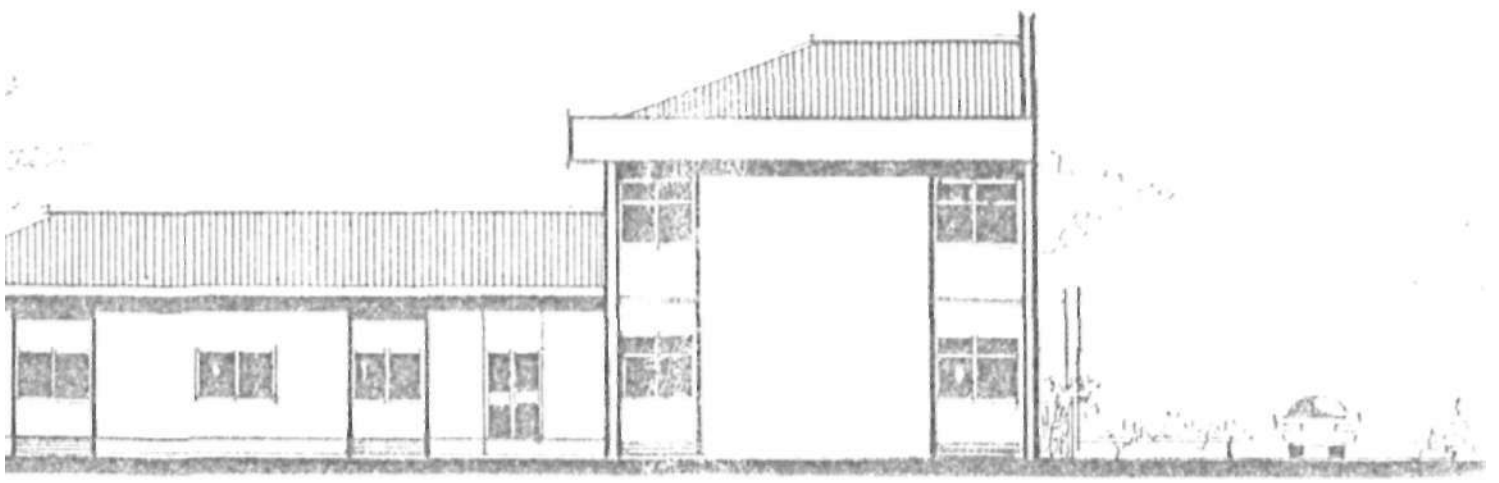
APPROACH ELEVATION.



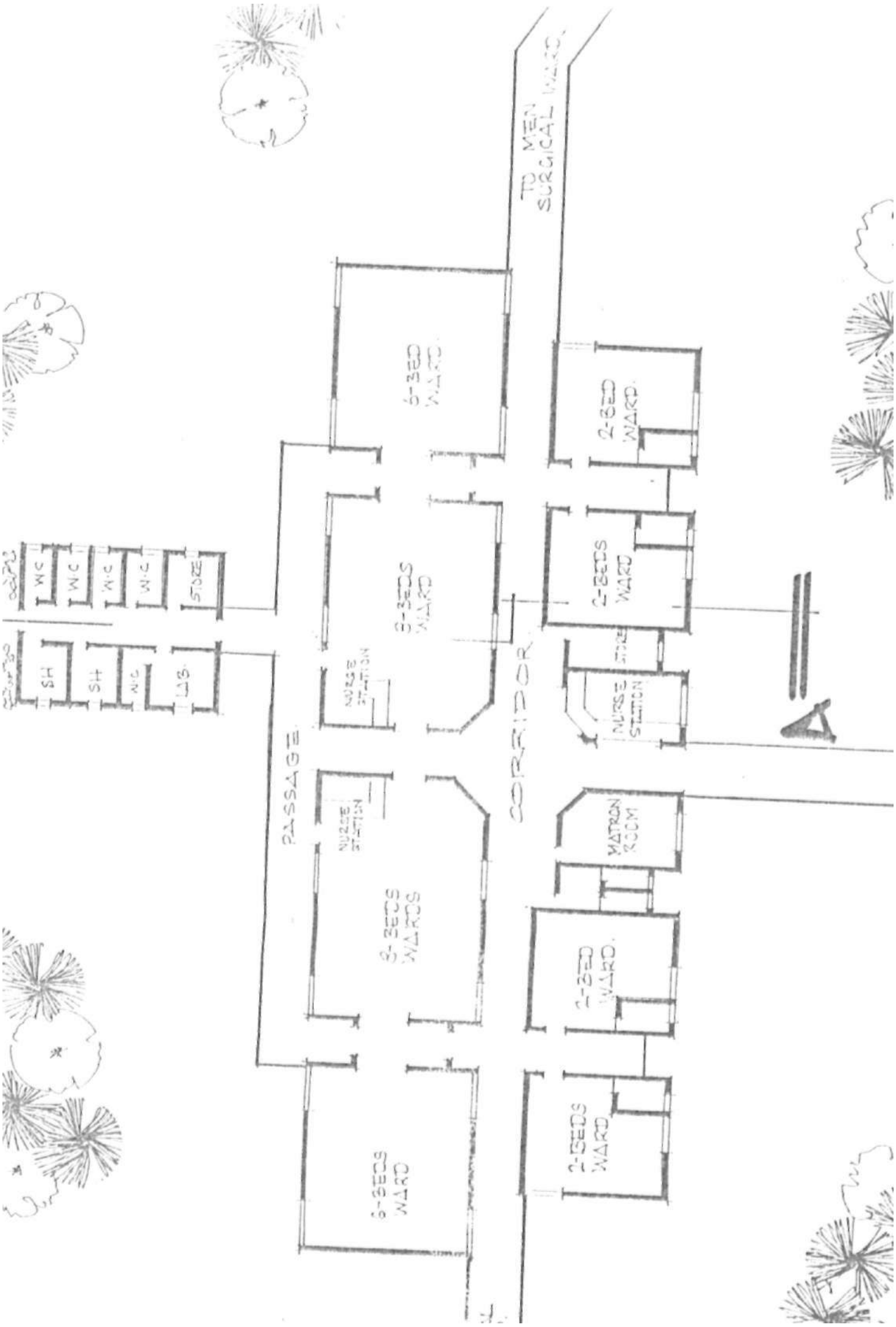
APPROACH ELEVATION.

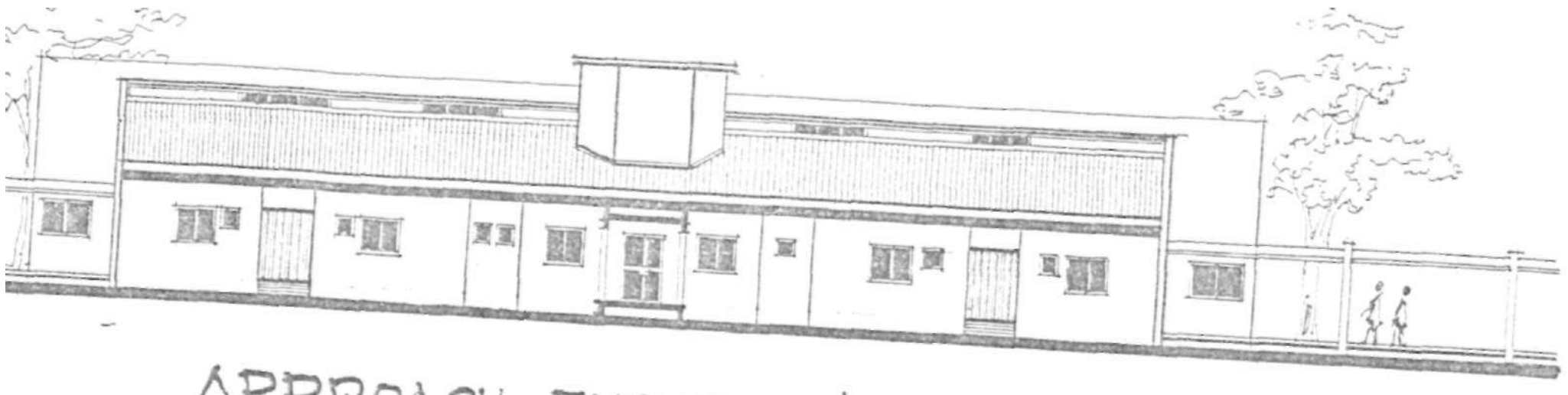


NORTH - EAST ELEVATIO

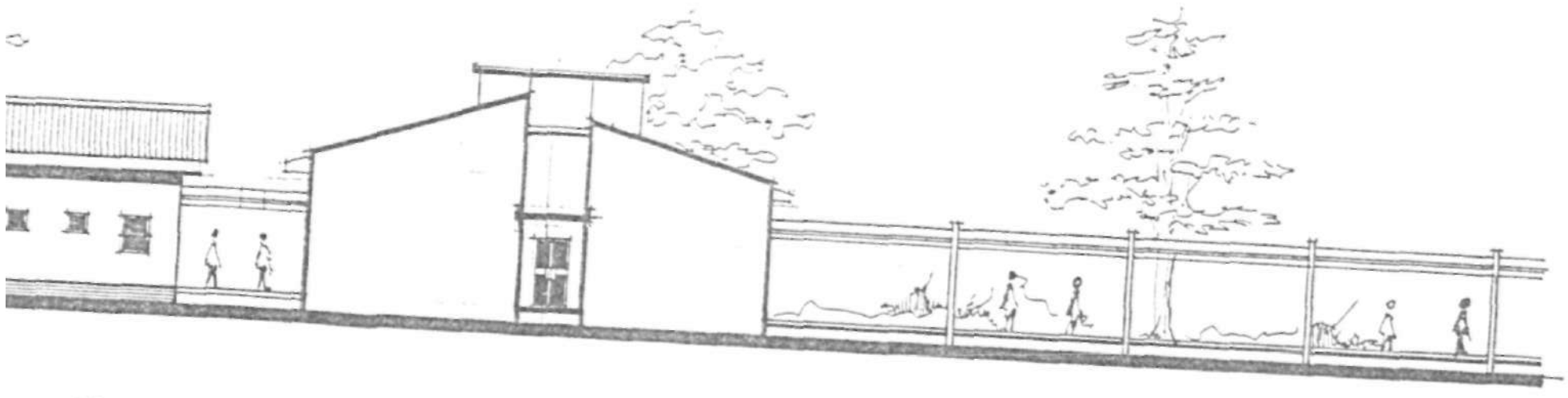


SOUTH - WEST ELEVATION..


TO MEN SURGICAL WARD
6-BED WARD
2-BED WARD
6-BEDS WARD
2-BEDS WARD
NURSE STATION
STORE
W.C
W.C
W.C
W.C
SH
SH
W.C
LAB.
PASSAGE
CORRIDOR
NURSE STATION
MATRON ROOM
6-BEDS WARD
2-BEDS WARD
2-BEDS WARD



APPROACH ELEVATION.



RIGHT-SIDE ELEVATION

project entirely on its on and has very little effect on the performance of the hospital service.

8.5 NEW INFRASTRUCTURES

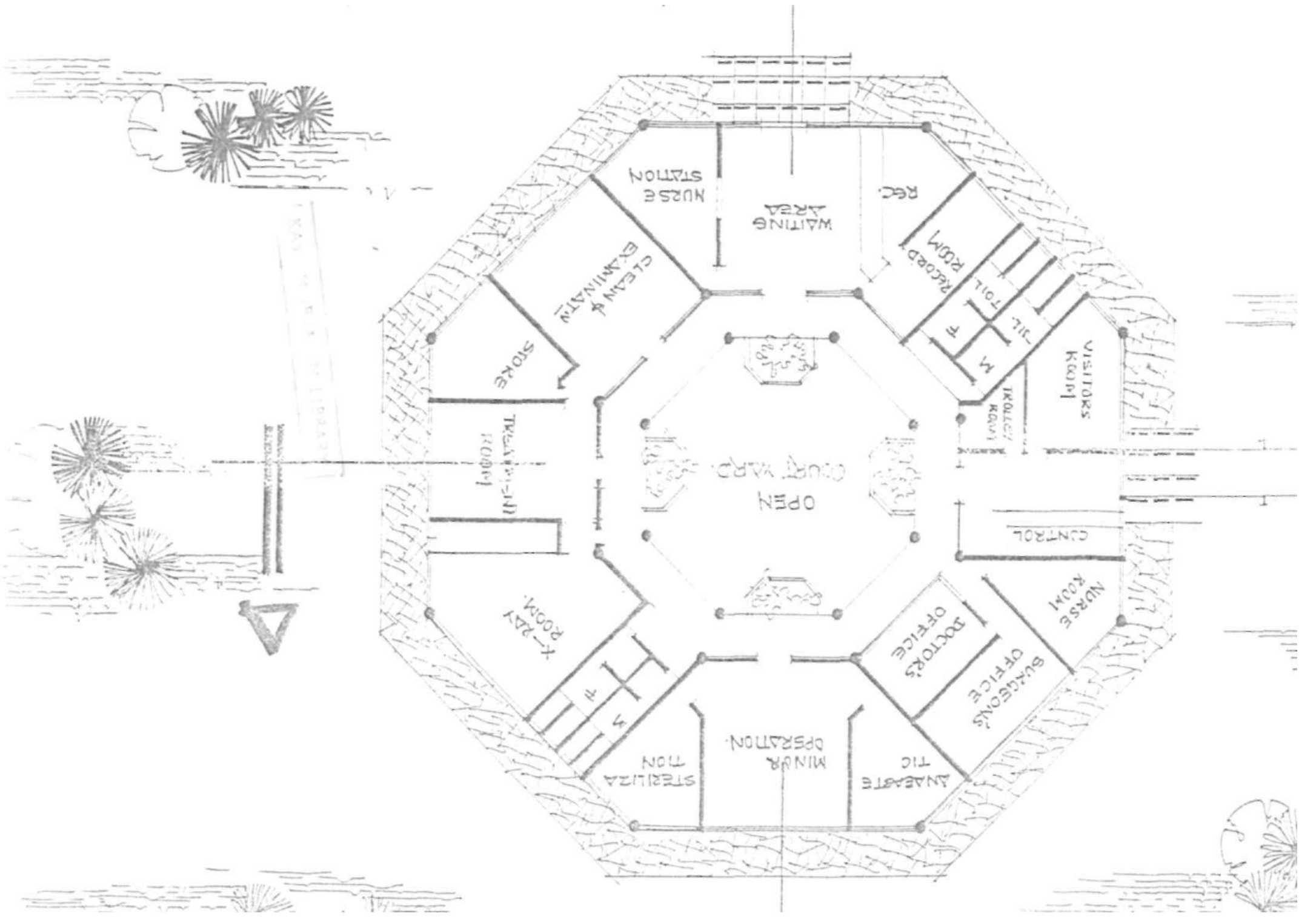
There are some vital hospital infrastructures which at the moment is not available at the hospital. These facilities have therefore been incorporated in the redevelopment scheme. These include multiclinics, emergency, maternity, operating theatres, etc.

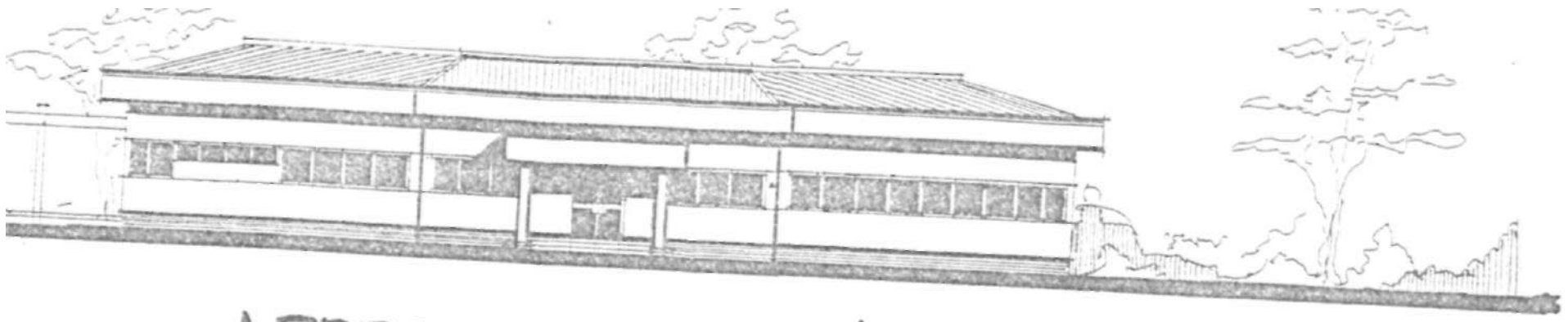
8.5.1 Emergency Unit

This ward is concerned with the immediate examination and treatment of emergency cases, which cannot follow the normal procedure of the hospital bureaucracy. This ward consists of the reception, examination and treatment rooms, a minor surgical suite, nurses' station, etc. A central courtyard serves to aid ventilation and lighting.

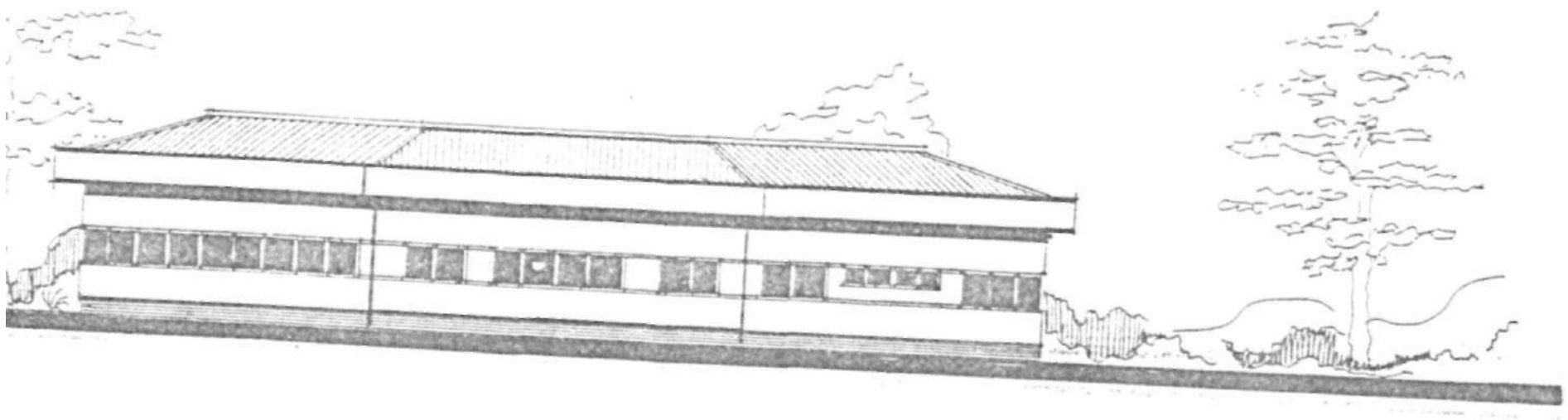
8.5.2 Maternity

Maternity is another facility that was conspicuously absent in the existing facility. The maternity is concerned with caring for the pregnant women and delivery. It consists (as shown) of three basic components of the maternity. These are the labour rooms, delivery suites and recovery rooms. The labour room is where pregnant women who are about to give birth in a few hours are cared for. The delivery suite is where the babies are delivered and the mothers are moved to the recovery rooms to regain some of their strength.

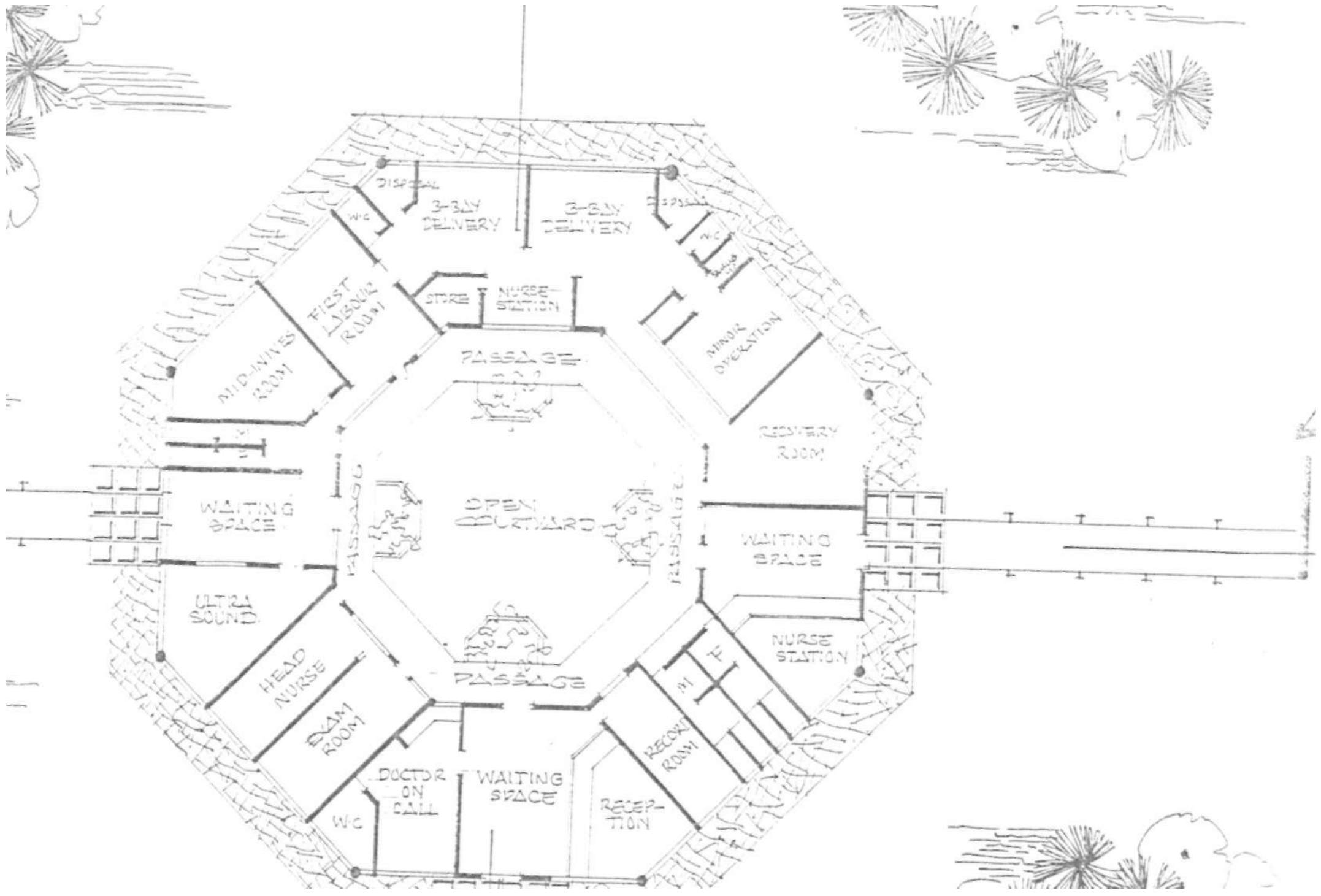

NURSE STATION
WAITING AREA
REC.
RECORD ROOM
TOILET
TOILET
VISITORS ROOM
CLEANING & EXAMINATION
STORE
TREATMENT ROOM
OPEN COURT YARD
CONTROL
NURSE ROOM
DOCTOR'S OFFICE
SUGGESTIONS OFFICE
MINOR OPERATION
STERILIZATION
ANAESTHETIC
X-RAY ROOM

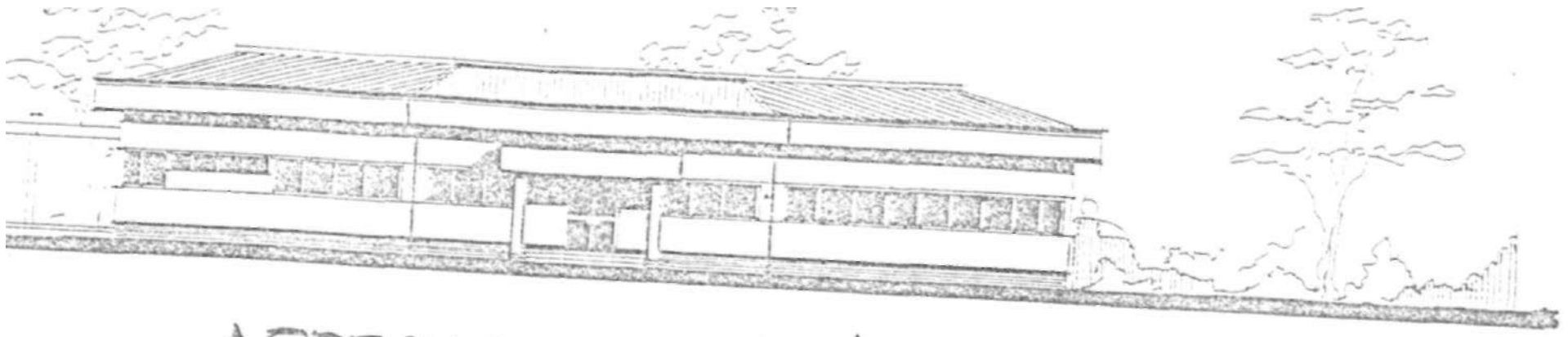


APPROACH ELEVATION..

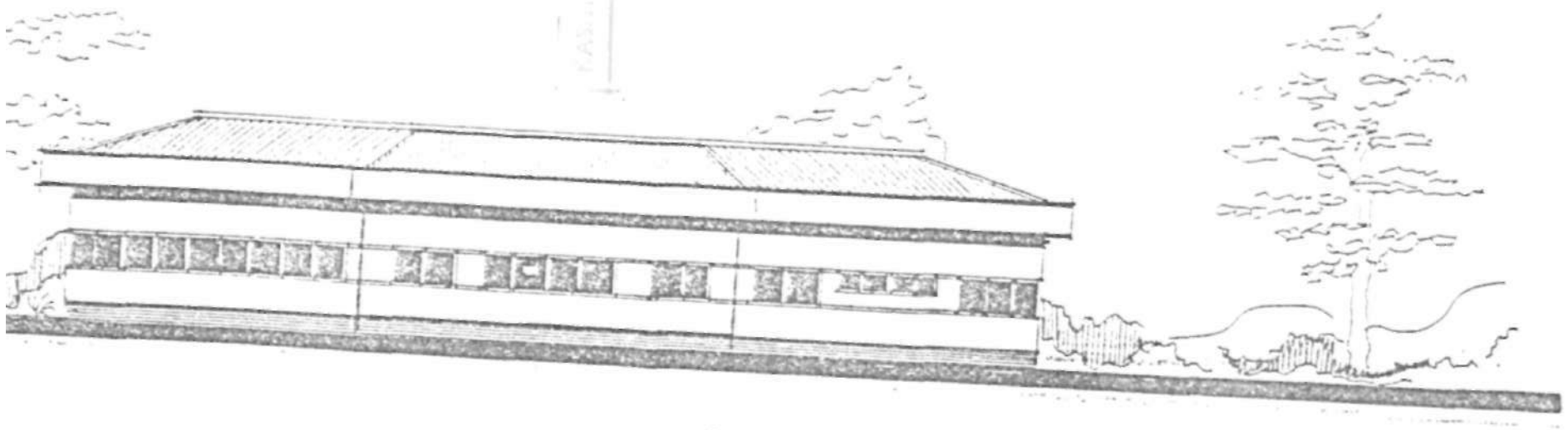


BACK ELEVATION..


DISPOSAL
W.C
3-BAY DELIVERY
3-BAY DELIVERY
W.C
FIRST LABOUR ROOM
STORE
NURSE STATION
MID-WIVES ROOM
PASSAGE
MINOR OPERATION
RECOVERY ROOM
WAITING SPACE
PASSAGE
OPEN COURTYARD
PASSAGE
WAITING SPACE
ULTRA SOUND
HEAD NURSE
EXAM ROOM
PASSAGE
NURSE STATION
RECOVERY ROOM
W.C
DOCTOR ON CALL
WAITING SPACE
RECEP-TION



APPROACH ELEVATION..



BACK ELEVATION..

A minor operation theatre is provided in case there is a complication during delivery (caesarean section). There is also a provision for nurses' station, surgeons' office/changing, toilet facilities, stores, etc.

8.5.3 Surgical Suites

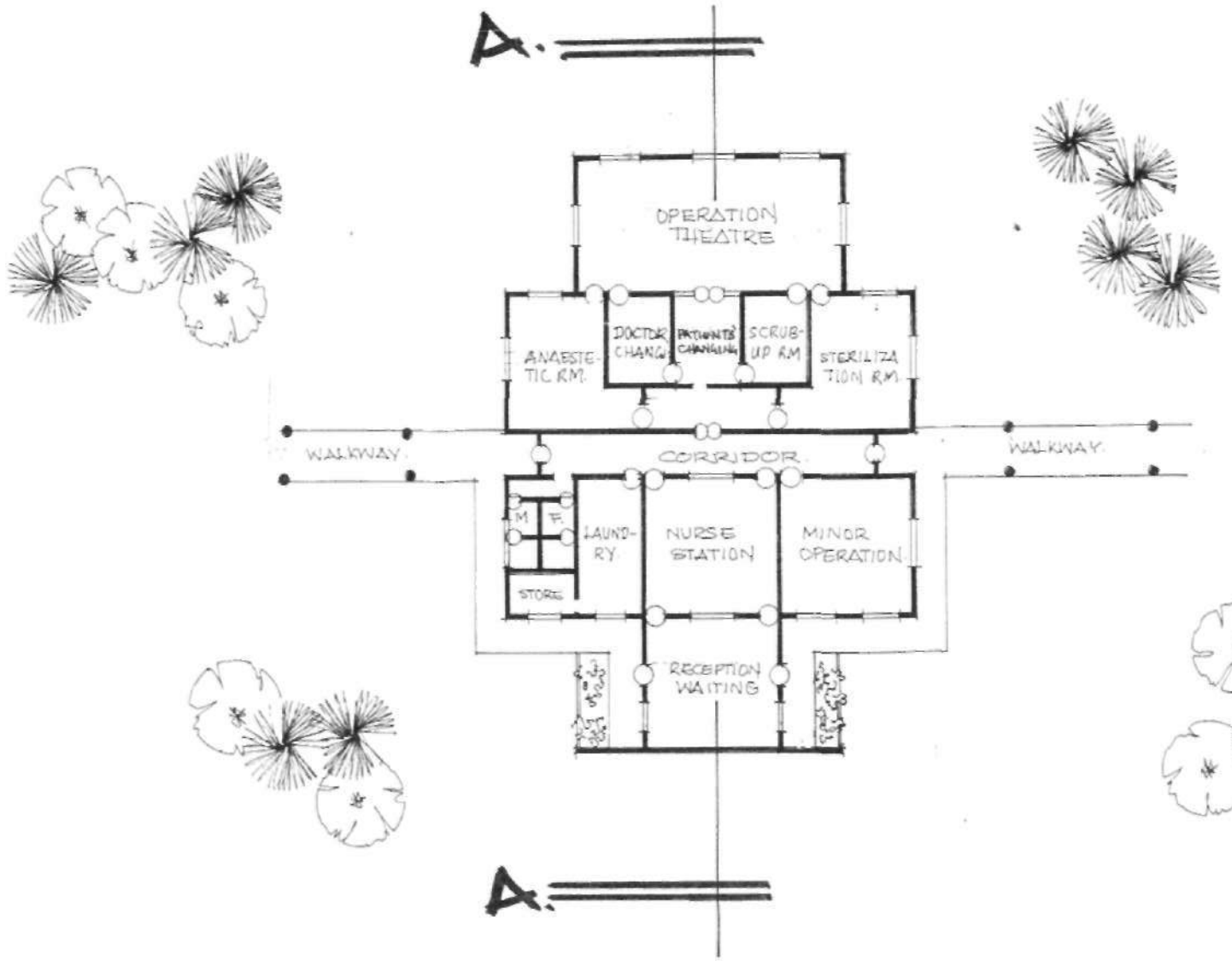
The old surgical suite is to be demolished and two new ones erected. These are located on either side of the multiclinics just by the women surgical ward and men surgical wards respectively. Each of these surgical suites is meant to serve the facilities around, i.e. surgical wards, emergency, maternity, etc. This is meant to ease circulation and save steps for everybody especially nurses and patients. There is a direct link with the CSSU.

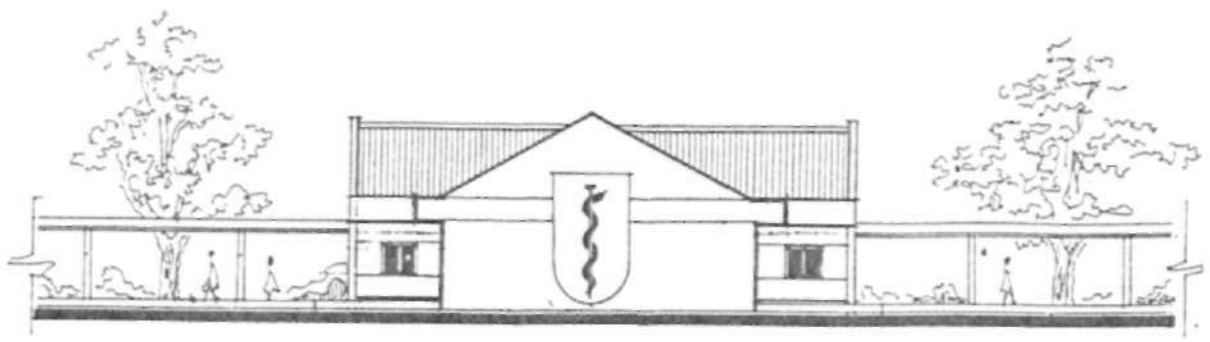
The surgical suites consist, each, of two operating theatres: minor and major theatres. There is a provision for changing/scrub-up, nurses station, sterilisation room, store, anaesthetics room, patients relatives waiting area.

8.5.4 Central Sterilisation Supply Unit (CSSU)

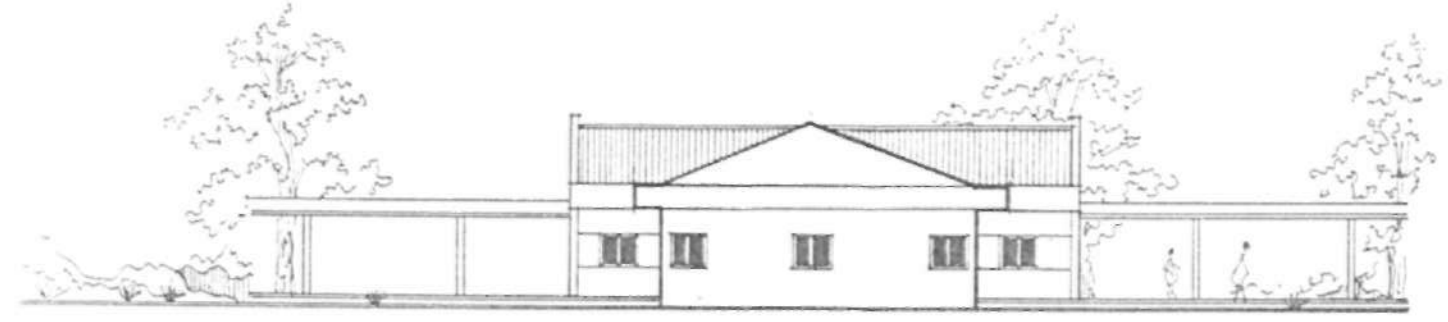
This unit is basically concerned with the sterilisation of surgical and other medical equipment. After sterilisation, some of them are sent directly to the departments requiring them, like the surgical suites, or stored in the CSSU until required.

This unit was basically absent in the original hospital.

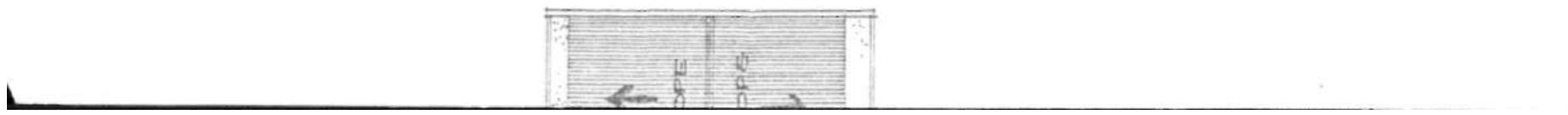

A
OPERATION THEATRE
ANAESTE-TIC RM.
DOCTOR CHANG.
PATIENTS CHANGING
SCRUB-UP RM
STERILIZA-TION RM.
WALKWAY
CORRIDOR
WALKWAY
M
F
STORE
LAUND-RY
NURSE STATION
MINOR OPERATION
RECEPTION WAITING
A



APPROACH ELEVATION..



BACK ELEVATION..



8.5.5 Multi-clinics

This department was totally absent in the existing hospital. It comprises the adjunct diagnostic and therapeutic facilities, opthalmic clinic, ENT clinic, dental clinic, gynaecology clinic, staff offices, stores, and treatment facilities. The multiclinic serves both outpatient departments and especially the inpatient nursing units.

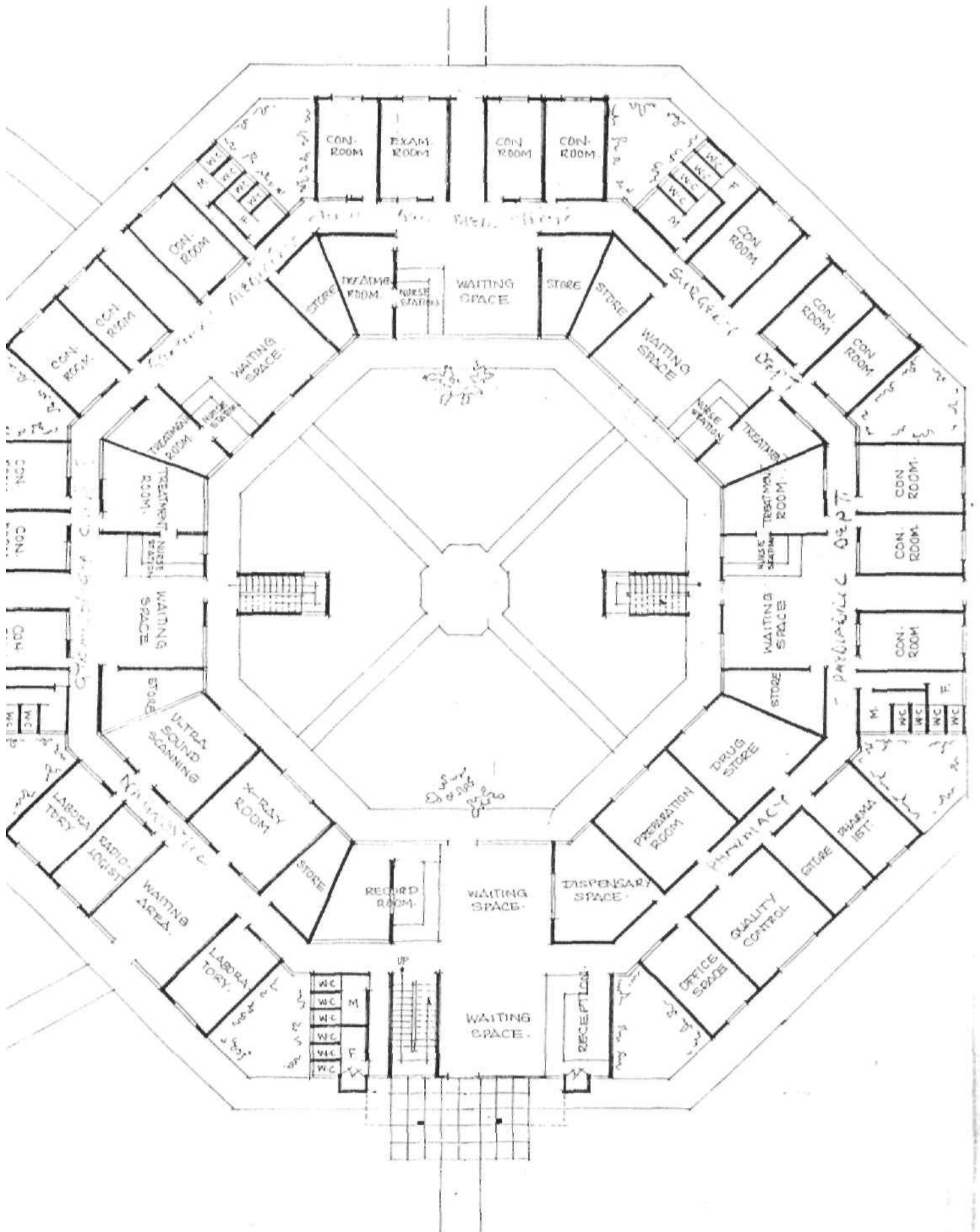
(a) Adjunct diagnostic facilities

This includes a provision for radiology department which uses x-rays in diagnosis and treatment of ailments, clinical laboratories which comprises the haematology, microbiology, pathology, etc. Work spaces are provided for all these so as to establish or confirm the cause of a disease. Toilets are provided so that patients can conveniently procure their stool or urine specimens for laboratory investigation. Pharmacy is another facility added in the multiclinic so that patients may not have to go back to the OPD before purchasing a drug. That saves steps especially for nurses and patients in the wards. Sufficient writing spaces are provided for all these.

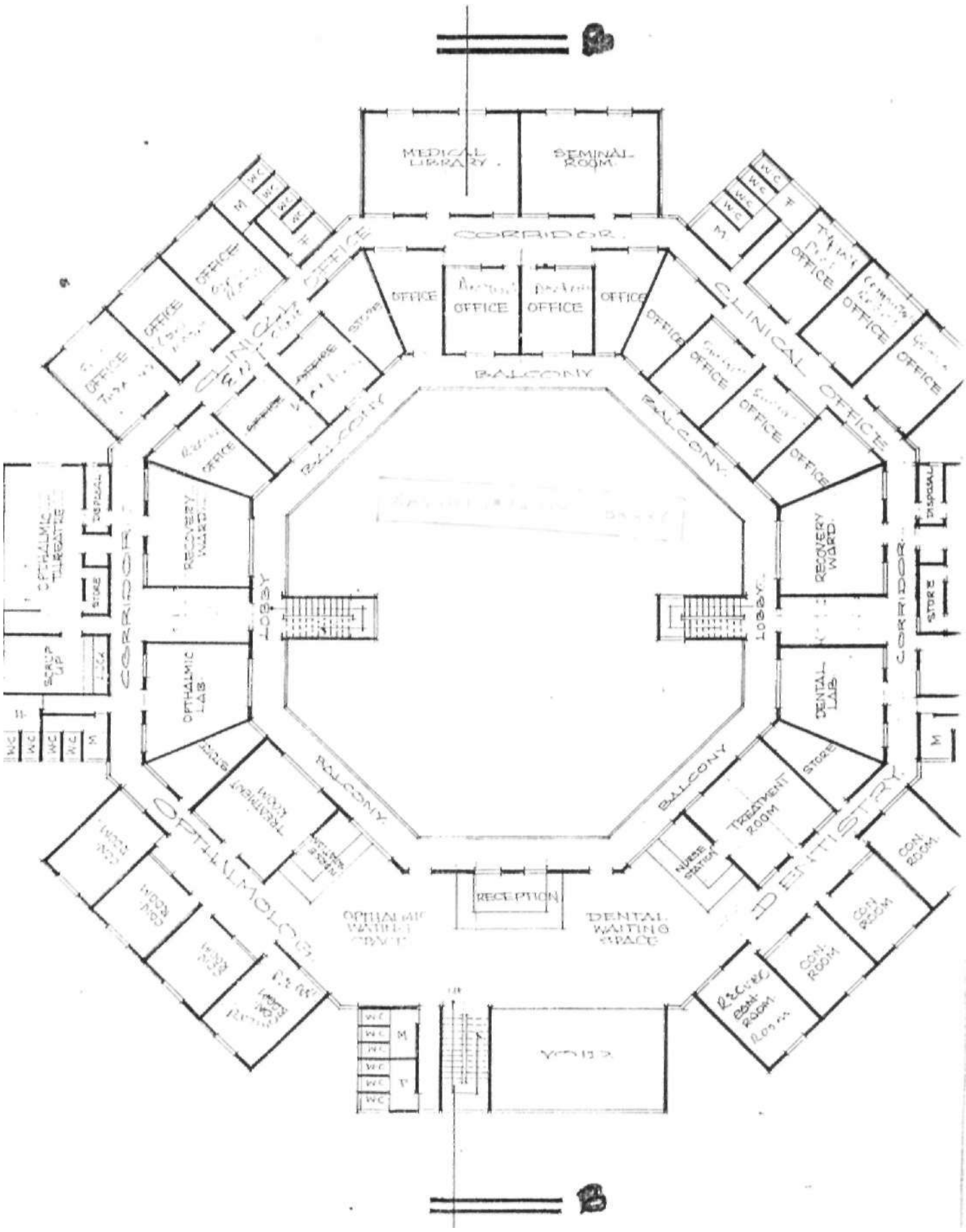
(b) Dental clinic

This clinic is concerned with care and treatment of tooth diseases. A dentist consultation rooms are provided for proper examination of the teeth. There is a waiting area for dental patients as well as other patients within the multiclinic. There is a provision for nurses station, dental records within the multiclinics registry, tooth removal and treatment room.

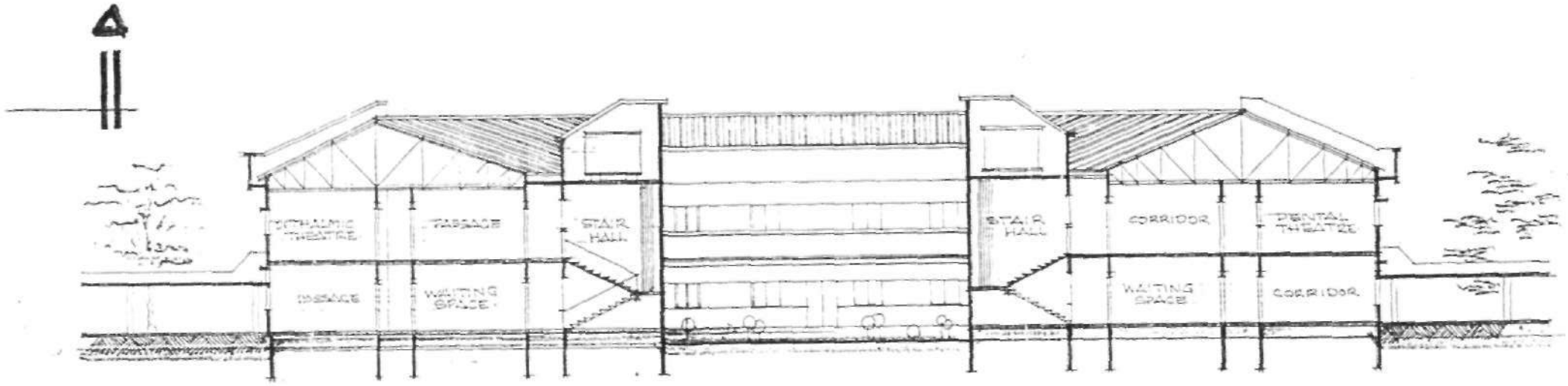
GROUND FLOOR PLAN.



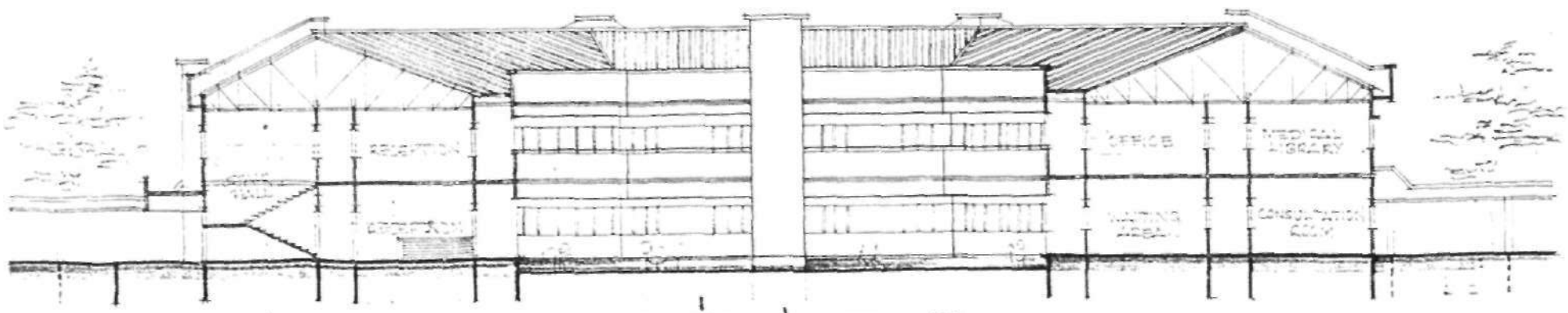
FIRST FLOOR PLAN..



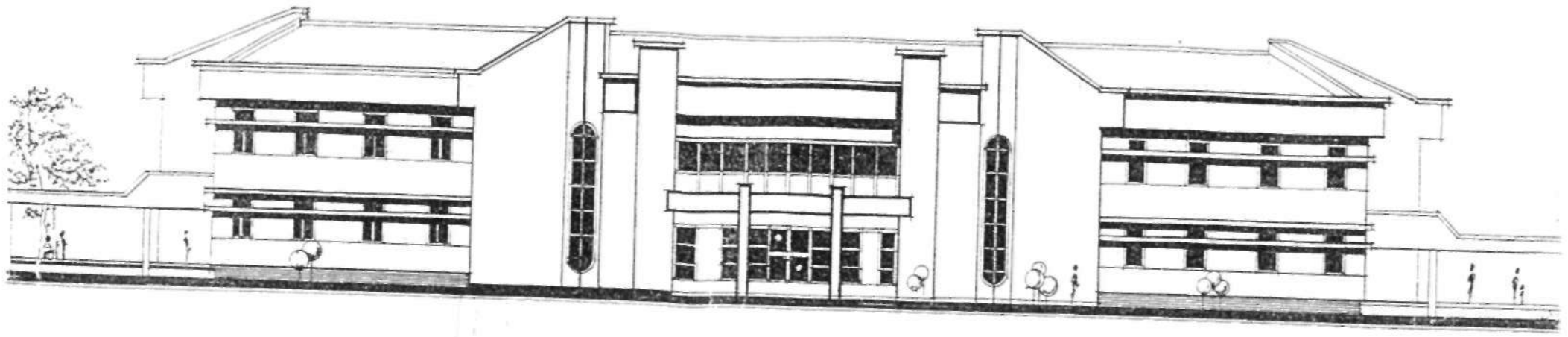
LEFT-SIDE ELEVATION..



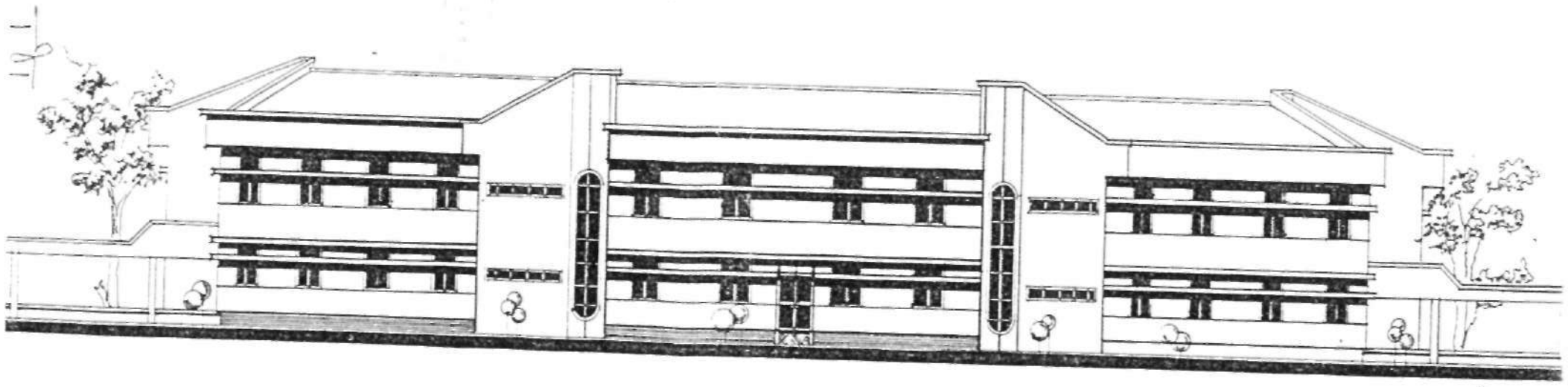
SECTION A-A..



SECTION B-B..



APPROACH ELEVATION



BACK ELEVATION

(c) Eye clinic

The eye or opthalmic clinic is also located in the multiclinic for diagnosis and treatment of eye problems. Workspaces for minor eye surgical operation have been provided. There also is a consideration for fungascopy and eye treatments and their facilities. Eye observation and examination spaces have been provided and an ophthalmologist office provided.

(d) Ear, nose and throat (ENT) clinic

As the name suggests, this clinic is concerned with the diagnosis and treatment of diseases related to the ear, nose and/or throat. ENT clinic comprises the investigation room, treatment room, nurses' room and a doctor's room. Since patients here are usually few, they share waiting areas with the eye patients, etc.

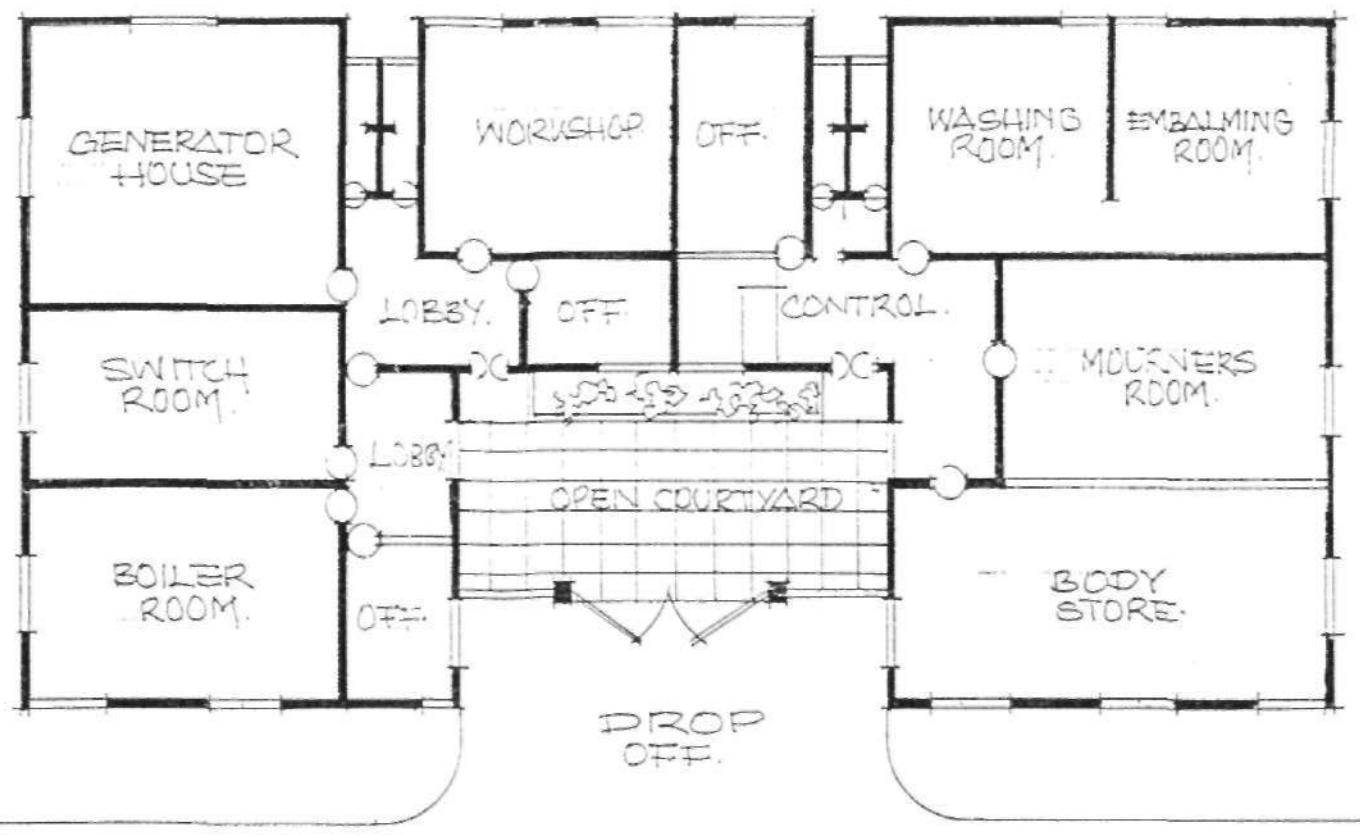
(e) Gynaecology clinic

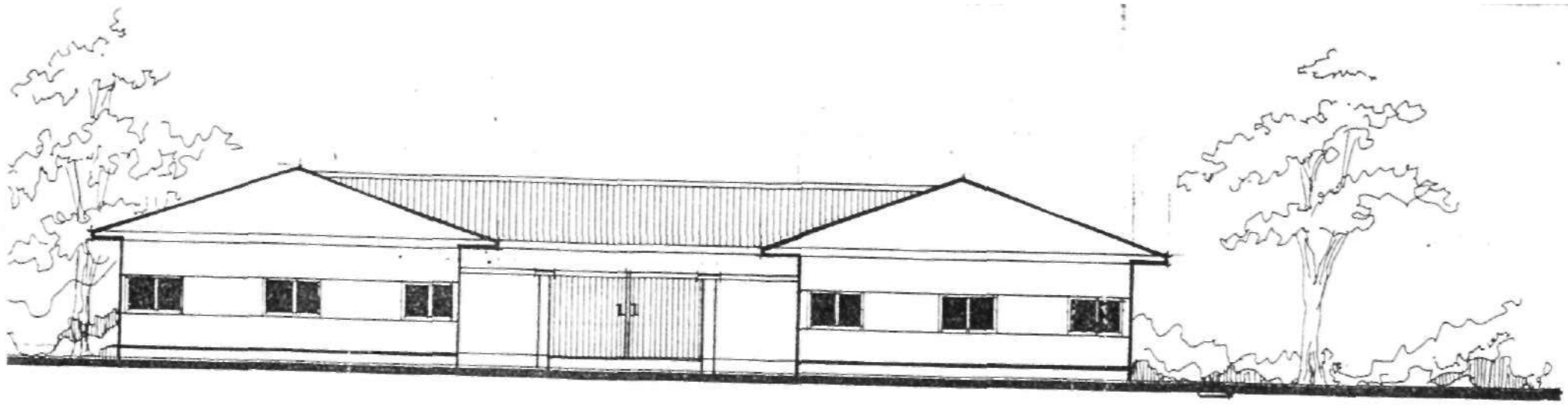
This clinic is provided with consulting room, a doctor's office, nurses' room, treatment room and a waiting space for patients.

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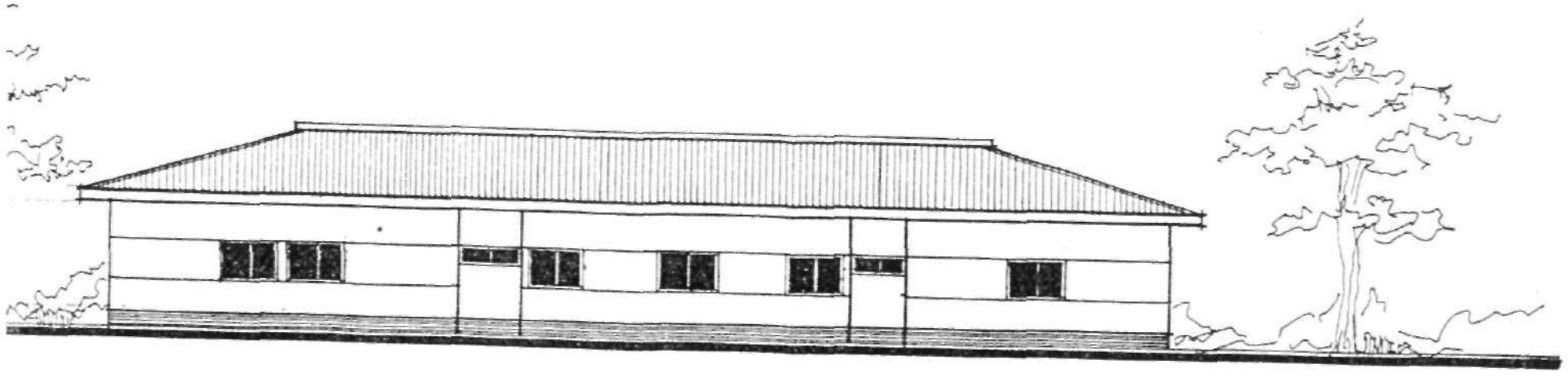
8.5.6 The Mortuary

There was an old and outdated morgue which will be totally demolished and a new one erected on the northeastern most part of the hospital complex, behind the male maternity ward and attached to the maintenance/power house. It consists of spaces for collecting the cadaver, washing it and refrigeration. Embalming room is also provided


GENERATOR HOUSE
WORKSHOP
OFF.
WASHING ROOM.
EMBALMING ROOM.
LOBBY.
OFF
CONTROL.
SWITCH ROOM.
MOURNERS ROOM.
LOBBY
OPEN COURTYARD
BOILER ROOM.
OFF.
BODY STORE.
DROP OFF.



APPROACH ELEVATION.



together with an office for the undertaker. A store is also provided for stretches, work bench and other facilities.

8.5.7 Service Department

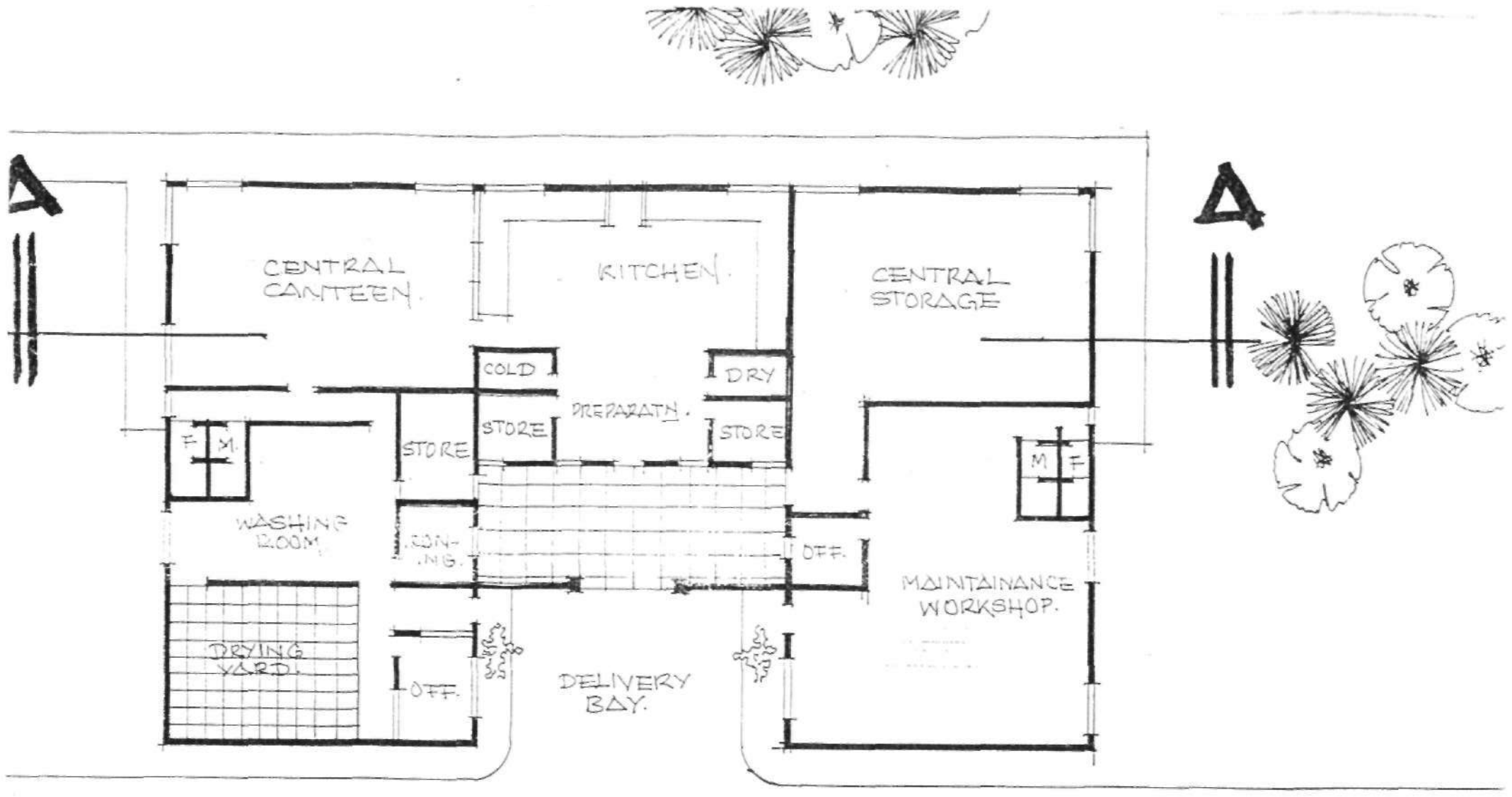
Some of the units in this department were present before the redevelopment programme, but the redevelopment scheme proposes a demolition of them because they are both physically and functionally obsolete. The units in this department include the kitchen, laundry, store, canteen, etc.

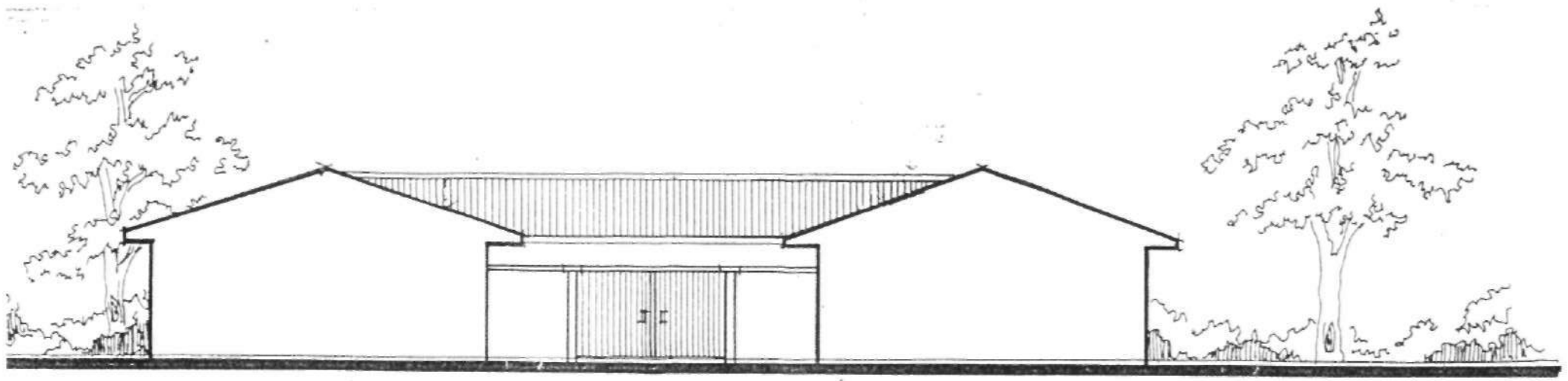
(a) Kitchen

This unit was formerly existing and consists of a small kitchen area and a dining section which were both physically and functionally obsolete. The redevelopment programme proposes a demolition of the kitchen and the laundry which are attached to it and building of a new one close to its present position behind the female maternity ward. The new kitchen is going to consist of the kitchen, a dining and storage facilities. Toilets are shared with laundry, central store and maintenance.

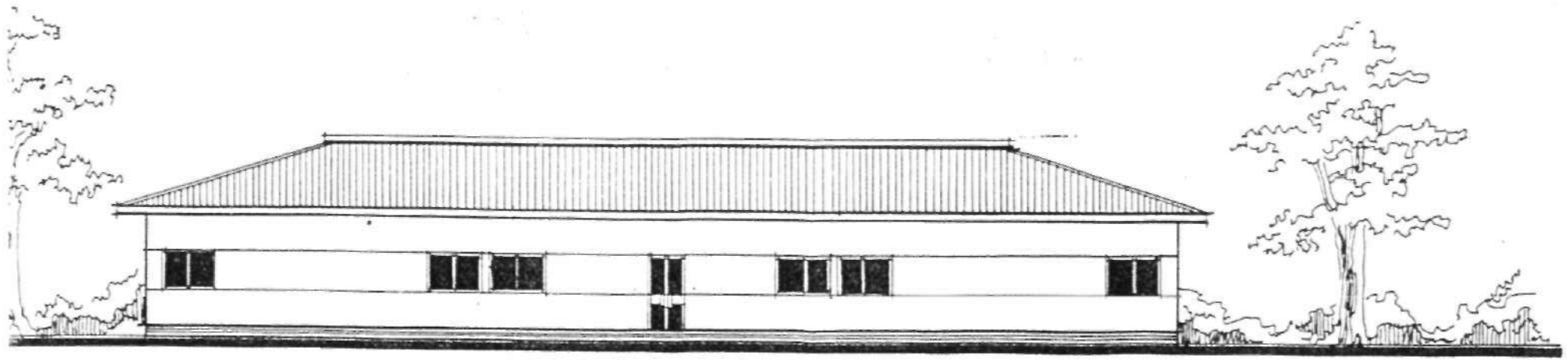
(b) Maintenance

This section is attached to the kitchen and central store because of the common facilities they share. It consists basically of maintenance workshop for the various maintenance sections, e.g. electrical, carpentry, mechanical, etc and storage facilities.

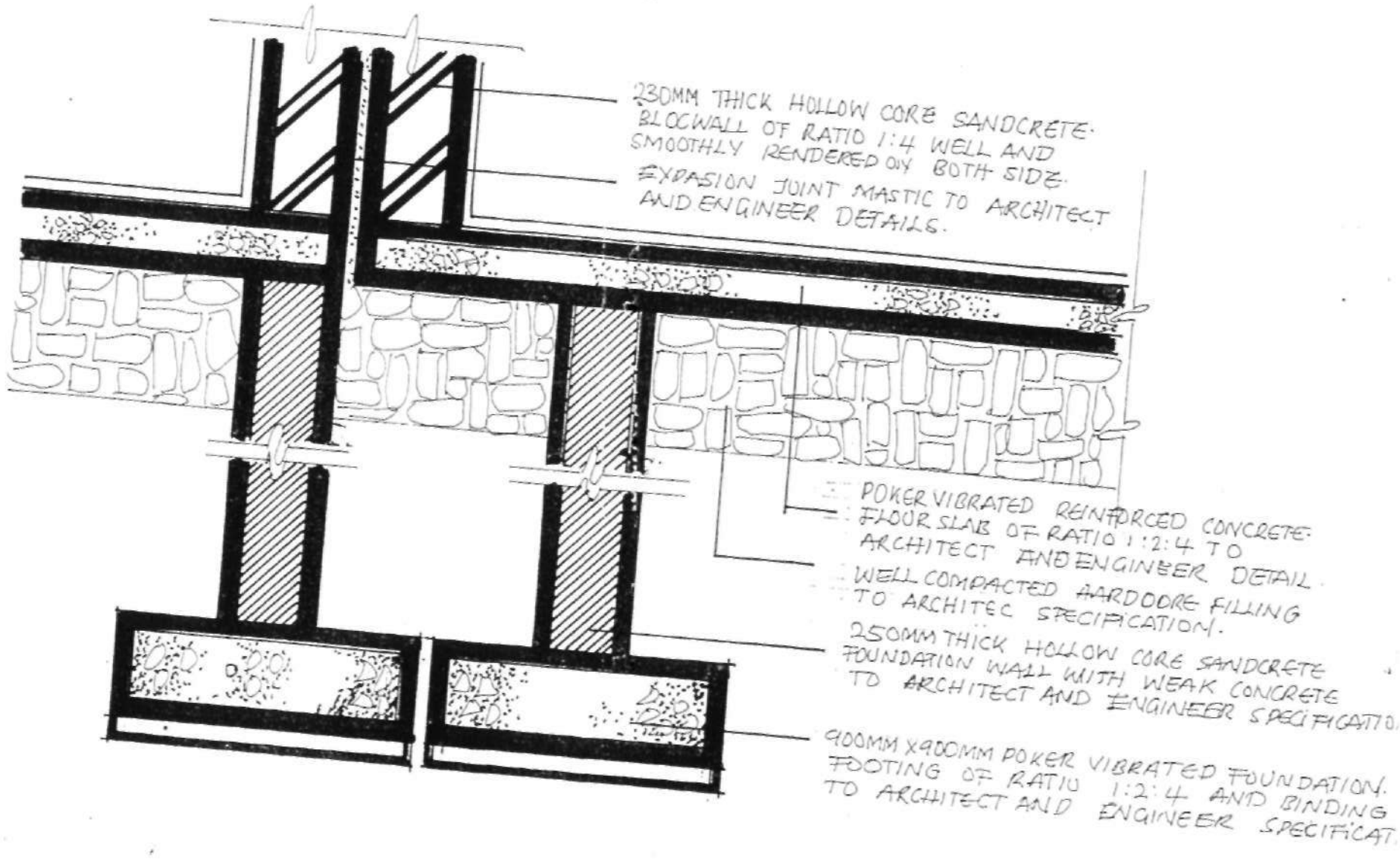

CENTRAL CANTEEN.
KITCHEN.
CENTRAL STORAGE
COLD
PREPARATN.
DRY
STORE
STORE
STORE
F.
M.
M.
F.
WASHING ROOM.
IRON-ING.
OFF.
MAINTAINANCE WORKSHOP.
DRYING YARD.
OFF.
DELIVERY BAY.



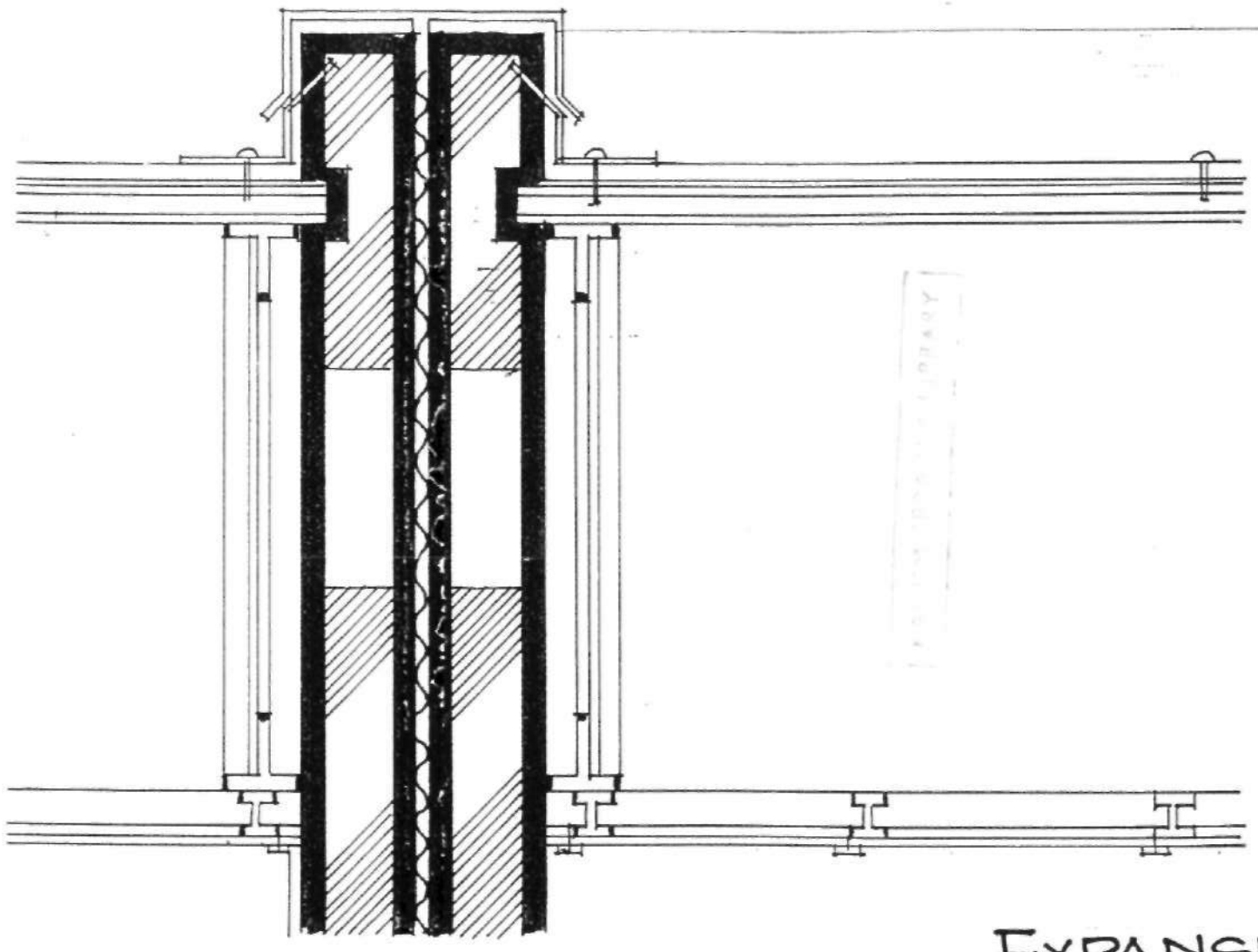
APPROACH ELEVATION.



DET


230MM THICK HOLLOW CORE SANDCRETE BLOCKWALL OF RATIO 1:4 WELL AND SMOOTHLY RENDERED ON BOTH SIDE.
EXPASION JUINT MASTIC TO ARCHITECT AND ENGINEER DETAILS.
POKER VIBRATED REINFORCED CONCRETE FLOOR SLAB OF RATIO 1:2:4 TO ARCHITECT AND ENGINEER DETAIL.
WELL COMPACTED AARDOORE FILLING TO ARCHITEC SPECIFICATION.
250MM THICK HOLLOW CORE SANDCRETE FOUNDATION WALL WITH WEAK CONCRETE TO ARCHITECT AND ENGINEER SPECIFICATIO
900MM X900MM POKER VIBRATED FOUNDATION FOOTING OF RATIO 1:2:4 AND BINDING TO ARCHITECT AND ENGINEER SPECIFICAT

EXPANSION JOINT DETAIL.
-AT FOUNDATION.



0.5MM GAUGE ALUMINIUM FLASHING TO MANUFACTURER'S DETAILS AND SPECIFICATION.

230MM THICK HOLLOW CORE DOUBLE EXPANSION WALL WITH MATSIC CORK TO ENGINEERS SPECIF

C-CHANNEL STEEL PURLINS AT 1500 C/C TO ENGINEERS DETAILS.

225MM STEEL STANCHION RAFTERS AT 1200MM C/C TO ENGINEERS DETAILS

CELLOTEX ACOUSTIC SUSPENDED CEIL TO MANUFACTURER FIXING DETAI

EXPANSION JOINT DETAIL

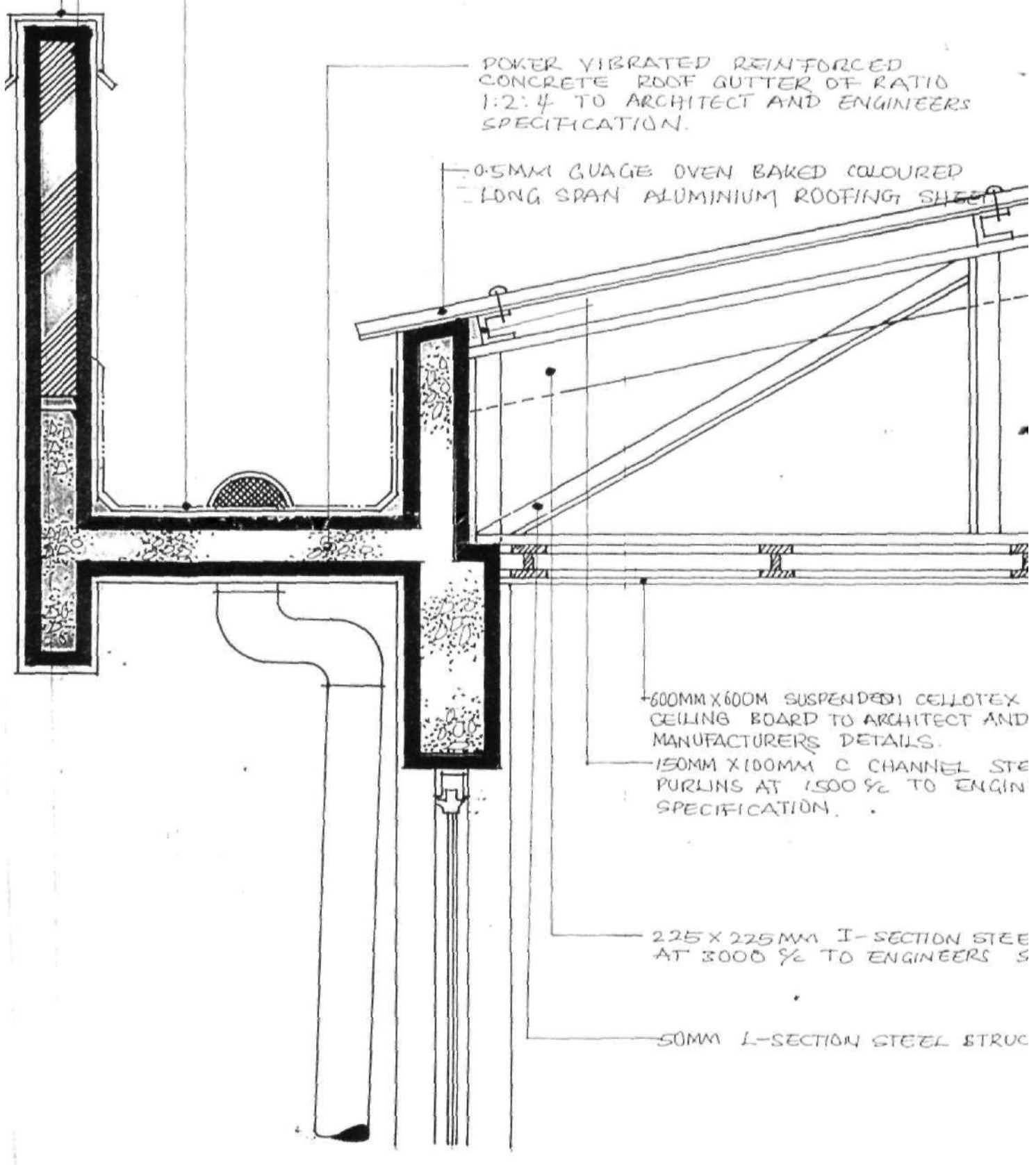
0.5MM GAUGE ALUMINIUM FLASHING LAID TO MANUFACTURERS, SPECIFICATION AND DETAILS.

150MM THICK (6") HOLLOW CORE SANDCRETE BLOCKWALL OF RATIO 1:4 SAND &EMENT WELL PLASTERED AND RENDERED ON BOTH SIDES.

3 PLY BITUMINEOUS FELT LAID HOT TO ARCHITECT AND ENGINEERS DETAILS.

POKER VIBRATED REINFORCED CONCRETE ROOF GUTTER OF RATIO 1:2:4 TO ARCHITECT AND ENGINEERS SPECIFICATION.

0.5MM GUAGE OVEN BAKED COLOURED LONG SPAN ALUMINIUM ROOFING SHEET



600MM X 600M SUSPENDED CELLOTEX CEILING BOARD TO ARCHITECT AND MANUFACTURERS DETAILS.

150MM X 100MM C CHANNEL STE PURLINS AT 1500 C/C TO ENGIN SPECIFICATION.

225 X 225 MM I-SECTION STEE AT 3000 C/C TO ENGINEERS S

50MM L-SECTION STEEL STRUC

(b) Powerhouse

This houses the generator in case of power failure from NEPA. This is a very important consideration in hospital so as to help some people's lives, e.g. when surgical operation is going and there is power failure, the generator will help the situation.

(c) Laundry

This consists of spaces for sorting, washing, drying and ironing, and storage.

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CHAPTER NINE

9.0 CONCLUSION

This chapter tries to summarise the whole research and come to a reasonable conclusion on how to redevelop and/or upgrade (modernise) an existing hospital, taking into consideration the scope and limitations involved.

9.1 SUMMARY

This thesis research work is aimed at proffering a solution to the existing and anticipated problems of Vom General Hospital. This solution is by redeveloping the existing situation.

The write-up is divided into nine chapters as discussed. Each chapter deals with a particular aspect of the thesis as discussed below.

Chapter One has to do with problem definition, aim and objectives of the thesis, research methodology, scope and limitations of the work.

Chapter Two is a literature review of the healthcare system. This includes the three tier health care delivery system: primary health care, secondary and tertiary healthcare delivery systems. It also includes analysis of the contemporary hospital institution and types of hospitals.

Chapter Three dealt with criteria for redevelopment of an existing hospital. These include factors that call for redevelopment which include obsolescence (both functional and physical), size of the existing situation and type of redevelopment, i.e. whether modernisation or merely upgrading the standard of the existing condition. Site layout and

circulation pattern were thoroughly discussed here as they form a crucial aspect of hospital planning.

Chapter Four is case studies of some selected hospitals around the country and abroad. The first two case studies (Pankshin General Hospital, Pankshin and Murtala Mohammed Hospital, Kano) were carried because of the similarity and semblance of the communities they serve with that of Vom General Hospital. Size and planning were therefore studied to aid the author come up with a workable solution to the many problems of Vom General Hospital. A study of FSP National Hospital for Women and Children, Abuja, was conducted to understand the most current (up-to-date) trend in hospital architecture. This is because the FSP hospital is the latest, one of the most up-to-date hospitals in Africa and is equipped with state-of-the-art technologies.

Two foreign case studies were carried out. These being on Yorkshire District Hospital in the United Kingdom and Khyber Medical College Teaching Hospital in Pakistan. The former was to show current forms of running a hospital in the advanced world while the latter shows effects of and possibilities of expansion and redevelopment.

Chapter Five dealt with analysis of the existing situation in Vom General Hospital. This analysis shows the physical and/or functional obsolescence or otherwise of the existing hospital structures in Vom General Hospital. This chapter also limited the research work to only the hospital complex, excluding the residential quarters and sporting facilities.

Environmental factors such as location and climatic data and their effects on buildings were analysed in Chapter Six. Cultural values and demographic data were also considered here.

Chapter Seven of the thesis dealt with definition of the various hospital departments and their functions. This was divided into three: inpatient nursing units (wards), diagnostic and therapeutic units and services units. Each of these units was further subdivided into the various sub-units that form them.

Design report of the thesis proposal was discussed in Chapter Eight. It dealt with the concept used to redevelop the existing situation, circulation pattern and general planning principles adopted in the design.

The structures dealt with in the hospital are divided into three: retained infrastructures, new (added) infrastructure and altered infrastructures.

Summary, conclusion and bibliography comes up in the concluding Chapter Nine.

9.2 CONCLUSIONS

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The need for this redevelopment scheme in Vom General Hospital is first of all informed by the demand for more beds, i.e. the need to improve the bedding/inpatient capacity of the hospital. But any improvement in any section of a hospital complex will require a similar/proportional improvement in other sections for an efficient service.

Taking into consideration the fact that this research work is on redevelopment scheme and not a whole new design, some parts of the hospital complex were only slightly altered while some are wholly retained unaltered lest a whole new design be proposed.

The absence of some basic hospital infrastructure has necessitated this redevelopment proposal. These infrastructures provided by this proposal include the emergency unit, maternity ward, multiclinics for dental clinic, eye clinic, ENT,

gynaecology, etc. Other new infrastructures include the central sterile supply unit (CSSU), two surgical suites, central store, etc. These units or departments were added to Vom General Hospital to boost its efficiency in terms of service.

Some structure were only slightly or partly improved upon and these include all the prototype wards (male and female medical ward and male and female surgical wards). These are slightly compartmentalised and a new wholly compartmentalised structure added on the other side of the corridor to increase the inpatient bedding capacity and provide the much needed comfort and privacy for patients to recuperate. Other structures altered but not completely redesigned are the General Outpatient Department which has been redesigned from ground floor building (bungalow type) to a one-storey structure to house a well co-ordinated OPD and a central administration. Others include the mortuary and service departments.

The concentric nature of original site planning has been retained.

This redevelopment scheme was carried out in the hope of boosting the efficiency of the services provided by the hospital, both diagnostic and therapeutic and to also provide other hospital services required by not just Vom community but Jos and other communities that benefit from their services.

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